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Social Acceptance of Climate Change Adaptation in Farms and Food Enterprises: A Case Study in Finland

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Abstract. This article identifies perceived climate change risks and adaptation aspects among farms and food processing enterprises using a case study in Finland. In addition, the article pinpoints key factors that contribute to the social acceptance of climate change adaptation and mitigation policies in the food system. The purpose is to study the willingness of farms and food enterprises to accept and adapt to different climate policy implementation. The research data consists of 27 thematic interviews conducted in 2012 and 2013. The main research questions were: 1. What risks does climate change pose to farms and food enterprises? 2. What adaptation features can be identified in farms and food enterprises? 3. What factors contribute to the social acceptance of climate change mitigation and adaptation in relation to policy practices? For data analysis content analysis was utilized. The results show that climate change is a somewhat indistinct issue from the viewpoint of the food enterprises. In addition, the adaptation to climate change in food enterprises can be characterized as a reactive strategy based on the localization and decentralization of food supply chains, as well as on the development of regional food systems. Farmers found it difficult to estimate the overall consequences of climate change for their farms. They also gave strong support to localized food systems. The study found that social acceptance of adaptation policies depends on the degree of limitation and estimated effects of the policies on the profitability of farming and food entrepreneurship. More broadly, a nexus between food security and energy security policies and climate change adaptation goals should be established. A local energy system would ensure the functioning of the local food system as well. We conclude that value-based strategic partnerships in the food supply chain could enhance the regions' adaptive capacity and resilience, as well as its social acceptance of climate change adaptation goals.

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Introduction

Climate change is one of the greatest challenges of our time. It is the most urgent and inherently global problem because of its causes and effects, as well as its solutions (Oosterveer and Sonnenfeld, 2012; Thiele, 2013). Hence, climate change influences all of the functions of society, including agriculture and farming, and climate policy is compelled to set new goals for ways to produce and consume food (Almås et al., 2011; Paarlberg, 2013). In the context of the food system, many new policy ideas and innovations have been presented on how farms, the food industry, retail stores and consumers could reduce their vulnerability to the risks caused by changing climatic conditions. The food system can reduce emissions and enhance sustainable development in many ways, such as increasing its energy efficiency or reducing waste. It can even use waste to create new innovative products (see Stuart, 2009). This kind of development has diverse influences on agriculture and food production (Renwick and Wreford, 2011). However, the success of these climate policy implementations is dependent on the general social acceptance of the policy goals and climate change mitigation and adaptation measures.

Generally speaking, social acceptance refers to how policy goals and implementations correspond to citizen or stakeholder conceptions about legitimate policies and policy practices. Policy goals are more likely to become permanent practices if they enjoy wide social acceptance among different local stakeholders that are affected by those political decisions. However, different barriers for social acceptance (such as beliefs about the estimated negative effects of a policy) may exist among citizens. Overcoming these barriers and creating favourable conditions for mitigation and adaptation is, thus, a social process (Wolf, 2011). Hence, citizens' values and attitudes are important for making adaptation policies successful (Antle, 2009; Wolf et al., 2012). Self-assessment surveys submitted by European countries revealed that there is 'an increase in the public and policy awareness of climate change adaptation, progress in the development of the knowledge base and involvement of stakeholders' (EEA, 2014, p. 9). Although the importance of understanding public views of climate change adaptation is widely acknowledged, there is relatively little literature on the social acceptance of climate change adaptation policies. Climate change is also a difficult topic for scientists and the public to communicate about (Pidgeon and Fischhoff, 2011). Climate change is an uncertain and complex phenomenon, and according to Pidgeon and Fischhoff (2011), many people consider it a distant issue that affects others elsewhere.

This article contributes to the climate change debate by focusing on the relationship between social acceptance and climate change adaptation within the food system. The purpose is to identify perceived climate change risks and features of adaptation among farms and food processing enterprises. In addition, we identify key factors that contribute to the social acceptance of policies on climate change adaptation and mitigation. The article is based on a study that examines climate change adaptation of farms and food enterprises in Finnish inland provinces. Data were collected through 27 thematic interviews in 2012 and 2013.

It should be noted, however, that this article does not aim to make a clear distinction between climate change adaptation and climate change mitigation, as adaptation is generally 'interpreted in a wide variety of ways by a wide variety of actors, and is a highly contextual process dependent on variables such as sector, region, and size of firm' (Nitkin et al., 2009, p. 20). For example, climate change influences societal and cultural processes, but it is also intensified by societal and cultural pro-

cesses, which means that successful adaptation approaches must include mitigation efforts in the long run (Beermann, 2011). The climate adaptation means and attitudes of Finnish farms and food processing enterprises represent the key focus of this study. In this context, the purpose of the study is also to examine their willingness to accept and adapt to different climate policy implementations.

The article is structured as follows. First, we present the core theoretical concepts of the study: climate change adaptation and social acceptance. This is followed by a description of the current trends in Finnish agriculture and the food system. Then, we describe the qualitative research setting, research data and analysis, followed by the results of the study. Finally, we present our conclusions and discuss the results.

Climate Change Adaptation and Social Acceptance

Climate change adaptation refers to the capability of a system (e.g. community, household, or sector) to better cope with or manage changing conditions, risks, hazards or opportunities. Adaptive capacity is context specific and varies over time, depending on the country, community and individual (Smit and Wandel, 2006). In the 2014 climate change adaptation report by the European Environment Agency, adaptation is defined as follows:

> 'actions taken in response to current and future climate change impacts and vulnerabilities (as well as to the climate variability in the absence of climate change) in the context of ongoing and expected socio-economic developments. It involves not only preventing negative impacts of climate change, but also building resilience and making the most of any benefits it may bring' (EEA, 2014, p. 8).

Adger et al. (2009a) examine in particular the social limits of adaptation. They argue that the discourse around limits to adaptation is categorized along ecological and physical, economic, and technological limits. Furthermore, they contend that climate change adaptation is also limited by societal factors that have not been adequately taken into account in academic research. Societal factors include, for instance, the ethical principles of local cultures and the ways of perceiving climate risks. These factors are also significant for adaptation in farms and food enterprises.

Adaptation is important in the food and agriculture sectors. The provision of inputs needed for plant or animal growth, as well as production itself, is dependent on climatic conditions. Farmers have to make decisions based on climatic factors and think about how to maximize economic returns and how to manage risks related to their productions. As climate change will have a major negative impact on food production and global food security (IPCC, 2015), farmers will need to make such decisions in a more difficult environment. However, these decisions and resources for making them also depend on decision makers and national policy (Antle, 2009). Building adaptive capacity, enhancing knowledge generation, and the dissemination and facilitation of mainstreaming are among the initiatives aimed at making climate change adaptation operational (EEA, 2014). Hence, climate adaptation refers to a broad variety of practices that vary among different regions and countries.

Social acceptance is, importantly, a concept that relates to the good performance of policy implementations. In this study, it refers to how climate adaptation measures correspond to the understanding of fairness and social justice by farmers and food enterprises. Social acceptance is a precondition for legitimacy of national poli-

cies. Legitimacy is constructed and based on the values, beliefs and definitions of the system or community. Suchman (1995, p. 575) discusses legitimacy in the context of organizations. He argues that legitimacy affects how people understand organizations and that 'audiences perceive the legitimate organisation not only as more worthy, but also as more meaningful, more predictable, and more trustworthy'. Suchman has suggested three forms or sources of legitimacy: pragmatic (motivated by self-interest), moral (normative approval), and cognitive (relating to the comprehensibility of the actions). These sources give rise to the legitimacy and, in parallel with that, the acceptance of adaptation policies. In this article, legitimacy is understood as consent of different stakeholders that justifies the exercise of power of governmental organizations. This legitimacy is always contextual, taking place within a particular community's values and beliefs. Legitimacy increases the willingness of those affected by policies or regulations to comply, and it may therefore be important not only for the sake of general 'fairness in policymaking' (in a democratic society), but also for the effectiveness of those policies (Kyllönen, 2013). Essentially, social acceptance creates legitimacy.

The concept of social acceptance has been used widely, for instance, in studies related to energy policy (Assefa and Frostell, 2007; Mallett, 2007; Wüstenhagen et al., 2007). Despite being a commonly used concept, social acceptance has not been clearly defined. Wüstenhagen et al. (2007) conceive social acceptance as consisting of three dimensions: sociopolitical acceptance, community acceptance and market acceptance. Figure 1 represents these levels of the concept, and it is adapted from Wüstenhagen et al. (2007); the three levels of acceptance are the same. The content of these levels is adapted from Wolsink (2012). Originally the figure refers to energy policy and therefore primarily deals with mitigation policies. However, we suggest it is also applicable in studies of adaptation policies.

Sociopolitical acceptance is acceptance at the most general level. Wüstenhagen et al. (2007) assert that sociopolitical acceptance concerns, for instance, the key stake-

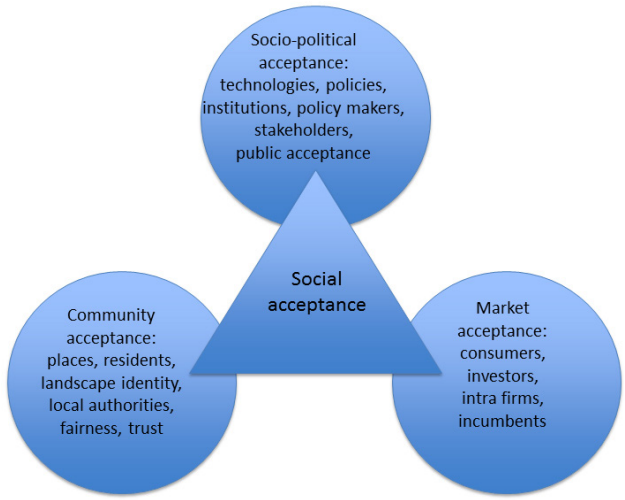

Figure 1. Levels of social acceptance.
Source: Adapted from Wüstenhagen et al. (2007) and Wolsink (2012).

holders and policy actors of effective policies. It is the task of the stakeholders to create favourable conditions for new innovations and technologies (Wolsink, 2012). Many barriers to policy implementation are related to the lack of acceptance at this level. While sociopolitical acceptance is a general framework of acceptance, community acceptance and market acceptance are determined at particular locations and communities (Wolsink, 2012). In the context of renewable energy projects, Wüstenhagen et al. (2007, p. 2685) argue: 'community acceptance refers to the specific acceptance of siting decisions and renewable energy projects by local stakeholders, particularly residents and local authorities.' In addition, the stakeholders need to perceive the benefits and possibilities of new innovations, and that is why fairness and trust are important constituents of acceptance at the community level (Wolsink, 2012). More generally, local networks are beneficial for enhancing community acceptance (Jobert et al., 2007).

The third dimension of acceptance is market acceptance. It refers to the process of an innovation's market adoption and, thus, relates to the concept of diffusion of innovation (Wüstenhagen et al., 2007). The diffusion and innovation theory is widely used within the social and business sciences. The concept is used not only in the study of technical or commercial innovations, but also in the study of policy innovations (Minstrom, 1997). The idea of the diffusion process originates from the American sociologist Everett M. Rogers (1995), who argues that diffusion is a particular kind of communication process. Diffusion also means social change, and through that process, new innovations are adopted – but these diffusion processes are usually very slow. In terms of market acceptance, the diffusion process explains the adoption of innovative products by consumers among individual adopters and their environment (Wüstenhagen et al., 2007). Successful market acceptance is, of course, also dependent on the actors' willingness to pay or invest in new innovations. In the context of climate policy, these innovations mean, for instance, renewable energy solutions or climate-friendly food products. Wide public acceptance creates trust and is also helpful for market acceptance (Wolsink, 2012).

In the early phases, climate policies mainly focused on mitigation, but the significance of adaptation policies was later recognized (Pielke, 1998). Lack of social acceptance can emerge as a significant barrier to climate change adaptation, and social acceptance can therefore be considered an important determinant in the failure or success of adaptation policies (cf. Tompkins and Adger, 2004). Thus, social acceptance also requires attention in research. The role of stakeholders in designing adaptation activities is of high importance in increasing acceptance (EEA, 2014). Climate change adaptation policies have great significance in food and agriculture sectors. Furthermore, climate change affects agricultural yields and earnings, food prices, food quality and food safety (Vermeulen et al., 2012). Consequently, good governance that increases social acceptance of adaptation policies has direct and indirect impact on food security and, for instance, coping abilities of poor producers and consumers, especially in developing countries. Successful adaptation reduces the vulnerability of farmers. However, adaptation is also dependent on other factors in the food system, such as the effects of the complex network of international and local trades (Vermeulen et al., 2012).

In the following sections, we focus on two key stakeholder groups in the food system: farmers and food processing enterprises. Farmers have opinions at the grassroot level, and they are able to perceive changes in climatic conditions in their daily work. Mapping the opinions of farmers can also expose important cultural factors

that are significant in order to understand adaptation processes in agriculture (Huttunen et al., 2015). At the same time, identifying vulnerabilities and risks of farm livelihoods is important for enhancing resilience and food security (Järvelä and Kortetmäki, 2015). In the near future the key challenge is how to produce enough good quality food in climate-friendly ways (Jokinen et al., 2015). In addition to farmers, food-processing enterprises have an important role in this study. These enterprises are able to look at the food supply chain with regards to both ends: raw materials come from the primary industry, and food enterprises need to consider consumer behaviour in their businesses.

Food Supply Chains and Climate Change Adaptation in Finland

As vulnerability and adaptation capacity to climate change varies by country, Finland is an interesting case. With respect to potential vulnerability to climate change, Finland, Sweden and the Baltic countries are the least vulnerable countries in Europe, with low vulnerability to climate change, depending on the region (Greiving, 2013). According to Greiving (2013, p. 295), the considerable adaptive capacity of Scandinavia and Western European countries lowers the potential climate impact. Therefore it is not surprising that Finland foresees higher immigration due to climate change and higher food prices (Tommila et al., 2013). In addition, Finland and the United Kingdom are the first industrialized countries to have developed a formal national adaptation strategy (NAS) and a comprehensive Climate Change Act, which covers mitigation of and adaptation to climate change (Keskitalo et al., 2012). Finland established a formal national strategy in 2005 (Marttila et al., 2005) and the Finnish government approved the proposal for an act on climate change in 2014 (Finnish Government, 2014). The Adaptation Action Plan (2011–2015) of the Ministry of Agriculture and Forestry defines 41 measures for agriculture, forestry, fisheries, game husbandry, rural policy, and water resources management (Ministry of Agriculture and Forestry, 2011). However, adaptation strategies and measures are heavily directed towards agriculture, with little emphasis on other phases of the food supply chain.

The recent developments of climate change adaptation in Finland are described well by Keskitalo et al. (2012, p. 388): 'As the NAS has no direct impact on regional or local level, adaptation measures at these scales instead derive from changes in legislation that will eventually steer regional and to some extent local administrations. The regional and local cases of adaptation in Finland have thus emerged as a result of their engagement in voluntary initiatives with no connection to the national level.' While national policymakers have paid attention to international development and science as driving forces in Finnish adaptation policy, the NAS has specifically targeted the national level.

Based on self-assessment surveys in European countries (EEA, 2014), the water, agriculture and forestry sectors are reported to be the most advanced in terms of implementing portfolios of climate change adaptation measures at all administrative levels. The adaptation measures in Finnish agriculture usually relate to changing weather conditions and expected increase in the average temperatures. The adaptation means discussed involve earlier sowing and later harvests, changes in chosen plant cultivars, more frequent irrigation, changes in sod farming and increased use of pesticides, to mention a few (Ollikainen et al., 2014). They might also include new innovative solutions such as climate-ready crops (Abergel, 2011). Accordingly,

the related agricultural adaptation policies concern, for example, regulations for the use of pesticides, sod farming, and economic incentives that favour or discriminate against certain practices. Small family farms have traditionally shaped Finnish agriculture. Plant production is important in the southern part of the country and dairy production in the north. In 2013, there were about 57 600 farms in Finland but the number of farms is decreasing and, at the same time, the average size of farms is growing. Currently, the average arable area of a farm is about 40 hectares (Niemi and Ahlstedt, 2014).

During the last couple of decades, the Finnish food industry has become centralized, and contractual relationships between producers and the food industry have become more common; nevertheless, the diversity of food processing and manufacturing companies is still the major characteristic of the industry. Actual disruptions due to climate change in the food industry may occur in information technology, transport infrastructure or in a supplier network. In addition, fuel shortages, loss of power, loss of water and infectious diseases may paralyse food industries. According to the Action Plan for the Adaptation to Climate Change (Ministry of Agriculture and Forestry, 2011), climate change poses direct threats to the food industry, such as the spread of plant and animal diseases and floods caused by abundant rains. In 2012, the Finnish food industry employed 39 400 persons in total. The majority of the firms employ fewer than five workers, and many of these small firms are located in rural areas. The bakery and meat processing industries are the largest food processing industries in Finland (Niemi and Ahlstedt, 2014), and producer cooperatives have a significant position in the dairy and meat processing industries. Trucks transport most domestically produced food, and a well-functioning road network is significant for the Finnish food supply chain. The importance of transportation in food distribution is emphasized in Finland because there are often long distances between farms and residential centres.

In food retailing, one of the major climate change adaptation concerns is associated with food safety. According to a study by Peck (2006), food safety regulations were the starting point for most operational risk management processes. This involved, in particular, larger retailers and wholesalers devoting considerable resources to monitoring stores, distribution sites and in-bound supplies. In retail stores, for example, it is important that the cold chain (refrigeration) is ensured in line with climate and other emission reduction targets (Ministry of Agriculture and Forestry, 2011). According to James and James (2010), temperature increases will increase the risk of food poisoning and food spoilage unless the cold chain is improved.

Centralization is also a major trend in the Finnish retail market. In fact, Finland has the most centralized retail food structure in Europe. Two main retailing companies, S Group and K-Group, dominate the Finnish food supply chain. In 2013, they had a combined market share of 79.7% (Niemi and Ahlstedt, 2014). There are approximately 4,000 food retail stores in Finland (Finnish Grocery Trade Association, 2015), and the whole food chain employs about 300 000 persons (Hyrylä, 2012). Due to globalized food supply chains, both production and processing are often located outside of Finland, which lengthens the food chain and adds to the complexity of its structure.

Data and Methods

Our research data consist of thematic interviews conducted in 2012 and 2013. The

data include 27 interviews: 5 interviews with dairy enterprises, 5 interviews with bakeries, 5 interviews with agricultural professional associations, and 12 interviews with farmers. The study was conducted in Finnish inland regions. The main research questions were: 1. What risks does climate change pose to farms and food enterprises? 2. What features of adaptation can be identified in farms and food enterprises? 3. What factors contribute to the social acceptance of climate change mitigation and adaptation related to policy practices? For the data analysis, an abductive approach to content analysis was utilized to answer these research questions.

The respondents of food enterprises represented companies of all sizes, including a large dairy company (two interviews), a medium-sized bakery (up to 250 employees), three small enterprises (up to 50 employees) and four microenterprises (up to 10 employees). The respondents of farms represented all major agricultural branches, including five cereal production farms, five animal production farms and two multi-branched farms. The professional organizations in the study were the Central Union of Agricultural Producers and Forest Owners (MTK) and the agricultural expert organization ProAgria. The basic information about the interviews is presented in Table 1.

Ten interviews were completed with food enterprises, two of which were conducted in the same milk processing enterprise (with the production manager and the distribution manager). At the beginning of the study, it was challenging to find interviewees from food enterprises. Many requests were met with concerns that the questions were too difficult, the enterprise had committed to other studies, there was a change in generation in the enterprise, or that the time was not suitable. However, the final number of interviews was considered sufficient. The farmers contacted were generally agreeable to the interviews, and only a few declined. Ten interviews were conducted face to face and four by phone. All 12 interviews with farmers were conducted face to face. Seven farms grew cereal, five specialized in dairy production, one farm was a dairy breeding operation, another a poultry farm, and two were organic farms. Some farmers were engaged in two production branches. Professional organizations were asked to participate in this study as well, because they have good local knowledge of their own regions. These (five interviews) included adviser organizations and lobbying organizations.

There were three main themes in the interviews. The first theme concerned the background information of the interviewees and the activity of their organization or farm. The second was related to the interviewee's perceptions and experiences about climate change. The third theme covered foresight and adaptation to climate change in the future. The research data were analysed using abductive reasoning, which is

Table 1. Interviews in the study.

	Number of interviews
Bakery enterprises	5
Dairy enterprises	5
Professional organizations	5
Animal production farms	5
Cereal production farms	5
Multi-branched farms	2
Total	27

a qualitative content analysis method that connects data-based and theory-directed analysis (see Timmermans and Tavory, 2012; Silvasti, 2014). Abductive reasoning enables a coding scheme that derives codes from both the data and earlier research, and it is a particularly useful method for qualitative research concerning topics that are relatively unexplored. Furthermore, the use of the abductive method was justified by the partial unpredictability of the results, due to which it was important to be able to perform analysis without commitments to preliminary hypotheses. Thus, earlier research provided the framework for recognizing the dimensions of social acceptance found in the interviews, while the data-based part allowed space to identify 'surprising facts' that were not expected before the analysis.

The reliability of qualitative research is here understood as the consistency and quality of the research, and validity as indicating how well the findings are grounded on the qualitative data (cf. Flick, 2002, pp. 218–225). Overall, procedural reliability and the quality of research and analysis were ensured through regular discussions in the research group and comparisons of the interpretations and findings. As a qualitative study, this research does not aim to produce generalizations about farms or food enterprises but rather to identify repeated meanings as well as the most convergent and divergent points of view among actors.

The case study on Finnish inland provinces offers an interesting case because the country's agriculture and food production have certain special features due to the northern location. The weather conditions in Finland make agriculture challenging. The growing season is relatively short and early spring and late autumn frosts threaten certain crops. Agricultural production is also highly regulated in Finland, which sets its own bureaucratic pressures for farming, food production and their adaptation aspects (Järvelä and Kortetmäki, 2015). As was mentioned earlier, farming has been based on family farms in Finland. However, the number of Finnish farms has been halved in about two decades and the continuity of farming businesses is under threat for many reasons. For instance unprofitable production, lack of investments, and on old age structure of farmers creates challenges for food production (Järvelä and Kortetmäki, 2015). These issues influence the adaptation of Finnish food supply chains as well.

Results: Farms, Food Enterprises and the Threat of Climate Change

The findings of this study indicate that farms and food enterprises are not well conversant with climate change-related questions. Additionally, we observed that a considerable number of entrepreneurs were unwilling to participate in the interviews, which resonates with our finding that among food enterprises, climate change issues are generally experienced as a complex phenomenon that is challenging to grasp (see also Evans et al., 2011). One reason for this discomfort regarding climate change and its risks is certainly the broad temporal span of climate change. Climate change seems, then, to be a somewhat indistinct issue from the viewpoint of food enterprises, and therefore, it is not easy to identify the intensity of climate risks and the degree of vulnerability of one's own enterprise (see Füssel, 2007). Furthermore, according to earlier studies on climate change, it is well known that awareness of climate change does not necessarily lead to action (Wilson, 2006). On the other hand, it is recognized that farms and small and medium-sized enterprises (SMEs) seldom have the time, resources or information required for mitigation and adaptation measurement, which also means that farms and SMEs do not have a clear understanding of

their own performance with regards to mitigation and adaptation (Bourlakis et al., 2014). Thus, SMEs are in the weakest position when it comes to adaptation to climate change and globalization (for the latter case, Moreira, 2011).

Despite having little knowledge of climate change, the interviewed entrepreneurs had noticed various changes in their environment. A majority of them mentioned the rapid changes in weather conditions, such as the increase in windy and stormy periods. The creeping crises that arise from incremental changes and their consequences attracted less interest. Overall, the interviewees did not consider tackling climate change the most crucial priority for their businesses, as there were more significant pressures, such as increased competition and bureaucracy. Finnish farms and food enterprises experienced these pressures equally. One interviewee mentions:

> 'Well, the EU has considerable power in these matters, but people hate the ensuing bureaucracy if you are trying to do something [in business]. But, I have to say that even the public administration wants all stuff to be cheap and nothing to cost any money. So I have a sneaky feeling that the role of public policy is to cut all the costs so that in the end our products should not cost anything to the customer' (Manager of food enterprise).

> 'All kinds of forms and papers must be filled, and a lot. So there is a lot of paperwork. And for example this change of generation, it brought quite an amount of paper in front of me and after I took them around the town to every possible office, I did not know myself which papers I had taken and what kind of papers they actually were, because their amount was so incomprehensible' (Dairy breeder).

Uncertainty about the actual effects of climate change was reflected in the discussions with farmers and food entrepreneurs. Overall, farmers found it difficult to predict the consequences of climate change for their farms: the layman's knowledge they possessed was not directly applicable to their own circumstances. The farmers believed climate change would bring both positive and negative consequences to Finnish agriculture: the likely increase in temperatures could lengthen the growing season, which will positively affect farming circumstances, yet at the same time the risk of pest problems and plant diseases may increase. According to earlier studies of adaptation, the influences of climate change vary significantly by crop and region (Lobell et al., 2008). These influences may be both positive and negative (Vermeulen et al., 2012). Simultaneously, this variation has serious consequences for global food security and, hence, it affects the attitudes of investment organizations (Lobell et al., 2008). It is interesting, then, that when farmers were asked whether Finnish agriculture will be a 'winner' or a 'loser' in the course of climate change, nearly all the interviewees predicted that Finnish agriculture (and in particular crop farming) will be a 'winner' at the European level of comparison. This estimation implies that climate change will make Finnish farmers better off than their colleagues in Southern Europe, and may affect their opinions concerning adaptation policies and their legitimacy. Food entrepreneurs and representatives of professional organizations also shared this point of view.

Adaptation Features in Farms and Food Enterprises

According to the results, the climate change adaptation strategies of food enterprises

can be characterized as reactive, based on the localization and decentralization of food supply chains, as well as on the development of regional food systems. Alternatively, these strategies may be perceived as autonomous reform processes that are more consciously linked to energy efficiency than to climate change, because many of the interviewees believed the price of energy had crucial influence on the profitability of the food chain. Hence, many enterprises have adopted solutions that enhance the efficient use of energy. Moreover, energy-related issues are more concrete and easier to integrate into a business than other measures about mitigating or adapting to climate change, as these food entrepreneurs described:

> 'The use of energy directs our pricing of products too. It is expensive to transport products from here, so all that is shown in the price of bread. It is clear that nobody does this job at his own cost. Everything has to be compensated somehow' (Food entrepreneur).

> 'Unfortunately we are not able to use bioenergy in transportation. All increases in energy prices also affect transportation costs and this trend has continued… Renewable energy sources are coming into use only now' (Managing director of food enterprise).

In this context, Wallgren (2006) presents interesting results based on her own study. She estimates that in the near future, it will be possible to develop bioenergy technologies that are more suitable for small-scale farmers and enterprises, for instance, by using biogas as a fuel for transport, as well as for heating (see Huttunen, 2013). These kinds of solutions are interesting from the local food system point of view as well, and all actors in the food supply chain would achieve more benefits via that kind of development, including consumers. Development of biofuels would have significant impacts on commodity prices (Antle, 2009).

Despite possible positive effects discussed earlier, farmers perceived climate change as a non-preferable but unavoidable phenomenon. As one farmer remarked, they cannot relocate their field abroad. For this reason, adaptation to climate change is understood to be necessary. However, adaptation was a new theme for most of the farmers, and it was also considered to be an issue that will concern future generations, rather than today's farmers. When the farmers were asked what kinds of adaptive measures they had taken or were considering, hardly any were mentioned; instead, many farmers started to describe the ways in which they had cut their greenhouse gas emissions. When the adaptation question was clarified by asking, for example, about the changes in sowing practices or adaptation to the increasing risk of storms and blackouts, it came out that different adaptive measures such as buying reserve power aggregates or evaluating the possibilities of changing the strains used had already been taken or were under consideration. Similarly to the food enterprises, the issues linked with energy efficiency (and possible self-sufficiency in energy production) were the most easily grasped themes within adaptation.

Two important and partially opposing tendencies arose from the farmers' views on adaptation. First, the general understanding that climate change will affect agriculture and make adaptation necessary can be predicted to increase the general acceptance of adaptation policies. On the other hand, the uncertainties and complexities related to the effects of climate change may decrease policy acceptance and lead to the favouring of reactive strategies. This attitude was insinuated as farmers generally believed their farms had sufficient adaptive capacity to climate change and that they are able to take the adaptive measures themselves. These attitudes

towards climate risks are likely to affect the opinion of farmers about acceptable adaptation policies (Antle, 2009). However, in order to achieve successful adaptation policy, actions at the farm level need to be supported by the planned adaptation at higher policymaking levels (Vermeulen et al., 2012).

Social Acceptance of Climate Change Adaptation and Policies

The research revealed various factors that influence the social acceptance of climate adaptation and adaptation policies. The results are discussed using the conceptual framework of different levels of social acceptance and the sources of legitimacy (pragmatic, moral and cognitive), which together give rise to the overall acceptance of adaptation policies. In total, we found four different factors that had significant effect on the dimensions of social acceptance: 1. the (perceived) obscurity of climate change, 2. the rigidity/flexibility of adaptation policies, 3. bureaucracy, and 4. economic factors.

Socio-political acceptance was affected by the perception of climate change as an *obscure phenomenon*. The interviewees did not consider themselves acquainted with the effects of climate change and the related adaptation measures. Many of the farmers interviewed held the opinion that climate change may actually make them better off. Farmers also believed that they already had sufficient adaptive capacity, although they often found it hard to name any particular measures they had taken or were planning to take. The same attitude was observed among the food entrepreneurs. This was due to a general confusion between climate change adaptation and mitigation actions and the uncertainties related to climate change. This finding is supported by Adger et al. (2009b, p. 3), who claim that adaptation and mitigation efforts 'are invariably intertwined and feed into each other' at the local level. From these premises, it appeared that there was confusion about the adaptation policies or their necessity. Thus, the lack of cognitive legitimacy decreases the sociopolitical acceptance of adaptation policies unless the reasons behind the policies are made more comprehensible to the farmers and food entrepreneurs.

Community acceptance was perceived to be dependent on the rigidity or flexibility of different adaptation policies. The *flexibility* of the policies increased their acceptance, whereas the rigidity of different regulations results in declining acceptance. Flexibility is conceived in our research as an issue of community (rather than sociopolitical) acceptance, because it was connected to the experiences of fairness and trust. These experiences are important elements of community acceptance (Wüstenhagen et al., 2007). They are also linked to the moral source of legitimacy, entailing a normative approval of the practices and procedures. Many farmers expressed the opinion that climate change policies are 'unfairly rigid' and argued that the ability of farmers to make the best decisions locally should be respected, as it grants the farmers more flexibility in their practices. The current inflexibility in policies is visible in, for example, the fixed dates for spreading manure on the fields. For the farmers, this was against common sense, because the weather conditions vary yearly. The experience of the fairness of the policies was then linked with the question of whether the knowledge and opinions of farmers were taken into account.

Food entrepreneurs also criticized the strict regulations and bureaucracy that make the development of local solutions difficult. This criticism concerns the cognitive form of acceptance. Here, increasing the flexibility and improving the comprehensibility of different regulations may have positive effects on the acceptance of the

policies. In climate change adaptation policies, flexibility in time and space is crucial, as the benefits of adaptation activities may take many years to take effect, and they may also be very place specific. Our findings are parallel to the wind energy-related results of Gross (2007), in that perceptions of the procedural and distributional fairness of the policy actions influence the acceptance of those policies.

Correspondingly, *substantial bureaucracy* decreases the acceptance of different suggested policies. The 'anxiety about bureaucracy' was expressed in the critical attitudes towards different obligatory practices that are considered to be useless and time consuming. This theme is related to the pragmatic and cognitive sources of legitimacy: if farming or food entrepreneurship becomes more difficult, and more time must be spent on practices that are not directly related to farming itself, it makes the actual business more difficult and burdensome. Moreover, these bureaucratic practices were often incomprehensible to the farmers, who did not see any sensible reasons for doing them. Increasing bureaucracy tends to oppose self-interest and the cognitive sources of social acceptance and may also risk the market acceptance of new innovations that could promote climate adaptation. Hence, the lack of trust in regulatory agencies, and the central and local authorities, may lead individuals to be less willing to accept climate change adaptation policies.

> 'The bureaucracy reminds me of the issues with the direct sale of raw milk. It has been made so difficult these days, and now there are even more regulations coming, as I read in the *Maaseudun tulevaisuus* [Rural Future, a farmer magazine], that soon, it will be impossible. There are farms that have sold it for decades, and even they are now considering giving up. This makes no sense. There are new regulations coming, and one must inspect the manures, the costs to increase and… A good idea, selling raw milk directly to those who want it, is killed by trivial paper circulation and testing' (Dairy farmer).

> 'Public administration has a two-way role in these issues. On the one hand, it is a trendsetter regulating via laws and rules. On the other hand, it has obstructive effects because the rules are open to interpretation. It will soon become a very bureaucratic system' (Managing director of food enterprise).

Market acceptance was related to the economic factors and estimated economic consequences of different adaptation measures or policies. It played a significant role in the overall social acceptance of climate adaptation, which was not surprising. Food entrepreneurs emphasized the significance of competitiveness in supranational markets. Furthermore, today's farmers view themselves more and more as entrepreneurs that make precise calculations and estimations about how to best run their farms. It was mentioned frequently that at a minimum, new policies must not weaken the competitiveness and economic performance of the farms. Market acceptance is closely linked to the pragmatic, self-interested source of legitimacy and consequently, this level of acceptance can be achieved by policies that somehow benefit the stakeholders in economic terms. The importance of economic factors also implies that supporting innovations related to renewable energy or energy efficiency (such as affordable small-scale biogas plants) could help generate adaptation solutions that enjoy broad market acceptance. Hence, the support for climate change adaptation might be undermined if wider concerns about economic sustainability are not addressed in future policy.

Consolidating Mitigation and Adaptation to EU Policies

The attitudes of farmers towards agricultural adaptation policies form an important part of community acceptance, which refers to the acceptance of particular policy decisions by local key stakeholder groups. The more general attitudes of acceptance towards non-specific policies belong to the dimension of sociopolitical acceptance (Wüstenhagen et al., 2007). In the context of agricultural policies and climate adaptation, sociopolitical acceptance is strongly related to the general institutional framework of agricultural policies and the role of the European Union (EU). Climate change is generally considered to be an issue demanding policies on a scale larger than Finland alone. However, when the interviewees were asked about the level on which agricultural climate policies should be made (local, national, or EU), the opinions were divided. On the one hand, many farmers strongly opined that the responsibilities should be common within the EU level. On the other hand, other farmers thought that the EU policymakers may lack knowledge and understanding of local conditions in Finland. This latter point insinuates a lack of community acceptance if policies were to be formulated at the EU level alone. Some interviewees took both viewpoints into account and favoured a consolidation between Finnish and EU level policies.

> 'The challenges and benefits in Finland are totally different from the ones in Central Europe. Or so I would think. So if it is directly said from the EU that you must do this and this, that might be beyond all reason here. The guidelines should come from there, and the correctives made here. That way, I would see that the things would work out and lead to the desired results' (Dairy farmer).

> 'It must absolutely be at the EU level, now that we have this common agricultural policy, climate policy must be made at the EU level as well. Of course it has both pros and cons. Then I hope that the Finns can stand up for themselves. This is after all quite an exceptional country in comparison with, let say, Southern Europe. But the basis must be in the EU, the big guidelines need to be drawn there' (Dairy farmer).

In this context, however, there is a difference between mitigation and adaptation activities. While mitigation policies and their goals can be designed at the EU level, this is not necessarily the case with adaptation policies. Climate change adaptation, which is context-specific and crosscuts all sectors of the economy, is characterized by long time frames and uncertainty, and does not have universally accepted targets (EEA, 2014). It has been suggested however, that 'solidarity mechanisms between European countries and regions might need to be strengthened because of climate change vulnerabilities and adaptation needs' (EEA, 2014, p. 19). Although long-term adaptation requires mitigation policies, not all mitigation policies support adaptation. This gives rise to a further concern: there is a risk that EU-level mitigation policies, when poorly designed, hamper the prospects of local adaptation policies and strategies. This might result from, for instance, strict regulations that prevent farmers from making changes in their farming practices based on yearly local circumstances.

Localized food systems were given strong support by all interviewees. However, their opinions were often expressed in a broader context rather than with regard to adaptation. The interviewees believed that local food had growing support among

consumers, and it would easily obtain strong market acceptance. Although local food systems support climate adaptation (Puupponen, 2015), their contribution to climate mitigation and promoting climate-friendly food systems is a more complex and disputed issue (Paarlberg, 2013; Räsänen et al., 2014). Still, local food can be seen as a market innovation that is already diffused in Finnish food markets. On the other hand, localizing and decentralizing the food system will be an enormous challenge in Finland, as currently, 80% of food is purchased through centralized national logistic systems, and only 20% of food is purchased locally (Niemi et al., 2013). Some interviewees reflected on how the current regulations and bureaucratic systems impede localization.

> 'It just irritates me that today both the state and the municipalities… they are told to call for tenders, and I do not doubt at all that you can get some European food, grown with other methods, for cheaper prices than Finnish food. It is then another thing whether production meets the same criteria' (Pig farmer).

It should also be considered that there are risks not resolved by localization. For example, a total blackout or fuel supply disruption would paralyse all current food systems, including both those that are centralized and those that are decentralized (Peck, 2006). However, the localization of food has become a clear trend, at least among quality-conscious Western consumers (see Pearson et al., 2011; Oosterveer and Sonnenfeld, 2012; Paarlberg, 2013). This should be taken into account in higher policymaking levels.

Conclusions

The concept of social acceptance has three dimensions: sociopolitical acceptance, community acceptance, and market acceptance. At the sociopolitical level, ways should be found to support policies that are acceptable at the community level and in the market. Our data revealed that social acceptance of adaptation policies depends on the degree of limitation and the estimated effects on the profitability of farming and food entrepreneurship. Consequently, the base of acceptance is the economic capability of farms and food enterprises. Therefore, preferring economic incentives to strict regulations and increasing the farmers' knowledge about policy objectives tends to increase the social acceptance of policies. Economic incentives were instrumental for farmers and food entrepreneurs to accept climate policy goals in their daily activities and at the community level. Moreover, the temporal and spatial dimensions of climate change strongly affected the perceptions of the interviewees. Climate change was often considered as something that would take place in the distant future, which was reflected in the suspicions about the necessity or usefulness of adaptation policies.

In reality, vulnerable rural communities and food supply chains in Finland will suffer from climate change. There is a factual and timely need to have a common European and national framework that centres on territorial approaches that would facilitate equal opportunities for rural populations in climate change adaptation (Kull et al., 2014; Battaglini et al., 2015). The problem concerning the development of climate change adaptation policy in Finland is that while the national adaptation strategy has been mainstreamed and institutionalized at a strategic governmental level, it has resulted in limited practical integration across regional and local levels

(Keskitalo et al., 2012). This is unfortunate news for effective climate change adaptation policy, as climate change adaptation is clearly a local process associated with local livelihood, rural entrepreneurship and community development (Paloviita and Järvelä, 2015, p. 3). Although farmers often prefer agricultural climate policy guidelines to be made at the EU level and only more detailed implementations to be made locally, bottom-up climate change adaptation efforts should be supported by the EU and national policy.

As an example of rural entrepreneurship, a localized and decentralized food system was accepted as a key adaptation feature among the interviewees. Thus, decentralization is also an important factor at the community acceptance level, along with economic factors. Furthermore, at the community level, renewable energy and energy security measures had strong positions as envisioned means to enhance adaptive capacity in farms and food enterprises. Hence, improving the understanding of the nexus between food security and energy security should be one of the goals of climate change adaptation policies. A local energy system would ensure the functioning of a local food system as well. Both local food and local energy are 'innovations' that could easily gain strong market acceptance if they provide good opportunities for local entrepreneurs and farmers. In order to realize this potential, policymakers should create favourable conditions for profitable local food and local energy solutions.

In addition, we conclude that value-based strategic partnerships among farmers, industry and trade in the food supply chain could enhance the regions' adaptive capacity and resilience. Further research on the regional impacts of climate change with respect to vulnerability and risks is required to provide decision makers with more comprehensive guidance. Finland may be less vulnerable to climate change compared to many other European countries, but the indirect environmental, economic and social impacts of climate change will definitely occur everywhere. Agenda-setting processes of climate change adaptation that occur not only nationally, but on local and regional levels as well, should gain more attention. This requires integrated multi-participant involvement on climate change adaptation across levels. Local and regional media, as well as social media, could ultimately influence public opinion and motivate more people to get involved in responding to climate change.

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