Factors influencing farmer’s decision-making and resilience. The case of banana production in Amubri, Costa Rica

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Supervisor: Cecilia MarkHerbert
Evaluator: Michael Jones
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Abstract: The need for further research into farmer’s resilience and an enhanced communication between multinational enterprises and farmers of developing countries, led to the investigation of decision-making factors, in the context of sustainable agricultural development. Cause for this need is the current global spread of Tropical Race 4 attacking the worldwide grown Cavendish banana and the global call for action in implementing new banana cultivars resistant to this disease. Research was completed in the community of Amubri in Costa Rica with farmers belonging to the Bribri tribe. The main aims of the study were to investigate which factors influence the farmer’s in their choice of banana cultivar and how resilient the farmers were to disturbances like banana diseases. Results showed that the socio-personal factors, such as family tradition and economic factors, such as demand of the market, had a high relevance in farmer’s choice of bananas cultivar. It showed that farmers are torn between following traditional ways of farming and the increasing globalised characteristics of commercial agriculture, limiting them in several decisions. The transition towards an ever more commercialised farming system, which is slowly embedded in the global economy, brings along advantages and disadvantages in the context of community resilience. Whereas the economic capital is increasing, aspects like environmental capital might get less attention. It is suggested to keep a balance between different capitals in order to strengthen community resilience.

Keywords: Sustainable Development, agricultural development, crop choice, decision-making, food security, pest resilience, point-score analysis, globalisation.

Lorenza von Ketteler, Department of Earth Science, Uppsala University, Villavägen 16, SE-75236, Sweden
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Summary: We find ourselves in a globalising world which is forming ever more complex interrelationships among society and nature. In a world where population is growing rapidly and the demand for food is increasing, pressure on agriculture and farmers to increase yields is getting higher and higher.

In order to secure a future with enough food for everyone it is essential to create a sustainable agricultural system through for example implementing agricultural innovation which can provide this goal. Farmers, especially small-scale farmers of developing countries are facing complex decision factors as they are shifting towards an agriculture which is slowly embedded in the global economy. Besides, farmers are facing changes like climate change, outbreak of diseases and fast moving changes on the market. Therefore, it is important to understand which factors influence farmer’s decision-making to provide them with knowledge and innovation which is creating resilience towards disturbances.

Cause of this study is the spreading banana disease, called Tropical Race 4, which is currently spreading around the globe. HiPP GmbH & Co, a German baby-food company, contracting farmers in Costa Rica, is planning to experiment with banana cultivars which are resistant to this disease and meet the requirements of the market. The aim of this study is to explain how indigenous small-scale farmers in Talamanca make decisions in the context of banana farming, with help of the point-score analysis. The wider motive of HiPP GmbH & Co is to create pest resilience among the farmers they contract. In order to implement agricultural innovation in this area it is important to understand the farmer’s behaviour, to achieve improvements in line with the farmer’s notions and not through an unexceptional top-down approach. The study includes a case study with 28 indigenous small scale farmers of the Amubri community, which is located in La Amistad Nature reserve of Costa Rica. The research has a flexible design which uses literature review and sources of empirical evidence- structured interviews, secondary data and point-score. Point-score was chosen as the main method because literature shows that it has many advantages, such as taking into account multiple decision-making factors. Moreover, it is focused on the perception of farmers which is suggested to be important for an enhanced cross-cultural communication.

The results of the study indicate that farmers especially value socio-personal factors like family tradition and tradition of the area (see explanation of the factors in Appendix 4). This is explained through the fact that farmers of Amubri are rooted in the Bribri culture and base their agricultural behaviour on sibö-knowledge. Nevertheless, economic factors also play a major role. The demand of the market is essential when it comes to choosing banana cultivar, as this is their main income source and a secured and regular income is important for their well-being. Physical factors such as natural catastrophes and diseases were ranked lower than the other two categories, but still have relevance, caused by experiences which the farmers made in the past.

The paper finally gave an attempt to estimate the resilience of the community based on the community resilience concept by Wilson (2012). Connecting decision-making behaviour and the community concept of resilience, Amubri can be described as moderately resilient community. Nevertheless, in order to protect the farmers from disturbances like banana diseases, agricultural innovations which are framed in line with the ideas and culture of the Bribri, are essential.

Keywords: Sustainable Development, agricultural development, crop choice, decision-making, food security, pest resilience, point-score analysis, globalisation.

Lorenza von Ketteler, Department of Earth Science, Uppsala University, Villavägen 16, SE-75236, Sweden
Abbreviations

APPTA – Association the Pequenos Productores des Talamanca
APPTA is a small producer association that was founded 1987 and is working with indigenous Bribri and Cabecar farmers in Talamanca. They support organic agriculture and sustainable development through providing tools and sources of income to the farmers (appta.org, 2018).

CODEBRIWAK – Commission for Defence of Indigenous Rights in Talamanca
CODEBRIWAK is an indigenous Non-governmental organisation, defending the rights of indigenous people in Talamanca (Posas, 2013).

CSR – Corporate Social Responsibility
“CSR is the continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families as well as of the local community and society at large” (Holme & Wats, 1999).

FAO – Food and Agriculture Organisation
“FAO is a specialised agency of the United Nations that leads international efforts to defeat hunger“ (FAO, 2018).

FPIC – Free, Prior and informed consent
„An indigenous peoples right and good practice for local communities“ (FAO, 2016).

MDGs – Millennium Development Goals
The United Nations Millennium Development Goals are eight goals that all 191 UN member states have agreed to try to achieve by the year 2015, before the SDGs were set in place (WHO, 2018).

GMOs – Genetic Modified Organisms
„Genetically modified organisms can be defined as organisms (i.e. plants, animals or microorganisms) in which the genetic material (DNA) has been altered in a way that does not occur naturally by mating and/or natural recombination. It allows selected individual genes to be transferred from one organism into another, also between nonrelated species. “ (WHO, 2014).

MNEs – Multinational enterprises
Businesses which operate on an international market and have institutions in several countries. Their influence is therefore overarching the boarders of the headquaters’ location (Kolk & Tilder, 2010).

TR1 – Tropical Race 1
Fusarium wilt (Panama disease) is a disease attacking bananas and is caused by the fungus Fusarium (the full name is Fusarium oxysporum f. sp. cubense). It is a soil pathogen which infects the root system and goes on to colonise the plant through the vascular system – hyphae of the fungus can even reach the leaves (Panama, 2018).

TR4 – Tropical Race 4
Since the 1990s a new strain of the Fusarium fungus – the so-called Tropical Race (TR) 4 has developed and is attacking the Cavendish banana (Panama, 2018).

SDGs – Sustainable Development Goals
„The Sustainable Development Goals (SDGs), otherwise known as the Global Goals, are a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity.“ (UNDP, 2018).

SES – Social-ecological system
„Resilience thinking addresses the dynamics and development of complex social–ecological systems (SES). Three aspects are central: resilience, adaptability and transformability.“ (Folke et al. 2010).
1. Introduction

This chapter is going to explain the background of the problem and the problem itself according to the discussed topic and introduces the Sustainable development discourse. Furthermore, it is going to state the aim, research questions and delimitations of the study. It also explains the commission of the project in order to give an understanding of what initiated this study. Last, the first chapter shows a brief outline of the whole paper.

1.1. Problem background

The world population is expected to grow by 2.6 billion people between 2008 and 2050, and the demand for food is going to increase drastically over the coming decades (Miller & Spoolman, 2012, p.122). Industrialised agriculture and high input agriculture has the aim to constantly maximise the yield to meet the increasing demand for food (Ibid.). It today produces around 80% of the worlds food (Ibid.). Industrial agriculture and globalisation often triggers economic, ecological and social challenges which have negative impact on public health, ecosystems, food quality and can disrupt traditional rural livelihoods (Altieri, 2009). One form of industrialized agriculture is presented in big monoculture plantations, especially established in tropical developing countries (Miller & Spoolman, 2012). Such plantations imply many challenges, such as the loss of biodiversity in general and the diversity of agricultural crops in particular (Ibid.). By, for example simplifying genetic codes the risk of epidemic hazards rises (Wognum et al., 2010).

According to these developments agri-food and agri-business companies are facing economic, environmental and social pressure (Ibid.). In a globalising world MNEs play an essential role, because they have a high impact on civil society and the environment (Crane & Matten, 2016). They are often accused of exploiting workers in developing countries, destroying the environment and abusing their economic power (Ibid.). Consequently, many businesses realised the time has come to take on responsibilities and to define ethical frameworks to their actions (Ibid.). In connection to business ethics, sustainability has become a trending term which was defined as “ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs” by the Brundtland commission (Kates, Parris & Leiserowitz, 2005). However, businesses also have the potential to implement agricultural innovation, such as technologies, diversification or generally speaking change of agricultural strategy, and improve the productivity and well-being of farmers (Ryder, 1993; Beckford, 2002).

In order to achieve a more sustainable agricultural system, in technological, cultural, institutional, and normative aspects (Rotmans et al., 2001; Geels and Schot, 2007; Smith & Stirling, 2008), it is important to initiate intervention strategies at different levels (Altieri, 2002; Rammel et al., 2004, 2007; Thompson et al., 2007). Feola and Binder (2010) stress two factors which frame requirements for the success of such strategies: First, agricultural systems need to be recognized as complex, multiscale and multi-level systems (Dent et al., 1995; Berger et al., 2006; Thompson et al., 2007; Darnhofer et al., 2008) and second it is important to understand farmer’s behaviour as they are the key actors in these systems (Öhlmér et al., 1998; Webster, 1999; McGregor et al., 2001; Edwards-Jones, 2006).

Within these concerns for sustainability in agricultural development, the knowledge of indigenous farmers was re-evaluated and is becoming ever more relevant to sustainable farming systems (Appleton et al., 1995; Altieri, 2009). This has been realised by farmers, NGOs, companies, and academic institutions and they are working on enhancing food security through conserving natural resources and biodiversity (Altieri, 2009).
1.1.1. Sustainable development and SDGs

Nowadays, one will find many definitions of the term sustainable development and the understanding of the concept can vary among its users. Anyhow, the most common definition was phrased by the Brundtland Commission and was mentioned in the previous chapter: “ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs” (Kates, Parris & Leiserowitz, 2005). The World Summit on sustainable development in 2002 based the term sustainability on three pillars, namely, environmental, economic and social. Whereas, emphasis was put on the economic pillar over many years, more recently attention was directed to human development including values and goals, such as education and equity (Ibid.).

Illustrating the three pillars of sustainability through three circles overlapping each other (Figure 1) has become a common way of visualizing the system of sustainability since the 2005 UN World Summit has endorsed this model. Each of the circles represents one of the pillars: Economics, Environment and Equity (Caradonna, 2014, p.8). The space between two sustainability aspects defines the socio-economic aspects, the eco-ecological aspects and the socio-economic aspects of sustainability. The centre of the circles, forms the state of sustainability and is defined as state which is aimed to be reached. Caradonna (2014, P.8) states that “a “sustainable” society required a balance between and equal concern for the environment, social equality, and the economy.

Figure 1. The three Es of sustainability (Caradonna, 20014, p.8.)

In 2000 the so-called Millennium Development Goals (MDGs) were set in place by the UN and formed the first global approach to combat poverty, hunger, disease, unmet schooling, gender inequality, and environmental problems (Sachs, 2012; UNDP, 2017). In general countries have made progress through aiming for the millennium goals, although the success varies among goals, countries and regions (Sachs, 2012). Shortfalls, like a set of operational failures have been noticed, but the policy makers and civil society have agreed that global goals are a useful concept in order to reduce poverty, hunger and disease (Ibid.). Therefore, the former UN Secretary-General Ban Ki-Moon, among others, initiated the Sustainable Development Goals (SDGs) which continued the improved MDGs in 2015 (UN, 2015). The goals were expanded and improved within 17 Goals and 169 targets and implement the three dimensions of sustainable development: the economic, social and environmental (Ibid.). In 2017 the UN has called...
for an even stronger application of the SDGs to be able to reach the Agenda 2020 (United Nations, 2017).

Three of the sustainable development goals are mainly addressed in this study:

- **Goal 2 “Zero hunger”** implies the aim to create ways where agriculture, forestry and fisheries can provide nutritious food for everyone and provides a secured income, while supporting people-centred rural development and protecting the environment (United Nations, 2018).

- **Goal 12 “Sustainable Consumption and production”** works on resource and energy efficiency while promoting the aim of “doing more and better with less” (United Nations, 2018). It furthermore asks for systemic approach and cooperation between actors operating in the supply chain, from producer to consumer (Ibid.). One of the main concern in this goal is the challenge of providing food without causing land degradation, declining soil fertility, unsustainable water use, overfishing and marine environment degradation and the ability of the natural resource base to supply food (Ibid.).

- **Goal 15 “Life on land”** focuses on the sustainable management of forests, the prevention of desertification and land degradation, as well as the halt of biodiversity loss (United Nations, 2018).

Due to global challenges like poverty and climate change the social and environmental impact of international business has been of particular focus in the sustainable development debate (Kolk & Tulder, 2009). It has been realised that multinational enterprises (MNEs) are often perpetrators of problems, but nevertheless can also be seen as potential solution to problems (Ibid.). Given their global influence and the confrontation with several challenges, stakeholder and institutional contexts, in the home country, as well as afar, MNEs are increasingly called to contribute to sustainable development (Ibid.).

Donaldson (1996) stresses the importance of rethinking business practices in foreign countries respecting different standards of ethical conduct. Everyone learns ethics in the context of his or her culture and therefore Donaldson (1996) warns against absolutism through presuming that people must express moral truth using only one set of concepts or as Michael Walzer (cited in Donaldson, 1996) expresses it “There is no Esperanto of global ethics”. Furthermore, Walzer describes the zone in which no tight prescription for a company’s behaviour exists as “moral free space” and therefore managers have free space to create their own norms.

### 1.2. Problem

In an industrialising and globalising world, small-scale farmers are increasingly facing external influences and ever more complex decisions-making (Altieri, 2009; Ilbery, 1977). Rural communities started to open up to a global market, where they are not only confronted with the challenges of their direct environment, as they were before, but face new requirements such as certifications, policies and uncertainties of global food trends. These changes also influence the way farmers make key decisions in tackling environmental challenges such as changing land use patterns and social challenges such as shifting power structures (Wilson, 2011). In an agricultural system the farmer acts as actual decision-maker and the farmer is confronted with multiple factors influencing themselves (Ilbery, 1977). Decisions which are directly connected to actions, also called “operational decisions” by Clouaire (2017), influence the output of a farm and therefore have environmental and economic consequences. Developments in technology, growing commercial competition as well as stricter requirements in terms of sociological and environmental aspects make consideration of decision-making ever more important (Clouaire, 2017). Furthermore, each farm is influenced by different factors, as farmers all have their own motives, perceptions, beliefs and preferences (Ibid.). Understanding decision-making is a highly
complex approach but is important in order to explain current situations and to show how a situation might change (Ibid.).

Small-scale farmers in particular, who are located in developing and developed countries, face agricultural transition which is triggered by globalisation (Wilson, 2011). In order to make implementations and agricultural innovations in an ever more complex environment, one solution of finding the source of problem is to understand decision-making processes. A fast changing environment can be a challenge for decision-makers, as they have to react and adapt quickly to fit the fast moving changes of a global market. Another aspect which is experiencing change and is facing new challenges is the resilience of farmers. A commercialised farmer might improve certain aspects of resilience but at the same time the risk of decreasing other aspects is high (Wilson, 2011). However, so far the aim to describe factors related to choices in order to improve agricultural systems has been inadequate and of poor documentation (Kavoi, 2014).

Because of the wide-reaching influence of agricultural practices affecting more than the farm itself, stakeholders of all sorts, such as governments, companies, and civil society are interested in the farmer’s behaviour (Edward-Jones, 2007). The Food and Agricultural Organisation (FAO) stresses in a report from 2016 that in order to create resilience to increasing challenges at the farming level, a cross-sectoral approach needs to be adopted and decision-making needs to change. Challenges, especially include the outbreak of diseases, loss of biodiversity and extreme weather conditions (Miller & Spoolman, 2012; FAO, 2016).

1.3. Commission

For the high demand of bananas, being one of the main ingredients in the products of HiPP GmbH & Co (see detailed information Appendix 3), the company started to contract indigenous small-scale farmers in the La Amistad National Park in Talamanca, Costa Rica, over 20 years ago (HiPP, 2017). The aim was and still is to encourage the traditional ways of farming practices and to support a sustainable and chemical free production through ensuring them a reliable income with fair prices (Ibid.). Beissel (pers. com., 2018) mentions that the company’s motive is to maintain and create an environmental friendly agricultural system in line with indigenous traditional ways of farming. This implies maintaining the biodiversity and mixed crop farming (Beissel, 2018). In the contrary to plantation cultivation the banana plants are being planted with enough space to each other in order to avoid diseases and fungi spreading (HiPP, 2017). Anyhow, as farmers of Talamanca mainly grow Cavendish bananas, the global spreading banana disease Tropical Race 4 (TR4) implies a potential risk for the farmers and consequently the company (Ibid.).

HiPP GmbH & Co is interested in supporting the smallholders by improving the resistance to banana diseases and fungi, in particular TR4. Facing the risk of spreading diseases HiPP GmbH & Co has set in place an experimental farm to test different banana varieties, which suit the processing requirements, but at the same time are resistant to disease outbreaks and suit the environmental conditions of Talamanca. The goal is to create a resistance to spreading diseases without using Genetically Modified Organisms (GMOs) or any chemicals (Beissel, 2017). Trobanex is a private limited liability corporation and subsidiary company of HiPP based in San Jose, Costa Rica. The corporation employs 12 people who are in charge of cooperating between all the farmers HiPP is purchasing bananas from in Costa Rica. They stay in direct contact with the farmers and frequently pay them visits in order to check if the requirements such as organic standards are met.

In order to meet the growing demand for bananas, companies like HiPP GmbH & Co are working on securing their source of products. Consequently, according to Hipp and Beissel (pers. com., 2017) the purpose of the company’s interference is not to impose ways of creating a more resistant banana production, but to find ways to communicate and cooperate with the smallholders with regard to their ways of choosing banana crops. The company is interested in evaluating cultural and economic aspects of the farmers which influence them in choosing banana species. Therefore, they want to understand the
decision-making processes of the farmers in order to be able to improve the communication between the two parties and to find ways to implement new cultivars resistant to diseases, in agreement with the farmers.

1.4. Aim and research questions

The aim of this study is to explain how indigenous small-scale farmers in Amubri make decisions in the context of banana farming. The wider motive of HiPP GmbH & Co (see Appendix 3) is to create pest resilience among the farmers they contract. In order to implement agricultural innovation in this area it is important to understand the farmer’s behaviour to make changes in line with the farmer’s perception and not through top-down approach.

To achieve the aim, the following research questions were formulated:

1. Which key factors, cultural, economic and environmental, influence indigenous small-scale farmers in the community of Amubri, Costa Rica, in their choice of banana cultivar?
2. How aware are the farmers towards existing and imminent risks of banana diseases?
3. In which way is the community resilient/vulnerable to disturbances in the context of decision-making behaviour and globalisation?

1.5. Delimitations

This study is going to focus on the geographical boarders of one community within the La Amistad National Park in Talamanca, namely Amubri. Amubri is one of the biggest communities of Talamanca, counting approximately 650 inhabitants, and is one of the most accessible communities from which HiPP GmbH & Co is purchasing bananas. Most of the farmers in this community speak Spanish next to their traditional Bribri language, which avoided communication problems and lost content through doubled translation. The given scope of the degree project didn’t allow me to interview more than 28 farmers. In preparation of the study the participants were chosen from a wide range of demographic factors in order to give the most possible realistic overview (Table 4). The characteristics of all communities, HiPP GmbH & Co is collaborating with, are similar and therefore this study can be tailored to other communities of this region.

1.6. Outline

The first chapter explains the background of this study and is stressing the problem which it entails. It furthermore states the aim and research questions, the commission and delimitations. Along the second chapter the theory in line with the literature review is presented. It starts with a general approach on decision-making and is then narrowing down to agricultural decision-making theory and finally ends up with the main empirical decision-making theory, the point-score analysis. The last chapter of this part is giving an insight into the community resilience concept, which is connected to decision-making behaviour in agricultural communities. The third chapter describes the method used during the study and gives and explanation on why certain methods were chosen. The empirical continues with a background chapter which provides an understanding of the characteristics of banana cultivation and recent developments on the market and is furthermore providing an understanding of the research area in terms of history, culture and agricultural practices. The empirical result chapter is presenting the outcome of the empirical research, including the interviews and point-score analysis. The analysis chapter is finally analysing the empirical results, linking it to the theoretical chapter and the literature review. Whereas first the decision-making factors are being discussed, the results are finally connected to the community resilience concept. The discussion chapter examines the results and analysis in context of the research questions presented in chapter one. The study ends with the conclusion,
summarising the most important findings and debating the methods used, as well as suggesting further research.
2. Literature review and theoretical framework

This chapter explains different theories of decision-making. As this study argues that the decision-making influencing the resilience of farmers, the theory of resilience is explained in the beginning. After, a general approach of decision-making theories is shown and then narrowed down to decision-making theory in agriculture and point-score theory in particular. This chapter ends with evaluating decision-making factors and the conceptual framework.

2.1. The concept of community resilience

The concept of resilience and vulnerability has become an essential conceptual framework with the purpose to understand how communities respond and adapt to environmental and societal changes (Adger, 2006 cited in Wilson, 2012). As this study is concerned with the complexity of farming systems the concept of complex social ecological systems (SES) by Folke et al. (2010) is used as a definition of resilience. SES is based on three aspects, namely resilience, adaptability and transformability and is “the capacity of a SES to continually change and adapt yet remain within critical thresholds” (Folke et al., 2010). It furthermore implies the capacity to adapt to changing external drivers and internal processes (Ibid.).

The focus has so far been on socio-ecological resilience approaches, but has recently also been on social resilience theory, which is trying to understand the response of human systems to change (Wilson, 2004). Within the field of social resilience particular emphasis lays on resilience at the local community level, where measures that cause resilience are implemented „on the ground“ (Adger et al., 2006). Many researchers argue that it is essential to understand behaviour at the local decision-making level before scaling up to an international and global level (e.g. Oudenhoven et al. cited in Wilson, 2012).

This study defines a community based on Wilson’s (2012) definition when he talks about resilience of communities in a globalised world. He stresses that it is important to find an intermediary definition which is not too narrow but at the same time not too broad (Ibid.). Therefore, he defines community as “the totality of social system interactions (i.e. an affective unit of belonging and identity and a network of relations) usually (but not exclusively) within a defined geographical space” (Wilson, 2004, p. 1219). Local communities and individual decision-making are rooted in hierarchies of regional, national and global communities (Wilson, 2012, p. 1219) and therefore are of particular interest.

Changes in the environment are driven by effects of neoliberal capitalism, such as climate change, population growth, migration and natural resource exploitation (Wilson, 2012). Additionally, happenings like natural catastrophes play an influencing role when it comes to resilience and vulnerability of a community (Davidson, 2010). Resilience is moreover defined in an adaptive context, which is analysing if a system can or cannot respond to changes and cope disturbances (Cutter et al., 2008; Wilson 2012). A system with a high diversity is usually more resistant to disturbance and has a higher adaptive capacity (Folke, 2006).

Wilson (2012, p. 1223) suggests in his article that the resilience of a community is dependent on how well the three aspects of the community resilience model in Figure 2 are developed. The three circles are based on the concept developed by Bourdieu (1987), who emphasised the importance of social capital and cultural capital next to economic capital in enhancing community resilience. Wilson (2012) extended Bourdieu’s framework by the environmental capital and he integrated the cultural capital into the social capital by.
Economic capital here is defined as material property (Bourdieu, 1987). Social capital on the other hand includes the state of social networks, interconnectedness of people, trust, complex notions of power and cultural and institutional glue that binds communities together (Bodin & Crane, 2008; Wilson, 2012). Whereas environmental capital defines the use of natural resources for human consumption (Wilson, 2012).

The connection of the three capitals in Figure 2 show how different spaces of resilience and vulnerability are created (Ibid.). The centre of all three circles builds the ideal state in which a community is overall resilient (Ibid.). Whereas communities in which two aspects are well developed form a moderately resilient or moderately vulnerable state. Is only one of the aspects fulfilled the community is described as weakly resilient. Within community resilience there is space for decision-making and either decisions effect a stronger resilience or weaker resilience (Wilson, 2012). In general, research has shown that communities which have been through transition from subsistence farming to commercialised farming face higher complexity and factors influencing their decisions (Wilson 2012; Folke 2006).

Wilson (2012) defines a community as resilient if it provides high diversity and if the community keeps a balance between the community and the interaction with the global level. The overdependence on local resources, but also the loss of autonomy and identity as a consequence of globalisation can form problems within a community. Studies have shown that communities which undergo some sort of globalising process, show an increasing economic capital, but a decreasing social and environmental capital. In this specific context of globalisation and community resilience Harvey (2006) connects economic capital to the question if the integration of a community into global capitalism is creating a well-developed economic capital or is increasing the dependence of communities on outer forces. This question is addressed in a later stage of this paper.

Proponents have argued that there are many advantages to globalisation. Advantages such as the potential for new markets, the mechanization of agricultural practices, and an increase of educational can enhance the resilience of a community (Janssens, 2010). Furthermore, it is stressed that democratization, as a consequence of western influence, can help empower communities internal decision-making and effective policy implementation (Wilson, 2012). Opponents of globalisation processes on the other hand believe that neo-liberalism brings characteristics with it which decrease resilience of a community, because a vertical and not horizontal stakeholder interaction is promoted (Gray, 2002). Besides, neo-liberal free market ideals, which often entail power imbalances within communities are usually moving into focus and aspects like social capital are neglected (Harvey, 2006).
Wilson (2012) furthermore, discusses the transition from subsistence farming to commercialised farming in the context of shifting resilience aspects. Subsistent farmers entirely rely on their agricultural production and are dependent on it. Social and environmental capital in this case is usually well developed, whereas economic capital is weak (Bardhan, 2006). Communities which are being embedded in the global economy on the other side potentially strengthen their economic capital but might decrease the social and environmental capital. These communities might find both improved and reduced opportunities for stronger resilience, but overall decision-making opportunities may be reduced.

2.2. Decision-making theory in general

The following chapter gives an overview on the general theories of decision-making, which is a highly complex field with various approaches. The scope of this study doesn’t allow to mention all of these approaches but emphasises main angles.

Decision-theory in a context of global change is essential as it can raise awareness of the status quo and potential future outcomes and can estimate alternative outcomes under different decisions (Polasky, 2011). In the Anthropocene humans have a significant impact on the global development regarding biodiversity, climate, diseases outbreak among many other aspects (Ibid.). Polasky (2011) argues that without reliable information about how actions are affecting global change, it is difficult to provide advice to decision-makers in order to create future well-being. Decision-theory is therefore a useful tool to find the best management approaches through given and available information (Ibid.).

There are two main approaches of decision-making models which can be applied to understand decision-making, the empirical and normative approach (Ilbery, 1978). The empirical approach (see Table 1), also known as descriptive approach, strives to understand how humans actually make decisions through investigating patterns, regularities and principles (Ibid.). Descriptive theory is concerned with the present status of an object and the "what is" and not the "what ought to be" (Ibid.). It is about explaining the goals, values, knowledge and ways of thinking (Rapoport, 1967). Bell et al. (1988, p.16) list some questions, descriptive theory is concerned of: “How do real people think and behave? How do they perceive uncertainties, accumulate evidence, learn and update perceptions? How do they learn and adapt their behaviour? What are their hang-ups, biases, internal conflicts?" And so forth. In general, the descriptive model is focusing on the how and why individuals behave like they do. This is an empirical approach which is used in social science (Bell et al., 1988).

The normative model (see Table 1) on the other side gives suggestions on how "idealized, rational, super-intelligent people should think and should act" (Bell et al., 1988). This approach is concerned about the cognitive concerns of people and their values, anxieties, regrets and disappointments after they have made decisions (Ibid.). The researcher, like in mathematical system, plays with variations (Ibid.). A normative model is an abstract system that describes how people should make decisions ideally (Ibid.).

| Table 1. Comparing the Normative and Empirical approach (based on Bell et al., 1988, Ilbery, 1978 and Bradford, 2009). |
|---------------------------------|-------------------------------------------------|-------------------------------------------------|
| Characteristics                | Normative approach                              | Empirical/ Descriptive approach                 |
|                                 | Focus on how people should make decisions ideally | Concerned with the present status, the “what is” |
|                                 | Works with the cognitive concerns of people      | Trying to understand how humans actually make decisions |
|                                 | Assuming a rational decision-maker              | used in social science                           |

| Advantages | • Enables economic modelling of behaviour  
• Can predict behaviour | • A wide range of factors is taken into account  
• Recognises a farm as more than an economic entity  
• Gives space for interpretation |
| Disadvantages | • Lack of realistic explanation of agricultural land use patterns  
• Unilateral focus | • Subjectivity |
| Evaluation system | Theoretical adequacy | Empirical validity |
| Examples | Mathematic: Game theory, Bayesian theory, Dampster-Shafter theory | Point-score, repertory grids, decision trees, naturalistic decision model |
| Both approaches can complement each other | | |

The advantages of normative models are that they can predict behaviour and enable economic modelling of behaviour (Bradford, 2009). It furthermore is relatively objective and gives potential advise for future decisions (Ibid.). The disadvantages on the other side are that they usually have a unilateral focus not taking into account various decision-making aspects and therefore a realistic explanation of something is not given (Ilbery, 1978). The empirical approach implies many advantages, as a wide range of factors is taken into account, it notices a farm as far more than an economic entity and it gives room for interpretation (Ilbery, 1978; Bill et al. 1088). However, some scholars condemn the subjectivity of empirical approaches as it is not based on mathematic facts (Ilbery, 1978; Ryder, 1993).

There is a third, less recognised model, which has been used in order to define decision-making. The prescriptive model is giving suggestions to individuals on how they should make better decisions (Bell et al., 1988). Emphasis in this case is put on the differences of people’s characteristics and that helpful advice needs to be adapted to these characteristics. The two models have different evaluation systems: The descriptive models are evaluated by the empirical validity and normative models are evaluated by the theoretical (Bell et al., 1988).

### 2.3. Perception behaviour

Merleau-Ponty (2002) highlights another approach of decision-making, that of individual perception, which is one of the major influencing factors when it comes to personal decision-making. Perception according to Bradford (2009) is the way in which people approach different impacts and accept different information. The principles of perception can be categorised in two different ways: intuition and decision bias. Intuition can either be described as an experience-based decision, where patterns of behaviour have been collected in someone’s long-term memory and can be applied to situations in various combinations (Simon, 1987) or like Gigerenzer (2007) sees intuition as a guess, hunch or hypothesis which is triggered by the unconscious. Intuition has also been described as a direct and immediate action which happens without conscious thoughts or judgement (Fishbein 1987; Greer 1988).

Bradford (2009) argues that intuition and creativity influence people in different ways and that these factors can lead to biases and errors in decision-making (Nutt, 2002). There are two different approaches to the understanding of perception. It can be created by elements of sensation and it can also be an awareness of the truth (Kahneman, 1973; Stout, 1899). Nevertheless, this can get very complex as each
person takes in physical stimulations in one way or the other (Bradford, 2009). Robbins (1993, p. 135) on the other side explains perception as a process during which people organize and interpret outer impressions to explain the environment. Based on this argumentation, decision-making is based on the perception of reality and therefore is essential for decision-making theory (Bradford, 2009, p. 45). Reasonably, scholars have been concerned with the influences of perceptions on decision-making models and much research is developing in order to avoid human error (Bredford 2009; Rothwell, 2007).

2.4. Decision-making in agriculture

The decision-making process in agriculture is complex, as many factors and a multifaceted environment influences farmers in their decision-making approach. Bradford (1990) describes the farming environment as complex and uncertain due to aspects of various origin, such as being economically or environmentally successful and of uncertain outer influences, like weather or political frameworks. Furthermore, farmers can be influenced by their surrounding and the information given by the community (Ibid.). Another essential influence in the decision-making of a farmer are lessons learned from the past and possible recovery processes (Ibid.). According to Yudkowsky (2006 cited in Bradford) decision-makers also often rely on intuition or “gut feelings” in complex situations.

Many studies that have looked into farmers’ decision making have used a normative theory approach which is focused on economic factors and farmers strive for profit maximization (eg. Gould, 1963; Howes, 1967). The advantages of this theory are that it enables economic modelling of behaviour and it can potentially predict behaviours (Binswanger, 1980). But it is important to mention, that farmers not only make decisions according to the economic outcome, but are people who live in an environment with specific circumstances. They can be influenced by their direct and indirect environment, by their family or community or by traditions and experiences. Models based on the normative approach with regard to economic factors can make false assumption about what is important to farmers. The models are therefore unreliable predictors.

More recently, the research on decision-making in agriculture has focused on a naturalistic decision making framework, which includes a descriptive approach. Klein et al. (1993) describe a decision-maker, in the context of agriculture and naturalistic theory, as someone who is street-smart and a hands-on practitioner who relies on experiences in order to find solutions. The decision-maker makes accurate assessments of situation, classifies and interprets problems on the basis of knowledge and experience and decides for the best option (Ibid.). Naturalistic decision making can help to complete normative research through cognitive processing and observations (Bradford, 2009). Personal factors like values, attitudes and norms are taken into account in these studies in order to understand context of societies (Ibid.). Bradford (2009) used this psychological approach for his case study in New Zealand on wool farming.

Special focus has been on decision-making research with tropical small-scale farmers, as it can be described as unique farming system. Within this context, Wigley (1988) suggests that it would become evident that, unlike commercial farmers in developed countries, small-scale farmers in developing countries are influenced by factors more important than the market. Research on decision-making in these areas is essential because literature reflecting on small-scale farming in the Caribbean has stressed that the degree of failure within intervention and development strategies are high due to one sided information flow and top-down approaches, which are not taking into consideration various factors(Collymore 1984; Spence 1989).

King and Burton (1989) also mention that understanding behaviour of farmers is particularly important in areas undergoing agrarian structural reform, or where such reform is proposed, because only through an adequate understanding of the interrelationship between land ownership values and behaviour can the implications of such changes be fully understood. At the same time, a better understanding of motivation may lead to a more thorough explanation of farmer’s economic behaviour and to more realistic models of agricultural systems (King & Burton, 1989). Furthermore, Beckford (2002) mentions
in his study on decision-making in the Caribbean’s that there is a high degree of failure in agricultural intervention strategies aimed at stimulating development and improving small-farming performance (Demas 1965; Nurse 1970; Barker et al. 1983; Collymore 1984; Spence 1989). And Collymore (1986) moreover stresses the importance of meaningful observation of decision-making which should occur at the interface between human rationality and complex environmental small-scale farming.

2.5. Point-score analysis

Many approaches of mathematical models of decision-making processes in farming have been developed (Gould, 1963; Howes, 1967), but Ibery (1985) states that mathematic approaches often lack providing realistic explanations of agricultural land use patterns. Therefore, an alternative has emerged in studying the perception of factors affecting farmer’s decisions through empirical methods. Repertory grids (Floys, 1979; Ibery 1983), decision trees (Gladwin, 1980) and point score analysis (Gasson, 1973; Ilbery, 1977) are examples for these kinds of empirical models. As mentioned in chapter 2.2 empirical behavioural studies have the advantage that they take into account a wide range of decision-making factors which consider socio-personal aspects (Ibery, 1977).

The point-score analysis was originally framed by Van der Vliet (1972, 1974) and was further developed by Ilbery (1977). Further studies using the point-score approach are based on the strategies and factors that Ilbery is suggesting in his paper on point-score analysis (1977). Whereas Ilbery applies this method in north-east Oxfordshire in a context of a developed country, several further studies have applied point-score in developing countries. Ryder (1993) was the first who applied the method on small-scale farmers in a developing county, the Dominican Republic.

Point-score analysis has been proven to be applicable in developing countries with the purpose of encouraging a cross-cultural communication between planners and farmers (Ryder, 1993; Greig, 2009; Beckford, 2002). International development specialists also state that point-score is a valuable tool in order to encourage a cross-cultural communication (Dickson et al., 1983; Blakie and Brookfield, 1987). According to Ryder (1993) the advantages of empirical behavioural studies take into account a wide range of decision-making factors, including socio-personal aspects, and Ilbery (1985) states that they have provided valuable insights into the farmers’ decision making process. Moreover, the wide range of factors has the advantage of taking into consideration factors that influence farmers subconsciously (Found, 1971; Gladwin, 1980). The advantage of point-score in particular is that the farmers don’t need to provide detailed information about the farm size, yields and other sensitive issues (Ryder, 1993). King and Burton (1989) on the other side mention the subjectivity of this method, but also stress the advantage of the possibility of coding the answers in groups which allows further statistical analysis.

Ryder’s study in the Dominican Republic has shown that much can be gained from communication with farmers in development projects. Implementing point-score in this case provided the opportunity to get an insight of farmer’s opinion, goals, values and experience. At this point it should be emphasised that point-score analysis is dealing with farmers’ perceptions, where one is interested in finding out the importance attached to various factors by the farmers themselves, as it is their decision which governs the patterns of agricultural land-use (Ilbery, 1978). Therefore, the techniques which are themselves objective, use subjective data, but they do help to unravel some of the complexities of the decision making process (Ibid.). Ilbery (1985) and Beckford (2002) even go further and state that understanding the perception of farmers is more important than understanding what is actually there: “Perception has influence on the learning process through which images of the decision environment are formulated”.

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2.6. Enhancing cross-cultural communication and information flow

The decision-making that a farmer and especially a small-scale farmer in developing countries has to face is very complex. Decision-making in this context implies aspects like choice of crop to the right time, in the right soil and the right treatment. Collymore (1986) stresses that it is particularly important for people coming from the outside to understand the subjective rationality of farmers. There is a general aim of modernisation initiatives which are eager to increase agricultural productivity in developing countries (Spence, 1989). This attempt, nevertheless, is dependent on perceptions and responses of traditional small-scale farmers towards these innovations (Ibid.). One of the reasons for the failure of innovation projects is that the unidirectional communication flows from development planners to farmers often neglects the complex cultural environment of the farmers (Baker, Collymore & Spence, 1983). Spence (1989) argues that the misleading perception of small scale farmers from developing countries as being conservative, primitive and inefficient, has led to mistaken predictions of farmer’s response to innovation and therefore many projects have failed. It becomes clear that much can be gained from improving communication and information flow with farmers.

The question arises if farmers are more likely to accept change if they are being provided with more information (Beckford, 2002). Jones (1963) argues that the characteristics of a farmer influence the reaction on the information they receive. The traditional way of implementing innovations is a top-down approach with the idea that change is superior to existing methods (Chambers, 1983, 1997). Consequently, scholars like Beckford (2002) suggests paying more attention on the providers when it comes to innovations and to enhance a frequent communication. Generally speaking, many studies show that farmers are usually locked in a cycle of adaptation, experimentation and innovation. Organisations like HiPP GmbH & Co can contribute towards a bottom-up approach through paying attention to the ideas of the farmers and through supporting local innovation.

2.7. Decision-making factors

The factors suggested for the point-score methodology were originally framed by Van der Vliet (1972, 1974) and were then developed by Ilbery (1978). Hereby they came up with a set of factors which are most likely to play an influencing role on farmer’s decision-making. Each scholar who has made use of the method (eg. Ryder, 1993; Beckford, 2002; Greig, 2009) has adjusted the factors to the circumstances and environments of their case study. Applying this method, the farmers are asked to rank different preselected decision-making factors and they are given the task to explain whether a factor has influenced the choice of crop. The questions and factors in this process stand in relation to the crop they grow. In order to not influence the farmers in their choice of ranking, the factors are shown to them in a random order and the farmers are first asked which factors have a relevance to them. Afterwards the farmers distribute scores between zero and four (Table 2) to the different factors, whereas one is relatively unimportant and four is very important. The exact meaning of the scores is explained as followed (Ilbery, 1977):

<table>
<thead>
<tr>
<th>Score</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Irrelevant</td>
</tr>
<tr>
<td>1</td>
<td>Not really important</td>
</tr>
<tr>
<td>2</td>
<td>Important</td>
</tr>
<tr>
<td>3</td>
<td>Very Important</td>
</tr>
<tr>
<td>4</td>
<td>Essential</td>
</tr>
</tbody>
</table>

Table 2. Possible scores achievable (Ilbery,1977, p. 69).
Ilbery (1977) suggested an inventory of possible factors affecting the decision-making process in agriculture based on Van der Vliets (1972, 1974) argumentation. These factors served as template for various further point-score studies (eg. Ryder, 1993; Greig, 2009) including this study:

**Table 3.** Point-score factors (Ilbery, 1977, p.68).

<table>
<thead>
<tr>
<th>A. Socio-personal</th>
<th>B. Economic</th>
<th>C. Physical</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Personal preferences</td>
<td>1. Market/ demand</td>
<td>1. Soil type</td>
</tr>
<tr>
<td>2. Proven type of farming in area</td>
<td>2. Income</td>
<td>2. Soil drainage</td>
</tr>
<tr>
<td>3. Agricultural training</td>
<td>3. Profits</td>
<td>3. Degree and aspect of slope</td>
</tr>
<tr>
<td>5. Free time</td>
<td>5. Labour</td>
<td>5. Amount of rainfall</td>
</tr>
<tr>
<td></td>
<td>10. Government policy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11. Others</td>
<td></td>
</tr>
</tbody>
</table>

The choice of the factors in this list is subjective, but the aim here is to cover a wide range of potential factors (Ilbery, 1977). As many of the factors intersect it is important to separate the factors into three headings, namely, socio-personal, economic and physical (Ibid.). Economic factors for example can also be interpreted as personal factor and the other way around. The farmer is furthermore able to choose an additional factor which is relevant to him.

### 2.8. Conceptual framework

This study is based on an empirical approach of decision behaviour. Considering various methods of decision-making in the field of agriculture, point-score method was evaluated to be the most suitable for this case-study. The framework is based on Ilbery’s concept of decision-making factors and the perception of farmers in relation to different factors. This method was selected because it has shown to be successful in developing countries and in cooperation with indigenous small-scale farmers (e.g. Ryder, 1993, Beckford 2002; Greig, 2009).

The chosen factors (Table 4) are based on the factors suggested by Ilbery (1977). Much attention was given on choosing the suitable factors for this study. Paying attention to previous similar studies, which applied point-score, a set of factors was conceptualised. These factors were discussed with employees of Trobanex and a peace core employee which have been working closely with the farmers for a long time. The factors were then edited and pretested with two farmers, who also helped adapting the factors.
Table 4. Chosen decision-making factors for this case study (based on Ilbery, 1977, p.68 and Ryder, 1993, p.6).

<table>
<thead>
<tr>
<th>Socio Personal Factors</th>
<th>Economic Factors</th>
<th>Physical Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prestige</td>
<td>Demand</td>
<td>Natural catastrophes</td>
</tr>
<tr>
<td>Family traditions</td>
<td>Regular income</td>
<td>Soil</td>
</tr>
<tr>
<td>Area traditions</td>
<td>Available credit</td>
<td>Weather</td>
</tr>
<tr>
<td>Education</td>
<td>Production costs</td>
<td>Diseases</td>
</tr>
<tr>
<td>Free time</td>
<td>Long-term security</td>
<td>Growth cycles</td>
</tr>
<tr>
<td>Governmental policy</td>
<td></td>
<td>Practicality</td>
</tr>
<tr>
<td>Transport</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The shorter list of 18 factors was created in order to save time during the conduction of interviews and some factors were merged into one factor, in those cases where they clearly overlapped. The factors chosen in Table 3 are based on the factors suggested by Ilbery (1977) and Ryder (1993, p.6) in his study of the Dominican Republic, as circumstances of the study are most similar to this study, compared to other ones. Factors were established and adapted according to dialogues with Trobanex employees and two farmers. The factor Personal preference was changed into Prestige, because they agreed that in this area prestige was something community members pay attention to and also Ryder (1993) sees this as a relevant aspect. Besides that, the factor Previous occupants was taken out of the list, because within the observation sample the farms run in the family and therefore, Family tradition considers this factor. Within the economic factors, mass media was taken out due to the reason that it has no relevance in the community of interest. Instead the factor of Transport was taken in on recommendation of Trobanex employees. Following recommendation of the two farmers, factors like practicality and natural catastrophes were taken in. Natural catastrophes like flooding play an essential role in the community of Amubri and therefore were considered as potential influencing factor. Also, Practicality seemed to be a relevant factor, as in banana farming this plays an essential role in terms of height and reachability of the crop.
3. Method

In this chapter, the methodological approach is presented. The methods’ relevance to the research problem and consequences for the research process are discussed to ensure transparency and consistency of the study. This project has a flexible design and builds on literature review and case study with multiple sources of evidence – structured personal interviews and secondary data.

3.1. Literature Review

The literature review gives a brief overview on the state of academic research done in the field of interest. Some of the main research words used were following: decision-making, decision-making in agriculture, point-score analysis, Resilience, community resilience, banana diseases, Cavendish and TR4, cross-cultural communication, CSR, agricultural innovation, agriculture in Talamanca, agriculture and Bribri farmers, culture of the Bribri.

The main database that was used to purchase relevant studies and articles was Uppsala University library, JSTOR, Research Gate, DeepDyeve, Googlebooks and Science Direct. Relevant webpages were used as a source to, for example, explain the current situation of banana trade in Costa Rica and latest updates on banana disease challenges and served to complement information that was not found in scientific papers. Hereby it was payed attention to make use of reliable sources.

Hardly any research was done in the Amubri community, but rather on the Bribri and Cabecar tribes in general (e.g. Villabos & Borge 1995; Posas 2013). Also, there was no literature found on decision-making behaviour in this area. This is the reason why it was very important to take face-to-face interviews in order to get a wider picture of the environment and the circumstances the farmers live in. Main focus of the study lays on point-score studies which were taken in areas with similar characteristics: Ilbery (1979), Ryder (1993), Beckford (2002) and Greig (2009). Furthermore, the theory of resilience is based on the concept of community resilience by Wilson (2012).

3.2. Choice of sector and unit of analysis

In a globalised world with an increasing population, agri-food businesses play an ever more important role as main provider of food. As supply chains get more complex and often the communication between different parties causes new challenges, agri-food businesses are realising their responsibilities towards stakeholders (Matopoulos, 2007). The actions of the agri-food sector have a high influence on the environment, resource management and social aspects like working conditions (Wognum, 2010). Agri-food businesses are showing increasing attempts to improve the impact they have in countries they purchase products from (Ibid.). The choice of sector for this study is therefore a small holder community in Talamanca which is selling bananas to a German food company. The community represents a typical indigenous farming community of the region, which is slowly becoming part of the global economy and experiences a phase of transition. Furthermore, the community was chosen because most of the farmers mainly grow Cavendish, a banana cultivar which is facing to be attacked by TR4.

The community of Amubri was chosen as unit of analysis, as the farmers can be representative for other communities of the region and their decision-making factors can be analytically tailored to similar communities. Interviews were moreover taken with employees of HiPP GmbH & Co and Trobanex, as well as NGO workers of the region providing background information. Structured interviews and semi-structured interviews (Appendix 2) with both producers and practitioners, observation and personal communication served as valuable information in order to understand decision behaviour. Point-score analysis was implemented as it was, in previous studies, shown as successful tool to understand farmer’s perception of decision-making (eg. Ilbery, 1997; Ryder, 1993; Greig, 2009).
3.3. Empirical study

3.3.1. Case study

"Case study is a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence" (Robert Yin, 2009). In this sense a case study aims to explain a phenomenon which hasn’t been explored yet, like in this study. Applying a case study approach is useful when theoretical frameworks already exist, but there is still a need to look at a specific empiric problem. Miles et al. (2014, p.30) mention that a case always has to be seen in its social and physical context in comparison to a fully developed quantitative study. Furthermore, case studies are not necessarily working with individuals only, but can discover a phenomenon of groups and neighbourhoods as it is the case in this paper (Robson, 2011). The degree of flexibility of design varies decisively among different case studies and attention needs to be payed to the degree of looseness and selectivity which is applied (Ibid.). A rather loose approach can entail the challenge to state the important information and the more structured one on the other side entails the risk of missing out information due to the tightness of the theoretical pre-understanding (Robson, 2011). This study uses structured interviews as focus is on point-score analysis which has a fixed set of questions (Appendix 4) and respondents preferred to give short answers.

3.3.2. Data collection

This study uses multiple sources of data. It is based on the collection of empirical data and applies a multi-strategy design. During the collection of data, structured face to face interviews and personal communication were used in order to achieve overall background information before the main data was collected through point-score methodology in order to answer the main research question (see chapter 1). In addition to the literature review, information is gathered through secondary sources, such as reports, webpages and documents. Besides, observation of the farmers surrounding such as family connectedness and the characteristics of the farms, was an important technique to gather spontaneous information. Observation of the body language of farmers was furthermore important in order to understand indications that farmers were making in order to illustrate the meaning of what they were saying.

Questions, which are attached in the Appendix (2), were chosen carefully with the purpose of giving the interviewed the option to answer with a short response. This decision was made after two trial interviews were taken and after talking to a Trobanex manager as well as a volunteer of peace corps, who explained that farmers of the community are shy and don’t tend to talk a lot if they don’t know someone. The interview guide was pre-printed including the open questions and the point-score methodology. After each interview was finished, the questions and answers were repeated and were asked for validation by the interviewed. This is essential in order to reduce the interviewers dominance over the research object (Kvale, 2006) and to confirm the content accuracy of the answers. Anyhow, the structured interview guide wasn’t sent back to the participants after evaluation and analysis, because most of them were illiterates and the infrastructure for mailing is non-existent.

Robson (, 2011, p. 288) states that the advantage of taking interviews as a primary approach is that it works well with other designs and provides a flexible and adaptable way of finding things out. Furthermore, the advantages of open questions are that they are flexible, they can go into depth, misunderstandings can be cleared and it can include unexpected answers (Ibid.). For this particular case study, face to face interviews were chosen as the most suitable method, as first of all participants are mostly illiterates and it provides the opportunity to follow up on interesting responses and provides an interpretation of non-verbal signals which may help understand the context (Ibid.). Interviews were all recorded, and notes were taken in agreement with the respondents, in order to gain most information.
possible. Furthermore, probes were used to expand a response when it was assumed that the respondent had more to say.

Interviews were taken with 28 farmers located in Amubri, they were all taken face-to-face, and they were recorded in order to provide reliable information which can be repeated at any time. The respondents were chosen carefully, before interviews were taken. In order to get an overall outcome of responses, which reflects the average decision-making behaviour of the whole community, it was tried to include farmers of different age, gender and farm size (Table 4). This study is not focusing on a specific target group, such as female farmers or farmers under the age of 30 and therefore it was important to find a diverse group of respondents. Anyhow, due to infrastructural challenges there was a slight inequality in the number of males and females participating. Main infrastructural challenge was the communication and some farmers weren’t home when visit was paid.

Table 4. List of all respondents including background information.

<table>
<thead>
<tr>
<th>Number</th>
<th>Respondent</th>
<th>Age</th>
<th>Gender</th>
<th>Size of farm in ha</th>
<th>Quantity of bananas produced/ month in kg</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rudolfo Lupario Lupario</td>
<td>64</td>
<td>Male</td>
<td>3</td>
<td>90</td>
<td>12.02.18</td>
</tr>
<tr>
<td>2</td>
<td>Laura Lupurio Morales</td>
<td>21</td>
<td>Female</td>
<td>1</td>
<td>160</td>
<td>12.02.18</td>
</tr>
<tr>
<td>3</td>
<td>Saturnine Solles Solles</td>
<td>84</td>
<td>Male</td>
<td>3,5</td>
<td>300</td>
<td>12.02.18</td>
</tr>
<tr>
<td>4</td>
<td>Anustacio Gabh Morales</td>
<td>50</td>
<td>Male</td>
<td>1,5</td>
<td>1600</td>
<td>13.02.18</td>
</tr>
<tr>
<td>5</td>
<td>Floilan Moreno Alvares</td>
<td>58</td>
<td>Male</td>
<td>2</td>
<td>600</td>
<td>13.02.18</td>
</tr>
<tr>
<td>6</td>
<td>Jose Maria Segura Briceno</td>
<td>87</td>
<td>Male</td>
<td>2</td>
<td>400</td>
<td>13.02.18</td>
</tr>
<tr>
<td>7</td>
<td>Gritina Arias Sulazar</td>
<td>46</td>
<td>Female</td>
<td>2,5</td>
<td>350</td>
<td>14.02.18</td>
</tr>
<tr>
<td>8</td>
<td>Dayana Suarez Nelson</td>
<td>35</td>
<td>Female</td>
<td>1</td>
<td>300</td>
<td>14.02.18</td>
</tr>
<tr>
<td>9</td>
<td>Cubillo Jupanio Savier</td>
<td>43</td>
<td>Male</td>
<td>1</td>
<td>800</td>
<td>15.02.18</td>
</tr>
<tr>
<td>10</td>
<td>Viviana Raya Sanchez</td>
<td>39</td>
<td>Female</td>
<td>3</td>
<td>3200</td>
<td>15.02.18</td>
</tr>
<tr>
<td>11</td>
<td>Xiomara Arias Salazar</td>
<td>31</td>
<td>Female</td>
<td>1,5</td>
<td>800</td>
<td>19.02.18</td>
</tr>
<tr>
<td>12</td>
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Consequently, 16 female and 12 male farmers in the age between 19 and 87 years were interviewed, resulting in an average age of 47.5 years. It is notable that female farmers are as common as male farmers and that some of the farmers already take over responsibility in a very young age, such as Alejandro N. R. or Laura L. M. (Table 4). The farm size varies between the smallest one with 0.5 ha and the biggest with 3.75 ha, which results in an average farm size of 2.1 ha. On these hectares the farmers produce between 90 and 3200 kg bananas per month, which gives an average of 676.8 kg of bananas produced by one farmer per month. Concluding from Table 4, it can be stated that neither gender nor age of the farmer has an influence on the size of the farm. This can be traced back to a relatively high gender equality and a low hierarchy among different generations in Amubri’s society. It is furthermore noteworthy that the farm size is not necessarily linked to the quantity of bananas produced. Rudolfo L. L. for example has a relatively big farm of 3 ha but has a relatively low harvest of 90 kg per month. Saturdine S. S. in comparison shows a relatively low monthly production of 3000 kg bananas on one of the biggest farms with 3.5 ha. This outcome can be explained through the diverse cultivation of the farms, where some of them are more commercialised than others.

3.3.3. Data analysis

In comparison to quantitative research, qualitative research is working with text and not numbers (Miles et al., 2014). In this paper the qualitative interview questions are based on the theoretical framework and the results are categorised accordingly, to provide further analysis. In order to find out which factors influence the farmers in their choice of banana cultivar the most and the least the point score analysis was applied. The evaluated scores of each factor were added in order to create a ranking from the most important factor to the least important factor. The minimum score on each factor was zero and the maximum was four. The number of respondents was 28 and therefore 112 was the highest achievable score of each fact. Afterwards the overall score was expressed as a percentage of the maximum score reachable. The analysed decision-making behaviour was then put in context with the community resilience concept of Wilson (2012).

Besides, structured open-ended questions (Appendix 2) were used to first of all answer the research questions, to gain background knowledge and to create a warmup phase where interviewer and interviewed could get used to each other.

3.4. Ethical considerations

When taking interviews with indigenous farmers it is important to consider ethical aspects as the interviewed person belongs to a socially sensitive and vulnerable group. Following to Robson’s (2011) questionable practices in social research, people were involved with their knowledge, they were not coerced to participate, detailed information about the research was explained to them and they were not induced to commit acts diminishing their self-esteem. Furthermore, participants were not exposed to physical or mental stress, their privacy was respected and they were treated fairly and with respect (Ibid.). The participants were asked if they are willing to take part in the research beforehand and the purpose and process of the study was explained to them in detail, as Robson (2011) suggests. Besides the respondents were all asked for permission to publish their name and age.

Besides the Free Prior and Informed Consent (FPIC) and the FAO Free, prior and informed consent checklist used in field projects was applied afterwards in order to evaluate the validity of the project in line with the UN guidelines on research with indigenous people (Appendix 5).
HiPP GmbH & Co as commissioner has the responsibility to protect the values and culture of the farmers they purchase bananas from. They have given this responsibility into the hands of the researcher of this study, who has agreed on not abusing the name of the company and treat people involved with respect.

Moreover, the issue of bias is often occurring in flexible design research where people are involved (Robson, 2011, p. 171). There is an existing relationship between researcher and respondents and the researcher takes on the role of the “researcher-as-instrument, which encourages the risk of bias (Ibid.).

3.5. Quality assurance

It is important to achieve validity and reliability during the research process (Robson, 2011). The value of scientific studies has always been debated and criticised and therefore it is especially important to ensure the validity and quality of a study (Yin, 2013). Achieving validity and reliability is an important step in the research process (Robson, 2011). The scientific value of case studies has always been under great scrutiny (Flyvberg, 2006), which makes it especially crucial for a researcher to ensure quality and address this critique (Yin, 2013).

Riege (2003) suggests three case study design tests in order to confirm validity of a case study. First of all, *Construct validity*, which includes case study techniques like using multiple source of evidence, establishing a chain of evidence and having key informants reviewing draft case study report. The Internal validity supposes to do within-case analysis and cross-case pattern matching, to do explanation-building and to assure that internal coherence of findings and concepts are systematically related. Last, the *External validity*, suggests to use logic in multiple-case studies, defining scope and boundaries of reasonable analytical generalisation for the research and to comparing evidence with extant literature.

In order to construct validity, this project employs multiple sources of evidence, such as personal interviews, secondary data, such as documents provided by Trobanex on the details of the farmer and farms, and perspectives of different actors. For all interviews direct oral validation was used. To ensure internal validity, both interviews and secondary sources are approached with the same framework (see appendix 2), and graphic models are used in the analysis. Finally, through creating congruence between the problem and the study design, recording of all interviews, using a case study protocol and using the same framework for all data sources reliability is ensured. Achieving all these aspects meets the criteria for valid research defined by Riege (2003).
4. Empirical background

This chapter provides background information on the characteristics of banana cropping and the Cavendish banana in order to understand related farming conditions. Furthermore, it gives a brief overview on the Tropical Race 4 disease and the international awareness on it. That is followed by some detailed background information on the culture and history of the Bribri people including farming traditions and development of the area. It finally discusses the debate on point-score decision-making factors mong various scholars.

4.1. Characteristics of banana cropping and trade

The banana is the third most popular tropical fruit in the world and plays an essential role to food security in countries of Africa, Latin America and Asia where it is grown in the tropical and subtropical regions (cirad, 2018; Marin et al., 2003). There are approximately 1000 different banana cultivar from which 105 million tonnes of bananas are produced each year (Ibid.). The dominating export in dessert bananas from Central America and the Caribbean started in the 1850s (Marin et al., 2003).

In order to understand the factors that are influencing a farmer who is growing bananas, it is important to explain the characteristics of banana cropping. The banana tree, which is actually a herb, can grow between 50 to 150 individual fruits, also called fingers (Britannica, 2018). The fruits grow from a bulb and after nine to 12 months the fingers can be harvested. After the fruits are harvested the whole tree is cut down, because it can only carry fruits once (Ibid.). In comparison to other fruits bananas have no growing season and can be harvested all year round (Bananalink, 2018). Banana plants grow in an average temperature of 27 °C in regions with high rainfall, enough hours of sun, and soils which are rich, dark and fertile with steady moisture in the air and ground (Ibid.). Working with bananas is usually very labour intensive as jungle growth has to be cleared and the plants need to be propped (Ibid.).

Nevertheless, the success of the banana trade is also dependent on the management of spreading banana diseases. Many diseases have caused destruction of thousands of hectares of banana plantations worldwide (Marin et al., 2003). Next to Tropical Race 1 (TR1), which was destroying Gros Michel plantations, Sigatoka leaf spot diseases have been a major threat to the Cavendish bananas (Ibid.). Sigatoka leaf spot disease is an ascomycete fungus which triggers an early ripening of the fruit injected and makes it inedible (Ibid.). Circumstances in the Caribbean part of Costa Rica (Figure 4) especially enhance the occurrence of Sigatoka and many banana farmers, conventional as well as organic, have problems in controlling the disease (Ibid.).

4.2. The Cavendish banana, an insight

As mentioned above there are around 1000 varieties of bananas produced globally, but the main banana on the market is the so called Cavendish cultivar, which accounts for around 47 percent of the global production (FAO, 2018). Approximately 50 billion tonnes of Cavendish are produced each year (Ibid.). The breakthrough of the Cavendish can be explained through its many advantages in commercialised settings: They produce high yields, are more resistant to weather influences due to the thick and stable stems and they are known to recover from natural disasters, such as diseases and flooding, more easily than many other cultivars (Ibid.).

Before the Cavendish was introduced to the market, Gros Michel was the main banana on the global market (see timeline in Figure 3), until it was wiped out by the Panama disease, also named TR1, in the 1950s (FAO, 2018; Leatherdale 2016). Due to monoculture plantations where the plants are grown close to each other, the big plantations were especially vulnerable to the fast outbreak of such diseases. Eventually, the Gros Michel was replaced by the Cavendish, which was immune to the fungus and has
the physical precondition for international transportation, but is less sweet and smaller (Leatherdale 2016; Panama Disease, 2018).

The Cavendish cultivar belongs to the AAA genome group, which includes all the cultivars that have three copies of each gene-bearing chromosome (promusa, 2018). The A stands for the wild species Musa acuminate whose genetic signature is found in the majority of cultivated bananas (Ibid.). The group would be called AAA, the subgroup of the group AAA is Cavendish which again includes over 500 different cultivars (Ibid.). The cultivars can differ in their height and circumference, leaf length and width, number of functional leaves at flowering and harvest, as well as pheno- logical differences such as leaf emergence rates, emergence-to-harvest intervals and harvest cycles (Lagerwall 1997). It is difficult to distinguish the various cultivars, however they all have in common that the fruits are long and slightly curved, a floral relict is attached to the fruit apex and the shrub is cylindrical with 10 or more hands (promusa, 2018). The most obvious contrast is the height of the plants (Ibid.). Whereas the shortest is the Dwarf Cavendish and the tallest is the Lacatan. For this study two cultivar, namely Congo and Lacatan play an essential role, as these were the cultivars mainly planted by the farmers interviewed in this study.

The historic distinction of the Gros Michel seems to repeat itself. A new variant of the Tropical Race 1, namely Tropical Race 4 started spreading in the 1990s (Figure 3) and has since then been attacking the different Cavendish sub-cultivars (Martin et al., 2003). It started spreading in Taiwan and from there it spread to other South East Asian countries such as Indonesia, Malaysia and Philippines and also China and northern Australia (Panama disease, 2018). Recent outbreaks in Jordan and Mozambique prove the high risk of a global spread over the next years (Ploetz, 2015; FAO, 2017). Several thousands of hectares of Cavendish have already been destroyed in these areas (Panama disease, 2018). TR4 is a major threat to the global export banana sector and especially for the domestic production, threatening the livelihoods of millions of smallholder farmers (Ibid.). The outbreak has so far caused a damage of around 400 million dollar worldwide (Ibid.).

Figure 3. Historical timeline of global banana diseases outbreaks.

TR4 is a vascular wilt disease, which infects the roots of banana cultivars and usually progresses into the vascularized parts of the rhizome (Beckman, 1987, 1990). It affects organic Cavendish cultivation, but also conventional cultivation, as it cannot be controlled using fungicides and cannot be combat by fumigants (promusa, 2018). The symptoms of the disease are yellowing on leaf margins of older leaves and eventual collapse of all leaves (NSW, 2017). Despite that, the plants still continue to grow (Ibid.). The internal symptoms of the disease are vascular discolouration, yellowing of the roots and yellow, red
or brown discoloured vascular stands in the stem and bunch bulk (Ibid.). The disease blocks the supply of water and nutrients and leaves behind spores that would affect any new plant (Ibid.).

4.2.1. Call for global action

International relevance to this challenge is shown in the FAO call for action in 2014, for countries, which grow bananas, to monitor, report and prevent one of the most destructive banana diseases, namely TR4 (FAO, 2017). In the same year FAO organised a consultation with a group of international experts to work on a framework for a global programme, which includes three aspects: preventing future outbreaks, managing existing cases, and strengthening international collaboration and coordination among institutions, researchers, governments and producers (promusa, 2018). This disease constitutes a severe threat to the production and export of the eighth most important fruit in the world. Furthermore, it is one of the most important food crops in developing countries and many people depend on it, according to FAOSTAT. FAO is addressing different stakeholders from industry, research institutions, governments and international organisations to support raising awareness and taking action in fighting not only TR4, but also the Black Sigatoka, Xanthomonas wilt and Bunchy (FAO, 2017).

The lesson learned from the story of Grand Michel is that genetically uniform monoculture bare highly exposed to wilt diseases in banana cultivation. Many institutions and authors agree that a genetic diversity is needed in order to reduce the high risk of fast spreading diseases (Richmond, 2016). Specifically, in Latin America and the Caribbean several organisations have been working on programmes in order to raise awareness on TR4 (promusa, 2018). The banana research Network for Latin America and the Caribbean MUSALAC for example has been providing training on quarantine pests.

4.3. Historical development of the case region

For the present study data was collected in Talamanca, in Costa Rica’s Limon province, located in the South-east of the country, close to the Panama boarder (Figure 4). What makes this area so special is that it contains 80 % of Costa Rica’s plant and animal species (UESCO, 2000) and is also home to one of the biggest indigenous communities of the country, namely the Bribri (Whelan, 2005). In order to understand the environment and the structure of the area it is important to get a brief understanding of the historical and geographical background of Talamanca. The indigenous territories are located in Bratsi, one of the three districts of Talamanca: Sixaola, Cahuita and Bratsi (Posas, 2013). The Talamanca Indigenous Reserve is one of the 22 national indigenous reserves formed by Costa Rican law in 1977 and entails the Talamanca Bribri Indigenous Reserve (437 km2) and the Cabecar Indigenous Reserve (Ibid.). The Talamanca Indigenous Reserve is part of the larger La Amistad Biosphere Reserve, which was announced to the United Nations Environmental, Scientific, ad. Cultural Organisation World Hertitage in 1982 (Ibid.). At the same time Talamanca is among the poorest areas of Costa Rica and the poverty is especially spread among the indigenous population (Gutiérrez 2000, Gutiérrez; Sandoval, 2003).
Figure 4. Location of the Amubri community in Parque Nacional La Amistad (Google maps, 2018).

Posas (2013) argues that agriculture has been an integral part of the Bribri culture for a long time. Already old spiritual texts mention that God Sibó created the first Bribri through planting seeds (Palmer et al. 1993; Stone 1956) and several folklore and oral stories mention the use of crops like maize or corn (Ferreto 1982; Jara 1993; Pittier 1903). Because there is a lack of evidence on the agricultural history of the Bribri it is difficult to capture the exact dimensions of agricultural use. Nevertheless, agriculture was consistently mentioned since the European explorers entered Costa Rica (Posas, 2013). During the 20th century several agricultural change theorists saw population fluctuation and changing markets as the key driver of agricultural change (Boserup, 1965 and Netting, 1993). Besides, new technologies, changing environmental limitations and changing preferences in crop choice influenced shifts (Goldman, 1993; Netting, 1993).

Posas (2013) furthermore stresses that sociocultural, political, economic, and environmental shocks play a major role in changing land-use patterns. One of the major exogenous shocks happened to the Bribri in the beginning of the 20th century when The United Fruit Company, an American corporation trading with tropical fruits, displaced the Bribri from their land in order to use it for their own fruit plantations (Ibid.). The population had to flee to the mountains where they were exposed to a harsher environment and therefore had to adapt to new agricultural practices. Around this time while the Fruit company was planting bananas in the valley, the Bribri started growing plantain, sugarcane, beans, greens, cacao, corn, banana and some other fruits (Skinner, 1920).

In 1977 the Costa Rican government set in place an indigenous law which returned 11, 700 hectares of land to the Bribri (Whelan, 2005). Indigenous people who haven’t moved back to the valley in the 60s, to work for the United Fruit Company, now resettled the land in the valley (Ibid.).

Since then, environmental disasters such as floods, crop diseases, such as monilia pod in cacao, destroyed a major part of the Bribri’s income source in the late 70s (Posas, 2013). At a time where the population was most vulnerable, RECOPE petroleum company started to extract petroleum on Bribri land (Ibid.). However, this event monetized the economies of the Bribri and paved the way for commercial banana trade (Ibid.). Continuing shocks like the earthquake in 1992 and strong flooding’s enhanced the Bribri to create a stable system of agriculture and caused the emphasis on traditional risk-reducing, diversified techniques (Ibid.). As Villabos and Borge (1995) put it, the Bribri and Cabecar indigenous territories are going through change and transformation as the local economy is integrating
into the national and global economy. As a consequence, some concerns about the development of the Bribri tradition have been raised. Shifting priorities, aspirations of young members and increasing abuse of alcohol are putting pressure on society and agricultural behaviour (Borge and Castillo 1997; Posas, 2013).

Besides, the Bribri beliefs also play a significant role for agricultural behaviour and resource management. Many farmers base their behaviour on the Siwa system of knowledge, which comes from the knowledge of Sibô (Posas, 2013). Bribri Lisandro Diaz Diaz mentioned in Borge and Castillo (1997) explains Siwa as a spiritual teaching that has dominated the relationship between the indigenous and nature. According to these beliefs, the Bribri and Cabecar were put in charge as guardians and protectors of the natural diversity (Ibid.). Lisandro Diaz Diaz furthermore says: “For thousands of years we have cared for our Mother Earth and during the next thousands of years, we will continue caring with the same zeal as our elders….” He says that thanks to this norm, there is still a great diversity in Talamanca (Borge & Castillo, 1997). Sibô transmission expresses the importance of natural diversity and the role of the humans to guard it (Posas, 2013). Nevertheless, the presence of old beliefs and traditions varies from family to family and some of them are increasingly part of the outside world and strongly influenced by a market economy (Posas, 2013).

Posas (2013) also finds that Bribri are generally open to new ideas and technologies in agriculture. They have stated this through the indigenous non-governmental organisation CODEBRIWAK (Commission for the Defence of Indigenous Rights in Talamanca). Within this statement they want to be open for outside influences, but at the same time merge them with cultural traditions (Posas, 2001).

4.4. Agricultural practices today

Today, the agricultural system of the Bribri is dominated by subsystems of indigenous polyculture (agroforestry) and internant agriculture (Borge, 1997) as shown in Figure 5. The Bribri have developed agricultural strategies in order to adapt to cope socio-political, economic and physical challenges. Posas (2013) explores three steps of risk minimization: First, careful management of the soil to obtain valuable insects, pollinators and soil organisms in order to guarantee productive crop plants. Second, keeping trees on the land to protect the farm from shocks like wind and floods and provide hunting opportunities and a higher independence from agriculture (Ibid.). Thirdly, the diversity in plants grown reduces the risk of overall crop failure, spreading pests and fulfills a range of needs all year long (Ibid.). The agricultural system of the Bribri is also known as an agro-pastoral system, which means that farmers hold livestock such as chickens, pigs, cows and horses next to growing plants. Subsystems nowadays are plantain and banana monoculture, plantain and banana polyculture, forestry and livestock (Borge, 1997).
Posas (2001) moreover identifies four typical parcels: 1) a parcel for rice, beans, maize, banana, plantain, and vegetables; 2) a spiral garden for crops and medicinal plants; 3) wild forest for hunting, gathering; and 4) an area which grows medicinal plants and fruit trees for wild animals.

Before the 1990s bananas, plantain and cacao were mainly produced for domestic purposes (Whelan, 2005). Organisations started to enter the area and showed their interest in purchasing organic bananas (Ibid.) After they contacted producers and made prices attractive the production quickly shifted towards organic banana production (Borge, 1999 cited in Whelan, 2005). There are several explanations for the rising interest for organic bananas. First of all, the rising demand in Europe, the U.S. and Japan in order to fulfil the consumer’s requests, secondly price premiums were provided and last, certifications and other regulatory systems were developed which are asking for certain requirements (Arze, 2001, cited in Hinojosa 2003). Today four big organisations purchase organic bananas from the farmers, namely TROBANEX, APPTA, UCANEHÜ and ACAORO (Wehlan, 2005). Hence, the initiative to commercialise the banana market in Talamanca came from the organisations, not the indigenous farmers, and the land use patterns changed according to the demand on the market (Wehlan, 2005).

4.5. Characteristics of farmers in Amubri

Due to the fact that there is no available literature which is focusing on the agricultural habits of the Amubri community, following paragraph gives a brief description of Amubri and the Bribri who live in this community, based on observations and dialogues with people familiar with the area.

Amubri has around 650 inhabitants and is located in the valley close to the Siksaola river (pers. com. Kessel, 2018). Farmers own land which they usually have inherited from their parents and is between one half and four hectares big (Fidel, 2018). Typically, several houses are located on the ground which accommodate various family members (Ibid.). The cohesion among family members is strong and everyone takes care of each other (Ibid.). Family relations are a main contributor to security in this area (pers. com., Kessel, 2018). Members of the family help out on the farm and support in times of disturbances, such as caused by natural catastrophes (Ibid.). Parents would on average get three children and the farm land is inherited to all of them (Ibid.). Nevertheless, many young people leave the area and therefore land is handed over to the remaining child (pers. com., Lupiario, 2018). The farms are equally owned by woman and man. Anyhow, there is a tendency that women take over responsibility of the
farming activities as alcoholic abuse, as well as crack and marihuana abuse is increasingly common among men (pers. com., Kessel, 2018). Families are strongly engaged with Christianity since the Spanish missionaries spread Catholicism among the Bribri (Ibid.). Nevertheless, members of Amubri community are still rooted in the traditional beliefs and the belief in sibu. Consequently, the role of the relationship between nature and humans is still significant.

In the 1980s/1990s farmers of Amubri along with the surrounding communities started selling organic bananas to Trobanex, APPTA and UCANEA (Lupiario, 2018). For commercial purpose farmers mainly grow bananas and a little bit of cacao and plantain. On the polyculture farms one typically finds different parcels for livestock (pigs, chicken, turkey), banana plants, plantain for animal feed, some cacao trees, fruit trees, herbs and beans. The farmers who work for Trobanex, the company trading the bananas for HiPP GmbH & Co, started growing Congo and Lacatan bananas, sub cultivars of Cavendish, in order to meet the demand for organic bananas. Some of the farmers still grow Gros Michel, but the Tropical Race 1 is taking down the last plants. Most of the farmers prefer growing the Congo and some people in the area predict a total shift to Kongo in the coming years (pers. com., Nunez, 2018). Trobanex is collecting approximately 120,000 kg of bananas twice a month in the community Amubri.

Figure 6. The Kongo Banana, subcultivar of the Cavendish (photo taken by the author, 18.02.2018).

4.6. Debating decision-making factors

There has been an intensive debate on the relevance of decision-making factors of farmers among decision-making researchers when it comes to the categorisation of economic, physical and socio-personal aspects. Talawar and Rhodes (1998) for example argue that economic factors and socio-personal factors surpass physical factors. Others argue that once the main aim of obtaining secure and stable farm business is archived, social and personal factors become the most relevant aspects in decision-making (Van der Vliet, 1972; Henderson, 1974; Ilbery, 1974). Furthermore, Raunborg and Rubinano (2001) state that other factors usually outweigh soil condition. Greig (2009) on the other side found that season and availability of water are the two most important factors influencing farmers of vegetables in Tanzania.
Regarding economic factors studies by Morgan (1977) and Jaffe (1989) stress that farms are businesses with economic objectives and therefore economic factors play a major role when it comes to agricultural decisions. Jaffe (1989, p.14) for example finds a reduction of yams cultivation in Haiti due to decreasing fertility and rising level of infestation. Anyhow, there is also an understanding that aspects like market prices and input of money are not the only influencing factors in farmer’s behaviour, due to the fact that in rural environments there is a comparably limited commercial activity (Briggs, 1985). In the specific case of tropical small-scale farmers, Wigley (1988) argues that the unique circumstances trigger various factors influencing decisions outweighing economic aspects.

The discussion of personal factors, in behavioural research, on the other side emerged relatively recent, in the 1970s and 80s, and were brought to the forefront by Ilbery (1977, 1979). There have been studies which found that personal factors such as experience with the crop (Briggs, 1985) are more important than other factors. Ryder (1993) found that economic factors like low risk, demand and production cost are usually the most important factors influencing the farmers, in his study on different crops in a mountainous area in the Dominican Republic. He explains this to be the consequence of non-isolated self-sufficient systems, but an integral part of nation’s commercial agricultural systems. On the other side family traditions and peer are ranked the highest, if all the different farmers are taken into consideration, without paying attention to the cultivation and Ryder suggests that agricultural innovations will be accepted easily as soon as the neighbour starts serves as a role model.

On the other side Greig’s study (2009), on decision-making in vegetable farming in the Kinamba Ward in Tansania, physical factors like seasonality and water availability played a major role, as the demand for water is high and fertility is highly dependent on seasons. After physical factors were considered economic factors also had a significant relevance, given the commercial orientation of agriculture in the communities. In this case personal factors played a subordinated role. A study on small-scale farmers in central Jamaica by Beckford (2002) shows that economic security is paramount, due to the reason that farmers in Jamaica and generally in the Caribbean have little economic security and the priority lays on minimizing risk.

Having compared different studies, it becomes clear that the decision-making factors have different relevance according to the type of farming and cultivation.
5. Empirical results

In this chapter, empirical results of the project are presented. They are derived from interviews and documents. The chapter starts with a presentation of the background questions and then describes the results of the point-score analysis which is indicated in Table 8. These are analysed by the three main point-score categories, socio-personal factors, economic factors and physical factors.

5.1. Background evaluations of the farms

The farmers were asked to analyse their farms and to give information on which crops they produce for the market. This was of interest in order to understand how dependent farmers are on growing and selling bananas. The only commercialised crops to be found in this region are bananas, cacao and plantain.

![Graph showing crop production]

**Figure 7.** Percentage of farmers producing different agricultural crops for the market, out of 28 participatory farmers.

All of the farmers grow bananas as their major income source, whereas some of them produce plantain and/or Cacao as a small additional source. Figure 7 shows that most of the farmers (48%) grow Cacao and Bananas for a commercial purpose, whereas 22% of them solely grow bananas. Only 15% of the respondents stated to grow bananas and plantains and likewise 15% stated to grow all three cultivars: bananas, plantains and cacao. The graph in Figure 7 shows that most farmers are growing an alternative commercial crop to bananas, which makes them less dependent on the success of growing bananas. Only 22% of the farmers are totally dependent on the commercial banana trade. However, it should be kept in mind that all the farmers still to a large extent live from a major outcome of their farms, through growing various other edible plants and keeping livestock for a domestic purpose. Consequently, none of them is entirely dependent on the market.

***
Furthermore, the farmers were asked to identify the different banana cultivars they grow on their land and the quantity they grow of each one (Figure 8). The cultivars grown for the marked in Amubri are limited to Gros Michel, Lacatan and Congo, whereas a few farmers stated to grow other banana cultivars for the domestic use.

As shown in Figure 8, amongst the 28 respondents, a majority (71%) is growing Congo, Lacatan and Gros Michel for the market. All farmers within this group stated that they grow Congo the most and are planning to grow more Congo instead of Gros Michel. Gros Michel on the other side is just grown in little quantity, because of TR1, which is attacking the plants since several years. The farmers are all tending to grow more Congo or switch to Congo cultivation solely. The farmers explain that there are various advantages of growing Congo: It is easy to grow, the fruits are more accessible due to the low height, it is resistant towards winds and flooding and relatively resistant to diseases. Taste is not a decisive criterion in this case as they are selling all of the crops, not keeping it for the own kitchen. Three farmers showed an exception in this case. They were growing additional species, such as Fiha, Primitivo and Quadrado with the argumentation that they want to enhance the biodiversity on their farm. These cultivars are used domestically and are neither sold to the national market nor to the global market. Lacatan is also a popular cultivar, but is defeated by the Congo, as it is not as resistant to diseases and taller which means that it is less resilient to winds and flooding, and the fruits are less accessible.

The participants of the questionnaire were furthermore asked to share if they have plans to change something on their farm and if so what they want to change. Two main groups were filtered according to the responses. As shown in Figure 5 one group was satisfied with the state of the farm as it is and wants to keep the farm running like they do it now. The other group was eager to grow more bananas for commercial use, whereas the third group wants to enhance biodiversity and start growing other banana species as well as other edible plants.
Table 5. Future plans of the farmers.

<table>
<thead>
<tr>
<th>Keep things like they are and pass the farm on to their children.</th>
<th>Increase banana cultivation:</th>
<th>Enhance biodiversity and start growing other banana cultivars:</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>16</td>
<td>4</td>
</tr>
</tbody>
</table>

Figure 5 shows that a majority of farmers (16) is planning on increasing banana cultivation, whereas 12 farmers are planning to keep the farm as it is. Anyhow, within the group that wants to expand the banana cultivation, farmers are limited by the lack of land available and therefore they are limited in increasing banana cultivation. Eugenio (pers. com., 2018) states, that first of all there is practically no available land for them to buy and second they don’t earn enough money in order to buy additional land. All of the farmers stated that they are keen on passing on the farm to their children and that this is one of the reasons why they want to keep the farm running successfully. Moreover, four out of 28 farmers stressed the aim to enhance biodiversity and to experiment with other banana cultivars besides Congo, Lacatan and Gros Michel, for their own use.

5.2. Experiences with and awareness of banana diseases

In order to get an understanding spread of banana diseases within the community, in context with the commission of this study, the famers were asked to state if they have had issues with banana diseases in the past and present. Table 6 shows that two main diseases were found to be a major challenge for the farmers of Amubri, namely Sigatoka and TR1.

Table 6. Number of farmers who have had issues with diseases and who have had no issues.

<table>
<thead>
<tr>
<th>Farmers who have had issues with banana diseases</th>
<th>Farmers who have had no issues with banana diseases</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>8</td>
</tr>
</tbody>
</table>

The majority of farmers (Table 6), 20 out of 28, stated that they have had issues with diseases in the past and still have problems with keeping diseases under control. The other eight farmers haven’t had any experience with diseases. It is notable that the farmers without disease issues were located in the same areas which can be attributed to very healthy soil, not contaminated with any diseases.

***

Another question in the interview guide was asking which disease was affecting the farmers the most and how aware they are of diseases in general. Table 7 shows that the farmers could be categorised into four different groups: Farmers who had solely issues with Sigatoka or TR1, farmers who had experience with both diseases and those who knew their bananas were affected by some disease which they couldn’t identify.

Table 7. Number of farmers with different diseases.

<table>
<thead>
<tr>
<th>Disease</th>
<th>Sigatoka</th>
<th>TR1</th>
<th>Sigatoka + TR1</th>
<th>Disease not identified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of farmers</td>
<td>7</td>
<td>5</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 7 illustrates how many farmers are affected by Sigatoka, TR1 or both diseases. With seven farmers affected by Sigatoka, five by TR1 and four by both diseases, it becomes clear that both diseases have a relevance to the farmers. Only four farmers couldn’t identify the disease attacking their banana plants. All respondent didn’t seem to care too much about the name or specific characteristics of diseases. Their major concern was if the banana plant is healthy or not, and in case of a disease to cut down the plant and plant new ones.
Another aim of the study was to find out if farmers in Amubri are aware of TR4. Consequently, the participants were asked if they have heard of the TR4 and if they are aware of the potential threat of the disease potentially reaching Central America. The responses showed that none of the farmers had ever heard of the disease not to mention that there is a future risk of a disease spreading in Costa Rica. This phenomenon can be traced back to the fact that in Amubri access to internet is rare and agricultural education low. As the disease hasn’t occurred there yet the farmers are not aware of it either.

5.3. Factors underlying crop selection

Table 8 shows the results of the point-score analysis performed with the 28 participants located in Amubri. The way in which the factors are presented and asked for are presented in Appendix 4. The fields marked in orange belong to the socio-personal category, the ones in blue to the economic category and the factors marked in green present the physical category. The participants were asked to first announce the factors which in general play a role in their perception of decision-making out of 17 different factors. The factors which were chosen to be completely irrelevant were scored zero. After, they were asked to distribute scores between one and four within the three categories: Socio-personal factors, economic factors and physical factor.

Table 8. Total number of respondents 28. Maximum score for any factor 112.
Red=Socio-personal Factors, Blue= Economic Factors, Green= Physical Factors.

<table>
<thead>
<tr>
<th>Decision factor</th>
<th>Total score</th>
<th>Score as % of max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Family tradition</td>
<td>97</td>
<td>87</td>
</tr>
<tr>
<td>2 Demand</td>
<td>96</td>
<td>86</td>
</tr>
<tr>
<td>3 Regular income</td>
<td>90</td>
<td>80</td>
</tr>
<tr>
<td>4 Tradition of the area</td>
<td>84</td>
<td>75</td>
</tr>
<tr>
<td>4 Education</td>
<td>84</td>
<td>75</td>
</tr>
<tr>
<td>5 Long-term security</td>
<td>83</td>
<td>74</td>
</tr>
<tr>
<td>6 Diseases</td>
<td>70</td>
<td>63</td>
</tr>
<tr>
<td>7 Prestige</td>
<td>65</td>
<td>58</td>
</tr>
<tr>
<td>8 Natural catastrophes</td>
<td>52</td>
<td>46</td>
</tr>
<tr>
<td>9 Practicality</td>
<td>50</td>
<td>45</td>
</tr>
<tr>
<td>10 Production cost</td>
<td>35</td>
<td>31</td>
</tr>
<tr>
<td>11 Weather</td>
<td>33</td>
<td>29</td>
</tr>
<tr>
<td>12 Growth cycle</td>
<td>32</td>
<td>29</td>
</tr>
<tr>
<td>13 Soil</td>
<td>30</td>
<td>27</td>
</tr>
<tr>
<td>14 Free time</td>
<td>23</td>
<td>21</td>
</tr>
<tr>
<td>16 Transport</td>
<td>19</td>
<td>17</td>
</tr>
<tr>
<td>16 Available credit</td>
<td>19</td>
<td>17</td>
</tr>
<tr>
<td>17 Governmental policy</td>
<td>18</td>
<td>16</td>
</tr>
</tbody>
</table>

The factor of family tradition got the highest score of 97 out of 121 and a percentage of 86, whereas governmental policy reached the lowest score of 18 and a percentage of 16. It is notable that socio-personal factors such as family tradition, tradition of the area and education and also economic factors, such as demand, regular income and long-term security ranked high with a score exceeding 80 scores out of 112. Physical factors are ranked in the middle range and scored between 30 scores (soil) and 70 scores (disease). On the other side a few socio-personal factors and especially economic factors ranked very low, such as free time (23) or Available credit (19).
6. Analysis

In this chapter, the empirical results are analysed with the help of the theories and the conceptual framework developed in Chapter 2. First, the point-score model is analysed and the ranking of the different factors is brought into context. After that, the results of the point-score are analysed and they are brought into context with the community resilience concept outlined in the theoretical chapter.

6.1. Physical factors

6.1.1. Diseases

Amongst the physical factors, *diseases* is the most relevant factor with a score of 70 and a percentage of 63, ranked 7th place in the complete list of factors. *Diseases* was one of the factors added to the list in Greig’s (2009) study, but was in this particular case not as relevant, because crop pests weren’t a big issue in the Kibamba Ward. Similar to Greig’s (2009) study, where season and water availability are the most important factors due to a region which is affected by a dry climate, the importance of diseases is also linked to the location and sort of crop cultivated in Amubri. The relevance of diseases is a clear consequence of the experiences with Sigatoka and TR1 (Nunez, pers. com., 2018) in the community of Amubri. The farmers interviewed are decreasingly growing Gros Michel because of the outbreak of TR1 which destroyed the banana cultivar. The perception of the farmers on diseases is therefore relevant, based on the long experiences and issues with diseases attacking banana plants since many generations (pers. com. Nunez, 2018).

Anyhow, the appearance of these diseases is dependent on the farms location within the community. It became clear that a few farmers had no problems with diseases at all and therefore gave little value to this factor. Only 5 farmers ranked *diseases* with zero scores and these farmers were all located in the same area. This is also explaining the high difference between score distribution regarding the factor of *diseases*. However, the fact that farmers still grow banana plants, although they are struggling with diseases, explains the overall ranking of the factor *diseases* on the 6th place, outweighed by more relevant factors. Another argument supporting this finding is that most of the farmers grow bananas either as their only or dominant commercial commodity, which results in a dependence on the income of the crop (Figure 7).
6.1.2. Natural catastrophes

*Natural catastrophes* was placed second in the category of physical factors and has a total score of 52 which is 46 percent of the maximum score reachable, whereas it is placed on the 8th place of the complete list of factors. This factor was suggested by Tropanex employees. Many farmers, especially those located in low altitude have had experiences with flooding. In the raining season the water level of the Sixaola river is flooding the valley (pers. com. Eugenio, 2018). Those farmers who gave high relevance to this factor stated that past flooding has taken down banana trees and has threatened their production. This is one of the major reasons why the farmers prefer cultivating the Congo banana since it has a wide trunk and is short, therefore more resistant to heavy flooding and winds. Those farmers who are located on a hill ranked this factor relatively low. According to Lupiario (pers. com., 2018) weather patterns are slowly changing and flooding becomes more frequently.

6.1.3. Practicality

*Practicality* was placed third within the category of physical factors and 9th in the complete list with a score of 50 and a percentage of 44. This factor was understood as in how the practicality of a certain banana cultivar influenced the farmer’s decision making in daily life. One main aspect here was the height of bananas and the reachability of the fruits. In comparison to other cultivars the Cavendish, here Lacatan and especially Congo, have the advantage of a lower trunk and farmers don’t need to climb far up the tree to cut the fruits. Anyhow, this factor was rather considered as a “good comfort” to have, but not essential in choosing the banana cultivar.

6.1.4. Weather

The factor *weather* with a total score of 33 and 29 % of the maximum reachable score was ranked 11th most important factor out of 28. Lupiario (pers. com., 2018) says that the success of banana fertility is dependent on the right amount of sunshine hours and rainfall. As all the banana cultivars are dependent on approximately the same amount of rain and sun this factor was not given the most attention and many

![Figure 9. Cavendish banana, which was attacked by Sigatoka (photo taken by the author, 04.03.2018).](image)
farmers chose to give no relevance to it at all. Still they are dependent on the right amount of rainfall and hours of sun (bananalink, 2018), but they haven’t had significant issues with this aspect yet.

6.1.5. Growth cycle
The factor Growth cycle was just rated one below Weather and got a score of 32 and 29 % of the maximum score reachable. To this factor, just like in Greig’s study (2009), where the time taken to grow the crop has reached an average score, farmers paid little attention, because their concern for factors like diseases and natural catastrophes is the main focus when it comes to physical factors. Several farmers explain that the growth cycle of bananas is more or less the same although Kongo seems to grow slightly faster than Lacatan for example. Besides bananas are growing all year around and no attention needs to be payed to seasons.

6.2. Economic factors

6.2.1. Demand
The factor demand is in the perception of the respondents one of the most influencing factors affecting the choice of banana cultivar with a total score of 96 and 85% of the maximum achievable score. Comments like “We grow what Trobanex is asking for” or “If we don’t deliver what the market asks for, how should we earn any money?” made by interviewed farmers, express the fundamental characteristic of this factor. This result goes in line with other studies, such as Ryder (1993) who found economic factors to be most important and explains this as a consequence of the farms operating not as self-sufficient subsistent systems, but as integrated institutions of a commercial agricultural system. Consequently, success in growing a cash crop is dependent on the demand of the market.

Besides Ryder, many others studies such as Ilbery’s (1979) study in Oxfordshire show the high importance of demand and Ilbery traces this back to the given fact that a farm is primarily a commercial organisation. Anyhow demand is on second place and not on first and is outdone by family traditions, which will be looked at closer in the discussion chapter.

6.2.2. Regular income
Regular income placed as third factor and long-term security as fifth again proves the prominence of economic factors on a commercialised farm business (Ilbery, 1979, Ryder 1993 and Beckford, 2002). The farmers depend on the money that Trobanex pays them twice a month when they pick up the banana harvest (Eugenio, pers. com., 2018). As banana crop is the main or even the only commercial crop (Figure 7) they grow, the regular income is highly dependent on that. Many farmers comment that without this income they couldn’t afford things like education for their children, extra food or clothes.

6.2.3. Long-term security
Long-term security with a percentage of 74 was in the first place not something the farmers would think about, but through further explanation and through a dialogue in which all farmers stated that they want to pass on the farm to their children it became clear that it had a value to them. A main goal was to maintain the farm as it is, and in some cases to expand the land or increase the productivity of the farm. It can be presumed that farmers are making their decisions based on experiences (Bredford, 1990) and act on current influences rather than considering future developments.

6.2.4. Production cost, transport, available credit and governmental support
The production cost factor was ranked on the 7th place with 31,25 percent of the total score. As the farmers don’t have any input costs in organic banana farming, because no fertilisers, no machinery is used and there is no need to buy new seeds. This explains why other studies, where the farming required implementation of technologies and fertilisers, have found a higher score in production costs (eg. Ryder, 1993; Bredford 2002).
Factors like transport, available credit and governmental support on the contrary have almost no relevance for the respondents in Amubri. The bananas are being picked up by Trobanex at the closest road which is usually not far. Eugenio (pers. com., 2018) states that farms which are located further from the main road usually use a horse to transport the banana plants. Besides, there is no available credit for the farmers. This means, no available credit makes them more dependent on the regular income and therefore indirectly plays a role in context with other factors. 20 out of 28 farmers stated that they get governmental support for their children’s education. This is not much, but takes little economic pressure from them and gives them more freedom in their choices.

6.3. Socio-personal factors

6.3.1. Family-traditions

In the farmer’s perception, family tradition is the most important factor influencing the decision making in their choices. With a total score of 96 and 87% of the maximum achievable score, family traditions are just slightly more important than the demand. Compared to other studies, family tradition has played an essential role in each study. In Ryders study (1993) for example family tradition was also ranked with the maximum score when it came to decision-making in coffee cultivation. Besides, Bradford (2002) in his study on Jamaican Yam farmers found that farmers are highly influenced by family and community traditions. In his case the use of traditional agricultural methods is part of the cultural ecology of yam farming and he explains this as being a consequence of remaining independence where the farmers don’t need help from the outside. In Greig’s study (2009) in the contrary personal factors didn’t play a significant role, because physical and economic factors outweigh them. In Amubri there was only one farmer stating that family tradition had no importance at all. In general, those farmers ranking this factor with a relatively low score, were amongst the young farmers in their 20s.

The high score for family tradition can be explained as a consequence of agriculture having been a part of Bribri culture for a long time (Posas, 2013). As mentioned in the empirical background the siwa knowledge still is present in the way the farmers interact with the environment. Several farmers and Nunez (pers. com., 2018) mentioned the god sibu and their responsibility to protect nature. Furthermore, some farmers stress that they want to enhance the biodiversity on the farm, because that is the way it has been done by their parents and grandparents. Growing organic is, next to a financial aspect, also a decision of valuing the traditional way of farming. This furthermore, acknowledges the theory of Klein et. al. (1993) who describe a farmer as street-smart and hands-on, who relies on experience in order to find solutions.

6.3.2. Tradition of the area and Education

Tradition for the area and education were both placed on the fourth rank and reached a score of 75 percent. As Bradford (2002) and Ryder (1993) found, it is important to small scale farmers to be integrated into the practices and traditions of their community. One of the reasons for the relevance of area tradition is that farmers solve their issues by exchanging ideas within the community and by helping each other out in extreme situations. Indeed, the farmers of Amubri stated that the agricultural habits and especially successes of their neighbours have an influence on their decision-making. If the neighbour is implementing an innovation the farmers around are likely to take over the innovation in case it shows success (Nunez, pers. com., 2018).

The factor education is closely interlinked with the perception of family tradition as farmers have their knowledge about agriculture from their parents and grandparents. There are no agricultural education programmes or anything comparable in this area (Eugenio, pers. com., 2018). Anyhow, Trobanex has given them brief instructions on handling diseases, so they would not infect other plants. The fact that the farmers plant the same banana cultivar as their parents did, namely Congo, Lakatan and Gros Michel underscores this outcome.
6.3.3. Prestige and free time

Prestige is also closely interlinked with the tradition of the areas and scored 65, which results in a percentage of 58 of the maximum achievable score. As already mentioned in the previous chapter, the farmers are concerned about fitting into customs of the community (Bredford, 2002). Being a part of the commercial banana trade and doing so successfully is also part of the attitude towards prestige.

Free time on the other side was considered as a relatively unimportant factor with a score of 23 and ranked 14th in the overall list. During the interviews it became clear that farmers are used to work a lot and haven’t really considered free time as a fact influencing them in the crop choice. They have worked on the farm since they are children and consider a hard working days as normal. This result underlines the outcome of Ilbery’s (1779) and Graig’s (2009) study, where free time did play a slightly more important role but was outweighed by many other factors.

6.4. Summary

In conclusion socio-personal and economic factors play a similarly important role, especially demand and family tradition have a high value in farmer’s perception. Physical factors like diseases and natural catastrophes were also essential factors, but got a lower score as not all the farmers had influencing experiences with these aspects. On the other side factors like free time, governmental support and available credit haven’t been aspects the farmers really thought of and therefore were ranked low. The fact that many factors got high scores with similar ranking to each other underlines the theory that farmers live in a complex environment where several interlinked factors influence their choice of cultivar. Based on the idea by Ilbery (1985) and Bradford (2002) and the importance to understand perception of farmers according to decision-making factors, the analysis has shown that farmers of Amubri are situated in a transition phase between substance and commercial lifestyle where they are torn between ever more complex decision-making processes. The fact that farmers are adapting to the demand of the market in their choice of banana cultivar is obvious, but in their perception values lay also on other factors like family tradition, tradition of the area and environmental influences.

6.4. Connecting decision-making and community resilience

Following chapter is connecting the outcome of the point-score analysis with the concept of community resilience based on Wilson’s (2011) debate on the influence of globalisation and transition on resilience and decision-making of a community. This chapter is giving an approach to answer the third research question: In which way is the community resilient/vulnerable to disturbances in context with decision-making behaviour and globalisation?

In this study it is argued that decision-making behaviour and resilience are closely interlinked concepts which are constantly influencing each other (Figure 10). Wilson (2011) states that it is essential to understand the behaviour of individuals in order to create resilience on the community level. This case study of farmers in Amubri stands for a community which has over the past 25 years experienced a shift from subsistence farming to commercial farming and which has slowly become embedded in the global economy.
Figure 10. Decision-making factors (based on Ilbery, 1977) in connection with the community resilience concept (based on Wilson, 2011).

In terms of economic decision-making factors, the high relevance of demand, regular income and long-term security confirm the relevance of the economic capital. Whereas, economic aspects didn’t play an essential role at times when the farmers used to be entirely subsistent, it now has shifted towards being perceived as major factor influencing their choice of banana cultivar. Only a few farmers (Figure 8) have stated to grow additional banana cultivars besides the ones asked from the market (in this case Trobanex). In terms of economic capital and the explanation mentioned in the theoretical chapter the income provided by the regular sale of crops is offering a higher resilience in case of disturbances. Disturbances such as market collapse, environmental shocks or societal changes form new potential threats to the resilience of Amubri.

The answer to Harvey’s (2006) question, if the integration of a community into global capitalism is triggering a well-developed economic capital or if it is increasing the dependence of a community on outer forces is two-fold. Based on findings discovered during the interviews, the point-score and personal communication, it can be explained that on the one side economic capital is strengthened through a regular income and the higher independence on local resources. On the other side farmers of Amubri face new potential risks through being dependent on the market circumstances and a sustained demand. They are limited in their decision of banana cultivars as they depend on the market requests. Overall, this study argues that the resilience in terms of economic capital has improved since the shift to commercialised cultivation. This theory is confirming the determination of Villabos and Borge (1995), that Bribri communities are undergoing a way of transformation through the integration of local economy into national and global economy.

The socio-personal factors like family tradition and tradition of the area were recognised as highly relevant (Table 8). This outcome confirms the importance of socio-personal values which have remained in the deeply rooted traditions of the Bribri. It should be emphasised at this point that the cultural capital (Bourdieu, 1987) plays a significant role in this case. Bribri in the knowledge of Sibō are highly concerned about their relationship with nature (Borge and Castillo, 1997) and the Sibō knowledge stresses the importance of diversity. According to Wilson (2011) one of the main indicators for a resilient community is a high biodiversity in ecosystems, because the adaptive capacity to disturbances is higher. Considering that tradition is the highest ranked decision-making factor social capital, at least in the perception of the farmers, is still strong. Furthermore, the social network is supported by the fact that most family members live on the same piece of land and build a relatively strong social network.

In terms of environmental capital, the outcome of the point-score analysis shows that relatively low importance is placed on physical factors influencing the decision-making process of the farmers.
However, factors such as diseases and natural catastrophes play a role influencing the farmer’s choices, because they have had experiences with these factors.

In conclusion farmers are facing increasing outer influences which provide a complex set of decision-factors. Therefore, making the right decisions in order to create resilience is getting ever more complicated and unclear. This study shows that farmers of Amubri are torn between different relevant factors and are challenged to bring relevant factors under one umbrella. For example, they want to meet the demand in order to secure their economics, but at the same time they want to follow agricultural traditions and enhance diversity, which is often difficult to combine. This inner strife is a consequence of changing environments. It is furthermore, confirming the theory by Wilson (2011) that decision-making opportunities are widening in the developing as well as in developed countries. This widened state entails both an environmental and socio-culturally vulnerability, and as Wilson (2011, p.1229) states ”new opportunities for the rediscovery of strong resilience in global and relocalised communities”.

Based on the structured interviews (Appendix 2) as well as observations and results of the point-score analysis (Table 8) this study suggests that the community of Amubri is to be defined as moderately resilient community (Figure 2). The dominating conceptual space is the intersection between the economic and social capital, whereas the environmental capital shows a tendency to get less attention. However, within each capital, aspects of resilience are debatable and cannot be stated as fully resilient or non-resilient.

Wilson (2011, p.1218) suggests that ”the right balance between communities and their interaction with the global level is key for maximization of community resilience”. As mentioned in chapter 4.3 the Bribri have stated, in line with Wilsons’s suggestion, through the CODEBRIWAK that they want to be open for outside influences and change, but at the same time merge them with cultural traditions (Posas, 2001).
7. Discussion

First the following chapter discusses the analysis of the three decision-making categories. Then the chapter is reflecting back on the research questions asked in chapter one and is providing a conclusion that can be drawn from the results and analysis chapter. It furthermore makes a comparison to similar studies which were described through the text.

7.1. Discussing decision-making factors

Overall physical factors were ranked the lowest amongst the three categories. This goes in line with most scholars applying perception decision-making theory. As mentioned in the theoretical part scholars like Talawar and Rhodes (1998), Ilbery (1974) and Raunborg and Rubinano (2001) found that other factors outweigh physical factors. Greig (2009) on the other side found season and water availability on the forefront, which she explains as a result of the climatic challenges in the region. Likewise, in this case physical factors, especially diseases and natural catastrophes play a significant role and almost all farmers share concern about these factors and therefore it is essential to mention them. However, at this point It needs to be considered that the overall score, especially in factors like disease and natural catastrophes, would probably have been higher if the factors weren’t dependent on the location of the farm.

Based on what Bradford (1990) said, it becomes clear that farmers within the category of physical factors base their decision-making on lessons learned and recovery processes. As mentioned in the empirical background the Bribri farmers of Talamanca have had experiences with flooding in the 1970s and a strong earthquake and flooding in 1992, which destroyed a major part of the farm’s income (Posas, 2013). This was a trigger for implementing risk-reducing diversified techniques (Ibid.).

It becomes clear that some economic factors like demand, long-term security and regular income play essential roles in the decision-making behaviour of the farmers due to the commercialised character of the area. This has confirmed the content of many other studies applying this method. It should be mentioned that the reason for a relatively low ranking of economic factors and a higher ranking of physical factors in Greig’s (2009) study is the result of subsistent farmers participating in the survey, which don’t have an interest in demand, income or anything related. The commercial aspect of farming anyhow is relatively new to the farmers in Amubri, as they have been subsistent farmers until the 1990s when started growing bananas, cacao and plantain for the market which also explains the high ranking of socio-personal factors (Whelan, 2005). At this point it can be questioned at what point commercial trading becomes part of the tradition. However, it seems that economic factors limit other factors in their relevance because it is becoming ever more important to farmers and their standard of living.

Overall, socio-personal factors play the most important role when it comes to the perception of farmers in context with decision-making. This is comparable to Ryder’s study (1993) where socio-personal factors also had a high relevance in coffee plantation due to the rootedness of the farmers to their traditions. It furthermore proves what was stated in the theoretical part, that tropical small-scale farmers need to be recognised as unique farming entities and that farmers are influenced by factors more important than the ones with an economic origin (Wigley, 1988). Free time on the other side was in comparison to Ryders (1993) findings much less important. However, from the outside it seems that demand is taking over major relevance

7.2. Answering the research questions

The research questions described in chapter one are:

1. Which key factors, cultural, economic and environmental, influence indigenous small-scale farmers in the community of Amubri, Costa Rica, in their choice of banana cultivar?
2. **How is the awareness of the farmers towards existing and imminent risk of banana diseases?**
3. **In which way is the community resilient/vulnerable to disturbances in context with decision-making behaviour and globalisation?**

Regarding research question number one it needs to be stressed that there is no absolute clear answer for this question. Farmers are facing such complex environments that influencing factors are all interlinked. Nevertheless, point-score has the unique advantage of examining the perception of participating objects and is providing a set of factors which might influence the farmers subconsciously (Found, 1971; Gladwin, 1980). In the perception of the farmers of Amubri, socio-personal factors, especially traditions, play the most relevant role due to their predominant cultural roots (Borge and Castillo, 1997; Posas 2013). This result confirms argumentation by some scholars who take the view that farmers are not only economic entities, but are influenced by much more than economic values (eg. Ilbery, 1977; Ryder, 1993; Bradford 2009). On the other side it contradicts case-study findings of Morgan (1977) and Jaffe (1989) who argue that farms are businesses with economic objectives and therefore economic factors will always come first. However, the demand factor is limiting several other relevant factors, as no demand means no sale.

Economic factors like demand and long-term security are still essential aspects of influence, also in this case study. After the shift from absolute subsistent farming to partly commercial farming in the 1990s (Whelan, 2005) the choice of banana cultivar has been adapted to the requests of the market. Anyhow, the tendency to grow increasingly Congo bananas shows that still the farmers react on other outer influences besides demand, and experiences with natural catastrophes and diseases influence their choices accordingly. It becomes clear that the relevance of factors can change over time and that outer influences like environmental change will probably also change the perception of decision-making factors. In Greig’s study (2009) for example physical factors are most relevant due to the harsh climatic conditions in the Kimbau ward, which make factors like weather and water access most pressuring.

It should be mentioned at this point that the meaning of perception itself is debatable. One of the definitions by Bradford (2009) was that it is a reflection of reality and facts, as farmers are the ones who make the decisions. In this case study, for an outsider, economic factors might seem to have the highest influence. However, the perception of the farmers tells us something else which we as outsiders wouldn’t notice otherwise. It tells us something about their values and these values are very precious as they enhance a biodiverse way of farming and should be recognised and encouraged by institutions interfering the community.

Along the data collection it became clear that farmers of Amubri are torn between two worlds. A world of traditions, Bribri culture and beliefs and a new world where neo-liberal capitalism (Wilson, 2004) is dominating society. In order to implement agricultural innovation this conflict needs to be considered and needs to be adapted to the circumstances.

***

The awareness of banana diseases within the community is prevalent. This is a consequence of challenging experiences with banana diseases over the past decades which also affected earlier generations and explains the relatively high ranking of diseases in the point-score analysis. Diseases like TR1, known as Panama disease among Amubri farmers, and Sigatoka are known in this area. Nevertheless, some of the farmers have heard of the diseases, but weren’t able to identify them with their own crops. Results have shown that none of the farmers have heard of the potential threat of TR4. A lack of information flow can be identified here. It furthermore emphasises the importance of experience of the past as influencing factor in decision-making behaviour and asks for an improved information flow. As Beckford (2002) finds people are more likely to adapt to change of the information flow is improved.

***
Beckford (2002) and Hudson (1982) stress that the circumstances under which small-scale farmers operate ask for minimizing risks or in other words following the principle “safety first”. This leads us to the aspect of resilience and the third research question. This study showed that farmers of Amubri are moderately resilient to disturbances such as banana diseases. Especially in terms of economic capital they have increased resilience in terms of financial security. Point-score analysis shows that socio-personal factors still play a major role in their society and therefore the intersection between social capital and economic capital is seen as moderately resilient. On the other side environmental capital seems to be an aspect that is being addressed decreasingly in the transition phase towards a global economy. Wilson (2011) states that resilience can only be provided if all three capitals, environmental, economic, as well as social are fulfilled equally. Therefore, it is essential, to encourage the perception of the farmers on environmental aspects.

On the other hand, the fact that farmers are mainly growing Cavendish banana makes the farmers economically vulnerable to diseases such as TR4. If the outbreak of TR4 is going to happen soon, their commercial crop is most likely to be wiped out. However, farmers of Amubri are still stronger as they have a high diversity of other crops than bananas on their farms and some grow cacao and plantain commercially. Therefore, it is very important to maintain and enhance the biodiversity on the farms and specifically encourage a diversity of banana crops.

Applying the FPIC checklist by FAO (Appendix 5) shows that most of the relevant aspects of completing research with indigenous people are fulfilled. However, some aspect couldn’t be completed due to various reasons. There was no communication with leaders of the community before the interviews were taken, as it wasn’t able to find an appointment with ADITIBRI. This could have been a good source of further information and sensitisation of ethical concerns. Moreover, there was not enough time to carry out a participatory mapping analysis. This also would have supported the validity of the farmers’ opinions. Last, following question was not fulfilled: Has the community been engaged in an adequate negotiation process on land and resources agreements, governance arrangements, legal and financial arrangements, employment and contracting opportunities, culturally appropriate benefits sharing, processes and mechanisms for monitoring, grievances and dispute resolutions, among other items? These aspects were not focus of the research questions and were therefore not included into the research process. Anyhow, it is suggested that further research pays particular awareness to these aspects.
8. Conclusions

The aim of this study was with the help of flexible design and point-score analysis to explore the role of various factors influencing farmers decision-making in a complex environment. The conclusion chapter refers to the aim and summarizes the key findings. Furthermore, it gives suggestions to the commissioner of the study and finally reflects on the methodology and suggestions for future research are presented.

In order to encourage sustainable agricultural systems and the connected SDGs, it is a major contribution to understand the factors which influence farmers in their decision-making. The results of the empirical research have made clear which factors are most and least relevant in farmer’s perception of decision-making. As expected economic factors like demand and long-term security played a major influencing role, which is traced back to the commercialised nature of the farms today. More surprising was the fact that socio-personal factors gained an overall higher attention and that factors like family tradition and tradition of the area have a highly emotional importance to the farmers. Physical factors also played an important role, but were given less attention. Physical factors which were connected to past experience and disturbances, such as diseases and natural catastrophes, played a role to most of the farmers. Nevertheless, the relevance of factors is something that will never have a constant ranking but will change according to various outer influences on a community and individual.

The wider objective of this study was to enhance the cross-cultural communication between the farmers and HiPP GmbH & Co in order to pave the way for agricultural innovation and a higher resilience towards disturbances. This study suggests that when the new banana cultivars are going to be implemented, this should happen aligned with the ideas of Amubri farmers. Special attention should be given to the cultural and traditional methods of growing bananas and to merge economic requirements with socio-personal aspects. Furthermore, it needs to be explained to the farmers, what the risks of TR4 and other diseases are, in order to show them the importance of implementing new cultivar. For example, the traditional importance of biodiversity needs to be encouraged next to implementing innovations. Besides, the company needs to take into consideration that factors like natural catastrophes are a relevant aspect of perception and choice of banana cultivar should be resistant to flooding and winds. A balance needs to be found where the community, while going through a transition phase of globalisation, emphasises economic, social and environmental capital equally, in order to be resilient to disturbances.

8.1. Methodological reflection and suggestions

Reflecting on the methodology used in this study there are several advantages and disadvantages which were discovered along the research process. The point-score analysis has been proven to be successful with small-scale farmers in developing countries in several previous studies. Providing a set of factors that potentially influences the farmers decision-making served as a fruitful method to approach the farmers, as there were factors included of which they wouldn’t think of. Moreover, it was essential for this study to understand the perception of farmers related to their decision-making processes. This can on the one hand be seen as subjective way of collecting information, but on the other hand it contributes to the understanding of the values, impacts and conditions the farmers are concerned with. The quantification and “nudging” of certain factors on the other side limits results, whereas a more open interview might have given more information in the first place. In order to counteract this phenomenon some open questions were added. Nevertheless, also complications occurred during the interview process. Many of the farmers had issues in understanding factors as they were compiled beforehand. In several cases it took a long time in order to explain the different
factors. This can be traced back to the fact that the question of perception is quite abstract and indirect and requires a way of thinking which the participants aren’t used to. Explaining this via interpreter made the process even more complicated. Each factor had to be formulated in different ways and might have been interpreted slightly different among the participants.

This study was using the data collected from individuals in order to make conclusions of the resilience of a community. This needs to be mentioned at this point as it is debatable if data collection of 28 farmers can be representative to show the resilience of a community. It is argued that this study is giving an attempt to estimate the resilience and vulnerability of Amubri, but further investigation through a systematic approach is needed in order to form a complete picture of the SES.

In order to avoid bias in an existing relationship between researcher and respondent it is suggested to collect data through point-score in a rural environment with using prolonged involvement. Building up a familiar relationship to the respondents over weeks or months would have encouraged a more realistic set of answers. The farmers often seemed to be intimidated and afraid to give the “right” answers, although it was given detailed information about the purpose of the research beforehand. Another suggestion for further research is to prepare an exact explanation of each factor in a very simplified and understandable way.

The implementation of various data collection methods provided a valuable set of empirical results. Doing face-to-face interviews was a valuable method in order to get the most possible and authentic answers of the participants as possible. Due to the fact that respondents were reserved and not used to many foreigners in their area, it was important to find a trustworthy and loosened atmosphere with them. It became clear that personal communications gave very important insights and background information as participants seemed to be more relaxed as soon as the recorder was switched off and they would show the scholar the farm. This information was tried to be noticed as precise as possible.

This study is contributing to the research which is striving to understand the decision behaviour of small-scale farmers in rural areas and is providing valuable information in order to create resilience of a community facing change and disturbances. Point-score has for the first time been connected with resilience within this study. Nevertheless, it should be emphasised that this study is a case study. It can be used as a pilot and can be aligned with similar studies used for further research. It is advisable to interview as many farmers as possible in order to gather most realistic picture of a community. Interviewing 28 farmers out of 100 potential farmers was the minimum amount, but the scope of this study and infrastructural limits didn’t allow further interviews.
9. Acknowledgements

This thesis would not be possible if it was not for many inspiring people surrounding me.

First, I would like to thank my wonderful family for their support and tolerance for my immersion in work.

I thank Cecilia Mark-Herbert for her great teaching and helpful supervision. Her ideas inspired me on sustainable development studies and gave me essential guidance during the thesis process. I would also like to thank Mario Beissel and his family for their hospitality and the great support during the field trip in Costa Rica.

I express my gratitude to all interviewees: all the farmers from Talamanca, the Trobanex managers and HiPP GmbH & Co employees, who have shared their valuable time with me. Special thanks goes to HiPP GmbH & Co for supporting me during the process of this study with relevant information and for supporting my fieldtrip with all needed documents and finances.

Last, special thanks to Savannah Kessel and Adis Sanchez, who spend a lot of their free time, voluntarily translating from Spanish to English during the Interviews and who shared interesting stories about their experiences and life in the field of interest.

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Websites


HiPP, 2018. [online] Available at: https://www.hipp.de


Personal massages

Mario Beissel – Manager of Trobanex
trobanex@racsa.co.cr

Stefan Hipp – Shareholder of HiPP GmbH & Co
Stefan.hipp@hipp.de
Personal communication

Eugenio Nunez: Trobanex manager of local affairs

Fidel Lupiario: Trobanex employee, facilitation, in charge of organic certifications

Savannah Kessel: Peace corps volunteer and interpreter

Mario Beissel: Trobanex manager and HiPP GmbH & Co employee

Interpretation

Savannah Kessel: piece core volunteer and interpreter

Adis Sanchez: student in Bribri, interpreter
Appendix 1. Case-study protocol

Case study
Farming community in the indigenous nature reserve of Talamanca, Costa Rica

Case study background
Presented in Chapter 4

Research questions
Presented in Chapter 1

Data collection methods/sources
Structured personal interviews and point-score analysis
Personal communication
E-mails with representatives

Data collection procedure and history
- *November 25<sup>th</sup>* - first contact with HiPP GmbH & Co via telephone call
- *November 29<sup>th</sup>* – First contact with Mario Beissel, manager of Trobanex via e-mail
- *February 06<sup>th</sup>*- arrived in San Jose, Costa Rica for fieldwork
- *February 8<sup>th</sup>*- Meeting at Trobanex office for fieldwork preparation
- *February 9<sup>th</sup>*- documents studied to prepare questions, interview guide developed with Trobanex employees
- *February 12<sup>th</sup>*- arrived to Bribri in Talamanca
- *February 13<sup>th</sup>* until 8<sup>th</sup> of March- Interviews conducted with farmers in Amubri. Approximately three per day, due to unexpected happenings a few days had to be skipped.
- *March 19<sup>th</sup>*- March 23<sup>rd</sup>*- interviews transcribed
- *April 02*-May 22, 2015 – categorization, analysis, report

Ethical considerations
-Interviews with residents should be anonymous;
-Interviewees should know they are recorded;
-Interviews should be aware of study purposes and how data will be used
-Receive approval for interview from a person

Interview guide
Appendix 2

Special preparations
- Recording device for recording interviews;
-Print out interview guidelines and bring materials for face-to-face interviews;
-Notepad and pen for taking notes;
- Pre-discuss the location of farms visited each day.

Full list of interviewees
Presented in Chapter 3
The participants agreed on publication of their personal details, such as name, age and gender
Appendix 2. Interview guide

Interview guide for structured interviews with farmers in Amubri, created by the author:

- What kind of crops do you produce for the market?
- Which of the crops is your main income source?
- Which banana cultivar do you grow?
- What are your future plans concerning banana farming?
- Have you had issues with banana diseases?
- Have you heard of Tropical Race 4?

Chosen decision-making factors for this case study, point-score (based on Ilbery, 1977):

<table>
<thead>
<tr>
<th>Socio Personal Factors</th>
<th>Economic Factors</th>
<th>Physical Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prestige</td>
<td>Demand</td>
<td>Natural catastrophes</td>
</tr>
<tr>
<td>Family traditions</td>
<td>Regular income</td>
<td>Soil</td>
</tr>
<tr>
<td>Area traditions</td>
<td>Available credit</td>
<td>Weather</td>
</tr>
<tr>
<td>Education</td>
<td>Production costs</td>
<td>Diseases</td>
</tr>
<tr>
<td>Free time</td>
<td>Long-term security</td>
<td>Growth cycles</td>
</tr>
<tr>
<td></td>
<td>Governmental policy</td>
<td>Practicality</td>
</tr>
<tr>
<td></td>
<td>Transport</td>
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</tr>
</tbody>
</table>
Appendix 3. Background on the organisation and business strategy

HiPP GmbH & Co is a German company founded in 1899 by Georg HiPP and is producing various baby food products for the international market (HiPP, 2018). Until today HiPP still runs in the family and is known as a pioneer in organic production and sustainable principles (Ibid.). It is a medium-sized company that has production sides in Germany, Croatia, Austria, Russia, Switzerland, Ukraine and Hungary and has the biggest market for organic babyfood products in Europe and Asia (Pretzel, 2015, P.5). They employ approximately 2.600 people and the turnover in 2014 was 730 Mio Euros (ibid.).

The company obtains its ingredients from Europe, Asia, Africa and Latin America and therefore it counts as Multinational enterprise (MNE). The company claims that sustainability is centre of the company’s philosophy, which implies the long-term alignment of the company’s actions, a responsible interaction with the environment and a social responsibility for all stakeholders (HiPP, 2018). Therefore, the company builds on the three pillars of sustainability: ecology, economy and society (Ibid.). Since 1956 HiPP buys exclusively organic certificated resources and in 1999 HiPP Ethik-Charta was framed (Ibid.). The Ethik-Charta expresses the commitment of the company towards values like fair trade and a respectful and reliable interaction with business partners, costumers, colleagues and suppliers (Ibid.). The HiPP- Ethikmanagement is also a reaction on short term profit orientation and for taking over social responsibilities (Pretzel, 2016).

Every three years the company is releasing a sustainability report which is made public and contains all the relevant updated sustainability strategies. In the most recent sustainability report from 2015, HiPP phrases the so called sustainability guidelines which are the binding fundmand for the definition of all sustainability goals and apply to all associates (Pretzel, 2016). These guidelines are formed out of four main aspects: HiPP and environment, HiPP and social responsibility, HiPP and values, HiPP as employer (Pretzel, 2016, pp. 8-9). The first guidelines focus on the maintenance of livelihoods through a gentle treatment of natural resources (Ibid.). In this light the environmental management is being developed and improved frequently and negative effects on the environment are reduced (Ibid.). An ecological standard is being met through the fulfilment of the international valid environment management system ISO 14001 and EMAS (Ibid.). Furthermore, the company opposes green genetic modified organisms and supports research and development of near-natural agricultural methods in order to enhance biodiversity (Ibid.).

According guideline number two “HiPP and social responsibility” the company puts social responsibility at first place within acting transparent and obliges towards costumers to always deliver high quality products. Towards partners HiPP claims to act with respect and reliability (Ibid.). The third guideline “HiPP and values” expresses the expectation that partners have to fulfil the same social and ecological expectations as the company itself (Ibid.). Along the supply chain basic compliance of human rights, no child labour, as well as appropriate working conditions express basic guidelines (Ibid.). Hipp expects that wages are fair, and that the workers have a dignified life in order to be a part of society (Ibid.). In general, the company strives, in the name of sustainability, towards a profit optimization instead of profit maximisation (Ibid.). The last guideline refers to the social togetherness among colleagues, partners and stakeholders (Ibid.). The fundamental guidelines of this are based on the Ethik-Charta which was mentioned earlier in the text (Ibid.).

Within the company there is a clear organisational structure in order to guarantee the achievement of a sustainable development (Pretzel, 2016). Each department has a responsible person in charge of the sustainability strategies within his or her field (Ibid.). The person I charge is frequently updating the sustainability department which is again reporting the higher management (Ibid.).

Besides the sustainability report 2015 stresses the importance of supply-chain-management (Pretzel, 2016, p. 22). HiPP acknowledges the responsibility towards suppliers and contractual partners (Ibid.). Integral part of business contracts is therefore always an environmental, social and ethical codex (ibid.).
It is fundamental for the babyfood company to assure a long-term and reliable cooperation in line with securing quality and availability of resources, fair prices and secured purchase quantity (Ibid.).
## Appendix 4. Chosen Decision-making factors and connected interview questions

<table>
<thead>
<tr>
<th>Socio Personal Factors</th>
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</thead>
<tbody>
<tr>
<td><strong>Prestige</strong></td>
<td>In which way/to what extend does prestige influence your choice of banana cultivar?</td>
</tr>
<tr>
<td><strong>Family traditions</strong></td>
<td>In which way/to what extend does your family tradition influence your choice of banana cultivar?</td>
</tr>
<tr>
<td><strong>Area traditions</strong></td>
<td>In which way/to what extend does the tradition of your area/surrounding influence your choice of banana cultivar?</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td>How did you learn to grow and treat banana cultivars? In which way/to what extend does your education influence you in your choice of banana cultivar?</td>
</tr>
<tr>
<td><strong>Free time</strong></td>
<td>In which way/to what extend does free time influence your choice of banana cultivar? Follow up question: Are there banana cultivars which are less work intense and would this be a factor influencing you in the choice of cultivar?</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Economic Factors</th>
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</thead>
<tbody>
<tr>
<td><strong>Demand</strong></td>
<td>How important is the demand of the market for your choice of banana cultivar? Follow up question: How important is it in comparison to other factors? (family tradition, prestige etc.)</td>
</tr>
<tr>
<td><strong>Regular income</strong></td>
<td>Do you get a regular income? In which way/to what extend is the protection of your regular income influencing your choice of banana cultivar?</td>
</tr>
<tr>
<td><strong>Available credit</strong></td>
<td>Do you get any credits? In which way/to what extend is the available credit influencing your choice of banana cultivar?</td>
</tr>
<tr>
<td><strong>Production costs</strong></td>
<td>What kind of production costs do you have? (in terms of labour, inputs like water, fertiliser etc.) In which way/to what extent are these costs influencing you in the choice of banana cultivar?</td>
</tr>
<tr>
<td><strong>Long-term security</strong></td>
<td>Do you have the feeling your future is secured? In what way is it or is it not secured? In what way/to what extend is this influencing you in your choice of banana cultivar?</td>
</tr>
<tr>
<td><strong>Governmental policy</strong></td>
<td>Are there any governmental policies you are aware of? Have they been influencing you? In what way/to what extend have governmental policies been influencing your choice of banana cultivar?</td>
</tr>
<tr>
<td>Category</td>
<td>Question</td>
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<tr>
<td>-------------------</td>
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<tr>
<td>Transport</td>
<td>How do you transport your products? In what way/to what extend has the availability of transportation influenced your choice of banana cultivar?</td>
</tr>
<tr>
<td>Physical Factors</td>
<td></td>
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<tr>
<td>Natural catastrophes</td>
<td>Have you had experiences with natural catastrophes (such as flooding and storms)? In what way/to which extend is this experience influencing you in the choice of banana cultivar?</td>
</tr>
<tr>
<td>Soil</td>
<td>Did you have any issues with the quality of soil? In what way/to what extend has this influenced your choice of banana cultivar?</td>
</tr>
<tr>
<td>Weather</td>
<td>In what way/to what extend is the weather influencing you in your choice of banana cultivar? How dependent is the choice on the amount of sun hours and raining hours?</td>
</tr>
<tr>
<td>Diseases</td>
<td>Have you had issues with banana diseases? In what way is this factor influencing your decision in banana cultivation?</td>
</tr>
<tr>
<td>Growth cycles</td>
<td>In what way/to what extend is the growth cycle influencing your choice of banana cultivation?</td>
</tr>
<tr>
<td>Practicality</td>
<td>Which banana cultivar is for you the most practical? (in terms of height, weight etc.)? In what way/to what extend is this influencing your choice of banana cultivar?</td>
</tr>
</tbody>
</table>

The participants were asked to score the factors through the point-score system which implies scores between zero and four. In case the farmers didn’t understand the questions, the style of questioning had to be adapted accordingly and the question was explained and also split into various different questions.
### Appendix 5. FAO FREE, PRIOR AND INFORMED CONSENT CHECKLIST USED IN FIELD PROJECTS.

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Does the project staff have the knowledge and competence to work with indigenous peoples in a culturally appropriate manner? / Has the project staff been trained on how to interact with Indigenous Peoples?</td>
<td>x</td>
<td></td>
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<tr>
<td>2) Has a detailed communication strategy for the dissemination of information been developed taking into account indigenous peoples’ own mechanisms, language and locations?</td>
<td></td>
<td>x</td>
<td></td>
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<tr>
<td>3) Have the individuals identified as legitimate leaders of the indigenous communities involved been met and consulted?</td>
<td>x</td>
<td></td>
<td></td>
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<tr>
<td>4) Have the involved communities had sufficient time to get expert advice on the project? Have sufficient resources been facilitated for them to get expert advice on the project?</td>
<td>x</td>
<td></td>
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<tr>
<td>5) Have adequate mechanism and procedures for effective participation in the FPIC process been established?</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6) Has a Participatory mapping analysis with relevant information been carried out?</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7) Have timely consultations (well prior to project design) been carried out?</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8) Have the indigenous communities involved been enabled to participate fully and effectively in project scoping, design, implementation, M&amp;E, mitigation and determination of the need for further review and management of the project?</td>
<td>x</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>9) Has project information (including environmental and social assessment document; environmental social management plan; and evaluation) been disseminated early and through appropriate means?</td>
<td>x</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>10) Has the proper understanding of the information provided to the indigenous communities involved been verified?</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11) Is the consultation process documented?</td>
<td>x</td>
<td></td>
<td></td>
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<tr>
<td>12) Has the documentation of the consultation process been disclosed in a timely matter and using appropriate languages, formats and locations?</td>
<td>x</td>
<td></td>
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</tr>
<tr>
<td>13) Has the consent been provided explicitly and recorded and affirmed in the format preferred by the community?</td>
<td>x</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>14) Do the participatory monitoring and evaluation of the project include indicators that indigenous peoples determine to be relevant?</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15) Has the community been engaged in an adequate negotiation process on land and resources agreements, governance arrangements, legal and financial arrangements, employment and contracting opportunities, culturally appropriate benefits sharing, processes and mechanisms for monitoring, grievances and dispute resolutions, among other items?</td>
<td>x</td>
<td></td>
<td></td>
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</tbody>
</table>