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Winegrowers' motives and barriers to convert to organic farming in Pfalz and Rheinhessen, Germany

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Winegrowers' motives and barriers to convert to organic farming in Pfalz and Rheinhessen, Germany

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Abstract:

Agricultural practices play a crucial role when discussing sustainable development in the world. Organic farming is a possibility to increase the overall sustainability, because it balances the environmental, economic, social and productive spheres better than conventional farming. Thus, Germany strives to have 20 % of the agricultural land organically certified. However, with current organic farmland at 6.2 %, the goal is far from being reached and conversion rates are slowing down, whereas organic viticulture indicates more successful conversion rates. Thus, the objective of this study is to investigate which motives and barriers wine farmers in Pfalz and Rheinhessen, Germany, have to convert to organic farming. Furthermore, it is explored which role one of the world's biggest retailers, Systembolaget, plays in the decision process to produce organically or not. The study was carried out reviewing literature and through a questionnaire and interviews with, in both cases, eight farmers from the regions of which four were certified organic and four were conventional farmers. Moreover, the five capitals framework, which attempts to assess livelihood strategies, was applied to analyze findings. Results indicate that most motives for organic farming identified in the literature could be placed in the financial, social and human capital, whereas the questionnaire and interviews found as many categories in the natural capital. Barriers to convert to organic farming were most frequent in the natural and physical capital both in the literature and the empirics. However, the findings suggest that a focus lies on the financial and human capital, in which the economic situation and the ideology of a farmer played a crucial role in the decision process. Systembolaget plays a supporting role in the conversion to organic farming, but it is not the driving factor in a conversion process. The findings indicate that policy could consider revising financial support schemes, address ideological barriers against organic farming and decide on the use of copper. Moreover, the organic label as marketing tool could be stressed and the influence of the private sector could be acknowledged in order to reach the organic farmland goal of Germany.

Keywords: Viticulture, five capitals framework, Systembolaget, sustainable development, Rhineland-Palatinate.

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Public Summary:

Agricultural practices play a crucial role when discussing sustainable development in the world, because it makes up more than one third of the ice-free surface of the world. The impact such a large share of land can have on the sustainability of the world, such as biodiversity, climate or services ecosystems provide, is crucial. Organic farming is a possibility to increase the overall sustainability, because it balances the environmental, economic, social and productive spheres better than conventional farming does. That means that it is not focused on high yields and nutritional quality only, but also on other aspects such as biodiversity or human exposure to pesticides. Thus, Germany strives to have 20 % of the agricultural land managed organically certified. However, with current organic farmland at 6.2 %, the goal is far from being reached and conversion rates are slowing down. However, organic viticulture in Germany indicates more successful conversion rates.

Hence, the objective of this study is to investigate which motives and barriers farmers in Pfalz and Rheinhessen, Germany, have to convert to organic farming. Furthermore, it is explored which role one of the world's biggest retailers, Systembolaget, plays in the decision process.

The study was carried out reviewing literature and through a questionnaire and interviews with, in both cases, eight farmers from the regions of which four were certified organic and four were conventional farmers. As a frame to analyze findings from the literature and the empirical part, the five capitals framework was applied. This framework attempts to assesses livelihood strategies and in this case lifestyle choices as it can, with relatively many resources, be focused on more than only survival.

Results indicate that most motives identified in the literature could be placed in the financial, social and human capital, whereas the empirics found as many categories in the natural capital. Barriers to convert to organic farming were most frequent in the natural and physical capital both in the literature and the empirics. However, the findings suggest also that a focus lies on the financial and human capital, in which the economic situation and the ideology of a farmer played a crucial role in the decision process. Systembolaget plays a supporting role in the adoption of organic farming, but it is not the driving factor in a conversion process.

The findings indicate that policy could consider revising financial support schemes, address ideological barriers against organic farming and decide on the use of copper. Moreover, the organic label as marketing tool could be stressed and the influence of the private sector could be acknowledged in order to reach the organic farmland goal of Germany.

Keywords: Viticulture, five capitals framework, Systembolaget, sustainable development, Rhineland-Palatinate.

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Acronyms and Abbreviations

CAP	Common Agricultural Policy
DFID	Department for International Development
EEA	Agreement on the European Economic Area
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
SID	Society for International Development
UNDP	United Nations Development Programme

Key Terms

Conversion	Conversion of conventional to certified organic farming after Council Regulation (EC) No 834/2007.
Organic farming	Farming which is certified after the Council Regulation (EC) No 834/2007.

1. Introduction

Agriculture plays a critical role in how the world is shaped today in terms of biodiversity, climate and other ecosystem services provided by terrestrial ecosystems (Hassan *et al.*, 2005). Cultivated biomes cover not less than one third of the ice-free surface on the Earth (Ellis and Ramankutty, 2008, p. 4410; FAOSTAT, 2015). Therefore, the impacts of agricultural practices are important to consider when discussing sustainable development.

The most accepted definition of sustainable development was developed by the Brundtland commission in 1987 stating that “[s]ustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (United Nations, 1987, p. 37). In spite of all criticism this definition has gotten (Robinson, 2004; Anderson *et al.*, 2012), it stresses that future generations should have the same abilities, so at least the same overall amount of resources that the current generation can assess.

Organic agriculture is among others one possible approach to more sustainable farming, because it balances aspects of productivity, environmental impact, economic viability and social well-being better than conventional farming (e.g. Reganold and Wachter, 2016). In the European legislation it is per definition a sustainable form of agricultural production, because it should “*combine best environmental practices, a high level of biodiversity, the preservation of natural resources, the application of high animal welfare standards (...)*” (Council Regulation (EC) No 834/2007, §1). Thus, organic farming is seen by the European Union as a way to protect the environment, but also to serve the purpose of strengthening rural development and providing the society with demanded products (Council Regulation (EC) No 834/2007).

All in all, organic farming with its principles can support a sustainable development, because it strives to preserve nature which is in line with the definition of sustainable development in which future generations should have the same opportunities than this generation has.

To increase organic agriculture, different political and economic actors recently promote organic farming. The government of Germany formulated sustainability goals of which goal 12b aims for 20 % organic agriculture of all agricultural area in Germany without specifying a set year (Federal Statistical Office, 2014, p. 42). Similarly, Systembolaget, one of the biggest wine purchasers in the world (OPERAs, 2015b) as the only retailer selling alcohol in Sweden, set a goal for 2020 to increase the share of organic products to 10 % (Systembolaget, 2015b). Wine surpassed this goal already, but it is still strived to increase it.

Despite the knowledge that organic farming can potentially be more sustainable than conventional farming and the will to promote organic farming in Germany, the conversion of conventional farming land to organic agricultural land is not as fast as wished for. In fact, conversion to organic slowed down during the last years and the German government evaluates the development of organic agriculture as too slow (Federal Statistical Office, 2014, p. 43).

In contrast to this general development in German agriculture, the organic wine sector in Germany has doubled between 2007 and 2012 and even though the overall level of organic farmland is still low, the conversion rates seem to be promising (Bund Ökologische Lebensmittelwirtschaft, 2014, p. 9). However, wine farmers face many challenges on a local and global scale from marketing to climate change (e.g. Koch *et al.*, 2013; Mozell and Thach, 2014; Fraga *et al.*, 2012). To meet these challenges, organic farming might be an asset, but it is only one aspect of many measures a farmer could take.

Thus, the objective of this study is to explore the challenges wine farmer's face further and investigate which motives and barriers wine farmers in Pfalz and Rheinhessen, Germany, have to convert to organic farming. This objective is specified in my four **research questions**:

1. Which motives and barriers to convert to organic farming within the EU are discussed in the literature?
2. Which motives do wine farmers in Pfalz and Rheinhessen consider in converting to organic farming?
3. Which barriers do wine farmers in Pfalz and Rheinhessen consider in converting to organic farming?
4. How does one of the world's biggest wine retailers, Systembolaget, influence perceived motives and barriers of wine farmers in Pfalz and Rheinhessen to convert to organic farming?

2. Organic Farming

This chapter will firstly give an overview of sustainability aspects concerning organic farming and why I am focusing on organic farming in this thesis about wine farming. Secondly, the legal backdrop from the European Union (EU) organic certification including regulations on wine will be focused on and finally, the development of organic farming in Germany is examined.

Organic farming aims to be environmentally friendly and thus sees a farm as an integrated process in which external inputs are aimed to be reduced (Best, 2009, p. 199; Reganold and Wachter, 2016, p. 1). Organic farming deals with: a balanced nutrient supply, biological and physical disease, weed and pest management, diverse flora and fauna, a biologically active soil, as well as diverse crop rotation, and crop health (Stockdale *et al.*, 2001). This serves the purpose of producing food, fiber or fuel to support human consumption as conventional farming does. However, it strives to minimize the environmental impact through fighting pests without synthetic products, diversification and rotation of crops and the improvement of the soils with natural products such as compost (Stockdale *et al.*, 2001; Reganold and Wachter, 2016).

Organic farming has a long history since it was developed in the early 20th century. The concept was first brought up in the 1920s and evolved in the 1930s and 1940s in Switzerland, England, the USA and Japan in response to a significant reduction in soil fertility and poor food quality leading to a crisis in farming (Vogt, 2007). However, a public discussion about organic agriculture only arose in the 1970s, in line with a growing public environmental awareness (Reganold and Wachter, 2016).

Even though the concept evolved almost a century ago, the benefits to humans and nature are still debated. A recent study from Reganold and Wachter (2016) analyzed studies from forty years of research on organic and conventional agriculture. The key finding is that organic farming meets sustainable development better than conventional farming by having a more balanced impact on ecosystems in terms of productivity, environmental impact, economic viability and social well-being (Fig. 1).

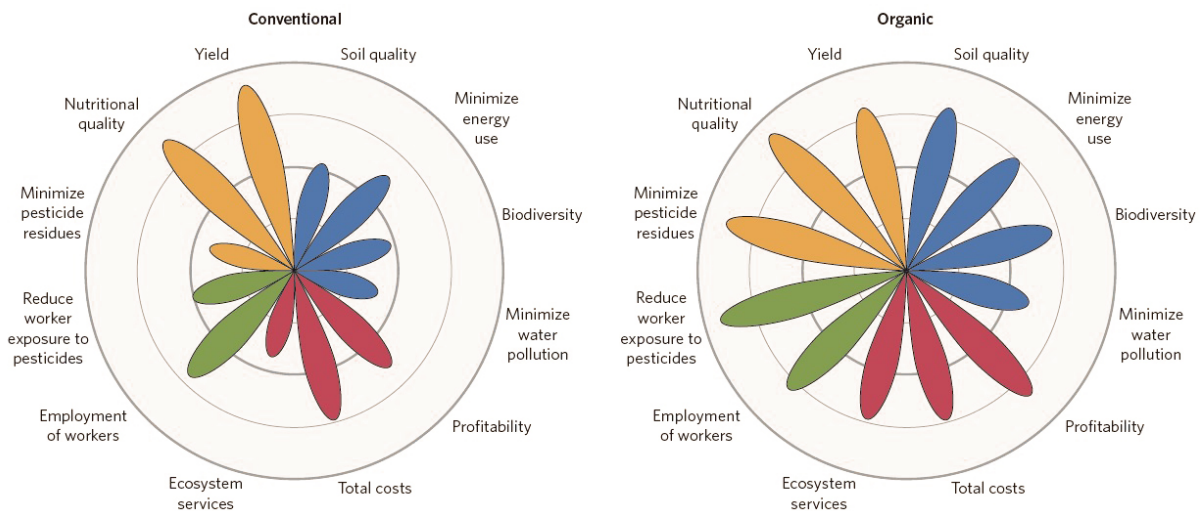


Fig. 1: Comparison of the conventional and organic farming-impact on aspects concerning productivity (yellow), environmental impact (blue), economic viability (red) and social well-being (green) (Reganold and Wachter, 2016, p. 4).

The authors showed that yields are 8 to 25 % lower in organic agriculture, but a key debate is still which implications this causes for feeding the world (Reganold and Wachter, 2016; Seufert *et al.*, 2012; Halberg *et al.*, 2006; Ponti *et al.*, 2012; Erb *et al.*, 2016). Erb *et al.* (2016), for instance, recently published a paper on scenarios how to feed the population of the world. One aspect they included in the scenarios was organic farming. However, the supply with organic food was only seen as feasible without more deforestation if vegetarian or vegan diets are adopted worldwide or farmland will be increased massively (Erb *et al.*, 2016).

Nevertheless, organic farming is generally considered as being more sustainable environmentally, economically and in part, socially. In terms of environmental sustainability, research showed that organic farming has the following environmental benefits: higher levels of stored carbon, better soil quality, less soil erosion, more faunal and floral diversity, as well as no pollution from synthetic pesticides (Reganold and Wachter, 2016; FAO, 2015). This is supported by findings in a comprehensive literature review from Reganold and Wachter (2016), but also from the Food and Agriculture Organization of the United Nations (FAO). The FAO has an inter-departmental working group on organic agriculture illustrating environmental benefits of organic farming touching upon soil, water, air and climate change, biodiversity and ecological services (FAO, 2015). It was found that organic farming is better for mitigating climate change than conventional farming (Scialabba and Müller-Lindenlauf, 2010; Gattinger *et al.*, 2012). Moreover, soil quality was to be found enriched soil organic matter with less erosion in organic farming compared to conventional farming (Tuomisto *et al.*, 2012; Mondelaers *et al.*, 2009; Gomiero *et al.*, 2011). The main reason for higher soil organic matter is that the input of it such as manure or compost is up to 65 % higher in organic farming systems (Tuomisto *et al.*, 2012). In addition, Rahmann (2011) concluded in a review of 396 related studies that biodiversity is higher in organic farming compared to conventional farming.

With regards to economic sustainability, there is some evidence that organic farming is more profitable and shows an increased benefit/cost ratio when premium prices are included in the calculation (Reganold and Wachter, 2016). However, without premium prices the cost/benefit ratio decreased and was lower for organic farming than for conventional farming as Crowder and Reganold (2015) concluded in a meta-analysis of a global dataset. It is noteworthy, that environmental externalities, so costs for preserving the ecosystems, were not included in the analysis. Moreover, significantly higher labor costs in organic farming could offset lower costs for synthetic products so that the costs were found to be comparable to conventional farming (Crowder and Reganold, 2015; MacRae *et al.*, 2007).

In the social sphere there are some indications that the community can profit from organic farming through development, more employment and more cooperation and interaction between farmers and stakeholders in a strive for local goods (MacRae *et al.*, 2007). Thus, rural development could in the best case be enhanced. However, the evidence is rather weak and has to be investigated further.

2.1 Organic Viticulture

Research for organic viticulture indicates similar findings as organic agriculture in general. A study from Germany showed that the productivity of organic vineyards was on average 35.9 % lower than in conventional farming with a slower growth of vines and smaller yields (Döring *et al.*, 2015). This fact is also supported by other research, for instance from Australia, which found the yields to be 21 % lower in organic farming compared to conventional farming with high inputs (Collins *et al.*, 2015).

Moreover, findings concerning the environmental sphere are contentious. Some research indicates that soil quality increases in organic farming compared to conventional farming. A study in Australia, for instance, showed that there were more soil organisms, such as earthworms, abundant in organic vineyards (Collins *et al.*, 2015). Coll *et al.* (2011) concluded that soil organic matter as well as soil microbial biomass increased in organic viticulture. It is furthermore stressed that biodiversity is higher in organic viticulture. Caprio *et al.* (2015), for instance, found that arthropod predators, which are naturally controlling pests and thus of high importance, occurred in higher numbers in organic vineyards.

However, there are also negative environmental implications found concerning organic viticulture. Firstly, research is scarce on the evaluation of greenhouse gas emissions (GHG) in organic and conventional viticulture. Nevertheless, there is some evidence that GHG emissions are not lower in organic farming (Longbottom and Petrie, 2015). Secondly, it was shown that soil compaction increased in organic farming and earthworm density decreased (Coll *et al.*, 2011). This is due to the fact that farmers need to drive over their fields more often to strengthen vines and for tillage compressing the soil more for every passage (Coll *et al.*, 2011). This is due to the fact that diseases and pests cannot be treated as effectively in organic farming as in conventional farming, so more prophylactic measures have to be taken. Finally, some research indicated that the heavy metal copper increases in the soil contaminating it as downy mildew can only efficiently be treated with copper salts, also known as Bordeaux mixture, in certified organic farming (Mackie *et al.*, 2012; Coll *et al.*, 2011; Martins *et al.*, 2015). Downy mildew is considered as one of the most disastrous

diseases in viticulture (Dagostin *et al.*, 2011). Research focuses now on a more efficient use of copper as well as on alternative treatments, but a replacement of copper is yet to be found (e.g. Dagostin *et al.*, 2011; Kuflik *et al.*, 2009).

Concerning the economic sphere, a lack of price premiums led to smaller gross margins in organic viticulture due to smaller yields but increased production costs (Collins *et al.*, 2015). In relation to the social aspects, a frequency analysis of wine sensory descriptions of a blind tasting revealed that organic wine was described as being more rich, textural, complex and vibrant and thus better than conventional wine (Collins *et al.*, 2015). Nevertheless, research on organic viticulture in the economic and social sphere is scarce and has to be investigated further.

I am focusing on organic farming in **this thesis** because there is evidence that it can be considered to be more sustainable than conventional farming. With sustainable, a better balance or a better distribution between the four spheres, the environment, social well-being, economic viability and productivity of farming systems is meant (Reganold and Wachter, 2016). Moreover, the benefits in the spheres are also generally higher (Reganold and Wachter, 2016). Meeting the challenge of feeding up to 10 billion people in the world while maintaining a good state of the environment is crucial for sustainable development and organic farming can be seen as one possibility, among many, to strive for this.

2.2 European Organic Certification

The regulation of the European Union for organic farming developed in the early 1990's and is still evolving. As a start, a financial support scheme was put into place in 1991 (Kallas *et al.*, 2010). It was an important part of the Common Agricultural Policy (CAP), which is a policy valid for all member states of the European Union (European Commission, 2014). Since 2007, there has been a new regulation on organic farming in the EU. It was set up by the European Council of Agricultural Ministers, replacing the earlier regulation from 1991 on organic production of agricultural products and indications (Council Regulation (EEC) No 2092/91 of 24 June 1991). With this regulation, a legal framework within the European Union to harmonize organic products was introduced. In the regulation from 2007 organic production is defined as an *“overall system of farm management and food production that combines best environmental practices, a high level of biodiversity, the preservation of natural resources (...) using natural substances and processes. The organic production method thus (...) delivers public goods contributing to the protection of the environment and animal welfare, as well as to rural development”* (Council Regulation (EC) No 834/2007, §1).

The regulation defines objectives for organic plant production and regulates basic elements of organic wine production (Council Regulation (EC) No 834/2007). At its core, life and natural ground fertility has to be ensured (IFOAM EU Group, 2013). This means that genetically modified organism (GMOs) and synthetic products are forbidden. However, some non-toxic measures which strengthen the health of vines are allowed such as natural fungicides, copper, sulphur or potassium bicarbonate (IFOAM EU Group, 2013). Moreover, the conversion periods set for perennial crops, such as grape vines, is three years (Commission Regulation

(EC) No 889/2008). If products are organically certified, the logo of the EU must be used according to the regulation (European Commission, 2015, Fig. 2).



Fig. 2: EU-organic logo which has to be used on certified products (European Commission, 2015).

In 2012, an additional regulation for **wine making** within the European Union was introduced (European Commission, 2016, 2012). The regulation on organic products in general is now complemented by a specific regulation for wine making (Commission implementing Regulation (EU) No 203/2012), which is a major step due to the fact that the regulation compasses now the wine production specifically (IFOAM EU Group, 2013; European Commission, 2012). Before, only grape cultivation was regulated. Thus, wine could not be labelled as organic, but as “made from organic grapes” (IFOAM EU Group, 2013).

With the regulation for wine making, new requirements apply in winery additionally to the mentioned aspects about producing organic grapes in the general regulation on organic farming (Council Regulation (EC) No 834/2007). These comprise restrictions on several aspects in the wine making process. Most importantly, higher restrictions on sulphites apply in organic wine making compared to conventional farming (Commission implementing Regulation (EU) No 203/2012). Sulphites are commonly used in wine making to preserve the wine and to protect it from oxidation (D'Amico *et al.*, 2016).

2.3 Organic Farming in Germany

The Federal Government of Germany defined sustainability goals in 2002, one of which was the promotion of organic farming. The goals to develop sustainably were formulated in the notion of thinking global but acting local (The Federal Government of Germany, 2002). Thus, 21 indicators were formulated addressing the themes of intergenerational equity, quality of life, social cohesion as well as international responsibility. Quality of life includes a goal to aim for 20 % organic agricultural land by 2010 in which organic agriculture is defined according to the European legislative framework (Council Regulation (EC) No 834/2007 and Commission Regulation (EC) No 889/2008) (The Federal Government of Germany, 2002, p. 113).

However, the aim to reach this goal by 2010 was far from being reached. Consequently, it was dropped and it is now defined as a goal “*to be reached in the next years*” (Federal Statistical Office of Germany, 2016, p. 22). Even though the total organically certified land in Germany is increasing, the conversion rates are considered as too low by the German government to reach the goal in an adequate time frame (Statistisches Bundesamt, 2016; European Environmental Agency, 2015). In a progress report, the Federal Statistical Office of Germany (2016, p. 22) reports that the share of total organic farming land amounted for 6.2 % meaning

that the organic share in agricultural land has to increase more than threefold to reach the goal. However, the conversion rates stagnated in the last few years and so it will take 40 years to reach the goal with the current rate of conversion (Federal Statistical Office of Germany, 2016, p. 22).

Within Europe, Germany sits with organic farmland of 6.2 % in the middle of the organic spectrum, with Malta having the least organic agricultural share (0.3 %) and Austria with the highest organic share (18.6 %, both 2012) (European Environmental Agency, 2015).

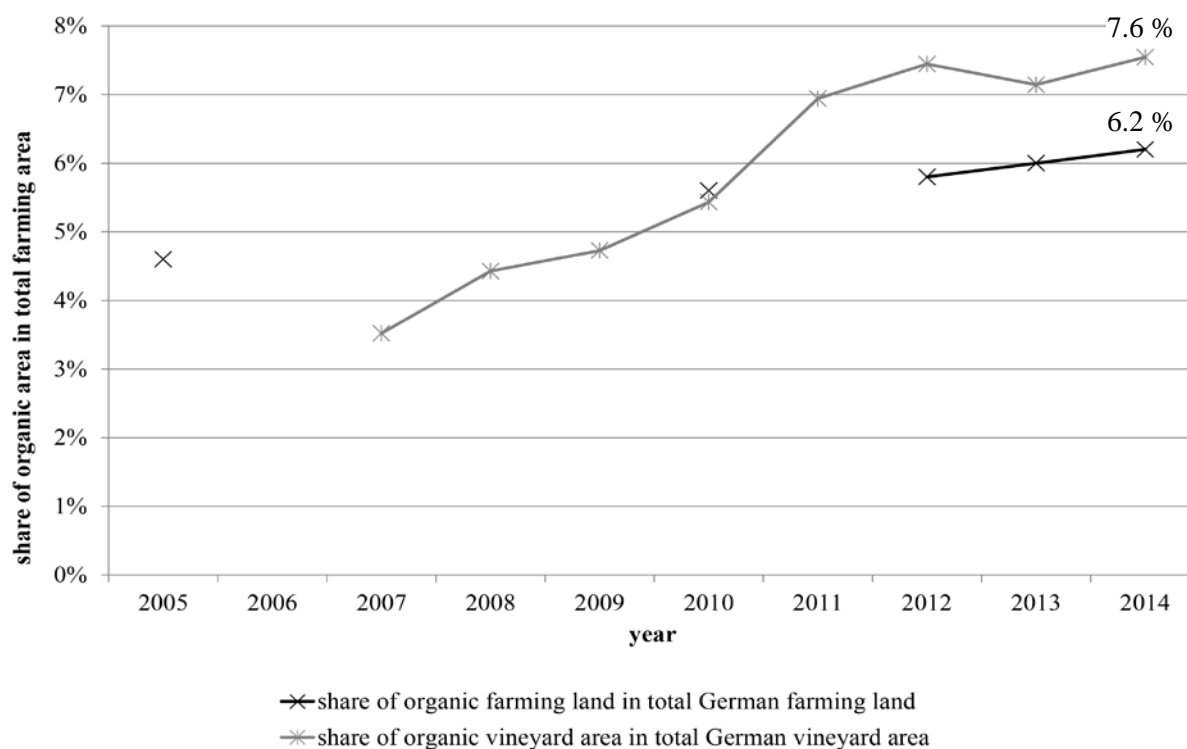


Fig. 3: Share of organic farmland in total German farmland (black line. Crosses are set where data were available) and share of organic vineyard area in total German vineyard area (gray line. Stars are set where data were available). Own illustration with data from Bund Ökologische Lebensmittelwirtschaft, 2014; Statistisches Bundesamt, 2016; Schaack et al., 2015.

In contrast to the slow development in German organic agriculture, the organic wine sector in Germany has doubled between 2007 and 2012 (Fig. 3) and shows thus conversion rates as strived for in agriculture in general, even though the overall levels are still low (Bund Ökologische Lebensmittelwirtschaft, 2014, p. 9). In 2014, vineyards accounted for 7.6 % of the total organic vineyard area in Germany (Bund Ökologische Lebensmittelwirtschaft, 2014, p. 8). This brings up the question addressed in this thesis, why the conversion rates to organic grape production are higher compared to the general organic agricultural development in Germany. If the total agricultural sector would develop like the organic share of vineyard area, the goal of 20 % organic share in agricultural land in Germany would theoretically be reached within 10 years. This makes it relevant to analyze the motives and barriers to convert to organic farming in the wine sector in Germany closer.

3. Case Description

This chapter will firstly introduce the study area and secondly, the Swedish alcohol monopoly Systembolaget. Thirdly, the cases which were investigated in this thesis is presented. Finally, how this thesis is embedded into the European project OPERAs is described.

3.1 Study Area

To acquire empirical evidence to answer research questions 2, 3 and 4, I focused my research on the neighboring wine regions of Pfalz and Rheinhessen (Fig. 4). I interviewed eight estates for this thesis, of which all are located in Pfalz or Rheinhessen, have vineyards over 10 hectares making them large-scale farms, and sell at least one wine at Systembolaget.

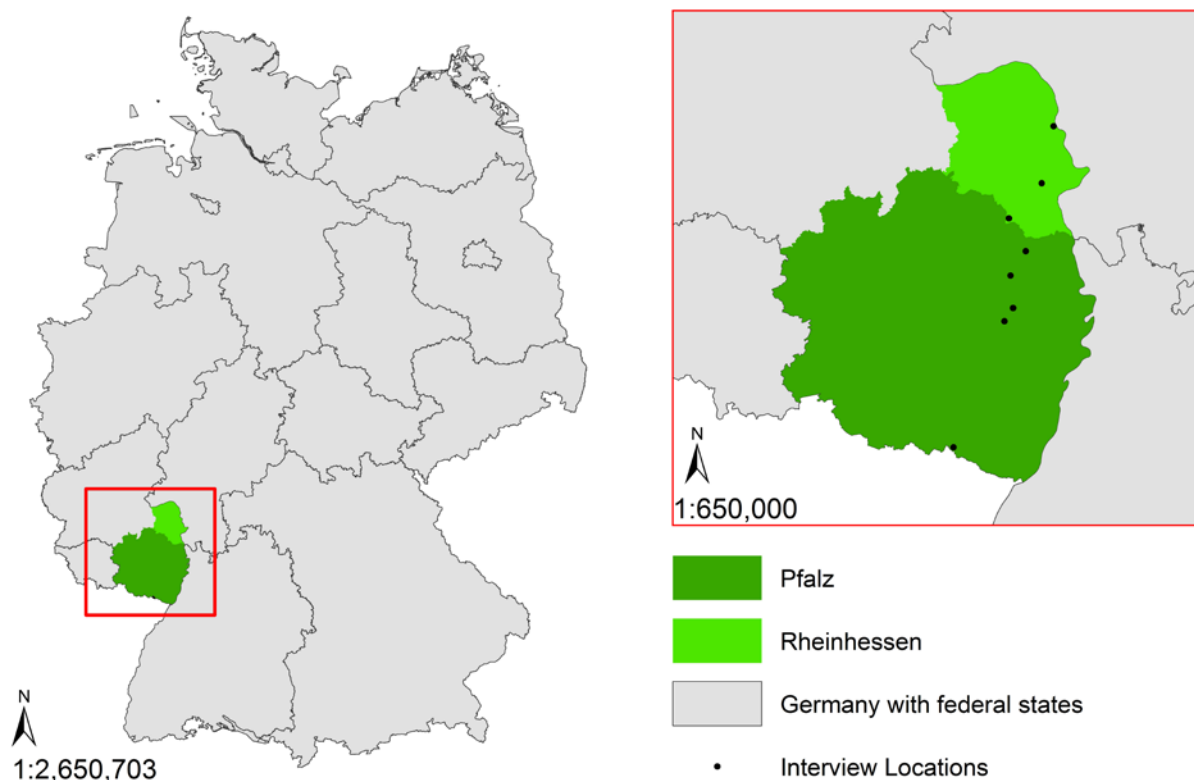


Fig. 4: Study areas Pfalz (darker green) and Rheinhessen (lighter green) in Germany (gray). Black dots illustrate the location of interviewed farms (own illustration with ArcGIS 10. Data sources: Federal Agency for Cartography and Geodesy, 2014, 2015; Statistisches Landesamt Rheinland-Pfalz, 2016).

Wine production in Germany is a noticeable cultural value even though it is relatively small in farming size and economic standing. Viticulture in Germany can be traced back at least till 370 when the Romans cultivated vines (Robinson and Harding, 2015, p. 314). With its long history and as a cool climate country with unique wines, the sector is of high cultural importance (Robinson and Harding, 2015; Koch *et al.*, 2013). In 2014, Germany ranked 10th in the world for the volume of wine it produced and the vineyard area amounted for only 0.3 % of the land area in Germany (after Deutsches Weininstitut GmbH, 2015, p. 14; FAOSTAT, 2015).

I chose the regions Pfalz and Rheinhessen because they are the two largest wine regions in Germany amounting for 49 % of the German vineyard area (Deutsches Weininstitut GmbH, 2015, p. 6). Pfalz and Rheinhessen are located in mid-west Germany and belong to the federal state Rhineland-Palatinate in which 42 % of all agricultural businesses produce grapes, showing the importance of viticulture in this federal state (Statistisches Landesamt Rheinland-Pfalz, 2012). That these two wine regions amount for almost half of the vineyard area in Germany while there are 13 wine regions in total (see Bundesministeriums der Justiz und für Verbraucherschutz, 2016 §3) shows the remarkable importance of this region for German wine production.

Moreover, it is important to consider how large scale farmers cultivate their vineyards. The landscape of estates in all German wine regions is dominated by small- and medium-scale farmers having vineyards smaller than 10 ha, representing 84.5 % of estates (Deutsches Weininstitut GmbH, 2015, p. 12). However, large estates account for 56 % of the total vineyard area, and so the large vineyards make up the biggest share of the vineyard area in Germany (own calculations after Deutsches Weininstitut GmbH, 2015, p. 12). In Rhineland-Palatinate, the vineyards that belong to estates with more than 10 hectares sextupled between 1979 and 2010 (Statistisches Landesamt Rheinland-Pfalz, 2015, p. 147). Thus, estates over 10 hectares amount for even 70 % of the viticulture area in the study regions Pfalz and Rheinhessen (after Deutsches Weininstitut GmbH, 2015, p. 12).

3.2 Systembolaget

In this thesis, I am linking the farmers and thus the producer-end to Systembolaget, because I want to explore which influence a big wine purchaser potentially has on motives and barriers of wine farmers to produce organic wine. As one of the world's biggest retailers and additionally a monopoly within Sweden, Systembolaget has the potential to drive sustainable development in promoting sustainable wine of which organic wine is one possibility. That retailers have an influence on sustainable supply chains was shown previously (e.g. Smith, 2008; Committee on Twenty-First Century Systems Agriculture and National Research Council, 2010). Thus, I am looking not only at the perceptions of farmers themselves, but also on the goals and influences in other steps of the supply chain, namely Systembolaget.

Systembolaget is a state-owned monopoly in Sweden with the exclusive right to sell wine, beer and spirits as a retailer (Systembolaget, 2015a). They have 436 stores in Sweden which were visited by 120.5 million customers during 2015 (Systembolaget, 2015a). Systembolaget's sustainability goals are sevenfold: they want to limit harmful effects of alcohol, want to ensure good working conditions in their supply chain, be responsible for ethics and anti-corruption, have competence, support inclusion, address climate change and improve the environment in the supply chain (Systembolaget, 2016a).

One goal regarding environmental improvements is the aim to sell 10 % organic products by 2020 (Systembolaget, 2016a). The goal to increase the sales of organic products by 2020 makes this a relevant case to look at in my thesis.

There is already an increase in organic wine sold in Systembolaget, with a doubling of the volume of organic wine sold in one year from 5.4% in 2013 to 10.8% in 2014 (Systembolaget, 2015c). It is not clear how the retailer defines "organic", but in an information brochure on

organic products, they identify the following organic certifications that they recognize among others: the European organic certification, which is the organic certification that this thesis focuses on, as well as KRAV, Sweden's best known organic label; Eco-Cert, an organic label; and Demeter, a label for biodynamic farming (Systembolaget, 2016b; Ecocert, 2016; KRAV, 2015; Demeter International, 2016). Systembolaget also has guidelines for organic products concerning the prohibition of using artificial fertilizers containing nitrogen and strict limitations on synthetic pesticides and fertilizers (Systembolaget, 2015c). The retailer argues that this will benefit biodiversity in the cultivation-ecosystem and diminish health risks for workers. To reach their goal, they request more organic wines (Systembolaget, 2015c).

3.3 Case Study

I interviewed eight farmers, who are all located in Pfalz or Rheinhessen, have large-scale vineyards over 10 ha, and sell their wine at Systembolaget. The estates were found in a database of Systembolaget online. For this purpose, a filter according to **Table 1** was used.

Table 1: Search options for identifying interviewed estates on www.systembolaget.se (2015-11-16).

Filter	Filter translated	Selection	Selection translated
Varugrupp	Product groups	Rött vin; Vitt vin; Rosé	Red wine; White wine; Rosé
Land	Country	Tyskland	Germany
Region	Region	Pfalz; Rheinhessen	Pfalz; Rheinhessen

With 18 wines from the identified estates available at Systembolaget (on 2015-11-16), these estates represent 13 % of all German wines sold at Systembolaget-stores. The estates that I interviewed stretch about 85 km in north-south extent. Whereas four are conventional farmers, three cultivate their grapes organically. One estate sells organic and conventional wines at Systembolaget. The vineyard area of the wineries varies between 11 and 86 hectares with a mean of 35.9 hectares and median of 27.5 hectares and they produce 110 000 to 600 000 bottles per year (mean: 260 000, median: 190 000 bottles per year). All estates process their grapes themselves, some buy extra grapes. 78 % of the estates sell Riesling at Systembolaget and two estates also offer Pinot Noir.

3.4 The OPERAs Project

This thesis is embedded in the European project Operational Potential of Ecosystem Research Applications, in short OPERAs, which strives to enhance the knowledge about ecosystems using the approach of ecosystem services with wine as one exemplar. The project, which is funded by the European Union, runs since 2012 for five years. Twenty-seven institutions which are spread all over Europe cooperate for this purpose (Nicholas *et al.*, 2014).

The goal of the project is to connect the academic concept of ecosystem services to practice aiming for a sustainable ecosystem management (OPERAs, 2015a). To reach this goal, six work packages have been developed which contribute to reaching this goal. These are practice, knowledge, instruments, outreach and dissemination as well as a resource hub (OPERAs, 2015a). Within the first work package, the Wine exemplar strives to explore consumer values to apply those to ecosystem services (OPERAs, 2016). As my supervisor for this thesis, Kimberly Nicholas is the task leader of the Wine exemplar, I got the chance to work in close collaboration with the project. Whereas the main focus of the exemplar is viewing ecosystem services from the consumer-end, I complement this perspective and explore the supply side to analyze motives and barriers of wine farmers in Germany to produce organic wine.

4. Five Capitals Framework

This chapter presents an overview over the theoretical framework which is used in this thesis. For this purpose, the five capitals framework is first placed in a larger context and then described in detail. Last, I argue for how and why I am applying this framework.

The five capitals framework, which attempts to assess livelihoods in a holistic approach, is a part of the **sustainable livelihood framework** or rural livelihood framework. The latter is commonly used to analyze rural livelihoods in terms of their sustainability and to develop these livelihoods in an intentional approach (Scoones, 1998; Bebbington, 1999; Ellis, 2000; Nelson *et al.*, 2006; Morse and McNamara, 2013). That means that organizations or governments carry out programs to support livelihoods after a systematic analysis (Cowen and Shenton, 1998). The framework evolved during the late 1990's in research and international development agencies (Solesbury, 2003). It is mainly used in research by Western countries to assess livelihoods in developing countries, often as part of development projects (Morse and McNamara, 2013). It was, for instance, used by organizations such as the Department for International Development (DFID) in the UK, the United Nations Development Programme (UNDP), or the Food and Agriculture Organization of the United Nations (FAO) (Solesbury, 2003).

The sustainable livelihood framework comprises of five capitals, which are then assessed in order to suggest policy implications. Within the framework the capitals can be seen as an attempt to assess a livelihood in terms of natural, human, social, physical and financial resources (Sayer *et al.*, 2007). These five capitals are then evaluated regarding their vulnerability to shocks and the institutional context surrounding them (Morse and McNamara, 2013; Ellis, 2000; Bebbington, 1999). The sustainable livelihood framework can be applied as a diagnostic tool aiming to display and assess livelihood resources and strategies in a specific context. However, it can also be used to respond to the assessed livelihood through institutional regulations (Morse and McNamara, 2013; Scoones, 1998; Nelson *et al.*, 2006; Ellis, 2000).

The core of the sustainable livelihood framework is the **five capitals framework**, which aims to assess capabilities of an individual, households or communities to cope with local and global environmental challenges (Dhakal, 2011; Sayer *et al.*, 2007; Brown *et al.*, 2010; Morse and McNamara, 2013; Ellis, 2000). This assessment should serve the purpose of recognizing the options individuals have through analyzing in a first step, which capitals or assets they own, control, claim or access (Ellis, 2000). Capitals can either be accessed directly or indirectly, but they ensure material well-being in any case (Ellis, 2000). Moreover, capitals represent either a stock which can generate an output, or a dynamic capitals generating a profit due to a higher production than consumption (Ellis, 2000; Maack and Davidsdottir, 2015).

The view on capitals which should be considered for a holistic analysis of livelihoods changed over time, but this thesis will focus on the most recent and applied capitals. Whereas capital is in classical economics seen as a factor of production, the economic viewpoint includes other forms of capital since the 1960's (Morse and McNamara, 2013). Nevertheless, Bebbington (1999) was the first to evaluate livelihood strategies with the help of five capitals, which is nowadays a widely accepted and applied concept (Dhakal, 2011). However, Scoones (1998) refers a year earlier already to four capitals: natural, economic or financial, human and social capital. In this concept, the physical capital is included in the economic or financial capital. Ellis (2000) discussed the framework in detail and argued that his classification would include all aspects of other classifications and coped therefore with anomalies. I am adopting this view on the five capitals (Fig. 5), which I will define in the following. The illustration introduces also symbols for the five capitals which are used in the following to make it easier for the reader to distinguish categories placed in the different capitals.

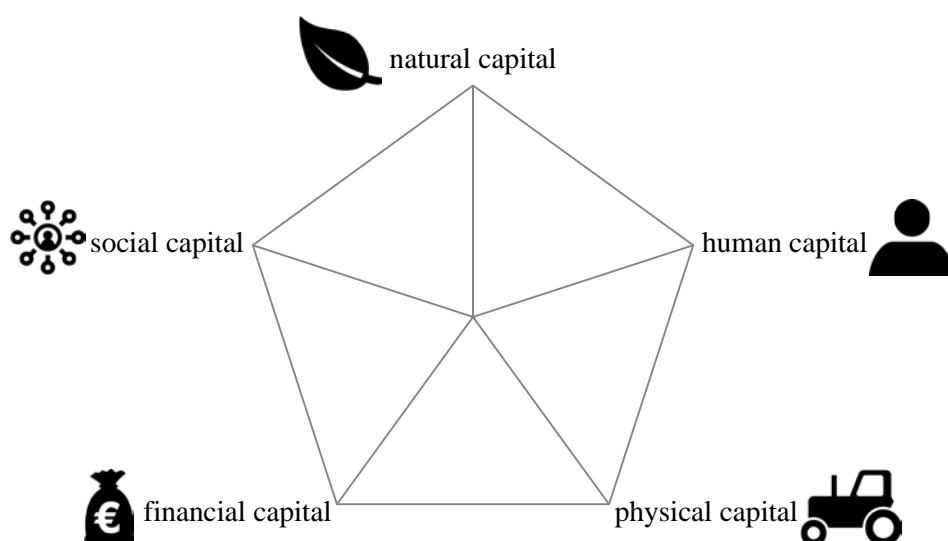


Fig. 5: The five capitals in a schematic illustration (own illustration after a suggestion of Carney, 1998. Icons from the Noun Project, 2016).

4.1 Natural Capital

Natural capital refers to natural resource stocks such as land, water and environmental services such as pollution sinks “*in the natural environment that provide environmental benefits through ecosystem services*” (Dhakal, 2011, p. 136). Moreover, these capitals are utilized to support means of survival and can be increased if productivity of these resources is enhanced (Scoones, 1998; Ellis, 2000; Dhakal, 2011).

4.2 Human Capital

Human capital comprises features and skills concerning the productivity of labor, thus the individual such as health, knowledge or skills (Dhakal, 2011; Ellis, 2000; Scoones, 1998; Nelson *et al.*, 2006). They can either be inherited or acquired (Dhakal, 2011). Ellis (2000, p.

33) summarizes the definition of the human capital as “*labor available to the household*”. It can be enhanced through, for example, education. Moreover, human capital is very sensitive to demographic changes, because developments such as marriage, deaths or external pressures can change relationships and viewpoints of the individual (Ellis, 2000).

4.3 Social Capital ❁

Social capital encompasses “claims of others by virtue of social relationships” (Nelson *et al.*, 2006, p. 11) of the individual or study object to its social environment (Dhakal, 2011). These can either be enforced or elective, but have trust as a fundament (Ellis, 2000). Furthermore, they can vary in their inclusion in society. In addition, they can either be vertical relationships, such as authorities, or horizontal, for instance organizations or friends (Ellis, 2000). It has to be noted that these relationships are difficult to analyze, because they include many interdependencies which are not easily noticeable (Ellis, 2000; Bebbington, 1999).

4.4 Financial Capital 💰

Financial capital refers to economic assets such as money or wealth which can either consist of savings or the access to loans (Dhakal, 2011; Ellis, 2000). It is noteworthy that the financial capital cannot directly produce outputs, but can be defined as a liquid capital either to be substituted to other capitals or to go directly into consumption (Ellis, 2000; Maack and Davidsdottir, 2015).

4.5 Physical Capital 🚗

Physical capital encompasses supporting objects such as infrastructure, tools, technology or equipment which are enhanced due to economic production (Dhakal, 2011; Ellis, 2000; Nelson *et al.*, 2006). In economy, one would talk about producer goods which are not consumed directly, but ought to produce income at another time (Ellis, 2000). Ellis (2000) stressed that physical capital is often substituted with natural capital of which the most striking example is the technological development during the industrialization where natural resources were used to invest in technological advancements.

I am using the five capitals framework for my thesis, because it is a useful tool to frame my thesis due to the fact that it firstly, **addresses livelihood strategies** in a holistic approach. Secondly, it is **applicable in my study region** and finally, it is concerned **with sustainable development**.

Firstly, the five capitals framework takes **complex influences on a livelihood** into account and does not only focus on natural capital (Vilei, 2011; Sayer *et al.*, 2007). It can thus be seen as a holistic and dynamic framework (Vilei, 2011). Therefore, I draw the purpose of the five capitals framework of Scoones (1998, p. 7) further, who argued that “*the ability to pursue different livelihood strategies is dependent on the basic material and social, tangible and intangible assets that people have in their possession*”.

In my thesis, I will assess capitals of wine farmers regarding their farming practices. The capitals I evaluate are not their actual possessions, but how they perceive how much they possess. I argue that these perceived possessions are crucial in motivating farmers to adopt

organic farming practices, because their decisions will be based on the availability of capitals. However, the available capitals are not necessary evaluated in a strategic analysis, but derive from the feeling of a farmer if he perceives to have enough capitals to convert or not. This is also reflected in other studies and frameworks where intrinsic motivations and perceptions play an important role in changing behavior (e.g. Ajzen, 2005; Meijer *et al.*, 2015).

For instance, the ecosystem service cascade model supports this claim. The model attempts to connect ecological processes with human perceptions to clarify the human nature relationship (Fig. 6) (Potschin and Haines-Young, 2011).

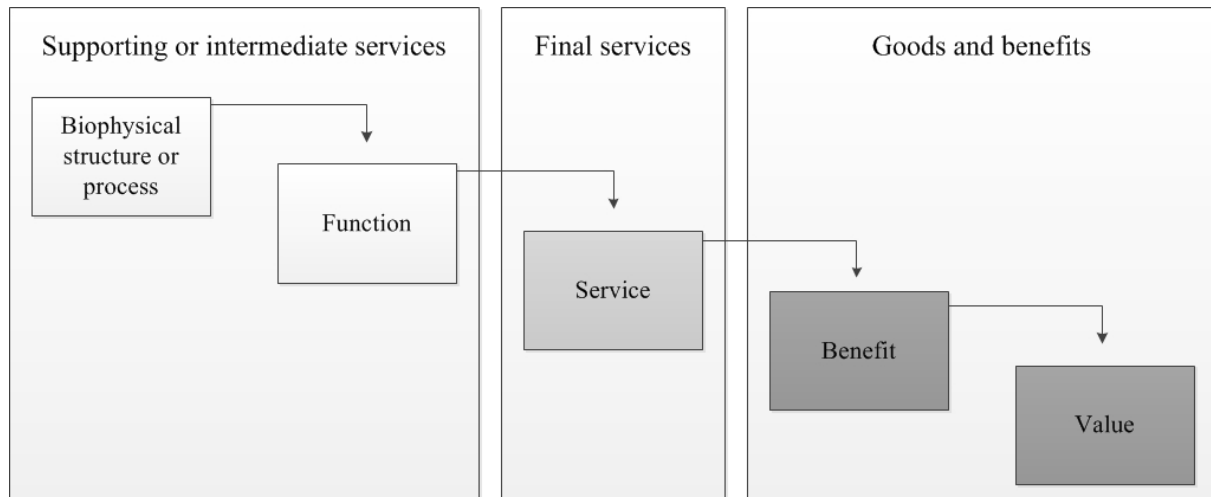


Fig. 6: The ecosystem service cascade model simplified. Important in relation to this thesis is that the actual assessment of resources takes place in the “supporting or intermediate services” and the “final services”, and is thus overlaid with the last steps “benefit” and “value”, which in this case is given by the farmer upon his resources or capitals (adapted from Potschin *et al.*, 2014, p. 2).

In the ecosystem service cascade model (Potschin *et al.*, 2014), values are the last step, because potential benefits can be valued differently by different stakeholders. That shows that values of individuals, in the case of this thesis the perceptions of possessions as a potential to adopt organic farming practices, are potentially more important than the actual possessions. In the cascade model, the actual evaluation of the material stocks are assessed higher up in the cascade in biophysical structures or processes, functions and services. However, due to the fact that they are valued in the last step, this might change the perception of the assessed stocks. Conveyed to the five capitals framework, the possessions might be differently perceived than the actual capitals a farmer has access to. In making decisions, these are thus important to consider.

Secondly, I am applying the five capitals framework in the **developed world**, where, in the notion of a sustainable livelihood, rather lifestyle choices are focused on than means of survival (Morse and McNamara, 2013). In the developed world, capitals are not only necessary to make a living, but also to give meaning to living and furthermore, to question the structural environment. This is in line with Kates *et al.* (2001) who discuss the importance of taking specific locations in the world into account when dealing with the interaction of nature

and humans. Given the fact that the study objects in this thesis are rather well stocked with capitals, the attention can be drawn to the latter aspects. Nelson *et al.* (2006), for instance, have a similar approach in which they used data of farm surveys to evaluate the adoption of sustainable farming practices in Australia.

Furthermore, the **scale** and thus the applicability of a framework are important to consider. Several authors argue that the scale on which the framework is applied to can vary between an individual up to communities or even nations (Ellis, 2000; Scoones, 1998). In my thesis, I am focusing on two neighboring regions within Germany and within one federal state which can be seen as homogenous in factors such as general political frameworks, climate conditions or cultural aspects. Thus, I argue that the five capitals framework can be applied to this case study, because it addresses one consistent unit.

Finally, the five capitals framework can be used to **discuss sustainable development**, because it takes a holistic view on capitals including interdependencies. Capitals are seen as a stock in which substitution of resources is possible (Nelson *et al.*, 2006). Thus, the distribution and importance of different capitals are evaluated. However, if natural capital is substituted, weak sustainability is considered, because most natural capital is not renewable in the same quality and time as used beforehand (Maack and Davidsdottir, 2015). Weak sustainability comprises that the total net capital has to remain constant, but the distribution between the different capitals can vary (Neumayer, 2013).

5. Research Approach

In this chapter, the methods of literature review and the empirical part are elaborated on. Furthermore, the categorization of motives and barriers is described. Finally, ethical considerations concerning this thesis are illustrated.

5.1 Literature Review

To answer the first research question on motives and barriers to convert to organic farming discussed in the literature, I conducted a literature study on motives and barriers to adopt organic farming practices. As research on motives is scarce for wine farming and Germany, I focused on agriculture within Europe, because the legal framework is given by the European Union and could thus be seen as comparable. Hence, I only considered studies which conducted their research at a time where the country was a member of the European Union (EU).

For the literature study, the databases Scopus and Web of Science were used. These databases are the biggest competitors on the market (Chadegani *et al.*, 2013) and complement each other in this literature review. I derived relevant search terms from my research questions and extended them after checking keywords of some literature. The search terms used are shown in **Table 2**. I pre-sorted the findings according to the relevance of their title. Relevant were articles with a clear focus on motives and barriers, organic farming and a setting within the European Union.

Table 2: Search terms for literature review in both Scopus and Web of Science.

Scopus	Web of Science	Search term
TITLE-ABS-KEY	Topic	"organic farming" OR "organic production" OR "organic label*" OR "organic certificat*"
TITLE-ABS-KEY	Topic	conversion OR converting OR reversion OR withdrawal
TITLE-ABS-KEY	Topic	decision-making OR motives OR objectives OR motivation OR preferences

Both databases, Scopus and Web of Science, were searched for terms in the title, abstract and keywords (Thomas Reuters, 2015; Scopus, 2016) related to organic farming practices, conversion as well as for motives or related terms. Moreover, only literature starting from the year 2000 was considered, to ensure that only research which was conducted after the introduction of the European regulation on organic farming (Regulation (EEC) No 2092/91) was considered.

The literature was then analyzed in order to derive categories from it. Hence, arguments made in the literature were compiled in a table to abstract dominant themes. If themes were identified in more than three papers I defined a category, which can be found in 6. Results, **Table 3**.

5.2 Empirics: Questionnaire and Semi-structured Interviews

Research questions 2 and 3 about motives and barriers of wine farmers to convert to organic farming and 4 which influence Systembolaget has, were answered with a questionnaire and semi-structured interviews conducted with eight winegrowers in the study areas Pfalz and Rheinhessen.

Firstly, I sent out questionnaires to the same farmers I interviewed on February 9th, 2016 via e-mail to help answering my research questions 2, 3 and 4. The questionnaire (Annex 1), which contained 16 questions and took about 15 minutes to fill in, contained questions about the farmer himself as well as the estate. This served the purpose of gaining more time during the interviews to focus on questions where elaborations were needed. Five farmers replied the questionnaire via e-mail, one farmer filled it out by hand and I included the questions in the interview for two farmers who did not fill out the questionnaire prior to the interview.

Secondly, the in-depth interviews aimed to understand why farmers converted to organic viticulture, which barriers they faced, which incentives could make conventional farmers consider converting and what the most significant barriers were (Annex 2). I conducted seven out of eight interviews at the farms face-to-face with the interviewee. One interview was conducted via Skype because the originally made appointment had to be delayed to a time when I did not have the possibility to meet the farmer in person. The interviews took place in February and March 2016 and were conducted in German. I recorded all the interviews and transcribed them so that they could be coded afterwards. Only direct quotes presented in this thesis were translated to English.

The decision to favor interviews over questionnaires only was so that I could acquire in-depth knowledge and a further exploration of personal views of the farmers (Gill *et al.*, 2008) which was necessary to fully answer my research questions. I decided to conduct semi-structured interviews, because they provided me with a general structure to lead the interview in the right direction, but also to leave enough space for the interviewee to talk about their major concerns, which is an advantage of this form of interviewing (Gillham, 2005; Gill *et al.*, 2008).

5.3 Categorization of Motives and Barriers

For the analysis of the literature and the interview transcripts I identified repeating concepts to define more abstract categories which were then classified in the five capitals framework (Ryan and Bernard, 2003; Corbin and Strauss, 2015). Firstly, to analyze findings in the literature I used an inductive approach and identified categories from reoccurring concepts discussed. That means that categories were formed if an argument with the same topic was brought up at least in three different papers. Secondly, I used a combination of deduction and induction to analyze the interview transcripts. Whereas I used the categories derived from the literature to analyze the interviews, I also added additional categories, which only became apparent in the interviews. This might be due to the fact that not a lot research focused on the study area of this thesis and viticulture. An additional category was created if at least two farmers mentioned the same aspect. Finally, all derived categories were described within the five capitals framework (see 4. Five Capitals Framework).

5.4 Ethical Considerations




I am aware that I, as a researcher, cannot be completely objective, but I base my arguments and findings on responsible and carefully conducted research in which it is stated clearly if ideas and findings are taken from other researchers. Furthermore, to increase the validity I am transparent about my methods and how I came to conclusions (Ryan and Bernard, 2003).



I acknowledge that I, as an interviewer, could influence interviewees and make them in this sense vulnerable (Gillham, 2005, p. 10). To minimize this vulnerability, I followed the recommendations from a literature review on research ethics in interviews (Allmark *et al.*, 2009) which comprise aspects regarding privacy and confidentiality, informed consent, harm, dual role and over-involvement and politics and power and I was as transparent as possible about my role as a researcher. Thus, I conducted interviews only if consent forms were accepted and signed by the interviewee prior to the interview (Annex 3). These entailed the description of my project, the procedure, concerns regarding anonymity, risks and benefits as well as rights of the participants. I am moreover aware that storing data carefully is sensible to minimize that risk that unauthorized people could get access to it. Therefore, only I can access the data and I have made sure that the interviewees are anonymous.

6. Results

This chapter presents firstly, findings from the literature review and secondly, from the empirical study in order to help answering the posed research questions. All findings are embedded in the five capitals framework. **Table 3** illustrates the definitions of categories which are presented in the following chapters. Moreover, it stresses if categories were identified in the literature, in the questionnaire or the interviews (empirics).

Table 3: Categories identified in the five different capitals. They are derived from literature if arguments according to the categories were brought up at least in three different papers (literature). Moreover, other categories origin from the questionnaire and interviews (in the following named empirics) when at least two farmers mentioned an aspect. In total, I interviewed eight farmers in Pfalz and Rheinhessen of which four were organic and four conventional.

Category	Definition	identified in		
		literature	empirics	
Natural capital 				
Strengthening the ecosystem	motive	The motivation to keep the environment in a good state and the aversion against chemical crop protection.	X	X
Soil protection	motive	Having a healthy soil, preventing erosion and other harming factors.	X	X
Farm location	motive	The farm location favors organic farming.	X	X
Pest control	barrier	The aim of being able to treat plants easily and flexibly with synthetic products.	X	X
High yields	barrier	The goal of obtaining high yields.	X	
Use of copper	barrier	Copper as a measure to fight downy mildew.		X
Amount of sprayings	barrier	The amount vineyards have to be sprayed in order to control pests.		X
Social capital 				
Social networks	motive	The supportive role of social networks such as associations, family, consumers including the social acceptance and a positive image of organic food.	X	X
Product quality	motive	The production of high quality products.	X	X
Validation of farming practices	motive	The aim to validate farming practices with a certification.		X
Skeptical attitude	barrier	The skeptical attitude of social networks such as experts, family or consumers.	X	X
Human capital 				
Ideology	motive	The personal attitude towards organic farming such as the belief that organic farming is better, aesthetics or living in harmony with nature.	X	X
Professional challenges	motive	The personal goal to be challenged, to be a craftsman and to be equipped with skills.	X	X

Minimizing health risks	motive	The perception that risks concerning health are minimized.	X	X
Well educated	motive	Educational level of farmers or an education outside of the agricultural field.	X	
Age	motive	The age as a driver to convert to organic farming.	X	
Little knowledge	barrier	A lack of knowledge as a barrier to convert to organic farming.	X	
Ideology	barrier	The ideology that organically certified farming is not to be strived for.		X
Financial capital 				
Higher profit	motive	Economic benefits and profitability or the resolution of financial problems.	X	X
Subsidies	motive	Direct payments from any external institution to support organic farming.	X	X
Premium price	motive	The additional financial amount a product can be charged with when it is organically certified.	X	
More sales	motive	The ability to sell more products due to the organic certification.		X
Financial risk	barrier	Expectation that sales are insecure short- or long-term and the uncertainty of the market.	X	X
Physical capital 				
More farmland	motive	The amount of farmland one farm manages.	X	
Sources of income	motive	The amount of income sources and the number of economic activities of a farmer.	X	
Tight legislation	barrier	Tight, inconsistent or changing laws related to the organic certification.	X	X
Bureaucracy	barrier	Control systems with paperwork and controls.	X	X
More work	barrier	Organic farming as causing more work.		X

6.1 Literature Review

1. Which motives and barriers to convert to organic farming within the EU are discussed in the literature?

With the approach described in Chapter 5.1, 101 publications were found of which 49 were obtained in both databases, Scopus and Web of Science, 16 were only listed in Scopus and 36 only in Web of Science. I analyzed the resulting list according to the relevance of the titles to answer my first research question. Articles which were not considered to be relevant did not focus on countries in the European Union or lacked the focus on motives and barriers or related terms. Out of these, 27 publications were selected according to the relevance of the title hinting to discuss motives or barriers to convert to organic farming, which were used for this literature study. As stated before, only studies were considered which conducted their research at a time the country was member of the EU. The only exception is Bartulović and Kozorog (2014) which compared motives and barriers before and after the entry of Slovenia to the EU. Additionally, two studies from the non-EU country Norway were included in the literature study (Koesling *et al.*, 2008; Flaten *et al.*, 2006). This is legitimate, because Norway

implemented the European regulation on organic farming (Council Regulation (EEC) No 2092/91) as part of the Agreement on the European Economic Area (EEA) in 1994 (European Economic Area, 2013). The literature from Norway is thus embedded in the same legal framework as the other relevant literature. Similarly, three studies had to be omitted, because they were case studies from Canada, New Zealand and the US (Cranfield *et al.*, 2010; Fisher *et al.*, 2004; Karlen *et al.*, 2007). Additionally, two other studies were similar to previously analyzed ones (Lamine and Bellon, 2009; Rozman *et al.*, 2015).

No literature about motives or barriers to adopt organic practices was found on viticulture in Germany and only limited literature about other agricultural sectors. Only two of the studies were conducted in Germany (Best, 2009; König, 2004) and two in viticulture of which one was in Austria and one in Spain (Darnhofer *et al.*, 2005; Kallas *et al.*, 2010).

Questionnaires and interviews were the most popular method addressing motives and barriers to convert to organic farming, while literature review and modelling were used in fewer cases. Most literature uses questionnaires as an approach to investigate in motives and barriers to convert to organic farming (Kubala *et al.*, 2008; Koesling *et al.*, 2008; Kaufmann *et al.*, 2011; Flaten *et al.*, 2006; Best, 2009; Mzoughi, 2011; Tress, 2001). Furthermore, interviews were a popular method (König, 2004; Lauwere *et al.*, 2004; Darnhofer *et al.*, 2005; Bartulović and Kozorog, 2014; Smit and Driessen, 2009). Literature reviews were conducted by Bellon and Lamine, 2009; Madelrieux and Alavoine-Mornas, 2013; Sahm *et al.*, 2013; Gattinger *et al.*, 2012; Smit and Driessen, 2009; Smith and Marsden, 2004. Only Rozman *et al.* (2013) and Rozman *et al.* (2015) used modelling and scenario analyses for motives and barriers to convert to organic farming.

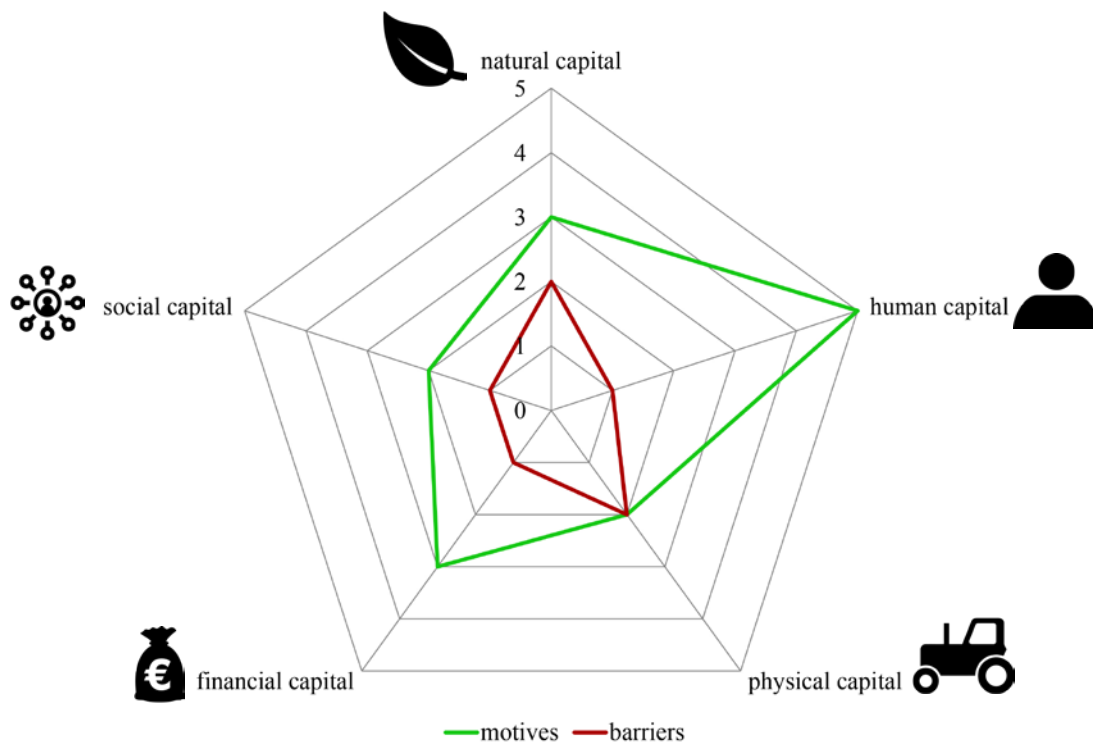


Fig. 7: Amount of categories identified in motives and barriers in the five capitals framework from 27 papers in the literature. In the graph, the green line illustrates the number of categories identified as motive to convert to organic farming related to the five capitals framework. The red line stands for the number of categories identified as barrier to convert to organic farming related to the five capitals framework.

Figure 7 illustrates the number of categories which I identified in the literature study. In there, the human capital is dominating with five identified motives and only one barrier. Moreover, categories in the natural and financial capital are important to consider (each with three motives). Barriers are more equally distributed with two identified categories in each, the natural, and physical capital.

6.1.1 Natural Capital

The categories which could be identified in the literature in relation to the natural capital deal with **the goal to strengthen the ecosystem**, with **soil protection** often mentioned as a second aspect. Some research also discussed the influence of the **farm location**.

Literature indicated that a general environmental awareness and the goal to **strengthen the ecosystem** was important for farmers to consider conversion to organic farming (Koesling *et al.*, 2008; L  pple and Kelley, 2013; Kallas *et al.*, 2010; Tranter *et al.*, 2007; Kaufmann *et al.*, 2011). Similarly, organic farmers in different sectors in the UK and Norway considered environmentally friendly farming as their most important farming goal (Koesling *et al.*, 2008; Tranter *et al.*, 2007). Bartulovi   and Kozorog (2014) concluded that one of the main farming goals was to keep the farm in a good shape. Therefore, farmers considered environmentally friendly farming as crucial to protect the natural resources. When a farmer was environmentally aware, the time for conversion was shorter in a study on viticulture in Catalonia (Kallas *et al.*, 2010).

While environmental awareness is a rather broad category, the aim to **protect the soil** and prevent soil erosion was an important and often mentioned motive and can support the decision to convert to organic farming. Lauwere *et al.* (2004, p. 237) identified the category “*cooperation with nature*” in crop farming of the Netherlands which included the good condition of soil. Organic farmers in a study in Norway considered a healthy soil as the second most important motive (Koesling *et al.*, 2008). In addition, it was found that soil protection was more important for farmers who converted before 1995 (51.1%) and decreased to 27.1% for farmers converting later (Flaten *et al.*, 2006). However, one third of the late converters saw soil protection as an important conversion motive.

Finally, some studies discussed the importance of the **farm location**. Kallas *et al.* (2010) discussed that the motivation to convert was higher for farms in areas which were difficult to manage. This is in line with a study from a tiny, not easy accessible village in Slovenia, in which the community was a strong incentive to take up organic farming. The strong bond among the farmers was linked to isolation of the village (Bartulović and Kozorog, 2014).

On the contrary, the main barriers to convert to organic farming are connected to the goal of **easy pest control** and **higher yields**.

Firstly, plant diseases, weeds and **pests can be more easily** and flexibly treated with chemical products, whereas in organic farming only non-synthetic products are allowed. This leads to the fact that plants have to be strengthened preventively to avoid diseases from the beginning with the help of non-toxic natural products. Not being able to use these measures increased the production risk as well as the financial risk and was thus a barrier to convert (Best, 2009; Lauwere *et al.*, 2004; König, 2004; Sahm *et al.*, 2013; Tranter *et al.*, 2007; Tress, 2001).

Secondly, farmers who want to have **high yields** tended to prefer conventional farming (Best, 2009; Lauwere *et al.*, 2004). Best (2009) concluded that convinced conventional farmers strived among other aspects for higher yields. However, a study on crops in the Netherlands found this to be a minor barrier (Lauwere *et al.*, 2004).

6.1.1 Human Capital

In relation to the human capital, I identified five categories from the literature in relation to motives to convert to organic farming: **ideology**, **minimizing health risks**, **professional challenges**, a good **education** as well as the **age**. **Little knowledge** of the farmer can create a barrier to the adoption of organic farming practices.

Firstly and most importantly, **idealistic and philosophical motives** are discussed as important driver for conversion to organic farming. In line with earlier findings, Darnhofer *et al.* (2005) found that as they call it “committed” farmers who strongly believe in the organic farming philosophy converted before the entry to the EU, illustrating their conviction to convert without financial support. Similarly, environmental awareness was the most common answer (63.3 %) for farmers and even the most important motivation for farmers who just took over a farm in Denmark (Tress, 2001) to convert to organic farming. More recently, farmers in studies from France and Ireland aimed to do “the right thing” especially in crop protection and wanted to meet demands of landscape aesthetics (Mzoughi, 2011; Läpple and Kelley, 2013). The latter point was also important for farmers in Slovenia who strived for what they defined as a harmonious cultivated landscape (Bartulović and Kozorog, 2014).

Secondly, **professional challenges**, so farm management practices which required new skills or broader knowledge of the farmer himself, were important in several studies. Lauwere *et al.* (2004), for instance, found the goal to challenge oneself was the most important motivation for adopting organic farming in crop production in the Netherlands. In a study in Norway posing personal challenges in terms of skill requirements and the need for additional knowledge were the third most important motive to adopt organic farming practices (Koesling *et al.*, 2008). Bartulović and Kozorog (2014) concluded that challenges and innovation were important for converters.

Thirdly, **minimizing health risks** was for instance of greatest importance for farmers in Poland followed by the motivation to live in harmony with nature (Kubala *et al.*, 2008). König (2004) concluded that health considerations did not seed the thought of converting to organic farming, but supported the decision, especially if personal experiences such as allergies in the family occurred. Moreover, another study found that especially women stressed organic values which included health aspects (Tranter *et al.*, 2007).

Fourthly, a **good education** could be seen as a motive to adopt organic farming. Whereas 54 % of conventional farmers in Norwegian crop and dairy farming had an agricultural education, 73 % of organic farmers were educated in this field (Koesling *et al.*, 2008). Kubala *et al.* (2008) and Mzoughi (2011) found similar results in Poland (crops) and France (fruit growing) where organic farmers had in general a higher education than conventional farmers. A study from Slovenia reported that farmers with an education in a field other than agriculture were more positive about organic farming (Bartulović and Kozorog, 2014).

Finally, the younger farmers are, the more likely are they to convert to organic farming, which brings up the relevance of **age**. This was shown by Kaufmann *et al.* (2011) in a region of Lithuania where converters to organic farming were significantly younger than conventional farmers. A study on dairy and cattle in Denmark found that farmers who adopted organic farming practices were usually younger than 50 (Tress, 2001). Nevertheless, Koesling *et al.* (2008) concluded that the differences in age are becoming less.

In contrast, a **lack of knowledge** was a barrier for conversion (Bartulović and Kozorog, 2014; Tress, 2001). König (2004) found that in-depth knowledge held back from organic colleagues increased the perceived risk to potential converters and thus demotivated conventional farmers to adopt organic farming.

6.1.1 Social Capital ❁❁

Motives which could be clustered in the social capital are twofold: **social networks** could have a supportive role in converting to organic farming. To produce **high quality food** could also be seen as a motive. On the other hand, a **skeptical attitude** of social networks created a barrier to convert.

Firstly, the attitude of **social networks**, may it be family, NGO's, spokespersons, experts or policymakers, was an important factor in the decision process to convert to organic farming. It was found that a motive to convert is when organic farming is socially accepted and has a positive image (Lauwere *et al.*, 2004; Kallas *et al.*, 2010; Rozman *et al.*, 2013; Kaufmann *et al.*, 2011; Läßle and Kelley, 2013; Mzoughi, 2011; Bartulović and Kozorog, 2014). Moreover, it was seen as modern in Germany and Slovenia where recent research was applied

in farming practices (König, 2004; Bartulović and Kozorog, 2014). The most important sources of information in Polish crop farming were consultancy firms, media and other organic farmers (Kubala *et al.*, 2008). Additionally, local authorities, neighbors and the internet were consulted. This is in line with Kaufmann *et al.* (2011) who researched on farming in Lithuania and found that informal social networks were of highest importance for a positive attitude towards organic farming.

Secondly, producing **high quality food** was a motive for the adoption of organic farming. It is reported that personal experiences, such as allergies in the family, or the striving for life quality were important aspects to consider (König, 2004; Bartulović and Kozorog, 2014; Koesling *et al.*, 2008; Kubala *et al.*, 2008; Kallas *et al.*, 2010). These experiences could motivate a farmer to strive for high quality food which does not jeopardize the health of the social environment.

On the contrary, a **skeptical attitude of social networks** could also present a barrier to convert to organic farming (Bartulović and Kozorog, 2014; König, 2004). Skepticism of advisors towards organic farming could decrease the motivation to convert. Furthermore, trends discussed in the media were either a motivation or a barrier to convert to organic farming in a study of the Netherlands (Lauwere *et al.*, 2004). Läpple and Kelley (2013) found that opinions of advisors had the biggest influence in their models of sheep and cattle farmers in Ireland. It is even reported that tensions with close people led to withdrawal from organic farming if additionally the financial situation was not stable (Madelrieux and Alavoine-Mornas, 2013).

6.1.2 Financial Capital

Economic motives to adopt organic farming were of high importance, particularly a focus on **higher profits, subsidies or a premium price for products** (Koesling *et al.*, 2008; Flaten *et al.*, 2006; Kaufmann *et al.*, 2011). On the contrary, financial risks to convert to organic farming is the dominating barrier.

Some authors argued that the importance of financial aspects is even increasing. Whereas converters to organic farming before the 1990's had mostly ideological motivations, farmers who converted later had often more pragmatic reasons including **higher profits**. Flaten *et al.* (2006) discussed that dairy farmers in Norway who converted later used more pesticides, focused more on higher yields and used less alternative medicine than early converters. This shows how the approach shifted from ideological motivations to a higher orientation on profits. Similarly, a study of farmers in Slovenia showed that economic incentives were not important for farmers converting before the entry to the European Union (EU) in 2004 where benefits in profit could not be expected (Bartulović and Kozorog, 2014). However, the motives of farmers converting after Slovenia became part of the EU were dominated by financial incentives. With the adoption of organic farming, expenses connected to conventional farming could be minimized and soil protection was important in the sense of preserving good farming conditions. Similarly, for farmers in the UK the most important reason to convert to organic farming were possible economic benefits such as higher profits (Tranter *et al.*, 2007). In Germany, the emergence of organic farming could economically be connected to reduced yields due to poorer soil quality. The link between lower soil qualities

and intensive agriculture is scientifically not necessarily connected, but alternative farming practices, such as organic farming, emerged from it (Vogt, 2001), because farmers reacted to this structural crisis in agriculture with converting to organic farming, where higher profits could be expected (Best, 2009).

In a system dynamics model, Rozman *et al.* (2013) found that **subsidies** were the most important factor for conversion in connection with a sufficient promotion of organic farming. This is in line with a study from Ireland showing that economic incentives dominated when aspects of farm management or the technical possibilities were overcome (Läpple and Kelley, 2013). Also Kaufmann *et al.* (2011) concluded in a case study from Lithuania that subsidies were the most important motive to convert to organic farming which might be due to the fact that income was generally low before receiving subsidies.

Another motive which is discussed in the literature is the **premium price** farmers can get on certified organic products, which is an important aspect of organic certification compared to environmentally aware but not certified farms (Best, 2009; Tranter *et al.*, 2007). A study on viticulture in Catalonia found that increasing white wine prices motivated farmers to adopt organic certification (Kallas *et al.*, 2010).

Even though economic incentives play an important role as a motive to convert to organic farming, it is in some cases not the main goal of farmers when converting. Critical voices argue that maximizing profits is only the means to reach other goals. However, these pragmatic financial motivations are easier to measure and thus concluded more often as the actual motivation (Bartulović and Kozorog, 2014; Darnhofer *et al.*, 2005; Bellon and Lamine, 2009). For instance, Koesling *et al.* (2008) and Lauwere *et al.* (2004) did not find that economic motives were dominating the decision to convert to organic farming. Darnhofer *et al.* (2005) argued in a study on viticulture (among others) in Austria that subsidies were only the means of enabling a professional challenge with a diversity of tasks, satisfying work and the needed knowledge, but were not aimed for the sake of higher profits.

In contrast to discussed motivations to convert to organic farming, **financial risks** were also the dominating barrier. Some authors concluded that farmers were more hesitant to convert if they saw economic returns as important (Mzoughi, 2011; Kallas *et al.*, 2010; Koesling *et al.*, 2008). Similarly, if sales were not perceived as being secure, returns were even expected to decrease or if the long-term market development was not expected to be positive, farmers were less likely to adopt organic farming (Darnhofer *et al.*, 2005; Best, 2009; Bartulović and Kozorog, 2014; Lauwere *et al.*, 2004; Koesling *et al.*, 2008). This could be due to the fact that if there were many organic products on the market, the pressure on the price was higher or the premium prices could not compensate the production costs in general (Smith and Marsden, 2004; Sahm *et al.*, 2013; König, 2004).

Moreover, rules of organic farming practices apply in the three-year conversion period (Commission Regulation (EC) No 889/2008), but a premium price cannot be claimed, because products cannot be labelled as organic due to the conversion period. Thus, income could decrease during the conversion period presenting a main barrier for conversion (Smit and Driessen, 2009). Some farmers expected reduced incomes or at least a high financial burden during the conversion process when adopting organic farming practices (Tranter *et al.*, 2007; Tress, 2001). Additionally, some authors (Sahm *et al.*, 2013; Madelrieux and Alavoine-

Mornas, 2013) reported that financial problems were the most apparent reason reverting to conventional farming.

6.1.3 Physical Capital

Whereas the physical capital comprises **more farmland** and the **amount of income sources** as motives for organic farming, **tight legislation** and **bureaucracy** are important barriers to convert to organic farming.

Firstly, several authors concluded from case studies that organic farms are bigger and have **more farmland** than conventional ones (Kaufmann *et al.*, 2011; Koesling *et al.*, 2008; Tress, 2001). Kaufmann *et al.* (2011) found in Lithuania that organic farms were three times bigger and in Tress' (2001) study about dairy and cattle farms in Denmark, organic farms had either more than 100 hectares of farmland or less than 20 hectares. Similarly, organic farms in Germany were usually larger than conventional farms (Best, 2009). In contrast, organic viticulture farms in Spain were smaller than conventional farms (Kallas *et al.*, 2010).

Secondly, farmers with more **sources of income** tend to convert more easily (Kallas *et al.*, 2010; Flaten *et al.*, 2006; Tress, 2001). Whereas only 4.6 % of famers with only one source of income considered converting to organic farming, 9.5 % of farmers with a more diverse source of income were positive about converting in Denmark (Tress, 2001).

On the other hand, changing or **tight legislation** is a barrier to adopt organic farming practices. Research showed that some farmers found it difficult to fulfil all regulations due to the fact that legislation is tight and inconsistent (Lauwere *et al.*, 2004; Darnhofer *et al.*, 2005). This even led to reversion back to conventional farming due to frustration and the lack of security of farmers (Sahm *et al.*, 2013).

Furthermore, more **bureaucracy** in the form of paperwork and inspections were seen as a constraint to convert to organic farming (Sahm *et al.*, 2013; Bartulović and Kozorog, 2014; Tranter *et al.*, 2007; Best, 2009). Nineteen percent of farmers, for instance, mentioned these aspects as a barrier in a study conducted in the UK (Tranter *et al.*, 2007). Madelrieux and Alavoine-Mornas (2013) found in France that farmers reverted even to conventional farming due to distrust in authorities.

6.2 Empirics: Questionnaire and Semi-structured Interviews

2. Which motives do wine farmers in Pfalz and Rheinhessen consider in converting to organic farming?

3. Which barriers do wine farmers in Pfalz and Rheinhessen consider in converting to organic farming?

I interviewed eight farmers, four organic and four conventional (**Table 4**). The four organic farmers got their certification in 2004, 2005, 2007 and 2009. Seven farms also had additional certifications. One conventional farm is Fair'N Green certified since 2012. Fair'N Green is a sustainability standard which includes ecological, economic and social aspects (FAIR and GREEN e.V., 2016). Another organic farm has also a Biodyvin-label since 2005, which stands for biodynamic farming. This way of farming focuses specifically on a healthy soil

without the usage of chemical substances (Biodyvin, 2016). One conventional farm prints a vegan label on their bottles since 2016, meaning that they are not using animal substances. Five out of eight farmers (three organic, two conventional) are also member in the VDP, which is the German abbreviation for the association of German Prädikat Wine Estates. This organization stands for high quality wines from Germany (VDP, 2016).

Table 4: Overview of interviewed farmers including their certifications and personal attributes. The labels used for the farmers here are used throughout the thesis to refer to specific famers.

Farmer	C1	C2	C3	C4	O1	O2	O3	O4
Organic	No	No	No	No	Yes	Yes	Yes	Yes
Other certifications	VDP	VDP, Fair'N Green	-	Vegan	VDP	VDP, Biodyvin	VDP	-
Sex	Male	Male	Male	Male	Male	Male	Male	Male
Year born	1948	1972	1982	1970	n/a	1971	n/a	1981
Year started to work on the farm	1973	1990	2010	1998	1995	2008	2013	2001
Family business	Yes	Yes	No	Yes	Yes	No	No	Yes
Position on the farm	Manager	Manager	Manager	Owner	Owner	Manager	Manager	Manager
Highest education	Technical school	Technical school	University degree	University degree	University degree	University degree	University degree	Technical school

All eight interviewed farmers are male, born between 1948 and 1982. They started working for their estates in the timeframe of 1973 to 2013 and were either the owner of the farm or the operations manager (**Table 4**). Five farmers were personally continuing a family tradition of wine farming (three conventional, two organic farmers). Five out of eight farmers have a university degree. Furthermore, three farmers had a qualification from technical schools.

The labels which are used to distinguish the farmers here are used throughout the thesis were O# indicating an organic farmer and C# for conventional famers.

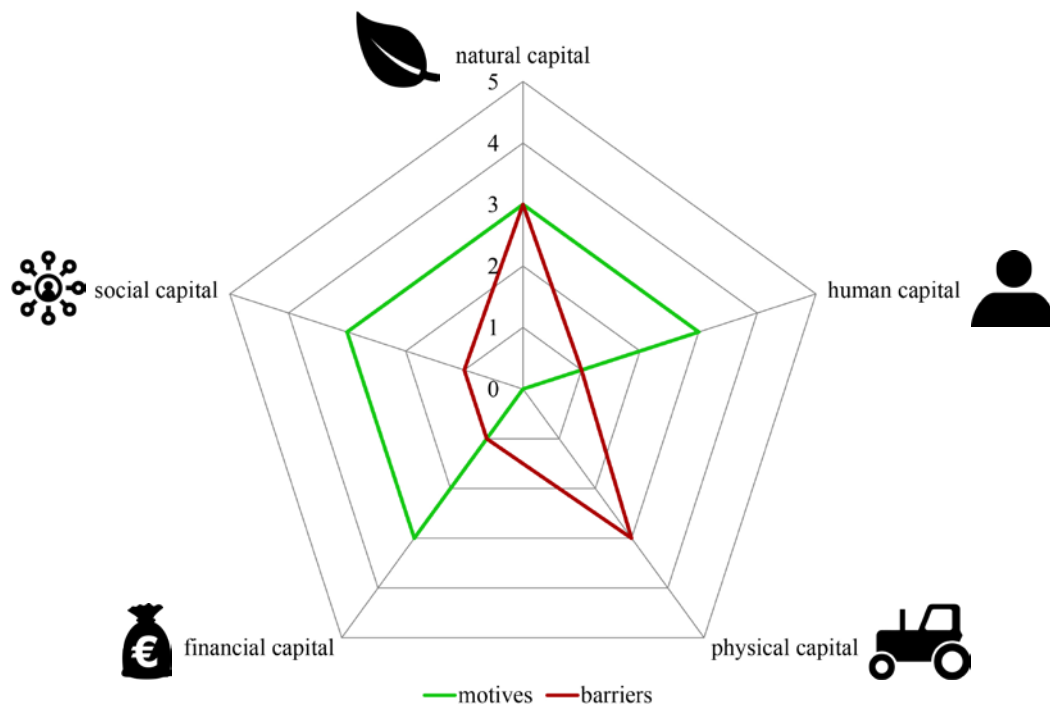


Fig. 8: Amount of categories identified in motives and barriers in the five capitals framework from conducted interviews and questionnaire. In the graph, the green line illustrates the number of categories identified as motive to convert to organic farming related to the five capitals framework. The red line stands for the number of categories identified as barrier to convert to organic farming related to the five capitals framework.

Figure 8 illustrates identified categories from the questionnaire- and interview-analysis. Noticeable is the equal distribution of three respective motives within the human, natural, social and financial capital, whereas motives in the physical capital are lacking (zero identified categories). Moreover, the barriers are dominating in the physical and natural capital (each with three identified categories) while in the human, social and financial capital one barrier could be identified.

6.2.1 Natural Capital

Maintaining the quality of the natural capital was the main motivation behind any farming practice which was chosen by the interviewed farmers. All farmers mentioned aspects regarding this capital no matter if conventional or organic. Motives to convert to organic farming comprised the goal of **protecting the soil, strengthening of the ecosystem** and the **location of the farm**. I could identify **more spraying, the use of copper** and the aim to ensure an **easy pest control** as barriers to convert.

Firstly and most importantly, the **protection and equilibrium of the soil** was a focus for all eight farmers no matter if conventional or organic: Environmentally friendly farming, as one conventional farmer described it, “*is absolute common sense meaning an orientation towards a better ecologic balance in the soil*” (C4). All of them saw a healthy soil as essential and three farmers also mentioned that they wanted to sustain a healthy soil for next generations (C1, O1, O2). A conventional farmer explained that his goal is to balance out the oversupply of nutrients earlier generations in the 1960’s to the 1980’s caused (C4). A *healthy soil* is described as a soil with a lot of humus (O1, O3, O4, C4), less erosion (O1) and a poriferous

soil (O3, C3). Measures which were mentioned to achieve healthy soils comprised seedings or revegetations in general (O1, O2, O3, C3, O4, C2, C4), the spreading of grape pomace (C4) and mulching was sometimes used (C4). For organic farmers, it was an important motive in converting to organic farming to avoid chemical substances in their vineyards. A biodynamic farmer said that *“only with healthy soils can we produce good grapes and from these make good wine”* (O2). An organic farmer had the goal to *“guarantee perfect working to (...) build up healthy soils and sustain them”* (O4). One conventional farmer (C3) told me that one benefit of organic farming would be diverse seeding, which would enhance the biodiversity and increase the soil quality due to more nutrients and a loosening of the ground.

Secondly, two organic farmers pursued on the aspect of a healthy soil and argued for **strengthening the ecosystem vineyard** when farming organically certified. Two farmers described how the whole system would be more balanced and very stable in regard to climate change (O2, O3). One farmer argued that the vine is forced to root deeper in order to access nutrients since the nutrition on the surface with fertilizers is stopped. Thus, the water supply is ensured from deeper layers in the soil profile. Another organic farmer told me: *“I never wanted to be the fire department in my vineyards or wanted to through something on the ground what the vineyards need, but we tried rather that the vineyard would take care of itself”* (O4). This shows how he aimed for an ecosystem which is healthy and balanced in itself.

Also discussed was the **location of the farm** as a wine-growing district globally and within Germany. One farmer argued that the southern Pfalz has very good conditions to grow grapes organically certified (O3). He compared the region with the French region Châteauneuf-du-Pape where, due to optimal soil and climate conditions, organic farming would be a *“children’s game”*. Even though the climate and soil would be different in Pfalz, *“organic wine (...) [would still be] really feasible”* (O3). Another farmer described that all of his vineyards can be managed with machines which makes it is possible to reach out quickly to all vines after precipitation, which would favor organic farming (O2). However, another farmer (C4) argued that Germany would be the most northern wine-growing district with high moisture which would make it tough to grow grapes organically due to disease pressure. Thus, the location of the farm can be a motive and a barrier to produce organic wine, but it was more often and in longer explanations expressed by organic farmers.

Whereas organic farmers were convinced that the renunciation of chemical substances is key to a healthy soil (O1, O2, O3), conventional farmers were skeptical about the measures organic farmers can take creating barriers to convert to organic farming. Firstly, an aspect which was mentioned by all conventional farmers (C1, C2, C3, C4) is that organic farming requires prophylactic spraying meaning that it has to be done **more frequently** than chemical substances. With driving through the vineyards more often, more greenhouse gases are emitted and the soil gets compressed. Thus, they questioned the sustainability of organic farming in general. Firstly, the increased use of fuel has negative effects on the climate and is resource intensive. One farmer elaborated on the possibility to use electrical tractors fueled with renewable electricity, but explained how they are too expensive and not powerful enough (C2). Secondly, soil compaction results if it has to be driven more often through a vineyard, especially after precipitation (C1, C2, C4). Farmers discussed how more erosion could result if the capillary network is compressed and water runs off on the surface (C2, C4). Finally, one

farmer mentioned also that copper as well as other agents are water soluble, so applying copper would increase the water use, which is a scarce resource. It is a difficult topic where to source it, because, as he described, farmers are not allowed to take water out of river Rhine, wells can dry out and tap water would be not affordable (C4).

Another aspect is that **copper** is used as natural pesticide in organic farming to avoid *Plasmopara viticola*, the agent of downy mildew. Due to the fact that it is a heavy metal which accumulates in the soil, several farmers including one organic farmer expressed their doubts about using it (C2, C4, C3, O1): *“but in organic cultivation it [pesticides pointing to copper] isn’t better. It sounds strange, it sounds harsh, but it is not better”* (C3). Nevertheless, the same farmer along with others did not expect synthetic substances to be environmentally friendlier: *“The European organic legislation (...) says: No, copper is better than systemic pesticides fullstop. (...) That is not discussed thoroughly”* (C2, C3, C4). Another farmer read that vineyards would turn into *“toxic waste”* after a long usage of copper (C4). Two organic farmers (O1, O3) addressed this issue of which one states that he would not need a lot of copper, but that a prohibition of copper in organic agriculture would endanger his certification, because he saw it as necessary if there is a lot of precipitation in a cultivation season (O1).

Finally, **pest control** is a crucial aspect in monocultures which farmers were worried about (O1, O2, O3, O4, C3, C4). Fungi are the main challenge in viticulture in Germany due to high rainfall and a cool climate (Robinson and Harding, 2015). Farmers saw the measures of organic farmers to fight these diseases as limited (C3, C4). Similarly, an organic farmer explained that the risk of fungi is the same for organic and conventional vineyards, only the *“possibilities to react make the difference”*, which other organic farmers saw as the main challenge (O1, O2). Another organic farmer stressed that he had to *“pay dearly, [because] there were more vineyards with decay than expected and you had to learn how the ripeness changed after the conversion”* (O2).

6.2.1 Human Capital

I identified three motives in the human capital to convert to certified organic farming: Firstly, the individual **ideology** of the farmer is important to consider. Secondly, **minimizing health risks** is a driver for some farmers and finally, **professional challenges** motivate some farmers to convert to organic farming. At the same time, a barrier against organic farming which was found was an **ideology against** the values of organic farming.

Crucial as a motive to produce organically certified wine was the **ideology** of the farmer and the belief that organic farming is the right thing to do. Reasons to have organic farming as an ideology are manifold. An organic farmer was convinced that all farming should be done organically certified: *“If you ask me, there shouldn’t be anything else [than organic farming]. (...) I think that we are all responsible to nurse our environment.”* (O4). Another farmer told me that he thinks that an organic cycle would just be better than one where chemicals would be included. Moreover, he thinks that organic fertilizers are made with love and that they would thus have a better effect: *“But I think that many compounds [fertilizers], maybe also because they are made with love, have another effect”* (O3). Another farmer explained how he believes in defensive forces rather than only fighting the causes: *“We try to strengthen the*

defensive forces of the vine. It's the same as what we are doing for us humans (...) in winter. It doesn't mean we take antibiotics from November to March straight (...). We try to strengthen the defensive forces of our body" (O1). He told me also that before the conversion he realized he was buying more and more organic products. Several farmers stressed this point that producing organically certified wine would have to be mirrored in the private life of the farmer (O1, O3). For one farmer the main goal was to pass on *"healthy vineyards to the next generations to run the business"* (O1). A conventional farmer told me that he observed some of his colleagues previously, because the vineyards of them were not intact and they had, in his opinion, to change their ideology to increase the quality of their vineyards (C2). However, he thought that there are many farmers who produce organically certified wine only out of commercial reasons.

Another motivation to produce organic wine is the **minimizing of health risks**. An organic farmer told me that his main motive to convert to certified organic farming *"was partly egoistic. (...) When we worked in the vineyards and used pesticides before, everything was irritated – The arms, the hands."* He wanted to know what he sprays on his vines (O4). Moreover, one farmer was concerned that pregnant women are not allowed to apply pesticides in vineyards. He elaborated on this fact and explained how he feels better producing organically certified. He illustrated that anyone can eat anything from his vineyard, because there are only natural substances in it: *"For me it was such a nice picture (...) when our operations manager pulled a radish out of the ground, cleaned it with a knife and bit into it with gusto. Because you can!"* (O3). However, this is not only connected to organic farmers. A conventional farmer worked together with a toxicologist and discussed substances potentially causing cancer which he does not use anymore. Furthermore, he expected the substances he does use to be not too bad for the health, because he expected *"the main risk for the consumer does not arise from the used products, because the legislative body [in Germany] takes already care of that"* (C2).

One farmer elaborated extensively on the responsibility as a traditional estate to be modern and progressive: *"[The estate] has the obligation to adapt faster than estates which are maybe new on the market"* (O3). This illustrated how this farmer saw also a **professional challenge** in producing organic certified wine and how this philosophy drives him in his business. A professional challenge describes the personal aim of a farmer to be challenged in his or her job with more difficult tasks, being in a leading position in the market or the necessity to learn new skills. This is in line with other organic farmers and how they explained the farming conditions when they started being organically certified. One farmer saw organic farming as a challenge, because most estates seemed to be *"chaotic and laissez-faire"* when he started (O1). Therefore, he had to be in a leading position as an organic farmer with the aim to show how well-organized and structured an organic farm could be.

However, as organic farmers were convinced that organic farming would be better, all conventional farmers had **ideological motivations against** organically certified farming (C1, C2, C3, C4). The most negative attitude is represented in my conversation with one farmer (C1):

Interviewer: *"If you think about producing organically certified wine..."*

Participant: *"I don't do that."*

Interviewer: “Why?”

Participant: “Because I think that this is nonsense.”

One organic farmer illustrated well how someone can have two distinct approaches to taking care of their vines: One is to strengthen the plants so that they would not get sick, which would point in the direction of organic farming. The other, which he thinks one can also have as an opinion, is that “*you want, as in medicine, pinpointed measures exactly to one pest to decrease the total intervention in the ecosystem*” (O1). Two farmers did not see any benefit in organically certified farming (C1, C4), stating that they are not willing to consider it at all. All conventional farmers elaborated on their environmentally friendly farming practices, ranging from mulching to a decreased use of fertilizer (C2, C4) or even the use of fertilizer which are also used in organic farming, so they believed they would not need a certification (C1, C2, C3, C4). Furthermore, one farmer (C3) questioned his own lifestyle such as his car and has the opinion that he would have to reconsider those things when deciding on organic farming. Another farmer was convinced that pesticides are not the main problem any longer, but CO₂ emissions (C2).

6.2.1 Social Capital ❁

Three categories related to the social capital dominated the discussion about motives to convert to organic farming: **social networks**, **a higher wine quality** and the **validation of farming practices**. Similarly, **social networks** can also create a barrier to convert to organic farming.

Firstly, **social networks** played an important role in sharpening the perceptions of farmers. Two farmers elaborated on how associations they are part of guided them through the process of certification and which aspects they got out of these advisory instances: “*You didn’t have anything before, but you get under an umbrella organization which is giving extremely helpful thoughts*” (C2). In this case the farmer is talking about the association Fair’N Green. Nevertheless, it exemplifies how important the opinion and advises of the association were for him and how they guided him in his farming decisions. Another farmer stressed the important assistance and advises of Biodyvin, especially in the conversion period (O2). One organic farmer told me how important good examples in the direct social environment of the farmer are: “*We were the first organic business in this village. We followed suit after other [estates] where we saw that they achieve good results with organic [farming] and now we are already six or seven estates in this village*” (O4). However, I was told one time by a conventional farmer how all farmers in leading positions of the most important association for quality wines in Germany, VDP, would produce their grapes biodynamically, but he was convinced that this is absolutely unnecessary (C1). This shows that social networks are important, but the personal ideology is still more important.

Furthermore, one farmer told me that the wine farming practices after organic principles convinced him to reach the goal of a **higher wine quality**: “*to produce wines which tell an individual, authentic story of the vineyard*” (O1). This is in line with other farmers who argued that organic wine was not drinkable ten years ago, because organic farmers back then seemed to be chaotic and did it only for the sake of organic farming and not to produce high quality wines (O1, O3, O4). This fact would have changed completely how one farmer told

me: *“You have smaller grapes, not so much water in the grapes, so you get higher qualities, much more concentrated wines, more intensive wines and that is fun”* (O4). The argument all four organic farmers used was that organically certified grapes which are not fertilized on the surface have to root deeper which would be reflected in the wine, namely the terroir would be more present (O1, O2, O3, O4). Terroir is an important aspect in wine quality and takes climate, cultivar or vine as well as soil as key components into account (van Leeuwen *et al.*, 2004; IFOAM EU Group, 2013). Moreover, one farmer expected that these wines with a present terroir would be better suitable for aging, which would often be valued by customers (O1).

Thirdly, some farmers saw the certification as a **validation for their farming practices**. They wanted to be able to show guidelines they are following (O1, O3, C2). One farmer argued that he wanted to stress with the label that his farming practices are more than a marketing instrument, but the validation of him following the legislative framework of organic farming: Otherwise, *„I am able to evoke the same association of costumers with my slogan”* (O1). One farmer stated also that he does not want to be the last non-organically certified farmer, but that he has his doubts on the usefulness of the certification (C2). However, four farmers (O1, O3, C1, C2) told me that the certification itself is not key to an environmentally friendly way of farming. One organic farmer said: *“That is a difficult topic, because certificates assume that there are yes and no decisions, but nature is too diverse to talk about black and white only”* (O1). He argued in line with two other farmers that *“there are conventional businesses (...) which manage their farm in some way ecologic and are in line with aspects, especially in the wine industry”* (O1). However, he thought as well that most businesses which farmed using organic principles would be on their way into certification by now. Another organic farmer explained that the certification is important to him: *“Either I am organic, then I’m certified and write on my label, or I am not, because it is fact that you have the loophole open”* (O3). With this he expressed how he is bound to organic regulations and that it is checked if organic farmers follow those. If a farmer is not officially certified, there is always the option to use synthetic products and no one does know how much of those products are used.

However, a **skeptical attitude of social networks** can also display a barrier to convert to organic farming. One farmer thought that the biggest barrier when converting to organic farming was that some employees quit, because they had another *“ideological view or also another professional view, because they had another opinion”* (O2). Other organic farmers told me that organic estates were seen as *“chaotic”* and *“laissez-faire”*, which was not something he aspired, *“so I was not sure if that [organic farming] would work”* (O1, O4). This goes along with another farmer who said: *“We did not want to be in the green corner and be thus smiled at or a little romanticized”*, so they are using their organic label as secondary marketing instrument (O2).

6.2.1 Financial Capital 💰

I found that, for the farmers I interviewed, financial motives were not as important considering the conversion to organic certified wine production. In contrast, the financial risk of **decreasing profits** illustrated a main barrier to conversion. The three dominant motives discussed were **higher profits**, **subsidies**, and **more sales** while the dominating barrier is the **potential reduction of profits**.

Firstly, all four organic farmers I interviewed were convinced that their **profits increased** in the last five years. However, all of them explained this increase with other aspects than the organic certification. One farmer (O1) saw a general positive trend for German wines on the international market and three farmers explained how the organic grape growing improved the quality of their wines which in turn led to higher profits (O2, O3, O4). One farmer told me that wines in the higher price sector (in this case €10 – €50) do not comprise a premium price for the organic certified product in contrast to cheaper wine (O1). On the contrary, another farmer thought that organic wines are more expensive: *“Of course, an organic wine is (...) more expensive than a conventionally produced one”* (O4).

Secondly, **subsidies** are received by all four organic farmers (O1, O2, O3, O4). However, all of them thought they were too low to be relevant in choosing to produce organically. One farmer described subsidies symbolically as *“nicely meant (...), but it has no influence on the profitability of my business”* (O1). Another farmer acknowledged, nevertheless, that subsidies helped to lower production costs (O2).

Thirdly, three farmers reported that organic wines **sell better** if wines have the same price and quality (O1, O3, O4). None of them saw this aspect as very important stressing that the quality and the story of the wines would be more important. One farmer told me: *“It tastes good, it looks good, it’s a good story behind and that is why it’s desirable”* (O4). Another biodynamic and organic farmer was convinced: *“If a brand should function well, than there can’t be anything which distracts from the brand”*, which is why his estate printed the biodynamic and organic labels on the back of the bottles (O2). However, one farmer decided to mention his organic certification on the front of the bottle to show clearly that it is an organic dry Riesling (O4).

On the other hand, three conventional farmers expected their **profit to decrease** if producing organically certified wine (C1, C3, C4). They argued that production costs would increase, but neither subsidies nor premium prices could cover the higher costs (C1, C3, C4). One farmer told me that he expected production costs to be about 20 to 30 % higher (C4) to produce organically certified. Moreover, he did not know anyone earning notably more money for his or her products only because they would be organic. Exemplifying how important this argument is for all farmers, he stated: *“And then are we already at the end of the line of argument”* (C4). Another farmer argued: *“I don’t think that [organic certification] would drive the profit. We are very satisfied with our profit in our business”* (C3). Furthermore, another farmer argued that the premium price for organically certified products would decrease, because since some years discount stores would sell organic products beating down the price (C3). This farmer was not convinced that organic products would be able to make a profit long-term and doubted if sustainability and ecology would be still topics in a couple of years (C3). Another farmer argued that only 50 % of the wine he processes in his winery would be from his own vineyards. He buys the other 50 % from conventionally grown grapes. If he would demand organically certified wine it could be delivered, but he would have to buy it in advance causing a higher risk for his business compared to conventional wine which he can order on demand (C4). However, one farmer also said that if he *“had enough money to work on the business and not in it”*, meaning if he had enough money to work on structural things and not aspects to keep the business running, he would consider practicing organic farming which is as close to nature as possible (C4).

6.2.2 Physical Capital

I could not identify any motives to convert to organic farming related to the physical capital. This could be due to the fact that I only asked farmers about their farm in a qualitative approach. The physical capital, as identified in the literature, addresses categories such as farm sizes or the number of income sources. In this case study, the farms were all comparable in size and for all wine was the only source of income. Thus, motives in this capital are not necessarily applicable for this study. However, that does not mean that there are no differences detectable in a more research design where more quantitative data are collected. The main barriers identified in the physical capital are **tight legislation, bureaucracy, and an increased amount of work**.

Firstly, three farmers discussed the **legal framework** and how big the constraints would be regarding sprayings and the use of sulfites (C1, C3, O2). One farmer argued that the limitations on how much he could spray would be too harsh (C1): *“I don’t want to bow to a dictate”* (C1). Another farmer discussed the limitations on sulfites in the winery and argued that these would be tough to comply with. That is, because the risk of fungi would be so high, which in conventional farming could be solved with sulfites in the winery when preserving the wines through adding sulfites, but there would be strict regulations for organic farming (C3). He saw this argument as so important that in his opinion, the certification is endangered itself and it is a main barrier for him to strive for an organic certification: *“That is for me a topic, where you can easily question the sustainability of ecological production.”* Moreover, one organic farmer was upset that the chemical industry succeeded sometimes to label *“plant strengthening agents”* as *“plant protection agents”* making it much harder for organic farmers to use these measures. In the legislative framework, it would be allowed to strengthen plans, but the regulations on plant protection agents would be much harsher (O2).

Secondly, one farmer complained about the **bureaucracy** when he would be certified: *“I don’t like it, this supervision. I don’t like it”* (C1). He argued that he has already so much paperwork to do and he does not want to voluntarily be under this additional pressure (C1).

Finally, some farmers argued that organic farming is too **much work**. One farmer told me that in an organic estate he knows *“there is no day and no night, there is no Saturday and no Sunday”* (C4). He expected the demand for employees as high and thought that it was not worth producing organically. This is in line with what two other farmers (C1, C2) told me of which one said: *“[organic farming] is very work intensive and I don’t want that”*, because he wanted still to spend time with his family (C1). Also two organic farmers elaborated on the fact that they had to be in their vineyards more often: *“You have to listen more often, because you can’t react so strong [on pests and diseases]”* (O3, O4).

6.2.3 Systembolaget

4. How does one of the world's biggest wine retailers, Systembolaget, influence perceived motives and barriers of wine farmers in Pfalz and Rheinhessen to convert to organic farming?

One criterion to select farmers was that they are selling at one of the world's biggest wine retailers, the Swedish alcohol monopoly Systembolaget. As one of the biggest wine retailers in the world, Systembolaget might influence motives and barriers farmers perceive to convert to organic farming.

Due to the fact that I adjusted my interview guideline after three conducted interviews, I asked five of the eight farmers if they knew about goals of Systembolaget concerning organic alcohol (O1, O3, O4, C2, C4). None of them had heard of any specific goals, but all of them, no matter if organic or conventional, had the feeling that organic wine played an important role for the retailer. One farmer told me: *"I came across (...) that there is the idea to increase [organic alcohol]"* (O1). Another farmer said: *"No, but I know from our importer that organic wines increase in importance"* (O4). They may not be aware of Systembolaget's specific goals, because they do not have direct contact with them. When selling wine at Systembolaget, a farmer works together with an importer and does not sell directly to the monopoly. One farmer commented: *"I am hardly ever in contact with them. My merchant on site does everything with [Systembolaget]"* (C2). An organic farmer told me: *"But I do have the feeling that Systembolaget looks for a production in harmony with nature or organic wine"* (O4).

However, one farmer who had the feeling that Systembolaget promotes organic wine was upset that they did not recognize the importance of other environmental concerns, such as carbon emissions. This farmer who is certified as Fair'N Green questioned that Systembolaget would not ask for production in harmony with nature, but only for organic certified wine in their tender, but *"it would also be nice, if sustainability would be included, too"* (C2). In his opinion, *"the main killer of the environment is rather CO₂ and less these measures [synthetic pesticides, herbicide and fertilizer]"* (C2). With his certification, he would, in the eyes of Systembolaget, still be the "swine" and complained about the "black and white-painting", meaning the picture of good organic and bad conventional farmers (C2). However, he decided to pursue his ideals and chose to focus on other aspects than required in organic certified farming.

Four farmers explained that they feel that Systembolaget prefers organic wine and that it has a positive influence on becoming organic. An organic farmer told me: *"It is apparently so that it [organic certification] facilitates our survival (...). So the world is shipshape for me"* (O1). Three other organic farmers (O1, O4, O3) expected the demand for organic alcohol to increase in the next years: *"You realize that (...), they naturally pay attention to what is happening in the country [Sweden], how it is eaten, how it is drunk. (...) That mirrors also in wines and I think that this [organic alcohol] will increase further"* (O3). Another farmer acknowledged an influence of Systembolaget and said that he would only consider converting to organic farming if he would not see another possibility, because it would be mainstream: *"I*

don't want to be alone some time (...), but I think that this [organic certification] is idiotic" (C2).

On the contrary, one conventional farmer elaborated on the risk of selling organic wine to Systembolaget. He buys wine from the local cooperative to fill up in bottles only for Systembolaget which he could get organically certified, but he had to buy the wine in advance: *"I have to say during the harvest or actually before: I will probably need xy hundred thousand liter next year for Systembolaget. And then the cooperation will say, that is okay, we take care of that, but you have to pay"* (C4). With conventional wine, he could buy the wine the moment he gets an order from Systembolaget, which has a lower production risk for him. Also, he can adjust the amount of conventional wine easily, whereas this would be more challenging with organic wine: *"Organic wine is not as easy to get in large amounts at push of the button"* (C4). Due to the fact that organic vines are in the minority of vineyards, the farmer saw it as more difficult to access organic wine.

7. Discussion

The discussion is structured in line with my four research questions. It answers the research questions and discusses implications, while also comparing findings in the literature and the empirical part. Moreover, I am illustrating limitations to this study and possible further research.

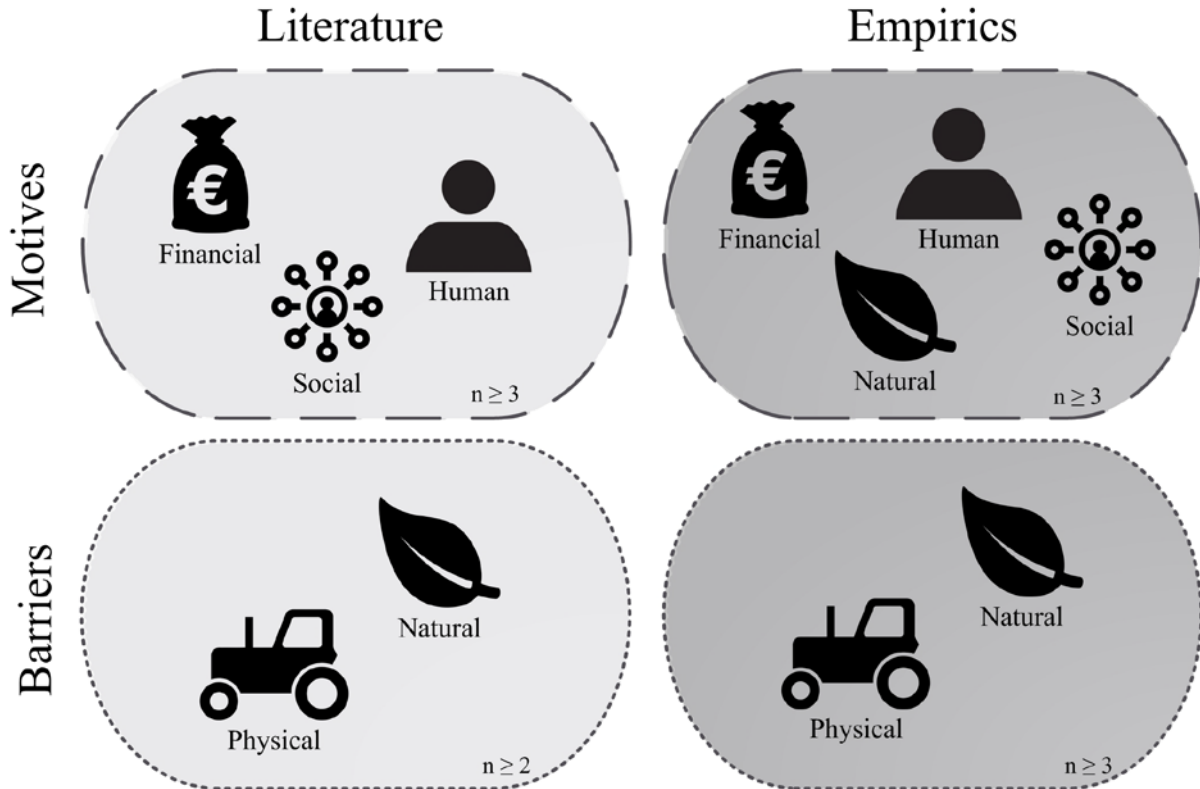


Fig. 9: Illustration of the capitals with the most categories identified in motives (border with small lines) and barriers (perforated border) to convert to organic farming in the literature (light gray) and the empirics (darker gray). *N* is the amount of categories which are identified in the capitals. Own illustration with icons from (the Noun Project, 2016).

In the following, findings from the literature and the empirics are presented in descending order of the amount of categories identified in each capital. **Figure 9** thus presents the capitals, in which categories are dominating by frequency.

7.1 Motives and Barriers to Convert Discussed in the Literature

To answer my first research question about motives and barriers to convert to organic farming within the EU I conducted a literature study. The literature study focused on agriculture within the EU with studies from 2000 or after.

It is striking that categories identified in the **human capital** comprise five **motives** with only one barrier. This stresses how important the views and perceptions of the farmer him- or herself are, which was also shown in a study on viticulture (among others) in Austria (Darnhofer *et al.*, 2005). As the farmer is the decision-maker about farming practices it is

crucial to consider his or her ideology and other aspects which are influencing the productivity of labor such as the age or the goal of challenging oneself or minimizing health risks for him- or herself and surrounding people. Similarly, education and knowledge were important in the adoption of organic farming as literature from Norway, Poland, France and Slovenia showed.

The second capital in which most motives were identified to convert to organic farming is placed in the **financial** and **natural capital**. The first addresses higher profits, subsidies and a premium price for products. All of these are of greatest importance, because economic motivations can be seen as the foundation of a decision process (Crowder and Reganold, 2015). The natural capital comprises categories connected to environmental conditions in general, so the goal to strengthen the ecosystem, soil protection and the general location of the farm. Strengthening the ecosystem and soil protection is generally discussed a lot and can be seen as important motives to convert to organic farming. Lauwere *et al.* (2004) named this aspects “cooperation with nature”, which shows the inherent goal of a farmer to protect the ecosystem he or she is working with.

The two last remaining capitals with motives identified are the **physical** and **social capital**. Whereas more farmland and the amount of income sources (physical capital) are not as relevant, because they do not directly apply to this case study, the support of social networks (social capital) is important to consider, because it influences the ideology of the farmer him- or herself (e.g. Bartulović and Kozorog, 2014). In Germany, organic agriculture is also seen as modern (König, 2004). The goal to produce high quality food is acknowledged in a study about Germany (König, 2004) as well as in a study on viticulture in Spain (Kallas *et al.*, 2010).

In contrast, there are also **barriers** which are discussed in the literature. Firstly, there is only one barrier identified in the **human capital**, because the ideology of a farmer will never be against the environment itself. Barriers are rather against aspects which are connected to the requirements of the European organic certification itself. This means that a farmer does rather not share the same values such as the way of protecting the soil or feels dictated by the legislation. However, little knowledge was identified as a barrier within the human capital as it increases the risk of a farmer to convert to organic farming if he or she does not have the feeling that the concept could be grasped with all its implications as found for instance by König (2004).

Secondly, in the **natural capital** it is often acknowledged that pest control is more challenging due to restricted use of pesticides, fertilizer and herbicide in organic farming. This leads also to smaller yields which are also identified to be a barrier within the natural capital.

Thirdly, categories directly connected to the certification in the **physical capital**, tight legislation and bureaucracy, are seen as a barrier in the literature, even though they only appeared as minor barriers. This aspect will most likely be persistent, because there often is an aversion to regulations put onto a farmer restricting him which lead in the past even to reversions to conventional farming (Sahm *et al.*, 2013).

Fourthly and importantly, in the **social capital** a skeptical attitude of the social network of a farmer influences him in the decision process to adopt organic farming practices, which was also recognized by a study about Germany (König, 2004). This is reasonable due to the fact that a lot of knowledge and perceptions are derived from social networks (e.g. Bartulović and Kozorog, 2014) and influence therefore the personal view on organic farming.

Finally, even though there is only one barrier identified in the **financial capital**, it is extremely important to consider, because financial security is crucial when taking decisions about the business (Crowder and Reganold, 2015). The expectation that sales are insecure or organic products might be not as demanded in the future is an aspect of survival of the farm for their owners. Thus, it might be the most important barrier to convert to organic farming.

7.2 Motives to Convert to Organic Farming

I conducted semi-structured interviews and analyzed answers of a questionnaire to answer my second research question about considered motives of wine farmers in Pfalz and Rheinhessen to convert to organic farming.

It is noteworthy that motives to convert to organic farming are equally distributed between the natural, human, social and financial capital. Only in the physical capital could no motive be identified.

Firstly, in the **natural capital** the goal to strengthen the ecosystem and soil protection were stressed as important points. Aspects from the natural capital were important motives for farming choices in general. The mentioned categories were crucial categories which motivated farmers to convert to organic farming. Less important was the location of the farm, which was in many cases rather an add-on to other, more important motives.

Secondly, in relation to the **human capital**, organic wine farmers were motivated to adopt organic farming principles due to their ideology, which can be seen as one of the cores to convert to organic farming. Without the belief that organic farming is something to be strived for, probably no incentive of other capitals will finally convince a farmer to convert. The motives of minimizing health risks and the goal of professional challenges can support the decision to convert but were in the interviews rather small aspects.

Thirdly in the **social capital**, social networks are closely connected to the personal ideology of a farmer. Thus, their viewpoint on organic farming can create an important motive or barrier. Important for almost all farmers was to be able to tell a story about their wine; that organic vines root deeper which stresses the terroir of a wine helped them to create this story about a high quality of their wine. Finally, an add-on of the adoption of organic practices is that a label brings validity to the story a farmer tells about his or her wine.

Fourthly, the **financial capital** motivated farmers to convert to organic farming due to higher profits. However, they stressed that these development is a general trend for their business and their organic label only supported it, but was not the main driver. Moreover, some doubted that there were premium prices for organic wine and all organic farmers saw subsidies as too low.

Finally, I could not identify any motives in the **physical capital**. As elaborated before, this might be due to the research design as a qualitative approach. Whereas the physical capital

addresses categories such as farm sizes or the number of income sources in the literature, this study aimed to investigate in farms with similar farm properties. Therefore, motives in the physical capital do not necessarily become apparent. However, there might be undetected motives in this study which could be placed in the physical capital.

7.3 Barriers to Convert to Organic Farming

In my third research question I asked wine farmers in Pfalz and Rheinhessen which barriers they consider in converting to organic farming. To answer this question, the same approach as in the previous chapter was chosen with semi-structured interviews and questionnaires. I am discussing how identified barriers to convert to organic farming could possibly be diminished.

Barriers to convert to organic farming dominate in numbers in the natural and physical capital. However, ideological barriers to convert to organic farming are probably the most important to consider, even though it is the only identified barrier in the **human capital**. This is due to the fact that organic farming has to be seen as convincing as a concept first, before a farmer considers conversion. Some farmers did not see any benefit in organic farming or had values which were contradicting the legislative framework of the European Union. Only in an open discussion between different stakeholders will it be possible to align values to motivate more farmers to conversion. Nevertheless, different perceptions and ideologies will always persist.

Farmers criticized the sustainability aspects of organic farming massively which illustrates the barriers within the **natural capital**. Firstly, to protect the plant so that it does not get sick, more frequently sprayings are required causing a higher use of fuel and compressing the soil. Secondly, copper is used as a natural pesticide, but some farmers argue that it enriches in the soil contaminating it as a heavy metal. These aspects are also acknowledged in research discourses (e.g. Coll *et al.*, 2011; Mackie *et al.*, 2012; Kuflik *et al.*, 2009) and are crucial when considering the farmers' perception about the sustainability of organic wine production. Finally, farmers were worried that their abilities to treat pests are so limited that it creates a main barrier, because the risk of bad yields increases.

In the **physical capital**, bureaucracy and tight legislation go hand-in-hand. Whereas some farmers dislike the paperwork and controls, other farmers think that the restrictions on possible measures, plant strengthening substances, would be too tight. Some farmers also saw the workload as too high. These barriers will probably always be persistent and can only be dealt with in an open discourse between authorities and farmers to decrease prejudices.

In addition, financial risk as the only identified barrier in the **financial capital** is extremely important to consider, because even though farmers are convinced that organic farming is to be strived for, the financial risk might stop them from converting which is also concluded in research (Crowder and Reganold, 2015). Several farmers argued that neither subsidies nor premium prices are sufficient to cover higher costs in organic farming. In addition, they are mostly satisfied with their profit. Thus, if they do not have the belief that organic farming is better and there is no financial incentive, they will not convert due to a lack of motivation.

Finally, the only barrier identified in the **social capital** is a skeptical attitude of the social network. This is important to consider as social networks shape perceptions and values of an individual. Thus, they influence if a farmer even considers conversion to organic farming.

7.4 Comparison between Motives and Barriers Discussed in the Literature and from the Empirics

Due to the fact that the literature discussed generally agriculture in Europe which is much broader than the case study, it is reasonable that some findings are different. Striking differences as well as similarities are discussed in each of the five capitals.

Both, findings in the literature and interviews indicate in the **natural capital** that the motive to protect the soil is important to consider. Whereas it is in the literature about motives and barriers to convert to organic farming hardly criticized that organic farming is environmentally friendlier than conventional farming, findings from the interviews show as well that some farmers doubt the environmental friendliness of organic farming.

Moreover, smaller yields in organic farming are discussed in the literature as a barrier to convert. However, in the interviews these are seen as an aspect to increase the quality of the wine. Due to the fact that wine is a processed product, the quantity is not necessarily as important as the quality grapes have to produce high quality wine.

Even though ideology (**human capital**) plays an important role in the literature it does not seem as important as in the interviews conducted. This could be due to the fact that it is a marketing strategy of interviewed wine farmers to sell a story and place their wine in a context. Thus, the motivation of a farmer himself with his ideology might be stressed more than in other farming sectors, where the story around a product is not stressed and the product stands for itself without knowing the farmer who produced it.

On the contrary, an ideology against organic farming could also be identified in the empirical part, whereas it some literature indicated that there are hardly ideologies against organic farming exist (Lauwere *et al.*, 2004). However, a study on viticulture in Austria (Darnhofer *et al.*, 2005) is in line with my findings from the interviews that there are ideological constraints to convert to organic farming.

Within the **social capital**, the supporting role of social networks is acknowledged as a motive to convert to organic farming in both, the literature and the empirics. Similarly, social networks can also create a barrier to convert to organic farming if the farmers are skeptical which is discussed in both, the literature and interviews. However, the product quality played a more important role in the interviews, where it was not as stressed in the literature. This might result in differences in product demands: Whereas organic and thus deeper rooting vine makes terroir better detectable, this aspect is not so important for crops or vegetables.

The motives in the **financial capital** seem to be more important in the literature than from the interviews. The analysis of the interviews indicates that financial incentives are important to support the decision to convert to organic farming, but they are not the driving factor where the ideology is more important. This might be due to the fact that wine is a product where the story is considered to be important and trust in the product is crucial for consumers to decide for it (Bonn *et al.*, 2016).

However, as Crowder and Reganold (2015) conclude, organic agriculture will only expand if the concept is proved to be economically profitable. This is in line with empirical findings and the financial risk as a barrier to convert. Thus, it is an important aspect to consider when trying to incentivize organic farming.

Finally, there was no motive to convert to organic farming identified in the interviews within the **physical capital**. As discussed, this might be due to the fact that this thesis uses a qualitative approach which might not indicate aspects of the physical capital as clearly as other capitals, because the physical capital assesses mainly quantitative data about a farm.

On the contrary, barriers to convert to organic farming stress tight legislative frameworks and much bureaucracy in the literature and empirical findings. These aspects should therefore be looked at when trying to diminish barriers to convert to organic farming.

7.5 Systembolaget's Influence on Motives and Barriers to Convert to Organic Farming

My fourth research question discusses the influence of Systembolaget on motives and barriers of wine farmers in Pfalz and Rheinhessen to convert to organic farming. I argue that Systembolaget as one of the worlds' biggest wine retailer plays a big role in possible business relationships with bigger farmers in the study region. That retailers are an important part of sustainable supply chains is acknowledged in the literature (Committee on Twenty-First Century Systems Agriculture and National Research Council, 2010; Smith, 2008). It was, for instance, shown that Unilever can influence supply chains in a more sustainable direction (Pretty *et al.*, 2008). Furthermore, the initiative Brazil's Soy Moratorium (SoyM) showed that pressure of retailers and nongovernmental organizations (NGO's) on soybean traders can enhance environmental protection. In the initiative, soybean traders agreed not to buy soybeans from areas which were deforested after 2006. Even though the project is evaluated having flaws such as a not long enough commitment, it is still seen as an important step in the supply chain protecting forests in the Amazon, which is led by companies committing to the scheme (Gibbs *et al.*, 2015). Thus, the retailer Systembolaget might influence perceptions on organic farming due to the fact that it has a policy to promote organic wine. To answer this research question, I used the same approach as described in 7.3 Barriers to Convert to Organic Farming.

All of the interviewed farmers recognized that Systembolaget favored organic wine. While organic farmers acknowledged that it can possibly help them to sell wine to Systembolaget and motivated them to produce organically, conventional farmers were hesitant to see it this way. One farmer stressed the risks which are connected to the work with Systembolaget. This is that the amounts of wine he needs for it would be difficult to get as organic. Due to the fact that the organic vineyard share is only 7.6 % of the total vineyard area in Germany, this will remain an issue.

Nevertheless, one farmer elaborated on the fact that other certifications, in his case Fair'N Green would not be considered by Systembolaget, even though he perceives the label as more sustainable than the European organic label. It is to question, which standards Systembolaget defined to label a certificate as organic or not, which might display a limitation of Systembolaget's goal to engage farmers in environmentally friendlier farming due to the fact that farmers do not know the criteria either. These criteria are not clear after reading information on the homepage and in leaflets which are available in Systembolaget shops, but could increase the knowledge of customers and guarantee an informed decision.

In sum, Systembolaget influences organically certified farmers in a sense that they acknowledge the label and favor, in the perception of the farmers, organic wine. This helps organic farmers to ensure sales (financial capital) and supports them in their decision to produce organic wine (social capital). Also conventional farmers recognize the goal of Systembolaget, which was an incentive for farmers to think about conversion to organic farming. However, Systembolaget has only an influence on two of the five capitals, namely in the financial and social capital, which is only a part of the capitals a farmer considers in the conversion to organic farming. Therefore, they do not foster more organic farming as an actor alone, but are able to contribute to the development if other institutions also incentivize organic wine.

7.6 Policy Implications for Germany

In order to reach the sustainability goal of 20 % organic agricultural land, which was formulated by the Federal Government of Germany, more efforts have to be put into incentivizing organic farming according to the EU-legislation (Federal Statistical Office of Germany, 2016). As this thesis explored in-depth which motives and barriers wine farmers in Pfalz and Rheinhessen have to convert to organic farming, this chapter lays out some potential policy implications for Germany to support their goal. These implications are firstly, ensuring **financial profitability**, secondly, promoting organic farming to influence **the farmers' ideology**. Thirdly, the **use of copper** should be revised. Fourthly, the **story of a product** could be stressed and finally, the **influence of retailers** should not be neglected.

Firstly, organic farmland will only increase if it is considered to be **financially profitable** (Crowder and Reganold, 2015). In Germany, the financial support system for organic farming should be revised in cooperation with the European Union if it is aimed to expand the share of organic agricultural land. This could mean, for instance, that subsidies are increased. Farmers should be involved in the process to be able to express their opinions and to gain trust in the schemes, because even organic farmers evaluated that subsidies as too low to cover the costs.

Secondly, the **ideology** of some farmers hinders the conversion to organic farming. In a first step, creating the opportunity for farmers to discuss motives and barriers freely would be important. This can be done with information from official points, important literature to farmers or discussion among farmers. As more and more farms convert to organic farming, the discourse is likely to be increased among farmers, whereas it should be further promoted by official instances. However, in a second step public education about organic farming could be increased further to raise awareness of the concept and to increase demand. Moreover, social networks might develop a more positive view on this farming practice.

Furthermore, legislative authorities should reconsider aspects in the natural capital, such as the use of copper or the amount of sprayings needed in order to strengthen the vines. Especially the use of **copper** is controversially discussed by farmers and is currently being assessed in the legislative framework of the EU in order to evaluate the impact of copper salts in the soil. For instance, a discussion which has been taking place in the last years is if potassium-phosphonate should be allowed in organic farming due to the fact that it can potentially reduce the need of copper (IFOAM EU Group, 2013). Moreover, the European project CO-FREE, which runs till summer 2016 strives to find alternatives to the use of

copper among other agricultural sectors also in vineyards (CO-FREE, 2015). However, a decision about the use of copper, which can be supported from a practical perspective as well as from the perspective of environmental protection should be taken soon. The negotiation process could help to find alternatives for copper or make the legislative framework more reliable if copper is further allowed. In the moment, the permission to use copper is only valid till 2018, causing insecurity for farmers of how they can fight downy mildew (Regel, E., Kauer, R., Szolnoki, G., 2016; Berkelmann-Löhnertz, 2016). This decision does not only influence the measures a farmer can take in the vineyard, but also the ideology and connected to that the perception, if organic farming is sustainable or not. Thus, it is important to consider.

Fourthly, the **story behind wines** was stressed by several interviewed farmers as being crucial in their marketing strategy. Some farmers saw the organic certification as a validation of their environmentally friendly work and thought it would help them communicating the high quality of their wines as, for instance, the terroir would be better indicatable. Thus, the organic certification can help to promote the product, which could be stressed also in other agricultural fields. One successful example of promoting a story around a product zooming out to a bigger picture is the labels, which stress a certain place of origin. In the European Union, there are three labels pointing out a specific designation of a place (Protected Designation of Origin, PDO), a specific place (Protected Geographical Indication, PGI) or a traditional way of producing foodstuffs (Traditional Specialty Guaranteed, TSG) (European Commission, 2009). This strategy of pointing out specifics about a product with which a relationship with a product can be established by the customer could also be stressed for organic products.

Finally, Systembolaget as a part of the value chain plays already an important role and will increase further if values of the **retailer** are communicated more transparently and products according to the values are favored. Therefore, the role of importers has to be looked at to understand if and how they are transporting Systembolaget's values. Moreover, the values Systembolaget promotes could be communicated more openly for the consumer to grasp the labelling better. If Systembolaget would increase its aim to increase organic products from 10 % up to 20 % this would increase the efforts of the retailer and incentivize organic wine further. Furthermore, Germany could work together with retailers in general to incentivize the promotion of organic products in order to reach their organic farmland aim. Whereas the alcohol monopolies in the Nordic countries play an important role for alcoholic products, other food retailers could be focused on for other agricultural products.

7.7 Limitations

This thesis has limitations in three relevant dimensions concerning sustainable development, the five capitals framework as well as the thesis in general.

Firstly, it is acknowledged that organic farming is a way to a sustainable development (Reganold and Wachter, 2016). However, it is only one way forward with many other potential sustainable farming practices. Thus, I want to stress that I am not claiming that organic farming is the one and only way to a sustainable development. However, due to the fact that is widely accepted in the institutional context of this thesis, namely from the EU,

Germany and Systembolaget, it is a way to frame this thesis and explore one possible way while being aware that it is a limited frame.

Secondly, the five capitals framework is mostly applied in developing countries and within the context of the sustainable livelihood framework (Morse and McNamara, 2013). In this notion, it is used to assess livelihood in numbers and facts. In this thesis, I am taking another approach and assess perceived motives and barriers to convert to organic farming and focus thus more on lifestyle choices than striving for survival. This can be seen as a development of the framework which is explored within the thesis. It can, however, be perceived in the sense that this approach is unfamiliar in relation to other applications.

Finally, time and economic constraints cause the number of questionnaires and interviews to be rather low. Therefore, it cannot be claimed that this thesis can neither be generalized for Pfalz and Rheinhessen nor for Germany. However, it gives an in-depth impression in motives and barriers of wine farmers in the region to convert to organic farming.

7.8 Possible Future Research

In future research brought up aspects could be investigated further to get a comprehensive view on the perception of wine farmers in Germany to help striving for the goal of 20 % agricultural share in Germany. This requires, that the successful example of viticulture is analyzed further and identified barriers are tried to diminish.

Furthermore, a comparison of the successful conversion example of viticulture and other agricultural sectors could be aimed for to offer similar incentives in other agricultural sectors as well in order to reach the goal of 20 % organic share in agricultural land. As stated before, if the total agricultural sector would develop like the organic vineyard area, the goal would theoretically be reached within 10 years.

8. Conclusion

The objective of this thesis was to discuss, which motives and barriers wine farmers in Pfalz and Rheinhessen, Germany, have to convert to organic farming. I showed that the motives are manifold. Whereas the discussion in the literature was dominated by categories in the financial, social and human capital, the empirical part revealed most motivations are placed additionally in the natural capital. Ideology and supporting social networks were possibly the most important factors when financial security is ensured. Moreover, barriers which are brought up in literature and the empirics dominate in frequency in the physical and natural capital. However, ideology against organic farming and the financial risk when converting are potentially the most important barriers.

Systembolaget as an institution in the value chain of wine plays already an important role and will increase further if values of the retailer are communicated and products according to the values are favored. Therefore, the role of importers has to be looked at to understand if and how they are transporting Systembolaget's values. Moreover, the values Systembolaget promotes could be communicated more openly for the consumer to grasp the labelling better.

If it is aimed to incentivize organic farming as strived for by the German government, it has to be focused on diminishing perceived barriers and promoting motives. Firstly and most importantly, the fear of financial instability should be diminished and thus support schemes should be revised. Secondly, ideological barriers about organic farming should be addressed, which could be done in an open discussion. Connected to this is thirdly, the use of copper and its environmental impacts. Finding alternatives or a compromise should be focused on. Fourthly, organic farming should as well be promoted as a possible marketing tool and finally, the influence of retailers should not be neglected, but supported if Germany wants to reach their goal of 20% organic farmland.

All in all, certifications bring always the challenge that it is focused quite narrowly on a set of rules which mirror a certain perspective and values. They suggest that one has to take either/or decisions. However, I want to stress that there are many ways for sustainable development. A combination of efforts and good solutions is needed. Certifications and with it the European label for organic farming can be seen as one potential way forward and should thus not be neglected, but acknowledged as one possible way for transparency and power to the consumer who can then decide with his or her best knowledge.

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References

- Ajzen, I. (2005), *Attitudes, personality, and behavior, Mapping social psychology*, 2nd ed, Open University Press, Maidenhead, Berkshire, England, New York.
- Allmark, P., Boote, J., Chambers, E., Clarke, A., McDonnell, A., Thompson, A. and Tod, A.M. (2009), “Ethical Issues in the Use of In-Depth Interviews. Literature Review and Discussion”, *Research Ethics*, Vol. 5 No. 2, pp. 48–54.
- Anderson, M.W., Teisl, M. and Noblet, C. (2012), “Giving voice to the future in sustainability. Retrospective assessment to learn prospective stakeholder engagement”, *Ecological Economics*, Vol. 84, pp. 1–6.
- Bartulović, A. and Kozorog, M. (2014), “Taking up organic farming in (pre-)Alpine Slovenia. Contrasting motivations of dairy farmers from less-favoured agricultural areas”, *Anthropological Notebooks*, Vol. 20 No. 3, pp. 83–102.
- Bebbington, A. (1999), “Capitals and Capabilities. A Framework for Analyzing Peasant Viability, Rural Livelihoods and Poverty”, *World Development*, Vol. 27 No. 12, pp. 2021–2044.
- Bellon, S. and Lamine, C. (2009), “Conversion to Organic Farming: A Multidimensional Research Object at the Crossroads of Agricultural and Social Sciences - A Review”, in Lichtfouse, E., Navarrete, M., Debaeke, P., Véronique, S. and Alberola, C. (Eds.), *Sustainable Agriculture*, Springer Netherlands, Dordrecht, pp. 653–672.
- Berkelmann-Löhnertz, B. (2016), “Bleibt Kupfer dem Weinbau Erhalten?”, *Der Deutsche Weinbau*, Vol. 7.
- Best, H. (2009), “Organic Farming as a Rational Choice. Empirical Investigations in Environmental Decision Making”, *Rationality and Society*, Vol. 21 No. 2, pp. 197–224.
- Biodivin (2016), “Bio-dynamics”, available at: <http://www.biodivin.com/medias/cVS61pAqjF7g/files/modules/plaquette.pdf> (accessed 31 March 2016).
- Bonn, M.A., Cronin, J.J. and Cho, M. (2016), “Do Environmental Sustainable Practices of Organic Wine Suppliers Affect Consumers Behavioral Intentions? The Moderating Role of Trust”, *Cornell Hospitality Quarterly*, Vol. 57 No. 1, pp. 21–37.
- Brown, P.R., Nelson, R., Jacobs, B., Kokic, P., Tracey, J., Ahmed, M. and DeVoil, P. (2010), “Enabling natural resource managers to self-assess their adaptive capacity”, *Agricultural Systems*, Vol. 103 No. 8, pp. 562–568.
- Bund Ökologische Lebensmittelwirtschaft (BÖLW) (2014), *Zahlen, Daten, Fakten: Die Bio-Branche 2014*, Berlin.
- Bundesministeriums der Justiz und für Verbraucherschutz (2016), *Weingesetz in der Fassung der Bekanntmachung vom 18. Januar 2011 (BGBl. I S. 66), das durch Artikel 3 des Gesetzes vom 16. Januar 2016 (BGBl. I S. 52) geändert worden ist: Weingesetz. WeinG 1994*.

- Caprio, E., Nervo, B., Isaia, M., Allegro, G. and Rolando, A. (2015), “Organic versus conventional systems in viticulture. Comparative effects on spiders and carabids in vineyards and adjacent forests”, *Agricultural Systems*, Vol. 136, pp. 61–69.
- Carney, D. (1998), *Sustainable rural livelihoods: What contribution can we make? ; papers presented at the Department for International Development's Natural Resources Advisers' Conference, July 1998, Issues*, London.
- Chadegani, A.A., Salehi, H., Yunus, M.M., Farhadi, H., Fooladi, M., Farhadi, M. and Ebrahim, N.A. (2013), “A Comparison between Two Main Academic Literature Collections. Web of Science and Scopus Databases”, *Asian Social Science*, Vol. 9 No. 5.
- CO-FREE (2015), “Innovative strategies for copper-free low input and organic farming systems. General Information”, available at: <http://www.co-free.eu/index.php> (accessed 10 May 2016).
- Coll, P., Le Cadre, E., Blanchart, E., Hinsinger, P. and Villenave, C. (2011), “Organic viticulture and soil quality. A long-term study in Southern France”, *Applied Soil Ecology*.
- Collins, C., Penfold, C., Johnston, L., Marschner, P. and Bastian, S. (2015), “The Relative Sustainability of Organic, Biodynamic and Conventional Viticulture. AGWA Final Report, Project No. UA 1102”, *University of Adelaide*.
- Commission implementing Regulation (EU) No 203/2012, of 8 March 2012 amending Regulation (EC) No 889/2008 laying down detailed rules for the implementation of Council Regulation (EC) No 834/2007, as regards detailed rules on organic wine.
- Commission Regulation (EC) No 889/2008, of 5 September 2008 laying down detailed rules for the implementation of Council Regulation (EC) No 834/2007 on organic production and labelling of organic products with regard to organic production, labelling and control.
- Committee on Twenty-First Century Systems Agriculture and National Research Council (2010), *Toward Sustainable Agricultural Systems in the 21st Century*, National Academies Press, Washington, D.C.
- Corbin, J.M. and Strauss, A.L. (2015), *Basics of qualitative research: Techniques and procedures for developing grounded theory*, Fourth edition, SAGE, Los Angeles.
- Council Regulation (EC) No 834/2007, of 28 June 2007 on organic production and labelling of organic products and repealing Regulation (EEC) No 2092/91.
- Council Regulation (EEC) No 2092/91, of 24 June 1991 on organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs.
- Cowen, M.P. and Shenton, R.W. (1998), “Agrarian doctrines of development. Part I”, *The Journal of Peasant Studies*, Vol. 25 No. 2, pp. 49–76.
- Cranfield, J., Henson, S. and Holliday, J. (2010), “The motives, benefits, and problems of conversion to organic production”, *Agriculture and Human Values*, Vol. 27 No. 3, pp. 291–306.

- Crowder, D.W. and Reganold, J.P. (2015), “Financial competitiveness of organic agriculture on a global scale”, *Proceedings of the National Academy of Sciences*, Vol. 112 No. 24, pp. 7611–7616.
- Dagostin, S., Schärer, H.-J., Pertot, I. and Tamm, L. (2011), “Are there alternatives to copper for controlling grapevine downy mildew in organic viticulture?”, *Crop Protection*, Vol. 30 No. 7, pp. 776–788.
- D'Amico, M., Di Vita, G. and Monaco, L. (2016), “Exploring environmental consciousness and consumer preferences for organic wines without sulfites”, *Journal of Cleaner Production*, Vol. 120, pp. 64–71.
- Darnhofer, I., Schneeberger, W. and Freyer, B. (2005), “Converting or not converting to organic farming in Austria. Farmer types and their rationale”, *Agriculture and Human Values*, Vol. 22 No. 1, pp. 39–52.
- Demeter International (2016), “This is Demeter”, available at: <http://www.demeter.net/what-is-demeter/this-is-demeter> (accessed 5 April 2016).
- Deutsches Weininstitut GmbH (2015), *Deutscher Wein: Statistik 2015*, Mainz.
- Dhakal, S.P. (2011), “The Five Capitals Framework for Exploring the State of Friends’ Groups in Perth, Western Australia. Implications for Urban Environmental Stewardship”, *The International Journal of Environmental, Cultural, Economic and Social Sustainability*, Vol. 7 No. 2, pp. 135–147.
- Döring, J., Frisch, M., Tittmann, S., Stoll, M. and Kauer, R. (2015), “Growth, Yield and Fruit Quality of Grapevines under Organic and Biodynamic Management”, *PloS one*, Vol. 10 No. 10, pp. e0138445.
- Ecocert (2016), “Certification body”, available at: <http://www.ecocert.com/en/certification> (accessed 5 April 2016).
- Ellis, E.C. and Ramankutty, N. (2008), “Putting people in the map: anthropogenic biomes of the world”, *Frontiers in Ecology and the Environment*, Vol. 6 No. 8, pp. 439–447.
- Ellis, F. (2000), *Rural livelihoods and diversity in developing countries*, Oxford University Press, Oxford, New York, NY.
- Erb, K.-H., Lauk, C., Kastner, T., Mayer, A., Theurl, M.C. and Haberl, H. (2016), “Exploring the biophysical option space for feeding the world without deforestation”, *Nature Communications*, Vol. 7, p. 11382.
- European Commission (2009), “Agriculture and Rural Development. Geographical Indications and Traditional Specialities”, available at: http://ec.europa.eu/agriculture/quality/schemes/index_en.htm (accessed 11 May 2016).
- European Commission (2012), *MEMO on Organic Wine rules: Frequently Asked Questions*.
- European Commission (2014), *Agriculture: A partnership between Europe and farmers, European Union explained*, 2014th ed., Publications Office of the European Union, Luxembourg.

- European Commission (2015), “The EU Organic Logo”, available at: http://ec.europa.eu/agriculture/organic/downloads/logo/index_en.htm (accessed 15 April 2016).
- European Commission (2016), “Agriculture and Rural Development. Organic Wine”, available at: http://ec.europa.eu/agriculture/organic/eu-policy/eu-rules-on-production/wine/index_en.htm (accessed 27 April 2016).
- European Economic Area (2013), *The Basic Features of the EEA Agreement*.
- European Environmental Agency (2015), *SOER 2015 - The European environment - state and outlook 2015: Cross-country comparisons. Agriculture - organic farming*.
- FAIR and GREEN e.V. (2016), “What is FAIR'N GREEN?”, available at: <http://www.fairandgreen.de/en/about-fair-green/> (accessed 31 March 2016).
- FAO (2015), “Organic Agriculture. What are the environmental benefits of organic agriculture?”, available at: <http://www.fao.org/organicag/oa-faq/oa-faq6/en/> (accessed 2 December 2015).
- FAOSTAT (2015), “Statistics Division”, available at: <http://faostat3.fao.org/download/R/RL/E> (accessed 25 April 2016).
- Federal Agency for Cartography and Geodesy (2014), *Verwaltungsgebiete 1 250 000: GeoBasis-DE*, Leipzig.
- Federal Agency for Cartography and Geodesy (2015), *Geographische Namen 1 250 000: GeoBasis-DE*, Leipzig.
- Federal Statistical Office (2014), *Nachhaltige Entwicklung in Deutschland: Indikatorenbericht 2014*, Wiesbaden.
- Federal Statistical Office of Germany (2016), *Umweltökonomische Gesamtrechnungen Nachhaltige Entwicklung in Deutschland: Indikatoren zu Umwelt und Ökonomie*, Wiesbaden.
- Fisher, M.W., Small, B.H., Mackay, A.D., Kenny, G.J., Jerebine, B.C. and Parminter, T.G. (2004), “Understanding shepherding within lambing, and organic farming systems through acknowledging cultural, community and individual influences”, *Proceedings of the New Zealand Society of Animal Production*, Vol. 64, pp. 183–187.
- Flaten, O., Lien, G., Ebbesvik, M., Koesling, M. and Valle, P.S. (2006), “Do the new organic producers differ from the ‘old guard’? Empirical results from Norwegian dairy farming”, *Renewable Agriculture and Food Systems*, Vol. 21 No. 03, pp. 174–182.
- Fraga, H., Malheiro, A.C., Moutinho-Pereira, J. and Santos, J.A. (2012), “An overview of climate change impacts on European viticulture”, *Food and Energy Security*, Vol. 1 No. 2, pp. 94–110.
- Gattinger, A., Muller, A., Haeni, M., Skinner, C., Fliessbach, A., Buchmann, N., Mader, P., Stolze, M., Smith, P., Scialabba, N.E.-H. and Niggli, U. (2012), “Enhanced top soil carbon

- stocks under organic farming”, *Proceedings of the National Academy of Sciences*, Vol. 109 No. 44, pp. 18226–18231.
- Gibbs, H.K., Rausch, L., Munger, J., Schelly, I., Morton, D.C., Noojipady, P., Soares-Filho, B., Barreto, P., Micol, L. and Walker, N.F. (2015), “Brazil's Soy Moratorium”, *Science*, Vol. 347 No. 6220, pp. 377–378.
- Gill, P., Stewart, K., Treasure, E. and Chadwick, B. (2008), “Methods of data collection in qualitative research. Interviews and focus groups”, *BDJ*, Vol. 204 No. 6, pp. 291–295.
- Gillham, B. (2005), *Research interviewing: The range of techniques*, Open University Press, Maidenhead, New York.
- Gomiero, T., Pimentel, D. and Paoletti, M.G. (2011), “Environmental Impact of Different Agricultural Management Practices. Conventional vs. Organic Agriculture”, *Critical Reviews in Plant Sciences*, Vol. 30 No. 1-2, pp. 95–124.
- Halberg, N., Sulser, T.B., Høgh-Jensen, H., Rosegrant, M.W. and Knudsen, M.T. (2006), “The impact of organic farming on food security in a regional and global perspective”, in Halberg, N., Alrøe, H.F., Knudsen, M.T. and Kristensen, E.S. (Eds.), *Global development of organic agriculture: challenges and prospects*, CABI, Wallingford, pp. 277–322.
- Hassan, R.M., Scholes, R.J. and Ash, N. (2005), *Ecosystems and human well-being: Current state and trends findings of the Condition and Trends Working Group of the Millennium Ecosystem Assessment, The millennium ecosystem assessment series*, vol. 1, Island Press, Washington, DC.
- IFOAM EU Group (2013), *EU rules for Organic Wine Production: Background, Evaluation and Further Sector Development*, Brussels.
- Kallas, Z., Serra, T. and Gil, J.M. (2010), “Farmers’ objectives as determinants of organic farming adoption. The case of Catalanian vineyard production”, *Agricultural Economics*, Vol. 41 No. 5, pp. 409–423.
- Karlen, D.L., Cambardella, C.A., Bull, C.T., Chase, C.A., Gibson, L.R. and Delate, K. (2007), “Producer–Researcher Interactions in On-Farm Research. A Case Study on Developing a Certified Organic Research Site”, *Agronomy Journal*, Vol. 99 No. 3, p. 779.
- Kates, R.W., Clark, W.C., Corell, R., Hall, J.M., Jaeger, C.C., Lowe, I., McCarthy, J.J., Schellnhuber, H.J., Bolin, B., Dickson, N.M., Faucheux, S., Gallopin, G.C., Grubler, A., Huntley, B., Jäger, J., Jodha, N.S., Kasperson, R.E., Mabogunje, A., Matson, P., Mooney, H., Moore III, B., O’Riordan, T. and Svedin, U. (2001), “Sustainability Science”, *Science*, Vol. 292 No. 5517, pp. 641–642.
- Kaufmann, P., Zemeckis, R., Skulskis, V., Kairyte, E. and Stagl, S. (2011), “The Diffusion of Organic Farming in Lithuania”, *Journal of Sustainable Agriculture*, Vol. 35 No. 5, pp. 522–549.
- Koch, J., Martin, A. and Nash, R. (2013), “Overview of perceptions of German wine tourism from the winery perspective”, *International Journal of Wine Business Research*, Vol. 25 No. 1, pp. 50–74.

- Koesling, M., Flaten, O. and Lien, G. (2008), “Factors influencing the conversion to organic farming in Norway”, *Int. J. Agricultural Resources, Governance and Ecology (International Journal of Agricultural Resources Governance and Ecology)*, Vol. 7 No. 1-2, pp. 78–95.
- König, B. (2004), “Adoption of Sustainable Production Techniques. Structural and Social Determinants of the Individual Decision Making Process”, *Acta Horticulturae*, No. 655, pp. 259–267.
- KRAV (2015), “Om KRAV”, available at: <http://www.krav.se/om-krav> (accessed 5 April 2016).
- Kubala, J., Jurczak, M.G., Cichon, M. and Nieszporek, K. (2008), “Motivations for organic farming among farmers from Malopolska Province, Poland”, *International Journal of Environment and Sustainable Development*, Vol. 7 No. 3, p. 345.
- Kuflik, T., Prodorutti, D., Frizzi, A., Gafni, Y., Simon, S. and Pertot, I. (2009), “Optimization of copper treatments in organic viticulture by using a web-based decision support system”, *Computers and Electronics in Agriculture*, Vol. 68 No. 1, pp. 36–43.
- Lamine, C. and Bellon, S. (2009), “Conversion to organic farming: a multidimensional research object at the crossroads of agricultural and social sciences. A review”, *Agronomy for Sustainable Development*, Vol. 29 No. 1, pp. 97–112.
- Läpple, D. and Kelley, H. (2013), “Understanding the uptake of organic farming. Accounting for heterogeneities among Irish farmers”, *Ecological Economics*, Vol. 88, pp. 11–19.
- Lauwere, C.C. de, Drost, H., Buck, A.J. de, Smit, A.B., Balk-Theuws, L.W., Buurma, J.S. and Prins, H. (2004), “To Change or not to Change? Farmers' Motives to Convert to Integrated or Organic Farming (or not)”, *Acta Horticulturae*, No. 655, pp. 235–243.
- Longbottom, M.L. and Petrie, P.R. (2015), “Role of vineyard practices in generating and mitigating greenhouse gas emissions”, *Australian Journal of Grape and Wine Research*, Vol. 21, pp. 522–536.
- Maack, M. and Davidsdottir, B. (2015), “Five capital impact assessment. Appraisal framework based on theory of sustainable well-being”, *Renewable and Sustainable Energy Reviews*, Vol. 50, pp. 1338–1351.
- Mackie, K.A., Müller, T. and Kandeler, E. (2012), “Remediation of copper in vineyards – A mini review”, *Environmental Pollution*, Vol. 167, pp. 16–26.
- MacRae, R.J., Frick, B. and Martin, R.C. (2007), “Economic and social impacts of organic production systems”, *Canadian Journal of Plant Science*, Vol. 87 No. 5, pp. 1037–1044.
- Madelrieux, S. and Alavoine-Mornas, F. (2013), “Withdrawal from organic farming in France”, *Agronomy for Sustainable Development*, Vol. 33 No. 3, pp. 457–468.
- Martins, V., Teixeira, A. and Gerós, H. (2015), “Changes in the volatile composition of wine from grapes treated with Bordeaux mixture. A laboratory-scale study”, *Australian Journal of Grape and Wine Research*, Vol. 21 No. 3, pp. 425–429.

- Meijer, S.S., Catacutan, D., Ajayi, O.C., Sileshi, G.W. and Nieuwenhuis, M. (2015), “The role of knowledge, attitudes and perceptions in the uptake of agricultural and agroforestry innovations among smallholder farmers in sub-Saharan Africa”, *International Journal of Agricultural Sustainability*, Vol. 13 No. 1, pp. 40–54.
- Mondelaers, K., Aertsens, J. and van Huylenbroeck, G. (2009), “A meta-analysis of the differences in environmental impacts between organic and conventional farming”, *British Food Journal*, Vol. 111 No. 10, pp. 1098–1119.
- Morse, S. and McNamara, N. (2013), *Sustainable livelihood approach: A critique of theory and practice*, Springer, Dordrecht, New York.
- Mozell, M.R. and Thach, L. (2014), “The impact of climate change on the global wine industry. Challenges & solutions”, *Wine Economics and Policy*, Vol. 3 No. 2, pp. 81–89.
- Mzoughi, N. (2011), “Farmers adoption of integrated crop protection and organic farming. Do moral and social concerns matter?”, *Ecological Economics*, Vol. 70 No. 8, pp. 1536–1545.
- Nelson, R., Webb, T. and Bryon, I. (2006), *Socioeconomic Data: Prioritising collection to support Australian Government natural resource management programs: principles and priorities*, ABARE–BRS Report, National Land & Water Resources Audit, Canberra.
- Neumayer, E. (2013), *Weak versus strong sustainability: Exploring the limits of two opposing paradigms*, 4th edition, Edward Elgar, Cheltenham.
- Nicholas, K.A., Walz, A. and Wilson, M. (2014), *Exemplar Study Design Descriptions: Ecosystem Science for Policy and Practice*.
- OPERAs (2015a), “Work Programme”, available at: <http://www.operas-project.eu/work-programme> (accessed 3 December 2015).
- OPERAs (2015b), *Exemplar Interim Report for Wine Exemplar: DRAFT*, Lund.
- OPERAs (2016), “Wine exemplar”, available at: <http://operas-project.eu/node/324> (accessed 17 April 2016).
- Ponti, T. de, Rijk, B. and van Ittersum, M.K. (2012), “The crop yield gap between organic and conventional agriculture”, *Agricultural Systems*, Vol. 108, pp. 1–9.
- Potschin, M., Haines-Young, R., Saarikoski, H. and Jax, K. (2014), “Benefiting from Ecosystem Services. Towards a Shared Understanding”, *OpenNESS brief*, Vol. 1.
- Potschin, M.B. and Haines-Young, R.H. (2011), “Ecosystem services: Exploring a geographical perspective”, *Progress in Physical Geography*, Vol. 35 No. 5, pp. 575–594.
- Pretty, J., Smith, G., Goulding, K., Groves, S.J., Henderson, I., Hine, R.E., King, V., van Oostrum, J., Pendlington, D.J., Vis, J.K. and Walter, C. (2008), “Multi-year assessment of Unilever's progress towards agricultural sustainability II. Outcomes for peas (UK), spinach (Germany, Italy), tomatoes (Australia, Brazil, Greece, USA), tea (Kenya, Tanzania, India) and oil palm (Ghana)”, *International Journal of Agricultural Sustainability*, Vol. 6 No. 1, pp. 63–88.

- Rahmann, G. (2011), “Biodiversity and Organic farming. What do we know?”, *Agriculture and Forestry Research*, Vol. 3, pp. 189–208.
- Reganold, J.P. and Wachter, J.M. (2016), “Organic agriculture in the twenty-first century”, *Nature Plants*, Vol. 2 No. 2.
- Regel, E., Kauer, R., Szolnoki, G. (2016), “Öko-Weinbau Rechtlich Ausgebremst?”, *Das Deutsche Weinmagazin*, Vol. 1.
- Robinson, J. (2004), “Squaring the circle? Some thoughts on the idea of sustainable development”, *Ecological Economics*, Vol. 48 No. 4, pp. 369–384.
- Robinson, J. and Harding, J. (2015), *The Oxford companion to wine*, Fourth edition, Oxford University Press, Oxford.
- Rozman, Č., Kljajić, M. and Škraba, A. (2015), “System Dynamics Model for Conversion to Organic Farming”, *Journal of Siberian Federal University*, Vol. 8 No. 1, pp. 64–74.
- Rozman, Č., Pažek, K., Kljajić, M., Bavec, M., Turk, J., Bavec, F., Kofjač, D. and Škraba, A. (2013), “The dynamic simulation of organic farming development scenarios – A case study in Slovenia”, *Computers and Electronics in Agriculture*, Vol. 96, pp. 163–172.
- Ryan, G.W. and Bernard, H.R. (2003), “Techniques to Identify Themes”, *Field Methods*, Vol. 15 No. 1, pp. 85–109.
- Sahm, H., Sanders, J., Nieberg, H., Behrens, G., Kuhnert, H., Strohm, R. and Hamm, U. (2013), “Reversion from organic to conventional agriculture. A review”, *Renewable Agriculture and Food Systems*, Vol. 28 No. 03, pp. 263–275.
- Sayer, J., Campbell, B., Petheram, L., Aldrich, M., Perez, M.R., Endamana, D., Dongmo, Z.-L.N., Defo, L., Mariki, S., Doggart, N. and Burgess, N. (2007), “Assessing environment and development outcomes in conservation landscapes”, *Biodiversity and Conservation*, Vol. 16 No. 9, pp. 2677–2694.
- Schaack, D., Rampold, C. and Behr, H.-C. (2015), *Markt Studie: Strukturdaten im ökologischen Landbau in Deutschland 2014*, Bundesanstalt für Landwirtschaft und Ernährung (BLE), Bonn.
- Scialabba, N.E.-H. and Müller-Lindenlauf, M. (2010), “Organic agriculture and climate change”, *Renewable Agriculture and Food Systems*, Vol. 25 No. 02, pp. 158–169.
- Scoones, I. (1998), “Sustainable Rural Livelihoods. A Framework for Analysis”, *IDS Working Paper No. 72. Institute for Development Studies. Sussex*.
- Scopus (2016), “Field codes”, available at:
http://help.elsevier.com/app/answers/detail/a_id/2347/p/8150/kw/TITLE-ABS-KEY/search/1 (accessed 10 February 2016).
- Seufert, V., Ramankutty, N. and Foley, J.A. (2012), “Comparing the yields of organic and conventional agriculture”, *Nature*, Vol. 485 No. 7397, pp. 229–232.

- Smit, A.A. and Driessen, P.P. (2009), “Conversion to Organic Dairy Production in the Netherlands. Opportunities and Constraints”, *Rural Sociology*, Vol. 74 No. 3, pp. 383–411.
- Smith, B.G. (2008), “Developing sustainable food supply chains”, *Philosophical Transactions of the Royal Society B: Biological Sciences*, Vol. 363 No. 1492, pp. 849–861.
- Smith, E. and Marsden, T. (2004), “Exploring the ‘limits to growth’ in UK organics: beyond the statistical image”, *Journal of Rural Studies*, Vol. 20 No. 3, pp. 345–357.
- Solesbury, W. (2003), *Sustainable Livelihoods: A case study of the evolution of DFID policy*, Working Paper 217, Overseas Development Institute, London.
- Statistisches Bundesamt (2016), “Nachhaltigkeit”, available at: <https://www.destatis.de/DE/ZahlenFakten/GesamtwirtschaftUmwelt/Umwelt/UmweltoekonomischeGesamtrechnungen/Nachhaltigkeit/Tabellen/Indikatoren.html#Fussnote1> (accessed 16 April 2016).
- Statistisches Landesamt Rheinland-Pfalz (2012), *Statistische Analysen: Landwirtschaftszählung 2010*, Bad Ems.
- Statistisches Landesamt Rheinland-Pfalz (2015), *Statistische Bände: Die Landwirtschaft 2014 mit Vergleichszahlen seit 1949*, Bad Ems.
- Statistisches Landesamt Rheinland-Pfalz (2016), *Classification of municipalities to tourism regions*, E-Mail, Bad Ems.
- Stockdale, E.A., Lampkin, N.H., Hovi, M., Keatinge, R., Lennartsson, E., Macdonald, D.W., Padel, S., Tattersall, F.H., Wolfe, M.S. and Watson, C.A. (2001), “Agronomic and environmental implications of organic farming systems”, *Advances in Agronomy*, Vol. 70, pp. 261–327.
- Systembolaget (2015a), “Ansvarsredovisning 2015. Verksamheten”, available at: <http://ansvarsredovisning2015.systembolaget.se/finansiering-rapportering/forvaltningsberattelse-och-bolagsstyrningsrapport/verksamheten/> (accessed 5 April 2016).
- Systembolaget (2015b), *Ekologiska ambitioner*, Stockholm.
- Systembolaget (2015c), “Responsibility Report 2014”, available at: <http://ansvarsredovisning2014.systembolaget.se/en/home/index.html> (accessed 5 April 2016).
- Systembolaget (2016a), “Ansvarsredovisning 2015”, available at: <http://ansvarsredovisning2015.systembolaget.se> (accessed 25 April 2016).
- Systembolaget (2016b), *Ekologiskt: Smått och gott om vår eko-satsning*, Stockholm.
- The Federal Government of Germany (2002), *Perspectives for Germany: Our Strategy for Sustainable Development*, Berlin.

- the Noun Project (2016), “Leaf by Mark Caron. Tractor by Bernar Novalyi. User by Denis Chenu. Social by Gregor Črešnar. Money Bag by Roy Verhaag”, available at: www.thenounproject.com (accessed 26 April 2016).
- Thomas Reuters (2015), “Web of Science All Databases Help. Searching the Topic Field”, available at: http://images.webofknowledge.com/WOKRS521R5/help/WOK/hs_topic.html (accessed 10 February 2016).
- Tranter, R.B., Holt, G.C. and Grey, P.T. (2007), “Budgetary Implications of, and Motives for, Converting to Organic Farming. Case Study Farm Business Evidence from Great Britain”, *Biological Agriculture & Horticulture*, Vol. 25 No. 2, pp. 133–151.
- Tress, B. (2001), “Converting to organic agriculture. Danish farmers' views and motivations”, *Geografisk Tidsskrift-Danish Journal of Geography*, Vol. 101 No. 1, pp. 131–143.
- Tuomisto, H.L., Hodge, I.D., Riordan, P. and Macdonald, D.W. (2012), “Does organic farming reduce environmental impacts? – A meta-analysis of European research”, *Journal of Environmental Management*, Vol. 112, pp. 309–320.
- United Nations (1987), *Report of the World Commission on Environment and Development: Our Common Future*.
- van Leeuwen, C., Friant, P., Choné, X., Tregoat, O., Koundouras, S. and Dubourdieu, D. (2004), “Influence of Climate, Soil, and Cultivar on Terroir”, *American Journal of Enology and Viticulture*, Vol. 55 No. 3, pp. 207–217.
- VDP (2016), “The VDP. Association”, available at: <http://www.vdp.de/en/vdp/> (accessed 31 March 2016).
- Vilei, S. (2011), “Local perceptions of sustainability of farming systems on Leyte, Philippines – divergences and congruencies between different stakeholders”, *International Journal of Sustainable Development & World Ecology*, Vol. 18 No. 4, pp. 291–303.
- Vogt, G. (2001), “Geschichte des ökologischen Landbaus im deutschsprachigen Raum. Teil I”, *Ökologie & Landbau*, Vol. 118 No. 2.
- Vogt, G. (2007), “The origins of organic farming”, in Lockeretz, W. (Ed.), *Organic farming: an international history*, CABI, Wallingford, pp. 9–29.

Annexes

Annex 1: Questionnaire

Annex 2: Interview questions for conventional and organic farmers

Annex 3: Consent form

Annex 1: Questionnaire

Nr.	Question	Answer
1	How many hectares of vineyards does your estate manage?	
2	Which grapes do you grow on how many hectares?	
3	How many bottles do you produce each year?	
4	How many people are employed at your estate?	
5	What do you do with your grapes?	<input type="checkbox"/> Estate processed <input type="checkbox"/> Sold <input type="checkbox"/> Cooperation <input type="checkbox"/> other (please name): _____
6	Does your estate have any certifications which you can label your products with? Please indicate.	<input type="checkbox"/> Yes <input type="checkbox"/> No
6.1	If yes, which and since when?	<input type="checkbox"/> VdP, since ____ <input type="checkbox"/> DLG, since ____ <input type="checkbox"/> Organic label (EG-Öko), since ____ <input type="checkbox"/> Ecovin, since ____ <input type="checkbox"/> Fair Choice, since ____ <input type="checkbox"/> Fair'n Green, since ____ <input type="checkbox"/> Demeter, since ____ <input type="checkbox"/> Vegan-label, since ____ <input type="checkbox"/> Other (please name): _____, since ____
7	What are the 3 most important business objectives of your estate (1 most important, 3 least important)?	1) 2) 3)
8	What are the 3 most important objectives in the vineyard management of your estate (1 most important, 3 least important)?	1) 2) 3)
9	Which are the 3 most important sources of information in relation to farming decisions for your estate (1 most important, 3 least important)?	1) 2) 3)
10	Which are the top 3 challenges in the wine sector in Pfalz/Rheinhausen you think will occur in the next 20 years (1 most important, 3 least important)?	1) 2) 3)
11	Since when are you working for your estate?	
12	What's your current role at your estate?	
13	What are the best 3 aspects of your job (1 most important, 3 least important)?	1) 2) 3)
14	In which year are you born?	
15	What is your gender?	<input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> No answer
16	What is your highest level of education completed? Please indicate.	<input type="checkbox"/> Secondary general school-leaving certificate <input type="checkbox"/> Intermediate school-leaving certificate <input type="checkbox"/> Fachhochschule or University entrance qualification

		<input type="checkbox"/> Apprenticeship (Dual system) qualification <input type="checkbox"/> Qualification from trade and technical schools <input type="checkbox"/> Bachelor <input type="checkbox"/> Master <input type="checkbox"/> Diploma <input type="checkbox"/> Others (<i>please name</i>): _____
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Annex 2: Interview questions for conventional and organic farmers

Date and Time:

Region:

Estate:

Setting:

Participant:

A) Challenges of the wine sector

Thank you again for taking the time to fill in the questionnaire I sent out.

One of the questions was which challenges farmers expect to occur in the next 20 years in the wine-sector in Pfalz and Rheinhessen. From the answers of all participants I identified three main challenges. I will ask you about these now.

1. Which measures can farmers, in your opinion, choose to meet these challenges?
 - a. Climate change (increasing temperatures, extreme weather events like hail & frost)
 - b. Sustainability (CO₂ balance, being able to persist in the future)
 - c. Marketing (international competition, standing on the market, sharpening of the product profiles of the regions)
2. How do you think organic farming practices would meet these challenges?
 - a. Climate change (increasing temperatures, extreme weather events like hail & frost)
 - b. Sustainability (and CO₂ balance, being able to persist in the future)
 - c. Marketing (international competition, standing on the market, sharpening of the product profiles of the regions)

B) Organic farming

Now I want to ask you some questions about organic wine production.

If interviewing a conventional estate:

3. Has your estate ever considered adopting organic certification?
 - a. *If yes, which challenges did you consider?*
 - b. *If yes, which benefits did you consider?*
 - c. *If yes, why did you decide against adopting organic certification or are you in the process of converting?*
 - d. *If not, which motivations do you have to use conventional farming practices?*
 - e. *If not, in which circumstances would you consider producing organic wine?*

If interviewing an organic estate:

4. Which motivations did you have to convert to organic farming practices?
5. Which were the challenges you had when converting to organic farming practices?

C) Financial capital

If interviewing a conventional estate:

6. Are you aware of any subsidies to grow organic grapes?
 - a. *If yes*, from where and how much for what?
7. How would you expect your profit to change if producing certified organic wine? Why?

If interviewing an organic estate:

8. Did or do you receive any subsidies from the EU, Germany or any other institution?
 - a. *If yes*, from whom and what?
 - b. *If no*, why not?
9. How did your profit change since you are producing certified organic wine? Why?

D) Human and social capital

10. Where does a typical customer of yours buy his or her wine?

In the context of my thesis, I'm focusing on estates which are listed at Systembolaget, the alcohol monopoly in Sweden.

11. Which importance has selling your wine to Systembolaget?
12. Are you aware about any goals regarding organic wine of Systembolaget?
13. Systembolaget defined a goal to increase the organic alcohol up to 10%. Which influence does that have on a possible organic certification of yours?
14. How do you expect your wine-selling will develop in the next 5 years? (amount, price, share of customers)

E) Natural capital

15. What are the 3 most important objectives for managing your vineyards for the next 20 years?
16. Which challenges could organic farming practices have for you in the vineyard?
17. What benefits could organic farming practices have for you in the vineyard?

Annex 3: Consent Form

Consent to participate in research on wine farming practices

Description and procedure

You are invited to participate in a research study on wine farming practices. The questionnaire and interview will involve questions about how your estate decides upon the management and production styles especially in regard to the environment. The goal of the study is to better understand why wine farmers in Pfalz and Rheinhessen choose their farming practices, and to investigate which motives and barriers are connected to these.

You will be asked to answer questions, which will be recorded if you consent below. Recordings will be archived in a secure location by Laura Siepmann.

Risks and benefits

The risks associated with this study are anticipated to be minimal, not greater than those experienced in daily life. The benefits which may result from this study are an insight into the development of wine management choices in your region. However, I cannot guarantee that you will receive any benefits from this study. You will not receive any monetary compensation for your participation.

Time involvement

Your participation in this study will take approximately one hour. Participation is completely voluntary.

Rights

If you have read this form and have voluntarily decided to participate in this project, you have the right to withdraw your consent or discontinue participation at any time. You can decline to answer any questions. Your individual privacy will be maintained in all published and written data resulting from the study. However, if you give information on a map (e.g., which varieties are grown on your estate), please be aware that someone familiar with the area could be able to trace this information to you.

Questions

If you have any questions about this research, please feel free to contact me via phone or mail.

I give consent to be recorded during this study: Please initial: Yes _____ No _____

I give consent that given information on a map (during the interview) can be published. Please initial: Yes _____ No _____

If you would like a copy of the thesis, please enter your email:

Please sign before the interview. Thank you very much for taking the time to participate in this study.

Participant's Name (*please print*)

Interviewer's Name (*please print*)

Participant's Signature

Date

Interviewer's Signature

Date

