



Analysing citizen's adaptive capacity:

– Individual adaptation strategies in Helsingborg, Sweden before, during and after the Advent Storm in 2011

Joakim Lindblad

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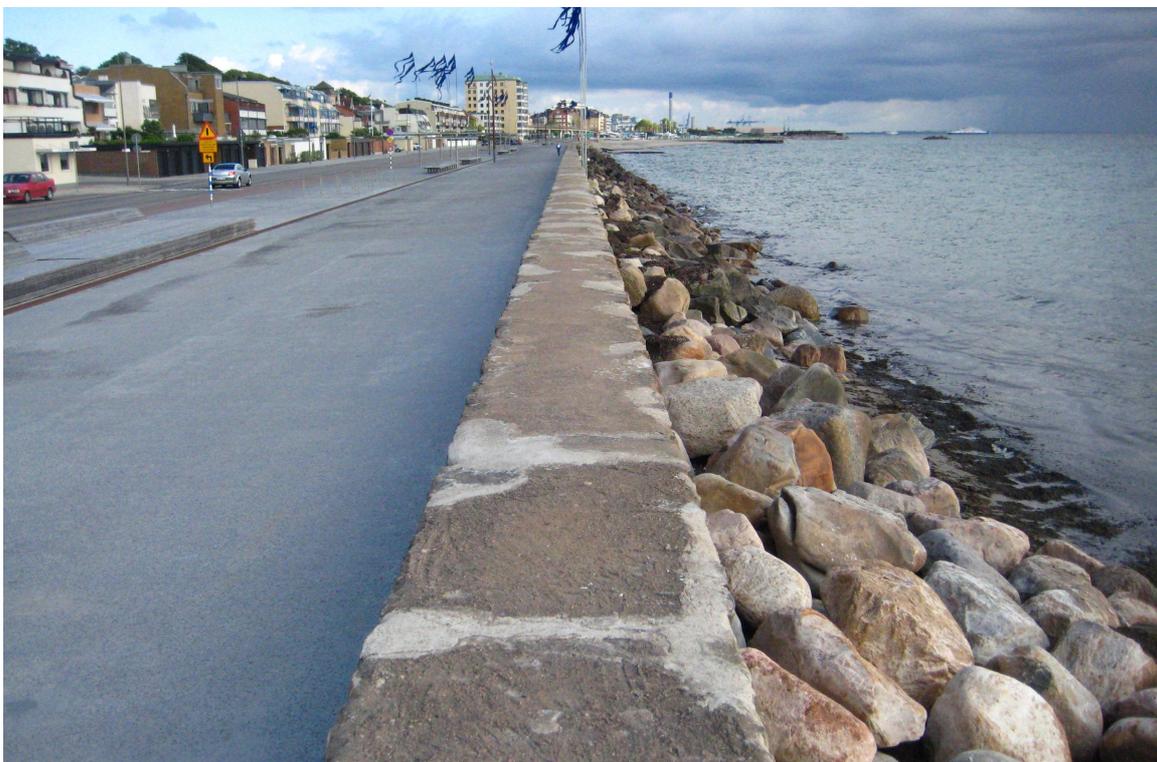
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Sweden before, during and after the Advent Storm in
2011*



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Abstract

Climate change is predicted to lead to an increase in the frequency and severity of climate extremes and variability (IPCC 2007). The result is an increase in climate-related disasters in a world where, even without climate change, the number of disasters is already on the rise (UNISDR 2010).

Also Sweden will be severely affected by climate change as temperatures are expected to rise more in Northern Europe than in the Mediterranean area, and precipitation patterns are expected to change (ibid.). Sweden is a high-income nation with a history of strong governmental institutions. The country is therefore considered to be less vulnerable to extreme weather conditions than many other countries, and able to adapt to a changing climate in an efficient way. However, in order to be effective, climate change must be addressed at all levels of society, from the institutional level and all the way down to the individuals and households of a community (UNISDR 2005). This understanding challenges the image of Sweden as being a country of low climate vulnerability as the adaptation capacities of individuals and households have, as yet, neither been well understood nor evaluated. In fact, the Swedish Commission for Climate Vulnerability identified the lack of information on individual's adaptive capacities as an important knowledge gap (SOU 2007:60).

Against this background, the aim of this thesis is to identify what measures, or adaptation strategies, individuals take to improve their own adaptation capacity. Potential barriers that hinder the individuals from taking further measures are also analysed in the study. This is crucial in the face of new research, which has found that adaptation strategies at different levels often tend to interfere with each other, rather than support each other (Wamsler 2007).

The study is focused on an analysis of the city of Helsingborg in southern Sweden and, more specifically, its inhabitants' measures and strategies taken before, during, and after a severe winter storm in late 2011. A literature review was carried out and structured interviews held with individuals in the study area.

The results of the study show that the majority of the interviewees have taken little or no action to prevent, mitigate, or prepare for the event. An exception to this is disaster insurance, which was identified as the most commonly used adaptation strategy. Apart from this, adaptation strategies were mainly ad-hoc and came as a direct response to the storm. The

reasons for this were, amongst other issues, the lack of pre-disaster information on (a) the potential severity of the storm and (b) what individuals can do to minimize potential impacts. In addition to this, also the strong belief in hierarchical structures was identified as a key barrier hindering people from taking more actions themselves. Individuals either thought that authorities had sufficient capacity to handle the situation, or they were afraid of interfering with the authorities' work or the law. Lack of cooperation between neighbouring households and between households and institutions was also identified as a barrier for adaptation.

The results of this study are to some extent in accordance with earlier research from other areas (e.g. Wamlser & Lawson 2012), showing the urgent need of finding models for better supporting people's adaptive capacities and complementing institutional efforts with local-level efforts for adaptation.

Key words: Adaptation strategies, adaptive capacities, climate change, climate change adaptation, disasters, Helsingborg, individual capacities, disaster risk reduction, storms, Sweden.

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1. Introduction

1.1. Problem definition

Climate change is predicted to lead to an increase in climate variability and climate extremes (IPCC 2007; IPCC 2012). In fact, worldwide climate-related disasters are already on the rise (IPCC 2012). The effects of climate change will be global but different regions will be affected in different ways (IPCC 2007).

According to the fourth assessment report of the Intergovernmental Panel on Climate Change, IPCC (2007), a rise in European mean temperatures of 0.9°C has been reported since 1901. However, the last three decades have shown a temperature increase noticeably higher than the mean of the century. Northern and central Europe has shown a greater temperature increase than the Mediterranean area (ibid.). The greater the temperature increase, the greater the impact will be on the affected regions, therefore, northern Europe faces severe challenges. For southern Sweden, predictions are that temperatures will rise by 4°C-5°C until 2100 (IPCC 2007, SMHI 2010). Precipitation patterns will also be altered and extreme weather such as storms will increase in both frequency and magnitude (ibid.).

There are two main fields of work when handling the issues of climate change, mitigation and adaptation. Mitigation seeks to reduce the causes of climate change, which is primarily done through reducing greenhouse gas emissions (IPCC 2007). Adaptation on the other hand seeks to reduce the impacts of climate change through adapting societies to altered climatic conditions (ibid.) The IPCC defines adaptation as “(An) *adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities*” (IPCC 2007, p. 869).

In the Swedish public debate, individuals are to a large degree encouraged to participate in efforts of mitigation, this is however not the case concerning efforts of adaptation. Regarding efforts of mitigation, individuals are encouraged, both through hard prohibiting policies and through soft economically oriented policies, to minimize their own emissions of greenhouse gases. These policies include for example governmental rebates on low-emission cars, and tax rebates on alternative fuels (Budget proposition of the Swedish government 2011a; Budget proposition of the Swedish government 2011b). Furthermore, much attention in the media is given to how to act, live, eat and consume in a climate wise fashion in order to minimize greenhouse gas emissions through actions taken in everyday life (Romson 2012; Bendz 2012).

In contrast to mitigation, there is in the field of adaptation a lack of knowledge regarding what the local community and the individual citizen can, or is expected to, do in order to adapt to a changing climate and on how to cope with adverse conditions and the possible stresses that follows (SOU 2007:60 2007). This knowledge is however crucial since it is likely that citizens in the developed world, and in Sweden in particular, are less able to make appropriate preparations for extreme weather conditions because of their lack of experience thereof. As Twigg (2004) states, the capacity to respond and cope with adverse conditions is dependant on the previous experience of an individual or a group, as previous experience generates knowledge and enables the development of strategies of coping. When combining the comparative lack of disaster experience with the absence of climate change adaptation information, it becomes interesting to study what the Swedish people do in order to adapt to a future climate where weather extremes will become more frequent and more severe.

As the *Hyogo Framework for Action* (UNISDR 2005) by the United Nations International Strategy for Disaster Reduction claims, it is essential that issues of climate change are addressed in all parts of our societies, from the higher institutional levels of governments and regional councils, down to the root levels of individuals and households. However, in reality strategies and actions at different levels often have a tendency to hinder rather than support each other (Wamsler & Lawson 2012). In conjunction with this, both horizontal and vertical knowledge transfer has been identified as major components in the striving towards efficient climate change adaptation (UNISDR 2005, Wamsler & Lawson 2012). This means that different levels in society should learn from each other, not only from the top and downwards.

Following the increasing urbanisation of the world, urban areas are likely to be hotspots of disasters with severe losses of both lives and economic values as they are densely inhabited (Pelling 2007). Furthermore, as urban areas will be placed under increasing risk, in both the developing and the developed world, mutual knowledge sharing between developed and developing societies are desirable (Pelling 2007, IPCC 2000).

The Swedish society is developed and has comparatively strong governmental institutions in place to protect their inhabitants. Nevertheless, even if institutional capacities are granted substantial amounts of resources and time, institutions alone can never fully prepare a community in such a way that it is not vulnerable to adverse or extreme conditions (Guldåker 2009). It is therefore of considerable interest to study the individual capacities to adapt to climate change. This becomes especially important when performing the study in a community or society with a history of strong institutions and with what can be perceived as

low vulnerability, as the inhabitants here are likely to be affected by extreme weather conditions more frequently and more severe than they have been before (IPCC 2012). Thus, there is an urgent need to generate knowledge on the existing individual adaptation capacities which has also been identified as a knowledge gap by the Swedish Climate Vulnerability Assessment, *Klimat och sårbarhetsutredningen* (SOU 2007:60 2007). A rapidly changing climate calls for swift knowledge transfers on how to cope with and adapt to climate change. Earlier research shows that strategies for climate change adaptation benefits from being localised and taking both existing and potential adaptation strategies into account (IPCC 2012; UNISDR 2005; Wamsler 2008) as well as cultural norms and socio-political dimensions (Pelling 2007). Bearing this in mind, it becomes evident that the inhabitants of an area possess unique knowledge of that certain area which must be acknowledged by institutions and developers when working in that area.

Thus, in order to determine the actual capacity to adapt in a certain area and how to reduce the potential of disaster impacts, it is necessary to already at an initial stage clarify what is actually done by the individuals at a local and individual level, and what stands in the way of taking more individual action.

1.2. Aim and objectives

This paper aims to provide knowledge on the existing adaptation strategies of individuals and households and thus to assist in the development of more efficient ways to adapt to climatic changes and extremes.

The specific contribution of this study is to examine individuals' current adaptation strategies in Helsingborg, Sweden. On this basis, the research questions are:

- 1. What are the current adaptation strategies of the individuals in the study area?*
- 2. Are there any identifiable barriers that prevent individuals from taking further or more efficient strategies?*

To answer these research questions, the study area needs to be one which has recently been hit by an extreme weather event, so that the inhabitants' adaptation strategies become apparent. The incident chosen was the storm of late November 2011, later named the advent storm, which as it hit Southern Sweden had substantial impacts on several coastal settlements.

The aim is to, through answering the research questions, try to clarify what is done and what can be done at an individual or household level in terms of climate change adaptation. This will increase the knowledge on how to effectively cope with climate change and help minimize the potentially negative impacts such a change may bring forward. This will in the long run contribute to a more sustainable development of society.

This study aims at contributing to a five year research project on adaptive capacities which is financed by the Swedish research council Formas, entitled *Increasing societies' adaptive strategies to climate change through distributed risk governance* (Wamsler 2012).

1.3. Methodological approach

This study is a case study of individuals in the city of Helsingborg, Sweden, before, during and after the advent storm of 2011. The study area, Norr, is situated on the coast to the north of the city centre. Data for the analysis of the adaptation strategies in the study area are collected through interviews carried out during May and June of 2012 in the affected areas of central Helsingborg. The interviews are complemented initially by a literature review on adaptation capacities and disaster risk reduction measures in the area, and secondly on strategies adopted in the area. The latter review will predominantly contain grey literature, including newspaper articles on the advent storm and information from municipal and governmental institutions.

Prior to this, a literature review on conceptual frameworks as regards climate change adaptation and disaster risk reduction is made through database browses on earlier research on associated issues.

1.4. Outline of the thesis

This paper is divided into six different sections starting with the introduction, which describes the problem and provides background information as well as presents the aim of the study.

Following this is the conceptual framework, which provides and defines central concepts in the study. The concepts of risk and its relation to other concepts such as vulnerability, adaptive capacity and adaptation strategies will be established in the conceptual framework. The adopted conceptual frameworks and its sources are provided here as they are

needed to systematically analyse the situation in the study area. Once the conceptual framework is in place, the methodology will be presented. The methodology describes the course of action when collecting data during the field work and how the data was analysed. The methods of the literature review and the way that the conceptual framework was put together is also presented in the methodology. It also provides information on the study area and why it was chosen. The methodology finally introduces the advent storm, which is central to the study, and its effects on the study area.

The results generated from the data collection and analyses are presented in the results section. Initially, the results will be divided into findings from the literature study and findings from the conducted interviews. The findings will then be divided into the different categories based on the research questions. In the discussion, these findings from the result section are discussed and related to other studies. In the discussion, the reliability of the findings from the study as well as the methodological approach are evaluated. Finally, the concluding section presents the most central findings of the study and the possible contributions made.

2. Conceptual framework

2.1. The need for a conceptual framework

In order to analyse the research questions presented in the aims and objectives, there is a need for a conceptual framework aiming at defining central concepts utilised in the problem definition, such as disaster risk, adaptation strategies and adaptive capacity. Concepts such as climate change adaptation (CCA) and disaster risk reduction (DRR) will also be presented and how to work with these.

The conceptual framework will define disaster risk reduction and climate change adaptation in such a way that it enables an efficient scrutiny and a breakdown of the disaster risk concept into smaller constituents. In order to enable this systematisation of the disaster risk concept, the study will to a large extent use the risk concept promoted by UNISDR, presented in the form that directly links the separate components of risk to a specific measure of risk reduction and adaptation (cf. Wamsler 2007; 2008).

As earlier research mainly covers the individual capacities in a surrounding and a society very different from the Swedish, care must be taken to translate this risk concept into a fitting surrounding. However, the theories behind the risk concept from earlier studies are arguably to a large degree translatable to a Swedish concept at an individual level, it is mainly the actual measures taken that may differ significantly.

2.2. The concept of disaster risk

Disaster risk is defined by UNISDR as “*The potential disaster losses, in lives, health status, livelihoods, assets and services which could occur to a particular community or a society over some specified future time period*” (UNISDR 2009, p09).

It is understood that the potential impacts from climate change may turn disastrous only when appearing under circumstances that allows them to do so (UNISDR 2005, IPCC 2012). This means that the risk of a certain natural hazard is not considered to be constant but rather fluctuates with the vulnerability and capacities of the impact area, as stated in the *Hyogo Framework for Action* (UNISDR 2005). Thus, disasters occur under vulnerable conditions. Vulnerability itself is decided by a community’s or a system’s characteristics and its circumstances, which may make it susceptible for the impacts of a hazard (UNISDR 2005).

The concept of disaster risk utilised in this study will use the definition of risk (R) as a result of hazard (H) and vulnerability (V) (Wisner et al. 2003, UNISDR 2009), see equation 1 below.

$$R=H*V \quad \text{Eq.1}$$

The relationship between these concepts will later be compartmentalised and linked to potential risk reduction measures to achieve a holistic view (UNISDR 2009, Wisner et al. 2003; Wamsler 2007; Wamsler 2008). This is done because attempts to increase individual capacities to adapt to and cope with disaster risk benefits from a more compartmentalised risk concept where different types of measures affects one part of the vulnerability of a community or a study area but not another, enabling a more efficient way of identifying, managing and reducing impact risks (ibid.). Thus, by breaking up the disaster risk equation into compartments, a more efficient work on reducing the disaster risk can be produced.

Initially, the term of capacity to respond, or rather the lacking thereof (LC), is introduced to the equation, see Eq.2 (UNISDR 2009)

$$R=H*V*LC \quad \text{Eq.2}$$

The lacking of capacity to respond and recover is here included as research has proven the importance of having the appropriate mechanisms to respond and recover from potentially hazardous incidents in a way to secure development and resilience also in a post event perspective (ibid.).

Wamsler (2007) interprets LC by compartmentalising lacking of capacities into: reducing or avoiding hazards, reducing the location-specific vulnerabilities, responding and preparing for response, and finally recovering and preparing for recovery.

2.3. Disaster Risk Reduction

In the area of disaster risk reduction (DRR) this in-depth definition of disaster risk is utilised as a basis in order to generate a systematic approach where the causal factors of risk and the lacking in sufficient capacities are thoroughly understood (UNISDR 2009). The concept of DRR itself is defined as “ *The concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through*

reduced exposure to hazard, reduced vulnerability of people and poverty, wise management of land and the environment, and improved preparedness for adverse events” (UNISDR 2009, p10-11). This means that DRR includes dimensions such as prevention and preparedness, see definitions below, as well as development and management, in the disaster risk concept. The constituents for reducing disaster risk through DRR are as follows.

Prevention is defined as a reduction or avoidance of the hazard, which will in theory eliminate the risk altogether (UNISDR 2009). An example of this might be judicial measures that prohibits all sorts of construction and housing development in disaster prone or high risk areas. Prevention therefore seeks to reduce, or preferably eliminate, the hazard.

Mitigation seeks to minimise the impact of the hazard by reducing the location-specific vulnerability of the community or area in question (UNISDR 2009). Mitigation in a DRR context is about mitigating vulnerability and should not be mistaken for the mitigation of greenhouse gases.

Preparedness for response will reduce the impact of a hazard by ensuring an efficient and appropriate response in the aftermath of a disastrous incident (Wamsler 2007). Early warning systems and stocking of supplies are illustrative examples. Such actions are at times also included under vulnerability reduction, and thus disaster mitigation.

Preparedness for recovery is important as events often turn disastrous when they occur in communities that are already trying to recover from earlier events, and therefore are more vulnerable (Wamsler 2007). Well developed plans for post incident reconstruction and rehabilitation can enhance the preparedness for recovery. Disaster insurances fall under this category. Preparedness for recovery is also at times included under vulnerability reduction, and thus disaster mitigation.

Although it generates a more complex view on risk reduction, the described conceptual understanding will likely give a better and more operational comprehension of the actual risk at a given location, or even more so in a specific community. More importantly, it will identify how to reduce these disaster risks more efficiently.

As a conceptual framework for the concept of risk now has been presented, it enables a more in depth analysis on what the individuals in the study area actually do in order to reduce their risk, and by doing so, increase their own adaptive capacity.

As the interviews unfolds, possible actions taken by the individuals and households will be analysed and then divided into the categories of what is done to prevent and mitigate the risks of a changing climate as well as what is done to be prepared to respond and recover from

potential disasters. Possible differences between pre- and post disaster behaviour will also be examined.

2.4. Climate change adaptation and adaptive capacity

People's capacity to adapt to a changing climate is dependent on the ability to reduce the associated risks. Thus, climate change adaptation is closely linked to disaster risk reduction.

Initially, in order to define climate change adaptation (CCA) it is important to understand the meaning of climate change. The term climate change has been defined by IPCC (2007) as “(A) change in climate over time, whether due to natural variability or as a result of human activity” (IPCC 2007, p 6). This differs somewhat from the definition of other organisations such as the United Nation Framework Convention on Climate Change (UNFCCC), which defines climate change as a phenomenon attributed to human activity, directly or indirectly (UNISDR 2009). The UNISDR (2009) report also states that both of these definitions may be applicable in a disaster risk reduction situation. As the focus of this study is solely on adaptation to climate change rather than the mitigation of greenhouse gases, both definitions are considered viable.

Regarding climate change adaptation, UNISDR (2009) defines adaptation as *(T)he adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities* (UNISDR 2009, p 4). This means that adaptation includes both responses to, ad hoc as well as planned ones, and preparations for climatic stimulus. Furthermore, it includes coping with adverse conditions as well as exploiting the occurring opportunities that may be positive. The adaptive capacity itself becomes visible by the ability to reduce risk by applying the measures of prevention, mitigation, preparedness for response and preparedness for recovery. Learning from the definition of the IPCC, the better the ability is to adjust to climate change with all its associated impacts the better the adaptive capacity can be considered to be (IPCC 2007).

This study will look into the measures, both those already taken and those planned for, that individuals take which may alter their adaptive capacity. These measures will be defined as individual adaptation strategies, which is a central concept in the research questions.

In relation to disaster risk reduction (DRR), climate change adaptation (CCA) is in one aspect a narrower concept dealing solely with the affects of a changing climate, excluding other risks. This makes climate change adaptation a subset of disaster risk reduction. However, as climate change adaptation also includes exploiting beneficial opportunities,

disaster risk reduction may under given circumstances be seen as a subset of the total climate change adaptation under given circumstances or in a given community.

Climate change adaptation is in this study regarded as a process that increases adaptive capacity. People's capacity to adapt to a changing climate is dependent on the ability to reduce the associated risks. Thus, it is possible to increase the capacity by either addressing a single risk component and reducing it, or by assisting and encouraging individuals to reduce their own risks by themselves. This is where it becomes important to follow the local pattern, bearing the individuals' assets, backgrounds and aspirations in mind, and furthermore, where the individual and the institutional strategies supports each other rather than the opposite (Wamsler 2007).

3. Methodology

The methodology section will initially introduce the background of the study, presenting the study area and its community. Following this, the events of late 2011, where several households were hit by extreme weather conditions in what was later called the advent storm, is presented. This will be done before presenting the method of data collection through interviews in the area, and the way the data analysis was made after the conducted surveys.

3.1. The study area

Helsingborg is a coastal settlement with a population in the entire municipality of 130.000 inhabitants in 2012, making it the 8th most populous municipality in Sweden (Helsingborg.se 2012a). The municipality has had, and will according to prognoses continue to have, a steady influx of people settling in the municipality (Helsingborg.se 2012b). The prognosis indicates a population of around 150.000 by 2024 (ibid.). This increase will likely require further exploitation of land and further densification of built up areas.

The municipality is dominated by the city, and the topography of the city itself is dominated by the abrasion slope and its proximity to the strait of Öresund. Öresund has been subject to floods in the past as water tends to pile up in the strait when wind conditions are unfavourable (Stadsbyggnadsförvaltningen 2011). There are also several water bodies such as Råån, flowing in to Öresund to the south of the city as well as rivers running to the north of the city, posing the danger of being flooded (ibid.). Nonetheless, a significant part of the built up areas, households as well as industries, are situated in exposed areas below the abrasion slope, which makes it physically vulnerable to rising water levels and extreme weather induced by climate change (Stadsbyggnadsförvaltningen 2011).

The city of Helsingborg has the shape of a narrow stretch along the Öresund strait, with much of the important infrastructure, such as the transportation hub, Knutpunkten, as well as a long stretch of the railroad and several major roads, situated in the direct vicinity of the ocean (Stadsbyggnadsförvaltningen 2011). Furthermore, the chemical factory of Kemira is also situated on the banks of the Öresund strait (ibid.). The central harbour pier, where Knutpunkten is located, is situated a mere 1.95m above the current sea level when regular water conditions apply (ibid.). At Råå, located to the south of the city centre, the situation is even more severe as the harbour piers are located no more than 1.2m above regular sea level

(ibid.). As the city centre itself is one of the most vulnerable areas to rising water levels, many of the crucial functions and security mechanisms of the society are at risk of being affected by extreme weather conditions. Climate change will increase flood risk in two ways, both through increased water levels and through the increase in extreme weather causing water to pile up in the Öresund strait (Stadsbyggnadsförvaltningen 2011; Håkansson 2011).

3.1.1. Effects of climate change in Helsingborg

According to documents from the municipality of Helsingborg and its department for strategic planning, *Stadsbyggnadsförvaltningen*, the effects of climate change in Helsingborg includes rising water levels, increased precipitation and more frequent events of extreme weather conditions (Stadsbyggnadsförvaltningen 2011). This information is based on a prognosis made by the Swedish meteorological and hydrological institute, SMHI, in turn based on the fourth assessment report by the IPCC (2007). These documents furthermore claim that water levels will continue to rise up to a 1m increase until 2100 (Stadsbyggnadsförvaltningen 2011). This will be added to the already documented rise of 0.2m over the last century (ibid.). The uplift that southern Sweden experiences since the last ice age will only partially offset the effects as it is limited to 1,5mm annually (ibid.). Flood risk is therefore identified by the department for strategic planning as the most severe risk caused by climate change (ibid.).

The prognosis also indicates increased precipitation of around 10-30% of the annual precipitation until 2100 (Stadsbyggnadsförvaltningen 2011). This may possibly result in floods in non coastal areas as water bodies will have flows that exceed their maximum capacity (ibid.). In addition to this, the frequency of extreme precipitation events will increase, which in turn increases the risk for flooded water bodies (ibid.). Another result of increased precipitation might be an increase of coastal erosion (ibid.) Coastal erosion is a process that can have severe impact on coastal habitats as well as on anthropogenic activities on the shoreline (Strahler & Strahler 2006).

A rising global temperature will have more effects than merely on the water levels. Increased temperatures will increase the frequency and severity of heat waves, the spreading of infectious diseases, air quality, water quality and the presence of allergens (Strahler & Strahler 2006, Stadsbyggnadsförvaltningen 2011). However, as is evident above, much attention has been given to the risk of floods, as this has been identified as the major hazard (Stadsbyggnadsförvaltningen 2011).

3.1.2. The advent storm of 2011

During late November of 2011, a severe storm hit the south western coast of Sweden and caused substantial damage to many settlements along the coast (Henning 2011; Lindquist 2011; Haraldsson 2011).

The inhabitants of Helsingborg, especially those in the vicinity of the rising ocean water, suffered from cellars flooded by water, power cuts and flooded roads from the piled up water masses. This was caused by registered wind speeds at over 30m/s in what was later called the advent storm (Henning 2011). The areas in the municipality of Helsingborg that were affected the most were unsurprisingly those below the abrasion slope situated a mere couple of meter above sea level; from Råå in the south, through the central areas around the train and bus station of Knutpunkten and up to the residential areas around Norr and Pålsjö to the north of the city (Lindquist 2011; Nilsson 2011). In figure 1 below, the most severely affected areas are highlighted. The study area is the northernmost highlighted area, this is where the majority of the affected individuals live.



*Fig. 1. Overview of Helsingborg, with storm affected areas highlighted
Image: Lantmäteriet/Metria 2012, retrieved from maps.google.se (2012)*

As this storm has occurred very recently, it was assumed that the affected inhabitants in these areas still have a good recollection of how they were affected, the severity of the incidents and how they coped, adapted, responded or recovered from it.

The underlying triggers of this storm will not be thoroughly studied, nor will the possible effects or driving forces that climate change might have had, as this lies outside the purpose of the study. The storm will be regarded as an extreme event whose frequency will increase in conjunction with the other effects that a changing climate is projected to bring (Stadsbyggnadsförvaltningen 2011; SOU 2007:60 2007).

Although the storm might not be regarded as a catastrophe or a major natural disaster in its most commonly used sense, it is nonetheless an extreme weather event where the protective mechanisms and strategies brought forward by both individuals and authorities were put to the test. This incident therefore presents a good opportunity to study the existing coping strategies that the inhabitants may have and how well they worked, or how they could have worked better.

3.2. Deciding the study area

The study was to be conducted so that field work was enabled in an efficient way. The area therefore had to be situated in Southern Sweden and had to be of sufficient size to generate a reasonable amount of data. The chosen area had to be recently affected by extreme weather as this would make for better understanding of the rationale behind the individuals' adaptation strategies. As Sweden is relatively spared from weather events with truly disastrous consequences, the storm of late November 2011 was seen as an extreme event to be utilised to answer the research question.

Out of a number of candidate cities along the south western coast of Sweden, Helsingborg was picked as the city had been hit relatively hard by the storm. Furthermore, Helsingborg is a city of rather defined topographical conditions, with a distinctive abrasion slope dividing the city into two areas (Stadsbyggnadsförvaltningen 2011). One coastal area below the slope sitting only a couple of meters above the water surface and one non coastal area sitting more than 20m above the water surface and at that out of harms way even when extreme water levels in the Öresund strait occur (Stadsbyggnadsförvaltningen 2011).

The city of Helsingborg was also chosen because it is a city that is aware of, and has started to work with the issues and potential impacts of climate change. This has been done partly via strategic documents in their municipal plans (e.g. *översiktsplan*), documents which

are mainly based on the prognoses and assumptions of SMHI. The municipality also claims to have introduced a vision as regards climate change and the possibilities of sustainable development (Stadsbyggnadsförvaltningen 2011). As Helsingborg is a city that has started to engage in these issues on an institutional level, it is also of importance that these actions are made in such a way that strategies at different levels are coordinated to promote rather than interfere with each other. This makes the city of Helsingborg an appropriate study area.

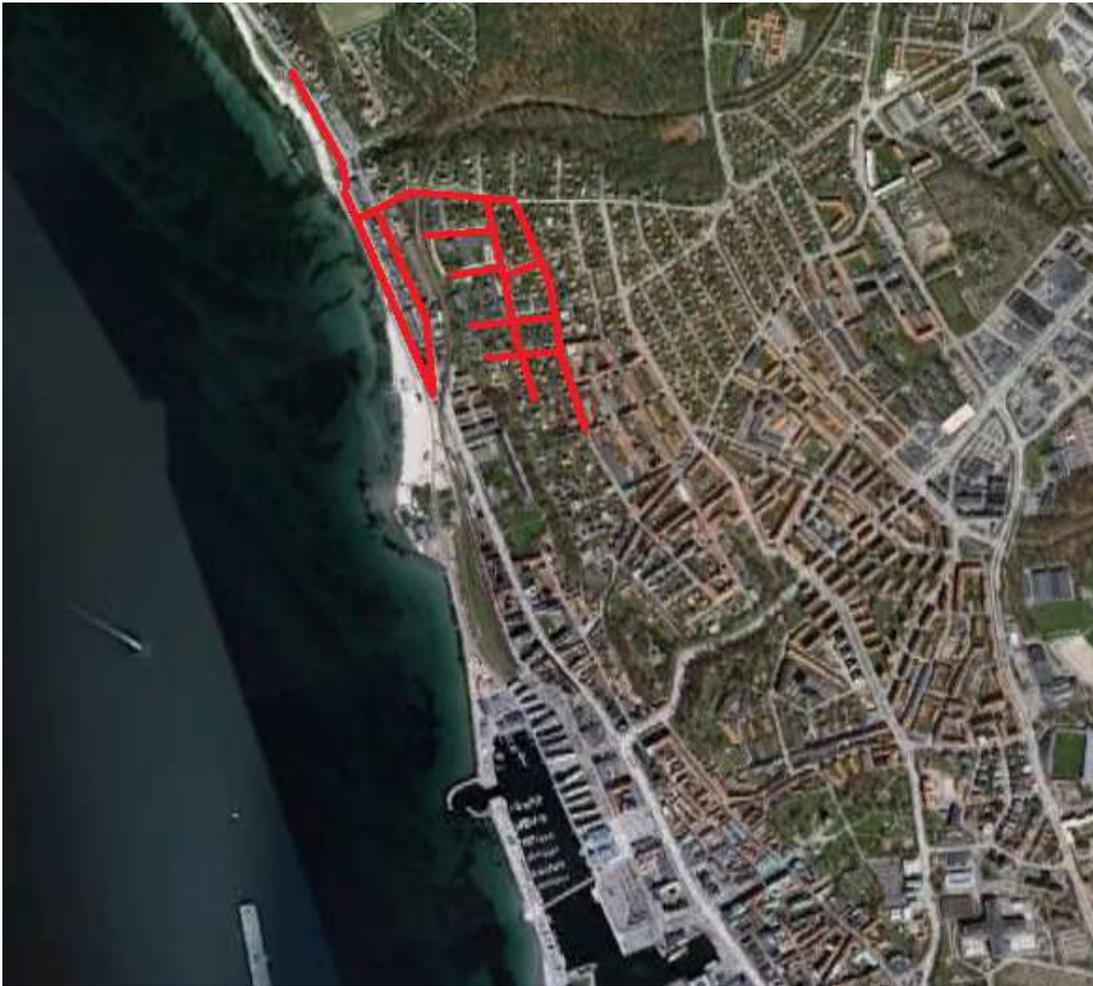
3.3. Data collection

Initially, a large amount of literature was reviewed in order to generate a conceptual framework suitable to the intentions and aims of the study. Articles on the concept of disaster risk, risk reduction and climate change adaptation were studied. To generate knowledge on disasters, natural hazards and adaptation strategies and capacities, documents from UNISDR such as the *UNISDR Terminology in Disaster Risk Reduction* (UNISDR 2009) and the *Hyogo Framework for Action 2005-2015* (UNISDR 2005) were studied alongside scientific articles on urban vulnerability and localised adaptation strategies. In addition, the aspects and impacts of climate change were studied generally in documents from international panels such as IPCC and from regional and local strategic documents such as the municipal plans of several of the southern Sweden municipalities (Stadsbyggnadsförvaltningen 2011, SOU 2007:60 2007).

Secondly, after the conceptual framework had been put together, an article search was conducted in the article database of *Mediearkivet*, containing articles from all the larger Swedish newspapers. The database was searched for articles mentioning recent storms, floods, heat waves or other adverse conditions in order to find a well documented incident that was still present in the minds of the individuals affected by it. Once the location of the study area had been decided, articles about this area were studied in order to identify the adaptation strategies among the individuals in that particular area.

As the article search had been finalised and the study area had been decided upon, data from the individuals living in the study area was collected. In order to collect this data, a number of structured interviews were conducted on the basis of an interview guide, see Annex 1. The interviews were performed during May and June 2012. Where to target interviewees was decided after the article search, when the most severely affected areas were known.

The area where individuals had been affected was concentrated to a number of streets near the coast and to the north of the city, see fig. 2 above.



*Fig. 2. The study area where interviews were made
Image: Lantmäteriet/Metria 2012, retrieved from maps.google.se (2012)*

In this area, individuals were approached in their homes and asked to participate in an interview. In this area, all homes which were possible to access were approached for interviews. If no one answered the door, one additional attempt was made at another time.

The focus of the interview was mainly on how the interviewees had been affected by the advent storm. They were asked how they perceived the situation and in what way they had acted to prepare before the event, how they reacted to the event, how they acted to recover from the event, and what they would do differently the future. They were also asked about how well they had been informed prior to the storm, whose responsibility they thought it was to deal with issues of extreme weather and about what other weather related risks directed towards them they could identify.

If the interviewee had not been affected by extreme weather, they were asked if they knew people who had, and if they could identify any reasons why they had not been affected. In total, 25 interviews were conducted with citizens in the study area. The depth and the length of the interview was decided by its circumstances, i.e. the amount of time that the

interviewee was prepared to sacrifice and whether they were prepared to give recorded statements or not.

3.4. Data analysis

Initially, the data from the article search on the advent storm in Helsingborg was analysed, trying to identify adaptation strategies that had been taken by individuals prior, during and after the advent storm. As the interviews with individuals in the area had been finalised, the acquired data was analysed for results. This qualitative data analysis was made through a thorough assessment and comparison of the interview content. Attention was directed to the answers given to direct questions but also to what the interviewee brought up as issues themselves.

The material from the interviews were accumulated and analysed, initially in order to identify individual adaptation strategies that had been adopted in the area, if any. The identified strategies were then categorised into strategies of prevention, mitigation, preparedness for response and preparedness for recovery. Following this, the causes for adopting these strategies and the knowledge that the individuals claimed to have as the basis for the strategies they had adopted were analysed. Finally, when the strategies and the causes had been examined, potential barriers, hindering them from adopting further strategies were identified.

4. Results

This chapter begins with the presentation of the results from the literature review. In this section, 4.1, first the findings regarding adaptation strategies and the involvement of individuals are presented. Thereafter, the adaptation strategies of Swedish institutions are presented as an orientation on what is actually done at institutional level, the focus here is on the municipality of Helsingborg. In the following, the individual and household level will be presented including identified individual adaptation strategies before, during and after the advent storm, in the way that they are presented in newspaper articles.

The next section, section 4.2, handles the results of the interviews, presenting the individual strategies and their nature. The strategies are then identified as measures of either prevention, mitigation, preparedness for response or preparedness for recovery. Other findings from the interviews will also be brought forward, such as the identified reasons for individuals to adopt certain strategies, as well as barriers hindering them from taking further or different kinds of actions.

4.1. Results of the literature review

4.1.1. Adaptation strategies at a local level: the importance of individuals' involvement

Guldåker (2009) as well as Cutter & Emrich (2006) conclude that large scale efforts of crisis management often collapse due to insufficient planning and under dimensioned resources. Bearing this in mind, it is evident that regardless of the strength of the institutions in place, the adaptation capacities of individuals of an affected community is of great importance when crucial functions of a society are no longer functioning.

The importance of local level engagement towards climate change has also been brought up by Wamsler & Lawson (2012), where the authors identify its importance in both developed countries (with strong institutions) as well as developing countries (with weaker institutions). Institutional strength is however likely to affect the inhabitants' tendency to take measures seeking to reduce vulnerability. In the case study of the city of Manchester and its floods of 2004 and 2006, presented by Wamsler & Lawson (2012), hardly any measures had been taken by the city's inhabitants prior to the events. The vulnerability reducing actions that were in fact taken were mainly ad hoc, meaning that they were not planned for at an earlier stage but

rather a response to what was happening (ibid.). As victims were interviewed one year after the floods, slightly more than a quarter of them had taken actions to reduce vulnerability, while some actions had also been taken to increase their preparedness for response, such as acquiring protective sandbags (ibid.). However, the most frequent adaptation strategy was that of insurances, which is a strategy aimed at preparing for disaster recovery. This was generally regarded as the most effective risk reduction strategy by the inhabitants. Furthermore, the strength of the institutions and institutional mechanisms seemed to affect the inhabitants in a way that led them to take little or no action (ibid.). This lack of action was attributed to people's belief that the institutions and their mechanisms would keep the inhabitants safe even under adverse conditions (ibid.). Pitt (2008) draws similar conclusions in his study in the aftermath of the floods of Gloucestershire and Thames Valley of 2007. No studies from Sweden on individual strategies or behaviour during floods were found, indicating a lack of local evidence. Guldåker (2009), who studied the aftermaths of a storm in Southern Sweden 2005, also identifies studies on households' and individuals' responses and strategies during disasters as scarce, and that the existing studies are mainly set in developing countries.

Reflecting on the findings of the literature review, inhabitants in regions with a historically low disaster risk have to accept that the institutions perceived as strong will not always be able to protect the inhabitants during the adverse and possibly unpredictable conditions that climate change give rise to (UNISDR 2005; IPCC 2012). At least not without the aid of efficient, localised strategies to cope and adapt (UNISDR 2005). It is therefore necessary to create localised strategies where the individual is encouraged to engage. As Wamsler & Lawson (2012) concludes, top-down and bottom-up approaches should be integrated to generate efficient ways of climate change adaptation. The incidents of the UK floods and their impacts and aftermaths are to some extent applicable to the municipality of Helsingborg, as both the institutional strength and the physical conditions with its flooding hazards are similar in conditions.

4.1.2. Adaptation strategies of Swedish institutions

Drawing upon the findings of the reviewed literature from the Swedish meteorological and hydrological institute (SMHI 2010), the Swedish civil contingency agency (MSB.se 2011a), the municipal department for strategic planning (Stadsbyggnadsförvaltningen 2011) and Guldåker (2009), the Swedish crisis management is largely built up around and dependant on institutional capacities and mechanisms. Guldåker (2009) states that the municipalities, given their geographically specific responsibility, are key actors in crises and when adverse

conditions occur. Furthermore, Guldåker (2009) highlights the difficulties associated to efficient crisis support and governing when adverse conditions appear, given that many vital functions in the society such as transport infrastructure and means of communication are taken out or damaged.

The municipality of Helsingborg has, mainly through the department for strategic planning, addressed the issues of climate change and its associated risk for some time (Stadsbyggnadsförvaltningen 2011). Their most important tools for adaptation strategy is claimed to be risk- and vulnerability analyses together with the regulations of the planning- and building law (PBL) and the municipal overview- and detail planning (Ibid.). Identified groups to cooperate with are mainly neighbouring municipalities, companies conducting environmentally hazardous activities the regional administrative board and the traffic board (Ibid.). Cooperation with individuals and households are not mentioned, neither do the studied documents say anything on how to communicate municipal strategies to individuals or how individuals should contribute to the strategies (ibid.). However, prior to these documents being finalised, public consultations had been carried out.

4.1.3. Recommendations from institutions to individuals and households

The municipal website, Helsingborg.se, provides some information on their climate change related work (Helsingborg.se 2012c). A strategy and action map is available with information on areas vulnerable to floods, and piers in need of reinforcement together with institutional strategies to sort out these problems. There is also a map on risk and vulnerability available (ibid.).

These two maps from the department of strategic planning together with the PM on climate change adaptation also available (Stadsbyggnadsförvaltningen 2011) generates a good understanding on different hazards in different areas. However, the basis for considering an area as vulnerable is strictly physical and does not include other variables affecting the potential impact, such as social or economic vulnerability (Helsingborg.se 2012c). Furthermore, on the municipal website, no information was found regarding what the individual households or neighbourhoods could do themselves to decrease their vulnerability.

The first information found acknowledging and informing on individual responsibilities was at Dinsakerhet.se (2011), a web page on risk and security created by the Swedish Civil Contingencies Agency, *MSB*.

On this site, several hands on guidelines were presented on what to do in case of an emergency such as power cuts, floods on snow storms (Dinsakerhet.se 2011). There is also a

discussion on the shared responsibility between institutions and individuals as regards crisis management and preparedness (ibid.). The individual responsibility is here identified as protecting their own lives and their own possessions, including being aware that emergencies may happen at any time, as well as staying informed on the work of authorities and being prepared by having access to food, water and heat (ibid.).

This sectioning of responsibilities is in accordance with the views of other institutional organisations (Krisinformation.se 2011a; MSB.se 2010a).

MSB has some information focusing on limiting the impacts of floods (MSB.se 2010a), this information is however primarily directed towards municipalities rather than individuals. On a local scale, MSB has a task of establishing so called river groups, which are local organisations intended to support institutions through spreading knowledge and enabling cooperation between local, regional and national organisations and institutions (MSB.se 2010b). These river groups are intended to contain representatives from municipalities, regional councils, the Swedish transport administration and the Swedish contingency agency, it is not intended to include representatives of local citizens. As the name suggests, these groups are intended to handle the issues of flooded rivers rather than elevated water levels in the sea, and there are no river groups in the area of Helsingborg (ibid.).

Conclusively, information on what institutions expect from Swedish individuals in a crisis does exist. It is however uncertain whether this information is acknowledged by the individuals themselves. This will be analysed after the interviews are finalised.

Prior to the advent storm, a class three warning was issued by SMHI, which is the highest level of warning (Hansson and Monikander 2011). The warning was broadcasted on television weather reports, in local newspapers and on the internet, where individuals were urged to stay inside, closing windows and doors, and clearing gardens and balconies (Hansson and Monikander 2011; Krisinforamtion.se 2011b).

4.1.4. Individual adaptation strategies and identified barriers

The advent storm brought some attention to the media, and several articles were found (Haraldsson 2011; Henning 2011; Håkansson 2011; Lindquist 2011; Nilsson 2011). As the newspaper articles mainly described the impacts of the storm and the people victimised by it, it was hard to identify any particular adaptation strategies during the literature review. The only conclusion that could be made was that many of the victims were caught unprepared. Thus, their adaptation strategies had either been non-existent or inefficient. Furthermore, no hindering barriers could be identified.

The review did however generate a good understanding of the storm and where the impacts had been the greatest, which was useful information prior to doing the interviews. As no adaptation strategies could be identified, the need for targeted interviews in the area was evident.

4.2. Results from the conducted interviews

The preliminary findings after the structured interviews had been finalised was that the number of individuals directly affected by the advent storm in Helsingborg were actually small and the impacts were restricted to a limited area. In total, only a couple of streets were heavily affected where many households had their cellars water filled and their cars and carports destroyed or damaged.

The interviewees were in general willing to talk about the storm, especially those that had been affected by it. However, they showed little or no interest when other weather-related risks were brought up as topics for discussion. It was evident that the principal reason for concern among the individuals regarding the effects of climate change was the combination of high water levels and great wind speeds in combination. Almost all of the interviewees listed this as the number one risk directed towards their household. Potential risks such as extremely cold temperatures or heat waves raised little or no concern among the interviewees.

4.2.1. Storm effects and action-taking by individuals

Slightly less than 50% of the interviewees claimed to have been affected by the advent storm in one way or another. This should however not be seen as a representative percentage of households affected, as the interviews were conducted in an area known to have been severely hit by the storm. Property damage due to flooded cellars or garages was the most common way of being affected. Others had their gardens destroyed or their cars either washed away or water filled. All of the affected households had either their homes situated in close vicinity to the sea or property, such as cars, situated there.

The issues most frequently brought forward by the interviewees when asked about the reason why they had been affected were mainly of geographical nature. That is, the fact that they are living very close to the sea. Out of the non-affected individuals, the explanations as to why they were not affected were also mainly of geographical or physical nature, connected to their houses being situated higher above sea level. Only two individuals named their own actions as part of the reasons for not having been affected. The actions taken by these two

individuals (8% of the interviewees) were to bring all of the furniture, pottery, etc. out of the garden and staying inside with the radio on, they took these actions after hearing storm warnings on the radio. As one of them stated: “*Yes, we took some things inside and made sure that everything was secured, we had (the storm of) Gudrun a couple of years ago, when things disappeared from our garden*”.

When explicitly asked about any measures they had taken to be better prepared for the storm, the most common answer was that no measures at all had been taken. 80% of the interviewees answered that they had taken no measures at all, see table 1 below. Furthermore, about half (48%) of the households claimed that they were unprepared as a storm of this calibre had never occurred before, which made preparations hard as they did not know what to expect or what to do. A fifth of the interviewees (20%) had taken actions of preparation with the storm in mind. These measures consisted of staying inside, bringing loose things inside and keeping the radio or the TV on. Two of the interviewees (8%) claimed to have made more extensive preparations as one claimed to have bought a submersible pump, in order to pump water out of his basement, this measure had been taken after a storm in 2005. The other interviewee had reinforced his fence through attaching it more firmly to the ground so that it would withstand higher wind speeds, this was carried out after the same incident.

All of the interviewed individuals claimed that their household had a home insurance intended to financially cover incidents such as damaged property. However, it was only until asked explicitly about their home insurance that the interviewed individuals identified this as a risk reducing measure. Among the households which experienced damaged property, the vast majority chose to use their home insurance to cover the damage. Two households chose not to use their insurance even though they had damaged property and was likely eligible for financial compensation. The reason for this was that these individuals perceived the damages as so minor that they preferred to mend them on their own without involvement from insurance companies.

Table 1. Actions taken before and after the storm to be better prepared

Question asked:	Yes	No
Did you take any measures before the storm in order to be better prepared?	20%	80%
Have you taken any further measures after the storm to be better prepared in the future?	24%	76%

Actions taken after the storm varied greatly among the affected households. As shown in table 1 above, 24% of the interviewees state that their households have taken further action to stand better prepared in the future as a result of the storm. The measures that had in fact been taken were flood proofing of basements and garages, purchasing back up power generators and submersible pumps and being more cautious as to where to park the car. Out of those opting not to take action (76%), the majority had none the less discussed the possibilities of doing so, but either decided not to do anything or had not decided upon the appropriate measure yet.

When the interviews switched focus to that of other potential weather related risks, the interest and the enthusiasm among the interviewees dropped significantly. Almost everyone, regardless of if they had been affected by the storm or not, pinpointed either storms, wind speeds or elevated water levels as the number one risk directed towards their household. Other potential risks, brought up by the interviewer, such as heat waves, landslides and extremely cold temperatures were regularly discarded. The most common explanation for not showing any concern with temperatures was that the individuals claimed to live in well built, air conditioned, thoroughly insulated houses. Another explanation was that the interviewees saw themselves as accustomed to very cold temperatures and therefore handled it without problems. Landslides were looked upon as something that does not take place in Sweden.

When asked about their view on responsibility, opinions varied somewhat. The interviewees were asked to initially assess whether the responsibility to handle weather related risks were their own as individuals or if it was the responsibility of authorities. This was made on a scale from one to five, where one equalled the sole responsibility of the individual and five equalled the sole responsibility of the authorities. The answers ranged from three to five, with no answer being less than three, see table 2 below. The justification from the 56% who answered three was that the responsibility was in fact shared, where they as individuals and households had a responsibility to protect their own property and to obey warnings, laws and regulations from the authorities so that their lives were not put at risk.

Among the 44% who answered four or five, the most common motivations were that they as individuals could do little or nothing to protect themselves from such a thing as the weather. This was considered a task far too great and too expensive for a single individual or household. The belief that nothing at all could be done against these destructive forces was also put forward by four interviewees in this group.

Table 2. Interviewees' opinions on responsibility distribution

Question asked:	The individuals'				The authorities'
	1	2	3	4	5
Whose responsibility is it to handle the issues of extreme weather?	0%	0%	56%	28%	16%

The view on responsibility differed slightly between those affected by the advent storm and those not affected. Those affected were more in favour of a shared responsibility (3) between households and authorities, whereas those not affected attributed more of the responsibility to authorities.

Even though views on responsibility varied, almost all of the respondents agreed that authorities owned the responsibility to inform its inhabitants on disaster risks and to coordinate actions and adopt strategies in different parts of the society in case of an adverse incident. Authorities were also considered to have the full responsibility to make sure that public areas and infrastructure was in working order.

The respondents were further asked whether they saw themselves as well informed on how to deal with extreme weather conditions. On this question, no difference in opinions could be established between affected and not affected households. Responses furthermore suggest that one third (32%) identified themselves as well informed. However, out of this third, a frequently occurring comment was that the individual in question was aware of the risks, but chose to live in the area regardless. This could suggest that the respondent was in fact not well informed on how to handle the risks, but rather that he or she disregarded the risk.

Although no difference could be detected between affected and not affected households regarding their risk awareness, there was a clear difference between the interest shown to acquire knowledge between those renting their home and those owning it. Interviewees that were renting their house or apartment were generally unconcerned with what weather related risks their households were facing. One of the interviewees renting his apartment stated that: *"I do not need to be well informed of the risks my household is facing, as it is not my house"*. The majority of the interviewees (76%) did however own their houses, and they generally claimed to be interested in and concerned about weather related risks. The main interest was to achieve information on the municipal plans. Four of the house owners (16%) asked for information on how they should protect their houses in the most efficient way.

Table 3. Willingness to adopt further adaptation strategies

Question asked:	Yes	No
Would you be willing to take more actions on your own to protect yourself from extreme weather?	64%	36%
Would you be prepared to pay a higher insurance premium?	76%	24%
Would you be prepared to relocate if advised to do so by the authorities?	84%	16%

When asked what information the households were lacking the most frequently appearing answer was that they wanted a warning system informing when extreme weather conditions or other hazards were approaching, and how the individual itself should handle the oncoming situation in the most efficient way.

Finally, the interviewees were asked whether they were prepared to take actions of their own to reduce their vulnerability to extreme weather. The initial response was that 64% were to some extent willing to do this, see table 3 above. Out of the 36% being reluctant to taking more actions, 24% stated that they were in no way prepared to take any measures that would result in some sort of cost. Whereas 12% of the respondents answered that nothing could be done at all. 64% were prepared to take further action, and one fifth (20%) claimed to be prepared to take action with funds out of their own pocket. The majority out of those prepared to take action did however claim it to be a question of either necessity or cooperation, where the interviewees were ready to take action provided that the severity of the situation forced them to do so, for example if their household was to be destroyed if they did not take action. A number of respondents also claimed that they were ready to discuss appropriate measures with neighbours and authorities, and in this way ensuring that their own efforts would not be redundant or made in vain due to measures taken by others.

The vast majority, 76%, were prepared to pay a higher insurance fee in order to stay at their current location, whereas only four respondents (16%) were prepared to move from their current location if they were advised to do so by the authorities.

4.2.2. Individual adaptation strategies in Helsingborg

Given the result of the interviews, a number of adaptation strategies among the inhabitants of Helsingborg were identified. These adaptation strategies will now be further analysed by dividing them into the categories of prevention, mitigation, preparedness for response and preparedness for recovery. The categorised adaptation strategies among the individuals before the storm are shown in table 4 below.

Table 4. Categorised adaptation strategies before the storm

Adaptation strategies before the storm:	% of interviewees who adopted the strategy
Prevention	0%
Mitigation	20%
Preparedness for response	4%
Preparedness for recovery	100%

The vast majority of the interviewees (84%) had heard the warnings from the authorities through media, and some claimed to have taken action as a response to this. These actions were ad-hoc and had not been planned for at an earlier stage.

No adaptive strategies aimed at preventing or reducing the hazards before the storm could be identified by the interviews. Neither could any strategies of actual prevention after the storm be identified at an individual level.

Before the storm, merely unplanned and improvised preparations were made in order to mitigate the hazard or to reduce the vulnerability to the hazard. These actions were mainly physical and unplanned for, such as taking objects inside and closing windows, but also security oriented such as staying inside with the radio turned on. Only two of the interviewees (8%) could recall taking actions of mitigation more than one day in advance of the storm. In total, 20% of the interviewees adopted strategies of mitigation before the storm, see table 4.

The only adopted strategy for preparedness for response was a single individual who had bought a submersible pump to be able to respond to floods.

It became evident that the adaptation strategies of mitigation and preparedness for response adopted by the individuals in the study area had a clear focus on one particular hazard, namely storms and the risks attributed to storms, primarily floods. The vast majority of the individuals did not worry about any other weather related risk, nor planned to take any sort of action against any other weather related risk. As the advent storm was a very recent incident at the time of the interviews, the interviewees' focus on storms was not surprising. It should also be said that for example the standard of housing makes the households resistant to many temperature-related hazards.

In table 5 below, the adaptation strategies adopted as a result of the storm are shown. After the storm, some tendencies of strategies to mitigate the hazard could be identified. 24% stated that they had taken action after the storm. However, half of the individuals in this group (12% of the total) could not name any particular measures, they only claimed to be more cautious now than before. Only three individuals (12%) had adopted more actual strategies. Thus, strategic measures of mitigation, such as flood proofing basements or reinforcing jetties and fences, did exist, but were scarce also after the storm.

Table 5. Categorised adaptation strategies adopted after the storm

Further strategies adopted after the storm	% of interviewees who adopted the strategy
Prevention	0%
Mitigation	24%
Preparedness for response	4%
Preparedness for recovery	0%

Out of the nineteen households (76%) which claimed not to have taken action, two responses recurred regularly. The first response, stated by five interviewees (20%), was that no measures had been taken because the individuals still did not know what to do in order to reduce their own vulnerability. Or that they chose not to do anything because of a belief that nothing could be done, which two individuals (8%) stated. The other response, stated by five individuals (20%), was that there had been a discussion within the household on what could be done to reduce the vulnerability, but that nothing had been done. Nothing had been done as the household during the discussion either could not find a solution, or they had found a solution but were not prepared to sacrifice the money (e.g. flood proofing), stated by four individuals (20%) or the space (e.g. acquiring sand bags), stated by one individual (4%).

Two adopted strategies to increase preparedness for response were identified. One individual (4%) had bought a pump before the storm, another (4%) had bought one after the storm.

The adaptation strategy most commonly used in the study area was undoubtedly that of insurances. Table 4 and 5 shows that 100% did have disaster insurance before the storm and that none had changed or altered this insurance as a result of the storm. This is a strategy to increase the preparedness for recovery. As all of the respondents claimed to have a home insurance, it was in theory the insurance companies' responsibility to cover losses caused by the storm. The majority of those affected by the storm chose to utilise their home insurance to cover repairing and reconstruction costs. The two individuals that had not utilised their insurance had opted for finding a solution of their own as they found the damages very limited and that they would not benefit from including their insurance company. The households that had used their insurance were content with the way their insurance company had dealt with the situation. All households except for two (8%) claimed that they had, at the time of the interview, recovered from the storm and that their properties had been restored in the same condition as before the storm. The two households that claimed not to have recovered still had some of their property in storage facilities.

However, no interviewee claimed to have been offered any improvements or reinforcements to their houses during the reparation process, bearing future incidents in mind.

Among the respondents, some concern was directed to future increases in premiums and conditions of their home insurances. However, no individual claimed to have made any changes regarding their home insurance. Whilst the majority of affected individuals had been in contact with their insurance companies in order to recover, none had been in contact with concerned authorities such as the municipality, even though the municipality had been in the area to clear the streets from debris.

No local voluntary, community based or neighbourhood cooperative strategies of prevention, mitigation or preparedness were identified through the interviews. When asked about this sort of commitment, respondents generally answered that they knew that others had been affected by the storm but they had not offered or been offered help by people in the neighbourhood. No interviewee could mention any non-governmental organisation, formal or informal, that had been raising the issues of weather-related hazards or that had assisted in any way once the storm hit or in the aftermath.

4.2.3. Barriers hindering individuals from adopting more, or different, strategies

In sum, the barriers that hinder people from taking further action were identified to be related to: knowledge, costs, responsibility sharing, information and cooperation, time, and attitudes to risk. Geographical barriers also exist as the study area is situated in close vicinity to the sea, this may make efficient adaptation strategies more complex, discouraging people to take any action.

Knowledge was identified as the first barrier. Based on the findings from the interviews, the governmental warnings broadcasted in media were not sufficient. Ten respondents (40%) willingly declared that even though they had heard the warning, they either ignored them or did not understand to which extent their households were concerned. Furthermore, four of the interviewees (16%) stated that they understood the warning, but did not know how to protect themselves and their households from the storm, and therefore chose to do nothing. If the storm will act as an eye opener for the affected households to take future action is not certain for different reasons. No household claimed to have been in contact with the municipality or with any other authority after the storm. This suggests that there has been no follow up from the municipality on the situation of the households, which could have increased individual knowledge.

Knowledge was also identified as a barrier since interviewees, both affected and not affected, commonly believed that this storm was a unique incident and will not happen again in the

future. This view is not in accordance with the prevailing opinion of authorities working with these issues, which states that this kind of extreme weather is likely to increase in both intensity and frequency (Stadsbyggnadsförvaltningen 2011).

Finally, there is some confusion as to what individuals believe they can do to reduce their climate risk. When asked about measures taken to reduce their vulnerability, a frequent answer was that the interviewees mentioned their environmental awareness. With this, they usually referred to their active reduction of carbon dioxide emissions and recycling efforts, measures which they considered to reduce the frequency or impacts of climatic extremes, such as water levels. Whilst measures of this kind is an important part of the striving towards sustainable living and climate change mitigation, it is unlikely that they can stop the increase of extreme weather events in the foreseeable future (IPCC 2007).

A number of house owners did also bring up the insecurity of climate forecasts as a source of confusion on what to prepare for. As one interviewee stated: *“To me it is confusing to know who holds the truth of the future, and therefore it is hard to know what I as a house owner should do.”*

Not surprisingly, costs were also identified as barriers for adaptation. Primarily, this barrier consists of the unwillingness amongst the interviewed households to spend their own money in order to reduce their disaster risk. This is also connected to the responsibility attitudes explained further below. A common perception was that, since the households pay to insure their homes and themselves, they put the responsibility to pay for damaged property, health losses or income losses on the insurance companies. Insurances, even though it is a way to reduce risk, may as a result of this also prevent households from taking other measures.

The third barrier identified is attitudes and perceptions regarding responsibility sharing. 36% of the respondents saw risk handling as an issue that should primarily be dealt with by authorities. Not a single interviewee stated that he or she had a bigger responsibility to handle the issues of weather-related hazards than the authorities had. Three interviewees (12%) expressed it as a socioeconomic issue which should be dealt with by tax revenues. Two interviewees (8%) named the Netherlands, where a large part of the country lay below sea level, as a good example for successful risk avoidance engineered by authorities. Moreover, the 56% who declared the responsibility as something shared between individuals and authorities identified their own responsibility mainly as listening to warnings, obeying rules, regulations and standards, and acting in an orderly manner in the event of a crisis. While this

is something everyone should do, this view on responsibility does not relate to adopting adaptation strategies on your own.

As the advent storm unfolded, two concerned individuals (8%) claimed to have tried in vain to contact institutions such as rescue services. Whether or not the storm has led to, or will lead to, a change in attitude amongst the affected households in the future could not be determined as opinions varied strongly. Where some became determined to take matters into their own hands, such as flood proofing, others merely expressed their disbelief in the capability of the authorities and general disappointment, not relating it to their own responsibility.

Alongside the barrier of knowledge described above lay the barriers of information and cooperation. Somewhat surprisingly, the interviews detected that although the inhabitants living in an affected area were fully aware of the harm that the storm had caused their neighbours, they chose not to interact with these neighbours. Neither during nor after the storm. Nor did anyone claim to have asked their neighbours for help before, during, or after the storm. Unfortunately, as this behaviour was discovered halfway through the interviews, the reason for this behaviour has not been further investigated.

Time was also identified as a barrier. As people were found to spend much of their time elsewhere occupied in work or other activities it gave them less time to interact with neighbours and to coordinate strategies of adaptation.

The attitude towards risk is the final identified barrier. As mentioned earlier, several interviewees believed that the storm was a once in a lifetime incident, which does not motivate people to take action. Apart from this, many interviewees willingly declared that they did not apply the authorities' warnings to their own situation. As one interviewee stated: *"I know that it was written in the newspaper that warnings of this or this storm category had been issued and that the storm was expected to hit my area. But regardless of this, I parked my car just by the ocean, I could not believe that anything could happen to it"*. Another individual explicitly stated: *"As a private person, I must admit that I am very careless when it comes to crises"*. The individual behind this statement had been working professionally in the field of crisis communication.

5. Discussion

As the results indicate, there is a near absence of both prevention and mitigation oriented adaptation strategies among the interviewed individuals in Helsingborg. The reason for this absence is likely to be found in the identified barriers. These barriers may be decreased or eliminated through better information, increased local participation, and better community-based involvement and cooperation, which will be described in sections 5.1 and 5.2 below.

Adaptation strategies of preparedness for response and preparedness for recovery were more frequent, mainly in form of disaster insurances. It is, however, unlikely that the applied strategies of preparedness for response and preparedness for recovery alone and automatically can steer the households to a continuously decreasing their climate risk. This will be described in section 5.3 before making a general assessment of the adaptation strategies of the individuals in Helsingborg in section 5.4.

5.1. Individuals' relation to institutions and authorities

During and after the storm, many of the storm affected households of Helsingborg felt that they had not been properly informed about the nature of, and risks associated to, the upcoming storm. Some even felt let down by the authorities who in their eyes had the responsibility to protect them and their households from potential impacts. This failure to take preventive or mitigative actions as described in the results, is similar to the outcomes described by Pitt (2008) after the 2007 floods in the United Kingdom. As Wamsler & Lawson (2012) describe it, this may be a result of the strong belief in institutional capacities and hierarchical structures. This belief, in turn, may come as a result of the 'traditional' ability of these institutions to cope with and protect their inhabitants from adverse conditions. However, as stated before, climate change can negatively impact institutional effectiveness to handle adverse conditions because of its magnitude and unpredictability (SOU 2007:60; Wamsler 2012).

By judging from the official documents on climate change adaptation, such as those from the department of strategic planning (Stadsbyggnadsförvaltningen 2011), the individuals' role in Helsingborg's strategies for climate change adaptation has not been defined and communicated. This may have influenced the lack of strategies among the interviewed

individuals and the feeling among them that nothing could be done, partly also out of fear of interfering with the authorities' work.

Organisations, such as the Swedish civil contingencies agency clearly states that the individual has the responsibility to protect their own lives and their own property (MSB.se 2010a). However, the measures and strategies to cope with floods presented in their documents are exclusively directed towards municipalities and other institutions. The individual household seems to be regarded as capable of taking mainly ad-hoc responses to incidents as they happen. They are however not considered as being an integral part in the creation of engagement models, or of strategies where individuals and institutions are involved in joint efforts. Nor are the individuals regarded as a source of local knowledge on for example location specific vulnerabilities. These findings are in accordance with earlier research in other Swedish municipalities. In a study in Gothenburg, Glaas et al. (2010) states that although the public is regularly informed on the risks associated to climate change and its costs, little effort has been made to incorporate values and local knowledge of the public. Glaas et al. (2010) furthermore claims that this absence of two-way communication may lead to lowered trust in formal institutions.

Different areas of Helsingborg face different risk associated to the changing climate. These have been defined by the department for strategic planning (Stadsbyggnadförvaltningen 2007). But this information has apparently not reached the households in the study, as no interviewee was aware of any municipal plans or strategies, such as the future needs for barriers and pumping stations (ibid.).

What makes matters more complex is the fact that research shows the importance of following local cultural and social norms and traditions (Pelling 2007). Setting up community or neighbourhood based interest groups or organisations are not likely to be a common activity in the study area at present. This may make it hard to establish these sorts of measures, as involvement and participation is required.

With this said, having strong institutions and a population that acknowledges these institutions is in many aspects positive. Strong institutions should imply a good general ability to cope with adverse conditions, and the inhabitants' strong belief in the ability of the institutions should imply obedience to regulations and warnings, if they are clearly stated and communicated.

5.2. *Improving individual adaptation strategies of prevention and mitigation- breaking the barriers*

As no preventive and very few mitigative adaptation strategies were identified among the interviewed inhabitants of Helsingborg, there is likely room for some improvement in this area. Reflecting on the interest shown in storm and flood issues, and the despair expressed by several interviewees, it also exist a will to increase the adaptive capacity through adopting more strategies. Many of the interviewees themselves mentioned that they wanted to discuss their situation, and their view of what had happened before and during the storm with the authorities, which also points to the will of increasing knowledge and preparedness

The study area, on the northernmost shores of Helsingborg city, is a thriving community with generally high income households. It is therefore not likely that the lack of adaptation strategies of prevention and mitigation can be solely explained by the associated costs, even though this is a hindering factor. Instead, as stated above, the barriers hindering people from taking further action is associated to risk knowledge and to confusion regarding responsibilities of different sectors of the society and the community.

In addition to having a strong belief in hierarchical structures, the interviewees and their actions can be regarded as centred around the individual rather than around the community. Indices of this is, for example, that the individuals in general did not help, ask for help or offer help to neighbours that they knew had been affected by the storm. Furthermore, not a single interviewee could mention any local or community-based organisation working with the issues of weather related risks such as storms and floods, nor was any discovered during the literature review.

Community- or neighbourhood-based organisations with explicitly stated frames and responsibilities could support a more locally based and communitarian form of preventive adaptation strategies to complement individual actions. Measures such as flood gates, sand bags and drainage systems must be coordinated between the households in order to keep the houses from being flooded, as temporary embankments on one site can increase the flood risk elsewhere. Earlier research has shown that community based, localised strategies is crucial in order to achieve sustainable climate change adaptation (Glaas et al. 2010; IPCC2012; Twigg 2004). Through neighbourhood-based strategies, information spreading and risk education from authorities or experts could also be easier accomplished. This will lead to better, mutual, knowledge sharing which is a key activity in climate change adaptation (IPCC 2012; UNISDR 2005). This way, the households could be better informed of what is allowed,

encouraged, discouraged and illegal so that the institutional and individual adaptation strategies do not hinder each other.

5.3. Improving individuals' adaptation strategies of preparedness - breaking the barriers

In accordance with the obedience to hierarchical structures, the most commonly applied adaptation strategy was that of preparedness for recovery through disaster insurance, which all of the interviewed households claimed to have.

As Wamsler (2008) describes, better-off households often tend to opt for hierarchical arrangements instead of community involvement. Being a thriving community, this situation is much applicable to Helsingborg. Here, the inhabitants relied heavily on the hierarchical structures, namely municipal authority and institutionally based security mechanisms. And everyone had opted for arrangements of preparedness for recovery through insurance companies. This system of preparedness for recovery is already up and running, which means that it can be difficult to alter or improve. It will also be impossible to do so without the willingness of the insurance companies.

As it should be in the interest of the insurance companies to reduce the amounts paid out to insurance holders, it should also be in their interest that house owners to reduce their risk to extreme weather conditions. Thus, a mutually benefitting solution should be possible, where the households are encouraged to take measures to better protect themselves. The recovery phase after the advent storm, however, consisted generally of restoring property to its original condition, without making particular improvements aimed at decreasing future disaster risk. Without incentives from the insurance company to decrease vulnerability, it is less likely to happen. During the interviews, no incentives of this kind were identified. However, as mentioned earlier, insurance companies are starting to attend to the issues of climate change adaptation and its associated costs (LF.se 2011, IF.se 2011). The future will tell whether this will promote increased adaptation strategies among house owners.

5.4. General assessment of adaptation capacities

The results of the literature study and the interviews generated a two sided image of the adaptation capacities of the individuals of Helsingborg.

Initially, all interviewees, except for two (8%), claimed to have recovered from the advent storm and could not be regarded as more vulnerable at the time of the interviews than what they were before the storm. The two interviewees which had not recovered, as they still had belongings in storage facilities, claimed that they were in fact able to move their belongings back as their basements were no longer water damaged. There were no visible traces from the impacts of the storm, and none of the interviewees claimed to still be severely affected by the impacts. Through insurances and taxes, households can be seen as quite successful in managing their expenses associated to weather-related risks and keeping them at a constant, predictable level as taxes enables the existence of municipal security mechanisms and insurances enables financial reimbursement if affected.

As the area is mainly residential, with people working elsewhere, none of the interviewees' livelihoods were at risk during the storm. The fact that peoples' livelihoods were not destroyed has most likely helped the recovery process as the affected households' income was not affected.

On the other hand, it became evident that cooperative efforts for reducing risk, for example via measures of prevention and mitigation, may be hard to coordinate due to lack of time. During the process of interviewing, it was discovered that the people of the area spent a lot of time away from their homes. Furthermore, communication within groups of individuals and between individuals and institutions seems to be hardly existent, especially after the incident several households expressed their disappointment that they had not been contacted by any authorities.

It is stated in earlier research that the vulnerabilities and risks of today not necessarily corresponds to future vulnerabilities, as a result of the changing climate (Rummukainen et al. 2005). As a result of this, many institutional responses regarding climate change adaptation is already or will soon be outdated and new models and strategies will be needed, making knowledge sharing essential, as expressed by UNISDR (2005). The lack of information sharing between institutions and individuals, especially from the bottom and up, identified in this study and in earlier research (Glaas et al. 2010) is therefore a cause for some concern regarding the future state of the adaptive capacities of Helsingborg. Helsingborg is a municipality where the inhabitants rely heavily on the institutional security mechanisms, and the individuals would likely have a hard time to adapt to a society where these security mechanisms are inefficient or outdated.

There is an inequity between the different categories of adaptation strategies applied by the households. As described, the most common strategies were those of preparedness for

recovery, whereas mitigation and prevention strategies were scarce. As a result of this, the capacity to recover from a disaster is more developed than the capacity to prevent it from happening or to mitigate its impacts.

During the storm it became evident that the municipality had no strategies that were efficient enough to altogether withstand the forces of the storm. Whilst it would be close to impossible to avoid any impact whatsoever, some of the impacts could have been decreased or eliminated through better adaptation strategies among the individuals.

Adaptation strategies of prevention would be hard attained. An outright avoidance of the hazard would possibly require relocating the individuals' homes to a location further from the sea. The individuals were however found to be very reluctant to move. A relocation of the garages, which are the most exposed buildings due to their location, is a more reasonable strategy but will nonetheless require major reconstructions.

There are adaptation strategies of mitigation suitable to the area. As the high flood risk area is limited, both in width and length, protective walls can be constructed rapidly if the material and the knowledge exist. A neighbourhood cooperation group could acquire and store tube walls, which are rapidly put in place in case of an oncoming storm. These tube-walls generate a barrier of up to 1m in height when filled with air (Räddningsverket 2000).

The preparedness for recovery is already in place in the area via disaster insurance. The preparedness for response can be increased mainly through informing individuals on how to manage on their in case of an emergency, such as having backup power generators and submersible pumps.

Conclusively, had the individuals in the area been thoroughly informed regarding the risks of the oncoming storm and how to react to its impacts, for example by not parking their cars close to the water and by emptying their basements and garages, the damages caused by the storm could have been decreased with relative ease. Institutions should learn from this storm incident in order to better prepare their citizens for future storms. Whether the institutions know about the barriers identified on an individual level in this study is not certain as no documents or reports with conclusions regarding the storm and its aftermath have been found.

5.5. Limitations to the study

This study has been limited in time and resources. Therefore, only a fraction of the affected inhabitants of Helsingborg was interviewed. These interviews were mainly performed in a limited area at the north coast of Helsingborg. Nonetheless, the focus of the study was on the advent storm of 2011, and the affected households were mainly situated in this area.

Different areas are exposed to different weather-related risks and they have different socio-economic and cultural structures and living conditions. They should therefore adopt different adaptation strategies. The adaptation strategies identified and suggested in this study is therefore not applicable to all situations and locations.

Although limited in number, the majority of the interviews generated similar responses both regarding measures and attitudes and the results generated can therefore be regarded as a representative image of the adaptation strategies of the inhabitants in the study area.

This study has a focus on the individual strategies. The strategies of institutions have been presented, but the focus has been on the individuals' perception and the knowledge of the adaptation strategies applied by different institutions. This perception and the actual measures taken by the institutions may not always be identical. It is however evident that the adaptation strategies employed by the institutions can not fully protect the individuals and households from the hazards of extreme weather.

6. Conclusion

In order to increase the knowledge on local-level adaptation capacities, the aim of this study was to identify the adaptation strategies adopted by citizens of Helsingborg which were affected by the advent storm of 2011. Potential barriers that hinder people from adopting further strategies were also assessed.

The outcome of this study is that individual adaptation strategies are not given much attention, neither in municipal documents nor among the inhabitants of Helsingborg. Most adaptation strategies identified were ad-hoc and had not been planned for at a prior stage. The majority of the individuals had heard the authorities' warnings through media channels, but these warnings were either disregarded or people did not know what to do with the information.

The most commonly used adaption strategy is to obtain disaster insurance, which all of the interviewed households claimed to have. The insurance policies fulfil their purpose through the compensation of costs for rebuilding or repairing damaged property and bringing it back to its original state. The individuals were generally satisfied with them, but during the reconstruction, no or few improvements had been made to reduce future disaster risk.

The lack of more holistic individual adaptation strategies was identified to be mainly related to barriers of knowledge, of attitudes and of responsibility sharing, but also through barriers of costs.

The conclusion regarding individual adaptation strategies in Sweden is that during this study it became evident that regardless of the strength of the institutions, individual adaptation strategies are vital as authorities can never fully protect their inhabitants. New models for increasing local-level and individual involvement should therefore be created and in such a way that they can complement the existing efforts at municipal level.

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8. Annex

8.1. Interview guide Helsingborg, English version

Neighbourhood:

M/F:

Building type:

1. Was your household affected by the advent storm of last November/December?

- Yes
- No

2. If YES, in what way were you affected?

- Was your household more or less affected compared to others?**
- Why do you think your household was more/less affected than others?**
- Did your household take any measures in order to stand better protected against the storm?**
- Did your household take any measures in order to be less affected by the impacts of the storm? (Do you for example have insurances?)**
- What has helped you to recover from the impacts of the storm and what has helped you solve the issues that occurred? (Insurance companies, neighbours, authorities, organisation, etc.)**
- In hindsight, what could you have done in order to be better prepared or to reduce the impacts?**

3. If NO, do you know of others that have been affected?

- **Where do they live?**
- **Why have they been affected but not you?**
- **Did you take any measures before the storm to stand better protected against the storm?**

4. After the advent storm, have you taken any measures in order to be better prepared if it should happen again?

5. Apart from the advent storm, what other weather related hazards are your household exposed to? (If no answer is given, follow-up questions are asked: What about heat waves? Or cold waves? What about floods? What about snow storms? What about icy streets? Landslides?)

6. Which one of these do you think has the potential to affect you the most?

**7. Have you taken any measures to avoid any of these weather-related risks or to reduce the impact on your household?
(If no answer is given, follow-up questions are asked: What about heat waves? Or cold waves? What about floods? What about snow storms? What about icy streets? Landslides?)**

8. According to you, whose responsibility is it to deal with the hazards we have talked about?

The individuals	Shared responsibility	The authorities		
1	2	3	4	5

-Follow-up: What do you consider to be your responsibility and what do you consider the authorities' responsibility?

9. Do you consider yourself to be well informed on how to deal with and be prepared for extreme weather on your own?

- If not, what type of information are you lacking?

10. Would you be willing to take more measures on your own to assist authorities and complement them in their work?

-Would you be prepared to pay a higher insurance premium?

-What about flood proofing your own home at your own expense?

-What about relocating if advised to do so by authorities?

11. Are you a member of, or aware of, any networks or organisations in the area that addresses the issues of weather-related risks/ extreme weather/ climate change adaptation?

12. Do you own or rent your home?

13. How many people live in your household?

14. For how long have you been living in this house?

15. Which age span do you belong to?

0-20

20-35

35-50

50-65

65+

Thank you for your participation!

8.2. Interview guide Helsingborg, Swedish version

Område och adress:

M/F:

Hustyp:

1. Blev ert hushåll påverkat av adventsstormen i december förra året?

- Ja (gå till fråga 2)
- Nej (gå till fråga 3)

2. Om JA, på vilket sätt?

- Blev ert hushåll mer eller mindre påverkat än andras?
- Varför tror ni att ert hushåll blivit mer/mindre påverkat än andra hushåll?
- Hade ni vidtagit några speciella åtgärder för att ert hushåll skulle vara skyddat från stormen? (Eller har ni på något sätt gjort ert hushåll mer motståndskraftigt mot stormar?)
- Hade ni vidtagit några åtgärder för att påverkan skulle bli mindre? (Har ni t ex en försäkring eller besparingar för ändamålet?)
- Vad har hjälpt er att återhämta er från effekterna av stormen/vad har hjälpt er att lösa problemen som uppstod? (t.ex. försäkringsbolag, egna initiativ, grannsamverkan, hjälp från myndigheter)
- I efterhand, vad hade ni kunnat göra för att påverkan skulle bli mindre på ert hushåll?

3. Om NEJ, känner ni till några som blivit drabbade?

- Var bor de?
- Varför tror du att de blev drabbade men inte ni?

○ Hade ni vidtagit några speciella åtgärder för att vara skyddade/ för att påverkan skulle bli mindre? (Har ni på något sätt gjort ert hushåll mer motståndskraftigt mot stormar, eller har ni t ex en försäkring eller besparingar för ändamålet?)

4. Har ni efter adventsstormen vidtagit några särskilda åtgärder för att vara förberedda om det skulle hända igen?

5. Utöver adventsstormen, vilka andra väderrelaterade risker är ert hushåll utsatta för? (Om inget svar ges: Vad anser ni om värmeböljor? Eller köldknäppar? Eller Översvämningar? Eller Jordskred? Eller isgator?)

6. Vilken av dess anser ni kunna påverka ert hushåll mest?

7. Kan ni nämna några särskilda åtgärder ert hushåll vidtagit för att minska påverkan av dessa risker?

(Om inget svar ges: Vad anser ni om värmeböljor? Eller köldknäppar? Eller Översvämningar? Eller Jordskred? Eller isgator?)

8. Vems ansvar anser ni att det är att handskas med de här riskerna vi pratat om?

Individens

Delat ansvar

Myndigheternas

1

2

3

4

5

-Uppföljning: Vilket är ert ansvar och vilket är myndigheternas ansvar?

9. Anser ni att ni är väl informerad om hur ni ska handskas med extrema väderhändelser på egen hand?

-Om inte, vilken information tycker ni att ni saknar?

10. Skulle ni vara beredda att vidta fler åtgärder på egen hand för att underlätta för myndigheterna i deras arbete med de här frågorna?

- Skulle ni vara beredda att översvämningssäkra ert hus (på egen bekostnad)?

- Skulle ni vara beredda att betala en högre försäkringspremie?

- Skulle ni vara beredda att flytta härifrån?

11. Är ni med i, eller känner till någon organisation som tar upp frågor om extrema väderhändelser/klimatanpassning?

12. Äger ni eller hyr ni er bostad?

13. Hur många personer bor det i hushållet?

14. Hur länge har ni bott i det här huset?

15. Vilken åldersgrupp tillhör ni?

0-20

20-35

35-50

50-65

65+

Tack så mycket för er medverkan!



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