Designing preparedness – Emergency preparedness in a community context

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To the ones I lost during these years
I love you so much

Summary

There has been an increased focus in society on preparedness for emergency response in recent years. Today there is legislation that requires all Swedish authorities at the local, regional and national levels to prepare for emergency management and response. Since the task is rather new, most authorities are just beginning to address it. How the preparedness process should be designed and integrated into daily work has often not yet been decided.

This licentiate thesis presents research on how Swedish authorities, at a local and regional level, are working to design their preparedness processes. The research questions are as follows:

> How does the preparedness process function?
>
> What are the challenges and obstacles faced by the organisations during the preparedness process?

Studies examining the preparedness processes were carried out in five Swedish authorities at the local and regional level. Five challenges and obstacles were identified:

- People not directly involved in the preparedness work do not read the plans created.
- People not directly involved in the preparedness work are not familiar with the planning.
- There is often no planned process (e.g. exercises and reflections) for transferring the results of the preparedness work.
- Opportunities to gain a broader view of potential emergencies by the use of one scenario with its possible variations in the course of events are commonly overlooked.
- Emergency managers have difficulties getting others in the organisation interested and committed to preparedness issues, including management.

Every organisation has to develop its own process for working with preparedness for emergency response to further improve preparedness planning and avoid the five identified obstacles. To facilitate this effort, every organisation should consider who needs to be involved (both inside and outside the organisation) and what knowledge and competences these persons need to deal with future emergencies.

Sammanfattning (Summary in Swedish)

Under de senaste åren har förberedelser inför hantering av kriser och katastrofer fått en allt mer framträdande plats i samhället. Exempelvis finns det idag lagstiftning som kräver att svenska myndigheter på lokal, regional och nationell nivå ska arbeta med förberedelser inför hantering av så kallade extraordinära händelser.

Eftersom arbetet med förberedelser är relativt nytt är de flesta myndigheter idag endast i startfasen. Hur arbetet ska utformas och hur det kan integreras i annan verksamhet är således oftast ännu inte helt bestämt.

I denna licentiatavhandling studeras hur svenska myndigheter på lokal och regional nivå arbetar med att utforma sin förberedelseprocess. Forskningsfrågorna för denna avhandling är:

> Hur fungerar förberedelsearbetet?
>
> Vilka utmaningar och hinder ställs organisationerna inför under arbetet med förberedelserna?

För att studera förberedelsearbetet har fem svenska myndigheter på lokal och regional nivå undersökts. Vid dessa studier har fem utmaningar som de inkluderade myndigheterna står inför i arbetet identifierats. Dessa är:

- Personer som inte är direkt involverade i förberedelsearbetet läser inte de befintliga planerna.
- Personer som inte är direkt involverade i förberedelsearbetet känner inte till planeringen.
- Det finns oftast inte en planerad process (innehållande t.ex. övningar och utbildningar) för att föra ut resultatet från förberedelsearbetet.
- Möjligheten att få en bredare bild av potentiella kriser genom att använda ett scenario med dess möjliga variationer av händelseförloppet är ofta förbisedd.
- Det är problem för dem som arbetar med förberedelser att få förståelse och engagemang för sitt arbete i resten av organisationen, även hos ledningen.

För att utveckla förberedelsearbetet vidare och undvika de fem identifierade utmaningarna krävs det att varje organisation själv tar fram en process för hur den ska arbeta. För att underlätta detta framtagande bör organisationen fundera på vilka i organisationen (och utanför) som behöver bli inblandade i förberedelsearbetet men också vad dessa olika personer behöver för kunskaper och kompetenser för att kunna hantera framtida händelser.

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List of appended papers

Paper I Eriksson, Kerstin, Abrahamsson, Marcus, & Fredholm, Lars (2007). An analysis of assistance needs during the storm Gudrun. *Proceedings of the 14th TIEMS Annual Conference 2007*, Trogir, Croatia, 65-72.

Eriksson formulated the objectives and methods of the study. Eriksson designed and preformed the study. Eriksson designed and carried out the analysis and wrote the paper. All authors reflected on the results and discussion.

Paper II Eriksson, Kerstin (2008). Knowledge transfer between preparedness and emergency response: A case study. Accepted for publication in *Disaster Prevention and Management: An International Journal*.

Paper III Nilsson, Jerry & Eriksson, Kerstin (2008). The role of the individual – A key to learning in preparedness organisations. Accepted for publication in *Journal of Contingencies and Crisis Management*.

Both authors formulated the objectives of the study. Eriksson formulated the methods and collected empirics in one of the two studies included. Both authors designed and carried out the analysis and wrote the paper. Both authors reflected on the results and discussion.

Supplementary publications

Borell, Jonas & Eriksson, Kerstin (2006). Learning for safety - Improving effectiveness of scenario-based exercises, *Proceedings of the International Workshop on Complex Network and Infrastructure Protection*, Rome, Italy, 489-497.

Borell, Jonas & Eriksson, Kerstin (2007). Improving emergency response through cognitive task analysis. *Proceedings of the 14th TIEMS Annual Conference 2007,* Trogir, Croatia, 568-574.

Petersen, Kurt & Eriksson, Kerstin (2008). Adaptation as an element in the design of emergency response systems [Electronic version]. *Proceedings of the PSAM 9*, Hong Kong, China.

Brown, Christer & Eriksson, Kerstin (2008). A plan for (certain) failure: Possibilities for and challenges of more realistic emergency plans [Electronic version]. *Proceedings of the 15th TIEMS Annual Conference 2008*, Prague, Czech Republic.

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1 Introduction

During the last fifteen years Sweden, among many other countries, has focused more and more on planning for civilian emergencies such as natural disasters, infrastructure breakdown and terrorist attacks. This has also initiated the relatively new research area of disasters and crises (Quarantelli, Lagadec, & Boin, 2006). Due to globalisation as well as the development of larger and more integrated systems, society has become more complex and interconnected. According to Perrow (1999), complex systems with tight couplings will inevitably lead to accidents. The more complex world has also influenced vulnerability to emergencies (Boin & Lagadec, 2000; McEntire, 2001). The new and clearly more diverse threats place novel forms of demands on society. In addition, Clarke (2005, p. 53) claims, "We have higher expectations for safety and security". This has led to a new structure with accompanying legislation for emergency management in many countries (McConnell & Drennan, 2006). This is also the case in Sweden where the Swedish Emergency Management Agency (SEMA) was established in 2002 with the task of co-ordinating the work of developing preparedness for handling serious crises. Public authorities in Sweden today are, due to legislation, required to make plans and to prepare for civilian crises, emergencies and accidents. Preparedness activities by public authorities are thus obligatory by legislation. But it is difficult to prove the extent to which preparedness activities actually improve the emergency response capacity: "How can we plan for a phenomenon that, by its very nature, violates the very regular patterns upon which planners rely in order to prevent it?" (Boin & McConnell, 2007, p. 53). Thus, a relevant question is why engage in planning if you are not completely sure that it will pay off?

An emergency situation is always dynamic, which implies that improvisation in some form will be required during a response. Yet many researchers point out that the need for improvisation does not exclude the usefulness of planning (e.g. Boin & Lagadec, 2000; McConnell & Drennan, 2006; Robert & Lajtha, 2002). Kreps (1991, p. 31) claims that "Emergency preparedness – even if it is modest - can make an important difference if a disaster takes place". For instance planning may free up personnel to concentrate on aspects that were not anticipated (Wachtendorf & Kendra, 2006). Clarke (1999, p. 48) argues that "...planning and response are causally connected. If you don't have an emergency response plan then emergency response is bound to fail". But at the same time Clarke (1999) and some others are quite pessimistic about the value of planning and plans. Clarke (1999) mentions that plans sometimes become "fantasy documents" that will not be useful during emergencies since they are based on wild assumptions. Weick and Sutcliffe (2001) are also pessimistic

about the value of plans and mention that they tend to create mindlessness instead of mindfulness. Yet, many researchers view preparedness activities as important for handling an emergency situation but point at the necessity of improvisation (e.g. Dynes, 1994). Thus improvisation and creativity are seen as important components in handling an emergency situation and successfully meeting the changing demands of the situation while preparedness "...serves as the backbone of disaster response efforts..." (Kendra & Wachtendorf, 2003, p. 121). This is also mentioned by Dynes (1994) who argues that by planning, the organisation can create an ability to improvise. As McConnell and Drennan (2006) also conclude, I believe that preparedness is a possible task and not a "mission impossible".

2 Research questions and objective

The research presented in this thesis is a part of the FRIVA Project (Framework Programme for Risk and Vulnerability Analysis), which is sponsored by SEMA (Swedish Emergency Management Agency). FRIVA aims at studying risk and vulnerability from a number of different perspectives. One of these has been to examine the usefulness of preparedness activities, above all risk and vulnerability analysis, as a basis for preparedness for emergency response.

Creating a prepared society that is capable of managing possible future events is not an easy task; it may even be impossible. Nevertheless, the public (as taxpayers or potential victims) expects a prepared societal response to be in place when an emergency strikes. Regrettably, evaluations of the managing of emergencies in recent years, for example the storm named Gudrun over South of Sweden (SEMA, 2005a, 2005b) and the December 2005 tsunamis (Swedish Government Official Reports, 2005), point at shortcomings in the Swedish society's emergency management capabilities. A recently published government performance audit also shows major weakness (The Swedish National Audit Office, 2008). Thus there is a need for Swedish public authorities to engage in this complex and difficult task and improve their capabilities to handle future emergencies.

The central area of interest of this thesis is to study how Swedish public authorities, at the local and regional level, can work with preparedness planning processes. The overall research question is:

> How can the emergency preparedness process be designed?

This licentiate thesis is a first step in a discussion of how the preparedness process can be designed to improve the capability to manage future emergencies by Swedish local or regional public authorities. The specific research questions are:

> How does the preparedness process function?
>
> What are the challenges and obstacles faced by the organisations during the preparedness process?

To study emergency preparedness, an initial case study of the municipality of Ljungby was carried out. It focused on the municipality's emergency response to the storm Gudrun and Ljungby's preparedness work. In addition, more limited studies of how different authorities work with emergency preparedness activities were conducted.

2.1 Limitations and demarcations

The focus of this thesis is on Swedish public authorities, at a local and regional level, working with emergency preparedness. In this thesis, the term "emergency" is used as the main expression of a description of an unwanted event that cannot be handled in the ordinary organisation by ordinary measures or routines.

The thesis is limited to studying preparedness activities and response to emergencies. Actions carried out to prevent emergencies are thus not examined. The study is limited to local and regional authorities and preparedness activities at the national level are not considered. The aim is not to consider geographical differences between countries either. Nor are the roles of private companies and individuals studied or discussed. Despite the limitations, studies of organisations for emergency preparedness of varying sizes and structures were feasible.

2.2 Thesis outline

An overview of the theoretical background essential for the research area is described in chapter 3. In chapter 4 the research process and design are outlined. The results of the research are presented in chapter 5. In chapter 6 a discussion of the research can be found. Finally, in chapter 7, the work is concluded and the need for further research is discussed. Appendix 1 includes the three papers on which this thesis is based.

3 Theoretical background

This chapter presents an overview of the research area of emergency preparedness in relation to the central area of interest and the research questions. The purpose is to identify required concepts for further discussion and to provide a description of the research that has been carried out in the area.

3.1 Emergency, crisis, disaster or catastrophe?

There are no commonly accepted interpretations of the terms "emergency", "crisis", "disaster" and "catastrophe". Sorting out this issue is a presumably impossible task that many researchers have spent years on (e.g. Perry & Lindell, 2007; Perry & Quarantelli, 2005; Quarantelli, 1995, 1998b). Even so, there is a need for a brief discussion about this matter in this thesis.

The terms "disaster" and "crisis" are related concepts (Boin, 2005a). The difference between them may be a result of the two terms being used in different research fields. This is illustrated by Stalling's (2005, p. 268) discussion of the two concepts:

> When one speaks of "crisis," there is an implied reference to a specific social unit characterized by this condition. Disasters are more likely to imply a geographical location (e.g., the Northridge earthquake, the Mississippi River floods) than a social unit.

Boin (2005b) points out that the term "crisis" is commonly used as a concept that tries to include all types of "un-ness" events (i.e. situations that are unwanted, unprecedented, etc.). Boin and 't Hart (2006, p. 42) view crisis as when "...a community of people – an organization, a town, or a nation – perceives an urgent threat to core values or life-sustaining functions, which must be dealt with under conditions of uncertainty". A disaster instead is seen as "...a crisis with a bad ending" (Quarantelli et al., 2006, p. 23). From studying different meanings of the word "disaster", Perry (2005, p. 313) has come up with a definition by including common features: "Disasters are disruptive, understood in social time as social events (not agent based), and that they are intertwined with change".

Quarantelli (2000) distinguishes between three of the concepts: everyday emergencies, disasters and catastrophes. Disasters are seen as more than simply "very large scale traffic accidents" that are something quantitatively and qualitatively different than everyday emergencies. In the same way, a catastrophe is seen as being quantitatively larger than a disaster (Quarantelli, 2006). Hoetmer (1991) also perceives emergencies as minor events compared to disasters. He defines emergencies as "... 'routine' adverse events that do not have a communitywide impact or do not require extraordinary use of resources or procedures to bring conditions back to normal" (Hoetmer, 1991, p. xvii).

By some researchers, "emergency" is instead used as a broader term describing a "...future event that is expected to cause significant damage and disruption" (Perry & Lindell, 2007, p. 2). Dynes (1983, p. 653), for example, defines emergencies as "...those events which cannot be dealt with by ordinary measures or routines". Alexander (2005, p. 159) also thinks of "emergency" as a broader term which "...includes disasters, catastrophes and smaller disruptive events".

However, in this thesis the term "emergency" will be used as the main expression of a description of an unwanted event that cannot be handled in the ordinary organisation by ordinary measures or routines. "Emergency" is thus seen as a broader term. But as different authors use different terms for what in this thesis will be defined as an "emergency", the choice of words for this phenomenon in the text will sometimes differ.

3.2 Emergency

The future is unknown or as Sagan (1993, p. 12) describes it, "...things that have never happened before happen all the time...". In addition, emergencies are also dynamic causing new challenges and demands to arise (Dynes, 1994). In some sense all emergencies are unique situations since they have their own physical characteristics, scenarios, etc. But if the focus instead is on other levels, such as the challenges to communities, emergencies are not so unique anymore (Brändström, Bynander, & 't Hart, 2004). Clarke (2005) argues that emergencies (he uses the word "disasters") are normal and should be seen as normal parts of our lives. McEntire and Fuller (2002, pp. 136-137) state that:

> ...a natural hazard agent does not produce disaster, unless it interacts with humans and their vulnerability (...) On the other hand, the presence of social vulnerabilities may not lead to disaster, unless there is a triggering agent that exposes and exacerbates them...

When describing emergencies, both the physical characteristics and the social factors (or social settings) must thus be taken into account. People tend not to realise that if the focus on the physical characteristics or the specific disaster agents is too narrow, they can misrepresent the similarities of the consequences from different types of emergencies (Dynes, 1983). It is much more useful to think of more general attributes such as variations in disaster agents in terms of predictability, frequency, controllability, speed of onset, length of forewarning, duration of impact, scope of impact and intensity of impact. Yet the problem is that these dimensions (as well as other possible dimensions) can be combined in endless ways. The use of these sorts of typologies of disasters as mental models for discussing the variation in scenarios is seen as valid (Dynes, Quarantelli, & Kreps, 1981).

The other part is the social factors of an emergency that also can be described as the social settings where an emergency occurred. Quarantelli et al. (2006, p. 30) point out that "...what should be looked at more is not the possible agents that might be involved, but the social setting of that happening". Their discussion is about the focus of research studies but the societal focus is also emphasised by several researchers when preparing for emergencies. Buckle (1998, p. 21) argues that, "Hazards are important only in so far as they threaten or harm human activities or assets or those (such as the environment) on which we place some value". In other words, emergencies are in essence about people and planning for handling emergencies should therefore be driven by the population's needs during future emergencies.

3.3 Emergency management

Scholars commonly see emergency management as consisting of different phases or periods. This perspective is also common in other areas where "life cycles" or phases are used to describe, organise and classify the area of study, in this case emergencies (Neal, 1997). The use of a model to describe emergency management is, as always, a way to simplify a complex process or a system. It is also an approach to gain a common understanding for all of the actors involved (Kelly, 1999).

The most simple model of emergency management is to identify the periods: pre-event, disaster and post-event (Kelly, 1999). An early attempt at a more complex model was created by Carr (1932) containing the four phases: preliminary or prodromal period, dislocation and disorganisation phase, readjustment and reorganisation phase, and finally confusion-delay phase. Another model, commonly referred to in the literature, is that of comprehensive emergency management. In this model an emergency consists of four phases: mitigation, preparedness, response and recovery (see Figure 3.1). The first phase, mitigation, aims to reduce the risk through preventive actions both during recovery from a past emergency and during the preparedness for a potential future emergency. The second phase, preparedness, aims to create an emergency management capacity before an emergency occurs. The third phase, response, aims at minimising injury and damage above all during an emergency but also immediately before and directly after the emergency. The fourth phase begins immediately following an emergency and is called recovery. This phase aims at restoring and returning to a "normal life" (Godschalk, 1991).

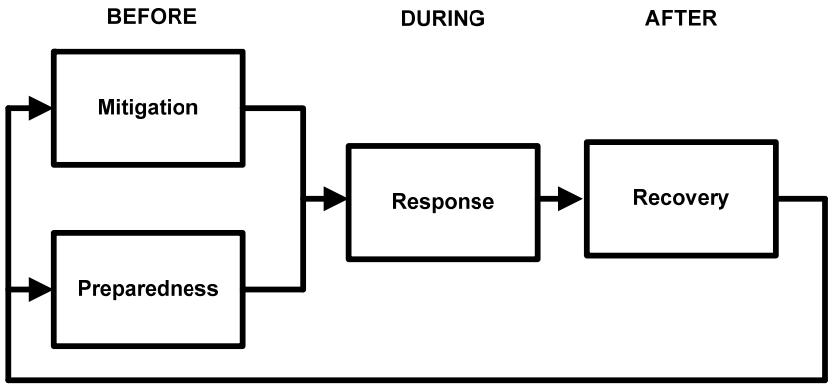

Figure 3.1: The process of emergency management (Boisvert & Moore, 2003).

To use this very simple description of emergency management is viewed as problematic by both researchers and practitioners (e.g. Crondstedt, 2002; Kelly, 1999; King, 2007; Neal, 1997). A question is if it is possible to make such a simplified description when the phases actually overlap (Godschalk, 1991) and merge into each other and thus are not mutually exclusive. The variables that characterise the different phases sometimes change by degree. An additional problem is that different individuals, groups or organisations may find themselves in different phases at the same time. The different phases also look dissimilar in different emergencies (Neal, 1997).

But discrete modelling, such as the comprehensive emergency management model, helps to categorise and focus a study. Thus, in spite of the above discussion about the problems of using phases to conceptualise emergencies, I found the term "preparedness" useful for the purpose of this thesis.

3.4 The preparedness process

Emergencies will always occur whatever preventive actions we introduce as long as society is active and developing. Perrow (1999) even points out that in some complex systems accidents are inevitable. So even if mitigation is the primary priority, researchers claim that it is necessary to have some sort of preparedness for emergency response (e.g. McEntire & Fuller, 2002). The question is if it is really possible to prepare for emergency response and by doing this become better at handling emergencies. As McConnell and Drennan (2006), I believe that preparedness, while not a "mission impossible", is not easily achievable.

Fredholm (2006) points out that it is the assistance needs (that is the need for assistance in the affected population from society or NGOs, for example) that should be the basis for the emergency response and thus also for the preparedness planning. Enander (2006) argues that the purpose of an

emergency response operation is to assist the affected individuals in coping with their own situation. An important part of emergency preparedness and response is therefore to identify the most adequate way to meet the identified needs (Buckle, 1998) and what services are required to meet them (Buckle, Mars, & Smale, 2000).

At the same time it is not society's task or responsibility to handle all the needs of the affected populations. The individuals themselves must have (and usually have) a capacity to handle their own situation. The response organisations thus have to find ways to prioritise among the different needs that arise in the population (Fredholm, 2006). Dynes (1994) also discusses needs. He distinguishes between two different types that need to be responded to during an emergency. The first sorts of needs (or "demands" that he also uses) are agent generated. These are the needs and problems that the emergency (involved disaster agents) in itself creates. The other sorts are response generated. These needs result from the particular organisational response to the emergency. As the response-generated demands are more general, the focus of the preparedness process should be on them. Fredholm does not depreciate the response-generated needs (discussed as "managing" or "actions" and not "demands") but instead emphasises that the aim of managing an emergency should be to assist the affected population. He thinks that response to emergencies and preparedness planning often becomes disconnected from the affected population and thus often just focuses on the response organisations.

Godschalk (1991, p. 136) defines preparedness as, "Actions taken in advance of an emergency to develop operational capabilities and to facilitate an effective response in the event an emergency occurs". Kreps (1991, p. 34) points out that, "The goals of preparedness are to anticipate problems and project possible solutions". Mileti (1999, p. 215) declares that, "The purpose of preparedness is to anticipate problems in disasters so that the ways can be devised to address the problems effectively and so that the resources needed for an effective response are in place beforehand". In conclusion, my stance is that the goal of the preparedness process is to in advance foresee possible problems and demands that can arise during an emergency situation and build up a capability to manage them.

The difficulty, as mentioned, is that the future is unknown and thus the preparedness process can not identify all possible future scenarios and is unable to plan for every possible situation in detail. Researchers therefore state that it is important to focus on the principles of planning and response (e.g. Dynes, 1983; Perry & Lindell, 2003). Perry and Lindell (2003, p. 342) express it as, "Planning should focus on principles of response rather than trying to elaborate the process to include many specific details".

A so called all-hazard approach, which combines the planning for different types of emergencies, is one that seems to focus on principles of response. The same planning is thus considered to be usefulness for handling different types of hazards. The usefulness of this form of planning is argued for by several researchers (e.g. Kreps, 1991; Perry & Lindell, 2007). An all-hazard approach is preferable when different emergencies or hazards create similar demands on the response organisation. McEntire (2001, p. 193) agrees with the usefulness of an all-hazard approach and claims that there is a need for "...an approach that addresses all agents, all actors (including the public), and all phases pertaining to disaster vulnerability". There are several arguments for using an all-hazard approach. One is that an emergency often is the result of an interaction between several disaster agents (McEntire & Fuller, 2002).

A related discussion is that some researchers, as mentioned, claim that there are differences between everyday emergencies, disasters and catastrophes (e.g. Carley & Harrald, 1997; Quarantelli, 2000). For example, Quarantelli (1997) claims that it is not possible to use the same planning for different sizes of emergencies. Kreps (1991) argues that even if preparedness for disasters does not have to start from scratch it is important to understand that there are differences between everyday emergencies, disasters and catastrophes. In a disaster, for example, new and different demands will occur and there will also be a need to co-operate with new, unfamiliar actors.

Obviously the usefulness of the preparedness process also depends on its quality. What makes a preparedness process good? How do you build up an emergency response capacity? Preparedness is enhanced by different factors, for example the number of contacts, in different types of organisations (Tierney, Lindell, & Perry, 2001). In the literature there are sets of guidelines or general principles of good preparedness as well as good emergency response (e.g. Dynes, 1983; Dynes et al., 1981; Kreps, 1991; Perry & Lindell, 2003; Quarantelli, 1997, 1998a). Clarke (1999) as well as Quarantelli (1997) emphasise that even if they are related, there are differences between preparedness for emergency response and the actual response to a specific emergency. The difference is that preparedness activities deal with the general while managing deals with the specifics. Described in other terms, planning for a study is not the same as managing a project. Quarantelli (1993, p. 30) even expresses that, "It is therefore possible to have a good overall strategic approach or emergency preparedness, but when the disaster occurs, it may not be handled very well". This is partly due to the unknown future. Preparedness aims, by a strategic approach, at reducing the unknown. But it is not possible to totally remove it (Quarantelli, 1985). Planning for an emergency and managing an emergency need, as I see it, to be handled at different levels of abstraction, in which the planning needs to be much more abstract then the

managing of a specific emergency. Thus, one unsuccessful emergency response operation is not enough for the plan to be considered a total failure.

3.5 Contributions to the preparedness process

There are many different forms of activities that may contribute to the creation of an organisation's capacity to handle emergencies. For example, experience from handling earlier emergencies as well as different types of analyses, exercises and training may all contribute to creating a prepared organisation.

3.5.1 Experience

Previous experiences of emergencies build up an awareness that often creates a higher level of preparedness. In general, experience creates a willingness to prepare for future emergencies (e.g. Boin, 't Hart, Stern, & Sundelius, 2005; Gillespie & Streeter, 1987; Kartez & Lindell, 1987; Tierney et al., 2001). Emergencies also offer situations from which to learn. Clarke (1999, p. 71) emphasises "...the importance of experience in formulating functional plans and I've said that lack of experience is a key factor behind the production of fantasy documents". The importance of learning from experience is also widely mentioned in High Reliability Organisation (HRO) theory. By working with reporting errors and learning from near misses, for example, they claim that organisations become better at managing the unexpected (Weick & Sutcliffe, 2001).

But the opportunity to draw a lesson is often not used or at least not the full potential of it (Boin & 't Hart, 2006). Levy (1994, p. 279) describes the problem with experience as "...decision makers are always seeking to avoid the failures of the past and the generals are always fighting the last war". After an emergency much of the focus is on mitigating and handling the specific event. If a storm occurs the planners focus all their efforts on handling future storms or if a terrorist attack occurs, all efforts will be on handling terrorist attacks (Carley & Harrald, 1997). But the future is not the past. Clarke (1999, p. 71) mentions that "...experience is not the same thing as good knowledge. Experience can lead us astray". To be able to handle the future it is thus important to "...not prepare to fight the last war" (Lagadec, 2006, p. 489).

3.5.2 Analysis, trainings, exercises and plans

As mentioned, emergencies do not happen frequently and preparing to handle future emergencies therefore necessitates the transferring of information and knowledge from other activities (Carley & Harrald, 1997). Examples are "...formulating, testing, and exercising disaster plans; providing training for disaster responders and the general public; and communicating with the public and others about disaster vulnerability and what to do to reduce it" (Mileti,

1999, p. 215). Perry and Lindell (2003) mention that the preparedness process can be seen as consisting of three critical components: planning, training and writing plans. The concept "planning" is thus used in the literature both as a description of the specific analysis process and of the entire preparedness process.

3.5.2.1 Analysis process

As with the preparedness process, the analysis process should be an ongoing one to be able to create an emergency capability in the organisation. In general "...planning is a prosaic, and ubiquitous, fact of life. It is always with us, in one way or another, because either we are constantly doing it ourselves or we are part of someone else's plan" (Clarke, 1999, p. 1).

A common approach for identifying and planning for future threats as well as making an assessment of what is worth protecting is to conduct a risk and/or a vulnerability analysis. For example, Swedish legislation requires that all authorities integrate a risk and vulnerability analysis as part of their planning processes for emergency management. The usefulness of identifying and analysing risks and hazards is also emphasised in the literature (e.g. Perry & Lindell, 2003).

Risk is a concept defined differently in the literature (Kaplan, 1997). One definition used is to consider risk as the complete set of the answers to three questions: *What can happen? How likely is that it will happen?* and *If it does happen, what are the consequences?* (Kaplan & Garrick, 1981). A risk analysis is thus the method used to identify and classify these risks. Dynes (1983) claims that planning should be based on the most probable scenarios and not the worst cases. Robert and Lajtha (2002) instead claim that risk analyses are not enough for diagnosing emergency situations when emergencies by definition are low probability events and a risk analysis focuses on identifying likely scenarios. They mean that it is also important to use methods that consider more unlikely scenarios. Clarke (2005) as well points at the need for considering possibilities and not only probabilities. He means that as a counterweight to, for example, risk analysis (probabilistic thinking) it is wise to use worst case thinking. I think that since emergencies commonly are improbable scenarios, worst case thinking is necessary in some form. But this does not exclude the usefulness of methods such as risk analysis. A risk analysis does not necessarily limit the findings to the most probable scenarios. It is instead the way the method is used or the users that are the limitations. But whatever method is used, the problem with finding the worst cases is always as Clarke (2005, pp. 72-73) describes it:

> The great paradox of worst cases is that ultimately they are never as bad as they could have been. Counterfactuals help us deal with that.

> It's a comforting message, in the sense that the truly horrible things that we've witnessed could have been more horrible. But it's discomforting too, because it means that we'll never truly be prepared for the worst that human and nature can throw at us.

3.5.2.2 Training and exercising

Training and exercising are seen as very important components in the emergency preparedness process. McEntire and Myers (2004) separate training and exercising. Training is seen as the process that takes the planning (and the plan) into readiness in the organisation (Boin & McConnell, 2007). Methods for training can be classified into three main categories: academic, professional and practical (Alexander, 2002). Exercising instead tests the planning (and plan) and is also a means of evaluating the planning (McEntire & Myers, 2004). There are many different ways to perform exercises, from tabletop simulations to field exercises, i.e. from seminars to full-scale events (Alexander, 2002). When conducting training and exercises it is important to think of who needs what information. As Boin and Lagadec (2000, p. 189) point out, "Different responsibilities require different preparatory efforts...".

3.5.2.3 Written plans

While planning is an ongoing process the physical plans can be seen as a "...snapshot of that process at a specific point of time" (Perry & Lindell, 2003, p. 338). To create a living document and thus a more useful plan, it must be changed and revised as society changes (Perry & Lindell, 2003).

In the literature, problems with plans are often brought forward: "Plans, in short, can do just the opposite of what is intended, creating mindlessness instead of mindful anticipation of the unexpected" (Weick & Sutcliffe, 2001, p. 79). Examples of problems with plans that are mentioned in the literature are that most of them are out of date before they are published and that they are often unknown by the people who are supposed to use them (Carley & Harrald, 1997; Robert & Lajtha, 2002). Researchers claim these sorts of plans sometimes become an illusion of preparedness. Auf der Heide (1989) calls this the "paper" plan syndrome. Clarke (1999) also discusses this and points out that many plans are "fantasy documents" and promise more than the organisation can possibly handle. These sorts of plans are sometimes used by planners and decision makers as "...rhetorical devices designed to convince others of something" (Clarke, 1999, p. 41).

3.6 Creating and maintaining a response capability

As mentioned, to create preparedness and a capability to handle emergencies in an emergency preparedness or response organisation it is vital to design the work as a continuous learning process including different activities such as

experience, analysis and exercises. Preparedness is not a static condition and thus it is necessary to continuously maintain it.

3.6.1 Conditions for learning at an individual level

For different preparedness activities to have any impact on the emergency response ability, it is necessary to create the right conditions for learning at an individual level. The individuals working in the organisation need to constantly improve their ability to handle emergencies. An aspect of learning that is central is the creation of transfer, which is how principles or rules that an individual gains during one experience can be used during another. It can be defined as:

> ...the process whereby experience on one task has effect (either positive or negative) on performance on a different task subsequently undertaken. The underlying notion is that knowledge or skill acquired in the first task either facilitates or interferes with carrying out the subsequent task (Reber, 1995, p. 810).

Different aspects of how to create and improve learning and thus also transfer at an individual level can be found in the literature. A relevant one that has been emphasised for a long time is motivation. Motivation is sometimes seen as an inner driving force that makes the learner active in the learning process and thus improves learning. Motivation effects, for example, the time that the individual is willing to devote to learning.

One theory applicable to discussing conditions for individual learning is the variation theory (Marton & Booth, 1997) that was developed in the area of phenomenography. According to this theory, learning improves if the design of the learning situation makes the dimensions of variation visible to the learners. Marton and Booth also discuss another important principle when designing learning processes. This is the building of a relevance structure for the learners. Aspects such identifying the goals and success criteria are important for helping the learner to build a structure of relevance.

3.6.2 Conditions for learning at an organisational level

For maintaining a response capability in an organisation over time, there is a need that not only individuals have the necessary knowledge but the whole organisation. Scholars debate if learning only occurs at an individual level or if entities such as organisations also are able to learn. According to Senge (2006), learning at the organisational level is possible. Senge (2006, p. 129) mentions that, “Organizations learn only through individuals who learn. Individual learning does not guarantee organizational learning. But without it no organizational learning occurs”. Argyris and Schön (1996) also mention that organisational learning is possible and point out that it takes place when the

individual members learn for the organisation. Argyris (1993) describes two types of learning: single-loop and double-loop (see Figure 3.2). In single-loop learning, the action strategies (i.e. the behaviours) change without changing the governing values (i.e. values, norms and objectives). In double-loop learning, the governing values also change. Double-loop learning is necessary if the changes are going to last.

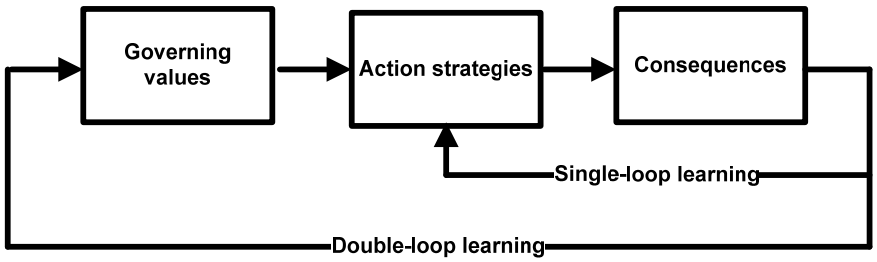

Figure 3.2: Single-loop learning and double-loop learning (Argyris, 1993)

The concept of transfer is also discussed in organisational theory. At an organisational level the concept involves both transfer at an individual level and between different individuals or organisations. Transfer at an organisational level can be defined as "...the process through which one unit (e.g., group, department, or division) is affected by experience of another" (Argote & Ingram, 2000, p. 151). There are many mechanisms that may result in transfer of knowledge within an organisation for example training, communication and personnel movement (Argote, Ingram, & Levine, 2000).

4 Research process

This chapter describes the design of the research process. It provides a description of the choice of methods for the different studies and how the data were collected and analysed.

4.1 Literature study

Before making field studies and deciding on what method to use, it is important to do background research such as a literature study to become familiar with the research area (Dunn, 2005; McGuirk & O'Neill, 2005). Therefore a literature study in the area of interest (i.e. emergency management and learning) was carried out to launch this research. Concepts identified as central (see headings in chapter 3) were used. Searches were performed in scientific journals (mainly in the ELIN@Lund database). In addition, further searches from references were done in scientific journals and books. The literature study continued in parallel during the rest of the work.

4.2 Choice of method

The choice of method should be based on the purpose of the study as well as the research question. The methods determine the way in which the data and empirics should be collected and analysed. Even if different methods often have different approaches, there are many overlaps between them and several methods can often be applicable. When studying emergency preparedness and response in real settings one is unable to perform a traditional experiment since it is impossible to control all aspects of human behaviour. For such studies Yin (2003) instead suggests methods such as surveys or case studies.

Case study methodology can be used when examining complex phenomena and according to Yin (2003, p. 7) it is preferred when studying "...contemporary events, but when the relevant behaviours cannot be manipulated". An advantage when using case studies is the possibility to use many different sources of evidence, for example interviews, documents and observations. A case study is also preferable when studying phenomena that have not been examined in depth before – an exploratory study. This is also discussed by George and Bennett (2005) who mention that case studies are useful for identifying new variables and hypotheses. This suits the purpose of the actual research which is to analyse how the preparedness process functions and the challenges and obstacles that are experienced. The choice of method in this thesis is thus to use case studies.

4.3 Creation of data

When studying emergency preparedness it is possible to use data and empirics from different activities such as from the preparedness phase, involving

different forms of analyses and exercises, or from emergency response operations. I have chosen to study one emergency response operation case as well as to gather data and empirics from different emergency preparedness activities.

4.3.1 Case selection

A difficulty when using case studies is determining the number of cases that are appropriate and manageable. The choice in the research on which this thesis is based was to focus on one larger case study of an emergency response operation and four minor ones. George and Bennett (2005) discuss two types of case studies: the within-case analysis of a single case and the cross-case comparison of a number of cases. They mention that it is preferable to use a combination of the two. According to Yin (2003) it is also preferable to base the case study on multiple cases, but when the interest is in extreme or unique cases as in emergency studies, single cases are usable.

In recent years a couple of changes have been made in the Swedish emergency management system resulting in new legislation. Since the focus of this research is on how to create a preparedness process at a community level, it seemed obvious to study current emergency preparedness work. For this reason the cases studied were chosen using the criterion that they were not too far back in time. The focus of this thesis has been to study the municipality of Ljungby's handling of the Gudrun storm. This storm is one of Sweden's most recent emergencies and can be seen as both an extreme and unique case. In addition, four smaller cases of emergency preparedness were selected and studied.

4.3.1.1 Ljungby's response to the Gudrun storm

On the 8th of January 2005 southern Sweden was hit by a storm called Gudrun, with long lasting gusts of hurricane strength winds. In only a few hours, trees corresponding to more than 75 million cubic meters of wood were blown down, and a total of 341,000 homes lost power resulting in several difficult problems in the area (SEMA, 2005b). Ljungby was one of the municipalities most affected by this storm. For several weeks, extensive parts of Ljungby lacked utilities such as electricity and telecommunications. The larger roads in the municipality were usable a couple of days after the storm and after a week, most of the roads were open. The objective of this study was to investigate how Ljungby worked with preparedness activities prior to the event, how this work influenced the response to Gudrun and what demands the acute situation placed on the preparedness activities.

4.3.1.2 Studies of preparedness processes in organisations

In addition to the larger study in the municipality of Ljungby, four other organisations were studied, but to a smaller extent. The study objects were the City of Malmö, the municipality of Stenungsund, the Region Västra Götaland and the Region Skåne. In these organisations the objective was to investigate preparedness activities. These studies were based on interviews with above all emergency managers (sometimes called preparedness planners) and managers responsible for the preparedness work in the organisations. In addition, observations of and documents from different preparedness activities (including emergency response situations) were also included.

4.3.2 Collection of data

After selecting the cases, it is important to consider what form of empirical material was needed to answer the research questions. For the larger case study a plan was drawn up containing the specific questions, the data that was of interest and the method to be used. Yin (2003) discusses six different sources of evidence: documentation, archival records, interviews, direct observations, participant observations and physical artefacts. In my main case study I chose to use mainly interviews, documentation and archival records. It was impossible to use observations since the emergency had already occurred. For the other studies I chose interviews, observations, documentation and archival records. The different sources of evidence were used selectively to various extents depending on what was possible.

4.3.2.1 Interviews

The case study of Ljungby and one of the smaller studies were mainly based on interviews. An important part is thus the selection of informants, a process which is important for the outcome. The actors interviewed were chiefly involved in preparedness work or in the handling of an emergency in the organisations studied. The initial selection of interviewees was based on a dialogue with the actors most involved in the response or preparedness work. From these first interviews, additional persons were identified as important actors and were also interviewed, resulting in a total of 27 interviews. The interviews were all recorded. In the Ljungby case study, the interviews were also transcribed.

Interviews can be structured in different ways from standardised questions chosen beforehand to letting the content mainly be decided by the informant, in which case the questions are a result of the informants' answers. The interviews in this thesis were semi-structured. The questions were chosen and standardised in advance but at the same time were open to further discussion of interesting information if that came up during the interviews.

When interviewing persons involved in preparedness work, the content of the questions was about how this work was structured and how they worked with emergency preparedness. When interviewing persons involved in the response to an emergency, questions were asked about the interviewees' experience of the specific response as well as their experience (or, in some cases, lack of experience) with preparedness activities and earlier emergencies.

4.3.2.2 Observations (direct and participant)

In three of the smaller studies, observations were performed when participating in exercises and training. Notes were taken during the observations and some of them were also tape recorded. This was done to gain a better understanding of the different organisations as well as different forms of preparedness activities. On these occasions problems that could arise in this kind of work emerged.

4.3.2.3 Documentation and archival records

In connection with the interviews and observations, different types of written documentation were gathered such as diary notes entered during an emergency response, evaluations of emergency responses, preparation materials (i.e. emergency plans, risk and vulnerability analyses), as well as newspaper articles.

4.4 Analysis of data

The information gathered during the study of Ljungby was analysed based on questions that had been developed in advance. The interviewees were able to read and make minor corrections on the transcribed interviews. An analysis was then performed of the transcribed interviews and the other text documents collected based on questions regarding three central themes: 1) whether and how various preparedness activities influenced the emergency management capabilities in Ljungby, 2) what demands specific situations imposed on the implementation of preparedness activities, and 3) what kind of assistance needs emerged among the affected population during the Gudrun storm. I was interested in both what the majority and the outliers believed. The analysis of the texts and notes from the observations and interviews in the other studies was carried out in the same way as the analysis of the Gudrun storm.

5 Results

This chapter presents the results of my studies by addressing the two research questions: How does the preparedness process functions? What are the challenges and obstacles faced by the organisations during the preparedness process?

According to Swedish legislation, public authorities have to prepare for emergency response. To handle this task and to co-ordinate the preparedness work most Swedish authorities at the local and regional levels have a function called a preparedness planner. In the organisations studied this position is everything from a part-time job for one employee to several full-time jobs. It is also common to establish a larger working group, a preparedness planning group, composed of people from the organisation's different administrations. This composition is intended to present a comprehensive representation of the whole organisation. Generally the group is co-ordinated by the preparedness planner. The group performs risk and vulnerability analysis, for example.

One stipulation in the Swedish legislation is that public authorities have to create a plan for how to handle larger emergencies. Many researchers have found that these plans often end up unread on a shelf collecting dust, sometimes referred to as "paper plans" (Auf der Heide, 1989), or even worse that they create a false feeling of security while the plan in fact is a "fantasy document" (Clarke, 1999). Ignorance of plans was also found in many of my interviews with Swedish civil servants. "We have had charming plans that were written, but no one had the time to bring out any plan" (interview C, organisation 3). The same interviewee continues, "Actually, I have not read the plan!" (interview C, organisation 3). These two quotations are not exceptional (see also Paper II [Eriksson, 2008]). Instead it seems that people not directly involved in the preparedness planning (i.e. not involved in the preparedness planning group) do not read the plans or do not know they exists.

That people outside the preparedness planning group mention that they have not read the plan is perhaps not remarkable as it is the process and not the physical plan that is important. What is worse is that people mention that they have "...not seen any results of their (the preparedness planning group's) work" (interview E, organisation 3). This may be due to a lack of activities to spread the knowledge throughout the organisation. This indicates the lack of or at least limited organisational learning. According to the legislation, elected representatives as well as civil servants ought to receive the education and practise they need to be able to handle emergency situations. The need for education is also emphasised in the literature (e.g. Perry & Lindell, 2007). One question, thus, is if people who in the future are involved in emergency response will receive the education and training they need. "There is a plan. But you can ask yourself if it is practised as much as it should be" (observation

1, organisation 1). In more than one of the organisations, persons (often those not directly involved in the preparedness work) mention that they have not participated in any education or exercise but subsequently were involved in emergency response activities. Auf der Heide (1989) mentions that planning should be done by the users. The issue is that it is difficult to know the individuals who will be involved in emergency response in the future. In conclusion, is seems that people not directly involved in the preparedness work are not familiar with the planning.

The interviewees in the organisations studied have emphasised the problems or obstacles in the transferring of information and knowledge about preparedness planning to different individuals (see also Paper II [Eriksson, 2008] and Paper III [Nilsson & Eriksson, 2008] for further discussions on the subject). The planning therefore risks becoming an isolated process. "Up to now it has been spread by the preparedness planning group to their respective administrations. But how they establish it and how they gather different points of view I really don't know. It's up to them!" (interview G, organisation 3). The problem with disseminating the results of the preparedness planning can be illustrated by the fact that there often is no process (planned or even improvised) of how the knowledge obtained should be transferred throughout the organisation.

Scenarios are commonly used when conducting risk and vulnerability analyses. A scenario describes one specific course of events but when used in a broader sense, a single scenario can represent a class of scenarios. One of my interviewees points out the problems that can arise if a too narrow perspective is used during the planning, "We had not imagined an emergency that would last more than two days. The emergency that occurred lasted for five weeks and families with children were in desperate need of just being able to wash their clothes..." (interview G, organisation 3). In another instantiation it seems that the plans and/or risk and vulnerability analysis was not applicable to what actually occurred. As one actor pointed out, "We tried to think of the worst that could hit a municipality like ours, but we could not imagine the extent of the catastrophe that actually occurred" (interview G, organisation 3). Thus, sometimes there seemed to be considerable differences in the analysed scenarios and the emergency that actually occur (see Paper II for a discussion of the issue [Eriksson, 2008]). One aspect of this problem – the use of worst cases thinking – is thoroughly discussed by Clarke (2005). Another difficulty is to identify a broad range of scenarios. Hamrin and Strömgren (2008) have studied risk and vulnerability analysis from all Swedish county administrative boards and describe these analyses as predominantly dealing with what they call "organisational risks" and not a broad range of different scenarios. The problem identified in this thesis is thus that risk and vulnerability analyses seem to focus on scenarios that are too specific and the individuals making

these analyses appear to have difficulties broadly imagining potential events given a specific narrow scenario as a starting point of the analysis. They do not cover the possible variations in the course of events and thereby miss the opportunity to gain a broader view of the scenarios studied.

An additional problem experienced by some of the interviewed emergency managers is that they have difficulties getting others to understand them, and that the commitment to preparedness issues is generally low (see Paper III for an additional discussion on this issue [Nilsson & Eriksson, 2008]). A further problem is when the top managers do not consider preparedness activities as sufficiently important. In one of the organisations studied, the emergency manager felt that she did not get any support from the leaders of the organisation in the beginning. It was not until she carried through a comprehensive exercise that they understood that emergency management is, in fact, something that influences them (observation 1, organisation 5). In another organisation one of the leaders mentions, "We have the kind of emergency plan that you are supposed to have and are in the process of updating it now" (interview J, organisation 4). One interesting observation is that the old plan was several years old and when asked, the preparedness planner mentioned that he (with some colleagues) had updated the plan at least one year ago but the management had not dealt with it yet due to what they claim is a lack of time (interview Z, organisation 4). The problem of getting emergency management high on the organisational manager's agenda is also identified by, for example, McConnell and Drennan (2006), Lajksjö, Enander and Hede (2004) as well as Perry and Lindell (2007). In conclusion, in the organisations studied there seems to be difficulties for the emergency managers to get other individuals in the organisation interested and committed to preparedness issues.

Summing up, the problems and obstacles identified in the organisations studied are:

- People not directly involved in the preparedness work do not read the plans created.
- People not directly involved in the preparedness work are not familiar with the planning.
- There is often no planned process (e.g. exercises and reflections) for transferring the results of the preparedness work.
- Opportunities to gain a broader view of potential emergencies by the use of one scenario with its possible variations in the course of events are commonly overlooked.
- Emergency managers have difficulties getting others in the organisation interested and committed to preparedness issues, including management.

6 Discussion

This chapter discusses an approach to designing preparedness for emergency response in public authorities, in particular, at a local community level. The discussion thus centres on my overall research question of how the emergency preparedness process can be designed. The approach supports measures to manage the problems and obstacles identified in this thesis. The discussion is structured around how to organise the preparedness process, who should learn and what they should learn when preparing for emergencies. Finally, there is a discussion of methodological issues related to the current research area.

6.1 Designing preparedness

How to create a preparedness process is a subject most Swedish authority's deal with today. As a support in this work, the Swedish national authorities offer a number of guidelines. But as described in this thesis, creating a preparedness process that actually yields results is not an easy task. Instead many challenges and obstacles emerge in this effort.

6.1.1 Organising the preparedness process

In agreement with several researchers, I believe that it is the process (creating the plan, carrying our exercises, etc.) that is of utmost importance. When working to improve preparedness activities, there is a need to structure the work as a continuous learning process. These facts are widely mentioned in the emergency management literature by, for example, Perry and Lindell (2003), Quarantelli (1997) as well as Robert and Lajtha (2002). Robert and Lajtha (2002, p. 181) point out that effective emergency (they use the word "crisis") management should be a "...structured and continuous learning processes designed to equip key managers with the capabilities, flexibility and confidence to deal with sudden and unexpected problems/events...".

An organisation's (or the entire society's) efforts to improve safety can be seen as an overriding process including all the different aspects of safety. Safety is not a static condition; it is constantly changing (Reason, 1997). Therefore there is a need for an organisation to continuously work with safety. The emergency management process can further be seen as a part of the safety process. Preparedness for emergency response is a sub process of emergency management. Suggestions of other sub processes may be the three other phases in the comprehensive emergency management model: mitigation, response and recovery. In this thesis the focus is on the preparedness process and its sub processes, see Figure 6.1.

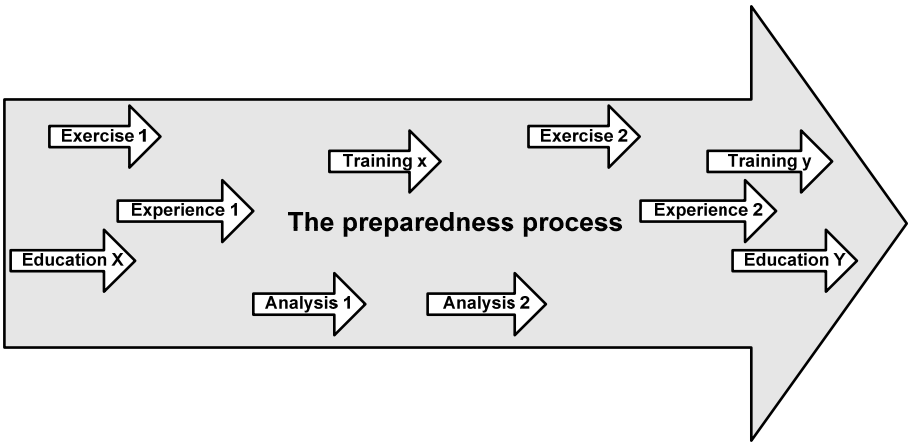

Figure 6.1: The preparedness process and some of its sub processes

In this discussion I want to emphasise the value of seeing the preparedness process as a part of something bigger and not as an isolated process. Often the preparedness process can be included in already existing processes such as one for improving safety or quality. It is also so that much work that already is performed in the organisation to improve safety such as risk and vulnerability analysis can be used in the preparedness process and its sub processes. There is a need to determine how the different sub processes fit into the organisation's complementary processes (where they begin and where they end). Obviously this can and will be arranged differently in different organisations. What I want to stress is not how it should be arranged but that it is arranged.

Nevertheless, it is important to comprehend the preparedness process as an individual process. As an emergency situation is something out of the ordinary, it cannot be managed with ordinary measures (Quarantelli, 1997). Therefore just fitting the preparedness process into other processes and not understanding its peculiarity may lead to inappropriateness.

A problem identified in the organisations studied is that often there are no planned processes for disseminating information and knowledge throughout the organisation. There thus seems to be a need to emphasise that the preparedness processes should facilitate transfer from preparedness activities to the handling of an emergency but also between different preparedness activities. It is likely that the dissemination of information and knowledge should be a planned process.

Today there are thorough discussions in Sweden about how to structure the preparedness process and its sub processes. Its structure and implementation vary from organisation to organisation (Paper III [Nilsson & Eriksson, 2008]). Some organisations desire strict regulations from SEMA. They demand exact

methods and processes for how to prevent and prepare for emergencies. The problem is that it is not feasible to create strict regulations since different organisations may be exposed to different threats. They may also have different recourses and conditions. All organisations thus have a variety of needs, obviously some more similar, and it is not possible to create a detailed method that fits all organisations, not even all municipalities. This fact is mentioned in the literature by, for example, Quarantelli (1993, p. 29) who found when studying preparedness activities at a local level that:

> ...heterogeneity still exists; there is still considerable variations in structure and function. (...) – we told FEMA this is good, not bad. The variability may create problems in terms of national policy and planning. However, the fact is that at the local community level, the reason you have variations is because the variation reflects local conditions and circumstances. If you were impose an artificial structure and function in a locality, then it would no longer be rooted in the local community and would not really be very effective.

Perry and Lindell (2003, p. 342) also argue for the need for different plans for different organisations while saying that "...there is no 'model plan' that will serve every community effectively". Alexander (2005) instead discusses the need for standards in emergency planning and claims that a standard would make it possible to evaluate and improved plans. Even so, the embedded problem with standards is that, although they can help improve the work in the organisations with the poorest preparedness, they commonly do not challenge an organisation to continuously improve its preparedness planning.

In every organisation there is thus a need to create the preparedness process as a continuous learning process. This process needs to suite the specific organisation and adapt to its needs. In addition, the different sub processes will also look (and need to look) different. In this work it is has been shown to be important to have a planned structure for how to transfer information and knowledge in the organisation. Even if it is not possible to create an exact method, general principles to improve the preparedness process can be found in the literature (e.g. Dynes, 1983; Dynes et al., 1981; Kreps, 1991; Perry & Lindell, 2003; Quarantelli, 1997, 1998a). When creating the preparedness processes there is also a need to consider who to involve where in the process and who should learn what.

6.1.2 Who should learn?

As mentioned, learning is intended to occur during the process of preparedness. The difficulty is to assure that all the people who in the future may be involved in managing an emergency are actually involved in the preparedness process.

Usually preparedness activities in Sweden are performed in a limited group not even involving the entire national response organisations (e.g. Paper III [Nilsson & Eriksson, 2008]). As this thesis indicates, individuals outside this group are often not familiar with the planning or the plans. In addition, the interviewed emergency managers also mention having difficulties getting others in the organisation interested and committed to preparedness issues.

In the organisations studied, the ignorance of the preparedness becomes visible especially when an emergency occurs. The people that were expected to be involved in the emergency response (hopefully equipped, trained and exercised) were either absent or had changed jobs. This reality points to the need for the organisation to create a continuous preparedness process, involving more people, exercising more often and organised for continuous availability to create a better capability to manage future emergencies. It is also essential, as emphasised in the literature, that the planning should be based on function and not person. It is important that the function is carried out on demand independently of the person doing it. This can make the planning more robust as several persons may have the same function. This requires that people who substitute for someone with a function in the response organisation need to be equally informed about the preparedness work, especially at the highest management positions. Another requirement is that different functions in the emergency response need to have different capabilities. Therefore different people need to be involved in the various preparedness activities.

To create an emergency response capacity it is thus interesting to not only study learning at an individual level but also at the organisational level. Creating organisational learning is not easy, especially as identified in this thesis when there are problems getting people committed to the issues. The understanding and commitment to preparedness activities has to be felt from the top manager and down to those working on the floor. It is hard to create a prepared organisation when the top managers do not recognise the need for preparedness activities. Involving them in the work (e.g. by education and more exercises) may be one way to increase their understanding and also their interest and commitment.

6.1.3 What is to be learnt?

By learning from earlier emergencies as well as other preparedness activities, such as risk and vulnerability analysis and exercises, the organisation can improve its response capacity. Yet, neither by using experience nor other forms of preparedness activities can all possible future emergencies be identified in detail. The question, *What is to be learnt?,* thus has to be complemented with the question, *What can be learnt?* The point I want to make is: What is possible

to learn beforehand and what needs to be improvised during an emergency and still supported by the preparedness process?

As mentioned, many researchers point out that improvisation is vital and necessary for handling an emergency. At the same time researchers indicate that this does not restrict the necessity of planning, exercising and other preparedness activities. When discussing the usefulness of preparedness activities with persons directly involved in planning work at Swedish authorities the answer is similar to what can be found in the literature. They believe that planning is necessary. One of my interviewees points out that "...even if the thing you practise never occurs, even if what you practice on the organisational level never is carried out that way, it doesn't matter because we have learnt..." (interview O, organisation 4). Another interviewee points out that the plan is an important foundation "...we would never had handled the situation if we hadn't had the plan" (interview A, organisation 4). At the same time the interviewee mentioned the need for improvisation "...you can write a plan for everything, you can write exactly: you should do this and I should do that. But in the end, suddenly it is not possible to fully follow the plan..." (interview A, organisation 4).

When studying emergency response activities, improvisation seems to have been a considerable part of the responses. For example one interviewee points out that, "You had to improvise from the first moment until the last. There are no cure-alls here. No, there were, of course, a lot of things that you can't study for" (interview E, organisation 3). The same person also states "...but we are practical individuals with an enormously broad network and during the emergency situation there is a need to create unconventional solutions. It's not possible to go by the book!" (interview E, organisation 3). One interviewee points out that, "It is hard to have specific tasks before you know the situation; the needs can be so different" (interview P, organisation 4). Another interviewee mentions that she had not participated in any exercise nor does she have any other education in emergency management but she claims that, "...everyone understands that it comes down to acting directly and acting fast" (interview F, organisation 4).

The need for improvisation during an emergency is stated both in my interviews and in the literature but when it comes to the need for preparedness work, all my interviewees are not convinced. It seems that the people who never have been involved in preparedness work do not see any value in it. When instead discussing the subject with those who have been involved, they indicate the need for both preparedness and improvisation. I agree with others that preparedness is important, at least as a way to gain understanding and improve the ability to improvise.

An additional form of preparedness mentioned by the interviewees is to create a mental readiness. "I have always had in mind that things can happen. What are we doing then? You need a mental readiness" (interview C, organisation 3). Experience from ordinary work is also emphasised as an important preparation, something you use during the response: "It's what you have obtained during the years; that experience" (interview F, organisation 3). These two aspects, the usefulness of creating a mental readiness before an emergency response and the usefulness of ordinary work experience when handling an emergency, are also identified by Lajksjö, Enander and Hede (2004).

The ability to gain a broader view of the threats the community is facing by using possible variations in the scenarios studied seems commonly overlooked in the organisations. Working with preparedness activities such as risk and vulnerability analysis is, if conducted with a strategic approach, a technique for the learners to become aware of the dimensions of variation. This awareness is seen as an approach to improving learning (Marton & Booth, 1997). Employees' imagination also benefits from working actively with learning from errors (such as HROs): the range of future imagined possibilities becomes broader. "Events and imagined events are used as opportunities for learning. Imagination stretch occurs when the usual categories of thought are expanded or added to so that new possibilities are considered" (Clarke, 2005, p. 146). Clarke (2005, p. 146) also states that, "Worst case thinking can facilitate organizational learning by forcing managers to imagine possibilities that might not otherwise have occurred to them". Thinking in dimensions of variation and worst cases are thus approaches that can support the organisation in acquiring a better and broader image of the future.

As mentioned, there is a need to transfer the information and knowledge (general principles or rules) gained during the preparedness process to handle future emergency situations. Both the literature and the results of my studies illustrate that preparedness "...should focus on principles of response..." (Perry & Lindell, 2003, p. 342). The exact scenarios used during the preparedness phase will never occur; the idea is to instead consider a class of scenarios of which the one selected is an instantiation. The discussions in the literature are more about how a process can be structured than the exact information that a person (or organisation) needs to handle an emergency. For example, "...disaster simulations or tests should teach officials the questions rather than answers..." (Quarantelli, 1993, p. 31). A follow-up question would be: Is there any knowledge that is necessary for all emergency response operations or a set of capabilities and competences that are general for all or the majority of emergencies?

Dynes (1994) mentions that response-generated needs are rather general for all types of emergencies and preferable to focus on when planning for them. The discussion so far in this thesis has therefore focused on the response organisation and how to establish and improve its ability. Nevertheless, there is a need to understand how people respond to an emergency. Researchers such as Auf der Heide (1989) point out that myths of people responding with maladaptive behaviour such as panicking and looting are common. Instead of myths it is better to base planning on what the affected population is likely to do and what they actually need help or support with.

An aspect not to be forgotten is thus the affected individuals' role in the response, both as an important actor managing the situation and as the one that may need some form of support. One of the aims of the response to an emergency is to assist and reinforce the affected individuals to handle their own situation (e.g. Enander, 2006). Their response should therefore also be a part of the preparedness work. A practical way may be to base the preparedness work on identifying and analysing possible assistance needs (See further discussion in Paper I [Eriksson, Abrahamsson, & Fredholm, 2007]).

6.2 Methodology and quality

6.2.1 Methodological issues

This research is based on case studies of emergency preparedness and response work in different public authorities, at local and regional levels. Most of the findings are based on a single case study of how the municipality of Ljungby handled the Gudrun storm. Four additional smaller studies of emergency preparedness were carried out as a supplement. Was the case study methodology the right choice for answering the research questions? I argue that it was a feasible solution. Methods such as experiments or participation action research are not feasible when studying events that have already occurred. Instead, the method needs to be able to look back on a past event, facilitating the re-creation of both the preparedness process and the emergency situation. Case studies do this. They also offer an opportunity to use many different methods for data collection.

The next question is if it really was a case study approach that was applied. Yin (2003, p. 13) means that, "A case study is an empirical enquiry that:

- investigates a contemporary phenomenon within its real-life context, especially when
- the boundaries between phenomenon and context are not clearly evident".

He further points out that, "The case study inquiry:

- copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result
- relies on multiple sources of evidence, with data needing to converge in a triangulating fashion, and as another result
- benefits from the prior development of theoretical propositions to guide data collection and analysis" (Yin, 2003, pp. 13-14).

My studies meet the above definition and thus are, at least according to Yin, case studies.

The choice of case is also important when conducting case studies. The idealistic case when studying emergency preparedness requires not only an examination of the response in real time but also of the preparedness work prior to the response and the subsequent follow up activities. In studies of preparedness of emergency response this is often impossible since you do not know beforehand where and when an emergency will strike. Therefore the Ljungby study was carried out after the municipality experienced an emergency situation. This influenced the answers in the interviews. How experience is reconstructed is a research area in itself and further considerations are given in, for example, Myers (2002).

There are a couple of aspects to consider when conducting and analysing interviews. One is the selection of the interviewees. In my studies the first selection was based on a discussion with the persons most directly involved in the response to the emergency or preparedness work and in the second selection, persons that had been mentioned during the interviews of those first selected. A relevant question is what sort of problems this can cause. In all research there is a risk that some views might be overlooked and just being conscious of this is important.

An additional problem when conducting interviews is what questions to ask and how they are perceived and understood. To test the questions, I discussed them with others before using them. Another rather similar problem is that the interviewee sometimes answers what they think the interviewer wants or what might be considered an appropriate answer. It is relevant to ask yourself if you recognise the answers from other informants. In addition, the choice of using semi-structured interviews to allow flexibility and avoid too strong guidance from the interviewer was made. An additional problem with some of my interviews and very frequently when investigating past emergencies was that they were carried out some time after the event. Since I contacted Ljungby after the emergencies had occurred this problem is embedded and unavoidable.

Two problems emerged during the gathering and analysing of documents. First, it was difficult to know what material was needed because it was impossible to know what material existed. The second problem was that no

one seemed to know all the material that existed. To get as many relevant documents as possible I thus asked all my interviewees for documents about the emergency and preparedness work and on my own searched for information from other sources. This may have created the best basis for identifying documents of relevance.

6.2.2 Validity, reliability and generalisation

There is no general agreement on how to measure quality of research. Common measures on the quality of scientific research are validity and reliability. Validity is considered as being good when the researcher measures what he intends to measure. Good reliability means carefulness in the measurements. These criteria are often associated with quantitative research. If the concepts also are applicable to more qualitative research is more controversial. Bergström and Boréus (2005) state that validity deals with if the investigation answered the questions that it intended to answer. An additional criterion to achieve good validity is that the researcher increases his or her understanding. Reliability concerns the need to be careful in all steps. It is also an ambition to be transparent and use a well-founded argumentation. These two more open views of validity and reliability can be applicable to all sorts of research, such as the research that this thesis is based on. To ensure the quality of my research I have tried to follow the criteria for good validity and reliability to the extent possible.

An important question is if research results can be generalised or not and to what degree. Yin (2003, p. 10), a positivist researcher, states that generalisations are possible and claims, ”The short answer is that case studies, like experiments, are generalizable to theoretical propositions and not populations or universes”. Another view is expressed by Flyvbjerg (2001, p. 76) who mentions that just because “...knowledge cannot be formally generalized does not mean that it cannot enter into the collective process of knowledge accumulation”. Contrary to this optimistic view, other researchers mean that generalisations are not possible. In this more pessimistic tradition some researchers instead talk about representing the results as probabilities. For example, how likely is it that this specific case is also valid for other cases? As this thesis is based on only five case studies, this discussion is required. The literature review that was carried out indicates that most of the problems and obstacles that emerged in this study are also found in other organisations. Even if these studies and thus the results are not representative for all public authorities in Sweden, it is possible and likely that the problems emerge in many organisations and by trying to prevent them is, I believe, essential.

7 Conclusions and further research

This thesis studied how Swedish public authorities, at local and regional levels, can work with preparedness planning processes. The overall research question was:

> How can the emergency preparedness process be designed?

This licentiate thesis was a first step in how that can be done to improve the capabilities of Swedish local or regional public authorities to manage future emergencies. The specific research questions were:

> How does the preparedness process function?
>
> What are the challenges and obstacles faced by the organisations during the preparedness process?

As identified in chapter 5, Results, designing emergency preparedness processes implies several challenges. As thoroughly discussed in chapter 6, Discussion, it is not possible to create a single specific method or process that suites all organisations. As I see it, this is neither useful nor desirable. The creation of the preparedness process is, in itself, useful for developing the organisation's emergency management ability. In addition, developing a process that actually suites the specific organisation may both create a more suitable process and more engaged members.

Yet it is essential for an organisation to actually design a preparedness process and establish a function for continuous learning. Such a preparedness process may, for example, simplify the creation of positive transfer of information and knowledge throughout the organisation. In this thesis I outline an overriding approach that an organisation can use when designing their preparedness process. Aspects of this approach are today being implemented in co-operation with selected Swedish public authorities. The approach is based on a discussion of how to organise the preparedness process and who should learn what.

There is still a need for further research on how to develop a preparedness process that improves the organisation's ability to handle future emergencies. Even if I do not believe it is possible to create a specific preparedness method that all organisations can use, some general considerations for how an organisation can improve the design of their preparedness process can be made. An important part of this is to study how to ensure dissemination and understanding of the preparedness work throughout the entire organisation. In addition, how to use (and plan) exercises that support emergency management needs to be further studied. Another interesting aspect for improving the preparedness process is to study basic or generic elements of emergency

management. A difficulty is the evaluating of an organisation's level of preparedness. How can the effectiveness of the work be defined and measured?

An area that also needs to be studied in more detail is the inhabitants' ability to operate during an emergency as well as their needs for help and support during the event. An emergency commonly has to be managed by several organisations and how to improve preparedness work across organisational borders also needs to be further examined.

8 References

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Appendix 1: Papers

Paper I Eriksson, Kerstin, Abrahamsson, Marcus, & Fredholm, Lars (2007). An analysis of assistance needs during the storm Gudrun. *Proceedings of the 14th TIEMS Annual Conference 2007*, Trogir, Croatia, 65-72.

Paper II Eriksson, Kerstin (2008). Knowledge transfer between preparedness and emergency response: A case study. Accepted for publication in *Disaster Prevention and Management: An International Journal*.

Paper III Nilsson, Jerry & Eriksson, Kerstin (2008). The role of the individual – A key to learning in preparedness organisations. Accepted for publication in *Journal of Contingencies and Crisis Management*.