Emergency response in rural areas

Sofie Pilemalm
Linköping university
sofie.pilemalm@liu.se

Rebecca Stenberg
Linköping university
rebecca.stenberg@liu.se

Tobias Andersson Granberg
Linköping university
tobias.andersson.granberg@itn.liu.se

Anders Axelsson
Swedish Rescue Services
anders.axelsson@gislaved.se

ABSTRACT

In this study, security and safety in rural parts of Sweden is investigated. New ways of organizing for efficient response can be found in the extended collaboration between societal sectors and in utilizing the local social capital. New categories of first responders and their requirements are identified and we propose non-technical and technical solutions as support. The results' application to large-scale crises is discussed.

Keywords

Emergency management, first responders, information technology, social capital, rural areas

INTRODUCTION

In our society the demographic structure is in continuous change, with people moving into or closer to large cities, and with increasingly sparsely populated rural areas as a result. In these areas it may not be possible to maintain the same level of safety for the population as in urban areas using traditional resources such as fire and rescue services, police and emergency medical services. The needs of the population may be different as well as the requirements on response organizations and corresponding information systems. Meanwhile, handling of frequent emergencies in sparsely populated areas shows several substantial similarities to large-scale crises. This includes e.g. an insufficient basic infrastructure and the need to quickly organize immediate response using local resources in combined and innovative ways (Pilemalm, Andersson and Hallberg, 2008). More than half the geographic area of Sweden can be considered sparsely populated with more than 45 minutes by travel by car to a town with more than 3000 inhabitants. The Swedish government considers it a challenge to respond to emergencies effectively in these areas and has proposed trial activities in two counties primarily based on new ways of collaboration between existing response organizations (Stenberg, Andersson Granberg and Blondin, 2010a). This will bring entirely new issues about responsibility, rights and duties in emergency management.

The aim of this study is to investigate the *needs* for security and emergency management in rural areas, and to identify their technical and non-technical solutions. Based on the results, a number of *trial activities* are suggested addressing issues about about *responsibility, rights and duties*. The study results refer to emergency management primary as response to accidents on smaller scale but what large-scale crisis management and emergency management in rural areas can co-learn and use is discussed with basis in the research literature.

METHODOLOGY

The study was performed using qualitative interviews and organizational hearings in two Swedish counties.

Interviews and organizational hearings

A set of semi-structured interviews were performed with the intention to learn the local citizens' needs for emergency management. Intensity sampling, where you select a small number of rich cases to explore in depth was used (Patton, 2001). In total, 24 interviews were performed with citizens in two municipalities in north Sweden (Jokkmokk in Norrbotten län and Kopparberg in north Örebro län). Of the interview respondents, 10 were men and 14 were women and in the age span 18-84. All lived at a distance from a city so the minimal

response time for rescue services was 30 minutes. Six interviews were also carried out with spokespersons for organizations such as nonprofit interest organizations for pensioners, hunters, and mountain climbers, the Sami National Federation, a national project for woodworker's safety and an organization for safety and rescue in commercial ski resorts in Sweden. The study also included organizational hearings in forms of conversations with six key persons for service providers including the police, the rescue services, the County Council and municipalities. All material was documented using memory notes and analyzed through a thematic approach inspired by common-sense analysis, in which the researcher alternates between data and reflection (Feldman and Sköldberg, 2002). The themes from the interview guide were used as basis for the emerging categories.

RESULTS

The needs presented are those most commonly described among both interview and organizational hearing respondents. They are related to similar needs in large-scale crisis management, as reported by literature.

Basic infrastructure needs

The basic infrastructure that in urban areas is presumed to be available in also case of an emergency is not to be taken for granted in rural areas, according to the interview respondents. Basic infrastructure needs include electricity, water, food, gas, human contact, and possibilities to contact help. In particular, insufficient coverage of the mobile phone communication net is pointed out by both interview respondents and authority representatives in the organizational hearings. When there is no coverage where the emergency occurs, consequences can be severe. Reindeer herdsmen, woodmen and mountain service rescue workers are examples of professional categories that are exposed to this risk. Sometimes, alternative solutions, such as short-wave radio transmitters are used. The interview respondents emphasized the need for complete mobile net coverage and the authority representatives claimed that redundant communication possibilities are central for rural area safety and emergency management. Emergencies in rural areas thereby on a regular basis experience what often happens to the affected areas in large-scale crises, e.g., breakdown of infrastructure.

Needs for social networks

Moreover, long response times and sometimes absence from traditional emergency response services, leads to a substantial need for social networks. The interview respondents emphasized neighbors and family while the authority representatives talked in terms of non-profit organizations, organizations belonging to other societal sectors than traditional response, and individual volunteers. Needs that are locally solved by these networks may include e.g. electricity and water sustainment, fire preparedness and first aid. The networks further attain social control, maintain security and react on deviations from the normal. The collective strategy makes the villages strong in handling regular emergencies, but also makes them relatively prepared to handle extraordinary events. Above all the interviews showed that rural citizens often expect and are prepared to handle emergency situations on their own by having up to date first aid kits at home and cars equipped for slippery and snowy roads. They are also willing to support rescue operations, e.g. by meeting the ambulance half way. The rescue services deemed that the threshold for alarming is higher for citizens living in rural areas than for citizens living in cities:

"When the alarm comes from Porjus[small village in rural area], not from Luleå [city]. Then you know that it is really important".

There are also situations that are not possible to solve locally, but where traditional response organizations must provide functions. From the interviews it is clear that citizens expect different actors to sustain different needs, depending on the severity and extent of the incident. In general, ambulance services are regarded as the most important and as the most difficult to replace. Besides the traditional response organizations there are a number of actors employed in other occupations providing assistance in incidents, as reported in the organizational hearings. They include e.g. employees in commercial ski resorts in ski areas giving first aid in traffic accidents close to the slopes, and hunters seeking for missing people or animals wounded in traffic accidents. Again, several similarities to large-scale crisis management can be discerned. The notion of social networks and their importance in large-scale catastrophes have been noted by research. In the hurricane Katrina, it was necessary for actors on site to act as first responders and it has been argued that, in contrast to technical systems, the social systems almost never break down in a crisis situation (Tierney, Beve and Kuligowski, 2006).

Cross-sector communication and collaboration needs

Above all, the organizational hearing respondents further expressed a strong need for further collaboration among different actors, organizations and societal sectors. There are currently many legal and organizationally

related obstacles for collaboration, including work environment laws and rules, questions of responsibility and prestige. The needs also include human face to face contacts. In areas where the population continuously decreases and natural meeting places such as the school and the gas station disappear, it is important to create and maintain new meeting places. It was pointed out that collaboration and "getting to know each other" needs to be built up before the incident takes place. In the context of large-scale crises there is similar increased emphasis on the need for "mega-comunities" (Himberger et al, 2007). This means that actors from practically all available societal sectors must collaborate to solve problems that are too large or complex for individual actors, or organizations to handle. Similarly, the need for actors from different organizations, e.g., the military and local actors, to collaborate has been pointed out (Horton, 2007), as has the need for regular employees to act as semi-professionals and take on first responders' tasks, in case of a major emergency (Jack, 2005). In Katrina, when rescue activities were down prioritized, meaning that voluntary organizations like the Red Cross were shot out, this had devastating consequences in terms of insufficient handling of injured people (Tierney et al, 2006).

Organizing the social capital

Figure 1 summarizes the main findings in the needs analysis. Cities are rich in *structural capital* in terms of material, functions, routines rules and templates for how these can be combined and exchanged in systematic and standardized ways within societal systems (Putman, 2000). This leads to a high degree of specialized measures for ensuring the citizen safety, e.g. the *traditional emergency response organizations* including those paid professionals employed by the government, like fire and rescue services, police and emergency medical services. As the population gets sparser (along the diagonal from upper left to lower right in Figure 1), it is not possible to maintain the safety using specialized measures, and the importance of the *social capital* in terms of relations, networks, trust, voluntary activities and *new first responders* increases. New first responders then refer to semi-professionals, and volunteers who are organized in non-governmental groups.

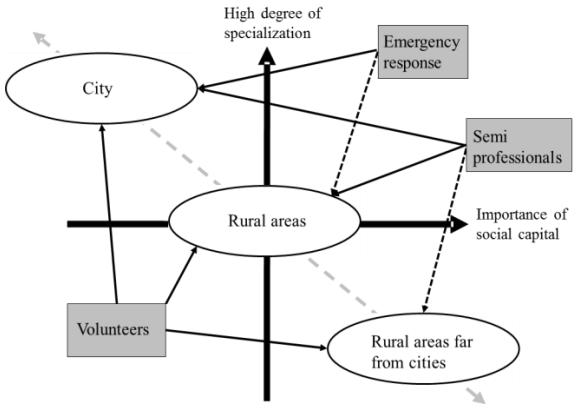

Figure 1: The relationship between type of habitat and factors which are important for the safety of the inhabitants

Three different types of resources are thus highlighted in Figure 1. *Emergency response* corresponds to the traditional responder type. These are mostly active in the cities and areas close to the cities as indicated by the arrows. *Semi-professionals* are a group of people who might be instructed, trained and equipped to provide first response, but who do not have this as their primary profession. In Sweden, this is a fairly new noted category of first responders. An example might be home care personnel who are equipped with and trained to use hand held fire extinguishers. Semi-professionals can be used in all types of habitats, but the type of professions suited for this task might be hard to find in rural areas far from cities, where the importance of *volunteers* increases. Volunteers include both neighbors helping each other and organized non-profit groups. (It is acknowledged that this distinction reflects Swedish emergency management and that the situation might be different in other countries). In the planned trials, each activity will be connected to the three resource groups.

Trial activities: collaboration and coordination of emergency management

The trials will investigate where effective measures can *be performed by other emergency response actors than the traditional*. Both the combination of police and fire service organized volunteer work, (e.g. mountain rescue and paid on-call firefighters), will be investigated, as will the extended use of semi-professionals (e.g. home care), local volunteer organizations (e.g. local sports clubs) and individual volunteers (e.g. neighbor networks). The trials will look into which combination of actors that is suitable for a certain type of emergency. The development of a new type of public safety official that can function as a generalist in the field of safety, and as a first responder, will also be investigated.

Trial technology: new communication and information channels

New ways of coordinating response activities need support by *proper communication channels*. They should be used to create dialogue between new and traditional emergency response organizations and may include e-mail lists, SMS, message groups and robust and easy to use push call mobile technology. The aim is to support the new groups, but also to provide the traditional emergency response actors with access to informal networks and local resources. An Internet based communication system, to communicate with semi-professionals and volunteers close to the emergency, is under planning. New ways of organizing response further require an *information infrastructure* making it possible for emergency response dispatchers to see all available response units, and including also the new first responder groups. It should further be possible for the new groups themselves to obtain information about events requiring emergency response, in order to act as first responders and maintain safety until the main resources have arrived. Databases with information on human and material resources will be prototyped. Mobile solutions will be tested including extended SMS functions and an iPhone application displaying information on the emergencies and resources available. In this step, a broad connection to RAKEL, the Swedish TETRA based national communication system is a pre-requisite.

Large-scale crises are often initially handled locally, with local first responders and municipalities using existing resources used for frequent emergencies in innovative and collaborative ways (Pilemalm et al, 2008). Their technical support includes e.g. decision-support, geographical information systems, personal digital assistants, communication support, and logistic support systems for resource inventory and allocation (e g. of vehicles, hospital beds and human resources). Many of these systems can apply to the new categories of first responders. There are several studies indicating the difficulties of communicating among different actors in large-scale responses, especially when the regular communication structure is down and suggesting mobile solutions such as security videos, mobile phone applications and wireless communication networks (e.g. Jack, 2005).

Trial activity: training, equipment, responsibility and legal aspects

All of the above require *cross training and equipping emergency response services* properly to enable cross-organizational first response, e.g. municipality home-help services responding to a fire. Both traditional and new first responders further need training in new systems and technologies. The latter may further need adequate training in e.g. first aid and use of currently existing resources and material. Not all types of responders can or should have access to all existing systems information. On the contrary, the involvement of technology raises issues about responsibility and credibility. A thorough investigation what the different groups can do and are allowed to do and not to do in different types of emergency situations is required. This *includes investigation of tasks, responsibilities and corresponding access rights to systems and material*. Further, a more juridical oriented investigation should be performed in order to identify what legal frames exist for collaboration. If needed, constitutional amendments should be proposed. It is important to support the existing informal structures and local networks so that they are built upon, not lost.

DISCUSSION

There are few studies on emergency management in sparsely populated areas. Meanwhile, research acknowledges that the response time is extremely significant for the outcome of certain emergencies such as fires in buildings and traffic accidents. Studies (e.g. Werner et al, 2005) show that there is much to win if rescue operations can start immediately, both in terms of saved human lives and less material damage. Thus, society should benefit from extending the first responder concept to embrace new actors and provide them with sufficient resources. In research, these new types are mostly described in relation to large-scale crisis management where they are discussed in the context of hierarchic versus networked organizations (e.g. Schraagen, Huis i´nt Veld and de Koning, 2010) and sometimes connected to decision-making and technical support (e.g. Dugdale, Darcy and Pavard, 2006). Very few studies discuss the organization of these new types; where and when they are supposed to participate in a rescue operation and what consequences their participation may have. Even fewer take the perspective of the first responders themselves but focus on that of authorities (Stenberg et al, 2010b). Studies do not problematize questions of responsibility, rights and duties of volunteers, or semi-professionals but their participation in rescue operations is mostly seen as a mere practical, technical or financial issue. The listed aspects will be considered in the trial activities which are is planned to start in 2013.

The results of this study suggest that the extended first responder concept should be further explored for smaller emergencies and large-scale crises simultaneously – where the contexts learn from each other and use the same resources. In fact, structures and systems that has been developed and that is utilized for smaller emergencies will often already be in place in case of a crisis. This supports the idea that strengthening the daily emergency response, will also lead to more efficient crisis management. Further, improvisation theory has demonstrated

that improvisational action must occur in crisis management when resources are scarce and there is limited time period to act (Mendonça and Wallace, 2004) Rural response might inform that theory, considering that some types of emergency response assets may not be available in the rural environment and moving them to these locations takes much more time than in urban ones. There are also other differences. Large-scale crises pose scalability issues, and they do not occur with the same frequency as smaller accidents. This means that the opportunity for the involved actors to train together and get to know each other beforehand is smaller. Moreover, the categories of first responders and their involvement in emergency and crisis management may not be similar across nations or regions. The study results reflect the Swedish response system and are based on a case study in two counties. As noted by Franco, Zumel, Blau, Ayhens-Johnson, and Beutler (2008) disaster management research is often based on case studies making the confidence in generalizability claims questionable. As a conclusion, the connections between accidents and crises in the context of new first responders should be explored with a focus on mutual learning, synergy effects and co-use of resources. Also, how the individual cases can contribute to general disaster management theory building n should be looked into.

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