Chapter 7

Climate change, vulnerability and the local adaptation strategies of food enterprises in Finland

Antti Puupponen
Post-Doctoral Researcher
Department of Social Sciences and Philosophy
University of Jyväskylä

Address:
Riekontie 7
41350 Laukaa as

E-mail:
antti.puupponen@jyu.fi

Abstract

This chapter discusses vulnerability and the adaptation strategies of Finnish food supply chains in the context of climate change. A case study was conducted in 2012 within three Finnish regions. The people interviewed were food entrepreneurs, the managers of food enterprises and relevant stakeholders. According to the study, food enterprises seem to trust local and decentralised food supply chains as an adaptation strategy for combating climate change. Hence, the case study discusses the benefits and learning challenges of food supply chain localisation and introduces the idea of food supply chains that react proactively to climate change issues.

Introduction

Climate change is one of the greatest challenges to the sustainable development of societies. It also has a fundamental influence on food production, food supply chain management and eating habits (Tirado et al. 2010; Smith & Gregory 2012). In this context, some interesting questions are: How well can food chains adapt to climate change? What kind of strategies do food enterprises have for adapting to climate change? At the same time, there has been discussion about localised food systems (Allen 2010; Mount 2012). Furthermore, it is interesting to discuss how adaptation to climate change and emerging local food systems could be combined.

This article aims to present the benefits and challenges of food supply chain localisation in the current political and business environment of Finland. It also propounds some ideas about how local and proactive food supply chains – that aim to counter the predicted threats of climate change – could be created in the future. The structure is as follows: first I present some viewpoints on how the concepts of vulnerability and adaptation strategy have been defined in research literature. Then I describe the localisation of the Finnish food systems and how food enterprises operate in Finland. Finally, I make some observations based on my case study and conclude the discussion.

Climate vulnerability and adaptation strategies

Societies, communities, organisations and individual people are vulnerable to the risks caused by climate change. Therefore, a key concept in climate change studies is vulnerability. Adger (1999, 249) defines vulnerability "as the exposure of individuals or collective groups to livelihood stress as a result of the impacts of such environmental change." Füssel (2007, 157) argues that there are four fundamental dimensions to be used when describing a vulnerable situation: system, attribute of concern, hazard and temporal reference. System can refer any kind of system such as a human-environment system, a population group, an economic sector or geographical region. Attribute of concern refers to, for instance, the risk to human lives and health, income or the cultural identity of a community. Hazard means some influence that may potentially damage the system. It is usually, but not always, external to the system. Temporal reference means the time period being considered. Risks to the system can be changing during the time horizon and that is why temporal reference is significant in the context of vulnerability (Füssel 2007, 157).

Adger (1999) particularly highlights social vulnerability. Traditionally, climate change studies have concentrated on the physical dimensions and impacts of the issue, however, social vulnerability broadens this view to include societal and human dimensions. Based on this, vulnerability can be seen as a combination of social factors and environmental risk (Adger 1999, 252).

States, regional governments, municipalities, enterprises and other organisations have made strategic plans for adapting to climate change and reducing their vulnerability to it. Governing climate change demands multilevel politics (Bulkeley & Betsill 2013). Nevertheless, strategic planning is challenging because the impacts of climate change are unknown. Thus, despite the wealth of research, reports and scenarios related to the risks of climate change, it is not easy to recognise what the essential sources of information for the support of strategic planning are. As a result, uncertainty is always present in the context of climate change (Buuren et al. 2014).

There are several types of strategy enterprises and organisations that can be used to adapt to climate change. In the research literature, at least five different adaptation strategies can be found: 1) reactive adaptation, 2) anticipatory adaptation, 3) autonomous adaptation, 4) planned adaptation, and 5) pro-active adaptation (Fankhauser et al. 1999; Beerman 2011). Reactive adaptation means that measures are taken after some change has already occurred. Anticipatory adaptation refers to deliberate decisions that could prepare people for climate change's potential effects, for instance, using renewable energy sources instead of non-renewable energy. Autonomous adaptation can be characterised as natural and spontaneous adaptation to the threats of climate change. Planned adaptation requires conscious intervention. A pro-active strategy is the most demanding strategy. It aims to build resilience and take into account mitigation and adaptation requirements in a broader sense.

Regarding the limits of adaptation, Adger et al. (2009) especially examine the social limits of adaptation. They argue that discourse around the limits to adaptation is constructed by ecological, physical, economic and technological limits. Furthermore, they see climate change adaptation as being limited by societal factors that have not been adequately taken into account in academic research. These factors are significant for food enterprises and their adaptation strategies because creating local food networks, for example, is dependent on societal factors and community relations.

Local food and Finnish Food Enterprises

Academic research into local food has been has grown over the past 10 to 15 years. The research finds that many good attributes have been attributed to the idea of local food and it has been said that local food can create new markets for farmers and food processing companies, support family farming, reduce environmental degradation and create local jobs (Allen 2010, 296-297). In a wider sense, local food even enhances the social capital of a community (see e.g. Hinrichs 2003). However, local food does not have set standards or labels in Finland. On the contrary, the definition of local food is quite broad (Jokinen et al. 2009, 7-8). According to the Finnish Ministry of Agriculture and Forestry, the basic idea of local food is to promote the economy, employment and food culture of a region. Local food is produced, processed, marketed and consumed in the same region (MAF 2013). However, there are also some other definitions for local food, but usually the definitions do not take a position on exact distances and time between production and consumption. Nonetheless, local food aims to shorten the food supply chain.

Local food can be beneficial, in the sense of climate mitigation, due to fewer emissions stemming from the shorter transportation distances of local food products. However, according to Wallgren's (2006) study, the consideration of transportation distance is inadequate because the energy intensity of transportation depends on several parameters, such as distance, transport mode, quantity loaded and the vehicle. However, local products usually need less packaging and storage as well. In a wider sense, especially in developing countries, this has raised the question of food democracy. In this context some researchers have argued that the localisation of food could create better opportunities for food democracy and sovereignty (see e.g. Quaye et al. 2010).

However, according to estimates, local food products have only an eight percent share in the Finnish retail food sector (MAF 2013). It is also well-known fact that the Finnish food industry is highly polarised between just a few large companies and many small companies. In 2012, the Finnish food industry employed 39 400 persons in total. Seventy-one percent of the firms employ fewer than 5 workers and many of those small firms are located in rural areas. The bakery industry and the meat processing industry are the most numerous food processing industries (Niemi & Ahlstedt 2014).

Centralisation is a strong trend in the Finnish retail market. In fact, Finland has the most centralised food retail structure in Europe. The Finnish food supply chains are dominated by two main companies: S-group and K-group (Kesko), together they have about an 80 percent share of Finnish retail market. In 2013, S-group's market share was 45,7% and K-group's 34% (Niemi & Ahlstedt 2014). The main competitors for S-group and K-group are Suomen Lähikauppa (7% share) and the German company Lidl (6.6% share), which is growing (ibid.). There are approximately 4000 food retail outlets in Finland (Tike 2011). The whole food chain employs about 300 000 persons (Hyrylä 2012). Although the retail sector for food is centralised, globalisation is also a major trend in the Finnish food markets. In many cases, both production and processing are located outside Finland and that makes the food chain long and adds to the complexity of its structure.

Finnish agriculture has traditionally been based on small family farms. In 2013, there were about 57 600 farms in Finland. The number of farms is decreasing, but the average size of a farm is growing. At the moment, the average arable area of a farm is about 40 hectares (Niemi & Ahlstedt 2014). Plant production is important in the southern part of the country and dairy production in the north. Producer cooperatives have a significant position in the dairy and meat processing industries but there are long distances between Finland's countryside and residential centres. Thus, trucks move most of the domestically produced food and a well-functioning road network is important from the viewpoint of the Finnish food supply chain.

Findings of the case study

Data and methods

The findings are based on a qualitative case study that was conducted in three Finnish inland regions in 2012. For the study, 14 thematic interviews were conducted – nine interviews with food enterprises representing the dairy and the bakery industries and five interviews with professional associations. The research data consists of mainly individual interviews, but two interviews

featured a couple and due to this there were 16 persons interviewed in total. The persons interviewed were food entrepreneurs, managers of food enterprises and representatives of professional organisations. The research regions were Central Finland, Pirkanmaa and South Savonia, all traditional Finnish provinces.

Approximately 500 000 inhabitants live in Pirkanmaa, 275 000 inhabitants in Central Finland and 152 000 inhabitants in South Savonia. In 2012, there was a total of 452 food enterprises in these three provinces (Ruoka-Suomi 2012). There are many livestock and vegetable producers in the research regions, but only a few milk processing enterprises. It is a characteristic of the Finnish food market that milk processing is done by two large companies (Valio and Arla).

All enterprises in the study were small and medium sized (SME's). Some of them could be defined as self-employed. However, they still had quite an established circle of customers and all of them operated mainly locally or regionally. I also interviewed representatives from the professional organisations of the provinces because I assumed that they would hold a holistic overview of the food industry in their own region. The professional organisations in the study were the Central Union of Agricultural Producers and Forest Owners (MTK) and the agricultural expert organisation ProAgria. The basic information concerning the interviewees' background is gathered in Table 1. The interviews are presented by region, and not conducted in that order.

<TABLE 1. HERE>

In the beginning of the study it was quite difficult to find interviewees because many of them refused the request, citing a variety of reasons: a difficult subject to answer, the enterprise was committed to other studies, there was a generational change in the enterprise or the time was not good. Finally, ten interviews were conducted face to face and four by phone due to the interviewees' busy timetables. There were three main themes in the interviews: the first theme covered the background information of the interviewee and the activity of his organisation; the second theme dealt with the interviewee's perceptions and experiences of climate change; and the third theme was about foresight and adaptation to climate change in the future. The research data was analysed by using qualitative content analysis with the theory-bound and abductive approach (see e.g. Silvasti 2014; Timmermans & Tavory 2012). A more detailed analysis of the data is presented by Puupponen and Paloviita (2014).

Food enterprises and their attitudes to climate change

When I started my study it soon became clear that enterprises do not have very clear idea of the issue of climate change. In the beginning of the study there were many entrepreneurs who did not want to participate in an interview, which was also a signal that dealing with the issue of climate change is experienced as difficult and challenging by food enterprises. There were also some doubts concerning the authenticity of climate change:

"Well, I don't have a clear idea of climate change. There are a lot of discussions about it, but I have a bit of feeling that there is some real change or transformation coming, or is it just normal that these weather conditions vary over time." (Interview 6, woman, enterprise, Central Finland.)

Still, even this entrepreneur had noticed that some changes in climatic conditions are probably occurring. More precisely, according to the research data, it seems that the entrepreneurs and managers of the food enterprises take the risk of climate change seriously. However it is considered a lower level priority issue compared to other pressures.

One reason for this vagueness regarding climate change risks is certainly the time-period of climate change, which seems to be somehow indistinct from the food enterprises' viewpoint. In addition, it is not easy to identify the intensity of climate risks and the degree of one's own vulnerability (see Füssel 2007). Furthermore, according to earlier studies on climate change, we know that awareness of climate change does not necessarily lead to action (Wilson 2006). Based on my data, the reasons for that are also due to the other pressures of business, such as market competition and increased bureaucracy. The effects of these pressures seem to be much more concrete for food enterprises in comparison to climate change. Thus, these enterprises have a feeling that there is no time to think about climate strategies in their daily activities. In this regard, the adaptation strategies of food enterprises can be described as reactive, anticipatory or autonomous, but not planned or pro-active strategies.

It is obvious that state and transnational bureaucracy is experienced as an overwhelming burden by food enterprises. However, despite its good intentions, such bureaucracy can also increase vulnerability and even weaken adaptive capacity.

"This is becoming a really bureaucratic system and it is going to choke on its own impossibility, so that some are establishing the rules and others are trying to follow those rules. Then the mess is almost ready. The bureaucracy is even feeding itself. The good things are being crushed by the wheels of this system. Of course, there are a lot of good things, but there is a clear need to lighten the bureaucracy and the role of governance as well." (Interview 2, man, enterprise, South Savonia.)

On the other hand, the information presented about and the reportage of climate change seems to be indefinite and even contradictory. Some researchers argue that the way the public is informed about climate change may cause concerns and qualms. The creation of negative feelings influences risk perception and may lead to the avoidance of the source of risk (Marx et al. 2007). Swim et al. (2011) note that concern about and the anticipation of climate change may even weaken the quality of life and have negative impacts for mental health at the individual level. This may lead to stress and passivation, because the effects may appear as fatal and inevitable. Swim et al (2011, 242-244) argue, "Those who have the fewest social and economic resources are likely to be the most vulnerable to physical and psychological impacts." Thus, when taking into account the other pressures placed on enterprises, it is not a surprise that climate change is easily given a back seat in the strategic planning of SMEs. Hence, action to combat future climate change demands time and support. It seems that enterprises are willing to adapt to climate change, but the indistinct time-span makes it difficult from their point of view.

Climate change and local food

What is the role of local food in terms of climate change adaptation? According to the results, food entrepreneurs and the managers of food enterprises see the localisation of food as a key climate change adaptation strategy for whole food chain.

"Well, of course it is good for whole province and food supply if there is, for instance, rye in stock for the needs of the next year. And if the sites of production are located in many places, the system is less vulnerable… / … One could imagine that it would be more secure. And then it is, of course, a

marketing advantage as well, like I said. So, I believe that an awareness of the risks of climate change increases people willingness to use more local products." (Interview 3, male, enterprise, South Savonia.)

Thus, a local or regional approach to food production can enhance the adaptive capacity and resilience of a food chain. However, according to the interviews, there are some obstacles to this development. One major obstacle is the structure of the retail markets in Finland. One interviewee pointed this out:

"When we are dependent on the two big retail chains – for which we produce [our goods]. And then again, they are fighting bloodily between themselves trying to make good profits. Honestly, their values are not really at the level they say they are, even though their speeches they are something else." (Interview 2, male, enterprise, South Savonia)

The centralised structure of the food retailing industry creates unfavourable conditions for the competitive ability of small size food enterprises, which can be problematic in the context of climate change adaptation too. For instance, if transport connections are broken due to climatic reasons, centralised stocks are more vulnerable compared to a situation in which production and stocks are decentralised and located in many places. Thus, a centralised structure can be seen as a social limitation for the adaptation described by Adger et al. (2009). Centralisation also causes economic losses for retail chains if the inventory cycle is disrupted due to storms, floods or other changes in weather conditions.

In the discussion of local food one aspect is related to food security, which broadens the idea of local food. On the other hand, input production was seen as a vulnerability aspect, which should be developed on a more domestic, regional and local basis so that whole chains would be less vulnerable.

"So we are not very self-sufficient with regards to input production [here in Finland]. We should think about whether we can do something to improve it. Of course, all goals are dependent on energy and whether there is any renewable energy we can utilise. But we depend very much on imports of oil, fertilizers and, overall, how we use our machinery" (Interview 8, male, professional organisation, South Savonia.)

However, many interviewees highlighted the strengths of small scale local food production compared to global mass production. These strengths are related to the use of natural resources, such as cleaner air or clean water, which can also be seen as factors of production. These factors can be identified as marketing advantages for local or regional production because they have strong significance for local communities. Thus, they are more than just water and air; they are part of the local identity and well-being too. Adger et al. (2011) are therefore critical towards climate policy that is only based on the material and instrumental reasons behind the problem. They think that it is necessary to highlight places as a context "in which people create their lives, and through which those lives derive meaning". Hence, they argue that place and identity provide a greater force for arguments based on values that people really care about (ibid.).

Future aspects

Even though the interviewees did not see climate change as the most urgent priority for their business, most of them had noticed fundamental and rapid changes in weather conditions, such as increasingly frequent windy and stormy periods. The interviewees thought that these changes will

intensify in the future, but some of them thought that geographically Finland is not the most vulnerable country in the world.

Adaptation issues are mostly related to the discussion of energy from the viewpoint of food entrepreneurs. The interviewees believe that the price of energy has a crucial influence on the food chain. Hence, many enterprises have adopted solutions that enhance the eco-efficient use of energy. However, this is not primarily happening due to climate change, but rather in savings made through the reduction of production costs. It seems that energy-related issues are more concrete and easier to integrate as part of business than other measures about mitigating or adapting to climate change.

Global market competition is one of the pressures influencing the activities of SMEs, although they operate on the regional or local level. Increased competition also extends to an even wider range of stakeholders within the food chain, such as public procurement:

"Public administration is inviting us to tender bakery products and all the other products as well. So, price is the most important thing for them. There is no significance... when the price is the most important thing. These small enterprises producing goods through domestic raw materials and even organic products are never ever going to win those tenders. And we have not been successful either." (Interview 1, male, enterprise, South Savonia.)

Thus, a focus on product prices restricts well-functioning local food systems. Folke (2006) believes that, in terms of climate change, the aim should be a system that allows an adaptive governance system, while supporting adaptive management at all levels – globally, nationally and locally. Hence, incentive schemes for adaptation and an integrated knowledge base that is available for different stakeholders in the food chain are needed. On the other hand, stakeholders may need support to help with their learning ability. Different actors within the food chain must find better ways to meet each other's needs and they should be able to create genuine interaction as well. So, according to Folke (ibid.), "social networks serve as the web that seems to tie together the adaptive governance system".

Governing global food chains is even more challenging, because the power in the chain is unequally segmented. Fresco (2009, 384) argues that food production and distribution is more centralised and governed by fewer actors than ever before. A limited group of actors is producing food for a growing global population. Thus, there is a need for transparency regarding food-related knowledge, measures and political decisions, so that consumers could have better opportunities to make their own decisions. According to the research data, the interviewees thought that a more localised and decentralised food system would create better opportunities for achieving that transparency.

Conclusions

The localisation of food is seen in a positive light among food entrepreneurs and representatives of professional organisations. Most of the enterprises in the study were SMEs operating mainly in local and sub-regional markets. Thus, localisation and regionalisation are natural development paths for their business. However, representatives from the bigger companies and professional organisations also saw local and sub-regional markets as a very important target in the context of climate and rural policy. It seems that localisation is a clear trend in current food markets (Puupponen 2010; Pearson et al. 2011).

The case study indicates that the localisation of food chains can have a positive influence on enterprises, a local economy and food consumers. On the other hand, the centralised food system has been cost-effective and it will take time to create an equally cost-efficient localised system. However, in the Finnish context, operating on the sub-regional level could be a sufficient target for different stakeholders wishing to create a profitable business.

The discussion of the food industry seems to return often to the prices of products and the costs of production. Climate change is forcing food enterprises to operate eco-efficiently, because rapid changes in the environment may raise costs unexpectedly. Enterprises are anticipating these changes at some level, at least when the changes are related to energy saving solutions or the rationalisation of logistics systems. In a wider context, these solutions are part of the new resource efficient thinking in society, where saving, recycling and borrowing become virtues for enterprises and individuals alike. Local food production and the decentralisation of the food chain also match this thinking.

Particularly in the near future, food enterprises need to integrate energy efficiency into local food systems in order to achieve more benefits from their local system. Energy efficient and climate-resilient local food systems will be attractive for consumers as well. According to this study, it is easy to agree with Wallgren (2006) who argues that it is possible to develop technologies that are more suitable for small-scale farmers and enterprises, for instance, by using biogas as a fuel for transport and as a heating energy as well. Such local and regional solutions could quite easily be integrated into local food systems. In order to make the local food business flourish, there is obviously a need for structural changes in food consumption culture and preferences. All these drivers will push local food systems forwards and perhaps make them become the mainstream system in the future – when climate risk is conceived of more clearly in people's minds, and thus tackled more comprehensively.

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