University of St.Gallen

Perceptions of the Poor

The Impact of Organic Cotton Agriculture on the Wellbeing of bioRe Farmers in Rural Tanzania

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EXECUTIVE SUMMARY

The present study was conducted on the ground in the Meatu District of Shinyanga region, Tanzania within the framework of the organic cotton trading company bioRe Tanzania between March and May 2010. The main goal of the impact assessment was to find out how organic cotton farming influences wellbeing of bioRe Tanzania's contract farmers (hereafter bioRe farmers). bioRe Tanzania buys organic cotton from their contract farmers with a 15 percent price premium and a purchase guarantee of five years and trains the farmers in organic management practices. As no qualitative data on bioRe farmers existed before, it was not possible to conduct a before-after comparison. In the study, bioRe farmers were thus encouraged to share their experiences and to recall major changes in their wellbeing over the last then years. In order to control important factors, conventional farmers were also interviewed.

In the end, four group interviews, 22 semi-structured individual interviews (12 bioRe farmers and 10 conventional farmers) and 5 expert interviews were conducted with the help of participatory approaches and analyzed by means of the Sustainable Livelihoods Framework and the concept of wellbeing. The idea of the group interviews was to find out how the farmers define a *good quality of life* by elaborating wellbeing indicators together with the participants. The most important factors turned out to be the availability of land, a good house as well as enough food followed by education, cattle and income. By discussing the different wellbeing aspects with farmer groups, I was able to gain a first insight into the complex realities of the farmers. Moreover, the elaborated indicators set the focus of the subsequent personal interviews.

Semi-structured discussions held with individual participants opened up farmers' perceptions on how the conversion to organic farming changed their living conditions. The results show that being integrated in a formal network such as bioRe Tanzania has a broad impact on the wellbeing of the farmers. As bioRe farmers they profit from two-fold advantages:

Firstly, they are able to tap new knowledge, which leads to a sequence of effects. Through the access of organic know-how like crop rotation and the application of manure, most of the participants observed improved soil fertility and crop yields after converting to organic practices. While scientists tend to agree that organic agriculture has a positive impact on soil fertility, the debates continue on its positive impact on overall production. Fertile soils better withstand natural shocks, which would support food security of the farmers.

Secondly, bioRe Tanzania offers direct economic advantages to farmers: In concrete terms, bioRe farmers can sell their cotton with a 15 percent price premium and face a secure market. Moreover, farmers report reduced production costs mainly because the costs associated with chemicals are eliminated.

The consequences of these financial advantages are not easy to measure and depend on individual situations, but the following assumptions on the basis of the interviews can be done: In times of serious hardship, the farmers would use additional money to buy food if food at home is not enough for the whole family. This implies that they are better able to cope with shocks and are thus less vulnerable. Or, if food is enough, they might want to save their money for the future and buy some cattle using them as kind of a bank account. In good times, farmers would decide to invest their money in the construction or renovation of a house or to open up a small shop in order to diversify income.

Finally, every change in the asset base of the farmers also touches the emotional base of the individuals. bioRe farmers are proud that they receive training and learn to better care for or protect their land, which is their main source of income. Moreover, an improved income makes them more independent from money-lenders and helps them to satisfy their needs such as constructing a new house with a corrugated iron roof that protects them from rain. Being able to build a new and *modern* house makes the farmers proud and represents a status symbol.

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1 INTRODUCTION

Organic agriculture is practiced in more than 140 countries around the globe, mainly in Australia, Europe and Latin America, and covers around 32 million hectares worldwide (Willer & Klicher, 2009). Africa has the lowest organic production compared to the other continents, but the number of farms converting to organic management is increasing. But still, if organic production is compared to conventional farming systems, the industry has only a tiny world market share, namely less than one percent of global production (Eyhorn, Ratter & Ramakrishnan, 2005).

Willer and Yussefi (2007) underline that especially poor African countries such as Tanzania, Kenya and Uganda profit from organic agriculture as it contributes to a socioeconomic and ecologically sustainable development. Eyhorn (2007) explains: "By substituting synthetic fertilizers and pesticides with farm-own resources and labor, organic farming not only could have the potential to improve natural resource management, but also to reduce production costs and obtain a better price for the produce" (p 13). As a consequence, it mitigates negative aspects of conventional farming systems such as the depletion of soils and fluctuating world market prices.

The present study aims to find out if and how the above-mentioned advantages are valid for the organic cotton production in Tanzania, which experienced an impressive boom in the last two decades. The actor that successfully introduced the organic cotton in the East African country in 1994 is the Swiss textile trading company Remei AG. In the Northern District Meatu of Shinyanga region it founded the label bioRe under which over 2000 farmers produce organic cotton today.

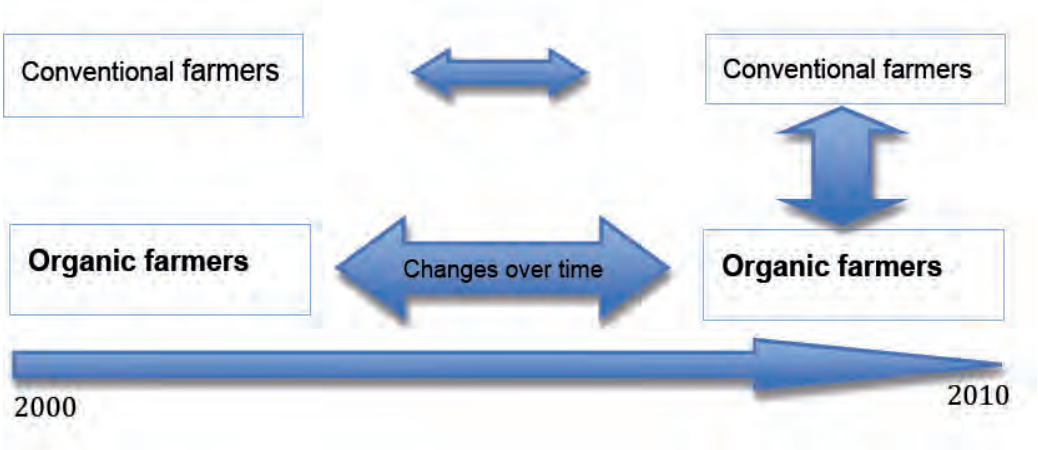
1.1 Approach and research questions

The main research question of the present thesis is to examine what impact organic farming has on the wellbeing of bioRe farmers in rural Tanzania. *Wellbeing* is a broad concept and different people in different places have their own perception of wellbeing. This is why I first wanted to understand how the farmers in Meatu define wellbeing or a "good quality of life" (Chambers, 1995, p 175). The reason why I chose the concept of wellbeing is because it places people at the center of research and allows a broad understanding of poor people's complex and dynamic realities. This implies that wellbeing goes beyond the popular development indicators such as income and consumption and includes other things that matter for people such as health, security, self-respect, social life etc. (Chambers, 1995). This shift in contents also implies a shift in research methods, whereby i.e. participatory

approaches (see section 4.2) turned out to be adequate tools to explore bottom-up perspectives of rural poor.

The overall procedure of the present impact assessment is visualized in Figure 1 below. The impact assessment is an adequate tool as it allows examining changes of farmers' wellbeing over time. Roche (1999) defines impact assessment as a systematic analysis of "significant or lasting changes in people's lives, brought about by a given action or series of action" (p 21). As no qualitative data on bioRe farmers existed before, it was not possible to conduct a before-after comparison. However, bioRe farmers were encouraged to share their experiences and to recall major changes in their wellbeing over the last then years. Furthermore, in order to control important factors and to find out how the situation of bioRe farmers might be if they had not converted to organic farming, conventional farmers were examined in addition.

Figure 1: Impact assessment



Source: Own figure based on Bachmann, 2010

With this theoretical background in mind, I decided to proceed as follows: To examine the vulnerability context of the farmers (see research question 1 in Table 1), I elaborated in a first step what shocks the farmers experienced and what events they are most worried about in the future. The following two subquestions were used as operationalization of the vulnerability context:

1.1 What was the most difficult time in the farmers' life?

2.1 What negative events are the farmers most worried about in the future?

In a second step, the aim was to explore what wellbeing - operationalized as a *good quality of life* - means for the farmers (see research question 2 in Table 1) by developing specific wellbeing indicators with the help of wellbeing rankings. Individual farmers were then asked how they would rank the indicators, what importance they attribute to the different indicators and why. Until this point, the differentiation between conventional and organic farmers was not a central aspect.

To facilitate the answer to research question 3 - *What impact does organic farming have on the farmers' wellbeing?* - wellbeing assets were combined with the Sustainable Livelihoods Framework. The Sustainable Livelihoods Framework is a people-centered approach that helps better understand the many factors that affect the livelihood situation of rural poor. At the core of the framework lies the asset pentagon, which describes poor people's capital endowment, namely human, natural, financial, physical and social assets. Each of these capitals may generate multiple benefits and help people to achieve their desirable objectives or livelihood outcomes. Accordingly, subquestions 3.1 and 3.2 were formulated as follows:

3.1 What impact does organic farming have on social, human, natural, financial, physical and social capitals?

3.2 What is the outcome of the respective capitals?

The final subquestion 3.3 refers to the sustainability of the organic system itself. On the one hand, bioRe educates the farmers in organic agriculture and thus provides them with human capital. On the other hand, bioRe guarantees the farmers a price premium, thus provides them with additional financial capital. According to the CEO of bioRe Tanzania, Niranjan Pattni, the system itself can only be sustainable if the farmers internalize and apply the organic know-how and are not only driven by price advantages (Interview, April 19, 2010).

Table 1: Research questions

Main research question	What impact does organic cotton agriculture have on the wellbeing of bioRe farmers in rural Tanzania?
1	What is the vulnerability context of conventional and organic cotton farmers?
1.1	*What was the most difficult time in the farmers' life?*
1.2	*What negative events are the farmers most worried about in the future?*
2	What does wellbeing mean in the eyes of conventional and organic cotton farmers?
2.1	*What are the main wellbeing indicators in the eyes of the farmers?*
2.2	*How do the farmers rank the indicators?*
2.3	*Why are the indicators important for the farmers?*
3	What impact does organic cotton farming have on the farmers' wellbeing?
3.1	*What impact does organic farming have on social, human, natural, financial, physical and social capitals?*
3.2	*What is the outcome of the respective capitals?*
3.3	*How sustainable is the organic system itself?*

Source: Own table

This study aims to answer the presented research questions with the help of the elaborated theory, the interviews conducted in Meatu District and the subsequent qualitative data analysis. Finally avenues for further studies are proposed in the conclusions.

1.2 Problem delineation

Impact assessments have already been used in several studies about organic cotton farming in the developing world: Eyhorn (2007) and Schwaller (2004) compared organic and conventional farmers within the framework of bioRe's partner project in India *Maikaal* and mainly examined the reasoning behind the decision-making process to convert or not to convert to organic farming. The present study, however, does not focus on the issue of conversion, but examines the effects of a conversion on the farmers' wellbeing over time. A most recent study by Bachmann (2010) had a similar goal, but used different means: On the basis of quantitative methodologies, the research team elaborated economic, ecological and social impacts of organic farming in Kyrgyzstan. In contrast, I worked with qualitative methodologies because they allow taking a bottom-up perspective of the farmers by first elaborating wellbeing indicators together with the respondents and then examining if and how organic farming influences the wellbeing of the farmers.

With regard to bioRe Tanzania's activities, the present study only focused on the business side of bioRe Tanzania's work and did not include the evaluation of their social projects. On the business side, briefly speaking, the company buys organic cotton from their contract farmers with a 15 percent price premium and a purchase guarantee of five years. Only cotton that is cultivated according to organic procedures can be certified as organic and sold with a premium. As the operational part of the organic system encompasses a complex set of procedures and guidelines, bioRe offers training to their farmers – not only for the conversion period but usually as a permanent support. On the other hand, the bioRe Foundation is committed to reaching specific development goals in the region. Most of the social projects focus on the domains of education (such as school feeding programs or building up school infrastructure) and access to water (such as the construction of water tanks and water wells). The evaluation of the various social projects would, however, go beyond the scope of this thesis.

1.3 Thesis structure

To understand the background of the study, chapter 2 *Context* gives a short introduction into cotton production in Tanzania (section 2.1), explains the main challenges of cotton production in the developing world (section 2.2) and highlights pros and cons of organic production systems (section 2.3). To conclude, section 2.4 describes the cotton project bioRe Tanzania and the research area.

Chapter 3 elaborates the theoretical background by presenting the concept of wellbeing (section 3.1), which lies at the heart of this thesis. Section 3.2, then, gives an introduction into the Sustainable Livelihoods Framework, which is used as a checklist as well as to structure the results.

Chapter 4 *Methods* starts with the selection process of the farmers (section 4.1) before presenting the underlying methods that were used in this thesis: Participatory rural appraisal (PRA) (section 4.2) and expert interviews (section 4.3). To conclude, section 4.4 describes the method how the data were analyzed, namely the qualitative content analysis and section 4.5 discusses quality criteria that are relevant for qualitative research.

Chapter 5 summarizes the results from the different interviews with farmer groups, individual farmers as well as experts. Section 5.1 gives a short overview of the socioeconomic characteristics of the individual farmers. Section 5.2 then shortly describes the vulnerability context of the farmers. Section 5.3 explores the local definition of a *good quality of life* with the result of concrete wellbeing indicators. Section 5.4 then attempts to bring together the elaborated wellbeing indicators with the Sustainable Livelihoods Framework, which helps to structure the subsequent and core section 5.5 *Impact assessment*.

2 CONTEXT

Cotton is one of the three most important cash crops in Tanzania (Poulton & Maro, 2009). Section 2.1 shortly outlines the history of the so-called white gold and the main features of today's cotton production in Tanzania. Section 2.2 then highlights central economic and ecological challenges for cotton producers in Tanzania and sub-Saharan Africa in general. In addition, section 2.3 defines and shortly describes pros and cons of organic production and shows how the system can meet certain challenges, presented in the previous section. Section 2.4 then dives into a concrete example by introducing the activities of the organic cotton project bioRe Tanzania, which was implemented in 1994 in Meatu District. This district lies in the North of the country and belongs to the Shinyanga region.

2.1 Cotton production in Tanzania

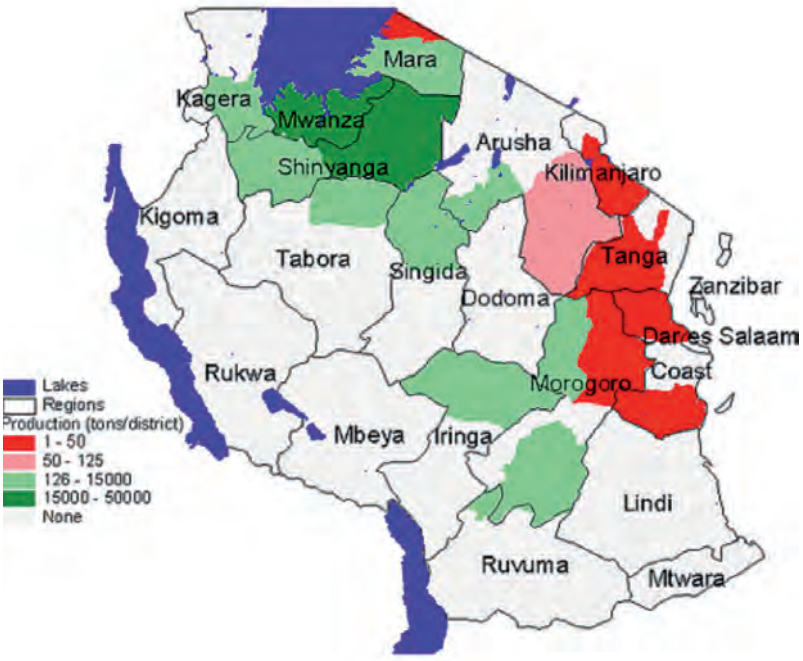
The so-called *white gold* is simultaneously associated with colonial power, trade disputes, development and poverty reduction (Moseley & Gray, 2008). Baffes (2002) reports in his book *Tanzania's Cotton Sector* that early efforts of the German colonial rulers to establish cotton in Tanzania at the beginning of the 20th century were marked with difficulties. Production, however, started to increase considerably since 1930 due to the releases of local cotton varieties and a better organization of the sector. This development was deteriorating in the 1960s when most aspects of the cotton industry were transferred to the unions and the Cotton Board, leading to inefficiencies and poor management. In consequence, Tanzanian cotton producers received far lower prices than average world prices for their cotton. Only with the Cotton Act of 1994, the government started to allow competition in the sector by formally eliminating the monopoly held by the unions and the Cotton Board. The most important reason for this step was a huge gap between world market prices and the prices Tanzanian cotton producers effectively received. Consequently, many private cotton traders entered the market, including the Swiss textile trading company Remei AG that initiated organic cotton in Meatu District of Shinyanga region. The new private traders (most of which are Tanzanian companies) not only offered higher prices than cooperative unions but also paid on the spot.

According to Poulton and Maro (2009) cotton is one of the most important cash crops in Tanzania along with coffee and cashew today. The cash crop links African countries to the international market and was the largest export earner of all agricultural commodities in the season 2004/2005 - contributing $90.3 million to export earnings. Moseley and Gray (2008) report that cotton is mostly grown by small-scale farmers and requires high levels of human labor in Africa: Whereas better-off farmers guide their ox-plows and ox-weeders through the

fields, worse-off households perform most of the activities by hand. Mostly male-headed households or young men cultivate the cash crop, whereas historically, mainly women grew cotton in their small gardens to deliver local cloth markets.

As the following Figure 2 shows cotton production is predominant in the north-west of Tanzania: The western cotton growing area - encompassing Shinyanga, Mwanza, Mara, Tabora, Kagera, Kigoma and Singida regions - accounts for over 99 percent of national production and within this, Shinyanga and Mwanza regions account for the majority of production (Tanzania Cotton Board, 2009).

Figure 2: Cotton Production in Tanzania



Source: Tanzania Cotton Board, 2009

2.2 Challenges of cotton production

Cotton producers in sub-Saharan Africa face several ecological and economic challenges: Firstly, increasingly unpredictable rainfall patterns and natural shocks such as droughts are not favorable conditions for the susceptible cotton plant. As in Africa most cotton is rain fed farms fully depend on weather condition (Moseley & Gray, 2008). Cotton plants would require a plentiful supply of water between germination and boll formation and after the capsules have opened the weather needs to be dry, otherwise the quality of the cotton is drastically reduced (Eyhorn et al., 2005).

Secondly, the increasing depletion of soils, along with problems of weeds and pests, has a negative impact on cotton yields and household food security. Heierli (2008) explains: “Due

to heavy pest attacks and ever higher pesticide and fertiliser applications, soils have become depleted and in some cases totally intoxicated“ (p 5).

Thirdly, cotton farmers in general face rather low and fluctuating prices. Commodity prices are heavily linked not only to national policies (as seen in section 2.1) but also to international price policies, influenced by the political and economic behavior of global players such as the United States or China (Moseley & Gray, 2008). Although commodity prices have risen in recent years and even experienced a price boom in 2010, prices are still highly volatile (International Monetary Fund [IMF], 2010). For example cotton prices in 2010 have doubled compared to the year before (Remei AG, 2010a). This is a good development for the farmers, but at the same time it shows that price changes are unpredictable and can be very drastic – not only upwards but also the other way around. The farmers have no ability to assess likely future prices and therefore base their expectations on the previous season’s price (Poulton & Maro, 2009). This makes cultivation management more difficult. On the other hand, if the farmers knew that cotton prices would be lower the following year they could enlarge their acres for food crops and reduce acres for cotton.

2.3 Pros and cons of organic production

The most visible trademark of organic agriculture is the exclusion of chemical inputs. However, the International Federation of Organic Agriculture Movements [IFOAM] (2009) defines organic farming in more holistic terms: “It is a production system that […] relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects.“ The idea is thus to make the best use of natural and local resources (United Nations Conference on Trade and Development [UNCTAD] & United Nations Environment Programme [UNEP], 2008). Thereby, inputs are substituted by management practices like crop rotation and by inputs produced on the farm like compost (Eyhorn, 2007). Morganti, a consultant of the Institute for Ethical and Environmental Certification (ICEA), explains that the advantage of organic techniques is that the farmers can give nutrients back to their soils, which have been depleted during cultivation (Interview, April 25, 2010).

One perceivable result is - according to Eyhorn et al. (2005) and other promoters of organic cotton production - that soil fertility is maintained or even increases over time (see Table 2). The quality of soils is a central discussion because cotton favors fertile soils with good water retention capacities (Eyhorn et al., 2005). According to Morganti, soil fertility depends on three major factors: The organic matter content, the texture of the soil and the microbial life

that make soils rich or poor in nutrients. Other important external factors are rainfall, pest attacks etc. (Interview, April 25, 2010).

The organic production system is, however, not only beneficiary for the environment but also for people involved as it promotes fair relationships and good health (Eyhorn et al., 2005).

Table 2: Advantages of cultivating cotton organically

	Conventional Cotton	Organic Cotton
Environment	• Pesticides kill beneficial insects • Pollution of soil and water • Resistance of pests	• Increased bio-diversity • Eco-balance between pests and beneficial insects • No pollution
Health	• Accidents with pesticides • Chronic diseases (cancer, infertility, weakness)	• No health risks from pesticides • Healthy organic food crops
Soil fertility	• Risk of declining soil fertility due to use of chemical fertilizers and poor crop rotation	• Soil fertility is maintained or improved by organic manures and crop rotation
Market	• Open market with no loyalty of the buyer to the farmer • Dependency on general market rates • Usually individual farmers	• Closer relationship with the market partner. • Option to sell products as 'organic' at higher price • Farmers usually organized in groups
Economy	• High production costs • High financial risk • High yields only in good years	• Lower costs for inputs • Lower financial risk • Satisfying yields once soil fertility has improved

Source: Eyhorn et al., 2005

Apart from ecological and social aspects, organic cotton promoters underline economic benefits as well (see bottom part of Table 2): Organic farmers can sell their products at higher prices, maintain close relationships with market partners and achieve satisfying yields once the quality of the soils has improved. Finally, they reduce their input costs by avoiding the relatively expensive chemicals and fertilizers. It has to be pointed out, however, that conventional farmers in the developing world only use few inputs (Moseley & Gray, 2008).

But conversion to organic farming is also related to certain fears, as described in a study conducted in India by Schwaller (2004). She discovered that conventional farmers' main constraints to do organic farming are an expected increase of work load, the fear of pest attacks, inefficiency of organic compared to chemical fertilizers, initial yield losses and the general risk of the conversion of the production system. Giovannucci (2005) affirms in his study conducted in China and India that the conversion period involves a decline in yields and uncertainties for the farmers. Moreover, as the organic farming system forgoes external inputs and at the same time relies on more demanding methods of cultivation and harvesting,

organic agriculture requires more labor force than conventional systems. The latter has been verified for organic farms in developed countries. However, there is a lack of systematic analyses in developing countries on this issue (Pimentel, Hepperly, Hanson, Douds & Seidel, 2005). Finally, Bachmann (2010) wrote in her study that "one major disadvantage of organic farming in the given context is, that organic farmers are currently 'bound to one product', which is cotton, and loose their flexibility to adapt to changing framework conditions such as fluctuating market prices" (p 42). Although the farmers also produce other products, they cannot sell them as organic because of the absence of a market.

2.4 Cotton project and research area

The previous sections showed that cotton production is one of the most central economic sectors in Tanzania, whereas historic developments shaped the conditions as we see them today. However, economic and ecological factors challenge the farmers' situation, whereby organic production tries to mitigate some of the constraints. The next subsection 2.4.1 presents the organic cotton trading company bioRe Tanzania and its activities and the section closes with a short overview of the research region Shinyanga (subsection 2.4.2).

2.4.1 bioRe Tanzania

In 1994, the Swiss textile trading company Remei AG initiated organic cotton in Meatu District and founded the label bioRe. The collaboration with only 45 farmers began as an experiment and soon turned out to be successful. The organic cotton project expanded significantly and bioRe Tanzania includes today 15 villages and over 2000 farmers. Extension officers train the farmers in organic management practices and assist them in any practical or theoretical matter. Supervisors represent bioRe in the different villages and do the internal inspections, because specific conditions have to be fulfilled in order to certify cotton as organic: Most importantly, cotton is cultivated by using untreated seeds and is grown without the application of neither chemical pesticides nor fertilizers. Moreover, bioRe extensionists advise the farmers to perform the following practices:

Table 3: Description of organic techniques

Techniques	Description
Crop rotation	A sequence of crops is grown in the same area over several years: Fallow - cotton - cereals - legumes - fallow etc.
Spreading of organic manure	Compost and cattle dung (supplies soils with nutrients)
Sowing in rows (instead of broadcasting)	Sowing the seeds in rows so that spaces between the plants are equal (easier to weed and plough)

Sunflowers as trap crop	Sowing sunflower seeds in a line around cotton fields (attracts pests and protects crops)
Using farm implements	Using ploughs, weeders etc. for agricultural management
Scouting and spraying	If necessary, farmers scout for pests and use botanical pesticides to kill them
Prevention of soil erosion	Ploughing across the slopes (so that the water does not run down the slope)

Source: Own table based on the activity calendar of bioRe Tanzania (see section 8.2 in the appendix)

Once cotton is certified as organic, bioRe Tanzania grants the farmers a purchase guarantee of five years and an added price premium of 15 percent paid on the spot. Moreover, as mentioned in section 1.2 *Problem delineation* bioRe Tanzania also promotes community projects such as school feeding programs, building up school infrastructure or construction of water tanks and water wells.

In short, the label bioRe respects the farmers and the nature by focusing on social, economic and ecological criteria (Remei AG, 2010b). Partnerships of long durations are granted and at the same time the rights of the workers are strengthened. Finally, the environmentally friendly organic production does not threaten the health of the farmers and improves soil fertility. A sustainable impact, however, can only be guaranteed if the system itself is sustainable. According to the CEO of bioRe Tanzania, Niranjan Pattni, this means (April 19, 2010):

> *The organic agriculture system is only sustainable if we [bioRe Tanzania] pull out tomorrow, but the farmers continue to grow organic cotton and benefit out of it […] But this is only possible if the farmers are ready to put the farm yard manure, to do the composting, to rotate their crops, to grow leguminous crops and follow the practices they learned. This is the whole idea.*

As the quotes shows, Pattni considers the system only sustainable if the farmers follow the organic procedures, thus apply the organic know-how and are not only driven by higher prices. Moreover, he says that prices are strongly volatile and not predictable, therefore farmers should balance volatility by using the acquired farming practices so that they can improve the fertility of soils and with it production.

2.4.2 Shinyanga region

The local language in Shinyanga is Sukuma and most of the people also speak the official language of Tanzania: Swahili. Shinyanga lies in the North of Tanzania in the Lake Victoria zone, where most of its inhabitants - predominantly people of the Wasukuma tribe – depend on agriculture. Cotton is the most important cash crops in the region and for the household's own consumption maize, sweet potatoes, sorghum, groundnuts, cowpeas etc. are cultivated (Interview with the Village Executive Officer of Paji, Donald Masunga, March 5, 2010).

Morganti (2010) characterizes Shinyanga as a semiarid region with two distinct rainy seasons. However, the rainfall distribution differs within the zone: The northern part of the district experiences more rainfall than the southern part, where for example Paji is located, the village where the study took place.

The Tanzanian Household Budget Survey conducted by the National Bureau of Statistics (2002) considers Shinyanga as one of the most disadvantaged regions in Tanzania. The criteria of the survey, however, did not only focus on income and share of expenditure on food, but also social aspects like education, access to water and health. The Economic Development Initiatives [EDI] (2007) conducted a broad study in Meatu District by using similar criteria with the following results: Most of the households (56 percent) frequently experience food shortages and 44 percent seldom or never; whereas households in accessible villages experience less food shortages than villages in remote areas. However, not only the location of the village plays a role, but also the amount of land a household owns as well as the household size: Whereas 20 percent of households owning six or more hectares of land never experience food shortages, 46.5 percent of households owning less than one acre always experience food shortages. Moreover, households with one or two family members have less problems to satisfy food needs than households with more members.

The criteria education showed interesting results as well: Whereas 83.6 percent of the children in the age of primary school attend school, only 11.1 percent of the children attend secondary school. Although, especially the secondary net enrollment rate seems alarming, the trend shows that overall education has increased among recent generations and also the gender gap is decreasing (Gonzalez & Miguel, 2002).

Concerning health, the study by EDI (2007) shows that 47 percent of the people in Meatu District suffer from fever or malaria and the infrastructure as well as the access to health care are limited. Moreover, only around 50 percent of the households have access to safe water. Safe sources of drinking water are considered to be i.e. treated pipes and protected wells, compared to i.e. river water. Finally, around 70 percent of the adult population is employed, around 25 percent are underemployed and wish to work more and unemployment is virtually 0 percent.

Many of these issues will be brought up again in chapter 5 when the results are presented. Section 5.2 i.e. describes the vulnerability context of the interviewed farmers and shows that food shortages and diseases are major problems in the lives of the farmers.

3 THEORY

This chapter presents the theories that are relevant for the study. Section 3.1 introduces the concept of wellbeing and gives some examples of how poor people describe wellbeing. Section 3.2 describes the Sustainable Livelihoods Framework, which is an approach that captures the many aspects of rural communities. The three most relevant parts for this study are explained in detail: livelihood assets, livelihood outcomes and the vulnerability context. Finally, the last subsection offers a short critique of the Sustainable Livelihoods Framework.

3.1 Concept of wellbeing

As mentioned in the introduction, people define wellbeing in different ways depending on place (i.e. developing or developed world) and time (i.e. older generations might define wellbeing differently than young people today). Chambers (1995) circumscribes wellbeing as "the experience of good quality of life" (p 175) and the network Wellbeing in Developing Countries Research [WeD] (2007) states: "Wellbeing is a state of being with others, where human needs are met, where one can act meaningfully to pursue one's goals, and where one enjoys a satisfactory quality of life."

Chambers (1997) underlines that the concept of wellbeing is popular with many development institutions because it goes beyond the measurement of income or other conventional development indicators. Bottom-up studies showed that poor people value much more than just income: health, security, self-respect, but also the quality of housing, clothing, land-holding size etc.

Thus, the idea is to not only include objective indicators (such as economic production, literacy rate etc.) bust also subjective indicators. Costanza et al. (2008) explain: "Subjective measures typically rely on survey or interview tools to gather respondents' own assessments of their lived experiences […]" (p 18). In the study *Voices of the Poor* by Narayan, Chambers, Shah and Petesch (2000) for the World Bank more than 20'000 poor people from 23 countries were asked by means of participatory approaches what a *good quality of life* means for them. Despite the diversity of participants, five major themes were expressed:

1. Material wellbeing: Having a job, enough food and adequate assets
2. Bodily wellbeing: Being healthy and appearing well
3. Social wellbeing: Being able to care for children, having good relationships in the family and community, having self-respect
4. Security: Not being vulnerable to environmental disasters and threats
5. Freedom of choice and action: Being able to help others and to be a good person

A study conducted in Shinyanga, Tanzania by the United Nations Development Program [UNDP] (1998) only differentiated material wellbeing from non-material goods:

1. Material wellbeing: Livestock, land, transport, housing, money, enough food etc.
2. Non-material wellbeing: Being married, having children, social networks etc.

A more recent study by the Swiss Agency for Development and Cooperation [SDC] (2003) that was also conducted in Tanzania, but in the Eastern region Morogoro, found out that wellbeing can be categorized as:

3. Economic wellbeing: Being able to afford three meals a day, good clothes, good house etc.
4. Social wellbeing: Access to education and information, good health, good family relations, support networks etc.
5. Political wellbeing: Having opportunities to express concerns (about rights, injustice and corruption)

The categorization shows that there exists not just one definition of the term wellbeing but that it is an amalgamation of different values. One objective of the present study is to find out how local farmers in Meatu District comprehend *good quality of life*.

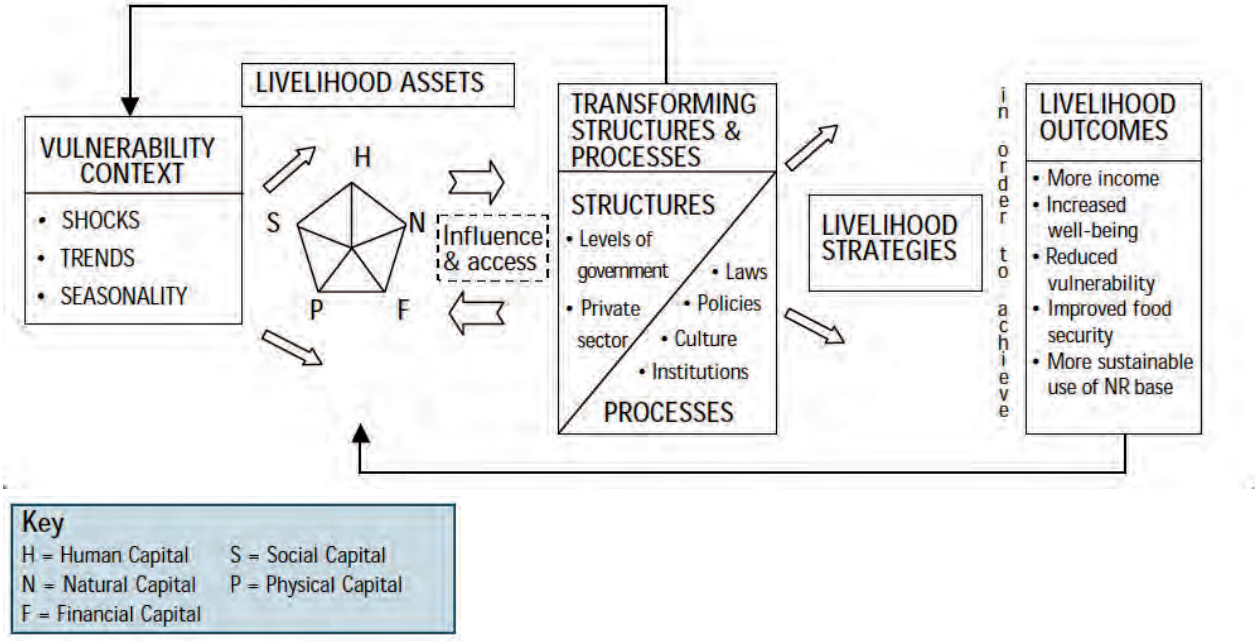
3.2 Sustainable Livelihoods Framework

The Sustainable Livelihoods Framework as described by the Department for International Development [DFID] (1999) and visualized in Figure 3 is used for this study. The people-centered approach helps to better understand the many factors that affect the livelihood situation of rural poor. Livelihoods or *livelihood strategies* are defined as the activities that make up a living, which include activities such as cattle tenure, running a small business or the cultivation of vegetables (Chambers, 1995).

Livelihood assets lie at the core of the framework. The asset pentagon describes poor people's capital endowment, namely human, natural, financial, physical and social assets. Each of these capitals may generate multiple benefits and help people to achieve their desirable objectives or *livelihood outcomes*. *Livelihood outcomes* differ from person to person but might include increased wellbeing, reduced vulnerability or improved food security.

People then adopt different activities - *livelihood strategies* - such as productive activities and investment strategies that help them to reach their objectives. As explained above, examples for *livelihood strategies* might be the tenure of cattle, running a small business etc., but also the adoption of organic farming may represent such a strategy.

Figure 3: Sustainable Livelihoods Framework



Source: Department for International Development [DFID], 1999

Moreover, people are embedded in a *vulnerability context* that shapes their livelihood situation: Trends (i.e. national economic trends), shocks (i.e. natural shocks) and seasonality (i.e. of prices) positively or negatively influence people's opportunities to attain their aims. Finally, *transforming structures and processes* such as policies and institutions may also have a direct impact on people's *livelihood outcomes*.

Given below are details on *livelihood assets*, *livelihood outcomes* and *vulnerability context*, the three sections of the Sustainable Livelihoods Framework that are most relevant for the present study and which will be empirically analyzed on site in Tanzania.

3.2.1 Livelihood assets

In this subsection the five capitals of the asset pentagon - again based on the proposition of the DFID (1999) - are described. They will help as a guideline for the analysis of this study:

- Human capital: Skills, knowledge, ability to labor, good health
- Natural capital: From intangible public goods such as the atmosphere to divisible assets used directly for production such as land, trees and the productivity of these assets
- Financial capital: Regular inflows of money like income or pensions and available stocks like cash and bank deposits (in rural areas available stocks are mainly held in the form of liquid assets such as livestock)

- Physical capital: Basic infrastructure that helps people to meet their basic needs, such as access to water, human health and information or the availability of a secure shelter.
- Social capital: Networks and connectedness, but also more formalized memberships of groups and associations

According to Neubert (1999), life circumstances of people can be estimated by creating these asset pentagons. Thereby, the absolute values of the unique assets are less important than the volume of all assets together. Moreover, the picture becomes more realistic if dynamic elements are included: Not only a unique positioning but also changes in the pentagon have to be considered. This is why the present study is working with trend analyses (as described in subsection 4.2.3) to evaluate how different assets have changed over time.

3.2.2 Livelihood outcomes

As mentioned before, *livelihood outcomes* are the result of specific *livelihood strategies* of poor people. DFID (1999) proposes a list with *livelihood outcomes*, but underlines that it depends on a given situation if the outcome is relevant or not:

- More income: Although the measurement of income has often been criticized, an increase of income continues to be one of poor people's objectives
- Increased wellbeing: Apart from income poor people also value non-material goods such as health, access to services, physical security, self-esteem etc.
- Reduced vulnerability: Poor people seek to reduce their exposure to shocks and risks
- Improved food security: Food security is strongly linked to vulnerability, but appears as a separate category because of its importance
- More sustainable use of the natural resource base

DFID (1999) recommends that *livelihood outcomes* of poor people should be the basis of every development project. So, the idea is that development institutions do not only set their own goals, but also judge their projects on whether they contribute to the achievement of poor peoples' goals.

3.2.3 Vulnerability context

Vulnerability is often used as a synonym to poverty. Chambers (2006), however, underlines that these two concepts have to be distinguished: Vulnerability does not signify "lack or want, but […] refers to exposure to contingencies and stress, and difficulty in coping with them" (p 33). Thus, there is an external and an internal side: the exposure to shocks and risks on the

one hand and the individual's inability to defend itself against these incidents, which can lead to a decline in wellbeing on the other hand.

The following typology by the World Bank (2000) takes a more complex approach: Risks and shocks are here classified according to the level at which they occur (micro, meso and macro level) and the nature of the incident (social, natural, economic etc.). At the micro level, individuals or households are for example exposed to social shocks like illnesses, injuries or death. A group of households or a whole community (meso level) might be affected by natural shocks like unpredictable rainfalls, plant diseases and pests, which can cause economic risks such as harvest failures. At the regional or national (macro) level, natural shocks like droughts and floods or economic shocks like financial crisis might occur.

The two most important threats in terms of vulnerabilities, as described by the United Republic of Tanzania (2000) in its Poverty Reduction Strategy Paper are floods and droughts as well as the growing number of HIV/AIDS victims. The World Bank (2000) further explains that coping strategies after a shock has occurred include selling assets, drawing down savings, borrowing, calling on support networks or, if these measures are not sufficient, reducing consumption. Most of these strategies imply high long-term costs for the households.

3.2.4 Critique

The Sustainable Livelihoods Framework seems to be an adequate tool to better understand rural communities. However, the critical point is that - although the approach wants to put people at the center of development - the framework does not include values that people attribute to the capitals they possess. The studies presented in section 3.1 *Concept of wellbeing* showed that farmers also define wellbeing in non-material terms such as being married, being able to care for the children or having good family relations. In the Sustainable Livelihoods Framework, however, material assets are in the foreground, whereas the personality of the individual farmer i.e. his self-image as well as the concepts of dignity and pride do not appear in the framework (Eyhorn, 2007).

However, the *emotional base* of the farmers can be seen as some kind of a *livelihood outcome* because changes in the asset base cause emotions in the individuals. Therefore, this study does not only focus on the farmers' assets but also on the values they attribute to the capitals. For example, a farmer might report that she or he was able to construct a new house some years ago. In this context, it would be interesting to capture the farmer's emotions and to know, what it means for him or her to be in the possession of this new house. Chapter 5 *Results* presents a range of *livelihood outcomes* that the farmers mentioned during the interviews.

4 METHODS

This chapter is divided into five parts: Section 4.1 describes the selection process of the farmers. Through bioRe Tanzania, I had good access to their contract farmers, whereas the access to conventional farmers was more difficult because updated lists of residents usually do not exist. Section 4.2 then highlights three participatory techniques - semi-structured interviews, rankings and trend analyses – that are relevant for this study and section 4.3 introduces the method *expert interviews*. Section 4.4 describes the content analysis, which is the procedure how data were analyzed. To conclude this chapter, section 4.5 discusses different quality criteria that are relevant for qualitative research and explains how they were applied in this study.

4.1 Sampling

Data collection during my three months stay in Tanzania can be divided into three major phases: Phase I consisted of group interviews, Phase II was the main part consisting of individual interviews and Phase III consisted of interviews with selected experts. To test the interview guide, pretest interviews were conducted before Phase I and II.

The sampling procedure of this study has similarities to theoretical sampling as described by Glaser (1992), because the data collection phase and data analysis were not two separate stages of the research activities but somehow intermingled: I collected data, analyzed them and decided what data to collect next.

In Phase I, two wellbeing rankings were conducted in two bioRe villages (villages, where bioRe Tanzania is active) and two non bioRe villages. These villages were selected randomly, whereby all bioRe and non bioRe villages within a radius of 20 kilometers from the headquarters of bioRe Tanzania in Mwamishali were defined as the basic population. Within the villages the farmers were selected through quota sampling according to two criteria: type of farming (conventional or organic) as well as gender. Finally, the Village Executive Officer or the bioRe extensionist of the respective villages gathered the farmers for the group discussions. The composition of the group interviews and the interview codes are shown in Table 8 in the appendix.

After having analyzed the group discussions, the elaborated wellbeing indicators influenced the focus of the subsequent personal interviews (Phase II). In order to guarantee an adequate comparison between the farmers it was important to find interview partners that live in similar circumstances with regard to predetermined dimensions (Flick, von Kardoff & Steinke, 2007). Only one bioRe and one non bioRe village were selected for the individual interviews to hold variations in the weather condition as constant as possible. The criterion

for the bioRe village was its registration with bioRe Tanzania. As I was working with a trend analysis covering the last ten years, it was helpful to choose a village, which joined bioRe in the middle of this period: 2004. Four villages met this criterion and by random sampling the village Paji was chosen. Bulyanaga, a non bioRe village, turned out to be the control village, as it was very close to Paji and the Village Executive Officer was cooperative.

Finally, 12 bioRe farmers and 4 conventional farmers in Paji as well as 6 conventional farmers in Bulyanaga were selected through quota sampling according to three criteria: again type of farming, gender and economic status (whereby the amount of land was decisive). Men dominated in the sample, because the vast majority of bioRe farmers are male. The interview codes of the farmers and a short description of the interviewees are highlighted in Table 9 in the appendix.

As mentioned above, the sampling process for bioRe farmers was far easier than for conventional farmers, because bioRe Tanzania possesses detailed lists about their contract farmers. As there was no list for conventional farmers, Rahel Elias Mahu, the Village Executive Officer of Bulyanaga selected farmers according to the predetermined criteria. But there might be a possibility that the Village Executive Officer would have chosen farmers that i.e. live closer to the city center to simplify the interviewing process. This possible bias needs to be taken into consideration.

After having partly analyzed the individual interviews, some expert interviews seemed to be necessary to underline or to control certain information (Phase lll). Through bioRe Tanzania's network, I had a good access to several experts in organic farming (see interview codes in Table 10 in the appendix).

4.2 Participatory rural appraisal (PRA)

Participatory rural appraisal (PRA) is a set of approaches and methods with a common idea of how to assess the situation of the poor. PRA mainly evolved out of a critique of traditional large-scale research methods applied in developing countries: The father of PRA, Chambers (1997), accused professionals of imposing their world view on the interviewed people by working with a top-down approach. As a countermovement, PRA tries to capture the realities of the poor by enabling "rural people to share, enhance, and analyze their knowledge of life and conditions" (Chambers, 1994, p 953). Accordingly, the attitude of the interviewer towards locals is less hierarchical and more respectful: Instead of imposing knowledge on them, the respondents should be enabled to take action and express their own ways of knowing (Chambers, 1997).

Since the 1970s PRA has been increasingly applied in practice whereby three main principles evolved (Chambers, 1997): from closed to open, from individual to group and from

verbal to visual. Instead of asking concrete questions, open discussions are stimulated. This is more likely to be possible, if the interview takes place in the form of a group discussion. Group members have an overlapping spread of knowledge and motivate each other for open discussions. Finally, visualization techniques should enable people to express themselves in a creative manner.

The four key techniques of the PRA toolbox are semi-structured interviews, rankings, trend analyses and mappings (Rietbergen-McCracken & Narayan, 1998). The first three techniques, as described below, were considered for the empirical part of this thesis. They were not applied one-to-one in practice, but adapted to the context as recommended by Chambers (2008). The freedom to adapt different methods to different contexts for varying purposes seemed to be useful, but nevertheless it constitutes one of the main critiques of participatory approaches: Leurs (2003) writes that “PRA methods are being used in different ways by many different kinds of people for very different purposes, and the labels RRA/PRA are used rather indiscriminately to cover all of these“ (p 220). This flexibility, on the other hand, allows researchers to be creative and to see in the field what methods work and generate what kind of information.

4.2.1 Semi-structured interviews

Chambers (2008) explains that semi-structured interviews are qualitative and non-standardized ways of interviewing. This interview type allows respondents to emphasize on what they consider to be relevant and new aspects can be brought up and developed during discussions. But still, the World Bank (2010a) underlines that semi-structured interviews are not entirely open and spontaneous, but a flexible interview guide has to be thoroughly prepared in advance. The guide is elaborated on the basis of structured knowledge about the field of research and covers specific topics. During the interview, the guide serves as a checklist for the researcher (Weischer, 2007).

Participatory methods use semi-structured interviewing as the basis for individual as well as group discussions (Geilfus, 2008). In the present study, this type of interviewing was particularly used for the individual discussions. However, they were not conducted as pure semi-structured interviews but combined with trend analysis techniques as explained in subsection 4.2.3.

4.2.2 Rankings

Two types of rankings are introduced in this subsection: wellbeing and problem rankings. Both methods were used in the empirical part of this study. The aim of *traditional* wellbeing

rankings is to identify different socioeconomic groups within a society according to local criteria (Mukherjee, 2002). Local people group different households of an entire village into categories (from better-off to poor households) and define the criteria they used for this ranking (Rietbergen-McCracken & Narayan, 1998). I tried this method out in a pre-test phase, but some constraints appeared: The villages were too large to include all the households and the participants sometimes felt shy to put households into the poor category, especially if poor farmers themselves participated at the group discussion. Moreover, one of the goals of this study was to find out indicators of wellbeing and not specific socioeconomic categories filled up with household names.

This is why the wellbeing rankings were conducted in slightly modified manner: The farmers were asked to think about what a *good life* within their families and communities meant for them. Before starting with the brainstorming session, two volunteers were asked to take three Polaroid pictures of situations that represent a *good life* for them. This element enabled farmers to express themselves in a creative manner and created a good atmosphere because most of them had held a camera in their hands for the first time. These Polaroid pictures were shown and discussed amongst the group and more indicators were then compiled through a brainstorming session. In a second step, these indicators were discussed related to socioeconomic categories (better-off, *average* and poor people): For example a question was how much land or what kind of house a *rich* or a *poor* farmer possessed.

The idea of problem rankings is to reveal the main problems and priorities of discussion members. Rietbergen-McCracken and Narayan (1998) propose to ask participants to brainstorm their main concerns (at the individual or community level) and to write them down on cards. Then, the problems can be spontaneously ranked by the farmers or in a more systematic manner through pairwise ranking (World Bank, 2010b). The present study used the pairwise ranking technique, wherein participants compared a specific problem with another problem in a matrix, and decided the relative importance of the problem with respect to the other within the pair. This exercise was carried out until all problems got ranked in the order of their importance.

4.2.3 Trend analysis

The main goal of trend analyses is to capture people's account of the past by finding out how specific factors have changed over time and why (Schoonmaker Freudenberger, 1994). Factors used for the trend analysis differ from study to study and might be education, health, land use, etc. (Chambers 1997). I took the trend analysis as carried out by Neubert (1999) as a model: She used predefined criteria elaborated by the research team (like access to

drinking water, health of the children etc.) to create village profiles in Mali. In concrete terms, selected groups judged how different aspects have changed over time (i.e. water supply today compared to five or ten years ago) by using a five-point scale from *very negative* to *very positive* for every criterion.

The method was, however, not adopted one by one, but the following modifications were done. Firstly, individual farmers were targeted instead of creating profiles for entire villages. Secondly, I did not use predefined criteria, but the farmers elaborated them in wellbeing rankings. The wellbeing indicators expressed in pictures were used as a support during the trend analysis and were especially helpful for illiterate farmers. Thirdly, stones were used to visualize the scale from one to five: Farmers decided and allocated the appropriate number of stones to the respective fields in a matrix. This allowed them to see the result in front of them and to change stones at any time. An example of a conducted trend analysis with an organic farmer (O10) is highlighted in Table 4.

Table 4: Example of a trend analysis

Years / Pictures	2000-2001	2002-2003	2004-2005	2006-2007	2008-2009
Land (qual. & quant.)					
House (qual. & quant.)					
Cattle (quant.)					
Food (quant.)					
Education (qual. & quant.)					
Income (quant.)					

Source: Own table

I used this kind of trend analysis to find out how farmers' wellbeing changed over time and what were the reasons for the changes. The idea was to understand the impact of organic farming on the farmers' lives without directly raising the issue, so as not to influence the farmers.

However, one major problem with the trend analysis was that some farmers had problems to recall certain years. A possible solution to mitigate the *recall* problem would have been to conduct trend analyses in groups, as in the original model, benefiting from overlapping knowledge. However, as I was interested in having individual stories and not village trends, this was not an option. To make things easier, I encouraged the farmers only to put stones for the years they remembered. Moreover, the farmers' wives often consulted their husbands

during the interviews when they had difficulties to recall certain events in the past or when talking about the education of the children.

4.3 Expert interviews

The expert interview is a non-standardized method that allows the access to expert know-how. An interview guide is used, similar to the previously described semi-structured interviews. But Weischer (2007) underlines that in contrast to semi-structured interviews, where the interviewee is central, the personality of the expert is not the main interest but his professional know-how. Experts take the role of informants and talk about their practical experience. However, it has to be stressed, that experts restrict themselves to their point of view and do not transmit an objective picture.

For this study three experts in cotton farming were chosen: Nicola Morganti (Consultant of the Institute for Ethical and Environmental Certification, ICEA), Niranjan Pattni (CEO bioRe Tanzania) and Samuel Ledermann (PhD candidate in Geography). Whereas Morganti and Pattni clearly support organic farming, Ledermann - who writes a thesis about socioeconomic inequalities within and between organic and conventional farmers in Tanzania - also pointed to potential weaknesses of organic agricultural systems.

Moreover, the Village Executive Officer of Paji, Donald Masunga and the Village Executive Officer of Bulyanaga, Rahel Elias Mahu, were interviewed, because they have a broad know-how about their villages. During the interviews not only farming was an issue but the history of the village, culture and socioeconomic development were discussed.

4.4 Content analysis

This study makes use of the qualitative content analysis as described by Mayring (2003) to analyze the conducted individual farmer interviews, the group discussions and the expert interviews. This method allows capturing a holistic picture of the complex livelihood situation of the farmers by systematically analyzing the documented communication content. A central concern of qualitative science is to analyze the data as near as possible to the material, thus to use inductive principles.

In a first step, the basic material is defined and the condition, under which the material was produced, described. In this study the relevant material encompassed transcribed texts of the individual interviews, group interviews, expert interviews as well as observation data. Whereas the individual interviews mainly took place at the farmers' houses, group

discussions were held at central points of the village. The farmers were usually not informed about the visit of the research team, simply because distances did not allow it. This had the advantage that the subject of the interviews was not discussed before with bioRe extensionists or other farmers. On the other hand, some farmers might have been overstrained by the unannounced visit of the team. Although the interviews were on a voluntary base, none of the farmers refused to participate. A local interpreter and bioRe employee, Justina Samson, directly translated the interviews from English to Swahili and vice versa. Although I acquired some Swahili skills, I would not have been able to lead and understand an entire discussion in this language. However, not understanding the local language caused difficulties in controlling the interview situation.

In a second step, I defined what information from the interviews was actually relevant for the analysis. This was done with the help of the prepared research questions that were used as a framework.

In a third step, the analysis of the material was prepared by defining a systematic procedure. The overall goal of the process was to develop a system of categories, which could be reached in different ways: by summarizing the relevant content, by explaining specific text excerpts or structuring the material. In this study, the material was at first structured with regard to contents on the basis of the three research questions. Secondly, the relevant text excerpts were summarized and assigned to categories in an interchanging process between theory and the concrete material. Finally, the resulting system of categories had to be revised to make sure that it still represented the basic material.

4.5 Quality criteria

The most important quality criteria with quantitative research are objectivity, reliability (constancy of findings) and validity (closeness of findings to reality) (Mukherjee, 1995). However, Flick et al. (2007) doubt that these criteria can be transferred to qualitative research and formulate instead a new set of criteria. The two most relevant criteria for this thesis are triangulation and the validation of the interview situation. Both criteria have close similarities with the quality criteria validity.

The aim of triangulation is to avoid biases that one method, one theory or one researcher may involve. This can be achieved by using different methods to study a phenomenon. In this research several methods were applied, from group sessions such as wellbeing rankings to semi-structured interviews, when wellbeing indicators were discussed as well. Moreover, as mentioned before, group discussions themselves allow cross-checking of information, because group members have an overlapping spread of knowledge.

The validation of the interview situation refers to the authenticity of the respondents' interview statements. It was, however, not a straightforward task to check if this criterion has been met or not. But still, there are some important indications. First of all, researchers that worked in the same region reported that farmers are often reluctant to give precise answers. Gonzalez and Miguel (2002) for example wrote in their study conducted in Meatu, Tanzania: "Certain households may have intentionally misreported their animal stocks, due to a widely known reluctance to discuss this information with strangers."

Secondly, as Pattni explained, farmers in Meatu often perceived white people as inspectors (Interview, April 19, 2010). To avoid biased answers, I introduced myself as a student and explained why as well as in what context the interviews were conducted. Moreover, I tried to avoid top-down situations by sitting on the floor, if the farmer sat on the floor and by starting personal discussions with the farmers off the record before starting with the official interviews.

Thirdly, it was challenging for me to confidently judge whether the farmers felt comfortable or whether any taboos were broken. For example, during the trend analysis a lot of recall data from the last ten years were needed. It was however difficult to estimate how challenging it was for the farmers to remember certain events or years. When I manifested my uncertainties to the interpreter or the farmers, they denied any complexities. It was therefore nearly impossible to receive any feedback on the form and content of the methods applied, which would have been important to improve the interviews.

Finally, the interpreter and the driver were employees of bioRe Tanzania, which might have conditioned the answers of the farmers. Pattni confirmed this assumption (Interview, April 19, 2010):

> *The farmers might feel that you come to investigate […] because they are partners of bioRe […] and they want you to know that they are happy with bioRe […] and would not like to talk against bioRe to you, because you are an outsider. But still, if something is drastically wrong, they will tell you.*

An illustrative example is the way bioRe farmers answered to the question of what advantages and disadvantages organic farming has: Whereas advantages were described in detail, disadvantages were rarely mentioned. Negative aspects were rather mentioned by terminated bioRe farmers or conventional farmers.

5 RESULTS

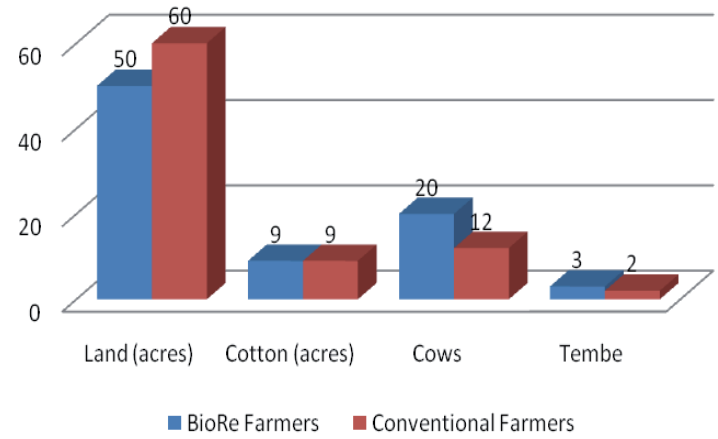
This chapter summarizes the results from the various interviews with farmer groups, individual farmers as well as experts. To start with, section 5.1 gives a short overview of the socioeconomic characteristics of the individual farmers. Section 5.2 then shortly describes the vulnerability context of the farmers, because it was noticeable during the interviews that i.e. weather condition plays a major role in the farmers' lives. Section 5.3 explores the local definition of a *good quality of life* with the result of concrete wellbeing indicators. Section 5.4 then tries to bring together the elaborated wellbeing indicators with the Sustainable Livelihoods Framework, which helps to structure the subsequent and core section 5.5 *Impact assessment*.

5.1 Characteristics of interviewed farmers

Before starting with the analysis, this section gives an overview of the main socioeconomic characteristics of the interviewed individual farmers. For the calculations, the median was used and not the mean, as extreme cases would have distorted the results.

Economic Characteristics: All of the interviewed farmers in Paji and Bulyanaga indicated cotton production as their main source of income. As seen in Figure 4 below, both bioRe and conventional farmers grow about 9 acres of cotton on average, but conventional farmers slightly own more land: The average bioRe farmer in the sample has about 50 acres and the average conventional farmer about 60 acres. I have met only one farmer, a conventional farmer, who possesses no land at all.

Figure 4: Economic characteristics of farmers

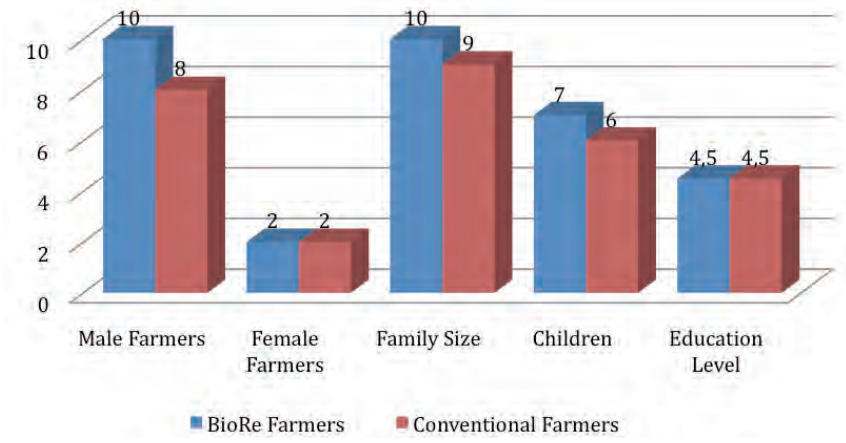


Source: Own figure

Furthermore, bioRe farmers hold about 20 cows on average and conventional farmers about 12. bioRe farmers on average possess 3 tembe houses and conventional farmers 2. Finally, only every second farmer of the whole sample is in the possession of an iron-roofed house (here the mean was taken, because the median indicated 0).

Social characteristics: On the whole, 10 male and 2 female bioRe farmers were interviewed as well as 8 male and 2 female conventional farmers (see Figure 5). Furthermore, family size and the amount of children living in one household were more or less the same: On average, 10 persons, thereof 7 children, live on organic farms compared to 9 persons, thereof 6 children, on conventional farms. It has to be said that the latter numbers may not be precise, as some respondents were not sure about the exact number of people living in the household. Finally, the education level was approximately the same as well: On average, the farmers attained level 4 or 5 of primary school. Only one farmer, an organic farmer, attended secondary school. The reason for the rather low educational level of the farmers is that they did not have access to many educational opportunities when they were young. But as mentioned in subsection 2.4.2 *Shinyanga region* the trend shows that overall education has increased among recent generations.

Figure 5: Social characteristics of farmers



Source: Own figure

5.2 Vulnerability context

This section explores the vulnerability context of conventional and organic farmers in Meatu District, Tanzania (see research question 1). The guiding questions to the following results were deliberately asked very general and in an open manner, allowing a general overview of the farmers' *most difficult time in their life* and the *events most worried about in the future*.

The answers shed a light on the vulnerability context of the respondents and on possible similarities and differences between bioRe and non-bioRe farmers.

When asking the farmers about the *most difficult time in their life*, the vast majority remembered specific years that were marked by droughts (ecological shock on macro level): They especially mentioned the droughts in the years 2002, 2003 and 2006. The farmers experienced another ecological shock in 2009, when a hailstorm and unexpected rainfall destroyed their harvest. One organic farmer (O2) explained: *It was raining during the harvest period, although it was not supposed to rain at that time. The cotton was contaminated and we only had a low income.*

Another reason for economic shocks such as harvest failures was expressed in terms of crop pests. One organic farmer (O6) reported that birds called *Quelea Quelea*, which move in large flocks, destroyed his crops by picking out seeds and grains in 2008. Moreover – in the same year – his crops were affected by the American bollworm, which is the major pest in cotton. In terms of social risk, only one farmer mentioned sickness and remembered the year 1995 when his illness hindered him to cultivate.

Finally, the answers to the question of the *events most worried about in the future* were similar to the previous answers: Drought and hunger were mostly mentioned followed by diseases. Malaria is considered as the most feared disease in the region as a problem ranking conducted in Paji showed: Through a brainstorming session the participants listed ten central problems and ranked them in a matrix (for detailed explanations of how problem rankings are conducted, see subsection 4.2.2):

Table 5: Problem ranking

Problems	Market for mung beans	Malaria	Access to health care	Access to good water	Distances to buying post
Market for mung beans		Malaria	Access to health care	Access to good water	Buying post
Malaria			Malaria	Malaria	Malaria
Access to health care				Access to health care	Access to health care
Access to good water					Access to good water
Distances to buying post					

Source: Own table

Malaria was ranked as number one, followed by the limited access to health care (especially for babies and pregnant women), the access to good water, too long distances to the bioRe buying post (there is usually one per village) and finally the absence of a sure market for mungbeans. bioRe has successfully introduced a market for mungbeans some years ago,

but does not buy them anymore today. Although there are many traders of mungbeans in the area, bioRe farmers would prefer to have a secure market for the beans as they have it for cotton.

It has to be added here that not only Malaria but also HIV/AIDS is a serious threat in Tanzania (as mentioned in subsection 3.2.3 *Vulnerability context*). During the interviews, however, the issue HIV/AIDS was never mentioned because it is considered to be a taboo. My translator explained to me that people rather report that a family member died of Malaria than admitting that she or he had HIV/AIDS.

To conclude this section, the results showed no differences between conventional and organic farmers. All of them live in a similar environment and are therefore exposed to similar shocks. There might, however, be differences in how the farmers cope with shocks. This issue will be discussed at a later stage of the study.

5.3 Meaning of wellbeing

The idea of this section is to explore local conceptions of wellbeing (see research question 2). Subsection 5.3.1 shows how farmer groups define wellbeing by using socioeconomic categories. The top nine expressed wellbeing indicators are then discussed in depth in subsection 5.3.2. All the interviewed individual farmers were asked how they would rank these indicators, what importance they attribute to the different indicators and why.

5.3.1 Overview of wellbeing indicators

The four group discussions, which were conducted at the very beginning of the research activities, were used to understand what wellbeing means in the eyes of the farmers. The central question of the discussion was therefore: *What does a good quality of life (in Swahili: maisha mazuri) mean for you?* Some farmers took Polaroid pictures of situations that represent a *good life* for them and further criteria were gathered in a brainstorming session. Again the median was taken for all the calculations.

With the help of socioeconomic categories the groups then came to the following conclusions: According to all the groups, a well-off farmer possesses more than 100 acres of **land** and can employ casual labor on his fields. The casual worker himself belongs to the poor category: He usually does not possess any land and has to work in exchange for **food**. The rich farmer, in contrast, has abundant land to cultivate enough food for the family for at least one year. Moreover, a rich farmer possesses more than 75 **cattle** and a poor farmer has to live without any cows but might own some sheep and goats. Most of the farmers explained that cattle are like a bank account for them, so they invest in cattle to save for the

future. The farmer groups also emphasized that it is important to have a good *income* or to have enough *cash* available.

In terms of housing (according to all the groups), a wealthy family lives in a good **house** with an iron roof, burnt bricks and cement floor in contrast to a *tembe* (a house with a thatched roof), which does not keep out the rain. A good house is therefore a protection but also makes it possible to have *a nice place to sleep*, as a woman (in G4) explained. Other possessions were expressed in terms of **means of transport** and **clothes**. One men's discussion group (G2) specified that a well-off person owns a motorbike or even a car, *average* people use their bikes and poor people have to walk. The other men's group (G1) explained that poor people wear bad or second-hand clothes whereas rich people wear nice and expensive ones. Both women's groups (G3/G4) added that they would value a lot if they had **housing assets** such as a sofa or a TV at home.

But the farmers did not only refer to material assets, but also non-material goods played a role: All the groups said that it is important to have access to **education**. The farmers emphasized, that education is only available to people who are better off. One group (G2) specified that poor people are usually not educated, *average* families send their children to primary school (where no school fees are required) and only better off people can afford secondary school (where school fees are required). Access to education was also associated with **employment** (G1/G3): The participants explained that they hope that education makes it possible that their children will be employed one day, so that they can help their parents financially. Surprisingly, only the women's discussion groups (G3/G4) referred to **health**. But as mentioned in the last section, health represents one of the major shocks for poor people. Finally, all the farmer groups value good **relationships** within the family and the community. Moreover, one men's group (G1) said that **being married** is another important factor. A group participant explained: *For a woman, being married is good and a prestige. And it is also good because the family of the woman receives a bride price.*

It is striking that the results of conventional and organic farmers were very similar: The farmers define wellbeing mainly in terms of material aspects. This is, however, not astonishing, as the farmers need some basic assets so that they can earn their living. The only non-material indicators that were often mentioned are education and a good relationship within the family and the society. Moreover, gender made a difference only to a certain extent. For example men used a different threshold than women: i.e. one men's group (G1) said that a rich farmer possesses more than 200 acres, whereas women's groups were more modest with numbers. Finally, only women mentioned health as an important indicator and appreciate it if they feel comfortable at home with different housing assets and a nice place to sleep.

Discussion:

It has to be added here that the results of the group meetings might be of limited scope because only four groups were considered. On the other hand, as mentioned in subsection 4.5.1 *Triangulation*, group participants have an overlapping spread of knowledge. However, there might be a bias within the discussions because a few opinion leaders mostly dominated the groups of about ten farmers. My interpreter observed that these opinion leaders were mostly well-off people and that poor people were rather shy and did not talk much – if at all.

5.3.2 Wellbeing indicators in depth

During the personal interviews I worked with the mostly mentioned wellbeing indicators - visualized as Polaroid pictures - and among others asked the farmers to rank them. As there are no striking differences between the rankings of bioRe and non-bioRe farmers (the median was taken), they are integrated in one single table, as seen below.

Table 6: Ranked wellbeing indicators

Ranking	Wellbeing indicators
1	*Land*
2	*House*
3	*Food*
4	*Education*
5	*Cattle*
6	*Income*
7	Good *relationships*
8	*Clothes*
9	*Means of transport*

Source: Own table

The farmers consider **land** (in Swahili: eneo) as the most important wellbeing indicator, which is not astonishing as the respondents derive most of their livelihoods from farming and therefore need land to cultivate food and cash crops. One organic farmer (O8) explained it as follows: *Land is a source of income. With the earned money you can afford all the other wellbeing indicators (cattle, house etc.).* Moreover, the farmers use part of their land as a grazing area for their cattle. Only a few farmers mentioned that they collect firewood from it (C5/6,O2/4/5) and one organic farmer (O1)

Figure 6: Wellbeing indicator land

reported that she produced chalk out of the collected wood. Moreover, land can be another source of income when it is rented out (O7) or used as a bond (C2,O7). Only one farmer (C10) reported that he had to sell land during the last ten years, namely during the drought in the years 2002 and 2003 he bought cattle with 40 acres of land and in exchange with cattle he bought food. Many farmers reported that they cultivate on a piece of land belonging to their parents or that they inherited land from their parents.

Figure 7: Wellbeing indicator house

A good **house** (in Swahili: nyumba) is considered to be the second most important wellbeing indicator. The house is generally seen as a protection for the household members and also for their possessions (C4/9,O7). As mentioned before, a good house has an iron roof, which stops the rain from coming in (C5,O6) and allows a comfortable sleep for the tenants (C1,O1). Furthermore, an organic farmer (O1) reported that she used her iron roof to harvest rainwater. However, a good house is not only convenient but also serves as a prestige: *I want to have a modern house with an iron roof and burnt bricks. The modern house will last for a long time and it looks nice (O6).*

Enough **food** (in Swahili: chakula) is considered to be the third most important indicator. As mentioned before, food is sufficient, if it lasts at least for one year. This would imply that there is no need to buy food. Most of the farmers in the sample, however, had to buy food at least once in the last ten years: Especially the droughts in the years 2002, 2003 and 2006 were marked by serious hardship.

Figure 8: Wellbeing indicator food

A seasonal calendar for the year 2006, which was elaborated by bioRe farmers in Mwambiti, showed that there was no rain in January and February, when there is usually a lot of rain. The dry period translated into a long hunger period. As a consequence, the farmers reported that they sold cattle to buy food and also the government supported them with food packages. Or, some of the farmers were working as causal workers on other fields and received food in exchange.

Education (in Swahili: elim) was ranked as the forth most important wellbeing indicator, directly after food availability and the possession of a good house. Some respondents (C2/8,O3/7) said that the situation in Tanzania is changing and one has to be educated to go with time. Other farmers (C1/6/8,O6/8/10) went even further and explained that education is the key to get out of poverty and to have a good life. A conventional farmer (C2) stated: *It is better to give the children education than resources, because resources will be finished one day, but education not.*

Figure 9: Wellbeing indicator education

More specifically, most of the farmers hope that their educated children will have the chance to be employed by the government or by private companies, so that they can support the parents financially one day. Moreover, educated children can help their sisters and brothers i.e. by financing their school requirements (O11). And if the children do not get an employment, they can at least organize their work on the fields properly (O4) or employ themselves successfully (O7/11), i.e. by running a shop. Or, two organic farmers stated that if you are educated *you can use your land in a good manner (012)* and *you can better understand the organic farming training (O2).*

Surprisingly, the wellbeing indicator **cattle** (in Swahili: mifugo) was ranked after education. As explained before, cattle for Tanzanian farmers are comparable with a bank account in the developed world: So, if farmers decide to save part of their income, they mostly invest some money in cattle. Only in difficult times cattle are sold: As mentioned before, most of the farmers reported that they had to sell some cows during hunger seasons within the last then years. Other farmers said that they sold cattle when somebody from the family was sick (O1/5) and an organic farmer (O12) stated that he had to sell some of them in order to get out of prison (he said that he was wrongly accused).

Figure 10: Wellbeing indicator cattle

On the other hand side, cattle are used as a bride price (O11) or for investments, i.e. to purchase land (C3) or to buy requirements like school uniforms (C9). Apart from being a bank account,

cattle provide milk and meat (C5/6) (although they are usually slaughtered only for ceremonial occasions), they are needed on the fields for farming activities like ploughing (C1/5/6,O7) and as a means of transport (C1) i.e. for cotton.

The next wellbeing indicator in the ranking is **cash/income** (in Swahili: fedha). Cash or income was surprisingly ranked rather at the end. When I asked the farmers during the ranking, why this is the case, they could not give a specific answer. It can be assumed that the farmers rather define their wealth in terms of land they possess, in what kind of house they live etc. It might also be possible that there was a misunderstanding as I worked with the picture on the left, a man holding cash in his hand (representative for income). It is possible that cash does not play a crucial role for the farmers as they mainly hold their liquids in terms of cattle and not necessarily in cash.

Figure 11: Wellbeing indicator income

Finally, the farmers appreciate having good **relationships** within the family and the community. A conventional (C4) farmer stated: *Nobody is going to help you if you don't have good ties with your neighbors and family.*

Furthermore, although the wellbeing indicator good relationship was put rather at the end of the ranking, the farmers saw their importance. One organic farmer (O3) explained: *If there is no love within the family, it is difficult to organize work within the family. You have to sit together and discuss who does what.*

Figure 12: Wellbeing indicator family relationships

The very last two indicators were **clothes** and **means of transport**. Clothes are not only a basic need but also a sign of wealth (O3/9) and thus serve as a prestige. One organic farmer (O9) said: *If you dress well, people think that you have a good life.*

5.4 Wellbeing indicators and SLF combined

As shown in the last section farmers mainly define wellbeing in terms of assets, which generate multiple benefits and help poor people to achieve their desirable livelihood outcomes in the future, such as more income and less vulnerability. Specifically, I found out that all wellbeing indicators, except food security, could be integrated in the asset pentagon of the Sustainable Livelihoods Framework, whereas food security directly represents an outcome. The first six ranked indicators, as visualized in Table 7, were analyzed during the personal interviews. The main wellbeing indicator **land** was expressed in terms of natural capital; **house** represents a physical capital, **education** a human capital and **cattle** might be attributed to natural capital but as cattle are kind of a bank account for the farmers it might also belong to financial capital. Finally, also **income** represents a financial capital.

Table 7: Wellbeing indicators and SLF combined

Ranking	Wellbeing indicators	Livelihoods Framework
1	Land	Natural capital
2	House	Physical capital
3	Food	Livelihood outcome
4	Education	Human capital
5	Cattle	Natural capital Financial capital
6	Income	Financial capital

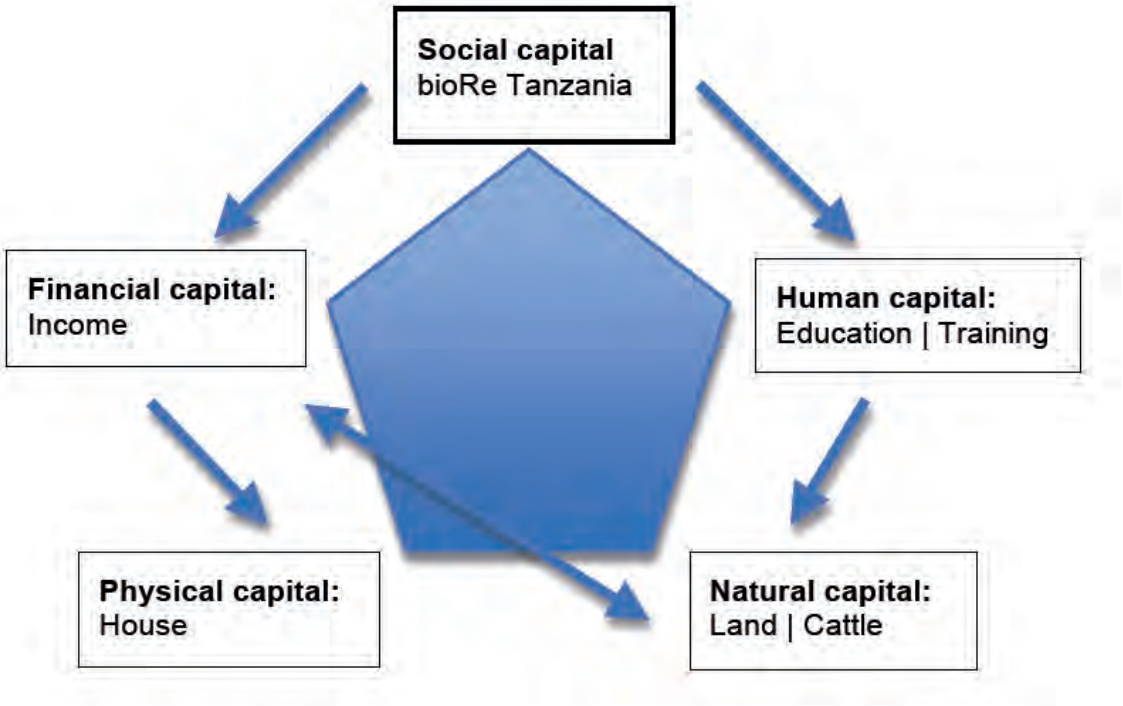
Source: Own table

The combination of the wellbeing indicators with the Sustainable Livelihoods Framework helps to bring an order into the indicators and to structure the next section 5.5 *Impact assessment*. The section starts with the category **social capital**, which the Sustainable Livelihoods Framework defines in terms of formal connectedness and networks. bioRe Tanzania represents such a formal organization and is the starting point of the analysis (see Figure 13). From social capitals two arrows point to **human capitals** and **financial capitals**: On the one hand side, bioRe educates the farmers in organic agriculture, thus provides them with human capital. The farmers mainly define human capitals in terms of school education but also in terms of training, such as agricultural training (the term in Swahili “elimu” signifies both of them). On the other hand bioRe guarantees the farmers a price premium, thus provides them with additional financial capital.

As mentioned in the introductory part, Pattni considers the organic system only to be sustainable, if the farmers follow organic procedures, thus apply the organic know-how and are not only driven by higher prices, which the organic system offers (Interview, April 19, 2010). So, in order to find out what influence prices and organic training play, this study

attempts to find out how convinced the farmers are about the received know-how or if price advantages mainly motivate them to grow organic.

Figure 13: Wellbeing indicators and SLF combined



Source: Own figure

From human capital the next arrow points to **natural capital**. The idea is to examine what concrete impact agricultural education has on natural capitals – whereby the quality of land and yields are in the focus. Moreover, financial capitals are then examined in a broader term, not only the price premium is in the focus but the profitability of the farm in general. Finally, the impact of additional income on other assets such as **physical capital** is examined.

However, this study attempts not only to capture the most important assets in the lives of the farmers but also observes changes over time. Every change in an asset of course influences livelihood outcomes such as food security or more income. Or, changes in the asset base make farmers more or less vulnerable and thus influence their ability to cope with shocks. Moreover, as discussed in subsection 3.2.4, livelihood outcomes might also touch the emotional base of a farmer, such as pride, satisfaction, feeling of security etc. The outcomes of every capital are therefore discussed respectively.

It has to be added here, that the interactions between the capitals are much more complex than presented in the model. However, it gives the results a certain structure and might be one way of understanding how organic know-how influences wellbeing of the farmers.

5.5 Impact assessment

In this section the results of the impact assessment are presented (see research question 3). The structure of this section refers to the different capitals of the asset pentagon. The starting point is subsection 5.5.1 *Impact on social capitals*, then subsection 5.5.2 *Impact on human capitals* shortly describes how the farmers value the acquired know-how. Subsection 5.5.3 examines how the natural base of the farmers changes if they are provided with new know-how. In the focus is the quality of land and crop yields. Livelihood outcomes following changes in natural capitals are then summarized in subsection 5.5.4. Subsection 5.5.5 *Impact on financial capitals* continues with changes in the financial asset base of the farmers by discussing the profitability of organic farm. Specifically, production costs as well as market conditions and cotton prices are concerned. Subsection 5.5.6 highlights possible Livelihood outcomes following changes of the financial asset base: Additional income can be used to buy food, saved in the form of cattle or invested in physical assets (subsection 5.5.7). Subsection 5.5.8 then describes livelihood outcomes following changes of the physical asset base.

It was remarkable and interesting to see how the responses of the different farmers were very diverse. Most of the farmers were open to give a deep insight in their way of living and their attitudes towards organic farming. Of course, the impact of organic farming on the farmers differs from individual to individual. It was remarkable that some farmers seemed to be exceptionally motivated to learn and follow organic techniques, whereas other farmers were more indifferent. Many aspects might play a role: Is the farmer the first generation to grow organic, or was his father already an organic farmer and therefore convinced and transferred him some of the know-how? To what extent does the farmer understand if and how organic farming brings a change to his standard of living? Does the educational level play a role?

5.5.1 Impact on social capitals

In the Sustainable Livelihoods Framework, the notion social capital is mainly defined in terms of connectedness and network, whereby rather formal networks are concerned. Social networks inter alia facilitate the development of knowledge and sharing of that knowledge. Through bioRe Tanzania, the farmers have access to new market opportunities and knowhow, which helps them to use their land in a sustainable manner. A conventional farmer (C10) described how this social network looks from outside:

bioRe farmers do always meet: They sit together, they talk together and they share information. Sometimes it is like a party, some farmers call for open house and all farmers go there. This is an advantage they have!

It is true that know-how is intensively shared within the bioRe network, but at the same time spill over effects from organic to conventional farms can be observed. Organic farmers live close to their conventional neighbors and thereby experiences of new techniques and their effects are exchanged. A conventional farmer from Paji (C10) for example reported that he used sunflowers as trap crops, because he heard from bioRe neighbors that they attract pests. So he tried it out and was convinced.

During the individual discussions, many farmers reported that they feel safe as part of the bioRe network, because the extensionists support them and give them advice. One organic farmer (O8) reported: *The extensionst is instructing me what to do and what is not required […] He is training and leading us at the same time.* The quote shows the close relationship between social and human capital. Another organic farmer (O12) said: *The extensionist has to do the follow-up and cares for the farmers.*

However, it can be assumed that not all farmers appreciate it if the extensionist watches them at work. Finally, it is also the extensionist, who has to report to bioRe Tanzania if a farmer has broken rules.

5.5.2 Impact on human capitals

In subsection 3.2.1 *Livelihood assets* human capitals were defined as skills, the ability to labor and good health. For the analysis part of this study, human capital is restricted to skills. According to Pretty (2008), the idea of sustainable agricultural systems such as organic farming is to substitute external inputs with human capital, thus to make productive use of the knowledge and skills of the farmers.

During the individual discussions the agricultural know-how played a central role. The farmers discussed many organic techniques, whereby three of them seemed to be accepted the most: crop rotation (which is mandatory), spreading of farmyard manure and sowing in rows. An organic farmer (O3) reported that the *best time in his life* was when he changed from conventional to organic cultivation: *Before, the way we were farming was not good. We did not plan and we did not have any know-how.* Another organic farmer (O10) summed up: *If you follow the instructions like doing crop rotation, pest management, application of manure etc., you can increase your soil fertility, which leads to better yields.* Details on how organic methods influence natural capitals are described in the next subsection.

It has to be added again that agricultural training and the compliance to rules and procedures might also be linked with unease, as the rather high number of *terminated farmers* shows. Two conventional farmers, whose contracts were terminated by bioRe Tanzania, were included in the sample. One farmer (C9) explained that he tried to purchase seeds at the bioRe office, but both times he went there, nobody was available to sell him the seeds. As he wanted to start cultivating and time was running, he bought treated seeds and was therefore terminated. Another conventional farmer (C8) was terminated in his first year, because he intercropped maize in cotton. He said that he did not know what the problem was with intercropping maize and cotton. If terminated farmers want to join bioRe again, they can do so after a while.

In sum, the acquired organic know-how is much valued by the farmers and most of them see its advantage. On the other hand, to follow the many techniques is time consuming and demanding for the farmers.

5.5.3 Impact on natural capitals

The idea behind this subsection is to examine what impact organic techniques have on the natural base of the farmers. As elaborated before, the most important wellbeing indicator for the farmers is land. Although the quantity of land dominated the initial group discussions, the quality of land or soil played a major role during the personal interviews, especially when talking about how land has changed over time. However, quality of soils does not stand alone: A direct consequence of it is the amount of yield a crop returns. The following two paragraphs show that bioRe farmers are convinced about specific organic methods that help them to improve soil fertility and yield (for cash as well as food crops). Therefore, the farmers embark on increasing their household income and they have more food available.

5.5.3.1 Soil fertility

As discussed in section 2.3, soil fertility depends on three internal factors, which are the organic matter content, the texture of the soil and the microbial life that make soils rich or poor in nutrients as well as on external factors such as rainfall, pest attacks etc. (vulnerability context). The texture of soils can be divided into sand (hardest particles), lime or clay (finest particles). In Paji, where most of the interviews were conducted, the soil is called *ibambasi*, which is rather a heavy texture. It is thus difficult to cultivate on this type of soil, but on the other hand the rather hard soil is less susceptible to wind erosions. Moreover, Paji lies in a rather dry zone with 500 mm/year, which is at the minimum rainfall limit for cotton production (Morganti, 2010).

When the qualitative changes of the **organic farmers'** soils were discussed during the trend analysis, the farmers either reported that soil fertility has stayed the same (6 out of 12) or has improved (6 out of 12) since they have converted their conventional farm to an organic farm. Morganti, who did research on soil fertility in the same area, explained that the farmers look at the size and the health of their plants in order to judge soil fertility (Interview, April 25, 2010). Most organic farmers (7 out of 12) consider the application of manure to have an important impact on soil fertility as well as yields. One organic farmer (O4) talked about his experiences:

> *In the years 2000-2003 the natural vegetation was not growing well in my fields, it was remaining short. Since 2004, I started to use manure, so it became better. When time goes by, you can see that they are growing better.*

Morganti agreed with this statement and explained: *Manure improves the texture of the soil and the retention of water in the long run*, *thus has a positive impact on soil fertility* (Interview, April 25, 2010).

Another organic method that helps to improve soil fertility and yield - according to 6 out of 12 farmers - is crop rotation. One organic farmer (O1) explained: *Crop rotation is good, because it improves soil fertility. If you grow sorghum, sorghum and sorghum, you will have weeds in your fields and the plants won't grow properly.* Morganti gave the technical explanation of this phenomenon (Interview, April 25, 2010):

> *What I can say is that, if you do not do crop rotation, you have some weeds or insects, which specialize in growing and attacking that crop […] what is good with crop rotation is that you are kind of confusing the pests or the weeds because there are different types of plants growing in the same field over the years.*

Another organic technique that was mentioned by some farmers (3 out of 12) is the prevention of soil erosion. The farmers reported that they had problems with soil erosion in their land and since they have joined bioRe, they acquired the know-how to take measures against it. Ledermann affirms that the prevention of soil erosion has a positive impact on soils, as soil erosion means that the top layer of the soil is washed away, which is often the most fertile layer (Interview, May 4, 2010). Finally an organic farmer (O7) reported that he is convinced that the use of chemicals *harms the quality of the soil in the long run.*

Discussion:

Qualitative studies by Schwaller (2004), Bachmann (2010) as well as Schwank, North and Bättig (2001) confirm the previous results: They report that soil fertility improves visibly after conversion to organic farming. In the study by Bachmann (2010) conducted in Kyrgyzstan 95 percent of the interviewed organic farmers perceive an improvement of their soils because of the application of manure, crop rotation and the abstention from using chemicals.

When the qualitative changes of the **conventional farmers'** soils were discussed during the trend analysis, the farmers either reported that soil fertility has stayed the same (5 out of 10) or decreased (4 out of 10) over the last ten years (one farmer does not possess any land, therefore soil fertility was not an issue). A conventional farmer (C6) noticed that her plants did not grow well, because she cultivated the same crop on the same plot over years. Although she has already heard of the technique crop rotation, she does not practice it. Another conventional farmer (C1), however, thought of rotating his crops:

> *Since 2006 the vegetation does not grow well and the soil fertility is not good. For example in my cotton plot, some of the plants grow big and others are small. I therefore think of starting to shift my crops.*

A third conventional farmer (C6) explained that she cultivated on fallow land in 2008 and was rewarded with satisfactory yields. Obviously, there is not a clear dividing line between organic and conventional methods. Although organic farmers practice i.e. crop rotation, conventional farmers intuitively rotate their crops from time to time (however in the absence of strict rules).

5.5.3.2 Crop yields

According to the farmers, the techniques described in the last paragraph also have a positive impact on yields. Morganti said that this makes sense as improved soil fertility always leads to better yields, all other things held constant (Interview, April 25, 2010). Therefore, the techniques are not repeated here but additional methods are presented that do not have an impact on soil quality but on yields.

Most **organic farmers** (7 out of 12) mentioned that the technique of sowing in rows has positive impact on yields. One farmer (O4) explained:

> *When you broadcast the seeds, you consume a lot of time and energy to weed a big area of land, while the plant population is less. If you compare it with organic farming: You sow in row, the plant population is good and you can weed the fields by using the ox-weeder.*

When asking advantages and disadvantages of sowing in rows, Morganti came to the following conclusion (Interview, April 25, 2010):

> *There are two advantages with sowing in rows: First of all, you have an appropriate spacing between the plants. If you broadcast, on the contrary, the plants start to compete with each other for nutrients that are in the soil. Secondly, the weeding is easier. It is important that you can do the first two weedings quite quickly, because at the beginning the competition can strongly hinder the growth of the plant.*

There are, however, also disadvantages with this method. A terminated bioRe farmer (C1) i.e. explained that it is impossible for him to sow in rows because it is very time consuming given that he is cultivating a large area.

Another organic method that was mentioned by the farmers (5 out of 12) is the cultivation of sunflowers as pest management, an organic farmer (O1) explained:

> *Sunflowers attract American bollworms and other pests […] and you cannot see them down there […] Before I joined bioRe, I did not receive any extension service, so I did not know how to control this kind of pest.*

Although, I never asked directly whether organic or conventional farmers have more or less yields, one organic farmer (O1) stated: *We bioRe farmers use manure, which assists the plants to grow. So, even if there is little rain and I will only get little, I will get more than my conventional neighbor.*

Discussion:

The discussion about the comparison of yield in different agriculture systems is a complex one. Eyhorn (2007) writes in the qualitative part of his study conducted in India: "Despite the widespread belief that organic farms are less productive, cotton yields in organic farms that had completed the conversion period were on par with those in conventional farms" (p 13). However, according to Giovannucci (2005) as well as Scialabba and Hattam (2002) the productivity of organic farming cannot be judged if single crops are compared in a single year in terms of simple economic indicators. Rather, total production of useful crops per area should be considered and observed over a complete rotation. Or, the best method according to Scialabba and Hattam (2002) is to look at profitability instead of comparing yield, so that relative input, labor costs, actual production costs, market conditions and price premiums are considered as well. Subsection 5.5.5 *Impact on financial capitals* gives an overview of these factors.

Surprisingly, the discussion about the conversion period never came up during the interviews. Many empirical studies i.e. by Bachmann (2010), Eyhorn (2007) and Schwaller (2004) underlined that farmers, who convert from a conventional to an organic farm, suffer from decreased productivity. A possible explanation why the issue did not appear during the interviews is that all the respondents converted in the year 2004 after years characterized by droughts and low yields. It then seems to be obvious that the conversion period did no have a visible impact on the farmers' production. Or, the farmers simply did not want to talk about negative aspects of organic farming in front of bioRe staff.

The latter argument is not negligible. I have already mentioned in the theory part that the presence of my translator and my driver as bioRe Tanzania employees might have conditioned the situation and influenced the farmers' answers. I was therefore careful

throughout the data analysis with statements like the one cited before: *In the years 2000-2003 the natural vegetation was not growing well in my fields, it was remaining short. Since 2004, I started to use manure, so it became better (O4).* This statement would imply that the application of manure was the only reason for increased soil fertility. However, as mentioned before, the weather condition for cotton cultivation was more favorable in 2004 than in the previous years. Obviously, not only internal criteria play an important role, but also external factors such as rainfall and pest attacks have to be taken into account. It is therefore difficult to draw direct causalities from organic technique to the fertility of the soil.

In contrast to organic farmers, **conventional farmers** rarely talked about specific techniques, if I did not raise a certain issue. But when talking about advantages of conventional farming at the end of the interview, two conventional farmers (C2/5) expressed their conviction that the use of chemicals results in better yields, because they kill pests. One conventional farmer (C2) explained:

> *Conventional farmers are using chemicals. This is why they are getting more yields compared to organic farmers. bioRe farmers have a better income because they receive a better price and not because they have more yields.*

According to this conventional farmer, the key point of the organic system lies in the price they offer to their farmers and not in organic cotton techniques. The end of subsection 5.5.5 discusses this issue.

5.5.4 Natural capitals: Outcomes

This subsection explores possible livelihood outcomes of the previously described impact on natural capitals. As discussed above, scientists do not agree if organic agricultural systems do improve production or not. If organic farmers had better yields, they would at the same time also be able to improve their food situation. But as the issue of production is discussed controversial, the focus should rather lie on an agreed assumption: Most scientists support the fact that organic agriculture improves soil fertility, which contributes to food security. Therefore, the following paragraph examines the topic of food security and the last paragraph concludes with personal statements of different organic farmers highlighting the personal attachment to their land.

5.5.4.1 Food security

Giovannucci (2005) explains that fertility of soils should be less associated with productivity but to stability, because one important characteristic of organic production is that fertile soils better withstand natural shocks such as droughts. This would imply that organic farmers are

better able to cope with their vulnerability context. Giovannucci (2005) explains this phenomenon as follows: “The structure and physical tilth of organic soils are well-documented to better withstand adverse weather and climatic hazards such as drought and torrential rain. This is directly evidenced in reduced erosion and runoff and also in soils with superior moisture uptake, filtration, and retention” (p 45).

Another assumption in favor of food security in organic systems is that crop diversification reduces a farmer’s risk of dependence on one crop (Heierli, 2008). For example, in case of a natural shock such a drought, some crops might be more resistant than others. Moreover, crop diversification not only signifies a diversification of income but also of food - which leads to more varied diets (Eyhorn, 2007).

The two mentioned arguments would imply - in the case of bioRe Tanzania - that bioRe farmers face a more stable production than conventional farmers. To test this assumption, food availability on a scale from 1 to 5 was observed over the last decade during the trend analysis. The results, based on farmers’ perceptions, show that food fluctuations are comparable high with both types of farming. The farmers generally explained food fluctuations with weather condition. However, years marked with extreme food scarcity (when the farmers put only one stone in a certain year) had additional underlying causes: First of all, these were farmers (C5/7/8), who did not possess land during the hunger period in 2002 and 2003, but i.e. rented land from others. And secondly, farmers (C9/O4) experienced specific years as very tough, because one of the family members was sick. Food shortage and a lower income resulted out of it. Narayan (1997) reports in a World Bank study conducted in Tanzania that most serious diseases such as Malaria occur during the rainy season, exactly then, when farmers start cultivating their crops. The impact of health on wellbeing is not astonishing as poor people fully depend on their body. Chambers (2006) puts it as follows: “The poorer people are […] the more they depend on physical work, and the higher are the personal costs of physical disability.”

Another starting point, to compare the food situation of conventional and organic farmers was to confront their coping strategies during a specific drought. In concrete terms, I asked conventional and organic farmers how they coped with the drought in 2006 during the individual interviews. According to them, the two most common strategies are to use food stocks from last year or to buy food at the market (in exchange for cattle). On average more organic farmers (6 out of 12) had enough stock than conventional farmers (4 out of 10). An organic farmer (O4) proudly explained: *We usually have a box full of sorghum, because sorghum is tolerant to droughts compared to maize. This is why we never had to buy food.*

Moreover, more conventional farmers (4 out of 10) had to buy food than organic farmers (4 out of 12). However, four farmers (C7/10,O6/9) did not perceive that year as a drought. Possible explanations, besides simply not remembering, are that they did not suffer a lot

because they had enough stock or they might have some of their fields in another village with a different rainfall pattern.
Again, the latter numbers might be of limited scope because only a few farmers were interviewed and the results are not statistically significant. Still, they might show a tendency that could be examined in further studies.

5.5.4.2 Emotional base

I observed during the personal interviews that many aspects appeared that touched the emotional base of the farmers. It seemed that most farmers are proud to be organic farmers. They are thankful that bioRe Tanzania teaches them in organic methods so that they are better able to - as they say - *care for* (O10) and *protect* (O7) their land. The following four portraits show the connectedness of the farmers to their land.

O7 (age 58) is father of 9 children and cares for a household of 11 members together with his wife. He went to primary school and attained standard 7. He used to be a policeman before 2003 and at the same time possessed 5 acres of land for cultivation (today he possesses 8 acres). Since 2003, the government no longer employed him and he fully became a farmer. Today, when he looks back, what he learnt, he says that one advantage, if you grow organic, is that…

> *You learn how to protect your land, specifically how to improve fertility of the soil.* He adds that *organic techniques last for a long time, so if I put manure on my field, I can improve soil fertility in the long run.*

O10 (age 50) is married and father of 6 children. He went to primary school and attained standard 7. He was the first bioRe contract farmer in Paji. Earlier he possessed land, which belonged to the extended family. He said that he bought 80 acres of land in 2006 that belong to him and that he does not have to share with his relatives. He appreciates that with bioRe Tanzania…

> *I learnt how to care for my land […] if you follow the instructions of crop rotation, pest management and prevention of soil erosion, you can increase your soil fertility, which leads to better yields.*

O12 (age 32) is father of 4 children and cares for 9 household members together with his wife. He went to secondary school and attained standard 3.

> *Education in the sense of new know-how brings a big chance and helps me to improve my land […] if you follow certain procedures, you will use the land in a good manner and you cannot misuse it.* He is proud that *other farmers can learn from me what I am doing, because it is different from what other farmers are doing. For example others come and see on my field how I prevent soil erosion and I can explain them how it works.*

O11 (age 33) is father of 12 children and married with two wives. His household contains 17 family members and they live together in 5 tembe houses. He possesses 150 acres of land and about 75 cows. He went to primary school and attained standard 7. He is proud that he was able to learn how to take measures against soil erosion, he explains:

> *You build kind of a barrier out of straw, when the water comes, you can change the direction of the water [...] Through the soil erosion control, the water is staying in the field, instead of flowing away.*

5.5.5 Impact on financial capitals

As discussed before, it makes more sense to look at profitability of farms instead of comparing yields. To understand the profitability of a farm, Scialabba and Hattam (2002) recommend examining different criteria such as relative input, labor costs etc. Most of the criteria also emerged during the individual interviews out of the discussion and are highlighted below: First, production costs and second, market conditions and cotton prices.

5.5.5.1 Production costs

Production costs are separated in labor costs and capital costs. As discussed in section 2.3 *Pros and cons of organic production*, most scientists agree that organic production is related to more labor force, as external inputs are substituted through more demanding methods of cultivation and inputs produced on the farm. This has been verified for organic farms in developed countries, however there is a lack of systematic analyses in developing countries on this issue (Pimentel, Hepperly, Hanson, Douds & Seidel, 2005). As organic and conventional farmers have never raised the issue of labor cost during the personal interviews, this subject will not be discussed further here.

In contrast, capital costs were of great interest. Organic farmers reported that they spend less on capital costs than before as conventional farmers. They mentioned two reasons for this: First of all, the costs to buy chemicals are eliminated (4 out of 12). If organic farmers spray (although most farmers don't), they use botanicals, which are also quite costly. However, botanicals are subsidized and only used in little amounts, one farmer explained (O6):

> *By scouting for pests you can safe money: If there is an infestation, the extensionist and the farmer determine how many acres to spray and the extensionist says what amount of botanicals you should use on what part of the land. So, we do not spray the whole plot and consequently save money.*

Secondly, an organic farmer (O12) discovered that he requires less seeds when he sows in rows than when he broadcasts the seeds. A conventional farmer (C10) who lives in Paji and

knows bioRe quite well mentioned another advantage related to production costs: He says that bioRe farmers receive inputs on credit base, whereas conventional farmers have to go and buy inputs in cash. It is true that bioRe farmers can borrow money from the bioRe Foundation to buy inputs. Thereby, the farmers have to pay back money within one year but do not have to pay interest rates.

5.5.5.2 Market conditions and cotton prices

Another financial advantage of organic cotton farming, which came up during the interviews, are market conditions: Some organic farmers (3 out of 12) underlined that it is a great advantage for them that they are embedded in a secure market through bioRe. One organic farmer (O10) explained:

> *During the time of cotton sales, you can be relaxed because you know that you can sell your cotton and you are paid on the spot. Earlier, there were so many people and you had to fight to sell your cotton.*

Another organic farmer (O12) also talked about his experiences as conventional farmer:

> *The market was a problem, because it was not secure. Cotton traders come from many places and every year you are not even sure if they will come or not. And even if they come, the price is not good.*

Thus, having a contract with bioRe Tanzania provides the farmers with a certain security and makes them more independent from traders.

Moreover, some organic farmers (2 out of 12) reported that they were often cheated when they wanted to sell their cotton as conventional farmers. One conventional farmer (C10) explained:

> *The price of cotton is not known in advance and you have a lot of costs to produce the cotton by your farming activities (i.e. land hiring, labor, seeds etc.), but at the time you sell your cotton you face a low price, so you cannot meet the costs.*

This quote shows that farmers cannot assess likely future prices, which makes cultivation management more difficult, especially with highly volatile prices (as explained in section 2.2). Organic production on the one hand mitigates and on the other hand reinforces price volatility: As mentioned in section 2.3, organic farmers lose their flexibility to adapt to fluctuating prices because most of them can sell only one product as organic (such as cotton in Meatu) because of the absence of a distinct organic market for the other crops. On the other hand, bioRe Tanzania's price premiums are added on the basis of the price averages over 5 years, which makes income from cotton more predictable and dampens volatility especially during years of a low cotton price.

Finally, bioRe farmers appreciate the 15 percent price premium that bioRe Tanzania pays them. Despite this, many bioRe farmers did not sell all their cotton to bioRe Tanzania in the year 2010. Ledermann explains why (Interview, May 4, 2010):

> *Although bioRe always matches the highest price offered by a trader (plus adding the premium), in reality, private trader cheat farmers by purchasing cotton at their doorsteps and using manipulated weighing scales, not paying the full sums of money, etc.*

Discussion:

It was not an easy task to find out if the farmers are more driven by prices or by the organic methods they learnt form bioRe Tanzania. As mentioned in subsection 2.4.1 *bioRe Tanzania*, Pattni considers the organic system to be sustainable, if the farmers are convinced about the organic methods and would continue growing organic even if bioRe Tanzania pulled out of the market - given that other organic cotton traders would be present (Interview, April 19, 2010).

One way of approaching this question is to see if terminated farmers keep using organic methods out of conviction. As only two terminated farmers were in the sample, the following statements are not representative, but worth mentioning anyway. One conventional farmer (C9) reported that he is still applying manure, although not in enough quantities - as he says - and he is using sunflowers as trap crop. The second conventional farmer (C8), who was terminated by bioRe Tanzania in his first year, said that he is using none of the organic techniques. The latter is not astonishing as it might be difficult to fully internalize the organic know-how within one season.

Another way to answer this question is to look at the trend analysis. Many farmers mentioned specific organic techniques when their food or income situation was discussed over years. They are convinced that organic techniques help them to improve the quality of their soils and crop yields and with it their food and income situation. When talking about the income and how the income changed over years, improvements in income were first of all attributed to the weather condition, secondly to specific methods (4 out of 12) and thirdly to the price premium bioRe pays (3 out of 12). Also when asking the farmers directly at the end of the interviews, what advantages and disadvantages organic farming has, most farmers (10 out of 12) mentioned the acquired know-how and training and only half of the farmers (6 out 12) referred to the price.

One possible explanation is that the farmers are convinced about the techniques they are taught, and that they help them to improve their income. The price premium would then play a minor role. Pattni explains, that prices are dictated by the world market prices, so nobody can control them (Interview, April 19, 2010). When prices are very low, the price premium is only a small comfort. Giovannucci (2005) writes in his paper that the promise of a higher

price is mainly used to convince farmers to convert their conventional to organic farms. However, two studies conducted in India by Schwaller (2004) and Eyhorn (2007) show that motivations to change to organic farming are more diverse: Besides achieving a better price, the farmers want to improve soil fertility, to reduce production costs, to be less dependent on loans and to reduce the risk of production. In the case of bioRe Tanzania, most farmers mentioned training and extension service as well as a *modern style of farming*, where no chemicals are used, followed by the price as the main conviction for conversion at that time. So, the price and the reduction of input costs seem to be important but are not the main reason to convert to organic farming.

Another possible explanation is again, that the farmers were influenced by the fact that the research team was not independent from bioRe Tanzania. When talking about the price together with the interpreter in informal discussion, she explained that prices are a very important factor for the farmers but that farmers might be cautious to put more emphasis on prices, because they want to show that they are good organic farmers and not only driven by prices.

5.5.6 Financial capitals: Outcomes

The outcome of the impact on financial capitals seems to be evident. bioRe farmers profit from more income because they can manage their farms in a more profitable way and receive a price premium from bioRe Tanzania. Although bioRe farmers are embedded in the same vulnerability context as conventional farmers, an increased income might help to mitigate shocks as the next paragraph shows. Finally, the last paragraph again picks out some personal statements of farmers showing emotions with regard to new opportunities they have by earning some extra money with bioRe Tanzania.

5.5.6.1 Additional income

Several indicators suggest that organic farms are more profitable than conventional farms, because organic farmers can reduce their production costs by refusing to use chemical pesticides and profit from extra price premium paid at the end of the season. The next question is then, how do the organic farmers invest this additional money? It can be assumed that the farmers invest their money in assets that have high priority for them. Therefore, the elaborated wellbeing indicators can serve as a guideline.

As the trend analyses showed, in times of serious hardship (2002, 2003 and 2006), when food at home was not enough for the whole family, the farmers used their additional money to buy aliment. Furthermore, most farmers reported that they bought cattle in the last ten years (especially in the years 2004 and 2006). Cattle are used like a bank account where

money is saved for more difficult times. A World Development Report by the World Bank (2000) underlines that a sound asset base, such as enough savings in terms of cattle makes farmers less vulnerable, because in difficult years they can sell some of their cattle but they might still have enough of them for breeding. A difficult year might be a year, when a drought devastates most of the crops or when commodity prices suddenly collapse.

To find out more about how the farmers spend additional money, I directly asked the organic farmers: *If you had additional money this year, how would you spend it?* The main answers were clearly expressed in terms of physical capitals: They would like to construct a new house or open up a small business (see subsection 5.5.7).

5.5.6.2 Emotional Base

Farmers were rather neutral with regard to the price premium they received. But still some organic farmers expressed their pride to earn some extra money with bioRe Tanzania and to reduce input costs with organic farming, as the following four farmer's portraits show.

O8 (age 44) is married and father of 6 children. He went to primary school and attained standard 7. He possesses 60 acres of land and 14 cows. He explains:

> *We bioRe farmers have a higher price than conventional farmers and we therefore have a good image in the village.* He, however, adds that the price bioRe pays is no the only reason for his additional income, but also *if you follow good farming practices such as sowing in rows […] you will have good yields and therefore a good income.*

O2 (age 68) has 3 wives and 14 children. His household contains 18 family members. His father was already a bioRe farmer and he started to grow organic in 2004 as a family producer. He says:

> *Others admire me, because I receive extension service, I have a secure market and I receive a good price from bioRe.* He explains that before he joined bioRe *I was not able to finance school fees for two of my girls […] now I can pay the fees and they can go to secondary school.*

O5 (age 46) is mother of 9 children. She lives alone with the children in 2 tembe, her husband lives in the house of his first wife. They possess 25 acres of land and 15 cows. She does not know a lot about organic farming. Therefore, a family member, who is a family producer, helps her out:

> *The income from bioRe is high, if you compare it with conventional farmers: Once you go and sell your cotton, the price is high.* Then she counters that despite the good price bioRe pays *I find it very difficult to care for the whole family alone, because my husband is already old.*

O6 (age 47) is married and father of 6 children. Besides farming, he is in a political party

(demonstrated with a flag attached on the roof). He went to primary school and attained standard 7. He remembers the situation when he was a conventional farmer:

> *Cost of production was high, therefore, I had to borrow money and pay high interest rates. Other farmers could not pay the money back and got into troubles. Today I do not have to borrow money anymore. If you want to have a credit, you can have it from bioRe for free.* Although he appreciates the reduced input costs as organic farmers, he adds, *but my income is still low. I am planning every year to construct a nice house, but I still have failed. But I am optimistic that I will realize it in the future.*

The added value for the farmers of being able to construct or renovate a house is discussed in subsection 5.5.8.

5.5.7 Impact on physical capitals

As discussed before, the answers to the question - *If you had additional money this year, how would you spend it?* - were mainly expressed in terms of physical capital: About 75 percent of the respondents said that they would like to construct a new house with a corrugated iron roof or renovate their old one, which reflects the results of the wellbeing ranking. About 17 percent of the respondents said that they would like to start or expand a kiosk. For the farmers, opening up a small business diversifies their income and is kind of a livelihood strategy. During the group interviews, the participants explained that not everybody could start a business because you need a starting capital. Only two farmers of the sample have a business: An organic farmer (O11), who possesses about 150 acres, and an organic farmer (C8) with about 40 acres. Both of them expressed that they are not very dependent on the business.

The rest of the answers (about 13 percent) were expressed in terms of natural assets: One farmer (O7) said that he would like to acquire more land so that he can cultivate more cotton (he possesses 8 acres). Land acquisition was also mentioned during the trend analyses: Four organic farmers (O2/4/6/7) reported that they were buying land in the last ten years. They added on average 8 acres and one farmer (O2) said that he was a family producer and cultivated on the land of his father until 2008 (the weather was very good then), when he bought his own land (28 acres).

Other physical assets were expressed during the wellbeing ranking, namely good means of transport and clothes. But these two indicators did not turn up again during the individual interviews. However, a new physical capital appeared several times during the personal interviews: farm implements (i.e. ox-weeder and ox-plough). An organic farmer (O6) remembered that before he joined bioRe, he heard that organic farmers use improved farm

implements such as planters, which lay seed down in precise manner along the rows, and this was one of the reasons why he wanted to join bioRe. Not all organic farmers can afford farm implements, but bioRe Tanzania encourages the farmers to use them by offering credits for the acquisition or the rent of such devices.

5.5.8 Physical capitals: Outcomes

As mentioned before, a good house allows a secure shelter for the farmers, whereby *security* represents another livelihood outcome. Moreover, being able to build a new house or renovating an old one is a status symbol and gives the farmers self-respect. A lady explained this during a group interview:

> *If someone has a nice house, it is a physical appearance that represents something that is good. It shows that you have enough money to for example care for you family. Therefore, people will admire you.*

During the personal interviews emotions with regard to physical assets were also expressed by several farmers, as the following two portraits show:

O1 (age 50) is mother of 9 children. Her husband abandoned her years ago and now she cares for the 12 household members alone. She possesses one tembe house and an iron roofed house for the whole household. She is illiterate. Asked what her *best time in life* was, she replied:

> *In 2008, I only cultivated four acres of cotton and with the help of my neighbors I sew the seed in rows and used manure […] So, I got more yields and was able to construct a new house with an iron roof.* The iron-roofed house protects the family from rain and allows a good and comfortable sleep. She adds, *with the iron roof I can even harvest rain now.*

O4 (age 43) is father of 7 children and cares for 10 family members together with his wife. They live in two tembe houses. He never went to school, but received adult education, organized by the Ministry of Education. He possesses 28 acres and 20 cows. He remembers:

> *When I was a conventional farmer, I was just broadcasting the seeds and I was cultivating on the same plot - we simply did not have the right procedure. Now, I am sowing in rows, I am using manure and I am using an ox-weeder to weed my fields.* He adds that he wishes to have an ox-plough and a planter as well. Until now *I have always had to hire it from somebody.*

6 CONCLUSIONS

The present study explored the impact of organic cotton farming on the wellbeing of bioRe contract farmers. There are many ways to tackle such a research question, as other studies in organic agriculture research show. One common aspect of the studies is that researchers work with predetermined criteria to examine the impact on the farmers' situation. In contrast, one central aspect of this thesis was to first explore local conceptions of a *good quality of life*, before analyzing the impact of organic farming on their wellbeing. Thus, the idea was to understand perceptions of the poor from a bottom-up perspective.

Having read selected works of Chambers and having understood his conviction that poor people value much more than material assets, I was surprised at first sight that the farmers in rural Tanzania mainly defined wellbeing in terms of tangible assets: they mentioned the availability of land, a good house and enough food, followed by education, cattle and income. Education appeared as the only non-material asset and food was categorized as a livelihood outcome rather than a livelihood asset. The farmers' focus on tangible elements makes sense as having enough food, a piece of land and a secure house are basic needs that have to be satisfied before thinking of anything else.
However, when digging deeper into the wellbeing indicators, I found out that intangible assets are hidden behind material assets: A house is predominantly seen as a protection for the household members. But besides being useful for the internal safety, a house also represents a status symbol towards the outside. The latter argument is not negligible if one becomes aware that the house was ranked even before having enough food for the whole family.
These results open avenues for further studies aimed at exploring wellbeing by using other definitions. If a *good quality of life* were substituted with *the most important elements in a farmer's life* or *elements that make the farmers happy*, would non-material assets be more visible at a first glance? If rural poor are compared with urban poor, does the typology of wellbeing indicators differ? What is the attitude of the farmers towards materialism? What are other status symbols that have not been explored in this study?

After having analyzed the wellbeing of the farmers, the impact of organic cotton farming on the farmers' situation was examined with the help of the Sustainable Livelihoods Framework. bioRe Tanzania was considered to be the starting point of the analysis representing kind of a network, thus a social asset for the farmers. bioRe Tanzania encourages the farmers to tap new know-how, which they can implement in their agricultural activities. In this context, bioRe farmers are convinced that they can improve fertility of their soils. Scientists tend to agree

that reduced external inputs and the application of organic manures and fertilizers are good for the soil. Fertile soils would better withstand natural shocks and therefore decrease vulnerabilities of the farmers such as reducing hunger periods. As the sample of farmers in this study was not representative for all farmers in Meatu, further studies could focus exactly on the issue of food security. Is it true that organic farming considerably increases soil fertility and with it food security of rural farmers in Tanzania? How visible is the effect?

Besides analyzing the effects on natural assets and their outcomes, the present thesis also looked at the income of the farmers. As the farmers can manage their farms in a more profitable way and receive a price premium, bioRe farmers have more money available to invest in various purposes. It can then be assumed that an increased income is another possibility to decrease vulnerabilities. But does an increased income necessarily increase resistance to shocks? If we look at the elaborated wellbeing indicators, the answer must be yes. If farmers invest their money in additional land, they can increase their food and cotton production, making a contribution to food security. Investing in cattle means that cattle can be sold in times of serious hardship. If additional income is invested in the construction of a new iron-roofed house, the family can protect itself from rain.
The various investments described above can be divided into productive and *non-productive* investments. For example, the construction of a house directly serves the family and does not generate income (except when it is rented out or used as a bond). On the other hand, investments such as the acquisition of land or cattle are more productive. The tenure of cattle can be compared with saving money on a bank account: Similar to money that earns an interest rate, cattle are breeding and multiplying. But the risk of holding cattle is greater than saving money on a bank account because cattle can die if they do not receive enough food.

It could be interesting to see in further research activities if the farmers emphasize more on productive or *non-productive* investments. The present study has already shown that *non-productive* investments play an important role. Can it be assumed that the need to build a solid and modern house has to be satisfied first before thinking of investing in the future in a more productive way? One advantage of building a house is that it yields a direct and visible profit for the farmers, whereas investing in education for example would be more long-term oriented. Although the interviewed farmers are convinced that education is important and that a long-term development can only be attained if children are educated, the farmers would not actively motivate and support their own children to succeed at school. This is what the farmers told me during the interviews and what teachers confirmed. Consequently, an important question is: How do the farmers plan the future? What is the time horizon for their plans and investments?

A further avenue would be to explore what other hidden livelihood strategies the farmers use or might use within or outside their agricultural activities. One organic farmer for example reported that she is producing pots and chalk and sells them on the market. What other products are being produced in the area and what products would have the potential to make an important contribution to the farmers' situations? What if bioRe Tanzania or the bioRe Foundation would support their production and marketing?
Another organic farmer said that he would like to use irrigation systems for his fields. Would it be possible to implement irrigation systems in rural areas of Tanzania? Or would such systems bear too many risks for the water management? If not, how could bioRe Tanzania or the bioRe Foundation make a contribution?
Finally, more than one organic farmer dreamt of having farm implements, such as an ox-plough or an ox-weeder to facilitate cultivation. Besides guaranteeing credits for such implements, how could bioRe Tanzania or the bioRe Foundation further support the use of these devices? Would it be possible that farmer groups would rent or lease such devices instead of individual farmers?

To conclude, I want to come back to Pattni's statement that the organic system can only be sustainable if the farmers internalize the organic know-how and are not driven by prices. As discussed during the analysis part, the farmers are convinced that organic techniques help them to improve the quality of their soils and crop yields and with it their food and income situation. But prices also play an important role - probably more than they would have admitted during the interviews.
It seems that exactly the mix between providing human as well as financial capitals empowers the farmers to be better able to cope with shocks. If a drought destroys parts of an organic farmer's crops, it can be assumed that he loses less than a conventional farmer because his soil better withstands shocks. Losing less does, however, not mean that the farmer finally has enough food for the whole family. Therefore, the direct financial support that bioRe Tanzania guarantees is an important supplement to dampen vulnerabilities of rural poor in a progressive and sustainable manner.

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8 APPENDIX

8.1 Contract bioRe farmers

Annex of the contract between bioRe Tanzania and bioRe farmers (source: bioRe Tanzania)

ANNEX I

CONDITIONS for organic farming:

1. The farmer has to implement all conditions of organic farming.
2. The farmer never applies any not allowed inputs at any time under contract (no chemical fertilizers, no chemical insecticides, and no herbicides).
3. Should the farmer receive conventional inputs immediately return the goods or sell.
4. The farmer confirms to purchase and sow only untreated cottonseeds, from bioRe Tanzania Ltd. and never uses chemically treated seeds (CTS). In case they receive a passbook from the Tanzanian Cotton Board, the farmer must surrender the passbook to bioRe.
5. In case the farmer owns pesticide sprayers or pumps from Tanzania Cotton Board, he has to sell them before the next spraying time.
6. The farmer neither lends nor borrows sprayers from conventional farmers.
7. Border crops has to be planted on organic produce plots bordering neighbours farmland
8. The farmer implements crop rotation.
9. Cotton after cotton is forbidden for new farmer and for old farmer 75% cotton after cotton without intercropping with legumes is forbidden.
10. To protect organic cotton, plant rows of sunflower around the cotton plot, and every 15-meter in the plot
11. Scouting for pests before using botanical pesticides recommended by bioRe Tanzania Ltd
12. Attend trainings and meetings.
13. Give complete and correct information about bought cottonseeds, plot locations and sizes, rented out plots, purchased or hired plots, pest attacks and any other problems.
14. Inform bioRe Tanzania Ltd. immediately about purchased, sold, rented-out or hired land.
15. The farmer allows the company to inspect fields, houses, go-downs, and sprayers at any time, irrespective of the presence or absence of the farmer.
16. Respect the Location Leader as representative and spokesperson.
17. Put compost or farm yard manure on your fields to improve soil fertility or intercrop cotton with beans
18. Take measures to reduce soil erosion

ANNEX 2

Sanctions:

Conditions	Sanction
No chemicals	Exclusion
No passbook	Exclusion
Use or possess chemically treated seeds	Exclusion
Possess own spraying pump	Exclusion
3 years 75% cotton after cotton for Old cf with NO legumes intercropping	Exclusion
No access to farm or plots	Exclusion
Parallel production	Exclusion

Border crop or a space of 2m to a conventional field is a must, because of drift, otherwise the farmer is excluded.

The progress in organic farming practices of each individual farmer is evaluated over a period of 5 years.

I promise to follow the organic agricultural principles outlined in the contract as well as the Internal Control System (ICS).

<u>Herewith I confirm, that I accept the sanctions shown in Annex 2, if any of the above mentioned conditions are not followed.</u>

Farmer's Signature…….

ANNEX 3

The Purchase Guarantee
and
the Price paid to the Farmer

1. The Purchase Guarantee

The Company guarantee to purchase minimum 80 % of the individual realistic yield estimate for "full organic" Cotton only. The estimation of the expected yield will be worked out between the Farmer and the Extension Staff of the Company prior to the purchase.

2. The Price paid to the Farmer consists on the following elements:

The Basic Price

The Basic Price is the average Price of the entire conventional Buyers in the village. The Basic Price has to be agreed upon, between the representative of the Company and the appointed Farmer representative and will be announced every day for the following day.

The Premium for Organic Cotton

In addition to the Basic Price the Company will pay to the Farmer a Premium for any kg of "Full Organic" Cotton delivered. Prior to the season (in May) the premium will be agreed between the representatives of the farming community and the company bioRe® Tanzania Ltd.

During the period of "in conversion" no such premium will be paid by the Company.

The Premium for Inputs (Subsidy)

The Company will credit the Farmer for each delivered kg of either "in conversion" or "full organic" Cotton an additional premium for inputs. After final purchase, the Farmer will receive a Credit Note (Pass Book) stating the Total Credit with the Company. The Farmer can use this Credit only, to purchase the inputs like seeds and botanicals from the Company. Any purchase exceeding this Amount has to be paid in cash.

If the Farmer is not able to pay in cash he may buy the Inputs on Credit. The outstanding balance of such a credit has to be paid back within 8 month latest. The Company has the right to deduct any outstanding Balance during the next following Purchase.

I herewith agree on the Conditions of this ANNEX to this Contract.

Farmer's Signature…….

8.2 Activity calendar of bioRe Tanzania

(Source: bioRe Tanzania)

What happens in September and October:

- Registration of farmers:
  - Adapt and revise contract.
  - Adapt and revise sanction catalogue.
  - Training on risk assessment for staff, what are risks when registering farmers?
- Delivery of cotton seeds from ginnery to bioRe centers. Organize transport.
- Delivery of botanicals and seeds to bioRe centers.
- Get farm implements ready, order spare parts where necessary.
- Inventory of stock (seeds, botanicals, farm implements, spraying pumps).
- Organization of farmers into clusters and allocation to Extensionists and Supervisors.
- Fill out Basic Farmer Information and the Farm Book (See example).
- Check list from TCB and cooperative society, if bioRe farmers received unallowed inputs.
- Sale and distribution of farm inputs to farmers (See "how to fill out payment slips").
- Cross check of purchase slips with farmers (have they kept all receipts?).
- Decide who is Host Farmer (a farmer with good farming practice)
- Election of Location Leaders:

THE ROLE OF LOCATION LEADERS

- They are contract farmers' representative i.e.
  -Delivering information from bioRe to contract farmers and vice versa is true.
  -Disseminate acquired knowledge and ideas to other contract farmers after attending training session at our Training Centre.
- To inform other cfs to attend meetings.
- Responsibilities during purchase (see ICS Manual)

Election: Location leaders are selected through meeting at their respective location. The extensionist should organize the meetings and highlight the aim of the meeting. Also she/he should attend/observe and give some views if any. Cfs are the one who appoint their location leader.

Note: The location leader are only leaders for bioRe contracted farmers. No location leader who has political role.
They are elected every start of the season. But they are exchanged if he/she fail to fulfill his/her responsibilities.
Number of farmers per Location Leader varies according to distance from one farmer to the other. Number of farmers ranges from 15 to 20.

Farmer:

- Preparation of the season – planning of crop rotation.
- Bringing farm yard manure to the fields.
- Training on land preparation, ploughing, harrowing (Information about land preparation).
- Encourage the use of farm implements.
- Sowing of sorghum and maize.

What happens in November and December:

- Inventory of stock, end of year.
- Control, cross-check of farm files (field map, farm records) by Supervisor.
- Cross-check of buffer zone toward conventional neighbors, by Supervisor and ICS officer.
- Farmers attending FT. Monitoring, especially new farmers have to attend FT.

Farmer:

- Land preparation, ploughing, harrowing.
- Sowing of cotton (Information about sowing).
- Sowing of sunflowers at the time of sowing cotton.
- Leave 2 meters buffer zone from conventional neighbour/cotton plot
- Sowing of sorghum and maize.
- December: Sowing of mung beans, local beans, ground nuts.
- Control water flow from conventional farmer to avoid contamination during ploughing.This can be done by leaving fallow of 3 meters or making ridges and plant giant grasses. Also by making water catchments

What happens in January and February:

- Training of farmers on Scouting.
- Update of final cotton acreage and all other crops acreages, by end of February.
- Inventory of Stock.
- Sowing legumes

Farmer:

- Sowing of cotton until mid January.
- Sowing of sunflowers.
- Sowing of sorghum around the border of cotton plots.
- Weeding.
- Scouting (Information about American Bollworm).
- Spraying.
- Check soil erosion (Information about soil conservation).
- Control water flow from conventional farmer to avoid contamination during ploughing.This can be done by leaving 3 meters fallow or making ridges and plant giant grasses. Also by making water catchments

What happens in March and April:

- Internal Inspection is an annual process.
- Training on yield estimation in March.
- Inventory of stock.
- Order payment slips.

Farmer:

- Scouting.
- Spraying.
- Sowing legumes.(Local beans)
- Weeding.
- Collection of sorghum and maize residues for cattle feed.
- Yield estimation for cotton.
- Check soil erosion.
- Harvest of sunflower, sorghum, maize, mung beans, ground nuts, local beans.
- Extracting oil from sunflower seeds.
- Harvest of cotton.
- Grading of cotton.

What happens in May and June:

- Internal Inspection is an annual process and is coming to an end.
- Preparation of warehouse for purchase.
- Inventory of stock.
- Order bags for cotton seed transportation from warehouse to Mwamishali center.
- Update and new purchase of material for cotton purchase (tarpaulins, padlocks, weighing scales, torches, etc).
- Crosscheck all yield estimations before purchase, with query from database. (Average yield per acre).
- Purchase of cotton beginning of June.
- Preparation of the ginnery.
- Organization of bags and trucks for seed cotton transportation.

Farmer:

- Scouting (Information about cotton strainer).
- Spraying.
- Harvest and grading of seed cotton.
- Control of storage pests

What happens in July and August:

- Seed Cotton purchase.
- Purchase of other crops (sunflower).
- Evaluation of the season.

Farmer:

- Harvest of seed cotton.
- Uprooting of cotton stalks

8.3 Codes of interview partners and groups

Table 8: Codes of interview groups

Group code	Village	Farming type	Gender
G1	Mwabagalu	bioRe	m
G2	Bulyanaga	Non bioRe	m
G3	Bulyashi	bioRe	f
G4	Nkoma	Non bioRe	f

Source: Own table

Table 9: Codes of individual farmers

Code	Type of farming	Name	Village	Gender	Land (in acres)	Cattle
O1	Organic	L. Mboje	Paji	f	50	22
O2	Organic	S. Malelemba	Paji	m	28	8
O3	Organic	M. Winogelea	Paji	m	125	20
O4	Organic	K. Sosoma	Paji	m	28	20
O5	Organic	S. Kwilasa	Paji	f	25	15
O6	Organic	V. Mashauri	Paji	m	44	25
O7	Organic	C. Kulwa	Paji	m	8	12
O8	Organic	N. Minoja	Paji	m	60	14
O9	Organic	Y. Bugehu	Paji	m	28	60
O10	Organic	F. Ng'wandu	Paji	m	100	15
O11	Organic	J. Nyolobi	Paji	m	150	75
O12	Organic	R. Mahona	Paji	m	60	46
C1	Conventional	S. Reuben	Bulyanaga	m	60	15
C2	Conventional	C. Seni	Bulyanaga	m	100	30
C3	Conventional	E. Maige	Bulyanaga	m	60	10
C4	Conventional	J. James	Bulyanaga	f	60	7
C5	Conventional	M. Mikembo	Bulyanaga	m	60	10
C6	Conventional	N. Ng'wigulu	Bulyanaga	f	0	0
C7	Conventional	G. Masuke	Paji	m	0	0
C8	Conventional	J. Mkumbo	Paji	m	40	18
C9	Conventional	K. Ngusa	Paji	m	40	12
C10	Conventional	S. Ngelela	Paji	m	30	25

Source: Own table

Table 10: Codes of experts

Code	Name	Function	Interview Date
E1	Niranjan Pattni	CEO bioRe Tanzania	April 19, 2010
E2	Nicola Morganti	Consultant of the Institute for Ethical and Environmental Certification (ICEA)	April 25, 2010
E3	Samuel Ledermann	PhD candidate in Geography	May 4, 2010
E4	Donald Masunga	Village Executive Officer, Paji	March 5, 2010
E5	Rahel Elias Mahu	Village Executive Officer, Bulyanaga	March 20, 2010

Source: Own table

8.4 Interview guide for personal interviews

Checklist for conventional and bioRe farmers (except the end is different)

Date		Village	
Name of the head of the household		Marital status	
Gender		Age	
How many people live in the household		How many children	
Observations:			

Indicators of wellbeing: Presentation of the wellbeing indicators visualized as Polaroid pictures
Look at these wellbeing indicators. Do you think that they are the most important or of what else factors could you think of?
What are the most important indicators? Why?
Vulnerability Context
What was the best time of your life? Why?
What was the worst time of your life? Why? How did you cope with it?
What are your main problems in life?
What negative events are you most worried about in the future?

Trend analysis

5 = very good
4 = good
3 = Average
2 = bad
1 = very bad

Nr.	Indicators	2000-2001	2002-2003	2004-2005	2006-2007	2008-2009
	Land					
	House					
	Cattle					
	Food					
	Education					
	Income					

Questions to the different wellbeing indicators during the trend analysis:

Land	Land size	
	Cotton acres (this year) Is cotton the main crop?	
	Food crops	
	Importance • Why is land important? For what do you use it? • What does it mean for you to have a lot of land?	
	Quality • How did the amount or quality of the land change? • What was the consequence of the increased / reduced soil fertility?	
	Changes • Did you buy or sell land during this time? Why? • Why did you buy more land? How many acres? • For what do you use the additional land? • Did you inherit land?	
House	Amount of houses	
	Type of houses (material)	
	Importance • Why is it important? For what do you use it? • What does it mean for you to have a good house?	
	Quality • How did the amount or quality of houses change? • Why did you buy a better house? For what do you use the new house?	

Cattle	Amount of cows	
	Amount of sheep and goats	
	Importance: • Why are cattle important? For what do you use them? • What does it mean for you to have a lot of cattle?	
	Changes • How did the amount of cattle change? • Did you buy or sell any cattle? Why? • For what do you use the additional cattle?	
Food	Changes • How much food was available in these years? • Why did you have more or less food? • Is the weather condition the only reason for better/less yields? • Did you also buy food sometimes in these years? When and why?	
	Farmers told me that there was a drought in 2006 in this region: • How were you able to cope with this shock? • What were your strategies to cope with it? • What would have helped you to better cope with this shock? • How long did it last to recover from this shock?	
Education	Level of education of farmer	
	Amount children in age of school	
	How many attend school	
	Importance • Why is education important for you? • Who/what convinced you that education is important?	
	Changes • Is there an exceptional year for this issue? • Did any child fail at school? Why? At primary or secondary school? • Have you ever had problems with paying school fees, clothes etc.?	
	Future • What plans do you have for the future of your children? • What highest level of education will your children probably achieve? • Do you want them to be a farmer like you?	
Income	Cotton: Main source of income?	1.
	Other sources of income?	2. 3.
	Also off-farm activities?	
	Changes: Why did you have more or less income in these years?	
	If you had additional income this year, how would you invest it?	

QUESTIONS ONLY FOR BIORE FARMERS

Organic farming
If you want to convince a conventional farmer to join bioRe, what do you tell him? (Positive aspects of organic farming, compared to conventional farming?)
But you however want to warn him: What are the dangers or negative aspects of it? (What are the negative aspects of with organic farming, compared to conventional farming?)
What are positive and negative aspects of conventional farming?
Why did you change to organic farming? What was the main motivation/conviction to change to organic farming?
Do you think that your image in the village has changed? How?

QUESTIONS ONLY FOR CONVENTIONAL FARMERS

Conventional farming
What are positive aspects of conventional farming? (If you would convince your organic neighbour to grow conventional cotton, what would you tell him?)
What are negative aspects of conventional farming? What are your main problems with conventional farming?
Organic farming
Have you heard about organic farming, what?
What are positive and negative aspects of organic farming, compared to conventional farming?
Image of an organic farmer: How would you describe an organic farmer?
If you could choose today to change from conventional to organic cotton, would you do it?

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Declaration of Autorship

Eigenständigkeitserklärung

"Ich erkläre hiermit,

- dass ich die vorliegende Arbeit ohne fremde Hilfe und ohne Verwendung anderer als der angegebenen Hilfsmittel verfasst habe,
- dass ich sämtliche verwendeten Quellen erwähnt und gemäss gängigen wissenschaftlichen Zitierregeln korrekt zitiert habe.“

Datum und Unterschrift
