



UNIVERSITY OF
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BODØ GRADUATE SCHOOL OF BUSINESS

MASTER THESIS

**The worldview and not the economy: Explaining
resistance towards organic farming among farmers in
India**

FE306E Sustainable Management

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Abstract

In the world where number of people is growing rapidly doubling in last 50 years agriculture plays a significant role. With green revolution, where agriculture became heavily commercialized and chemicals were introduced, agriculture made a great advancement in terms of efficiency and effectiveness. It is feeding all and employing many, helping or even being the one of the main sources of income for economies of many countries. That came with the price, conventional agriculture causes number of problems few of which are depletion of natural resources, environmental degradation, impacts on human health. There are alternatives for conventional agriculture. One of which is organic agriculture which reduces negative impacts of agriculture and offers price premium for the growers. Although number of organic growers are increasing it is still very small portion of the whole agriculture.

This study aims to understand attitudes of growers towards organic farming from two points of view, mainstream research which stresses few factor groups that may potentially affect adoption of organic farming and less researched application of innovation diffusion theory, considering organic agriculture as a process innovation.

This Master Thesis focuses on India which is second biggest producer of agricultural products in the world, employs half of its population in agriculture, has a rich and sensitive natural life and feels severe impact from conventional agriculture. The study includes 11 in depth interviews with organic and conventional growers and with four scientists of Indian Coffee Board in Kodagu (Coorg) area of India. Findings of the study were compared with findings in literature regarding factor groups influencing adoption to organic agriculture and understanding was enriched with application of innovation diffusion theory. As a result study confirms most of the factors found in literature, but with the different importance of factors – it was found it was the worldview that influenced decision of adoption the most rather than economic considerations.

Table of Contents

Abstract.....	i
List of tables and figures.....	iii
List of appendixes.....	iii
Chapter 1: Introduction.....	1
Background and problem discussion.....	1
Impacts of agriculture.....	1
Organic agriculture.....	3
Statement of purpose.....	4
Thesis structure.....	5
Chapter 2: Theoretical frame of reference.....	7
Factors affecting attitudes.....	7
Economic factors and policy.....	7
Farm characteristics.....	9
Knowledge and information.....	9
Societal context and farmer characteristics.....	10
Measures.....	12
Innovation diffusion.....	15
Chapter 3: Methodology.....	19
Research design.....	19
Case study approach.....	19
Sampling.....	20
Data collection methods.....	20
Data analysis.....	23
Reliability and validity.....	23
Chapter 4: Empirical findings.....	25
Context.....	25
India.....	25
Kodagu.....	29
Factors affecting attitudes.....	32
Economic factors.....	34
Policy.....	40
Farm characteristics.....	43
Knowledge and information.....	45

Societal context and farmer characteristics	49
Measures	54
Chapter 5: Results and discussion	57
Factors affecting attitudes	57
Economic factors	57
Farm characteristics	58
Knowledge and information.....	59
Societal context and farmer characteristics.....	60
Organic farming as innovation: low level of diffusion	62
Factors and innovation diffusion.....	65
Chapter 6: Conclusions	67
Conclusions.....	67
Research contribution and further research	68
References.....	70
Appendix 1: Interview guide	78

List of tables and figures

Figure 1: Causes of global biodiversity loss (UNEP, 2012)	2
Figure 2: Factors for adoption of organic agriculture (made by author).....	15
Figure 3 Process of innovation diffusion	18
Figure 4: Map of research area. Kodagu (Coorg)	29
Figure 5 Conventional and organic coffee plantations	33
Figure 6: Revised factors for adoption of organic agriculture (made by author).....	61
Table 1: Interview list of farms.....	22

List of appendixes

Appendix 1: Interview guide.....	78
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Chapter 1: Introduction

Background and problem discussion

Impacts of agriculture

For the centuries agriculture was one of the biggest contributors for the development of countries, providing revenues that enabled industrialization and poverty alleviation (MEA 2007). After the Second World War, together with increasing global need for food conventional agriculture took growing trend. Companies producing chemicals for military purposes lost their markets, therefore they turned to new customers – farmers (Alvares 2009). The development of agriculture was a success in terms of meeting the food need. In the last 40 years, agricultural production doubled even though cropland area has increased only by 12 percent (Levin, 2009). At the same time there was 700 percent increase in global fertilizer use and 70 percent increase in irrigated cropland area. It provides agricultural goods for human needs but often in expense of degrading environmental conditions. Agricultural land cover 40% of the terrestrial earth surface (The World Bank) therefore the methods chosen for agriculture are making a great impact on the environment and natural life.

Around 40 percent of agricultural land has been strongly degraded over past 50 years by intensive use (World Resources Institute 2013). By 2050 world food demand is expected to double in comparison with the levels of 20th century (Tilman et al. 2002). Most of the fertile lands of the world are already used for cultivation, there are very few opportunities on expansion (Levin, 2009). Degrading land, increasing demand for agricultural products and biofuels caused by growing human population, changing habits and growing income will put even more pressure.

Conversion of land is resulting extinction of most plant species and of animals whose habitat is determined by that plant species. Below ground organisms are also affected by land use change (Sala 2000). Additionally, converting land to agriculture leads to local extinctions of biota in those areas, but in addition to loss of habitat, agricultural practices might also have other indirect negative effects on biodiversity. The insecticides and herbicides kill non-target species (Sodhi and Ehrlich 2010), fertilizers run off into coastal waters, removing, altering or destroying natural habitat (Halpern et al. 2008). Fragmentation of vegetation, reduction of areas with some type of vegetation and expansion of others, introduced species are the few of many

worrying consequences of agriculture that may lead loss of biodiversity. As can be seen in figure 1 habitat conversion for agriculture is a leading cause of global biodiversity loss.

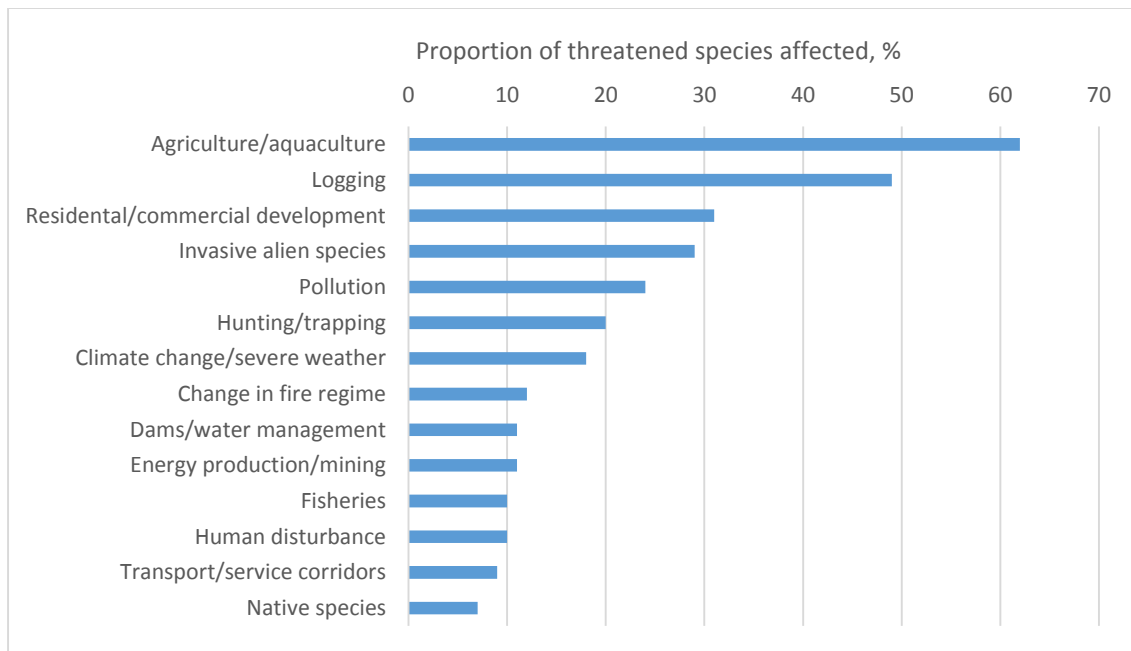


Figure 1: Causes of global biodiversity loss (UNEP, 2012)

Biodiversity is central to ecosystem function and the provision of its services. Number, quantity, kinds of species, diversity of habitats and interactions influence dynamics and magnitude of ecosystem functions (Levin, 2009). Therefore, because of agricultural activity ecosystems may have reduced ability to provide services. For example, usage of fertilizers and pesticides can increase nutrients and toxins in groundwater and surface waters, incurring health and water purification costs. Agricultural practices may also degrade soil quality and necessitate the expenses of increased fertilization, irrigation and energy to maintain productivity (Tilman et al. 2002). Expansion of agricultural lands by converting forests to agriculture can change frequency and magnitude of floods (MEA 2007).

In 2010, agriculture counted for 24 percent of global green gas emissions. The number includes agriculture production, fertilizer use, tractors and fertilizer production. Another 11 percent was contributed by land use change, which primarily driven by agriculture (World Resources Institute 2013). Greenhouse gasses leads to global warming, smog, acid rains (McLaughlin et al. 2002).

Agriculture may also impact human health. It may happen through contact with agricultural chemicals, air, water and soil pollution as well as residues in food products. The pesticides used heavily in industrial agriculture are associated with elevated risks for workers as well as consumers, there are also links with endocrine disruption and reproductive dysfunction, as well as disruption in immune and nervous systems. Growth promoting antibiotics used in animal agriculture are thought to be driving the increase of antibiotic resistance in human. The United Nations has estimated that about 2 million poisonings and 10 000 deaths occur each year from pesticides. Many pesticides are not tested on their effects on human health (Horrigan et al 2002).

Organic agriculture

As written above agriculture may impact environment in negative ways. Several of these ecosystems provide services essential for agriculture itself. Soil formation, nutrient cycle, pollination of crops, regulation of agricultural pests, water purification and climate regulation are examples of ecosystems vital to agriculture (Levin, 2009). To keep resilience and stability of farming systems, agriculture must have management strategies that does not cause negative impact on the environment. Sustainable management incorporates different components of farming system (plants, soils, insects, fungi, animals and water) recognizing importance of their interconnections and functional relationships. (Committee on Twenty-First Century Systems Agriculture, National Research Council 2010). That means that agricultural systems rich in biodiversity are able to recover more readily from biotic and abiotic stresses such as drought, environmental degradation, pests, diseases, epidemic among the others. For example, conventional pest management practices alter community structure, which may potentially lead to pest outbreaks, as there are no pest-predator balance. (Mone et al 2014). Sustainable management systems also stresses linkage between farming components with other aspects of environment and economy. There are different examples of sustainable agrosystems, but all of them next to the predominant industrial philosophy introduces agrarian, trying to find balance between them in different levels (Committee on Twenty-First Century Systems Agriculture, National Research Council 2010). Food and agriculture organization of the United Nations provides five principles of sustainable agriculture: resource efficiency, direct action to conserve, protect and enhance natural resources, protection and improvement of rural livelihoods and social well-being, enhance the resilience of people, communities and

ecosystems, especially to climate change and market volatility, good governance of natural and human systems.

One kind of sustainable agriculture is organic agriculture. It is a natural production management system which enhances biodiversity, soil biological activities and biological cycles. It prohibits the use of synthetic inputs, such as drugs, fertilizers and pesticides. Certified organic product can bring price premium for farmer (Akinyemi 2007). Research made on potential of organic to become main source of food indicates that organic methods could produce enough food in global scale per capita to sustain current or even larger population without increasing the agricultural land base (Badgley et al 2006). This is because although yields of organic farms are on average 10-15% less than of conventional in developed countries, in developing ones organic systems produce 80 percent more than conventional farms (Ching 2009). Organic require over 15% more labour, but they are balanced out by lower input costs and higher margins. Annual growth rate for organic was about 20% for the last decade, now accounting for over 31 million hectares of area and generating over 26 billion US dollars in annual trade. Organic is practiced in more than 130 countries with total area of 30.4 million hectare, about 0,65% of total agricultural land (Pandey and Singh 2012). Even usage of organic agriculture management methods are increasing globally, increase is rather slow. The small percentage among all the agricultural land with all the benefits of organic agriculture and threats of conventional one brings focus to the reasons why adoption of organic is not gaining momentum.

Statement of purpose

In this study, it is premised that local farmers in India may be resistant to change their conventional practices, into organic ones. The main focus is on attitude towards organic farming of Indian farmers, as India has one of the richest biodiversity, and has a rapid development. The research figures out which factors influence farmers attitude and therefore behaviour and in which extent, what prevents them and how to address these barriers to implement organic agricultural practices in their farming. I will study how organic and conventional farmers and Indian Coffee Board employees perceive these factors and evaluate and compare their understanding.

The area of Madikeri in India was chosen because of agriculture being predominant occupation, high biodiversity in area and social pressures. Clear understanding of motives and

reasons local farmers have not to adapt organic practices and knowledge how to address these barriers provides insights for formulating policies. Based on these considerations problem statement was formulated:

What are attitudes and factors influencing those attitudes of local farmers towards organic farming in Madikeri, Karnataka state of India?

There have been research made in Karnataka state about the reasons for adoption or non-adoption, one was quantitative (Kumar and Narayanaswamy 1999), the other qualitative (Lukas and Cahn 2008), but it was not studying view point of conventional growers, the third research studied conventional growers knowledge of ecosystem services and their function on the plantation (Purushothaman et al 2015). With qualitative method using in depth interviews and involving conventional farmers better understanding of the farmers' reason for their action will be brought and it will help to formulate approaches to convince farmers to use biodiversity friendly farming systems.

Thesis structure

The master thesis consists of the following parts:

Introduction presents the background of the research, main concepts and background of the study including object of research, statement of purpose, research question.

Theoretical frame of reference describe chosen theories and literature on the topic of the study. It includes theory. Explains factors affecting farmers' attitudes towards management style choice between organic and conventional agriculture found in previous research and incentives towards sustainable agriculture and introduces innovation diffusion theory. There is also an example of another adoption to sustainable agriculture in another country.

Methodology explains research design and discuss methodology of data collection and processing. It includes research design, sampling, data collection and analysis procedures and reliability and validity of research.

Empirical findings provide findings from the interviews and context of the issue. It deals with the wide context of the research being India and its agriculture in general and research area in particular. The second part provides findings from interviews regarding factors

affecting attitudes of farmers, and the measures seen by farmers to improve the situation in favour of organic farming.

Results and discussion chapter provides the interpretation of results.

Conclusion includes summary of findings, conclusion of the study derived from the findings and suggestions for future research.

Chapter 2: Theoretical frame of reference

Factors affecting attitudes

Previously made studies concerning adoption of organic or other form of natural farming most of the time would look for certain factors affecting attitudes towards organic either using quantitative or qualitative methods. Findings in those research are mostly being classified in categories. Different studies have slight different categories and subcategories, bringing focus on various aspects regarding the adoption of organic farming. It is stated to be found that they can all positively or negatively influence the decision of the adoption in various ways. Identification of factors will reveal barriers commonly seen for adoption of organic farming and build a ground for understanding of resistance. Factors from literature were categorized in four groups being economic factors and policy, farm characteristics, knowledge and information, societal context and farmer characteristics.

Economic factors and policy

Economic factors are most frequently mentioned as a barrier to adoption of sustainable agriculture practices. Farmers can resist if they don't have economical means for investment, or they can be unwilling because of perceived economical risk and loss related to the change in practice (Rodriguez et al. 2008; Sattler and Nagel 2010).

Markets. Farmers participate in the markets as buyers and sellers. They buy input from suppliers (seeds, fertilizer, machinery etc.) and sell their output. Therefore, direction of markets for farm inputs and products influence farmer production decisions. High prices and low variety of input may both decrease and stimulate willingness to change practices into more sustainable ones. Decisions of farming practices that might promote sustainability are also conditioned by output market opportunities and constraints. Sustainably grown product might not always have a market to sell or the price might be too low. At some cases seller (farmer) and buyer uses contracts. They provide some level of certainty in price, quantities and attributes of the product to be sold to end consumer. Contracts may specify quality requirements or specific farming practices. Those quality and cosmetic requirements often cannot be met using sustainable farming practices (Committee on Twenty-First Century Systems Agriculture, National Research Council 2010).

Investments. Factors such as uncertain markets and low prices for sustainable production, investments into new equipment, greater labour needs, seasonal labour, more facilities for transport and storage, changing the management style may create significant barriers for adopting sustainable practices (Rodriguez et al. 2008; Soltani et al. 2013; Fazio et al. 2005). There is a fear among farmers for increases losses to insects, weeds, and that their potential income will not justify those losses. They perceive that it is long term investment without immediate benefit (Rodriguez et al. 2008). This is especially important in developing countries, as poverty typically impart a short run perspective to farm decision making (Lee 2005). To be certified organic during the conversion period of few years has to be grown organic but sold at conventional price. When failed to market the organic product, it must be sold at conventional prices. And certification itself creates extra cost (Acs, 2005). Farmers who don't have significant problems with conventional methods may be unwilling to take risks for adoption, or the ones who would be willing may not have sufficient funds for it (Rodriguez et al. 2008).

In most developing countries, sustainability should include food security and income generation needs for rapidly growing population. Focus on meeting long run sustainability criteria is inadequate at the conditions where poverty and malnutrition are immediate and require solution (Lee 2005).

Policy. Government policies is another factor that can do much to influence farmers' decisions. Macro level policies important although they influence sustainable agriculture adoption incidentally. Exchange rate reforms, trade reforms, domestic agriculture price policies, labor market policies, rural public education all have significant impact on incentives or disincentives for sustainable agriculture adoption (Lee 2005). It has been argued policies to be a leading cause of unhealthy trends, such as increasing agrochemical use, soil tillage, farm concentration, and regional and enterprise specialization (Knowler and Bradshaw 2007). Example of that kind of policies could be government subsidies, which in United States according to Fazio et al (2005) through the economic incentives caused, encouraged degradation and created disincentives for farmers to invest in new practices. It was shown in survey of eleven countries that in those countries where organic farming has been pursued by the state, cooperation within the organic farming community has increased, and therefore organic farming community is better unified and better recognized by the mainstream farming community. Countries with strong cohesion of organic communities have most highly developed organic farming sector (Moschitz et al 2004).

Farm characteristics

Biophysical characteristics. Unlike many conventional farming practices, sustainable agriculture often are location-specific, meaning that they are not broadly generalizable and easily scalable (Lee 2005). To adopt sustainable practices they have to be compatible with biophysical farm characteristics – geographical area and climate and the specifics of the farm itself, for example weeds, soil type, terrain, erosion potential, area cultivated, yield, slope of the land, etc. (Fazio et al. 2005; Lee 2005). For example in research on Spanish olive orchards (Lopez and Requena 2005) high correlation was found among yield and implemented farming techniques by growers - high productivity implied an increased likelihood of the following conventional methods.

Farm size was studied greatly in relation with adoption to sustainable practices, but results are inconsistent. The presence of soil erosion, other soil problems and farming lands being located on steep slopes are shown to be correlating with adoption of sustainable agriculture. Awareness and concern for soil problems is critical and one of most influential factor (Knwoler and Bradshaw 2007; Sattler and Nagel 2010).

Compatibility. Farmers also shown to be resistant to adopt agricultural practices that doesn't comply with current production strategies. Farming system normally is not easy to change and has been developed in years through trial and error, therefore new practices that are not compatible with current ones are less likely to be adopted (Fazio et al. 2005).

Land tenure is another factor influencing adoption. Renting the land results that the farmer don't have a complete control over the land they farm. This often has negative affect on adoption of sustainable practices (Fazio et al. 2005). This can be due to land owner unwillingness for farmer to adopt sustainable practices which may alter appearance of land, and farmers unwillingness to invest long-term in land that he does not own.

Knowledge and information

Awareness. Knowledge and information is vital component when adopting new farming technology. Farmers first have to be aware of sustainable agricultural practice, its implementation, potential benefits and drawbacks. He must be aware of situation in

biodiversity and his impact on conventional practices on biodiversity. Legislation, markets and other contextual conditions must be clear to dispel misconceptions, understand consequences and his future prospects.

Knowledge and information barriers mostly relate to market, and technical and financial issues. It is believed that farmers in many developing countries lack technical information about farming practices, production and marketing methods, such as choosing products to grow, identifying different markets and distribution channels, competition strategies and market access (Soltani 2013).

Complexity. Agricultural systems for sustainable farming may be very complex, this complexity must come with knowledge about it so it could be implemented in full capacity, otherwise it farmers will not be attracted to changes that require such intellectual investment (Nowak 1992; Lee 2005).

Better managerial skills are required for sustainable farming practices. They are intensive and require commitment to constant learning. Inadequate managerial skills is one of the reasons for farmers being unable to adopt (Nowak 1992).

Accessibility. If information is lacking or scarce a farmer may be unable to adopt a practice. The same is valid if costs of information are too high. It includes cost of information, the time spent to obtain it and difficulty while obtaining. Information is also often contradictory, inconsistent and not applicable to local conditions (Nowak 1992).

Survey on organic and conventional farmers (Boerngen and Bullock 2004) revealed that organic management requires 260 to 520 hours of investment before organic practices are adopted. During transition to organic farming it was 5.2 hours a week, and transition lasted one to two years. After transition both organic and conventional farmers spent around 3.3 hours per week in continuing education about farming.

Societal context and farmer characteristics

Sex. Number of studies have shown higher women tendency towards sustainable agriculture (Trauger 2004; Peter et al 2000). Research of women farmers in Pennsylvania found that women are three times more likely to be operator of the farm in sustainable agricultural models than in conventional (Trauger 2004).

Education. Education specific or general commonly correlates with the adoption of sustainable agriculture practices (Knowler and Bradshaw 2007; Lappe and Rensburg 2011). Sustainable growers are more likely to attend courses and conferences on agrarian topics and be members of agrarian organizations (Lopez and Requena 2005). Less educated farmers have no knowledge for adoption of practices that require more advanced technical skills (Caswell et al 2001).

Age. Older farmers are less likely to consider sustainable practices (Rodriguez et al 2008; Lopez and Requena 2005; Lappe and Rensburg 2011). Greater experience in conventional agriculture is also shown to be factor of resistance for sustainable one (Lopez and Requena 2005). Older farmers may be reluctant as they don't have years ahead of them to see all the benefits from sustainable farming. Experience as a barrier can come in a way that farmers have used and developed their practices for years, seeing that they work well enough (Caswell et al 2001). On the other hand more experienced farmers has a higher level of informal knowledge and might be keener to learn about sustainable agriculture practices (Soltani et al 2013).

Income. Studies show that farmers who has income from working off farm tend to change their practices to sustainable easier (Caswell et al 2001; Lopez and Requena 2005; McCarthy et al 2007). Income from off farm activities reduces risk undertaken when changing practices.

Worldview. It has been concluded by many scholars, that beliefs, attitudes and worldviews of a person are to be a major influence on pro-environmental behaviour (Quinn and Burbach 2008; Lopez and Requena 2005; Lappe 2009; Lappe and Rensburg 2011). There are few important categories in motivation regarding change in farming practices – environmental, knowledge, ideological and psychological motivations. They can create incentives or disincentives for sustainable farming (Asadollahpour et al 2014). It might be hard to change because of getting used to old habits, traditions, the way of farming has become custom or cultural habit (Rodriguez et al 2008). Decision to change is also based on such personal qualities as risk tolerance, environmental awareness, belief in personal responsibility, innovativeness, adaptability and it is strongly influenced by own experiences and acquired knowledge (Sattler and Nagel 2010). Orientation towards profits greatly decide the practices used, therefore more profit oriented farmers are more likely to resist sustainable agriculture practices (Lappe and Rensburg 2011).

Context. As farmer through his practices influence society, society influences farmers' decisions. Therefore if there is no public awareness from society as a whole about the importance of sustainable agriculture, farmers can be resistant too. It is not likely for agriculture to go sustainable direction if it doesn't comply with goals of society (Fazio et al. 2005). If the sustainable farming practices are not acceptable by the farmers family, friends and local community, the scepticism and rejection will most likely effect negatively willingness for sustainable farming of farmer (Toumisto 2005).

Measures

Sustainable agriculture can be achieved only by action at farm, community and national levels (Pretty 1995).

Markets. Consumer demand and willingness to pay price premiums for sustainable produce are essential, as it provides opportunity for organic farmers to supplement their incomes (Lappe and Rensburg 2011). As consumers become more demanding about the way of food production, retailers require different production practices from suppliers. To capture bigger share of profit farmers can get involved in direct sales markets with their sustainable products, such as farmer markets and farm to institutions (schools, hospitals, government agencies) sales (Committee on Twenty-First Century Systems Agriculture, National Research Council 2010). Therefore education of consumer is of high importance (Lappe 2009; Asadollahpour et al 2014) as the consumer creates pressure.

Economic factors. Although economic factors in literature tend to be described as barriers, they can be incentives as well. Studies have shown that profitability may well increase as a direct result of adopting sustainable practices (Acs et al 2005; Pretty and Hine 2000). Certified organic products usually have higher price in market, while specific sustainable practices can reduce costs. Also contrary to many conventional farmer belief it has been found that sustainable practices does not decrease yields and in some cases even increase them (Caswell et al 2001). This suggests that conventional farmers have misconceptions about sustainable practices due to the lack of knowledge.

Knowledge and information. To gain necessary knowledge to reduce risk by breaking free from misconceptions and understanding the aspects of sustainable agriculture, transition and context, information and training must be made available and easy accessible. Lee (2005) summarised entities to provide information for change to sustainable agriculture. They include

government extension pro-grams, farmer associations and unions, nongovernmental organizations, farmer field schools and field days, other farmers, electronic information sources, and others.

Conventional research is important in generating new knowledge and demonstrating scientific viability or technological alternatives (Lee 2005). This is especially important for practices with information intensive technologies. Technical assistance at such cases must also be provided (Caswell et al 2001). But research in sustainable agriculture must also be an interactive process on identifying farmers' needs, and fostering collaborations among farmers, scientists, extensionists, and the institutions, both formal and informal, with which they are associated. Applied research and NGO networks, working with farmers, are well suited to develop, transmit, and adapt this knowledge (Pretty 1995; Lee 2005). This way with participatory learning knowledge will be accumulated and communicated.

One of the most effective methods in sustainable agriculture communication is social training (Lappe and Rensburg 2011; Fazio et al. 2005). Existing sustainable farmers are important source of information for those who are to be converting to sustainable practices, this knowledge can be facilitated through social networks and collective action (Lappe and Rensburg 2011; Lee 2005). This collective action can enable farmers to address market imperfections and transactions costs, such as in surmounting information, credit, and marketing constraints (Lee 2005). Institutions might help to develop non-competitive based on cooperation or creative conflict relations between organic farming and the general farming community of organic farming with general agriculture organisations (Michelsen et al 2001). As the resources differ in every place and they are significant in adoption of sustainable agriculture, site specific information is critical to provide. (Caswell et al 2001). For this traditional agriculture systems can be used, as they usually exhibit important aspects of sustainable agriculture and are well adapted to particular environment (Altieri and Carroll 1990).

Policy. With the necessary information farmers may be more willing to change their practices to sustainable ones, but if they do not have economical resources, or there is no favourable economic and political setting for such a shift, they will be unable change. At this case government support is necessary. For the transition to sustainable agriculture, governments must create appropriate range and mix of policy instruments and measures. They can either offer incentives to encourage sustainability and/or penalize the polluters (Pretty 1995). Governments can introduce financial support through support of farmers (Michelsen et

al 2001; Lappe and Rensburg 2011; Fazio et al. 2005; Asadollahpour et al 2014). Although initial government financial support is necessary, in a long run sustainably produced food must be as profitable as conventionally produced (Fazio et al. 2005). Meaning that sustainable food producers must have organic food market access to get price premiums and be economically viable. Therefore policy should be designed with the aim to develop organic food market and give all farmers access to it (Michelsen et al 2001; Lappe and Rensburg 2011). For organic food market to work issues of certification and lobbying must be solved, and organic farming must be politically recognized through recognising production standards and adapting common international standards to reflect specific national conditions (Michelsen et al 2001; Asadollahpour et al 2014). In developing countries increasing investment in rural infrastructure such as transportation, communications, and markets are needed to improve marketing and the viability of diversified production opportunities at the same time making sustainable agriculture alternatives more economically attractive (Lee 2005). The state has to be committed to organic farming to create pull factor for the organic community to become active, after the initial stages of sustainable farming in a country strong institutional setting must be developed for sector to grow, political debate around the topic of sustainable farming must also take place continuously (Moschitz et al 2004).

Characteristics. Personal characteristics are also of high importance, many policy instruments may be limited unless more positive attitude towards sustainable practices are bred in the minds of landowners and general public (Wauters et al 2010). It is known that perceived moral obligation to the environment, seeing sustainable production as a reflection of oneself and positive views of significant others are significant incentives for sustainable agriculture adoption (McCarthy et al 2007). Therefore educational programs for farmers must be shaped to emphasize farmers' importance in ecological, social and economic life, to emphasize that environmental stewardship is a challenge that requires farmers' expertise, that way creating his self-identity in accordance to sustainable agriculture principles (Quinn and Burbach 2008).

Young growers and women should be incorporated into organic cultivation (Lopez and Requena 2005) as they are more likely to choose sustainable agriculture. Also acceptance must be encouraged of less polarized masculinity for male farmers (Peter et al 2000).

In some farms, especially in lacking conditions of developing country sustainable agriculture is sometimes suggested not to be a best fit. It is necessary to assess where particular practices will fit and likely to benefit. In developing countries farmers are resource constrained,

and sustainable practices may not always increase well-being of farm, and condition of the biodiversity may be secondary to the food security issues, therefore it may not be the best solution for biodiversity protection in all circumstances (Giller et al 2009).

Summary. All the factors described and their positive or negative influence on adoption of organic agriculture among growers are presented in Figure 2 bellow.

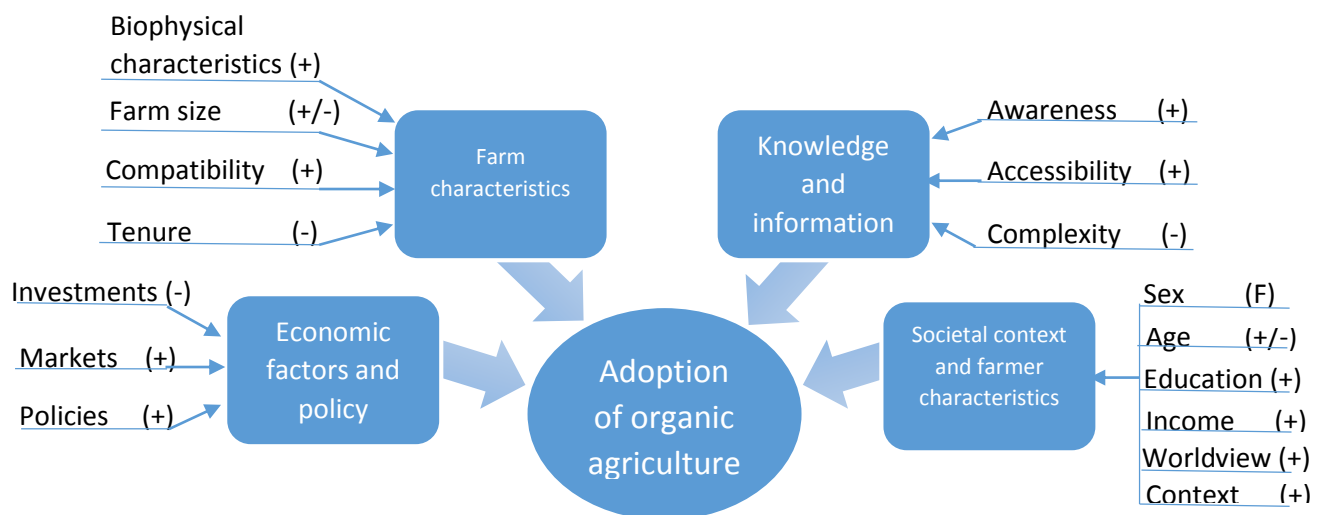


Figure 2: Factors for adoption of organic agriculture (made by author)

Economic factors are especially important where economic conditions favourable to organic farming together with low investments will stimulate the rates of adoption. Another factor group, farm characteristics, shows importance of compatibility in terms of technologies and biophysical characteristics, land must be owned by the farmer who cultivates it for adoption, there are many researches regarding farm size, but results are inconsistent. Farmers must possess and be able to easily access information and knowledge about organic farming which must be non-complex for easier adoption. They have to carry certain characteristics and worldview and live in societal context favourable to organic farming.

Innovation diffusion

By changing their practices every agricultural unit can contribute to environment protection negatively and positively in various degree. The change in practices might range from adjustments to existing practices to fundamental change in the underlying structure. The decision whether to change or not and to what degree is a complex one and depends on number

of factors. These factors can create barriers, resistance or incentives to for adopting organic practices. Decisions are made according to contextual factors, which are shaped by larger societal forces that have particular goals and objectives, as well as factors about farmer and his farm. (Committee on Twenty-First Century Systems Agriculture, National Research Council 2010). Next to mainstream research regarding factors influencing decision of adaptation is innovation diffusion theory which is used less when it comes to research on adoption of organic agriculture. Innovation diffusion theory has a potential to bring new aspects into the question of organic farming adoption as it describes process of change predicting the behaviour of farmer that way combining two theories it is possible to have the factors for adoption and how those factors influence behaviour of farmer and thus adoption extent in the community.

Innovation is defined as “an idea, practice, or object that is perceived as new by an individual or other unit of adoption” (Rogers 2003:12). The ‘4Ps’ model developed by John Bessant and Joe Tidd (2007) builds on the hypothesis that successful innovation is about positive change, and puts forward four broad categories where such change can take place:

1. Product innovation - it is changes in the things (product or services), which an organization offers;
2. Process innovation - it is changes in the ways in which products and services are created or delivered;
3. Position innovation - it is changes in the context in which the products or services are framed and communicated;
4. Paradigm innovation - it is changes in the underlying mental methods which shape what the organization does.

The boundaries of these categories are not well defined. They are not alternatives, they can be pursued at the same time (Bessant and Tidd 2007). Organic agriculture practices can be called innovation, as they promote management techniques that were not used previously by the grower. It is a process innovation as the organic systems bring about ways in which product is created, organic product having different qualities and value makes it also a product innovation, therefore process and product innovation are pursued together with organic farming systems.

The innovation diffusion model by Rogers (2003) suggests that communicated through certain channels innovations will be adopted if they will benefit individual making decision. Information provided affects uncertainty in a situation where choice exists among set of alternatives. This innovation through a process of diffusion alter social change. Therefore

innovation diffusion depends on four factors – the innovation itself, communication channels, time, and a social system in which diffusion is taking place.

For innovation in general initially there are few adopters, called innovators. Others keep learning from various sources including innovators and possibly adopt. The number of adopters' increases, reaching maximum, after decreasing as fewer non adopters are left, creating an S-shaped curve. Some ideas diffuse more rapidly while others slower, therefore slope of S varies from innovation to innovation. Full adoption does not always occur. In process of decision making regarding innovation decision making unit passes from first knowledge of innovation to forming attitude toward an innovation, to a decision whether to adopt or not, to implement the new idea and to confirmation of the decision. Process occurs in five steps: knowledge is when an individual is exposed to innovations existence and gains some understanding, persuasion when individual forms attitude, decision when engages in activities that lead to choice to adopt or reject innovation, implementation when innovation is put in use, confirmation when unit is seeking reinforcement of an innovation decision, that has been made (Rogers 2003).

In the innovation decision process, the individual acquires information from communication channels. The information channels and the behaviour in the process are influenced by the decision maker's personal characteristics, innovativeness, and the conditions of the decision maker's situation and the social system. Personal innovativeness is defined as a degree to which unit of adoption is relatively earlier than other members of the system. Innovators are the ones who adapt first, they believed to be active information seekers with a high degree of mass media exposure with wide interpersonal networks. They are able to cope with higher levels of uncertainty. Other groups are early adopters, early majority, late majority and laggards. If one is late to adapt he is believed to be low in social status, making little use of mass media (Rogers 2003).

Characteristics of innovations:

1. *Relative advantage* is the degree to which an innovation is perceived as better than the existing concept. It is not necessarily an objective advantage but the perception of individual.
2. *Compatibility* perception of innovation as being consistent with the existing values, past experiences, and needs of potential adopters. The lower degree of compatibility the lower chances of adoption.

3. *Complexity* is the degree to which an innovation is perceived as being difficult to understand and use. Innovations that require the adopter to develop new skills and understandings will create resistance.
4. *Trialability* is the degree to which it is possible to experiment with innovation on a limited basis. Low trialability will result in resistance.
5. *Observability* degree to which innovation results are visible to others. If the people cannot see the benefits they are not likely to adopt the innovation (Rogers 2003).

That means that if real or perceived cost of innovative organic agricultural practices realised through the new communicated information will outweigh the private benefit, it will create resistance to adoption of organic agricultural practices.

The process of innovation diffusion by Rogers (2003) is summarized in figure 3 below.

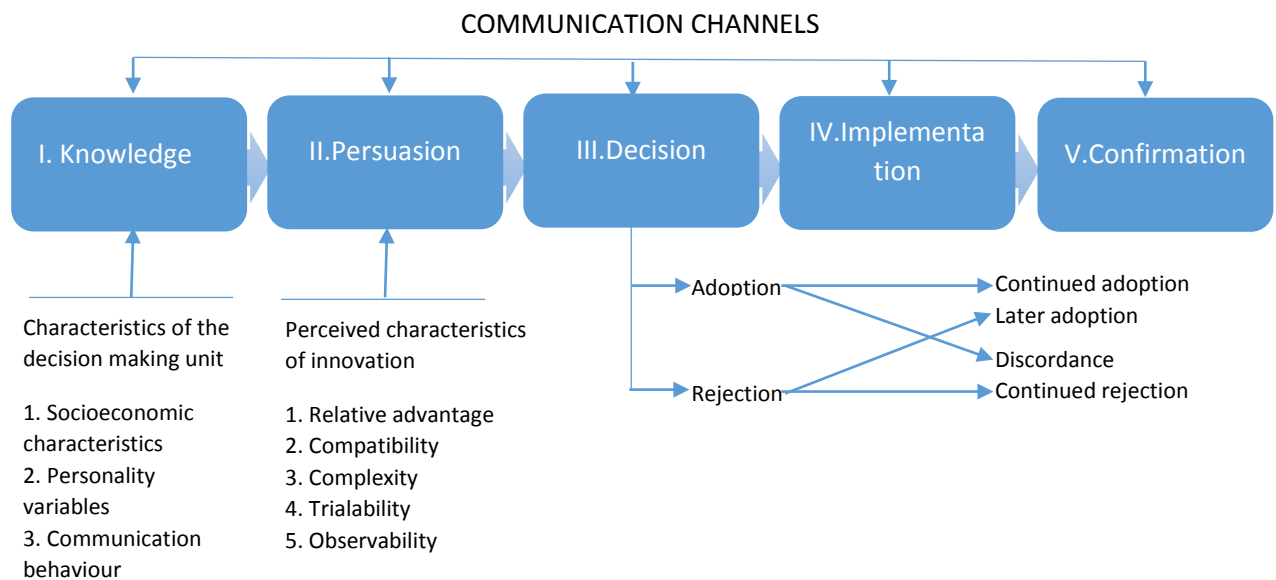


Figure 3 Process of innovation diffusion

Chapter 3: Methodology

Research design

There are three types of research design: qualitative, quantitative, and mixed research. All of them are valuable and used for different purposes. Quantitative analysis is important in understanding the degree to which certain phenomena are present in given group or how they vary across cases. It has advantage in breadth. While qualitative analysis let the case to be examined for the deep understanding and has advantage of depth (Flyvbjerg 2006).

Studied phenomena is multifaceted, therefore a broader perspective is needed than of quantitative approach with which most likely variations in the phenomena would be missed and the whole would be represented poorly. For this reason qualitative research design was found as most relevant and therefore chosen to be research design of this study.

Both inductive and deductive analysis will be used. Using deductive analysis data are analysed according to an existing framework (Patton, 2002) therefore it will be used to develop research questions and theoretical framework based on previous theory. Inductive discovers patterns, themes and categories in ones data, through the analysts' interactions with it (Patton, 2002) so it will be used to inform and expand on the theory in later sections of study.

Case study approach

According to Yin (2009:18) case study is: “an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident”. Therefore case study approach allows to explore phenomenon within its context using variety of data sources. It allows the researcher to explore individuals or organizations, simple through complex interventions, relationships, communities, or programs (Yin, 2009).

Case of Indian farmers' resistance to biodiversity protection in their agricultural practices is a complex one, involving number of different stakeholders and social, economic and political context. Case study is used to help understand this complexity and situation characteristics in holistic and meaningful way.

Robert E. Stake (1994) three types of case study – intrinsic, instrumental and collective case study. Intrinsic is chosen to understand better the particular case. Instrumental case study is when particular case is examined to provide insight into an issue or refinement of theory. Collective case study is when number of cases are studied to understand a phenomenon. These types do not have strong boundaries. This particular case is of personal interest to me because of my personal background and the study may provide instrumental value. Case study provides information based on real examples and tests different views of phenomena as they unfold in practice (Flyvbjerg 2006), therefore it might help to improve strategy to address farmer resistance to biodiversity protection in studied area.

Sampling

Usually, quantitative methods depend on large samples selected randomly, while qualitative focuses on relatively small cases, selected purposefully. As this study is qualitative, information rich cases are selected for in depth analysis. As organic farming community in the studied area is small purposeful snowball sampling is used as sampling method (Patton, 2002).

The important people for the research were organic and conventional growers, specialists and policy makers in state of Karnataka. As I was doing internship in one of organic farms, the owners were suitable respondents for me. Snowball sampling method was used to find other respondents, as the owners introduced me to other growers, and other interviewees directed me further.

Even though purposeful selection helps with variety of practical problems in doing research, it too contain a weakness of bias, as interviewees are subjective and therefore research could bring just one view of the problem, but because of small community it was easier to avoid this problem.

Data collection methods

There are two types of data one can work with - primary data, that is new data gathered specifically for the research, and secondary data, which have already been collected but with a different goal and agenda (Easterby-Smith et al., 2012).

There are several methods of collecting primary data. The types of primary data collection are: observations (structured and participant), interviews (group, structured, semi-structured and in-depth (unstructured)) and questionnaires (Saunders et al., 2007).

Data collection was carried out during the time that I spent in India from February 2015 to May 2015. To collect primary data interviews and observations were used. Using interviews, insights could be gained into social realities concerning attitudes towards organic farming of farm owners in Kodagu (Coorg) district, Karnataka, India. It was done by discovering views, perceptions and opinions of representatives of groups of organic and conventional growers, through the language they use. The interview was semi-structured, which means it was open interview along the themes of exploration allowing to ask additional questions. (Easterby-Smith et al. 2012). Doing internship in one of organic farms in the area Mojo Plantation allowed me to apply method of observation. Being involved in day to day operations of farm, seeing issues arising and being solved in organic farm brought better comprehension of validity of attitudes towards sustainable farming, and feasibility of it. This way, using a combination of interviews and observations methods deepened my understanding of studied phenomena and increased the reliability of information provided in the research.

I had a pleasure to intern in Mojo Plantation in Madikeri of Karnataka in India from 5th of February, 2015 to 5th of May, 2015. My duties included plantation work and guest house work. As plantation owners Sujata and Anurag Goel are both researchers in botany and biology, successfully maintaining organic coffee and spice plantation for more than 20 years, I was exposed to knowledge about organic and conventional farming systems, their principals and effects. They are also active in promoting natural farming, being founders and members of number of NGO's, I had a chance to interact with number of growers, policy makers and hear their opinions. Eco lodge is situated in the farm, where I was able to meet Indian people, have conversations regarding the research topic and form opinion on society stand on organic farming and produce.

In this research 11 interviews were conducted, which were aimed at analyzing the farmers attitudes towards biodiversity protection. The people interviewed were:

Table 1: Interview list of farms

<i>Number</i>	<i>Management style</i>	<i>Size</i>	<i>Crop</i>
<i>Farm 1</i>	Organic uncertified	13 acres	Major: paddy Minor: coffee, cardamom, tea, vanilla, fruit
<i>Farm 2</i>	Conventional	70 acres	Major: Coffee Minor: Pepper
<i>Farm 3</i>	Organic in process of certification	30 acres	Major: Coffee, pepper Minor: Cardamom, fruits, cocoa
<i>Farm 4</i>	In process of acquisition (organic)	-	-
<i>Farm 5</i>	Organic in process of certification	9 acres	Major: Coffee Minor: Cardamom, pepper
<i>Farm 6</i>	Conventional. Former organic	4 acres	Major: Coffee Minor: Pepper, cardamom
<i>Farm 7</i>	Organic certified	26 acres	Coffee, tea, rice in equal proportion
<i>Farm 8</i>	Conventional	52 acres	Major: Coffee Minor: Pepper, paddy
<i>Farm 9</i>	Conventional	100 acres	Major: Coffee Minor: Paddy, pepper, cardamom
<i>Farm10</i>	Conventional	225 acres	Major: Coffee Minor: Cardamom, pepper, oranges
<i>Farm11</i>	Conventional/organic	50 acres organic/ 50 acres conventional	Major: Coffee

Secondary data was used in form of written documentaries such as books and articles from journals, results of surveys and researches, statistics, government archives. This secondary data gives both the raw information and results of research conducted before, that way providing objective data for analysis and subjective for perspectives.

Data analysis

According to Yin (2009) there is no specific strategy case data collected in case study should be analysed. There might be different analytical strategies used. This research is analysed with explanation building method, which is analysing data by building explanation about phenomenon.

Data from interviews was recorded and transcribed. Data was very rich, therefore it was reviewed several times to get better understanding. Patterns within raw material were identified. I used data analysis software NVivo 10 to systemise my findings and put them into the same categories found in theoretical analysis for easier interpretation.

The findings are discussed in empirical and results chapters covering both primary and secondary data. I wrote down field notes of my observations from interviews and internship. Field notes helped for analysis as well as for further interviews.

Reliability and validity

Reliability and validity defines quality of research. According to Easterby-Smith et al. (2012, 347) *Validity is the extent to which measures and research findings provide accurate representation of things they are supposed to be describing.* In this way bringing up the question whether researchers see what they think they see. According to Yin (2009) there are three types of validity:

- Construct validity. Identifying correct measures for the concepts being studied;
- Internal validity. Establishing causal relationship;
- External validity. Being able to generalize study's findings.

Doing the study there is a risk that my selected respondents for data collection do not represent the reality and therefore it will affect validity of the research. To avoid this the difference sources of information were used, being literature review, key informants sampled to present as wide perspective as possible through interviews and personal observations identification of convergence, complementarity and dissonance among the data sources was possible. Because of this triangulation approach likelihood that findings will be credible is increased that way increasing the validity as well. Interview guides were set up on examination of primary data and the background and role of respondent. Other risk is the possibility of misinterpretation of what the respondents are telling me. To avoid this I have double checked

my understanding of information provided by participants going through the main points of discussion and that way making sure I understood it the way they intended to say it. These have helped me to reach higher level of construct validity in my research.

Although research is limited by geographical area and by number of respondents, case studies can be generalized for theoretical understanding, model can be developed and used in other settings and studies. In qualitative research external validity is to get in depth view of the phenomenon. Therefore phenomenon in particular area was intended to be explained, without claiming the findings to be true for other farm owners and settings.

Easterby-Smith et al. (2012, 347) defines reliability as *the consistency of measurement in a composite variable formed by combining scores on a set of items*. It demonstrates that the data collection procedures and other operations of study can be repeated with the same results (Yin 2009). For qualitative research as I myself was a tool to collect data with semi structured interviews no one has the same background, experience and views as I do it is hard for other researcher to repeat and get the same results. Reliability can be improved with transparency in data, its collection and interpretation process, understanding how my chosen methodology effected results of the study. Methodology chapter provides necessary information regarding this, interview guides are enclosed at appendix.

Chapter 4: Empirical findings

Context

India

As India is second most populous country in the world it has a large impact on environment, especially now, under a rapid economic growth. It has been experiencing high pressure on natural resources, especially forests. They are caused by large increasing population in country which drives demand for timber, pasture, minerals, crops and services. With this declines in environmental quality, shortage of natural resources and ecosystems came, such as shortage of water, soil degradation and erosion, decline in forest cover and biodiversity loss (Singh and Bagchi 2013).

Food production and therefore agriculture has a special importance in India. One of concerns faced by country is food insecurity, which should be addressed in part by agriculture by effective food production. Even though in Indian sacred texts and culture in general food abundance and its sharing are given great importance, for almost 200 years availability of food grains per capita remained one of the lowest in the world and is less than bare minimum set by British administration to avoid starvation deaths. Almost half of Indian people do not have access to minimum number of calories required for survival, more than half children under 5 are malnourished, and 88 percent of women anaemic. Food is scarce for animals as well (Alvares 2009).

India has a long history of successful biodiversity friendly agriculture, with introduced chemical agriculture practices. Indian agriculture dates back more than 4000 years, maintaining soil fertility over this period, and therefore being self-sustaining (Alvares 2009). Green revolution in India started relatively late - 50 years ago. During this period productivity increased due to advancements in technology, irrigation, electrification, research, support prices and subsidies. High yielding varieties were introduced and supported by government, which increased yields with use of fertilizers.

Besides increased crops, intensification resulted in environmental impacts, increased pesticide concentration in food products and high dependence on external inputs. This dependence caused increasing indebtedness of many farmers, resulting in agrarian distress (Pal and Byerlee 2003). Even though yields increased it is still far below what was recorded to be achieved in the eighteenth century with traditional agriculture (Alvares 2009).

Economic imbalance. Output from agriculture in the post reform period declined to 2.4 percent per annum during 1990s against 3.5 percent during the 1980s and it is declining further. Public investment has gone down, and imports have been increasing (270 percent in volume and 300 percent in value between 1996-97 and 2003-04) because tariffs are lowered. Farmers in India face high prices of costs of seeds and fertilizers and cheap imports from heavily subsidized foreign countries (Suri 2006). Agriculture now contributes about 17 percent to GDP while employing about 55 percent of the workforce in India. Poverty was 28.3 percent in rural and 25.7 percent in urban areas in 2005. Among rural households engaged in agriculture, poverty ratio was 31 percent. (Sankar and Vipin 2010).

Farmer economic insecurity. With green revolution earlier practices of farmers cooperating in their operations are dying out. Agriculture has become cash based individual enterprise requiring high investments in modern inputs and wage labours. Therefore farmers rely on credits. Without remunerative prices and with possible crop fails, farmers' economics may be easily destroyed. Uncertainty of yield can cause big problems, and even when yield is good fluctuation of prices can have great impact. At the same, development of other industries and change in social relation agriculture became no longer object of attraction or site of investment or a source of social status (Suri 2006).

Soil degradation. Conventional agriculture causes degradation in land, human and animal health. About 80 percent of geographical area of India is under agriculture, forestry, pasture and biomass production. Agricultural productivity reduced from 234.5 million tons in 2008-2009 to 218.2 million tons in 2009-2010 due to soil quality degradation and nutrient mining. About 57 percent of total land area has been degraded. Degradation of water quality is predominantly caused by agriculture. In India, average dietary intake of pesticide residue is 32.5 mg per day per person for vegetarians and 356.5 mg per day per person for non-vegetarians. Contamination shows causation links with sever health problems (Pandei and Singh 2012). Over half of country's burden of disease are linked with declining environmental

quality (Singh and Bagchi 2013). Because of expanding urban and agricultural areas, area under natural pasture is declining causing cattle death. Because of insufficient animal feed essential nutrients in excreta are less. Poor population of India use animal manure for domestic fuel that way limiting its availability for soil amendment. Tillage and mulch farming have little availability as most of the crop residues are used as fodder and fuel. The increasing demand for organic products is creating opportunities, and at the same time, majority of small farm holders are dependent on government incentives to meet the cost of input (Pandey and Singh 2012).

Organic agriculture

India is the largest producer of pesticides in Asia and twelfth in the world for the use of pesticides. Although Indian average consumption of pesticide is lower than many other developed economies, the problem of pesticide residue is very high in India (Abhilash and Singh 2009). At the same time India is a country with the most organic producers. It is second country after China by organic agriculture area with 0.5 million hectares. In 2012 there was major decrease in organic agricultural land in India, where almost 600 000 hectares less were reported. India has highly export oriented organic sectors running as contract farming under financial agreement with contract firms. The rising middle class and growing consumer awareness of organic production methods are however developing in internal markets for organic foods as well (Willer and Lernoud 2014). During 2008 – 2010 more than 200% growth in certified area was reported (Ramesh et al 2010). Most of the farmers who are opting for organic farming do so to price margins, rather than for safe agricultural produce (Pandey and Singh 2012). Even with recorded organic farming growth, this type of farming in society is regarded as out dated and conventional farming as modern, therefore organic farmers, or those who are willing to become organic are often being discouraged by their community (Alvares 2009).

In the areas facing severe agricultural crisis interest in organic agriculture among farm owners is very high. During my stay, on 28th February to 2nd March, 2015 5th National Organic Farming Convention organised by Organic Farming Association of India jointly with National Institute of Technical Teachers Training and Research, Alliance for Sustainable and Holistic Agriculture and Kheti Virasat Mission in Chandigarh, in the region of Punjab. Punjab has been the heartland of Green Revolution in India. Now it has degraded soils, depleted and

contaminated ground water, lost crop biodiversity and high indebtedness among farmers. Region is under severe environmental health and chronic illnesses crisis (Sidhu 2002). It was expected convention to have up to 1400 participants, while number of registered people have reached 4000. Even though convention couldn't accommodate all the applicants, this shows great need and interest in organic agriculture in areas of agrarian crisis.

Soil organic carbon is major component of soil organic matter, which is extremely important in all soil processes. Low soil organic carbon is mostly caused by conventional agricultural practices such as ploughing, removal of crop residues, soil fertility mining and accelerated soil erosion. Soil organic carbon in most of countries cultivated soils in India is less than 5 mg g^{-1} , one third of amount in uncultivated soils. With large area and diversity of eco regions, India has a considerable potential of terrestrial carbon sequestration, it occupies fourth position in potential rate for carbon sequestration in cropland by restoration of degraded soils and ecosystems, meaning that shift in agriculture practices alone could contribute massive carbon sequestration and help mitigating global atmospheric carbon balance. India has also a great potential in decreasing greenhouse gas emissions decreasing input of synthetic fertilisers, pesticides in this vast agricultural land of country (Pandey and Singh 2012).

Government support is available for awareness creation, technology transfer, support for establishment of compost, biofertilizers, biopesticides and vermicompost production units. Financial assistance is being provided for capacity building for facilitation of certification and other. Organic certification for export as well as for domestic markets was implemented. The Organic Farming Association of India (OFAI) is umbrella for organic farmers in the country. It was set up by the seniormost members of India's organic farming community in 2002. It was set up to promote organic farming, lobby with government agencies and departments to pay more attention to sustainable agriculture, and assist farmers using chemicals and pesticides to convert successfully to organic farming methods (Alvares 2009). Although organic agriculture is being promoted by government, there is no consistency in governmental programs in general. For example Indian spice and coffee boards, which are governmental organizations, recommends use of highly toxic compounds to deal with fungus and pests. Quinalphos recommended pesticide for mealybugs and green scale and methyl parathion for green scale in coffee are banned in most of the other countries because of their toxicity and harm for human and environment (Coffee board).

Kodagu



Figure 4: Map of research area. Kodagu (Coorg)

Farms in research are predominantly coffee plantations located in Kodagu (Coorg) district in Karnataka state (Figure 4). Kodagu is located in the slopes of Western Ghats Mountains. Kodagu is known as being one of the biggest coffee producing regions in India - one third of total India's produce. India produces 4% of world's coffee and is fifth largest coffee producer in the world. In the district coffee is one of major drivers for economy and landscape. Today coffee plantations occupy one third of the district. (Garcia et al 2009). Since 16th century coffee has been popular and successful cash crop in this region. Currently 57% of cultivated land is dedicated to coffee, 19% rice, 24% is distributed among various commercial crops like pepper, cardamom, ginger, cashew, rubber, areca nut and orange (Purushothaman et al 2015). Coffee is the second most tradable product in the world after oil.

Region faces issues that could possibly be solved with the help of natural farming or be an obstacle for it. Arabica and Robusta coffee is grown in Kodagu. Coffee here is grown under the forest shade using agroforestry technologies, therefore large areas of forest areas have been converted into coffee plantations. This type of farming do preserve the original forest and they have relatively high biodiversity, but only about 37% of land is covered by forest in comparison with 88% in 1920, with coffee being responsible for around 71% of this loss (Ambinakudige and Sathish 2007). The decrease of forest happened because changing patterns in tradition of coffee growing. Traditionally it would be grown under shade of native trees replacing undergrowth with coffee and leaving canopy to protect coffee from sun in dry season. Development of irrigation, easier management of Robusta varieties, increasing use of chemical fertilizers reduced need of shade cover and dependency on ecosystem services. Because of that plantation owners are reducing canopy cover for better yields, and replacing trees with fast growing introduced species (Garcia et al 2009). Although it is still providing habitat for number of species the loss of forest resources and therefore a decline in biodiversity has tremendous implications for the predominantly agriculture-dependent economy, as coffee plantations rely heavily on the forest for its role in pollination, hydrological balance and climate control. (Purushothaman et al 2015).

Kodagu is located in the south-western state Karnataka which is a good representation of economic imbalance in India. It has diverse agro-climatic conditions and therefore a great diversity in crops. It has high economic growth (from 5.5% in 1999 to 10.4% in 2010) mostly deriving from service and manufacturing sectors, but poor agricultural growth rates (agricultural share in GDP decreased from 28% in 1995 to 11.6% in 2013) and agrarian distress culminating in farmer suicides (30,552 farmers' suicides between 1997 and 2010) (Patil et al 2014). The factors of such a high amount of suicides among farmers were pointed out to be changed pattern of landholdings, changed cropping pattern due to policies which prematurely pushed agriculture into the global markets without a level playing field, heavy dependence on high cost paid out inputs, growing costs of cultivation, volatility of crop output, market vagaries, indebtedness, neglect of agriculture by the government, decline of public investment and so on (Suri 2006). In the state farmers indebtedness (61%) is higher than country average (49%). 73% of indebted households have loans for cultivation expenditure (Purushothaman et al 2012). In 2011 state had 49% of workforce engaged in agriculture, 75% of which are small

and marginal farmers, operating in <2 ha of land. Almost 21 percent of all inhabitants were below poverty line (DES 2013). The average fertilizer consumption between 1983-1984 and 2006-2007 increased by 83% (Purushothaman and Patil 2012). During my stay in a farm, coffee picking season was on. Plantations would face lack of local labour and therefore import workers from other parts of region hundreds of kilometres away.

Organic agriculture

To address this agrarian crisis, national and state governments introduce measures like loan waivers, subsidies and policies favouring sustainable agriculture practices including organic farming. Karnataka was one of the first Indian states to specify standards and implement pilot projects for organic farming in partnership with non-governmental organisations (Purushothaman et al 2012). In Karnataka, the Karnataka State Policy on Organic Farming (KSPoOF) was introduced in 2004 (implemented in 2006). This policy promotes organic farming as an alternative to conventional farming. The policy has an aim to reduce the dependence on external inputs, optimize the use of natural resources, increase crop diversity and maintain or enhance yields, and thereby increase the sustainability of agriculture in the state (Patil et al 2014). It does so by providing support for organic seeds and seedlings, vermicompost pits, azolla culture, biopesticides and livestock. Policy is being supported by Karnataka State Organic Farming Mission, National Horticultural mission and others (Purushothaman et al 2012).

At 2011-2012 area under agricultural cultivation was 1205900 ha, while under organic 29794 ha – 0,25% (National Centre of Organic Farming 2012). There are increasing number of active farmers associations in the state involved in organic farming and NGOs promoting it. Events about organic agriculture are taking part such as recent ‘Karnataka Organic Farmers Convention’ in the end of January, 2015, where farmers are sharing their experiences and being trained in various topics of sustainable agriculture (Pinto 2015).

My study is located at southern part of Western Ghats – the biodiversity hotspot is in Karnataka. It has recently been given a status of World Heritage Site because of rich biodiversity, unique geological, cultural and aesthetic values. Forest ecosystems influence monsoon weather pattern. It has high level of biological diversity and endemism and is recognised as one of the worlds eight hottest hotspots of biological diversity. Western Ghats is

home to at least 325 globally threatened flora, fauna, bird, amphibian, reptile and fish species (United Nations). Agricultural expansion, conversion to plantations and infrastructural projects in Western Ghats resulted in loss of forests, grasslands and is a major threat to biodiversity. In 1980-2000, more than one fourth of the forest was lost (Jha et al 2000). The area of my internship and research Karnataka Kodagu district, is in Western Ghats. From 1977 to 1997 there was 30 percent loss in forest cover in Kodagu (Gracia et al 2009).

Studies conducted locally in Karnataka have shown that organic agriculture relatively to conventional agriculture has potential to increase net returns, reduce risks of crop failure and reduce environmental impacts (Patil et al 2014; Lukas and Cahn 2008; Pandey and Singh 2012). Study comparing biodiversity in Kodagu district organic and conventional farms (Mone et al 2014) showed organic plantations supporting greater diversity of ground insects and nymphalid butterflies, number of pesticide applications is to have strong effect on both and ant and overall ground insect diversity. Research of Project Directorate for Farming Systems Research in Ecological Agriculture in India (Alliance for Sustainable and Holistic Agriculture 2014) on organic farming productivity in India reveals that yield of some crops reach and exceed yields of conventional farming. Okra, turmeric, cotton, carrot, black pepper and cowpea have recorded more than 20% increase in yield. Onion, ginger, dolichos bean. Greengram, sunflower and garlic recorded 5 to 10% increase in yield. An increase of up to 5% was observed in maize, soybean, berseem, brinjal, chilli, capsicum, tomato, sorghum and peas across the seasons and locations. Ecological Agriculture in India study set provides number of other research showing increase in yields. The studies also proves the possibility of improvement in yield and soil quality, increased biodiversity, decrease in disease and pests.

Factors affecting attitudes

11 interviews were conducted with plantation owners. Five of respondents were conventional, two certified organic, two in process of certification, one having half of his land organic, half conventional and one uncertified natural grower. I had talks on the topic with director and three scientists of one of the Coffee Spice Board research centres.



Figure 5 Conventional and organic coffee plantations

In Figure 5 on the left there is conventional coffee plantation owned by Coffee Spice Board of India. Coffee is multicropped with pepper under a shade of introduced species of trees (silver oak). On the right one of the organic coffee plantations. Coffee is multicropped with pepper, cardamom, vanilla, tea, citrus trees under a shade of native trees.

Organic growers I interviewed regarding the reasons for their choice of practice were more or less uniform, while there were several categories among interviewed conventional growers. One that doesn't have the means for change, although they would like to. Three that does have means but are strictly against organic, and one more who has means, would like to perform just natural practices in estate, but is not willing to put extra effort.

In study by Purushothaman et al (2015) conducted in Kodagu it was found that it is primary economic reasons why farmers do not adopt organic. It was the lower yields, longer gestational lag, lack of availability of inputs, such as farmyard manure and labour supply constraints, lack of market for organic products as well as problems with obtaining the required certification. Other potential reasons were the lack of appropriate and continuous extension services, lack of incentives for best practices (premium price for organic coffee is elusive for small growers as certification is costly).

Studies previously conducted in state of Karnataka have found that the major reason to adapt organic practices was negative experiences with conventional farming (deteriorating natural assets, continuous pest and disease problems, high costs for external farm inputs, and health problems that were related to the use of pesticides) (Lukas and Cahn 2008; Kumar and Narayanaswamy 2000). Adoption was facilitated by education and information and by material assets such as large land holdings, savings or off-farm incomes, which have helped to overcome conversion period (Lukas and Cahn 2008).

After conversion farmers perceived enhanced natural assets such as improved soil structure, improved water holding capacity and increased biodiversity, as a positive effect of the conversion to organic agriculture. Over long term conversion had reduced vulnerability to pests, diseases and droughts. This encouraged farmers to experiment and enhance their knowledge. Conversion also improved the interviewed farmers' human and social assets contributing to preservation of indigenous knowledge. It also reduced external inputs, lowered labor requirements and reduced production costs, yields were similar or increased. This way enhancing financial assets, reducing vulnerability and providing potential for investments (Lukas and Cahn 2008).

Another reason for adoption is human health improvement through food safety improvement, eliminating of health risks with the help of the exclusion of chemical pesticides. Self-sufficiency was also important benefit. Organic farming reduced costs of farm inputs, thus the need of credit which is major source of vulnerability (Lukas and Cahn 2008).

Support from outside is also factor of high importance. Organic farmers' associations and vertical networks provide platforms for knowledge exchange and expertise, and enable farmers to influence policies. Marketing opportunities were enhanced by creation of separate organic marketing channel, and a number of NGOs and a recently introduced state policy support organic farming also influenced adoption (Lukas and Cahn 2008). High organizational participation correlated with organic practices adoption (Kumar and Narayanaswamy 2000). Without exception, all the organic farmers expressed satisfaction regarding their decision to convert to organic farming (Lukas and Cahn 2008).

Reasons to discourage conversion, were that the conversion process involved high level of risk and uncertainty, lower yields for conversion period, higher required knowledge in comparison with conventional agriculture (Lukas and Cahn 2008).

Economic factors

Economic factors were mentioned as the most important factors by conventional farmers regarding their choice of farm management style and was not mentioned at all by organic farmers. It was to affect conventional growers in two ways, either they didn't have means for conversion, or they didn't have willingness to take perceived risk and loss. Line between those two groups is not well defined.

Most of the organic farm owners as they wouldn't be able support themselves from farming only had another sources of income, such as homestays, businesses abroad, coffee processing units, consultancy businesses. The reasons for insufficient returns from farming were mentioned as low acreage and unfavorable weather conditions – most of the farms I am discussing are situated in high rainfall area where crops are much lower whether farming management style is conventional or organic: *“Our family would not be able to sustain. Amount of acreage we have would not be sufficient to sustain. If we wouldn't have homestay, someone would have to go and work outside”*. The two organic farms that are both out of high rainfall area one is predicted to support itself fully and make profit after second year of operation even without premium price, as certification is still in process. The other one has sufficient acreage, price premium and other conditions to be profitable. All except one conventional farmers even if they do have extra income would be able to sustain from money they make out of their farms. It is important to mention that all except the same one are situated out of areas with unfavorable weather pattern. Stable income from other sources gave organic growers space for experimentation, without risk of complete bankrupt: *“I was in a liberty because my income was from abroad. And therefore I did not focus on economy.”* Some of interviewed conventional growers too have secure incomes from sources other than farming.

While at the same time organic grower believes in profitability of natural farming, some of them proving the profitability in practice, just one of them mentioned economic motivation as one of the primary motivation to go organic. Most of conventional growers do not perceive organic farming as economically reasonable activity. However, some of them see the future for it, but they want immediate returns, and as natural farming thought to require effort in terms of physical investments as well as creating infrastructure, with very uncertain returns in the long term, which prevents them even from considering organic. Because they see their farming activity as a business bringing money, economic issues they perceive could potentially arise from converting to organic practices are the ones of they stress the most. Some bigger conventional farm owners wouldn't call themselves farmers, but as planters – business man. Organic growers mostly wouldn't be able to sustain from farming only, but as their focus is elsewhere, they are willing to put extra effort and get combined income from other activities as well. One organic grower is in good economic situation from his plantation only, reason being well developed market channels.

Markets for produce. Some of conventional growers do see the possibility of organic market with the price premium in a future: *“Right now no, but the way things are going there*

will be market.”, but mostly they do not believe it exists: “*As I know it [market for organic] doesn’t exist.*”; “*There is no market as such in our country, it’s not worth a trouble.*” Both organic and conventional growers see organic produce buyers as some small niche consisting of higher income people living in the cities: “*Maybe with some super rich people. Maybe 5 percent of total market.*” Some conventional growers see organic as marketing scam for naïve people: “*In cities it is there, you go to Bangalore, you see people buy anything labelled as organic or green. They don’t know what it is, but they see label and they buy.*”

However, most of organic farmers have different experience – they do see demand for organic produce, selling their produce with 30 percent price premium. Even organic markets are there, infrastructure is not well developed. Organic farmers themselves does their marketing, create and search channels, if they do not have ability to create them and do not have access to ones that have been created they must sell their produce as commodity together with conventional produce that way not getting any price premium. That was a case with small farm holder who was organic for 7 years getting low yields because of high rainfall and even more decreased yields because of absence of chemical use, had got no access to a market with price premium, that way even resonating deeply with natural way of farming, they had to turn back to the use of chemical fertilizers. They believe income would have been sufficient with those small yields if the price premium would have been available. It is also important to mention that in this particular case they couldn’t perform all the necessary practices for organic farming because of labor constraints, this way getting in closed circle – not getting enough income from small produce, not being able to perform all the activities to increase produce because of not enough income.

Other better organized organic farmers have developed themselves channels for their produce. Some farmers have formed groups for selling their produce: “*We were selling more than we were producing so now we have formed a group of farmers so they give us produce we process it sell it which is a safe market for them. We have to build and are controlling our market as farmers because if we are depending on middle men we are always getting raped literally.*” or are sourcing individually. They have found markets in local cities: “*There is already a market right now in this locality. But I am just waiting to get organic, because the people they are ready to buy with the premium. They are waiting for a stamp. <...> I already have few people, because they know I am in conversion they like my coffee so they order small portions of it and I send it and they put money in my bank.*” But locally some of organic farmers consider people to still be price sensitive, not prioritizing quality foods: “*I think people are*

little price sensitive. For some things, not for other. They go and waste money to buy fancy telly.” The coffee and spices are also being exported to Europe – group of four farmers although mostly selling to India right now, are planning to increase their sales in Germany this summer. Most of the organic farmers do find where and how to sell their coffee, spices and similar products with price premium, while fruits and vegetables, is a challenge, as there is no high demand locally: *“I’ve go in Mysore quite often so I take fruits I load my pickup truck with fruits and I distribute in shops but they don’t buy more than 20 kilos that’s the problem”* and it is difficult to bring it to big cities because of short shelf life: *“If I’m growing avocados, I planted few hundred of them, meaning few thousand kilos maybe, but not able to distribute them. In cities they need good avocados, people don’t get good avocados there. The shelf life is once you make organic fruits is once you pluck it from the tree is a week. If I get it somewhere I have to figure out the market.”*

The economically successful organic growers see the market channels as the main focus to reach good profitability in organic farming, close relationship with buyers must be created. To create your own channel is an extra effort, to join existing one is not always possible, to depend on the middle man is not economically reasonable - it is an extra effort, therefore conventional growers see it as a significant obstacle, preventing instant money: *“And marketing is a very big problem because everybody will say all kinds of things but at the end of the day we don’t get that price. So we grow conventional because we want money right now.”*; *“If I go through organic I don’t have market to get a premium for my organic produce, so I have to put a lot of more effort.”*

Market for inputs. Market for organic inputs is also perceived as a problem: *“Where are the inputs available, because if you have to buy things, Coorg is not a place where you find things easily, you have to individually locate suppliers so that’s another challenge”* *“I feed milk cattle with Goodrich, you think Goodrich is giving me organic feed? No way.”* Even when one finds organic inputs, extra effort is needed in a process of approving it as organic to the certification company: *“Again and again, every year we have to bring certificate, we are using EM and every year they ask me to give a certificate but its nonsense. I shouted on them. They know this is certified input, and every year I have to bring papers for this shit that shit.”* At the same time growers see subsidies for chemical inputs getting smaller, that way increasing costs of production. Increase is not seen yet as significant to be a threat, but the trend is there.

Period of conversion. Another frequently stressed factor creating resistance to organic was period of conversion in a way of 3 year certification to get price premium, and period when yields drop after discontinuing with the use of chemicals. In conventional growers opinion this period can last as long as 7-12 years: *“You see I am used to certain lifestyle, certain income. I am not willing to for 7 years [for yields to increase] go through hardship just to get organic.”* *“So you see I have to sit and wait eight years. What will be my cropping? Who is going to back me for 7 years?”*. There was also a fear of losing yields because of inability to manage problems in organic way: *“Then there is a disease in a pepper. Do I wait with trichoderma, take a chance and loose a pepper? I have nowhere to cry after.”*

Experience of organic growers yields did initially drop, time of recovery depended on type of crop. For example coffee would take a long time for yields to grow, while with organic pepper one of the respondents reached conventional level of yields in a second year already. Organic growers see gradual conversion as a way out – in their experience when reducing chemical inputs gradually, crop drops little harming profits insignificantly first few years.

Yields. However, almost all of the conventional farmers do not believe that yields can reach level when organic would be economically reasonable. They don't believe it to the point that they think organic farmers are cheating with their practices to be able to sustain themselves: *“I think they [organic growers] just lie. Do you have organic crops? Organic beef? Organic chicken? Pork? Everyone wants more money from one animal or acre.”*; *“You think there is outbreak of something [pest, disease, etc.] in paddy and they [organic growers] wait? No, they spray. Hundred percent there will be something [chemicals].”*; *“No, no, no. Nobody does actually go organic. Unless they don't have means”*. As mentioned above organic farmers did initially faced drop in yields and for some crops never reached the level of yield one can get with conventional, but there were some observation for crop yield stability throughout the seasons: *“On his organic farm he would always get 650 kg of coffee. On chemical it is 1 tone to 1 tin. It means you can have 1 tone one year but it will be just one tin the next. The variability is more than in non-organic after some time.”* Even though average annual yield of organic crop being lower than conventional in economically successful organic growers' experience brings greater profit, because of the price premium, and helps to create stronger relationship with the buyer as amount of crop doesn't fluctuate with every year.

Market instability. Coffee and spice markets fluctuate, so it is a risk every year anyway, and conventional growers see organic as an extra threat: *“If it was a clear cut price without a*

middle man everyone will do organic, everyone would go for it. You see the prices have come down, it crashed. It was 3000 now its 2000 tomorrow it might be 1000.” Some farmers have taken loans, and have responsibility to return it, interest rate determines what kind of returns farmer would need. With instable markets, uncertainty about organic produce pushes them even further away from considering organic: *“Even if I had passion [for organic], bank come and asks me money. Passion has to be put in the cupboard.”* In an experience of economically successful organic grower market instability can be addressed by creating close relationship with the buyer. If one has close relationship the buyer will not reduce the buying price even the market is down.

Investments. Increased investments in terms of time was seen as an issue by standard growers: *“We are always short of time, this thing has to be made by June, this by August. There are certain cycles. So you can’t push it.”* as well as investments for recovering the soil: *“You need that kind of money to make this soil, to start you have to build up the soil right I won’t be able to hold on to it.”* When converting organic investments indeed can be big constraints. Style of organic farming can be very different, one may be self-sustaining, requiring minimal material inputs from outside, while the other may misunderstood philosophy of natural farming, buy inputs from outside, and therefore fail: *“Technics are one thing, but maybe one should understand some of philosophy behind it, because otherwise my fear is that you can end up putting a lot of money on inputs, and not get enough. And then feel very disappointed and want to give up organic.”* Increased in terms of labour can be a big problem especially for small holders in a conversion period. As labour requirements increase, farmers find being not be able to do all the activities required for the natural type of farming that way not getting sufficient yields. Even though most of organic growers did mention increase in labour, in experience of economically successful organic grower expenditure for maintenance actually decreased when turning organic after the conversion biological condition was created where it mostly is taking care of itself and does not need much inputs from outside.

Food and economic insecurity. Conventional growers think that there are more immediate problems to address in India, such as food and economic insecurity of people. They do not believe organic farming can produce enough food or enough money, so it would actually be much more harmful than useful to society: *“Don’t say organic not organic. I think what is important is that people would feel that they are making money and that they are living happily.”*; *“We have to look to agriculture differently. Its importance to society, its importance to the planet. Which is to live in dignity to be able to sustain yourself.”* As they do not believe

one can make money or enough production with organic, they think that this kind of farming practices are not sustainable: *“You know it’s a very new word biodiversity. Everything falls into the place, if we are not productive we are not protecting the planet. And it’s not pollution it’s not climate change. It’s not that it’s not there. It’s [organic agriculture] not going to solve the problem of food on the planet. The food is the most important economy.”*

Policy

Organic and conventional growers are aware of government support programs, but some of the respondents didn’t see this help as effective: *“Government has some support schemes. Scams. They are giving us subsidies for wheat cutters. But before they do that they double the price, then they give 50 percent subsidies. Finally we pay same price, just that somebody in the middle makes a lot of money. And there are many other examples like that.”* There is also an issue of corruption: *“Last year we had a crop failure. So you are applying to the village accountant you will get some funds for your loss depending on the acreage. But to get that funding you have to bribe village accountant so you are able to get a little bit. Then he is giving money to the higher authorities, you are ending up with a little amount. So at the end you are wasting your time.”* However, most of the organic growers used government subsidies for machinery, water bodies, drying houses and see it as a little help that requires a lot of time effort. These subsidies are accessible all the growers. Many small farmers cannot access subsidies whether they are organic or not, because the documents of the land ownership after land reform or inheritance are not in order.

Government subsidize chemical inputs such as pesticides and fertilizers for conventional growers, but does not subsidize organic inputs, and requires them to pay for certification. This farmers see as another barrier created by government for organic: *“If you are organic and you just tell somebody buy my stuff, it would be reasonable, but you need to pay government every year have them come certify and they look like hawks, trying to find your mistakes and then and hopefully after three years you get a little bit an extra price. Government is just subsidizing chemical fertilizers and easily giving them these things that cost quite a bit, but because they have been heavily subsidized people are buying lots and applying”*

Next to the financial support farmers feels the shortage of information support and extension services for natural practices from government. Natural farming is more complex

than conventional, when there is no or little knowledge support farmers must learn themselves from books, trial and error, or each other, making it more risky as it is easy to make mistakes. For this reason, especially when one doesn't have financial backup for the period setting up your own natural farming system through experimentation.

Government in India has also big role as so much people depend on it: *"I think it's a matter of future planning and government support. Government also has a very big responsibility. Bigger responsibility here than in Germany for example. Because in Germany they are industrialized and there are just few people depending on it here it's totally different."* As such a big proportion of people depend on agriculture as workers to go further into its industrialization increasing use of chemicals, technology would leave them without source of income.

I have visited Indian Coffee Board research centre in Kodagu district. Indian Coffee Board is governmental organization which is aimed to enhance production, productivity and quality, to promote export for achieving higher value returns for Indian coffee and to support development of domestic market (Indian Coffee Board). It has 80 hectare plantation of coffee designated for research experiments. None of which was organic. None of the scientists were making research or working with organic systems. On coffee board webpage recommendations for conventional farming was provided, in terms of practices to be performed and inputs to be used in case of pest, disease or any other issue, while there were none for organic. Coffee board does have organic practices package and a booklet about it for a small price. They see organic practices as an option for a farmer to choose, without necessity to promote it, so they provide some information about it. The suggestions for coffee cultivating from coffee board includes natural practices such as composting, cultural control, thorough harvesting and others, as well as chemical fertilizers, fungicides with limited usage of weedicides and herbicides, and discriminative spraying of pesticides, they recommend only green and yellow branded chemicals. They have had area for organic cultivation before in the plantation, but didn't keep it for long enough to get optimum yield, meaning less than 6 years. They started new experiment at the same plot for the reasons I wasn't able to figure out. They have mentioned surveys to be conducted before about organic, doing research on organic pesticides, insecticides, fertilizers, and fungicides. There is also tribal development project, where tribal are provided with certification market and other incentives for organic coffee produce.

All of the researchers did see the threats caused by intensive chemical farming. They observe natural resource degradation, decline of soil fertility, damage to pollinators, change in rain patterns, biomagnification already happening. It is seen to be serious issue after 100-200 years if the trend of current farming practices keeps continuing. Reason for excessive use of chemicals in coffee is observed to be inappropriate shade maintenance in order to increase yields – farmers cut shade providing trees for coffee to get more sunlight, that way increasing amount of coffee berries and at the same time increasing risk of pests and use of pesticides. The main coffee pest is white stem borer, which is not possible to control by chemical inputs, as it lives in the stem of a tree, so in conventional plantations the mechanical solution is to cut and burn infected trees. However, in the coffee board web page it is advised to use highly toxic pesticide chloropyrifos. In their own plantation they have a major issue with white stem borer. They believe organic is researched enough, all practices are in place and provided in booklet for farmers who are willing to be organic, and therefore there is no necessity for further studies.

Although all researchers at coffee board I was talking to were convinced that natural practices are essential to be integrated with chemical ones in farming, they didn't believe in feasibility of purely organic farming. The reason being that organic coffee in their opinion can produce up to half of what conventional can – while conventional can produce 500 kg per acre, organic 250 at most. Organic product is not valued enough by buyer, and sold just with 10 percent premium, meaning that it is not economically sustainable. In addition to that while small scale farming in their opinion may be possible to control in organic, large scale is very difficult or impossible to create conditions for meeting nutritional requirements of plant. Also with such a small produce it wouldn't be possible to produce enough for big population of India. All except one interviewed researchers doesn't have any knowledge about economically successful organic coffee plantation in the area.

Most of the researchers interviewed believe coffee board suggested guidelines for coffee cultivation involving chemical and organic inputs are sustainable solution to be followed now and in the future, as doses of chemicals they promote does not disturb nature and human health too much. The issue is in their opinion that the plantation owners themselves spraying their fields for fast control of issues and not consulting the coffee board for alternatives. The one researcher who doesn't believe in sustainability of coffee board guidelines for growing coffee feels powerless until government policy becomes more sustainability oriented. He feels that coffee board is working for industry interests and organic farming is not in that particular interest. Director of the research centre believing that boards guidelines is a sustainable solution

in a long run did not think support schemes (such as subsidies for natural inputs) for organic growers are necessary as they are supposed to get price premium, at the same time stating that the price premium is not there.

Direction of financial, knowledge support and point of view of governmental organizations may heavily influence opinion and activity of farmers regarding sustainable farming. The ignorance I have faced in Indian Coffee Board towards organic farming makes it an extravagant activity, rather than a norm to follow now and in the future. With little support from outside when going organic farmers have to take all the responsibility on themselves. Thus creating big barrier for adopting organic agricultural practices among farmers and negative image for organic farming in general.

Farm characteristics

Main crops of all farmers are coffee and pepper. Minor crops are mostly cardamom, paddy and fruits. Organic plantations in my research range from 9 to 30 acres, while conventional ones from 4 to 200 acres.

Soil fertility. Most of conventional farms see some problems with their soil, but they are not major enough to influence farmers decision for changing the type of practices. All the farmers recognise traditional natural methods for increasing fertility and using them when using chemicals alongside. Also as coffee is shade grown in the area, leaves are falling giving organic matter to the soil. All except one organic growers except one don't see any issues with their soil fertility. The one who does have a soil problem faces it because of existential chemical farming in the plantation before conversion to organic. The owner finds it difficult to increase soil fertility: *“And people suggest lots of things, why don't you try this legume, that legume tried a lot of them they just don't wake up. That's just... bad soil.”* Organic growers saw soil fertility as one of the driving factors to convert to organic, looking at it with the longer time span: *“If I am going to leave land to my children I have to give it to them with better fertility than I got. That's the only way it could work”.*

Climatic conditions. Most of the organic farms and one small conventional are situated in high rainfall area with 5 meters of rain during monsoons. With this kind of rainfall crop is much smaller on any kind of farm *“Only rainfall. That's the big big problem, only problem. Last year we had 7 meters. Which then you can't expect a good crop with this kind of rainfall.”*

Labour. Labour on organic farming is more intense. The simple tasks becomes much more complicated: *“Chemical is an easy way out. You put chemical fertilizer, it’s a hand full for each plant you put it in a bag, carry it and it’s done. And organic you make compost mix it make few tons take a full basket full of it and put around a plant or even make tranches and make it sit over there. That’s a lot of work.”* It is costly for farm owners in two senses – time spent on activities: *“We are always short of time, this thing has to be made by June, this by August. There are certain cycles. So you can’t push it”* and costs on extra workers to make necessary activities: *“The moment you employ labor and you pay for work then the equation is not at your favor.”* Although, as mentioned above, there is organic grower who faces decreased expenditure on maintenance of the farm, meaning that intensity of labour in organic farming depend on other factors and can be influenced positively.

Farm workers. Organic growers one of the major problems in their farming practices is attitudes of their workers while starting with natural farming. Organic growers see reluctance among the workers to adapt to new practices for several reasons. First, as mentioned above labour mostly is more intense on organic. The workers are also exposed to extra discomfort: *“One problem we came across with an organic which I myself don’t face too much of it because I am not the one actually doing the work. I have 10 people they have problem of ants, they don’t know how to deal with them. The moment you touch the tree ants are all over you and it hurts like hell when they bite.”* Under conventional farming workers are exposed to chemicals which can be severe to their health, but according to farmers they do not realise the connection, when the effect after the cause is not immediate and when it is not obvious they do not understand the harm: *“Initially when we came there were some chemicals we put on the pits. The worker used to apply with their hand and just wash it with water and eat food”.* This gets especially complicated in farms where the owner is not directly involved in the work and don’t interact directly to his workers. Then the owner if he decides to go organic must convince and change the mind-set of the staff, which in turn have to convince workers: *“After I came back the manager just wouldn’t work with me on building the soil. So it became really difficult.”;* *“We don’t interact with our workers it’s our staff that does that. So we don’t have that some kind of personal bonding to convince them. If we say something it has to go through our staff, for that our staff first have to accept that doing this is correct. When he himself is not willing to accept he will not put it in to the workers. They [small organic growers] have personal contact with all the workers. In the end of the day worker also enjoys doing that kind of work thinking yes I’m doing something which is healthy. Our worker at the end of the day wants to*

know how much money he made.” However, some of the farmers think that only thing worker wants is to work, therefore it is not much of importance whether to do organic or conventional practices and if amount of work increases when organic, workers will favor to work more and this way to make more money.

Farm size. Farm holders of large conventional plantations are stressing their farm size as unfavourable factor for conversion. The problem mentioned above gets most complicated in big estates, in most of such cases owner is not present at doing the actual farm work and there normally is hierarchy, so change of mindset must also happen in several levels. The other reason the larger farm owners may resist converting practices is that organic is more complex than conventional, and in large farms it is more difficult to control all the activities necessary for the functioning of the system also it is difficult to observe and understand that functioning.

Knowledge and information

Education on natural farming. As mentioned above there were several categories of conventional growers identified. None of those who are against organic had any education about natural farming, not about benefits and drawbacks, or practices. Some were not just uninformed, but misinformed, for example after treating coffee remaining water with coffee pulp cannot be used further as it is highly acidic, but after composting it with certain microorganisms it can become source of nutrition for plants. This practice is recommended by Coffee Board and widely used by natural and some conventional farmers, but sometimes quite opposite information reaches the farmer: *“You know coffee pulping? The water that is used cannot be used for anything else. It’s not supposed to be let to stream and rivers, it is supposed to be dumped in separate tank or field. It’s highly toxic. You cannot use it. Even after you treat it with enzymes you don’t use it, you just let it go, you store it. I had a coffee pulping guy, he told me.”* Naturally, organic farmers have education about natural farming systems and practices. All of them attend courses, does individual research, share knowledge with each other and visit another farms. Some of them were exposed to the information before they started farming, through their previous occupations, social work or parents. The conventional ones who doesn’t feel strongly against organic both had some sort of education through courses or through interaction with other farmers about natural farming systems. But then they see another issues for converting. Organic farmers observed tendency of conventional farmers willingness to learn about natural practices when they see good results in terms of yields of organic farms:

“Unless they see results. One two people have seen results in my place and wanted to know recipes how I do it.” One of the causes of low awareness may be lack of people speaking up for importance of natural farming in the area: *“I think there is just a big problem of opening the mouth and sharing the experience.”* The problem of information accessibility is also observed, planters feel that they have to put a lot of investment in terms of time to get necessary information as government information support is not sufficient: *“Mostly organic education is supported by NGOs, farmers, or farmer groups. They finally have research center for organic farming but they do vegetable, cereals, medicinal, but not coffee. But you have to depend on other planters other farmers to get the information. You have to go and buy books and read, or experiment and find first hand. That’s it. That I think is also challenge. Because not everyone can do it or something can go very wrong.”*

Complexity. Natural farming systems are more complex than conventional. If natural is seen just as a replacement to conventional without having knowledge about the whole system one may easily fail. To understand this complexity one has to put effort and invest his time and energy when on conventional all practices are ready made what can make them less willing to turn to more complex one: *“They don’t have to put their head into research. Because there are guidelines [for conventional] it’s like assembling one of those air modeling pieces, you know exactly what to do how to do for organic you observe the plant it goes through the cycles, you put something and see how it works and stuff like that.”*; *“You get these kind of fertilizers ready, exactly what the plant needs to give out maximum out of the plant you get ready made all you have to do is buy out of package ask few people to distribute it and then you get maximum amount of the crop, you get a lot.”* Organic farmers believe if the simpler system would be created for this area it would encourage more people. They are working on that themselves: *“We very confident if we cracked this we really cracked it. Than this is an answer for entire part of the country”*; *“If we achieve good yields here in a long run in this place with this rainfall then it can be a training school. But we have to still work in that.”*; *“We have to do simple system that others can follow, how to shift to organic, because otherwise you don’t know where to start.”*

Tradition. Although some conventional growers tend not to take learning in natural farming intentionally, but they are aware of the practices because of tradition: *“But they know that organic is also a good solution. The tradition before the green revolution came was to use cow dung natural thing and everybody knows it’s a good solution because you know when you put cow dung for a plant even for vegetables it grows, so everybody knows that so the more*

you put organic it comes well so that they know, but chemical is an easy way out.” Green revolution took place relatively late and natural farming in India existed few thousand years before. Organic growers believe that this tradition not just of natural farming, but also of rich culture in general is a favorable factor for current practices and prospects of natural farming: “Now we have blend of, especially here in India, of very ancient remedies and preparation because India has, that’s an interesting aspect which is missing in Europe completely, India has an uninterrupted cultural line development. We are living in country where they have since 3000 years they evolved they own belief system they evolved their own line of experience, health whatever anything. That they have taken away from us in Europe. Because we were made Christians. So we had our own belief systems which do not think they were bad but they have taken it away. And they were very very bad when they did it inquisition was going on for 300 years. They have better roots. Stronger roots.”

Biodiversity and farming. In study by Purushothaman et al (2015) it was found that most respondents of the survey saw forest as being nuisance, disservice, because of the frequent attacks of wild animals, pollinators bees mostly were considered as not important, though the climate regulatory functions of forests were recognized by all. Only 32% of the farmers were ready to participate in forest conservation. Reason for maintaining native trees within the property was primary to provide shade for the coffee plants, followed by provision of mulch, soil nutrition, timber and firewood. Just three farmers mentioned that they valued these trees for themselves, i.e. their recreational and ecological value. In my research those who are strictly against organic farming do not recognize biodiversity importance to their farming activities: *“Biodiversity in agriculture in general is not so significant. The land is used year by year, month by month, under cultivation.”* They too do not know the effect of chemicals they use on biodiversity, environment in general and human health. They do not believe their practices affect natural world. One wouldn’t believe in global warming *“and all that nonsense”*. And if the other does believe in global warming it is the only role of biodiversity he is able to come up with. As they were speaking about biodiversity it sounded as if they are sure about their own knowledge, which would add extra difficulty in education on these matters. They tend to see the end result – low toxicity in the coffee beans but no impacts in the process: *“Pesticides are not significant. They don’t leave toxins in coffee. Crops doesn’t have much toxicity that’s the bottom line.”* They are aware, however, of changing weather patterns: *“In Coorg amount of rainfall is going down. Usually monsoons start in June it go till September October now it goes late July when it starts.”* At the same time when it comes to issues obvious for the naked eye,

they are concerned about nature, having strong opinions about littering: *“You see amount of litter everywhere we cannot expect government to clean it up, it’s we the people have to take responsibility, it’s a simple thing. It’s our duties we have to perform.”* Or they would fight against power lines going through the forest and consequentially cutting trees. However, some of the farmers who are against organic in their farming wouldn’t use practices with immediate negative effects such as application of herbicides and weedicides: *“It’s what I have noticed that you spray on the ground and it gets burned the whole layer. After you spray you can feel the heat. It is definitely not good.”* But without seeing immediate effects it is hard to comprehend impacts of ones own actions: *“They know it [effects of chemicals] they don’t know the extent of it nobody sees immediate reaction. Even you me, nobody live sustainable, nobody buys fully organic, we still buy vegetables from the supermarket although you know it has chemicals in it, and you may look healthy today, we don’t see the immediate harmful effect, when you look at the vegetable in the supermarket and it looks fresh it looks decent nice to eat, so for them it’s all that matters, long term effects doesn’t really sink on the people. For me as well, if I want to go to supermarket and buy organic vegetable it’s not much choice I buy what I have and I hope it doesn’t do much harm.”* Organic growers see link between their farming and biodiversity both ways - that biodiversity is affected by farming, and that farming is dependent on biodiversity. Conventional ones who doesn’t feel strongly against organic does recognize biodiversity importance in farming and in general. They are able see effects of their practices on the biodiversity.

Marketing skills. While conventional growers sell their coffee in auction, organic ones if to get price premium have to find their own channels. Meaning that converting from conventional to natural farming one has to have or develop marketing skills. The interviewed organic growers have developed their markets, the others formed a group and market it together. One farmer being organic for some time couldn’t market her product sufficiently, therefore not getting price premium could not sustain the profits and consequently had to give up organic. Conventional growers see themselves as not possessing the skills necessary to market their product: *“Most of the farmers are very bad with marketing. We don’t market ourselves aggressively.”*; *“We are not very innovative for marketing.”* Or they just don’t want to spend their time and effort on it: *“I don’t want into getting into packaging and all that, it’s a lot of headache, a lot of time involved, you have to be behind it.”*

Societal context and farmer characteristics

Respondents were 27-60 years old, both sexes, mostly educated irrespectively of farming type they chose. Organic growers mostly had income from working off farm. From the first impression categorical conventional growers and organic growers seem to be very different in their life styles and characters. Visiting conventional growers I found myself in big, luxurious houses or we met in club which cannot normally be visited not being a member, organic growers met me in their small simple houses, even though their economic situation is as good. With conventional growers it felt more official, while one of organic farmers was fixing waterline through out all the interview, the other in the middle ran to cover the drying coffee with the workers from the ground involving me in the job as well.

Philosophy of life. Farming for organic growers is one part of their philosophy. They apply the same principles in other aspects of life as well, and therefore their whole lives revolves around sustainability: *“For me it’s more than just an income it’s a way of life, a way of thinking. I can share what I’ve got maybe show people sustainable way of life. I’m trying to get there. Use as much less electricity have some solar, grow some vegetables.”* They are critical to other aspects of current economic and social systems. With their way of life, including organic practices, they feel as if they are fighting against it by *“staying out of system”*. *“I was working in a scientific institute of international reputation and they were absolutely on the other side - you could see how the system functions. Institute was catering to the industry, any very costly equipment would have a write up it was donated by so and so. Which causes them to be biased. Naturally the institute was basically on this side of industry, that’s biased science. For myself it was very early rather critical.”* Having built their own philosophy of life they can’t do conventional, as it would deny their beliefs: *“I am willing to put the effort because it’s an only way I know. I’m going to live here I know I want to be organic.”* They enjoy identity and social status of an outsider: *“Society regards someone like me as mad, but that’s ok I like. Its exactly the right thing for me. Gives me freedom to do what I want.”* Organic growers think that the main reason for conventional stay conventional is their belief system: *“Ganapathi [conventional farmer] thinks it’s not possible I think it is possible. And there you have your reality, for them it’s impossible for us it’s possible. Everyone has his own head and perceives and makes his own reality. There is no universal truth.”* When one’s mind is conventional he will choose conventional methods for his activities. As long as organic is not conventional it seems like farmers with alternative philosophy of life are more willing to choose organic.

Concept of wealth. Organic farmers were uniform in the sense that their occupation is not chosen for monetary income solely. Their concept of wealth includes more aspects: *“So whatever we started was in my case never was the focus of economy. It was in a focus of experience. Experiencing and experimenting.”*; *“Sustainable living. You have water you have a lot of life this is way bigger wealth than just a lot of money. People have a lot of money, they don’t know what to do with it. Money can’t buy this. For me that is wealth. Good air, fresh.”* Making enough money and getting wealth of another sort is considered more important than making the most possible money: *“For me it’s not to make maximum money out of it but I know I can make a decent living out of organic.”* Benefits from the long-term perspective are valued more among growers than immediate returns: *“And you cannot make the amount of money you can easily make with conventional. But let’s talk again in 20-30 years. Let’s take a look at their soil and let’s take a look at our soil. Then we will have an answer. A valid answer.”* And next to the monetary costs they include all the costs caused by agriculture: *“It’s because of understanding that this is a best way. The cheapest and the most sustainable.”* *“it should be as such that chemically produced products for their impact for our health and environment should be priced higher, therefore our organic produces which impact less environment should be cheaper.”* While conventional growers mentioned only monetary benefit as a goal and outcome of farming: *“We don’t consider ourselves as total farmers. We consider as farmer business man. Farmers are for more of personal satisfaction. We do love our plants but we do look at it from commercial perspective.”*; *“You see I am used to certain lifestyle, certain income. I am not willing to for 7 years go through hardship just to get organic.”*, *“It’s nice to talk about it [natural farming], it’s more passionate, it’s more romantic. It doesn’t fill my stomach”*; *“I want better. How better? More money per acre”*. Organic growers believe that the way for everyone to accept these extra costs of conventional farming is to see the causality in terms of their own health: *“In beginning they don’t see it but later they will see. The moment when your own body gets ill. Then you start to wake up.”* Some conventional growers are aware of chemical impacts on their health, so they keep organic gardens for themselves, choose to buy organic products and spray their commercial land. The purpose of all activities is to get some kind of output either material, mental, or another kind. At the current situation in India, where conditions for organic is not yet developed, if person values money the most, he is most likely to choose conventional, as it is, even if making the same amount of money with organic, more input intensive in terms of time and physical, mental efforts.

Personal responsibility. Farmers who are strongly on conventional side tend not to believe in their personal responsibility and give it to someone else instead: *“Can I personally help environment? Very frankly no, very frankly no. I think we need scientists. Revolution of science.”*; *“I can’t stop a climate change, how much can I worry about everything.”*; *“There is a problem of priority and there is a problem of internalizing bad cost. That’s all externalized. The water will take care, the trees will take care, the frogs will die but it’s not my problem.”* At the same time organic farmers feel as if they create their surroundings: *“As an artist I look at this piece of land as a piece of art. Not piece of art but something I work on over years to create something out of it just by staying out of the system and creating something within my place. I think I am doing society a favor just by creating more greenery or keeping more water and bringing more wildlife.”*; *“We are not doing this for our own personal gain. We are caretakers of the land. That’s one basic understanding when you’re organic farmer you take care of the land so that the next generation has land.”* It is not just about believing in one’s responsibility, but willingness to take it: *“When you do your own things you have to take responsibility for things that you do. When you do things that all the other is doing than you don’t have to carry much responsibility. If you are organic farmer you have responsibility for what you do, if you have the chemicals you call the company you say I have fungal problems they make a test on fungal and they say ok, you’re going to spray FX50 to that and then it’s done finished. And you don’t have to think. When you are organic, you have to start thinking when you have problem.”* If person does not believe he can influence environment either negatively or positively there is no reason for him to change his practices if otherwise he is content with what he is doing

Relationship with nature. Organic growers tend to identify themselves with the nature: *“I have animals I have dogs and I don’t want them to be put through this [chemicals] as well.”*; *“Insect life and birds because they also need place, they habitats are going fast, so I have some kind of relationship with nature.”* When there is relationship with the surroundings, observation is also higher. Initial push for some farmers to go organic was the observation of the effect chemical makes: *“Horse had eaten some kind of fertilizer or pesticide they put on the plants and it died. Because it chews on grass right. So that moment he decided to stop and convert the whole thing and no more chemicals on the farm.”*; *“I have sprayed myself and I’ve seen what it does, to my health, to surroundings.”* When farm owners themselves don’t work in the farm or if they work using conventional equipment they tend to lose the touch with the soil, with what is going on on their own land, thus making it difficult to observe impacts their

practices are doing: *“Farmers sitting two meters above the soil. They don’t even touch the soil all day long. When they work on the field they don’t even touch the soil.”*; *“With so many years of chemical farming you lose the picture completely.”*

Social circle. Respondents doing conventional had one or two acquaintances who are organic. But I got access to the conventional growers through the organic, therefore it is likely that case where conventional growers are involved with organic are exceptional: *“He is the only organic I know. I know him from 4 years old that’s why I come here, otherwise I’d call him an idiot.”* Organic growers are mostly involved with other organic growers. And they mostly were surrounded by this kind of people before they went into farming, they met organic farmers through their professional carriers, family relations, etc. What a person sees throughout his life forms his beliefs and opinions, if he was brought up by father who owned organic farm and had certain life philosophy, he will be more likely to grow organic himself: *“For me this is what I’ve seen from the time I was small. What my parents were doing and other. So obviously this is what is right to me. His dad has been organic and he wants to become that. So that’s what we have been exposed to from the time we were kids. That’s what defines what is right what is wrong and what should be done. That’s how our mindset is made.”* Big part of farmers have inherited their land from their parents, therefore frequently they have to divide it among brothers and sisters. Among respondents the situation was found where one of the brothers who inherited part of plantation turned organic, others not willing to be organic are giving him pressure for practical reasons as they cannot use the same facilities and new have to be built and for social reasons as well.

Complexity. Even if one has attitudes, worldviews and conditions favorable to organic farming if he cannot handle complexity farm may easily fail: *“How your one does organic versus his neighbor maybe very different even for the same tomato. Someone maybe on higher input someone low. Someone might mix things differently. So it’s so different, you actually look at your own land and work out for organic. That gets really tough to handle especially if you are not able to handle complexity. Most of organic farmers deal with complexity well. For new comers you don’t know it.”*

Competition. Probably it is quite natural for person to strive to be better at the activities he is doing. In the area dominating measure for being good is kilograms per acre. Quality is valued less: *“Like if my neighbor is producing applying fertilizer if he is producing so and so tons per acre and I produce less than this will result in feeling inferior. Loosing face.”* This

may be due to the fact that quality is less obvious than the quantity: *“You cannot see the chemicals on the grains. So that is not something that can convince others. You see quantity of it, not the quality.”* This creates social pressure and requires extra energy to resist or personal development not to care: *“And people are laughing at your pepper, you see it’s just few, people used to come and I was very embarrassed because they start telling this is not right that is not right without understanding that I try to do it slightly different. And then you get very effected by it and then you want they tell you so then you are like a pendulum swing.”*

Society and organic agriculture. In farmers opinions being farmer is respected by the society: *“You’re farmer. In Hindi they call it prince of the earth. It’s a good status anyway if you are farmer.”* But this is seen to be valid for older, traditional generation, the new generation has other preferences and look to farming differently, giving value to corporate jobs. When manual labor is not valued in society and its importance neglected type of farming practices loses their significance as well: *“It means work difficult work. Everybody in India what is very very sad is that nobody wants to work anymore. Everybody wants to sit behind the computer or be manager.”* Most of the people seem to not comprehend the difference between organic and conventional: *“They think it’s good, but I think they cannot relate what it is in the holistic difference between organic and not.”* Organic is seen as something exotic. Chemicals used for farming in local language are called medicine, interviewed organic farmers think that common people do not see the problem, do not consider it. It is possible it can be because biggest value most of the Indian people gives to the money: *“Majority of the society is so much in their daily running after money they cannot concern about organic farming or not.”* General Indian public seemingly is uneducated in any sustainability issues. One of organic farmers made a presentation in few of Rotary clubs, where people supposedly are more educated, and she found that they were not aware: *“Lots of people just didn’t know the issues. Plastics in the ocean, hormone disruptors. Nobody knows. It was a first time they ever heard of something like that. What actually struck them was food and environment links, because ultimately it’s something that affects most of us. Not everybody realize that chickens have antibiotics. Even doctors didn’t know. I say about 60 percent of antibiotics in India are used on farmed animals.”* But farmers do see new group forming in the cities where people being more educated understand the difference and value organic. There is also issue of the casts, and rich – poor. Different social groups tend not to communicate with each other what prevents information from spreading: It is easy to get influenced by the majority. If majority of society is not aware of significance of natural farming, or sustainable life in general, farmer himself must have some

exceptional character qualities, experiences or education to understand the importance. And when society is aware it creates pressure and eventually sustainability becomes a norm. Therefore awareness in society is important in creating attitudes of farmers in choosing the type of practices.

Measures

For mitigation of change farmers recognize some measures to be implemented. Some of them are putting effort to implement those measures themselves.

Markets. Organic growers feel that both the consumer and the conventional farmer are not educated about drawbacks of conventional practices. They believe negative effects of farming should be more publicised, and effect and cause linked: *“So first you have to have causality among your family, or food positioning or chemical poisoning and then maybe they will think. But the problem is how to prove that. There were story of people in this area dropping dead while applying pesticides. It needs to be highlighted. It needs to happen more so that they understand.”* Most of the growers tend to carry out this task. They chose different ways depending on skills, character tendencies and occupations. Some would make public presentations and be involved in it through the social work. The others as the providers of hospitality services would tailor their service revolving around sustainability and natural ways of producing the food that way educating the tourist. And the rest just speak about it with their acquaintances. However, it is seen that it is not done enough to reach an understanding: *“There are no spoke persons in organic for Coorg, there are strong spoke persons for other places.”* Half-jokingly half-serious ideas were expressed as to rather putting label on organic produce stating that it is naturally grown, put the label on chemical grown produce informing about all the health and nature hazards. The aim for this effort of education is that the person educated on side effects of chemical intensive practices will naturally demand clean product that way creating market and making pressure. There were ideas to include hidden prices in the price of the product and thus making chemically grown produce more expensive creating higher demand for natural.

Economic factors. Conventional growers believe making organic economically viable is close to impossible and organic growers’ experience it is indeed more work to get the same amount of economic benefits while doing organic, especially in the initial years. Organic farmers believe that government should provide incentives at least equal with what it provides

for conventional – subsidizing inputs for organic, or stopping the subsidy for conventional. They also have practical ideas how to make organic more economically profitable for farmers and the wider group of people, not necessarily directly involved in farming. One of that kind of ideas expressed was making gas from organic waste of households, vegetable and fruit markets and provide composted material to growers. The other kind of idea was supporting new natural growers: *“It’s a matter of growing support lines. Even those people they can become organic if some group is around who immediately as they turn number one gives them advice, make sure they don’t make big mistakes and number two pick up all their produce. Right from the day one. As a conversion product. At a better price.”* Adding value by making end product.

Knowledge and information. Information about organic cultivation and technology organic farmers see as lacking. Even though great improvement in information from research, books and internet is seen, they believe there should be more information and practical training provided from government, NGOs and farmers themselves: *“So they formed their own small groups and they helped each other out. So here we should do that more often I think.”* However there are self-organized workshops are currently going on, farmers have meetings to share the knowledge, one of the farmers had meeting in her house just few days before interview about biochar. They believe if they reach good results on their own plantations they could provide solution for all the region through making training with the example of their own land, or even to open schools.

Policy. As mentioned above government is expected to create incentives for organic farmer in economic terms, extension programs, information sharing and shift from favouring conventional practices to natural. Farmers do not want to pay more to say they are natural, they think farmers who harm environment should pay the price. Conventional growers mention that support during conversion period are necessary, otherwise it is too much of the strain to even try. Some organic farmers saw whole of political-economic system as unhealthy and causing the degradation of the environment. They believe governments’ role is to change it: *“If you don’t give proper framework you see what happens. Capitalism is gone bonkers. They just eating everything they are just killing this planet. No responsibility. Zero. Only positive balance sheet.”*

Characteristics. As we as a people create our own realities characteristics of farmer was being seen as crucial. Characteristics are being formed in the environment person is

growing up, therefore education in school and attitudes in society are of high importance in creating an aware mind to make sustainable decision in favour of a profitable one: *“You may ask probably to his teachers and to the environment which he grow up. In the end of the day we are all subject to our condition. How we grew up and what experiences we had. It’s all very relative.”* It is not the matter of the education of the farmer exceptionally, this is the society who influences this individual and it must be educated as well its attitudes in general towards farming in particular: *“Everybody now has to go to study. Bullshit this is bullshit absolutely wrong. Give respect to someone who can make water line. Or maison who builds a house. Make it a respectful work.”*

Chapter 5: Results and discussion

Factors affecting attitudes

There are some differences when comparing factors affecting attitudes found in theory with the ones found in the study. Some factors from theory does not apply in study, some do, distribution of importance also changed. Factors are summarized below.

Economic factors

In research based on theoretical framework looking at factors affecting farmers' decision, economy was being mentioned as the factor of probably the highest importance when adopting organic or other sustainable practices (Rodriguez et al. 2008; Sattler and Nagel 2010). This was found to be true in case of less well-off farmers who does not have any other sources of income and no funds for initial investment. Non adopters were also stressing economic factors, while adopters mostly didn't bring much focus to economics.

The *markets* were said to be crucial – if markets for inputs and outputs are not there adoption can be hindered significantly (Committee on Twenty-First Century Systems Agriculture, National Research Council 2010). Farmers perceive existence of markets in different ways. Conventional growers see markets as non-existent or as a small niche, and therefore considers this situation as one of main barriers not to go organic as they think it is not possible to get big enough price premium for organic, while organic growers see sufficient markets for their organic produce, feeling that they could sell more with price premium than they currently produce, and price premium is well sufficient to compensate and even increase profits for the decrease in crops. But they have to put extra effort in building and maintaining their market channels. Therefore markets are found to be important, but the perception of situation of individual grower depends on other factors as well.

The increase of *costs and investments* while doing organic was also frequently mentioned as an important factor as well as the period of conversion when there is no price premium (Rodriguez et al. 2008; Soltani et al. 2013; Fazio et al. 2005). In this research it was found to be true just in case of non-adoption, farmers would perceive investments to be too significant to make conversion. These investments involve initial investments as well as

increased maintenance investments such as need for more labour. In the case of adoption to organic direct economic constraints were much less important for farmers. *Policies* such as unfair support from government (subsidies for chemical inputs, non for organic) and output channels for products with short shelf life were mentioned, but investments were not seen as big barrier to adoption for organic growers. After conversion period some faced significant decrease in costs while doing organic, as soil became more fertile and systems were created for self-maintenance.

Farm characteristics

Biophysical characteristics in theory were frequently mentioned as at some conditions organic can be more successful than in the other (Fazio et al. 2005; Lee 2005). In some of interviewed farms the high rainfall damages crops therefore yield is lower than usual with conventional practices, therefore making it even lower with organic. Other than that growers didn't see biophysical issues in their plantations that could potentially prevent or encourage them for adoption of organic farming. Land in the area is fertile enough and is suitable for both organic and conventional practices.

Land tenure if the land is owned by someone else, farmers may be unwilling to invest in it long term and adopt organic (Fazio et al. 2005). All the growers owned their land, therefore I haven't observed the issue of land tenure.

Compatibility some organic practices may be incompatible with current farm systems thus creating resistance as it would need monetary, time and effort investments (Fazio et al. 2005). Conventional growers were reluctant to turn organic in a big part due to incompatibility of their current conventional systems with organic ones. Organic growers recognized substantial effort in a time of conversion due to incompatibility. Therefore incompatibility has been found to have negative relation with adoption.

Farm size in previous research was found to have impact on adoption, but results were inconsistent whether the impact is positive or negative (Knwoler and Bradshaw 2007; Sattler and Nagel 2010). In this study, farm size mostly was seen to have a negative impact on adoption. In few cases was mentioned as an obstacle for distance from labour who needs to change their practices. It was also thought to have more complex management when organic. But there were different opinions on this too – in one case big acreage in period of conversion

was seen as a safety net. While changing management systems it's just small parts of land would be converted keeping the rest conventional for income when yields from land being converted would drop.

Knowledge and information

In theoretical framework it was found that knowledge and information plays important role in organic agriculture adoption mostly in terms of technologies regarding organic practices. Information may be inaccessible, expensive both in regards to money and time thus creating resistance (Soltani 2013).

Accessibility. If information is not accessible on organic practices or the costs of acquiring it are too high adoption is said to be lower too (Nowak 1992). The information and knowledge factor was found to be valid in the area. Organic growers although seeing increased accessibility of information of natural farming acknowledges barriers to be faced in conversion, such as poor government extension services or limited knowledge sharing among growers. Although, the ones who did change their practices were able to find necessary information through other organic growers, books, internet, courses and schools. They are accumulating information to first hand experimentation as well. Conventional growers in this study were mostly not willing to make a change for more ideological or economic reasons, making accessibility of information not an important factor, as they stop one step before facing it.

Complexity. Knowledge basis for organic may be bigger than for conventional and more complex to manage (Nowak 1992; Lee 2005). In this study growers generally believed organic to be more complex and plantation specific, therefore grower must make time and effort investments to study the farm and create one's own knowledge system. It was found that information complexity can influence adoption decision positively as well, as farmers tend to find pleasure in doing research, understanding and creating systems.

Awareness. As mentioned in theory, to adopt practice growers first of all had to be aware of sustainable agricultural practice, its implementation, potential benefits and drawbacks. Lack of this information would create a big barrier for adoption (Soltani 2013). All the conventional growers knew about existence organic farming and some aspects of it. None mentioned lack of knowledge and information and limited accessibility to it as a barrier to

adopt organic farming system. In the study it was found that at this phase it is not the technology knowledge and information that is creating barrier. Conventional growers mostly tend not to see the necessity for organic farming, making the knowledge of organic farming technology irrelevant. They seem not to have understanding on how nature works, of its functions for farming and natural (including human) life in general and how they affect it with their practices. Some do not believe they affect at all. Few made similar examples of impossibility of organic product because of water and air pollution, not making the connection that it is their and similar practices that is the reason for polluted air and water. I found holistic understanding of themselves functioning in the natural and social environments not present among conventional growers. If one does not understand significance of nature and biodiversity and his role and impacts for it the question whether to change practices or not to organic would depend solely on economic versus required effort reasons. Awareness was found to influence decision positively.

Societal context and farmer characteristics

Sex, education, age. Demographic characteristics such as age, education and sex of a farmer and their impacts on the farming choice were studied before in many studies. During those studies it was found that farmers with specific characteristics were more likely to adopt or reject to organic farming. In this study I have found that such farmer characteristics as age, sex and education did not have any significant influence on decision for adoption. Both interviewed conventional and organic growers were from all age groups, either sexes, formally better or less educated.

Income is another factor said to influence farmers' decision. If farmer has income from another sources it supposedly creates him safety net to experiment with organic (Caswell et al 2001; Lopez and Requena 2005; McCarthy et al 2007). This was found true in my study as well. Many of organic growers did have other financial sources for their income and a liberty to fail in farming. There were few organic growers living from farming only, they all had more land.

Worldview. Many studies concluded, that beliefs, attitudes and worldviews of a person are to be a major influence on adopting or rejecting organic farming (Quinn and Burbach 2008; Lopez and Requena 2005; Lappe 2009; Lappe and Rensburg 2011). Worldview was found to be very important. All of the interviewed organic growers had a worldview that stressed

importance of nature and human relation with nature, low impact lifestyle, monetary income as of the secondary importance. While conventional growers considered success in monetary terms only. Worldview also involved different philosophy of life, concept of wealth and the feeling of personal responsibility.

Societal context. Farmers decisions are influenced by the context they are in. If society in general and local community, family, friends are resistant farmer may be also likely to resist organic (Fazio et al. 2005, Toumisto 2005). In this research this factor was found of importance. Generally, social awareness is not high in area about organic produce, but the organic farmers were exposed to the ideas of organic farming, or sustainable living from their social circles, while conventional growers would tend not to have people with such ideas in their immediate social circles.

Figure 6 bellow shows factors found in theory that were valid in this study as well and their either potential positive or negative impact on adoption of organic farming. Land tenure, information accessibility, sex, age and education seemed to have less of the impact on the decision than it is stated in previous research.

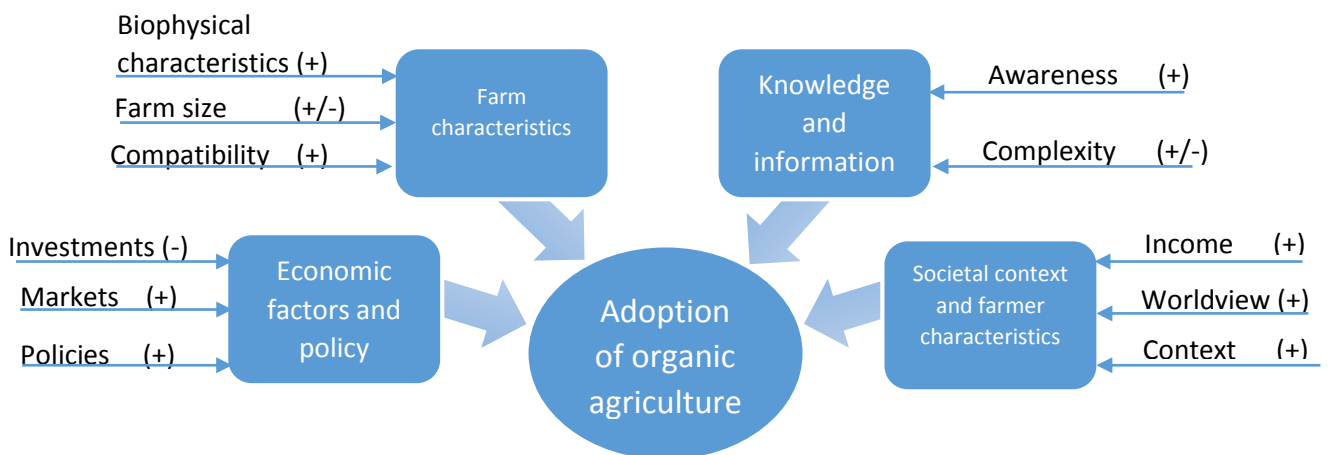


Figure 6: Revised factors for adoption of organic agriculture (made by author)

Organic farming as innovation: low level of diffusion

According to innovation diffusion theory decision to adopt to organic farming will depend on the few characteristics of it:

Few relative advantages of organic farming & these are not necessarily economic.

The farmers mentioned few different relative advantages of organic farming. Although monetary advantage didn't occupy exclusive role in organic farmers minds, they could sell organic product with 30 percent price premium and some premium for conversion products. They mentioned having some control over the prices and are less dependent from external inputs, of which price is increasing, as all of them tries to create inputs as most as possible themselves. While farmers observe pepper yields to be the same as the conventional in short period of time - it can bring more profit with price premium, coffee brings less monetary profit. And there is little support through the period of conversion which makes it expensive. There is support for conventional throughout for inputs and no support for inputs in organic which is also an extra expense. Labor increase in operations brings costs up.

As organic in the region is in early stage of diffusion, market channels, government support, extension services and other factors are underdeveloped, economics in monetary terms can hardly be a motivation for adoption, but as it gets in later stages, economic returns most likely will be at the easier reach and will potentially motivate growers to have organic management systems in their estates.

Identification aspect is another important relative advantage. Organic growers were able to identify themselves as being "*out of the system*" with organic, being capable of leading simpler life, being relatively free from consumerism. Freedom was mentioned frequently throughout interviews as freedom from practical things as inputs for farm and for the individual, as well as social such as freedom from opinions. They also believed being stewards for the nature and bringing some benefit for nature and future. At the same time conventional growers were proud of the status they created with their methods of farming, being successful farmers in terms of high yields and profits being able to enjoy some luxury and lead a social life of economically successful man.

Another advantage, which was presumed as very important, is personal satisfaction about the work itself, quality of the output, and the identification with environment. Organic farmers were content to sell chemical free product, at the same time keeping balance in the

nature and preserving it for the future generations. They were pleased to maintain connectedness to soil, and living organisms on their plantations. Their knowledge and understanding of natural systems working in farm and in nature also brought personal satisfaction.

Social advantage was also observed. Organic farming was seen to create stronger bonds in communities in few levels. It would create bonds among farm workers and farm owners as they have to adopt natural farming ideas. As farmers are dependent on each other for knowledge and information on organic farming they would organize get together, practical sessions, create systems of barter to share expenses what creates new social structures. As they are usually interested in sustainability in general even wider social networks are created.

Non-adopters were seen as motivated by monetary motivations. Conventional growers saw organic having no market to get price premium, being risky with too big investment of time and labor. Meaning that they don't believe they could make profit with organic, only with conventional. They saw the government policies as unfavorable for conversion as well.

Low practical compatibility between organic and conventional farming: new set of values required. While organic farming is complex, high knowledge system with risks, compatibility was the deciding factor for adoption. The organic farmers have the faith in this kind of farming and “*couldn't sleep at night*” if they were to use conventional methods in their practices. They all were sure of their choice and knew they wanted to do organic because of their belief system, values and experiences in the life, seeing consequences of conventional methods either through first-hand experience, or observing other growers. Conventional growers place a strong value on increasing production and therefore profit and see preserving the land as value conflicting with production value. Organic farming may be compatible with conventional growers needs as it preserves the land, biodiversity and ecosystem services which are essential to their farming, but farmers are not aware of impact of conventional practices.

High complexity calls for education and standardization. All the farmers perceived organic to be information based farming system being more complex than conventional one. It has to be studied and well understood in order to be effective. According to organic farmers, the system is not yet created for this locality, therefore farmers have to develop their systems themselves, through self-education and experimenting, while conventional was seen as being done “*by the book*”, meaning that is much less complex for the farmer. Conventional growers were mostly taught farming by other growers from their networks who uses conventional

methods, standards provided by government, which are mostly designed for conventional practices – this limited education can make misconceptions of high complexity in organic farming and difficulties to change the knowledge basis.

Triable and observable, no one to put the effort and show it. All of the organic farmers have observed organic practices on the other organic farms before they implemented practices on theirs. All of the organic farmers indicated being part of either formal or informal organic growers network, which according to them are important source of information and observation. However most of conventional growers and representatives of governmental body Indian Coffee Board stated that they haven't observed any successful organic farms. Conventional growers and Coffee Boards networks involved very few organic growers therefore observability was more complicated when they do not have a chance to face results and processes of organic growers reached by their immediate connections. Some of organic growers experimented on small scale before turning bigger plots - it is easily triable activity, but it needs extra time to bring maximum yields and extra effort to make system work. One conventional grower and governmental organization Coffee Board had small patch of organic but didn't wait enough to get the highest yields. As Coffee Board discarded their experiment with organic coffee on their plantation, growers have ability to observe the methods and results of organic farming only in other private plantations, that way making it more difficult.

Summary. All above shows possible reasons why adoption rate of organic is not high in the area. As farming organic coffee in the area seen as not having relative advantage in monetary terms, while for conventional growers does farming mostly for monetary reasons, is complex and is in line with values and norms which may be relevant for some conventional growers, but the connection is not understood yet and although possible to observe and trial, difficult to do so, due to long period of conversion and few organic growers in the area, it is no surprise adoption is being slow. For greater rates of adoption conditions must be changed so that the factors influencing adoption would be more favorable.

Organic farmers who consider themselves to be one of the first in the area started their organic operations at more than 20 years ago. All of those respondents either are foreign themselves or were travelling extensively. One was German, the other Swiss, they both learned about organic in their home countries where this type of farming came earlier and was more known and practiced. The first one to start organic was well traveled Indian who brought his knowledge about organic from abroad too. Later adopters who I have interviewed learned about

practices from NGO's or from their social circle. Observability played important role, farmers learned from other growers seeing their farms and now organic growers say that if they show good results, conventional growers are ready to adopt some of their methods, even when they think that conventional methods currently are superior to organic ones. As organic farming is complex activity, communication channels that are interpersonal seems to be most important. Information in area is shared with homophile people – organic growers interact with mostly other organic growers, conventional with conventional. Therefore, there are separate channels of communication for organic and conventional growers making diffusion more complicated. All interviewed organic growers has qualities of innovators such as venturesomeness and capability of coping with high degree uncertainty.

Factors and innovation diffusion

Both innovation diffusion and factor theories was found to have explanatory power for each other. Relative advantage, compatibility, complexity, trialability and observability can explain why and in what way some factors are important to growers when they consider adoption of organic farming and vice versa.

Relative advantage can be of the help when explaining the importance of economic factors. The findings in this research relate with theory in a way that economic factors influence adoption, but if there is relative financial freedom, economic factor may or may not lose its weight in decision making and concepts of the decision maker are of very high importance when weighing relative advantage. Although organic do strive for better economic performance, some are even willing to continue organic farming even with negative balance in terms of economic returns if they perceive other costs to be high with conventional farming. By the adopters the relative advantage was seen and bigger importance was given to other aspects of organic farming. While non-adopters would account only direct expenses and profits, organic growers would include non-direct long term prices such as soil degradation, nature pollution, biodiversity extinction and others. They also tend to see intrinsic value of the nature, without any direct use for them and damage to the nature take as an economic cost, thus seeing relative advantage of organic farming that doesn't bear these costs. Thus it can be said that importance of economic factors of individual farmer is closely related to farmer psychological characteristics.

Importance of societal context was based on trialability and observability. Organic growers were introduced to the practices and results in their social circles before adopting organic practices themselves. When having organic network, growers were exposed to practical examples of different technologies, the outcomes of different systems they had a proof of effectiveness of sustainable farming systems. At the same time conventional growers mostly seemed to have none or very little people in their social circles who would introduce the knowledge to them and show the results. Therefore they are not be able to observe positive results of organic farming. In this situation where direct observability is out of reach, conventional growers created negative misconceptions about organic farming.

Social context was also of high importance when building worldview of the farmer and thus increasing compatibility of chosen practices with belief systems, values and experiences. Innovation diffusion theory revealed the importance of compatibility with one's belief system, values and experiences. Also if farmer was exposed to information about organic farming early, seemingly he will more likely adopt that farming systems as it will be compatible with his knowledge. Innovation diffusion theory revealed character qualities of adopters such as venturesomeness, individuality. Organic growers seemed to enjoy being "different" and "out of system". Both conventional and organic growers tend to identify themselves with their work, therefore making their ideas of the world and themselves compatible with their practices. Worldview was crucial as it was building values of the decision making and, therefore, concept of relative advantage, attitude towards complexity, made compatibility possible or impossible. In context of diffusion theory this makes worldview one of most important factors when it comes to adoption of organic farming.

Chapter 6: Conclusions

Conclusions

Organic agriculture being natural production management system enhances biodiversity, soil biological activities and biological cycles. To reach this the use of synthetic inputs is prohibited. Recently, the role of organic agriculture is increasing worldwide as problems caused by conventional agriculture are some of the biggest global issues, being addressed throughout the nations. It is undeniable that the individual grower is an integral part in answering these problems as they are ones who decide about the implementation of sustainable agriculture. The research is focused on the influences on the farmers' decision and opinion on whether or not to follow organic agriculture systems.

In order to answer the research question “*What are attitudes and factors influencing those attitudes of local farmers towards organic farming in Madikeri, Karnataka state of India?*” the main factors were discussed within theoretical framework of previous studies. Theoretical framework provided number of factors affecting attitudes of growers towards organic farming, which were grouped into four categories. To give deeper insight innovation diffusion theory was applied onto these categories. The factor groups were – economic factors and policy, farm characteristics, knowledge and information, societal context and farmer characteristics. During empirical study each factor was investigated afterwards. When having discussion of the results empirical findings were analysed by comparing factors found in theory and in this study and later by applying innovation diffusion theory to explain the importance and influence of those factors on the farmers decision whether or not to adopt the organic farming system.

Economic factor was found to be important for organic farming systems adoption up to certain extent. For small growers with little means economic factor was found to be of the main importance. Either bigger organic growers or those who have incomes from other sources didn't see monetary economics as a driving factor for their adoption. While bigger conventional growers saw it as a driving factor for non adoption. Therefore researched showed that concept of economics is closely related with worldview of the grower.

Farm characteristics were found to be not of high importance.

Knowledge and information for adoption was important in a way that farmer understand agricultures role, impact on the natural world including themselves. Function of natural world. The difference between adopters and non-adopters in regards to the knowledge and information was the holistic understanding. Adopters would hold the understanding frequently based on their own experiences and observations how conventional and organic agriculture affect the world, while conventional growers would not possess this knowledge. If this understanding was reached, growers were willing to address the issues of information complexity and accessibility.

Demographic farmer characteristics were found as not important except income from other sources, which gave freedom for experimentation. However, worldview was found to be extremely important and interconnected with other factors, being a base for farmers' priorities and concepts, which would influence their view and actions regarding all the other factors. Societal context would help in building this worldview, as well as in ability to observe the outcomes of other growers.

The phenomenon of adopting to organic practices is multifaced and complex. Factors cannot be studied separately, as one is being influence by other. The observations in this study were made by using two theories complimenting one another and therefore allowing to see the connections between different factors, reasons behind it and therefore reaching better understanding of the issue. Any complex phenomenon calls for pluralism of the theories to be applied in a research this way bringing possibility for effective measures to be implemented.

Research contribution and further research

The research presented in this thesis contribute to general literature on why growers adopt or do not adopt to organic farming practices. The challenges are many research can help some of the dilemma by providing understanding when sculpting legislation or education programmes. Adoption to organic farming has been researched continuously, but this research brings in new perspectives in combining two theories – mainstream theory addressing factors and innovation diffusion theory.

The topic of research can be further studied in terms of behaviour change and adoption of organic farming under influence of factors identified in this study. Study can be continued in other regions of country with different crops as adoption in food crops is also low, even the

good yielding using organic systems tend to be reached easier than with coffee. In addition it might be relevant to conduct a more extensive study on the interlinkages between factors as it was found how important is the influence of one factor to the other, for example worldview to economic. By developing the model further it could be applied for other kinds of innovations.

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Appendix 1: Interview guide

Name:	Acreage:
Farm:	Rainfall:
Birth year:	Major crop:
Year when started farming:	Minor crops:
Education:	Fully organic/ conventional/ organic + conventional

1. What are the reasons to manage farm organically/conventionally?
2. What issues do you face in your practices (biophysical, markets, legislation, economic, community pressure, etc.)?
3. Are you pleased with your economic situation?
4. What is importance of biodiversity? General? In farming?
5. What do you think is your role in the society?
6. What do you think are the main reasons for other farmers not to turn/ to turn organic?
7. What do you think is the status of conventional farm owner in society? Of Organic?