CSS STUDY

International Civil Protection
Adapting to new challenges

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On behalf of the Federal Office for Civil Protection (FOCP)

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Content

1	**Introduction**	**5**
1.1	Background	5
1.2	Scope	5
1.3	Document Outline	6
2	**Methodology**	**6**
2.1	Selection of Key Challenges	6
2.2	Case Selection	7
2.3	Case Analysis	7
3	**Key Challenges in Civil Protection**	**8**
3.1	Interdependency of Threats and Hazards	8
3.2	Financial Efficiency and Civil Protection	9
3.3	New Conditions for Official Communication	10
4	**Comparative National Analyses**	**12**
4.1	Leadership and Coordination in Crisis	12
4.2	Strategies for Local Disaster Preparation	15
4.3	Rethinking Public Communication of Risks and Crises	20
5	**Future Directions and Conclusions**	**25**
5.1	Future Directions in Civil Protection	25
5.2	Conclusions and Implications for Swiss Civil Protection	27
Literature and other Resources Cited		**31**
Appendix 1: Electronic Participation		**37**

Executive Summary

Civil protection has gradually evolved as a set of diverse activities used to protect the population from both technical and natural incidents and accidents. The evolution, or adaptation, of civil protection systems worldwide reflects the dynamic nature of risk, and of the society living with risk. While continual adaptation is a characteristic of civil protection systems, the strategies that different countries employ to meet particular challenges often differ substantially, influenced by the country's specific social, political, and economic contexts. Understanding how different approaches work (or don't work) within different contexts can yield useful information for the civil protection specialist seeking to promote active adaptation.

This report compares and contrasts national approaches to addressing three important challenges to modern civil protection: the interdependency of modern threats/risks; austerity and the need for economic efficiency; and the changing nature of communication. Each challenge is examined in the context of an organizational response, and explored from the perspective of two countries where the challenge has been institutionally recognized. Threat interdependence is coupled with an examination of coordination and leadership in the United States of America and France. Financial efficiency and austerity are coupled with an examination of the increasing localization of preparedness in the United Kingdom and Austria. The changing nature of communication is coupled with an exploration of the use of new communication technologies in the Netherlands and New Zealand.

The work identified three principle results from these national comparisons of approaches to key challenges:

1. *There are no 'best' practices:* The analysis did not identify consistent 'best' practices when adapting to a challenge. Instead, organizations must find their own 'good' practices that match the social, political, environmental, and economic boundary conditions in which the particular civil protection system must operate. This finding is important because the ability to develop 'good' organizational practices in response to a challenge (or changes in boundary conditions) requires some creativity in the civil protection organization. It also requires organizational courage not to follow similar organizations which might be operating within different boundary conditions.
2. *Prioritizing high-impact events:* High-impact events are important drivers of adaptation in civil protection systems, in particular because they shift the political-economic perspective of the affected governments, redirecting investment to improve, update, or strengthen civil protection systems. While the lack of such experiences does not preclude civil protection system reform, countries like Switzerland (where high-impact events are not common) must actively seek ways to act on other countries' learnings in order to find benefits while avoiding the consequences of these events.
3. *Adaptation is about finding windows of opportunity:* Reforms in international civil protection systems are at least partially opportunistic processes. Certainly, disasters or crises focus attention on some aspect of a system (a condition of the system), but such focus is often only transient unless this attention also indicates some deeper problem that repositions this issue on the political agenda. Although the conditions of a system determine what reforms can be effective, it is more likely the problems that a system faces provide the impetus for reform.

1 Introduction

Civil protection has gradually evolved as a set of diverse activities used to protect the population from incidents and accidents, both technical and natural (Alexander 2002). Practices of civil protection can be observed in most well-governed countries, though nomenclature varies somewhat: in Europe, the civil protection moniker is widespread, while Anglo-Saxon countries refer to broadly analogous practices as emergency preparedness (USA), emergency management (New Zealand, Australia), or civil contingency (United Kingdom).

Modern civil protection has emerged from existing practices of civil defence. Civil defence focused on the defensive management of populations, primarily through a top-down, authoritarian approach. Civil protection moved beyond command and control practices, rather drawing on practices of information sharing, collaboration, and distributed efforts among responsible organisations.

1.1 Background

Since the 1950s, civil protection (CP) systems have seen significant changes in their mission portfolio (Alexander 2002). While early CP-systems were focussed on civil defence in response to socio-political characteristics during the Cold War, this focus quickly began to change in the last decade of the 20th century. Not only were the primary goals modified, but also new tasks were added in response to changing external and internal factors (social, cultural, economic, and environmental. For example, in Switzerland, the traditional civil defence system evolved into the five-partner system (civil defence, health, police, fire, and technical service operators) that is the basis of the modern approach to civil protection evident today.

Since the 1990s and early 2000s, organisation for civil protection has constantly changed, and indeed, civil protection organisations recognise the need to continually adapt to changing external circumstances. Adaptation typically happens as a result of both proactive and reactive responses to perceived challenges and actual events. In the 1990s, the quite narrow focus of civil protection shifted from armed conflict and the threat of nuclear war/attack to a broader focus on the loss of life, property, and economic disruption caused by natural hazards (the 1990s was designated by the UN as the "International Decade for Natural Disaster Reduction[1]), resulting in the development of an integrated, step-wise approach to hazard management.

Further adaptation was seen to be necessary following the geographically diverse terror attacks in the 2000s (New York, Madrid, London, Bali, *etc.*). The devastating attacks on 9/11, for example, exposed a major failure of strategic intelligence feeding into civil protection. The simplicity of the weapons (knives and razors) used to commandeer passenger airliners as weapons of mass destruction and disturbance highlighted the necessity for risk managers to look beyond 'routine' emergencies (small floods or power outages), to consider low probability, but high-impact incidents alongside the routine (Waugh 2000). In response to this attack, and other terror incidents, and high-consequence disasters, more diffuse approaches to risk identification and management were adopted. Indeed, the United Kingdom's new civil protection (civil contingency) legislation of 2004 completely excluded the use of the word "emergency" from its civil protection lexicon because it was associated with a too-narrow notion of an incident. These incidences blurred the lines and relationships that existed previously between assurances of safety, and the necessity for civil security.

Nothing and everything changes. The fact that risks to society are complex, and characterized by their international dimensions has not changed in twenty years. By contrast, the nature of society, our use of technology, environmental conditions, global health, perceptions of security, economic conditions, political situations and pressures, are all in dynamic flux (Roth et al. 2014). Consequently, finding and exploiting new approaches to civil protection has never been more important.

1.2 Scope

Like in the case of Switzerland, many countries have undergone significant reorganization in civil protection in response to new challenges and complexities. However, the strategies that different countries employ to meet challenges often differ substantially, influenced by social, political, and economic contexts. Understanding how different approaches work (or don't work) within different contexts can yield useful information for the civil protection specialist.

Since its basis was established as 'civil defence' in the late 1960s, Switzerland's approach to civil protection has undergone two major re-adjustments in 1990 and 2003. Given a range of increasingly important challenges for Switzerland's model of civil protection, including climate change, population density, social and economic technologisation, geographic proximity to unstable political situations, and the possibility of catastrophic hazard events, the Swiss government will revise its 'Population and Civil Protection Act', with implementation by 2020.

This study aims to support this process by conducting and communicating an international comparison of national approaches used to address key civil protection challenges as identified by the Swiss Federal

1 UN Resolution 45/185: 'International Decade for Natural Disaster Reduction'. *http://www.un.org/documents/ga/res/45/a45r185.htm*

Office for Civil Protection: a) coordination and the interdependency of modern threats/risks; b) austerity and the need for local level hazard preparedness; and, c) changing communication in a dynamic IT enviroment. For each key challenge the authors present a comparative national analysis illustrating how different approaches (successful and unsuccessful) are employed by different countries to address the same challenges.

The project focuses on the structural changes made in the course of the last 10–15 years, and links these changes to external environmental, social and technological drivers of change. By focusing on and comparing organizational development, capabilities and responsibilities, and cooperation between and within national CP-systems with respect to the key challenges that have led to these changes, the project seeks to inform future strategic realignment in the Swiss CP-systems.

1.3 Document Outline

The document is divided into five sections. In **section two** we describe the methodology used to identify key challenges and select national cases, to collect data and analyse the information obtained. In **section three** we briefly describe the key challenges of threat interdependency, austerity/efficiency, and new communication, and in particular we highlight what issues these challenges might pose for future models of civil protection and the organisations responsible for these activities. In **section four** we present the results of the national comparison of approaches to key challenges. We use this information to highlight important future considerations for CP organization in the future in **section five**. Lastly, in **section six** we discuss the results and consider the implications of these findings in the context of Switzerland's pending civil protection system adaptation.

2 Methodology

The study uses a desktop analysis to examine the relevant dynamics of national civil protection systems that will influence future organization. We examine national systems, and the ways in which they have changed in the context of three key challenges: interdependent threats, individual preparedness, and new forms of communication. We examine cases (national civil protection systems) that use very different strategies, or that are organized differently, in order to illustrate the diversity of national approaches employed to address these key challenges.

The report highlights strategic national civil protection adaptation processes and mechanisms. In doing so, we aim to contribute to a strategic realignment in the Swiss civil protection system with respect to important challenges identified in the *Strategie Bevölkerungsschutz und Zivilschutz 2015+* (BABS 2012). Our analysis focuses principally (but not solely) on questions associated with system organization and re-organisation, responsibilities and responsibility sharing (within organisations and between organisations and civil society), and collaboration.

2.1 Selection of Key Challenges

Three 'key challenges' were selected in a collaborative manner between the report's authors, and representatives from the Swiss Federal Office for Civil Protection (FOCP) – specifically from the Research and Development and Strategy departments of the organisation. Discussion of challenges was informed on the one hand by the *Strategie Bevölkerungsschutz und Zivilschutz 2015+* (FOCP 2012), published in 2012 by the FOCP, and by an analysis of mega-trends influencing civil protection published in 2014 on the other (Roth et al. 2014). The former describes how Swiss civil protection should be adapted and improved beyond 2015, especially in the context of more efficiently and effectively managing the use of technology and addressing natural disasters and emergencies. The latter report examines the way broad social, economic, and environmental trends offer opportunities and pose challenges to the future of civil protection.

Three key challenges were selected, and each is described in more detail in section three. These challenges (bold) are paired with an organizational response (italics) that could be used to address the challenge from a civil protection perspective.

1. The increasing **interdependence of modern threats and risks**. In the context of this challenge, effective *leadership and coordination* is considered as important, and is linked to this challenge in the case study analysis.
2. The increasing need for **financial efficiency** (sometimes associated with austerity measures) in civil protection activities. *Distribution of responsibilities from organisations to communities* and individuals has been an important development in the context of hazard and threat preparedness, and is addressed in relation to financial efficiency.
3. The **changing nature of communication**. In particular we examine how communication within organisations, between organisations and technical operators, and between organisations and civil society are changing, especially in the context of *new and rapidly improving technologies* that open new communication channels.

Figure 1 illustrates the assumed relationships between challenges identified by the FOCP and potential organizational responses to these challenges.

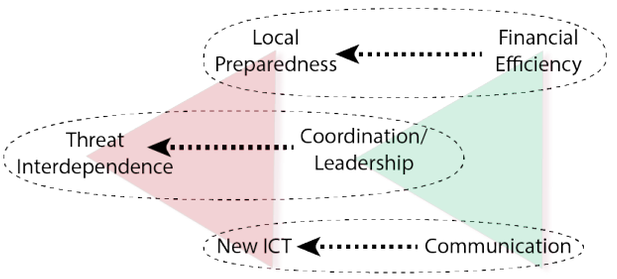


Figure 1: Identified key challenges for civil protection (red triangle) with potential organizational responses (green triangle).

2.2 Case Selection

Different countries often draw on different approaches to deal with the same challenges. In the context of civil protection, emergency, or disaster management, the variety of solutions is almost as broad as the number of countries. This diversity in approaches presents learning opportunities for the attentive organization attempting to understand what approaches work in which situations. This report uses pair-wise comparative analyses of country-specific approaches to address the significant challenges for civil protection identified in section 2.1. Cases were selected based on the authors' knowledge of each of the systems, and on a preliminary analysis of literature and online information collected for each of the cases.

2.2.1 Addressing Interdependency Through Coordination:

Multiple threats or hazards complicate organizational responses. Especially if hazards or threats occur simultaneously, in a cascading manner, or in a series, the organizational response can be over-stretched, inefficient, and ineffective. While such instances of multiplicity are rare, organizations must nevertheless organize themselves in ways that permit them to respond appropriately.

We present and compare coordination and leadership approaches in the US Incident Command System (ICS) and the French Inter-ministerial Crisis Center (CIC). Both countries use a mixed network-hierarchical approach to crisis coordination, with subtle differences reflecting government structures and situational features. Both approaches have received recent amendments, and are shown to work for each national context and threat landscape in which they are employed. We describe the contexts and compare the approaches, explicitly exploring the value of mixed approaches, and how changes have influenced the approaches since they were first established (US ICS: 2004–2008; French CIC: 2008–2013).

2.2.2 Public Preparedness and Financial Efficiency

Since the beginning of the 1990s, one of the main adaptations in civil protection has been the shift from a response-focused approach in hazard management, to one of integration. In an integrated hazard management approach prevention and preparedness are considered fundamental phases in a hazard management cycle, sitting alongside response and recovery. Nevertheless, preparedness is often less politically attractive than response, and raising resources for this pre-hazard phase of the cycle remains a challenge.

Although seen as increasingly important, levels of local or public preparedness are typically low. Given that local preparedness yields financial returns that offset public expenditure on hazard response and recovery, it makes financial sense to support investments in local preparedness (Meerkat, Kolo, and Renson 2015). We describe two approaches to building local preparedness: in the United Kingdom through 'local resilience forums', and in Austrian Tyrol through the UNISDR's Making Cities Resilience Program.

2.2.3 New Communication Environments, New Communication Channels

Traditional modes of hazard and threat communication were fundamentally hierarchical. Indeed, for the threats that predominated in the early years of civil protection and civil defence (military threats, for instance), this approach was suitable and effective. However, in a time of rapid technological development, where organizations respond in a multi-hazard/threat environment, where financial efficiency and local preparedness are important in integrated hazard/threat management programs, the need to find new ways of communicating risk or threats with the public is compelling.

We examine two country cases where new approaches to communication in crisis or hazard situations are being applied. In the Netherlands, centralized communication hubs are helping to achieve better coordination in times of complex crisis. In New Zealand, recent changes in organization and approaches to hazard management have placed responsibility for managing risks at the community and individual levels. To support this change, new approaches to communication are becoming strongly localized in order to increase community awareness, understanding, preparedness and participation in civil emergency management processes. We compare and contrast these two cases in the context of the hazard/threat situations in which they have been established.

2.3 Case Analysis

The analysis of each of the cases was conducted in two elements: a description of the civil; protection system, and an exploration of the relationship between the key challenge and organization response. The organizational responses, identified and connected to the key challenges

in discussion with the FOCP, are considered as potential factors that may help organizations to address the challenges only. The authors make no explicit connection between challenges and responses, but seek to explore how different countries address the key challenges we identify.

In each case, we firstly provide a brief description of the civil protection system of the case study country, including which organizations are involved in civil protection, and the distribution of responsibilities between these organizations. The descriptions also cover basic elements like how the system is organized (practices for coordination, communication, preparedness, and prevention, *etc.*), and which capabilities are held by different components of the system. This description was conducted using freely available information from online sources and literature. Where necessary, informal interviews were conducted by email or telephone with known representatives from the respective organizations.

Secondly, the authors explicitly focused on exploring the assumed relationship between a specific key challenge and an organizational response. This element was used to describe how the country's civil protection system had changed in the last five to 10 years, and to determine whether, and to what extent, the particular organizational response had actually allowed the system to address the specific challenge. It is important to note that the relationship between challenge and response was an assumed one, identified from the perspective of the report authors and representatives from the FOCP.

3 Key Challenges in Civil Protection

The key civil protection challenges examined in this report were selected based on considerations about their likely impact on both system-internal and system-external changes in civil protection. In this section we describe each of the three challenges: where the challenges originated, their social, environmental, and economic influences, and prospective implications for civil protection.

3.1 Interdependency of Threats and Hazards

Simultaneous, cascading, even disconnected, but temporally subsequent, hazards or threats complicate organizational responses. These various forms of interdependency are considered a major factor that will influence the organization of civil protection actions and resources into the short- and mid-term future. Here we focus on two aspects that are of concern in the context of hazard threat interdependency: population growth and centralization in cities; and, increasingly connected critical service infrastructures (CSI). In addition, we explore how these two conditions themselves interact, creating civil protection organization difficulties.

3.1.1 Population Density and City Life

Switzerland is a strongly urbanized country – around 75% of the Swiss population lives in urban areas (~6 million people). In addition, in the most populated part of the country, north of the Alps, population density averages almost 190 people/square kilometre. Patterns in population and internal migration observed by the Swiss Federal Office for Spatial Development (Bundesamt für Raumentwicklung ARE 2010) also show that urban populations are growing at a faster rate than rural populations (5% between 2010 in urban areas, as opposed to 3% in rural areas) (BFS 2012), mirroring similar patterns that can be observed on a global scale.[2] This pattern of urban population growth is also characterized by growing population diversity, which creates complications for civil protection managers who must address this diversity with adjustments to risk information, its distribution, and hazard/threat alerting practices. For instance, the introduction (February, 2015) of the AlertSwiss website and mobile phone application has been a significant development in the way the Swiss civil protection authorities interact with the public. In order to maximize population safety in Swiss cities, all aspects of urban civil protection should reflect the condition of increased technical and social complexity that characterizes these modern agglomerations.

3.1.2 Complex Critical Service Infrastructure

The necessity to service city populations with transport, electricity, water, and telecommunications introduces considerable socio-technical complexity into these city systems. Critical infrastructures (CI) make modern city life not just comfortable, but possible, so maintaining and protecting these services is of fundamental importance for the civil protection organisation. Not only is modern city life dependent on these increasingly complex systems, but they are themselves heavily interdependent. The systems therefore present a key challenge for the civil protection authorities tasked with dealing with the potential repercussions in the case of a hazardous event.

The complex social and technical interdependency between the city population and the CSI increases the sensitivity of both elements in this system to hazards or threats. Indeed, the demand for better, more efficient and

2 United Nations Population Fund, *http://www.unfpa.org/pds/urbanization.htm*, accessed 22.01.2013.

effective services is further increasing the requirement for interoperability across critical infrastructure sectors. For example, remote or sensor-driven operation of train lines, water and electricity supply infrastructure require a highly reliable (even infallible) ICT network, which itself is inextricably dependent on an uninterrupted power supply.

Interoperability of CSI is a clear character of these 'systems of systems'. However, the growing complexity of individual CSI sectors is problematic for human operators, who are increasingly challenged to develop more sector-specific knowledge within one system. For this reason, addressing the socio-technical sensitivity of CSI will become increasingly important in the context of vulnerability reduction through critical infrastructure protection programs, especially as a knowledge of sector interdependency becomes more important for CSI managers.

In addition, interdependencies have increased CSI system susceptibility to cascading or domino failures. An illustrative example of a cascade in an interdependent CSI was the disaster of Fukushima. Falling into the category of a 'NaTech' risk (Cruz et al. 2004), the Fukushima nuclear disaster was triggered by a catastrophic earthquake and tsunami.

In the context of civil protection, interdependency is also evident in and between organisations. For example, the European Union Civil Protection Mechanism aims to improve cross-border coordination and sharing of civil protection resources, but also increases the need for coordination between historically separate national civil protection and emergency management organisations. In Switzerland, the distributed nature of civil protection, enacted by Cantons and coordinated by the federal government, introduces organisational complications and interdependencies, especially in the case of supra-regional events. If those organizations responsible for dealing with civil protection, risk assessment, crisis management, *etc.* all have varying priorities and goals, then contradictions can stymie effective hazard or threat management. It is important to point out that sharing resources is useful in the case of singular events. However, in the case of cascading or simultaneous events, having extra resources on hand in different places is imperative, and simply distributing some resources between organizations may not be sufficient.

For reasons like cost efficiency, response capacities are being shared, distributed and streamlined. While this may offer benefits in terms of addressing everyday occurrences and small-scale incidents with minimal investment of resources, these capacities may prove insufficient to deal with medium- to large-scale disaster situations, or for multiple events happening at the same time. Arguably, the risk of cascading effects leading to multiple emergencies requiring attention simultaneously has increased due to increases in social and technical interdependencies. Increasing social and technical interdependencies call for excellent within and cross-organisation coordination.

3.2 Financial Efficiency and Civil Protection

The losses associated with disasters have been rising in the past years, reaching an average of US$250 billion to US$300 billion each year (UNISDR 2015a). Future losses are expected to be even higher as a result of more frequent extreme weather conditions associated with climate change (UNISDR 2015a). Nonetheless, budgets for civil protection have been restricted, primarily as a result of increasing pressure to pursue efficiency in public spending on one hand (World Bank and ODI 2015), but also connected to the economic downturn following the financial crisis (2008) on the other.

Budgetary constraints pose a central challenge for the prevention and mitigation of hazards, two domains that require long-term investments (Multi-Hazard Mitigation Council (MMC) 2005). Such investments can significantly reduce the losses associated with a disaster, and are therefore central to addressing vulnerability and fostering resilience against natural or man-made disasters in the future (Shreve and Kelman 2014). It is thus seen as highly relevant to invest in mitigation and preparedness today (UNISDR 2015b), although at times of budgetary deficit, the chances are high that costly prevention and preparedness measures are not a top priority. In his speech at the 12th Asia-Europe Foreign Ministers Meeting in Luxembourg in 2015,[3] the Swiss Foreign Minister, Didier Burkhalter, highlighted how the political unattractiveness of disaster (except when an event actually occurs) has influenced national and international long-term investments in disaster preparedness.

3.2.1 Influences of Financial Efficiency in Civil Protection Systems

Tight fiscal budgets can affect the civil protection system in several ways. Foremost *investment decisions* might be affected. Instead of investing in long-term prevention measures, investment is made in response capacity or possibly postponed altogether (Gall et al 2014). Indeed, austerity measures (institution-wide financial efficiency measures) can also have an effect on the *organisation of the system,* for example it might influence a decision about whether countries change from a conscription or volunteer-based-system to professional services (or *vice*

3 Speech by Bundesrat Didier Burkhalter at the 2015 Asia-Europa Meeting (ASEM) for Foreign Ministers: "Addressing insecurity and the consequences of disasters through prevention" *https://www.news.admin.ch/message/index.html?lang=de&msg-id=59352*

versa). Institutional willingness to impose *risk regulations* on businesses might be lower in times of an economic downturn because regulation often stifles economic development (Gall et al 2014). In a decentralized system like Switzerland, the *allocation of funds* to the various levels of government is an additional challenge that is exacerbated in times of fiscal conservatism. Austerity policies might furthermore lead to a *shift in responsibilities* to the population. Placing an emphasis on population preparedness, in the context of building community-wide experience especially, moves responsibility from the government to the public and can be argued to ease pressure on budgetary spending for risk prevention or mitigation measures (Roth et al. 2014). Moreover, the call for fiscal efficiency is often coupled with broader *evaluations and cost-benefit analyses* used to justify or inform spending restrictions (Gall et al 2014). Finally, *partnerships with private* actors are often advocated during times of fiscal conservatism in order to lower public spending on service provision (Roth et al. 2014).

3.2.2 Efficiency and Effectiveness of Prevention

From a political economy perspective, both individuals and governments encounter incentives to underinvest in mitigation and preparedness measures for natural hazard, where the occurrence is considered only a probability (Neumayer et al. 2014). Since the benefits of the investment are only realised when a disaster actually occurs, and because individuals tend to ignore the potential losses pre-disaster, investments in preparedness tend to be neglected. This is especially true at times of budgetary constraint. Moreover, purchase of insurance can lead to 'moral hazard', where citizens are reluctant to invest in preventative or preparedness measures in part because of the financial outlay for the insurance, and because they assume insurance will cover any losses they might incur. The same applies when individuals expect the government to compensate them when a disaster strikes (Neumayer et al. 2014).

While risk experts tend to be aware of hazard and threat risks, the broader population, including policymakers from other political domains, are usually less aware. In this respect, decisions to impose budgetary constraints on the civil protection system may originate from broad sources, and garner wide support between incidences of hazard or threat. Indeed, between hazards, governments tend to direct budgetary support (via transfer payments) to interest groups in order to guarantee political support at the next election, rather than investing in longer-term preparedness or prevention measures that only yield political currency in post-disaster situations (Neumayer et al. 2014). This political short-termism is a recurring problem for long-term investments in disaster risk management (Gall et al. 2014). The substantial uncertainty that lies in the very nature of hazards and threats adds further to the myopic behaviour of politicians, and research illustrates that the public pays more attention to post-disaster response and recovery policies than to prevention and mitigation measures (Gasper and Reeves 2011). The general incentive to underinvest in prevention is thus intensified in times of financial efficiency.

Regular evaluation of the effectiveness and efficiency of systems can be an important instrument for countering under investment, ensuring investment optimisation, and legitimating investments vis à-vis the parliament and the taxpayers. Here again, the application of cost-benefit analyses is on the rise. However, such assessments are difficult because calculating total expected costs (including the valuation of human life) can be seen as inappropriate (MMC 2005). Certainly, in the context of hazard management there are concerns about the extent to which financial efficiency should be pursued, and few countries have implemented standardized assessments of the effectiveness of civil protection measures to date (Brazova and Matczak 2014), especially in the context of changing financial conditions. There is also an inherent contradiction between the concept of resilience and efficiency. Many authors suggest that system resilience, especially in technical systems (for example, Demchak 2012, Fisher et al. 2010, Haimes 2009, Korhonen and Seager 2008, Petit et al. 2011), is enhanced by redundancy, which typically increases short- to medium-term costs (and may only increase cost efficiency in a post hazard response, where system downtime costs can be minimised) (Roth et al. 2014). Hazard risk management is inherently a constant process of weighing investment today against a future return if a disaster occurs.

3.3 New Conditions for Official Communication

The original organization and use of civil protection communication structures were geared towards military threats of airstrike and nuclear attacks. At this time, communicating about natural hazards was a minor concern, mostly under the jurisdiction of local actors – communicating to and organizing local residents, such as longstanding fire brigades, dyke masters, *etc.* – rather than civil defence organizations or personnel.

As a consequence, communication systems developed predominantly in a hierarchical fashion, with central governments at the top of the information provision pyramid. At this highest level, threat analyses were conducted, mitigation measures decided, and warnings issued. At the next step down in the pyramid, warning and alerting messages were disseminated primarily *via* public announcements by radio and television (when available), accompanied by siren alarms. These alert and warning systems were typically information-poor. The public's

role was to recognize the meaning of alerts, and follow the official instructions, which in most instances meant to seek shelter and stay calm. Accordingly, crisis communication was uni-directional and strongly centralized.

Public risk communication, as it is broadly understood today, established as a fact-based, enabling and sometimes participatory process. Instead, official announcements often contained highly ambivalent and vague messages of endangerment on one hand, but also of reassurance, which were of little practical use for public risk behaviour (see Roth and Prior 2014). With the paradigmatic shifts in civil protection since the end of the Cold War (described in section 1.1), the conditions for inter-agency and public communication have changed dramatically.

Communication within civil protection systems: Systemic complexity in hazards and threats characterize civil protection actions in the 21st Century. Civil protection organizations are no longer simple in nature. Indeed, since 2004, the Swiss composite system of civil protection has integrated five organization partners into a complex cooperative. In consequence, efficient coordination of tasks between the numerous public and private actors involved the management and communication of natural, technical and man-made risks has gained importance in recent years. However, collecting, integrating and organizing information from various administrative levels and broadly distributed expert knowledge holders (for example, spatial planners, engineers, operators of critical infrastructure, *etc.*) poses a major challenge for contemporary civil protection.

Communication with the public: Civil protection organizations today deal with a broad array of hazards, rather than the narrow, historical threats. Diversity in threats and hazards also requires diversity in message delivery, communication about specific vulnerabilities, and risk reduction advice. Communicating with the public is also considerably more complicated. In addition, professional communicators face challenges in encouraging the public to undertake prevention or mitigation measures, especially when disasters have been rare in recent history and overall societal safety levels are perceived as high.

On top of these challenges, professional risk and crisis managers must cope with a rapidly changing information environment. Although virtually all of the new Information and Communication Technologies (ICTs) that have shaped these changes offer opportunities for risk and crisis communication, they also impose organizational challenges that require organizational adaptation:

Dispersed information-seeking behaviour: Digitalization and the rise of the internet have led to numerous new media platforms that today are broadly used for seeking and sharing civil protection-relevant information. Such sources include online newspapers, social media, *etc.* Although new formats exist, traditional media like newspapers, radio or TV have not become obsolete. Instead, information seeking behaviours have become segmented and individualized and the media landscape has dispersed to a multitude of communication channels. The preferred information sources users choose is influenced by different demographic and social factors, but also by the kind of information that is sought.

Information marketplace: In the new media environment, various services and formats compete for public attention. In many instances, it is not the most authoritative or trustworthy source that exerts the furthest reach, but the fastest and most easily accessible source. Under these circumstances, official announcements like press statements and governmental reports, are forced to adapt to the changing expectations by utilizing popular dispersal formats (social media, for instance). The trouble for many government organizations is that if official communication is too slow for the 24/7 news cycle, the information vacuum left is filled by other, often un-vetted sources. This is an issue for official information providers because informal information sources can proliferate speculation, rumours or other forms of erroneous information.

Information overload: On the side of civil protection authorities, the increased speed of the modern media environment can easily lead to coordination problems. Especially when multiple agencies are dealing with a risk or a crisis, attempting to avoid ambiguities while maintaining a single message: a complicated task given the new information environment. A major challenge in this context is the management of information flows between the various actors as well as from the internal organizational environment. Making sense of the enormous quantity of information available in specialized data bases, media reports, crowdsourcing endeavours, and other sources therefore represents a key issue in crisis and risk management that most agencies have only just begun to address.

The modern, dynamic communication and information environment is exerting adaptive pressure on even the most modernized civil protection organizations and risk communicators. Section 4.3 illustrates how two countries are addressing this adaptive pressure to modernize their communication systems. Here we highlight that responding to challenges presented by technological and behavioural changes, as always, also yields opportunities for official communication.

4 Comparative National Analyses

4.1 Leadership and Coordination in Crisis

In a complex and unpredictable threat landscape, the key challenge for policy makers, regulators and administrators is to combine organizational stability and preparedness with flexibility and rapid response (Christensen et al. 2015). In heavily interdependent threats and hazards, where geographic, administrative, and cultural boundaries are often crossed, increasingly transboundary in nature, these challenges are magnified (Ansell et al. 2010). In the context of this challenging threat landscape, and the complicated organisational response required, a key issue is establishing an effective crisis management process (incorporating all phases: preparation and prevention, communication and coordination, response and recovery) that also incorporates critical decision making (Boin 2005). Of course, crisis management is a well-established practice, but there are many different approaches designed to meet particular circumstances and suiting a variety of organisational characteristics, and exploring this diversity is useful.

In the practice of crisis management, cooperation and coordination are typically the two main concerns (Boin and Bynander 2015). Of these, coordination is often viewed as both failure and fail-safe (Christensen et al. 2015). This section first gives a background on what defines a modern crisis, before presenting two country case studies that show how those countries have adapted their civil protection systems to cope with modern threats and hazards resulting in emergencies and crises. The focus is placed on leadership and coordination mechanisms in such contingencies.

4.1.1 Background

Crises have always been a test of the ability of leaders and their organisations to coordinate and solve the issues at hand. Crises and disasters typically require a rapid response despite conditions of collective stress and uncertainty (Herzog and Prior 2013). In recent years though, the changing nature of the socio-technical context has exacerbated the challenge in many respects. There is common understanding that trends and developments like globalization, high media exposure and the information and communication revolution, privatization, politicization of crises and disasters, and rising citizen expectations, have increased the complexity and pace of crisis phenomena.

The challenge of managing a crisis becomes harder across geographical and jurisdictional boundaries. Under these conditions, more organizations become involved, their responses are dispersed, agendas may be divergent, and responders often do not know each other well (Ansell et al. 2010). The results are even higher pressure and demands placed on strategic level crisis managers and their organizations are typically extreme (Stern 2015). These developments result in significant analytical, organisational and managerial challenges. Under these conditions, coordination and cooperation are identified as key aspects that can make the difference between a well or poorly handled crisis response. Therefore, various countries have adapted their capabilities to deal with crises and disaster situations und to improve their capacities to coordinate and cooperate.

A significant challenge for crisis managers is balancing the need for stability and effective preparedness, with flexibility in response (Christensen et al. 2015). Here, coordination becomes a fundamental activity in the management of crisis. Because coordination reflects the character of the connections between organisations, or organisational parts (Dynes and Aguirre 1979), the style of coordination influences the balance between response stability and flexibility.

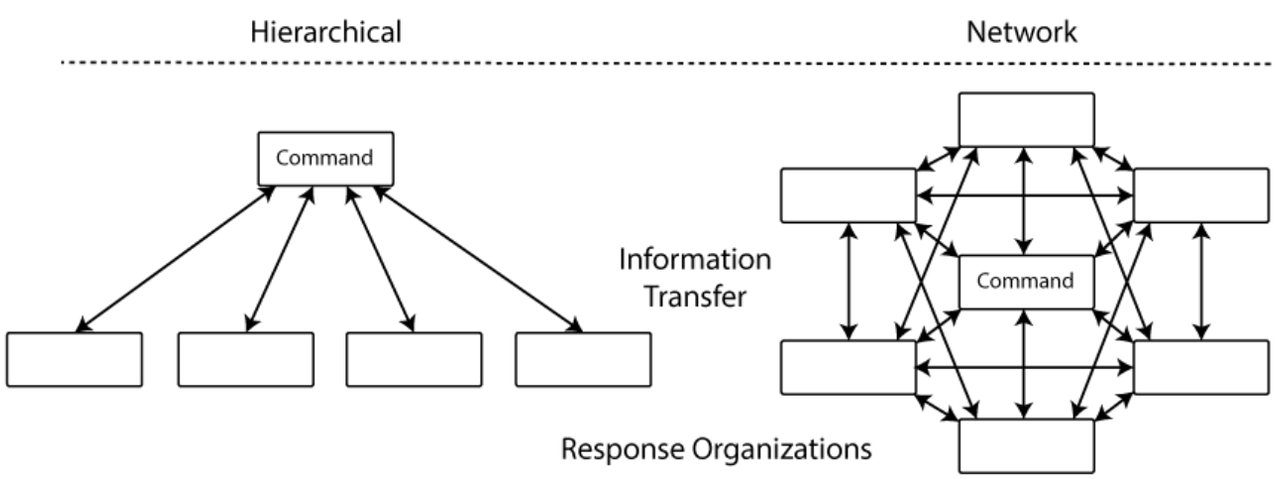


Figure 2: Generic centralized (hierarchical) and decentralized (network) forms of crisis coordination.

Two general models of coordination are established in the literature: the hierarchical (or centralized) form, and the networked (or decentralized) form. A hierarchical approach reflects traditional features of a bureaucracy where decisions are made by the political and administrative leaders. Government is typically horizontally specialized and information supporting coordination is transferred vertically (only) from public organisations to decision makers (Christensen et al. 2015). On the other hand, in a network approach, information is shared more freely both horizontally between public organizations and leaders who draw on this information and the network's relationships to make the final decision (Figure 2).

While it is tidy to imagine that these two forms of coordination are mutually exclusive, the opposite is the case. In reality, these two forms of coordination lie at two extremes of a crisis coordination continuum, and most practices lie around the centre of the continuum showing characteristics of both (Moynihan 2008). In this section we explore two different mixes of hierarchical (US National Incident Management Systems) and networked (French Inter-ministerial Crisis Centre) crisis management approaches. In the US case, a traditionally centralized form of coordination is tempered by elements of a strong network. In the French case, a historically distributed or decentralised form of coordination is being strengthened by a centralized coordination body.

4.1.2 Centralized Network Governance: The US Incident Command System

The terror attacks of 9/11 instigated a period of intense reorganization of risk, crisis, and disaster management process and practice in the United States, and around the world. In particular, this incident highlighted how the unpredictability, infrequency, and the required diversity of the response to a major incident complicated that response and the associated guiding decisions. While no single organization held the capacity to deal with such an incident alone, the response should nevertheless be rapid and decisive (Moynihan 2008).

Following in particular the crises of 9/11 and Hurricane Katrina the US Department of Homeland Security established (2004) and adapted (2008) a nationally standardized process for incident management. The National Incident Management Systems (NIMS) draws on a set of policy tools to coordinate responses to crises by all levels of government, the private sector, and non-government organizations (U.S. Department of Homeland Security (DHS) 2008). At the heart of this standardized response lies the Incident Command System (ICS), which acts to temporarily centralize response command to organize a diffuse group of actors with different skills and capabilities to assist in the crisis response (Moynihan 2009).

4.1.2.1 ICS in practice: Centralizing command, recognizing networks

The US Federal Emergency Management Agency suggests that the ICS should enable "incident managers to identify the key concerns associated with the incident – often under urgent conditions – without sacrificing attention to any component of the command system."[4] The ICS seeks to improve incident management by integrating facilities, equipment, personnel, procedures, and communication practices from different responder organization under a common organizational structure (U.S. Department of Homeland Security (DHS) 2008). Figure 3 illustrates the basic structure of the US Incident Command System.

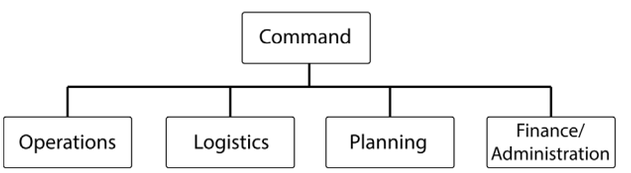


Figure 3: Generalized Incident Command System model. Adapted from Moynihan 2008.

The ICS was originally established in the 1970s in response to the necessity to improve wildfire emergency responses in California (Moynihan 2008). The basic problem in these responses was of adequate and efficient coordination of resources, personnel, and facilities in broad geographical and jurisdictional spaces – the networked nature of the organisations' interactions was slowing response.

A strong hierarchical approach to crisis coordination seems to buck the modern trend of decentralization (Christensen et al. 2015, Schraagen et al. 2010), and has not been established without conflict (Waugh and Streib 2006). However, FEMA frames the NIMS as a flexible system that can be adapted to suit the variety of diverse geographic and jurisdictional situations in which it should be used across the US (U.S. Department of Homeland Security (DHS) 2008). Here, flexibility is built not into the standardized system of incident management itself, but into the way the ICS is engaged and disengaged. Moynihan (2008) points out that in order to ensure decisional urgency on one hand, and the benefits of different organizational skills and capacities on the other, a centralized governance structure was engaged in times of crisis, while looser networks (reflecting day-to-day activities) operated in times of non-crisis. Although highly centralized, network aspects influence the ICS in three ways: specialization among response organizations required stronger coordination actions; shared authority among responders meant the need to identify and negotiate command between actors; and, networked relationships

4 Incident Command System Resources (2015), accessed on 01.12.15, *http://www.fema.gov/incident-command-system-resources*

between actors influenced the operation of the ICS (Moynihan 2009). Effective response to crises requires a network of actors, but the integration of these actors, and ultimate decisions must be managed hierarchically (Christensen et al. 2015, Boin et al. 2014, Moynihan 2009).

4.1.3 The Decentralizing Hierarchy: French Interministerial Crisis Centre

Since the turn of the 21st Century, France's traditional state centralization has progressively weakened (Lagadec 2002). Constitutional reforms adopted in 2003 explicitly state that "the organization of the state is decentralized" (Coste et al. 2013). To a large extent, the civil security landscape, and indeed the increasing decentralization of government in France, has changed in response to a changing security landscape characterized by surprise and unpredictability, overwhelming quantities of information, the involvement of many actors, and cascading events (Lagadec 2002). Traditional hierarchical models of coordination were seen as inappropriate in the context of these changes, and laws instituted in 2004 modernized civil security in the nation by establishing a basis of organizational and response flexibility (Coste et al. 2013).

4.1.3.1 Decentralized governance, national planning

While the French approach to crisis management has increasingly focussed on a multiplicity of actors, efficient coordination remains a challenge (see Figure 4). As decentralization has continued to gather pace, the need for strong coordination in crisis has been addressed by a focus on planning (across levels government). The Interministerial Crisis Centre (CIC) was established in 2008 to coordinate operation centres, and planning, across government ministries and departments (states). Planning processes are undertaken across four territorial, political, and administrative levels, with each level developing crisis response plans that are coordinated and connected by a strongly top-down approach (Coste et al. 2013). On the one hand, decentralized government (with increasing power moving to the territories) is in some ways contradicted by nationally organized crisis response, especially in the context of wide geographic (*e.g.* 2003 heat wave, and nationally significant crises (*e.g.* the 2005 Indian Ocean Tsunami) (Coste et al. 2013).

Figure 4: French government organization in times of crisis. From: *http://www.sgdsn.gouv.fr/site_rubrique106.html*.

The national-level CIC is coordinated under the authority of the Minister of the Interior, who answers directly to the Prime Minister or President. It is engaged only if a crisis affects the entire country, otherwise the concept of subsidiarity ensures Territorial 'Prefects' who decide if an incident should be classed as a crisis, and at what governance level the incident should be managed. If managed territorially, local plans and civil protection actions are engaged.

If escalated to the national level, the CIC can be activated in several formats.[5] Nationally, it can be enacted within the competence of the Minister of the Interior only. However, more commonly it is established as a broader cross-ministerial and inter-territorial group, coordinating the operation centres across all territories that might be affected by an incident. The CIC itself is

5 *http://www.interieur.gouv.fr/Actualites/Dossiers/Le-centre-interministeriel-de-crise-CIC-de-Beauvau*

organized into three 'cells': the decision cell, the situation cell, and the communication cell. The Decision Cell has a strategic focus, connecting the political and operational actors to make decisions and pass recommendations to the Prime Minister or President. The Situation Cell coordinates information on response resources and capacities, and locates actors in the crisis response, aiming to anticipate the unfolding crisis, and prepare for the expected consequences. It feeds this information directly to the Decision Cell. The Communication Cell is the central information portal, passing on upstream information distributed from the Decision Cell, and coordinating downstream information from the media, internet, social networks, and other information sources. So, while France has effectively decentralized its government since 2003, the CIC is functionally a top-down, centralized crisis coordination mechanism. It has been designed to permit the Minister of the Interior to quickly gain an overview of a situation and its development in order to conduct an efficient and effective operational response.[6]

4.1.3.2 Europeanization of French Civil Security Policy

France contributes actively to civil security policy development at the European Level (Coste, Nexon, and Daguzan 2013). At the same time this focus on broader EU policy strongly influences French national civil security policy (Gross 2009). The European Union Crisis Coordination Arrangements (EU-CCA) and the EU Civil Protection Mechanism act on the basis of subsidiary (European Union 2014), meaning they should respect national actions. However, security policy in countries like France, which strongly supports EU actions, are increasingly influenced by arrangements at the EU level (Gross 2009, Coste et al. 2013). For example, the 2013 French White Paper on defence and national security (Ministry of Defence 2013) proposed a review of the EU Civil Protection Mechanism to advocate greater cohesion between different national civil protection policies to ensure a more seamless integration of practices if the Mechanism is invoked.

This drive for coherence and standardized practice clearly improves overall coordination in crisis response. Yet, it could be interpreted as somewhat contradictory in the context of developments towards increasing internal decentralization. In fact, both the US and French cases discussed here highlight how value is placed on a sensible, and context sensitive, mix of decentralization (or networking) with centralization (hierarchy) in the context of crisis coordination and leadership. Clearly, this mix acknowledges that no one organisation or jurisdiction holds the resources, personnel, facilities or desire to take sole ownership in crisis management. It also recognises that without some form of hierarchy (US: NIMS and the ICS; France: centralized planning) organizing an effective crisis response in complex and changing threat conditions is almost impossible.

4.2 Strategies for Local Disaster Preparation

4.2.1 Background

Many governments and international organizations argue that a vital element in modern civil protection is the necessity to prepare (locally and individually) for potential incidents. Investing in preparedness plays a significant role in mitigating hazards and permitting more timely responses and recovery. The United Nations Office for Disaster Risk Reduction (UNISDR) defines preparedness as "the knowledge and capacities developed by governments, professional response and recovery organisations, communities and individuals to effectively anticipate, respond to, and recover from the impacts of likely, imminent or current hazard events or condition" (UNISDR 2009). Developing these capacities draws on a variety of aspects and is typically coordinated across levels of a nation's public administration. Drawing on two case studies (from the United Kingdom and Austria), this document examines how preparedness is being advocated and accomplished under different circumstances.

The country cases selected in this section contrast in the context of the role of the national government of each country in driving local preparedness. In the United Kingdom the national government has established a strong mandate placing municipalities as the basic entity responsible for coordinating and implementing preparedness-building measures. By contrast, in Austria's federation, states hold the competency for civil protection, including advocating preparedness. The comparison focuses on how both systems have changed in recent times, and how these changes have influenced their different approaches to local preparedness. A brief presentation of the respective civil security systems is provided. By juxtaposing these cases the elements of strategic preparedness and the varying ways used to build preparedness are highlighted, yielding insights into how to tackle and finance local preparedness in different settings.

4.2.2 Strategic Efforts to Build Local Resilience in the United Kingdom

4.2.2.1 Background

The British civil security system has been decentralized since the introduction of the Civil Contingencies Act in 2004. Civil protection now follows a subsidiary approach, in which the lowest level, that is, the local first responders usually manage emergencies and crises. Since the introduction of the Civil Contingencies act in 2004, the British

6 http://www.interieur.gouv.fr/Actualites/Dossiers/Le-centre-interministeriel-de-crise-CIC-de-Beauvau

system has sought to coordinate preparedness at the local level. Local Resilience Forums have been established by a mandate from the national tier to bring together first responders as the basic resource in preparedness incident planning, and response. The central government remains responsible for strategic command and control, mainly through regulations and guidelines in the Civil Contingencies Act (O'Brien 2008). The Civil Contingencies Act is the institutional "backbone" of the system, defining the responsibilities of the different authorities, including cooperation arrangements and defining situations in which up-scaling is appropriate (Fanoulis 2013). The system is thus characterized by strategic command and control, although local authorities are responsible for the operational aspects. The approach taken is of an "all-hazards" type, where preparedness should be ensured for different types of threats and hazards. The Local Resilience Forums (LRF) are used to highlight the decentralized preparedness approach adopted in the UK, which is evaluated in two aspects: what led to the introduction of this distributed approach, and how the approach is perceived to improve resilience of individuals, communities and cities.

4.2.2.2 Civil Contingencies and Preparedness

At the turn of the century, experiences of major hazards and threats in the UK were seen to highlight that the civil protection system was not flexible enough to cope with networked emergencies, and adaptation to meet a changing threat spectrum was necessary (Fanoulis et al. 2013). Weaknesses especially became evident during the floods in autumn 2000 and the foot-and-mouth disease outbreak in 2001, highlighting the need for thorough reform of the civil defence legislation that was in use at the time (Smith 2003). In particular the foot-and-mouth outbreak proved to be a complex, networked crisis that affected different sectors including the health department, the transportation sector, and agriculture (Smith 2003). Reform discussions stressed the need to streamline responsibilities and channels of control and account for complex emergencies that affected, or could affect, multiple jurisdictions or government departments. This led to cascading reforms and the replacement of the Civil Defence Act (1948) with the Civil Contingencies Act (2004).

Figure 5 illustrates the current organization of the British civil security system. Permanent entities are illustrated in blue, while groups that are convened in an emergency situation are illustrated in green. Arrows and lines visualize the provision of advice and support (blue arrows), information-sharing and coordination (black lines) and deployment in case of an emergency (black arrows). The grey box indicates informal organization of the community (so-called 'community emergency groups').

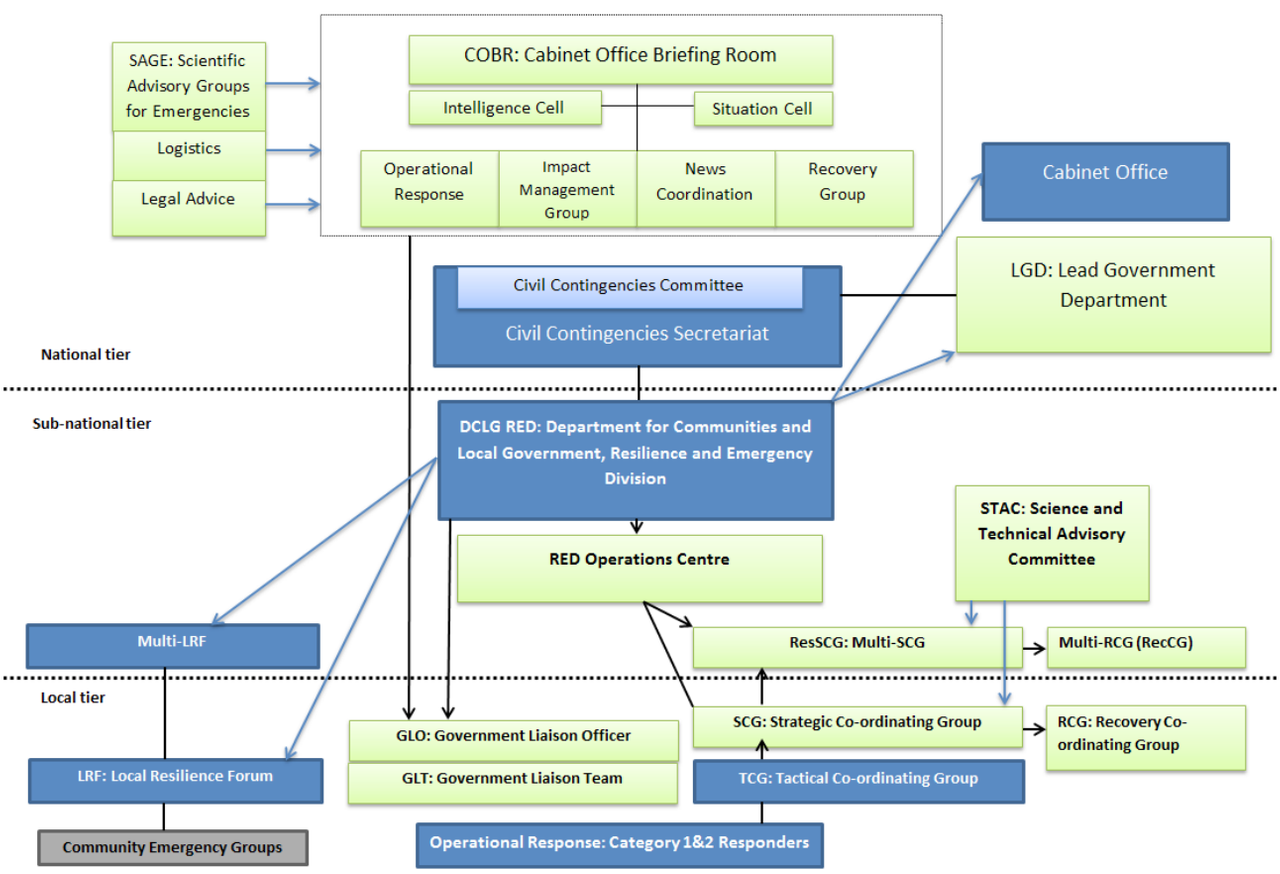


Figure 5: The British Civil Contingencies System. Source: Own illustration, adapted after UK Cabinet Office (2013).

This general framework aims to improve the coordination between different actors, across networks by bringing emergency responders closer. Separation between emergency responders was identified as a significant issue during discussions that established the Civil Contingencies Act. In fact, emergency responder interoperability has become a fundamental aspect in the context of civil contingencies because of historical difficulties communicating with each other during operations (Smith 2003).

4.2.2.3 Efforts on the national level

In 2001, the Civil Contingencies Secretariat was created with the aim to improve the UK's resilience (Lentzos and Rose 2009). Civil Defence legislation (in place until repeal when the Civil Contingencies Act of 2004 was introduced), including the Civil Defence Act (1948) and the Civil Defence in Peacetime Act (1986), mainly required local authorities and emergency services to deal with emergencies as they saw fit (O'Brien and Read 2005). A mandate for cooperation and coordination among the local agencies was not in place and the government did not hold the authority to lead municipalities in cases of severe crises. This proved problematic during the floods in 2000 and the foot-and-mouth disease outbreak the following year (Smith 2003). The UK government decided to tackle the problem by taking a more holistic approach to civil protection, focusing on every aspect of disaster management: prevention, preparedness, response and recovery. *Resilience* became a key term used by the government to integrate these aspects.

In the UK Civil Contingency Lexicon, resilience is defined as the *"ability of the community, services, area or infrastructure to detect, prevent, and, if necessary to withstand, handle and recover from disruptive challenges"* (UK Cabinet Office 2013). The strong emphasis on resilience was affirmed with the implementation of the Civil Contingencies Act (CCA) in 2004 and especially with a revision in 2010. The CCA strongly focuses on establishing coordination arrangements and defining the responsibilities of the various agencies (for an examination of two approaches to coordination, see section 4.1). The reform process leading to the introduction of the CCA was, besides the aforementioned events, heavily influenced by the New York terror attacks of 9/11, and substantial resources were invested in the fight against terrorism (Cornish 2007). With a wide range of threats and hazards in mind, *emergency* in the CCA was redefined in a very general manner as *"an event or situation which threatens serious damage to human welfare in a place in the UK, the environment of a place in the UK, or war or terrorism which threatens serious damage to the security of the UK"*[7]. A broadening of the definition of emergency could ensure that unknown or unanticipated threats and hazards could be captured within the CCA process as easily as more well-known threats and hazards. This broadened definition permitted the adoption of an and all-hazard approach to civil protection, meaning that preparedness should not only be enhanced for specific events, but also more generally across all sections of the UK society.

The Local Resilience Forums (LRFs) have been designed as one way of increasing the coordination between different crisis management actors. They connect category one responders (including emergency services, local authorities, health bodies, and local government agencies) with category two responders (including health and safety executives, transport, and utility companies) (European Commission 2014a). Additionally, LRFs engage in the emergency planning process with support for local response, recovery, and crisis situation assessment from a Local Resilience Team (LRT) (Department for Communities and Local Government (DCLG) 2014). The duties of the LRFs include risk assessment and the maintenance of a local risk register (that reflects the national risk register), the organisation of regular meetings and exercises, prevention of disasters, the installation of Strategic Co-ordinating Groups (SCG) for the coordination of the response in an emergency case, assistance with business continuity plans, and communication with the public (UK Cabinet Office 2012). Furthermore, the LRFs play a vital part in the National Resilience Capabilities Programme (NRCP), a cross-government programme that aims to enhance the capability of the UK to respond to and recover from any emergency. This capability is based on different factors, including the availability of personnel, equipment and supplies, training and exercising, and the ability to develop comprehensive response and recovery plans. Twenty-two work-streams covering different areas and belonging to different departments have been installed to structure the work (UK Cabinet Office 2014). The structural work-stream "Local Resilience" supports the local resilience partners in planning and preparing for disaster according to their duties under the CCA. By constantly monitoring capabilities and strengthening the weakness where necessary, preparedness has become a permanent work-in-progress (UK Cabinet Office 2014).

Since the introduction of the CCA, post-incident assessments have painted a generally positive picture of the reforms. A review of crisis management processes associated with the London bombings highlighted a largely effective emergency response (Fanoulis et al. 2013). A review of the response to the explosion at the Buncefield fuel depot in December 2005 also showed that the newly established organisational framework generally worked well (Major Incident Investigation Board (MIIB) 2008). However, an investigation report nevertheless made recommendations to improve collaboration practices, especially in the context of the interaction between the

7 Civil Contingencies Act 2004, Part 1, Article 1, Paragraph 1.

Strategic Co-ordinating Group and the health agencies providing advice to local responders (MIIB 2008). The Pitt review following the 2007 floods both appraised and criticized the emergency management, bringing many recommendations to improve the civil security system, which later were taken up by the Civil Contingencies Act Enhancement Programme. This programme was designed to revise and implement improvements to the act (Pitt 2008, UK Cabinet Office 2010).

Besides these reviews, no evaluations of the Local Resilience Forums have taken place to date. The reports mentioned above indicate that the coordination work that is done regularly improves the response in cases of emergency (MIIB 2008, Pitt 2008, Fanoulis et al. 2013). The very wet winter of 2013/2014, which caused serious coastal flooding did place the LRFs in a position that keenly tested the structures, and according to the Civil Contingencies Secretariat, these organizations were effective, with success determined by relatively less damage in communities than from comparable events of the past (Civil Contingencies Secretariat (CCS) 2015).

A problematic issue at the local level has been funding, and emergency management often has not been resourced properly, especially regarding the various new duties that have been imposed on local organizations by the national government (O'Brien and Read 2005). The progress report on the implementation of the Hyogo Framework for Action does not report improvements with regard to financing of local emergency management in the UK (CCS 2015).

4.2.2.4 Informal partnerships

Besides the formal institutions, the Civil Contingencies Secretariat aims to strengthen the involvement of citizens in local community emergency groups (UK Cabinet Office 2011a). A Strategic National Framework on Community Resilience has been prepared in support of this process. Moreover, guidelines for businesses on how to become resilient are provided to complement information on how to prepare and build resilience, such as the 'Community Emergency Toolkit' (UK Cabinet Office 2011a). For example, the toolkit explains how information on risks and vulnerabilities can be obtained, and provides advice on how to structure a first meeting of an emergency community group (UK Cabinet Office 2011b). The initiative for community emergency groups is intended to both raise awareness of threats and hazards among the public and encourage citizens to undertake their own preparedness measures. In this context, resilience is not just understood as preparing and planning for disaster, in order to manage the consequences of disasters in an effective and flexible way, but also as a practice that involves the public, raising awareness of risks and sharing the responsibility with various actors. How far these efforts to build resilience are in fact effective is difficult to assess. The UK's progress report on the implementation of the Hyogo Framework for Action mentions some community-based preparedness initiatives, such as flood or snow warden groups, which substantially engaged the public (CCS 2015).

4.2.3 Concurring Preparedness Approaches in Austria

4.2.3.1 Background

Austria's civil security system can be characterised by a federal nature, accompanied by a strong emphasis on voluntarism. The local level is responsible for emergency response while preparedness in many areas is hosted at the central level, where the legislative competence for a functional issue lies. The system is organized in a subsidiary fashion where response responsibility shifts up levels of government as a crisis worsens after which no longer be handled by the lower administrative unit (Bossong and Hegemann 2013).

While the British system has undergone major reforms in the past fifteen years, reform discussions in Austria have been ongoing for at least a decade. Here the federal nature of the system has ensured a lengthy consultation process, but no agreement has been reached to date (Bossong and Hegemann 2013). Nevertheless, a minor reform in 2004 involved a reorganization of the Federal Crisis and Disaster Protection Management Agency (*Staatliches Krisen- und Katastrophenschutzmanagement,* SKKM). These reforms consolidated various civil security coordinating bodies that had traditionally belonged to different administrative units at the provincial (Länder) level (European Commission 2014a), streamlining their activities with federal actions (Bundesministerium für Inneres (BM.I) 2003). The SKKM is the consultation and coordination centre of civil protection, assisted by the national warning centre (BWZ) and in severe cases, by the armed forces. Since 2006 the BWZ and the warning centres of the provinces have become an integral part of the national Operations and Crisis Coordination Centre (EKC), which belongs within the Ministry of the Interior[8]. Figure 6 displays the structure of the Austrian Civil Protection System. Blue arrows represent information and education transfers. Black arrows show lines of coordination and information exchange between agencies. Black lines illustrate channels of accountability.

No federal law regulating civil protection exists in Austria, instead all provinces have their own laws, which according to Bossong and Hegemann (2013) are not properly harmonized, leading to confusion in coordination processes. Although the federal system, and lack of federal civil protection law, causes some fragmentation in

8 Informations- und Kommunikationstechnologie Portal (IKT) (n.d.): Einsatz- und Koordinationscenter (EKC), available: *https://www.onlinesicherheit.gv.at/nationale_sicherheitsinitiativen/koordination_und_strategie/71763.html*

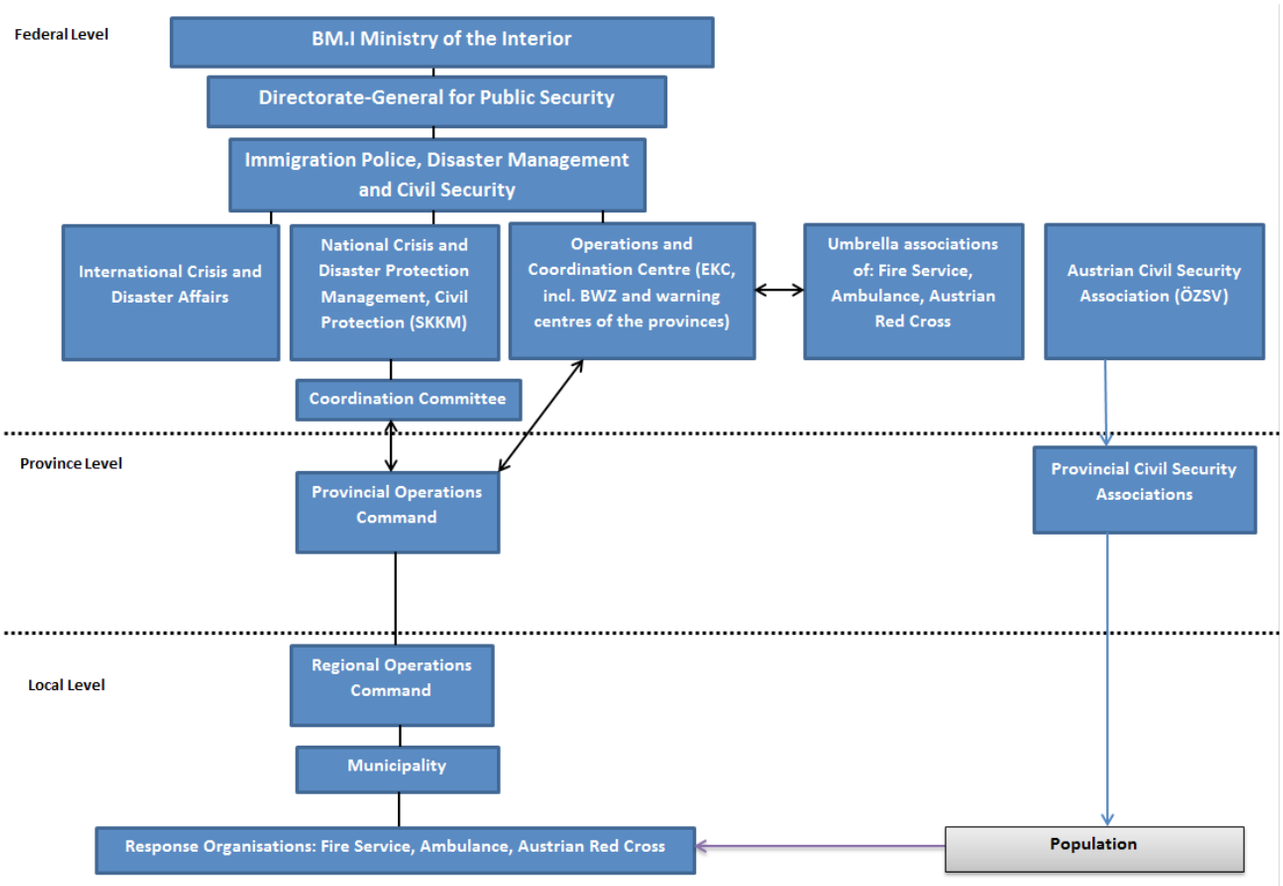


Figure 6: Austrian Civil Protection System. Source: Own illustration, adapted from Jachs (2011).

the system, coordination across different levels of government is a strong necessity, yet this has been a recurring issue for some time (Bossong and Hegemann 2013). Consequently, the 2013 security strategy of the Austrian government, "Security in a New Decade – Shaping Security" mentions improved coordination of the crisis management system as an important goal (Bundeskanzleramt 2013). Efforts to coordinate disaster risk reduction, preparedness, resilience, and response have also been initiated at the local level through the "Making Cities Resilient" initiative of the United Nations International Strategy for Disaster Risk Reduction (UNISDR). This initiative is discussed more thoroughly in section 4.2.3.2.

Austrian government competencies are distributed based on a distinction between prevention, response, and relief measures. Response and relief are in general tasks of the provinces, while the municipalities organize the immediate response together with the fire brigades and the emergency services. By contrast, responsibility for prevention rests where the legislative competence for a functional issue lies, which in many areas is at the federal level (Jachs 2011). For epidemics, forest fires, and events affecting the traffic and transportation system, competence is wholly in federal hands. Preparing for emergencies through the development of emergency plans, education of personnel, and execution of exercises is mostly regulated by the exercise of provincial disaster protection laws (Jachs 2011), yet competence formally lies at the level of government responsible for the functional issue (which may not be provincial). As a result, some federal ministries have developed nation-wide plans (*e.g.* Austrian plan for emergencies with radioactive substances, civil aviation, and tunnels), even though emergencies associated with the issues are regulated by provincial law and will be responded to by municipal authorities (Bossong and Hegemann 2013). Regulations regarding building standards, land-use and preparedness duties of businesses are part of provincial laws. Relevant companies and firms working with hazardous material are for example required to have special emergency plans (Bossong and Hegemann 2013). Critical infrastructure is often in state hands, otherwise arrangements are in place to ensure cooperation in case of an emergency.

These examples point to a diversely decentralized emergency management practice, and illustrates the difficulty behind developing consistent hazard preparedness planning. Disparate responsibilities complicate disaster responses when they cross several functional issues (and hence different departments on different level of governments). Furthermore, formal arrangements and clear guidelines for coordination and response upscaling (when more than one functional area, or province

is affected, or when a crisis of national significance occurs) are not in place in Austria. Instead, coordination in an emergency often takes place in an ad-hoc manner (Bossong and Hegemann 2013). The complicated nature if this system, and the need for significant re-organization, likely explains the attractiveness of non-national programmes, and Austria is one of the most active countries engaged in the UNISDR's international municipality-based resilience-building program, the 'Making Cities Resilient Initiative'.

4.2.3.2 Building on international preparedness strategies

Since its introduction in 2010, the UNISDR's 'Making Cities Resilient Initiative' has become one of the most successful municipal-level resilience building initiatives. The initiative provides a framework that aims to support cities' efforts to build disaster resilience and incorporate risk reduction activities into daily business (UNISDR 2012). Actions the initiative encourages include: considering disaster risk reduction in urban planning; establishing committees that draw disaster risk reduction and management stakeholders together; constructing or enhancing hazard mitigating infrastructure; and finally, developing and launching awareness and education programmes (UNISDR 2012).

The UNISDR initiative "Making Cities Resilient: My City Is Getting Ready" is remarkably popular in Austria. Among all the participating countries Austria has by far the greatest number of municipalities represented: 280 in total (UNISDR 2014). Indeed, the province of Tyrol joined the initiative, including all of its municipalities, at the outset of the initiative in 2010. One of the municipalities, the city of Lienz now serves as a role model for community-based risk management for member cities and prospective city participants (UNISDR 2012). The participatory risk assessment process that has been initiated by Lienz has been used to develop a hazard zone map, a detailed risk register, and spatial and building development plans that have contributed significantly to the city's level of preparedness (UNISDR 2014). In order to support this process, Lienz created an environmental department that integrates responsibility for environmental processes with disaster risk reduction and management. The new department's remit it to coordinate and oversee all emergency services, the fire brigades and other voluntary organisations, through regular meetings with the relevant stakeholders and measures to strengthen citizen involvement (UNISDR 2014). Other aspects of the engagement are investments in risk reducing infrastructure like flood detention basins and avalanche barriers and the installation of early warning systems.

4.2.3.3 Further efforts for local preparedness

The inclusion of the population in civil protection, especially through voluntary relief organisations, has a long tradition in Austria and is also one of the main principles of the SKKM mentioned in the strategy document 2009 (BM.I 2009). As early as 1986 the Ministry of the Interior (BM.I) initiated the installation of so-called "self-protection centres" (education centres supporting preparedness) in order to promote the self-protection of the Austrian population. Since 2001, the Austrian Civil Protection Association (ÖZSV) has held responsibility for these centres, now called Security Information Centres (SIZ), and receives financial support from the BM.I to undertake this task (BM.I 2015). Prior to this, in 2000, the Civil Protection Association also began an information campaign targeting children, and traveling around the country. Generally, the ÖZSV has the task to promote self-protection through awareness raising and public instruction on adequate behaviour in emergency situations (Central Institute for Meteorology and Geodynamics (ZAMG) 2015).

Another initiative to involve the public is "Team Austria", which organizes voluntary involvement without further commitment to an organization (Bossong and Hegeman 2013). Team Austria was founded by a public radio station, Ö3, and the Austrian Red Cross in 2007 in order to make use of the publics' willingness to help in emergency situations. To date almost 35'000 people have signed up to this non-binding initiative. In case of an emergency those volunteers located close to the scene of the emergency are notified and asked to help – participation is always voluntary. In order to prepare these volunteers to best assistance in crisis they are offered an educational course in disaster response by the Red Cross.[9]

4.3 Rethinking Public Communication of Risks and Crises

As indicated in section 3.3, the conditions for communication among the various agencies engaged in civil protection, as well as the communication between the authorities and the public, have changed dramatically in recent years. In order to fulfil their mandate and ensure the best possible protection from natural and man-made hazards, civil protection professionals disseminate information that must compete in a dynamic media landscape and adapt to changing public expectations.

In this chapter, we examine alternative approaches to adapt public communication as a key component of modern civil protection systems, drawing on two case studies. First, in section 4.3.1, we analyze how the Netherlands have updated their risk and crisis communication system, primarily by introducing new regional and national institutions and high-technology instruments in order to ensure an integrated response to the nation's

9 Ö3 (no date): Team Österreich, available: *http://oe3.orf.at/teamoesterreich/stories/2605842* (11.08.2015)

risk environment. Secondly, in section 4.3.2, we describe how New Zealand has established a strongly localized approach to risk and crisis communication as part of its overall strategy to building community natural hazard resilience. In each case study, the historical background of major incidents, risks and institutions in civil protection is described. Major transformations in the national civil protection system over the last years are sketched out. The third element focuses specifically on changes in official crisis and risk communication. Finally, we discuss prospective developments in both countries.

4.3.1 New Hubs for Improved Crisis Communication: The Netherlands

4.3.1.1 Background

In the Netherlands, located at the delta of the Rhine, Scheldt and Meuse rivers, and exposed to North Sea storm surges, the hazards of river floods and storm surges dominate the risk landscape. Significantly, at least 26 percent of the country land area lies below sea level. In response to this most important of hazards, the country has a long historical record of flood risk management, which has led to one the world's most advanced water management systems of dykes and flood barriers. Indeed, the modern Dutch civil protection system was established after the large storm flood of 1953 (Delta Commission 1960). Traditionally, the municipalities have been the primary actors in civil protection, responsible for sheltering, local crisis communication, and long-term aftercare. Regional and national agencies have assumed supplementary roles. Although these responsibilities are long-established, the large number of agencies involved in crisis management in the Netherlands has sometimes led to fragmented responsibilities and difficulties coordinating during crises.

Public communication is a central component of the Dutch civil protection system. Importance here is largely conveyed by the high expectations of the public towards authorities – especially in the context of transparency and trustfulness in political communication, but also in relation to disaster risks. Many members of the public expect comprehensive and timely information on disaster risks and vulnerabilities, reflecting the country's participatory political culture. By comparison to other countries, these characteristics have encouraged a relatively high level of tech-savviness in information-seeking behaviour within Dutch society. According to a survey from 2010, the internet was elected as the number one likely go-to information source during a major crisis or disaster for the Dutch public (Ministry of Security and Justice 2010). To meet the challenges posed by the country's risk environment as well as the public's expectations towards authorities, the Dutch civil protection system has undergone an almost continuous succession of reforms.

4.3.1.2 New institutions for improved risk and crisis management

In recent years, disaster risk and crisis management in the Netherlands have followed a general trend of centralization. These reforms were triggered by several experiences of major disasters, such as the 2000 Enschede fireworks factory explosion, which overwhelmed local authorities and exposed weaknesses in existing coordination procedures (Oosting Committee 2001). A first major leap to improve Dutch crisis management was taken in 2007, when the national government launched the Netherlands National Safety and Security Strategy, establishing a holistic approach to risk management: from threats of terrorism to natural hazards (Dutch Government 2007). Accordingly, all related measures are to be based on a thorough national risk assessment (NRA), led by the National Coordinator for Counterterrorism and Security, a branch of the Ministry of Security and Justice. The Coordinator also leads the National Crisis Centre (NCC), which serves as 24/7 information hub for authorities on all levels, and coordinates public crisis communication efforts.[10] Finally, the NCC represents the main competence centre for early warning, training and preparedness building.

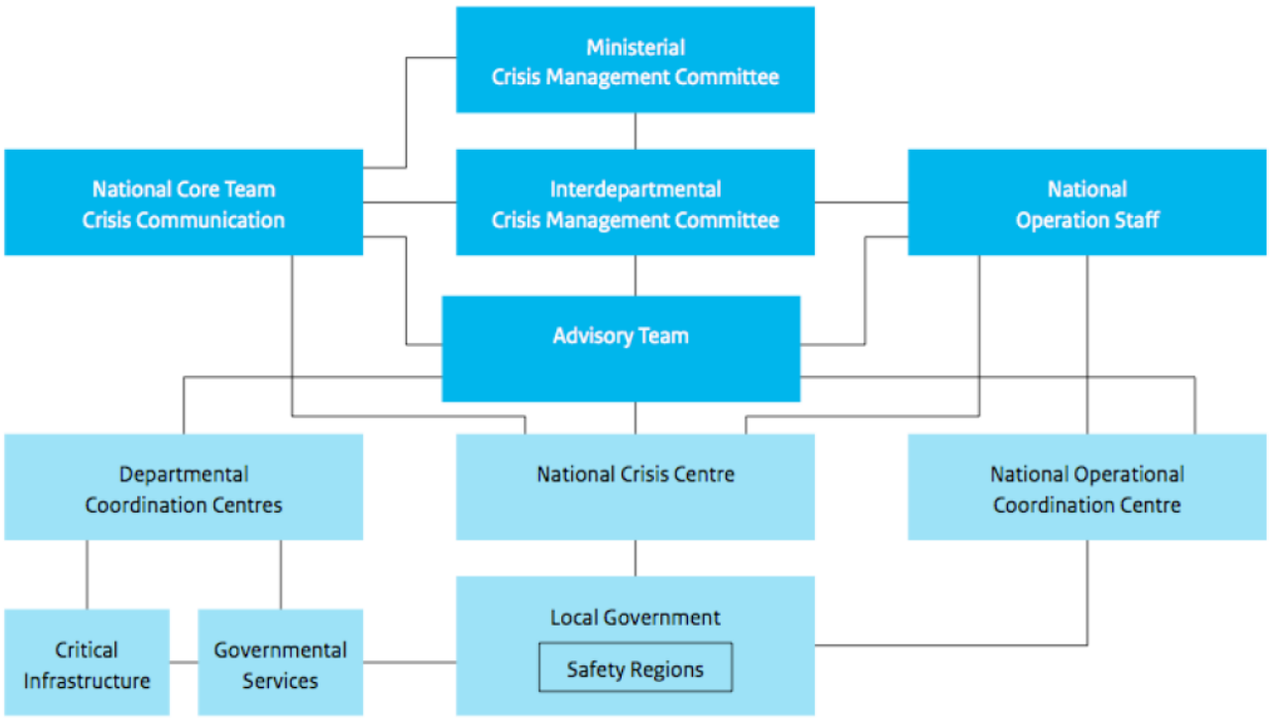
A second major reform was implemented in 2010 with the establishment of 25 *'Veiligheidsregio'* (safety regions). This new administrative layer was furnished with primary responsibility for crisis management in the Netherland's 408 municipalities. The security regions are headed by the mayor of the largest community of the region, who takes a lead coordination role in response situations (but, like other mayors, ultimately holds responsibility in their own communities alone). To facilitate coordination, several safety regions cooperate in transregional partnerships. For instance, the six safety regions around the Ijsselmeer (including Amsterdam) conduct joint exercises and coordinate their public communication strategies. Yet, despite these efforts, calls for further centralization continue. For instance, an independent audit in 2014 was critical of the autonomous safety regions, suggesting they were ill-suited to tackle challenges at a national scale, especially in regards to lessons learnt and relations with the population.[11] To this end, the central government has assumed additional tasks to improve knowledge management and public communication. The civil protection responsibility relationships between the national government and the safety regions is illustrated in Figure 7.

4.3.1.3 Centralization in risk and crisis communication

Although formally the primary responsibility for crisis communication rests on the municipal level, in recent

10 *www.crisis.nl*

11 *http://www.courtofaudit.nl/english/Publications/Audits/Introductions/2014/11/Public_authorities*



ource: National Manual on Decision Making in Crisis Situations, 2013

Figure 7: Revised national decision making process, illustrating in particular the relationship with municipalities and safety regions. From: Ministry of Security and Justice 2013.

years, crisis communication has moved increasingly to the national level. After several disasters that revealed weak-points in inter-agency coordination and public crisis communication (*e.g.* a failure of the websites of regional authorities due to traffic overload during a large industrial incident in January 2011), the NCC expanded its capacities to strengthen and streamline crisis communication across jurisdictions and administrative levels (Dutch Department for Safety and Justice 2013). A main instrument to this end is the National Academy for Crisis Management (NAC), established in September 2013. The NAC's work is focused on education, training, exercises, testing, assessment, and the documentation of lessons learned, benefiting authorities on all administrative levels. In addition, with the new LCMS 2.0 network the Dutch government has provided the basis for improved information exchange among authorities (Kuipers and Boin 2013).

At the same time, national authorities increasingly engage directly with the Dutch public in communication over disaster risks. For instance, as part of the National Safety and Security Strategy, the national government started a large media campaign "Denk Vooruit" (Think Ahead, running since 2007) aimed at risk awareness, prevention and preparedness. The campaign sought to make clear that in case of major disasters, citizens could not automatically expect immediate assistance from authorities, and individual preparedness was therefore important. Further, despite budgetary pressures the national government has invested in new technology for better public crisis communication. The most prominent effort in this respect has been the NL-Alert system, launched nationally on 8th November, 2012. NL-Alert is a cell broadcasting system to warn or alert mobile phone users in specific geographical areas. In the first six months after its launch, NL-Alert was used twelve times by seven different safety regions. Experiences were predominantly positive.[12] In addition, the local siren system (WAS sirens) has been updated, and a central website for crisis-related information (Crisis.nl) has been established. Finally, the NCC created an ad-hoc telephone team to answer frequently asked questions (FAQs) during emergencies or crises.

Although the general trend has been towards more centralized organization, these developments have placed a strong focus on better utilising established relationships between regional and municipal authorities, and with the public. To this end, the Dutch government has established so-called 'crisis communication frameworks' that all municipal authorities can use to customize communication solutions locally.[13] In general, the national government seeks to provide the organizational and technical basis for an integrated crisis management

12 Letter of 8 November 2013 from the Minister of Security and Justice Ivo Opstelten to the House of Representatives on national security

13 Letter of 8 November 2013 from the Minister of Security and Justice Ivo Opstelten to the House of Representatives on national security

practice that brings together expertise from all sides. For instance, the specific FAQs to the telephone hotline are not assembled by a single agency, but instead distributed by the incident-leading authority, either on a municipal, regional or national level. Overall, these integration steps have proved to be effective and following several reforms, independent inquires have demonstrated an overall positive communication performance of authorities during recent crises.[14]

4.3.1.4 Future developments

In the future, the Netherlands seeks to focus on strengthening public risk knowledge. One instrument under consideration in this context is a public risk campaign that includes NL-Alert test messages (NCTV 2015). Moreover, the Dutch government has recently identified improving the government's information gathering and management system as a key priority. To step up its information management, the Information Management Section (SIM), to which departments and security regions have access, will be expanded to include other vital partners and operational services (NCTV 2015). Further, monitoring social media as an informal information inlet for authorities will be enhanced. This insight was partly driven by the Cohen Committee's advisory report on the 2012 Facebook-related disturbances in the Dutch town of Haren,[15] which highlighted the necessity for the government to identify and actively monitor social media for information on potential risks. Additionally, the Dutch government plans to make greater use of social media for its own crisis communications efforts.

4.3.2 Localized Communication Strategies: New Zealand

4.3.2.1 Background

New Zealand is exposed to various natural hazards including earthquakes, flooding, and tsunamis – the latter a progressively prominent risk due to intensifying land-use in coastal areas (Power 2013). For long time tsunami has been a rather neglected issue, but the risks came into public focus in New Zealand after the Boxing Day Tsunami of 2004 in south-east Asia. In particular, this event caused an increased focus on preparedness for large-scale disasters. More recently, and more significantly for emergency management developments in New Zealand, were the series of severe earthquakes in 2010 and 2011, which devastated the Christchurch region (Canterbury Earthquakes Royal Commission 2012). Killing 200 people and causing approximately NZD 40 billion in damages, these events brought a new focus toward building community resilience and to strengthening the involvement of civil society groups and private business in disaster risk reduction (NZ Ministry of Civil Defence and Emergency Management (MCDEM) 2015). Moreover, the earthquakes triggered a number of changes in the way disaster risks were addressed in New Zealand. Many of these transformations in the country's civil protection system strengthened localized practices of disaster management.

4.3.2.2 Changes in risk and crisis management

New Zealand's crisis management system has changed significantly in the last 15–20 years, mostly aiming for unified and coordinated structures and processes, while maintaining that "responsibility for managing risks resides as close to the community/individual at risk as practicable" (MCDEM 2015). The legal basis of the current system is the national Civil Defence Emergency Management (CDEM) Act of 2002. Since its establishment, responsibilities on the national level have shifted repeatedly. Recently, New Zealand's national government has attempted to integrate disaster risk management into overall security policies. The most visible step towards this goal has been the transfer of the Ministry of Civil Defence and Emergency Management from the Department of the Internal Affairs to the Department of the Prime Minister and Cabinet in spring 2014. The Prime Minister also leads the Cabinet Committee for National Security (NSC), which carries the highest responsibly for emergency management at the national level. The NSC is supported by the ministerial Officials' Committee for Domestic and External Security Coordination (ODESC). The ODESC consists of the departmental chief executives and provides strategic advice to the NSC. Operational coordination on the national level is led by the National Crisis Management Centre, which also supports the ODESC.

Regardless of these changes, the organizational core of the CDEM Framework remain the 16 regional CDEM Groups, which are mainly self-organized coordination consortia of different local agencies. Participation of local authorities in the CDEM Groups is mandatory. Each Group is supported by Secretariats, which are tasked with developing and reviewing regional CDEM plans. Further, the Secretariats coordinate collaborative actions between authorities and stakeholders, including private companies and civil society groups. In general, assessments of hazards, risks and vulnerabilities are all conducted at the local level. Further, based on the local risk assessments, local communities are tasked to develop policy responses to mitigate risks in their jurisdictions.

The regional system is accompanied by the National CDEM Monitoring and Evaluation program, which encompasses a set of nationally consistent performance indicators and measures that all organizations with responsibilities for disaster and emergency management

14 IOOV report Poldercrash, 2009, p. 9–10 ; IOOV report Alphen, 2011, pp 7–20

15 A local teenager posted a party invitation on Facebook that attracted a crowd of 3'000. When party goers were turned away a riot ensued.

are required to apply periodically. The results provide benchmarks for regional and local performance of CDEM Groups and inform strategy-making processes at all political levels (MCDEM 2012).

4.3.2.3 Localization of risk communication

In its attempts to improve public knowledge about disaster risks and risk mitigation, New Zealand has followed a strongly localized approach. This approach is based on the primary goal of the CDEM Strategy, "increasing community awareness, understanding, preparedness and participation in civil defence emergency management" (MCDEM 2008). To reach this goal, New Zealand aims to go far beyond traditional risk communication, as the CDEM Capability Assessment Report makes clear: "It is no longer acceptable to only 'communicate' with communities, or even 'do public education'. Building community resilience is a lot more than that, and requires increasing levels of engagement, meaningful conversations with communities, and new and innovative approaches in order to be effective" (MCDEM 2012). Following this approach, public information is seen now as only the first step towards empowering local communities (see Figure 8). Ultimately, the national government hopes that community resilience will be owned by the community itself, responding to local problems and building on local knowledge and capacities (MCDEM 2012).

This localized and enabling approach is especially pertinent in the context of tsunami risk, since an adequate response necessitates effective evacuation planning across many communities in New Zealand's coastal regions. Since the time sequences between tsunami-triggering earthquakes and tsunami arrival are in many cases too short for public alerts, self-evacuation (and preparedness) is considered the most effective option to mitigate impacts from tsunamis. In effect, this means that the population in tsunami-prone areas has to begin with immediate self-evacuation whenever a heavy earthquake is felt. Since this approach is expected to lead to (and actually has led to) many unnecessary evacuations, a comprehensive risk communication effort is needed that also educates about earthquakes and manages public expectations (Power 2013). A specific focus of DRR efforts in recent years has been the inclusion of ethnic groups, in particular the Maori, which represent about 15 percent of New Zealand's population. The national government explicitly acknowledges the particular social and cultural practices and structures of the Maori, and follows a collaborative approach to improve resilience of Maori communities.

The role of the central government is mostly one of supporting regional and local actors. One focus of the Ministry of Civil Defence and Emergency Management in this context is to provide education materials that can be used by local authorities, such as an assessment guidelines for public alerting options or a handbook with best practices (MCDEM 2010). In comparison, national campaigns such as the public education program "Get Ready, Get Thru", launched in 2006, have been employed only occasionally to accompany the efforts on the community level.[16] Here, local risk communication begins in primary school education: based on the learning package 'What's the Plan Stan?' Students learn about hazards in their specific regions, and about the measures to prepare for and respond to disasters. The efforts are supported by partnerships between schools and local risk managers (MCDEM 2015).

Complementary to its other risk communication efforts, the national government places a strong effort on engaging local communities through joint disaster

Figure 8: Levels of engagement (Community Engagement in the CDEM context. Best Practice Guide 4/10: 19)

16 http://www.getthru.govt.nz

exercises. In collaboration with regional agencies, the first national earthquake drill, the "New Zealand Shakeout", was conducted in 2012 and involved approximately 30 percent of the population. The drill followed the concept of the "Great California Shake Out".[17] Most recently, a second drill was held in October 2015.[18]

Finally, the national government has developed a number of instruments that aim to aggregate and integrate locally-held disaster risk knowledge. For instance, the national Land Information Memoranda (LIM) system collects hazard information on the level of particular properties and turns it into a unique information hub, publicly available on request (*e.g.* for people interested in buying a home). Moreover, the national government established the Emergency Management Information System (EMIS) that provides a unified operation picture during emergencies and disasters and thereby improves coordination among the different civil protection agencies.[19] Finally, it fosters academic research on the roots of disasters and mitigation strategies. Most of these research activities are organized through the decentralized, trans-disciplinary Natural Hazards Research Platform (NHRP), created by the government in 2009.[20]

Overall, these measures have proved successful in increasing disaster preparedness at the community level. A comprehensive assessment of the CDEM framework in 2012 found that in most regions of New Zealand, effective steps to achieve preparedness have been taken since the introduction of CDEM ten years before (MCDEM 2012).

4.3.2.4 Future developments

Currently, the 2002 Civil Defence Emergency Management Act is under review. Most likely, the new version will not differ fundamentally from the previous one, but rather include several adaptations and new instruments, as the recent National Civil Defence Emergency Management Plan Order indicates (Governor General 2015). For instance, the revised Act will presumably place a stronger focus on the role of land-use planning in disaster risk reduction. Moreover, additional efforts to prepare communities for a quick recovery after disaster events should be expected.

Another major issue currently under discussion is the effective exchange of disaster-related data between all actors. For instance, already efforts are being undertaken to develop unified data sharing protocols and processes to advance New Zealand's geospatial infrastructure across jurisdictions, which is considered central to disaster risk management. All efforts are based on an open data approach.[21] Finally, enhancing partnerships with additional societal actors in order to increase the resilience of individuals and communities in New Zealand, including engaging the tourism sector with a so-called 'Visitor Action Plan' to address the risk to tourists, will be priority in the future (MCDEM 2012).

17 *shakeout.org/california*

18 *http://www.civildefence.govt.nz/cdem-sector/exercises/national-cdem-exercise-programme*

19 *http://www.civildefence.govt.nz/resources/new-zealand-coordinated-incident-management-system-cims-2nd-edition*

20 Natural Hazards Research Platform *http://www.naturalhazards.org.nz*

21 See *http://data.govt.nz*.

5 Future Directions and Conclusions

5.1 Future Directions in Civil Protection

This report has sought to make a broad examination of the way a selection of countries are responding differently to three key challenges in the context of civil protection. Country cases were chosen so that different approaches could be compared and contrasted, but no attempt has been made to indicate whether one organizational response to a challenge is better that another. Indeed, a review of these cases illustrates that there are few 'best practices' in organizational responses to civil protection challenges. Certainly, there are 'good practices' that are effective in meeting their goals, while also reflecting the situations and contexts of the case study countries. In this section we provide a brief summary of key patterns and future directions that the case study countries are taking in the context of the three challenges described in section 3.

5.1.1 Crisis Coordination and Leadership

The issue of effective coordination (and leadership) is perhaps the most commonly discussed issue across all of the case study countries, and in the context of each of the challenges, is also an important issue. As a cross-cutting challenge, the US and French case studies provide interesting comparisons of the different political attitudes to coordination problems. Two connected factors are important here. Firstly, the need for effective coordination has been strongly influenced by the diversification of risks addressed under the conceptual umbrella of civil protection in recent years, which in turn has resulted in an increase in the number of organizations involved in civil protection. Secondly, effective coordination is increasingly viewed as requiring a mix of strong leadership at the decision making end of the civil protection management tree, and networked coordination among actors, especially those engaged in operational civil protection in the

field (as well as non-governmental groups, civil society groups, the private sector, *etc.*). The turn to more engagement with grass-roots groups is partly due to an increased acknowledgement of the interdependencies of all actors, and partly due to a general trend towards participatory politics in many countries.

Both the United States and France have responded to a broadened risk spectrum (large events, terrorism, cascading 'NaTech' incidents, multi-jurisdictional events, *etc.*) during the 2000s with changes in civil protection organization responsibility, and the creation of new organizations, tasked with addressing the complexity and interdependence in the risk landscape. However, the organizational landscape has in fact become more complicated, in part because old institutions were not replaced or reformed, but supplemented by new ones. Under these circumstances, the need for strong leadership, especially in the context of organizational decision making, has become a fundamental aspect. For example, France has maintained in part even strengthened its centralized, top-down approach to civil security in the last ten years, in spite of a general trend towards decentralization in French politics during the same period. In the US, the development of the Incident Command System policy tool, as an element of the National Incident Management System, has reflected a more general centralization in both decision making and operations in all significant civil security incidents.

At the same time, both the US and French systems recognize the necessity of drawing on a coherent organizational network for a comprehensive approach towards current challenges. To accommodate the simultaneous roles of actor networks in a more complex and interdependent risk environment, the US and French systems rely on mixed hierarchically networked coordination approaches. Strategic decisions are taken by organisation leaders, who rely on networks of cooperating, but operationally distinct actors. The exact mix of hierarchy and decentralization in coordination approaches largely reflects the country's risk spectrum and the political system.

5.1.2 Financial Efficiency and Local Preparedness

Local preparedness of communities and individuals has become a political priority in all of the countries included in this study (United States, France, New Zealand, Austria, the Netherlands, and United Kingdom). In each of these cases individual and community preparedness for threats and hazards has been identified as an important factor that can contribute to increasing the hazard resilience of the society. In turn, the move towards public preparedness was, to a certain degree, often accompanied by hopes to unburden civil protection authorities. Therefore, the authors and representatives from the Federal Office for Civil Protection (BABS) together assumed an association between pressure for financial efficiency, or austerity measures, and a propensity of civil protection organizations to encourage local level preparedness. This assumption also reflects several countries' (*e.g.* France, United States, and United Kingdom) assertions that directing financial resources towards civil protection, especially with regard to high-impact events, has grown more difficult in the last eight to ten years.

Certainly, in the United States and United Kingdom, the 'community-as-resource' model of public involvement in emergency management has been seen as a means of easing resource investments at times of financial efficiency (Lichterman 2000). The development of Local Resilience Forums in the United Kingdom is in essence a practical application of this model, where a devolution of preparedness and response responsibility to the local level is seen to be an effective way of dealing with both small- and large-scale contingencies. However, this devolution of responsibility, and the activities this responsibility entails, is not completely free of costs, but also requires certain financial investment, which has been a point of contention during the early implementation of the Local Resilience Forums (O'Brien and Read 2005).

While the relationship between financial efficiency (and austerity measures) and local preparedness is rarely made explicitly, countries like France (Coste et al. 2013), the US (Waugh and Streib 2006), the UK, and Australia (AFAC 2010), nevertheless highlight the cost-saving potential (for formal civil protection organizations) of investing in local level preparedness (World Bank and ODI 2015). In these countries, strong political will has typically facilitated the focus on local preparedness, and financial support has largely followed this process. Yet, the case of Austria, a federal nation, in which the *Länder* hold primary responsibility for civil protection, shows that preparedness can not only be implemented top-down, but also grow from a decentralized base. Further, many of the operational aspects leading to local preparedness are lead at the municipality level. The state plays an advisory role only, with little power to influence regional or municipal civil protection activities. In the face of stalled political agreement on coordinating approaches to civil protection and preparedness inter-regionally (initiated on the federal level), municipalities have taken the need for local preparedness and resilience building into their own hands, engaging in the international 'Making Cities Resilient' program of the UNISDR. Municipalities are directing local funds towards building resilience through encouraging local preparedness, thereby overcoming the political stalemate in civil protection reform, and avoiding the financial uncertainty this could bring. However, the Austrian case also illustrates the problems the absence of strong overarching strategy for preparedness can bring. Although the number of communities in Austria with local preparedness strategies is certainly impressive, this

should not disguise the fact that most Austrian communities do not have such a strategy, and consequently the nature of activities is very divergent across the country.

Overall, these cases highlight that finding ways to adequately finance local preparedness and resilience building is largely haphazard, because these funds are rarely allocated in a systematic manner (even when formalized in legislation). In the face of increasingly consequential, complex, and unpredictable threats, ad-hoc local preparedness financing arrangements can even become counter-productive. In this context, countering political economic incentives to underinvest in preparedness on the national level will be necessary in the short term, and cost-benefit analyses assessing cost differentials between preparedness and response/recovery expenditure can support this goal by debunking the common misperception that community action can be fostered at no cost.

5.1.3 Public Risk Communication

The modern, diverse and dynamic communication environment was conceived as a challenge for civil protection in this study. However, the country comparison between the Netherlands and New Zealand contradicts this initial conception, illustrating what is actually a broader international pattern: that technical communication solutions (including situational awareness tools, social media, mobile applications, specific alerting systems, *etc.*) and individual involvement or engagement in hazard and threat management activities are complementary. Internationally, new forms of risk communication or information provision are rarely seen as challenges, but as opportunities that can support new activities and practices in civil protection.

New modes of communication are helping in two key ways. New communication technologies are facilitating the coordination and integration of an increasing number of civil protection actors. As operational civil protection is distributed across functionally and jurisdictionally distinct organizations, the necessity to bring coherence to activities across the integrated threat management cycle increases dramatically. In most cases, ultimate decisions about threat planning, crisis management, and response continue to be made in 'command and control' type groups, whether or not operations are widely distributed among a range of functional organizations. Funnelling information to these groups, and ensuring decisions can be quickly and clearly communicated to operational organizations has been significantly improved with the application of technical communication systems. However, this information streamlining has been successful only in situations where developing mechanisms for cohesive communication is supported by a strong political commitment to implement and use new networks and tools.

Second, for public communication, ICT technologies have always been seen as fundamental information transfer tools in civil protection. However, this project demonstrates that new communication technologies can increase not just public knowledge about risk, but also be used to encourage public hazard preparedness. In the Netherlands, new communication tools (*e.g.* text messaging and social media) are being used to directly connect with, and satisfy, a public that is not just tech-savvy, but also has a strong appetite to learn about the risk environment. Likewise in New Zealand, new communication approaches (not necessarily distinguished by their high-technology character) are being deployed to empower communities' preparedness, supported by decentralized organization of engagement processes that encourage conversations with communities about risk. Overall, we found few indicators suggesting this approach is problematic.

Both the Netherlands and New Zealand are employing new communication approaches or technologies to solve civil protection problems that are specific to their respective situations. Technology and responsiveness in the case of the Netherlands; creative and decentralized engagement in New Zealand. Both cases illustrate how a flexibility in organizational practices can turn developments that are often regarded as disruptive into civil protection advances.

5.2 Conclusions and Implications for Swiss Civil Protection

5.2.1 'Good' Practice and 'Best' Practice Civil Protection

The analysis did not identify consistent 'best' practices when adapting to challenges. Instead, organizations must find their own 'good' practices that match the social, political, environmental, and economic boundary conditions in which the particular civil protection system must operate. While this finding is somewhat expected, it is nevertheless important, because the ability to develop 'good' organizational practices in response to a challenge (or changes in boundary conditions) requires some creativity in the civil protection organization, especially because the focus on 'best' practice is widespread. Additionally, under changing circumstances, the ability to adapt can have significant consequences for the beneficiaries of the civil protection system: the public.

This project also demonstrated that the propensity to adapt civil protection practices and organization seems to be associated with the existence of functional whole-of-government decision-making mechanisms. This is obvious in traditionally centralized governmental systems like the United States and United Kingdom, but also in countries that have long histories of decentralization that have recently centralized (or strengthened)

command-level risk and crisis management decision making bodies (*e.g.* France and the Netherlands). Importantly though, having centralized structures is not a prerequisite for reorganization. The case of Austria's localization of preparedness and resilience-building is an excellent example, showing that decentralization, and diffusion of innovative initiatives among peers (in this case the municipalities), yields organizational flexibility to meet civil protection challenges as they are recognized, even though it might also lead to patch-work results with very different levels of preparedness. In these countries (both centralized and decentralized) organizations developed 'good' practices with respect to their specific constellation of boundary conditions, and in response to the particular challenges that incited a necessity for reform.

What does this pattern mean for Switzerland? The boundary conditions of strong federalism and subsidiarity in civil protection, coupled with few large-scale disasters in the country's recent history, place Switzerland into a situation where establishing a basis for systemic support for reform is difficult. This is especially the case for the cantons where an overview of nationally significant threats or hazards has somewhat less bearing on regional civil protection realities. From a national perspective then, finding ways to reform the system, while keeping its subsidiary nature intact, will mean developing coherent adaptations in national civil protection directions that complement rather than contradict cantonal structures and practices. Drawing from the country cases studies examined in this study, we provide some suggestions with respect to the key challenges identified by the BABS as important in a future Swiss civil protection system.

Managing interdependent risks

Current risks are often characterized by large-scale, cascading consequences. Their impacts regularly cross geographic and jurisdictional boundaries. They typically require multi-functional responses (for instance, NaTech incidents require broad cooperation among responders from diverse backgrounds and skillsets). It is exactly these types of interdependent, high-impact incidents that have exposed weakness in civil protection systems internationally, fomenting reform in many of the countries examined in this study. In response to such interdependent risks, no country is currently relying on purely hierarchical or decentralized approaches. Switzerland's current direction toward implementing its Civil Protection Strategy 2015+ highlights the role of federal measures in national incidents (radiation accidents, epidemics, zoonoses, and armed conflict) including the activation of special operating resources (*e.g.* from the army) and response coordination mechanisms. While untested by the types of events witnessed in the case studies, with respect to organization in other countries this represents a suitable model to address the prospect of incidents characterized by interdependence and cascading consequences.

Increasing preparedness in times of tight budgets

The relationship between financial efficiency, local preparedness, and resilience is convoluted, but significant in discussions about the future of civil protection internationally. The relationship is built on two elements. Firstly, local preparedness is closely associated with resilience – people who are well-prepared are considered to be less vulnerable to hazards, and can potentially recover more quickly when an incident does occur. This leads to the second element: that governments see preparedness as a possible way to increase the financial efficiency of civil protection spending, even though the connection between downward budgetary pressure and local preparedness is rarely made explicit. The French example is an exception: having recently stepped up activities to strengthen capacities to deal with major hazards among territorial authorities and civil society (while maintaining the state as the central actor in civil security), the state has avoided the financial and organizational burden, citing public expenditure reduction as the reason (Coste et al. 2013). In Switzerland, local individual or civil society preparedness has not been a priority of public policy since the days of civil defence during the Cold War (Prior and Roth, 2014). Yet, reviving the idea of individual preparedness (beyond the emergency kit) could help to offset cantonal mitigation, response, and recovery resources, especially in times of significant need (high-impact incidents) if resources are limited.

Making use of new technologies

The new approach to preparedness and risk communication being developed and employed in New Zealand is a model that could also be considered 'good' practice in the Swiss system. Building the capacity of local municipal representatives and volunteer fire and civil defence personnel to help householders and communities to prepare for potential disasters could be facilitated by the federal government and cantons.

This report demonstrates that encouraging flexibility and responsiveness in relation to new modes of communication can directly support advances in organizational coordination and local level preparedness. In terms of organizational communication to support coordination, Switzerland's POLYCOM system is considered world-leading. As a mechanism to connect civil protection partners from the composite system (as required depending on the functional and jurisdictional breadth of an incident), POLYCOM is a dynamic resource that has a demonstrated suitability for coordinating incidents within Switzerland's political, environmental, and social boundary conditions, though questions over long-term financial support, maintenance, upgrading of the system

remain open (as at December 2015). In the context of the pattern of increasingly centralized crisis communication and command observed in all of the countries included in this study, the POLYCOM system should be seen (politically) as a fundamental tool. That countries where this pattern is evident are seeking or developing similar tools indicates the significance of POLYCOM in future crisis management situations, especially given considerations about the possibility of large impact events affecting Switzerland's population in the future.

In regard to communication with the public about risk and preparedness, Switzerland has also made recent advances. The development of the AlertSwiss website and mobile phone application aimed at increasing the preparedness of the population, and awareness of risks brings Switzerland's approach to communicating with the population in line with international approaches. Nevertheless, as in the case of New Zealand, passively communicated risk and preparedness information should be coupled with more active forms of engagement in order to increase the meaningfulness and interpretability of this information (see Prior and Herzog 2014). The difficulty of passively communicating complex information about risks and preparedness, using new communication technologies, should not be underestimated. With respect to this difficulty, a recent UN Department of Social and Economic Affairs survey rated Switzerland's level of e-Participation considerably lower than similarly development countries (see Appendix 1: Electronic Participation). E-Participation describes "the quality, relevance, and usefulness of government websites in providing online information and participatory tools and services to citizens" (Dutta et al. 2015). Switzerland ranks surprisingly low with respect to e-participation (84th of 193 countries), and considerably poorer than countries with similar governance arrangements and levels of development. The survey used to collect the data was conducted with government officials, academics, intergovernmental institutions, civil society organisations, the private sector and citizens. Whether Swiss citizens are less willing to interact with these new communication technologies, whether offerings from government do not meet the expectations of the population, or whether the direct democratic nature of the Swiss system already allows for sufficient participation is difficult to tell. However, these results should give Swiss civil protection organizations reason to moderate expectations concerning the value of using these technologies to build population preparedness and resilience alone, without coupling the technologies with more active engagement communication practices.

5.2.2 The Broader Political Context: Prioritizing High-Impact Events

In countries like the United States, the United Kingdom, France, the Netherlands, and New Zealand the political prominence of civil protection has increased significantly in the last 10–15 years. In all cases this change has come as a result of experience with high-impact disasters, or as a result of assessments pointing towards the likelihood of future high-impact events. These realizations have switched the political-economic perspective of the affected governments, re-directing investment to improve, update, or strengthen civil protection systems. While such experiences or predictions about high-impact events do not preclude civil protection system reform, they often stimulate political will for reform, which often comes on the heels of a disaster.

The BABS highlights the necessity to address large events in the *Umsetzung Strategie: Bevölkerungsschutz und Zivilschutz 2015+*. This necessity is based partly on the recognition that the Swiss composite civil protection system has not been tested by large-scale events since its establishment in 2004, and partly because recent risk assessments (BABS 2015) indicate the probability of large events (especially technical accidents, or severe natural hazards in urban areas) affecting Switzerland are not insignificant. While avoiding high-impact incidents is fundamentally important, it may not always be realistic, so pro-actively engendering stronger political support for civil protection in Switzerland seems sensible. Established in 2010, and revisited in 2015, the *Bundesstab ABCN*[22] (Federal Staff Unit Crisis Management Board for Nuclear, Biological, Chemical and Natural Hazards) is positioned to effectively coordinate high-impact incidents. If given stronger political support (from across jurisdictions) the pro-activeness of this cooperative organ to plan and prepare for high-impact events can be increased.

Of course, if the internal composition of the civil protection system continues to adapt, but its position within the broader political system remains the same, then making big steps forward is very difficult. Here the example of POLYCOM is informative. Although POLYCOM is a world renowned resource, obtaining financial support for the system has been problematic in recent years, especially because various components and technologies in the system must be constantly maintained or updated. However, the real value of the tool can only be appreciated in the context of a large, multi-jurisdictional, cascading incident that requires fast, efficient and effective coordination – the type of incident Switzerland has not had in recent history. The value of, and possibility to enact, civil security development and reform is reduced if political will for change does not exist.

22 Verordnung über die Organisation von Einsätzen bei ABC- und Naturereignissen (ABCN-Einsatzverordnung), *https://www.admin.ch/opc/de/classified-compilation/20090306/index.html*, accessed 15.12.15.

5.2.3 Conditions and Problems: Finding Windows of Opportunity

Probably more than other policy domains, reforms in international civil protection systems are at least partially opportunistic processes. Certainly, disasters or crises focus attention on some aspect of a system (a condition of the system), but such focus is often only transient unless this attention also indicates some deeper problem that repositions this issue on the political agenda (Kingdon 2003). Although the conditions of a system determine what reforms can be effective, it is more likely the problems that a system faces provide the impetus for reform.

This project has illustrated that Switzerland's civil protection reforms and advances are, by and large, in line with the observed international practices and trends. With respect to coordination in the context of interdependent incidents (with cascading consequences, for instance), Switzerland's national crisis coordination committee *(Bundesstab ABCN)* is analogous to similar structures in countries that have experienced high-impact, complex incidents, and represents a practical solution for Swiss conditions. Switzerland also matches many countries in terms of developing new approaches around encouraging local preparedness for hazards and threats. These approaches are driven less by pressures associated with financial efficiency, than by the recognized importance of preparedness within the population (and the responsiveness and recovery potential this preparation yields). Actively building preparedness is deemed particularly necessary in response to general societal trends, such as increased mobility and urbanization, which are assumed to have negative impacts on parts of the population. In other words, while in a traditional society closely connected to local hazards and risks most people possess a basic level of preparedness, in our modern society this needs to be trained actively. Lastly, Switzerland is supporting strong coordination and local preparedness with existing (POLYCOM) and new (internet and mobile support) communication technologies.

Unlike other countries though, Switzerland has not (luckily) been handed the 'opportunity', and attention, a high-impact incident brings to discussions and politics surrounding civil security. In some of the countries examined in this study, these incidents have converted particular systemic conditions into problems requiring solutions. Kingdon (2003, p. 198) points out that this conversion can happen in one of three ways: a) if conditions violate important social values; b) if a condition is re-classified into a category that might receive more attention (*e.g.*, the terror attacks in the 2000s helped to shift political agendas from concern about public safety, to concerns about civil security, indicating a deeper problem that gave the impetus for civil protection reform in the US, the UK, and in Switzerland to a certain degree); and c) if, in comparison with other countries, the condition can be seen as a problem. Situations a) and b) do not reflect Switzerland, but in the context of high-impact hazards, situation c) does raise questions pertinent Switzerland's civil protection boundary conditions.

The experience of other countries in the context of high-impact, interdependent, or cascading hazards, should be seen as an opportunity for Switzerland to take reform action without the disruption an actual crisis or disaster might bring. However, the boundary condition of subsidiarity in the Swiss civil protection system is a complicating factor here. While high-impact hazards are included on Switzerland's most recent risk register (BABS 2015), cantonal civil security professionals nevertheless rate day-to-day incidents as their most pressing problems (for instance, see SSV 2013). Given the infrequency and perceived improbability of high-impact events, regional and local civil protection agendas tend not to pay them high attention. This is problematic, because although the national risk register (BABS 2015) is compiled at the national level, civil protection responsibility lies mainly at the regional and local levels. In addition, the responsibility for dealing with nationally significant incidents passes from the cantons to the federation, and although cantonal resources become subsumed into a federal response, the question remains – why give regional civil protection planning attention to high-impact, complex, multi-jurisdictional hazards if you are not responsible for them?

In the context of threats and hazards, surprise by unexpected events is a common issue. While the nation's most recent Security Policy Report (SIPOL 2016) points out the difficulty of preparing in advance for every event that challenges the nation's security, it nevertheless highlights the importance of flexible implementation of the tools of security policy – including civil protection. The SIPOL report connects this importance with a strengthening of the resilience and regenerative capacities of the society, the economy, and the state (SIPOL 2016). Although it is difficult to prepare for every possible eventuality, the experiences of other countries present opportunities to increase the organisational and public appreciation of problems facing civil security, and the need to proactively address them.

Literature and other Resources Cited

Adey, P. & Anderson, B. (2012): "Governing Events and Life: 'Emergency' in UK Civil Contingencies", *Political Geography,* Vol. 31, pp. 24–33.

AFAC (2010): Position Paper on Bushfires and Community Safety. Australasian Fire and Emergency Services Authorities Council.

Alexander, D. (2002): "From civil defence to civil protection – and back again", *Disaster Prevention and Management: An International Journal* 11 (3):209-213. doi: doi:10.1108/09653560210435803.

Ansell, C.; A. Boin & Keller, C. (2010): "Managing transboundary crises: Identifying the building blocks of an effective response system", *Journal of Contingencies and Crisis Management* 18, no. 4: 195–207.

Boin, A. (2005): *The politics of crisis management: Public leadership under pressure:* Cambridge University Press.

Boin, A., & Bynander, F. (2015): "Explaining success and failure in crisis coordination", *Geografiska Annaler: Series A, Physical Geography,* 97(1), 123–135.

Boin, A.; Busuioc, M. & Groenleer, M. (2014): "Building European Union capacity to manage transboundary crises: Network or lead-agency model?", *Regulation & Governance* 8 (4): 418–436. doi: 10.1111/rego.12035.

Bossong, R. & Hegemann, H. (2013): ANVIL Country Study: Austria, Institute for Peace Research and Security Policy at the University of Hamburg, in: Bakken, M. & Rhinard, M. (eds.), *ANVIL Deliverable 2.1: Compilation of Country Studies,* Utrikespolitiskainstitutet (UI), available: *http://anvil-project.net/deliverables*.

Brazova, V.K. & Matczak, P. (2014): Elusive E-words: Effectiveness and Efficiency in Civil Security, Institute for Western Affairs, Bulletin 158.

Bundesamt für Bevölkerungsschutz (BABS) (2012): Strategie Bevölkerungsschutz und Zivilschutz 2015+. Bericht des Bundesrates. Vom 9. Mai 2012.

Bundesamt für Bevölkerungsschutz (BABS) (2015): Katastrophen und Notlagen Schweiz 2015: Welche Risiken gefährden die Schweiz? Bundesamt für Bevölkerungsschutz BABS.

Bundesamt für Raumentwicklung (ARE) (2010): *http://www.are.admin.ch/dokumentation/00121/00224/index.html?lang=de&msg-id=27412*, accessed 09.11.2015.

Bundesamt für Statistik (BFS) (2012): *http://www.bfs.admin.ch/bfs/portal/en/index/themen/01/02/blank/key/raeumliche_verteilung/agglomeration-en.html*, accessed 09.11.15.

Bundeskanzleramt, Abteilung IV/6 – Sicherheitspolitische Angelegenheiten (2013): Österreichische Sicherheitsstrategie. Sicherheit in einer neuen Dekade – Sicherheit gestalten, Wien, available: *http://www.bmi.gv.at/cms/BMI_Service/STS/130717_Sicherheitsstrategie_Kern_A4_WEB_barrierefrei.pdf*

Bundesministerium für Inneres (BM.I) (2015): Zivilschutz: Sicherheitsinformationszentren, available: *http://www.bmi.gv.at/cms/BMI_Zivilschutz/skkm/siz/start.aspx* (13.08.2015).

Bundesministerium für Inneres (BM.I) (2009): SKKM Strategie 2020, BM.I: Wien, available: *http://www.bmi.gv.at/cms/BMI_Service/SKKM/SKKM_Strategie_2020_Druckversion.pdf* .

Bundesministerium für Inneres (BM.I) (2003): Neuorganisation des Staatlichen Krisen- und Katastrophenschutzmanagements sowie der internationalen Katastrophenhilfe (SKKM), Vortrag an den Ministerrat, GZ 66.000/939-II/4/03, available: *http://www.bmi.gv.at/cms/BMI_Zivilschutz/skkm/files/001_Ministerratsbeschluss.pdf*.

The Canterbury Earthquakes Royal Commission (2012): Final Report, *http://canterbury.royalcommission.govt.nz*.

Central Institute for Meteorology and Geodynamics (ZAMG) (2015): Austria: National progress report on the implementation of the Hyogo Framework for Action (2013–2015), available: *http://www.preventionweb.net/english/hyogo/progress/reports* (13.08.2015).

Christensen, T.; Danielsen, O.; LÆGreid, P. & Rykkja, L.H. (2015): "Comparing Coordination Structures for Crisis Management in Six Countries", *Public Administration.* doi: 10.1111/padm.12186.

Civil Contingencies Act 2004.

Civil Contingencies Secretariat (CCS) (2015): United Kingdom: National progress report on the implementation of the Hyogo Framework for Action (2013–2015), available: *http://www.preventionweb.net/english/hyogo/progress/reports* (12.08.2015).

Comfort, L.K.; Dunn, M.; Johnson, D.; Skertich, R. & Zagorecki, A. (2004): "Coordination in complex systems: increasing efficiency in disaster mitigation and response", *Int. J. Emergency Management,* Vol. 2 (1–2), pp. 62–80.

Cornish, P. (2007): Domestic Security, Civil Contingencies and Resilience in the United Kingdom, Chatham House.

Coste, F.;, E. Nexon, & J.-F. Daguzan (2013): "Country Case Study: France", In *Analysis of Civil Security Systems in Europe: Compilation of Country Studies,* edited by Mette Bakken and Mark Rhinard. Stockholm, Sweden: Swedish Institute for International Affairs.

Cruz, A.M.; Steinberg, L.J.; Arellano, A-L. V.; Nordvik, J-P. & Pisano, F. (2004): State of the Art in NaTech Risk Management. UNISDR and European Joint Research Centre.

Delta Commission (1960): Report of the Delta Commission, The Hague, The Netherlands; see also McRobie, A., Spencer, T., & Gerritsen, H. (2005): The big flood: North Sea storm surge. *Philosophical Transactions of the Royal Society of London A: Mathematical, Physical and Engineering Sciences,* 363 (1831), 1263–1270.

Demchak, C. C. (2012): "Resilience and Cyberspace: Recognizing the Challenges of a Global Socio-Cyber Infrastructure (GSCI)", *Journal of Comparative Policy Analysis: Research and Practice* 14 (3): 254–269.

Department for Communities and Local Government (DCLG) (2014): Local authorities' preparedness for civil emergencies. A good practice guide, available: *https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/368617/Oct_2014_LA_preparedness_for_emergencies_guide.Final.pdf*.

Dutch Court of Audit (2014): *http://www.courtofaudit.nl/english/Publications/Audits/Introductions/2014/11/Public_authorities*.

Dutch Department for Safety and Justice (2013): Final report "Unity in diversity, development of regional cooperation", *https://www.nctv.nl/Images/3.kabinetsreactie-eindrapport-eenheid-in-verscheidenheid_tcm126-576943.pdf*.

Dutch Government (2007): National Safety and Security Strategy, AVT13/JU110292B *https://english.nctv.nl/Images/bevindingenrapportageeng_tcm92-544281.pdf*.

Dutch Government (2009): IOOV report Poldercrash, 2009, p. 9–10.

Dutch Government (2011): IOOV report Alphen, 2011, pp 7–20.

Dutch Government (2013): Letter of 8 November 2013 from the Minister of Security and Justice Ivo Opstelten to the House of Representatives on national security.

Dutch Ministry of Security and Justice (2010): *Risico- en Crisisbarometer.* [pdf] Available at: *https://www.nctv.nl/onderwerpen_a_z/Risico-en-crisisbarometer/index.aspx* [Accessed on 03.10.2012].

Dutta, S.; Geiger, T., & Lanvin, B. (2015): The Global Information Technology Report 2015: ICTs for Inclusive Growth. World Economic Forum.

Dynes, R. R. & Aguirre, B.E. (1979): "Organizational adaptation to crises: Mechanisms of coordination and structural change", *Disasters* 3 (1): 71–74.

European Commission (EC), Vademecum Civil Protection (2014a): Austria – Disaster management structure, available: *http://ec.europa.eu/echo/files/civil_protection/vademecum/at/2-at-1.html* (10.08.2015).

European Commission (EC), Vademecum Civil Protection (2014b): *United Kingdom* – Disaster management structure, available: *http://ec.europa.eu/echo/files/civil_protection/vademecum/uk/2-uk-1.html#*.

European Union (2014): The EU Integrated Political Crisis Response Arrangements. edited by Enlargement and Civil Protection Directorate-General Foreign Affairs. Brussels, Belgium: European Union.

Fanoulis, E.; Kirchner, E. & Dorussen, H. (2013): ANVIL Country Study: United Kingdom, University of Essex, in: Bakken, M. & Rhinard, M. (eds.), *ANVIL Deliverable 2.1: Compilation of Country Studies,* Utrikespolitiskainstitutet (UI), available: *http://anvil-project.net/deliverables*.

Fisher, R.E.; Bassett, G.W.; Bühring, W.A.; Collins, M.J.; Dickinson, D.C.; Eaton, L.K.; Haffenden, R.A.; Hussar, N.E.; Klett, M.S. & Lawlor, M.A. (2010): Constructing a resilience index for the Enhanced Critical Infrastructure Protection Program. Argonne National Laboratory (ANL).

Gall, M.; Cutter, S. L., & Nguyen, K. (2014): Incentives for Disaster Risk Management (IRDR AIRDR Publication No. 2). Beijing: Integrated Research on Disaster Risk.

Gasper, J.T. & Reeves, A. (2011): "Make it rain? Retrospection and the attentive electorate in the context of natural disasters", *American Journal of Political Science,* Vol. 55 (2), pp. 340–355.

Gross, E. (2009): *The Europeanization of national foreign policy: continuity and change in European crisis management:* Palgrave Macmillan Basingstoke.

Haimes, Y. Y. (2009): "On the definition of resilience in systems", *Risk Analysis* 29 (4): 498–501.

Herzog, M. & Prior, T. (2013): *Krisenmanagement im Vergleich,* Center for Security Studies (CSS), ETH Zurich.

Informations- und Kommunikationstechnologie Portal (IKT) (n.d.): Einsatz- und Koordinationscenter (EKC), available: *https://www.onlinesicherheit.gv.at/nationale_sicherheitsinitiativen/koordination_und_strategie/71763.html* (11.08.2015).

Jachs, S. (2011): Koordination von Krisen und Katastrophenmanagement: Fachgespräch mit Innenministerin Maria Fekter am 24. März 2011, Wien: Bundesministerium für Inneres (BM.I), available: *http://www.bmi.gv.at/cms/BMI_Service/Aus_dem_Inneren/Staatliches_Krisen_und_Katastrophenschutzmanagement.pdf*.

Kingdon, J.W. (2003): *Agendas, Alternatives and Public Policies.* 2nd Edition Longman Classics in Political Science, Addison-Wesley Educational Publishers Inc., New York.

Korhonen, J. & Seager, T.P. (2008): "Beyond eco-efficiency: a resilience perspective", *Business Strategy and the Environment* 17 (7): 411–419. doi: 10.1002/bse.635.

Kuipers, S., & Boin, A. (2013): Country Study: The Netherlands. In *Analysis of Civil Security Systems in Europe.* Utrecht, Netherlands: Utrecht University.

Lagadec, P. (2002): "Crisis management in France: trends, shifts and perspectives", *Journal of contingencies and crisis management* 10 (4): 159–172.

Lentzos, F. & Rose, N. (2009): Governing insecurity: contingency planning, protection, resilience, *Economy and Society,* Vol. 38 (2), pp. 230–254, available: *http://www.eubarnet.eu/wp-content/uploads/2012/10/Lentzos-and-Rose.-2009-Governing-insecurity.pdf*.

Lichterman, J.D. (2000): "A 'community as resource' strategy for disaster response", *Public Health Reports* 115 (2–3): 262–265.

Major Incident Investigation Board (MIIB) (2008): The Buncefield Incident 11 December 2005: The final report of the Major Incident Investigation Board, Volume 1, available: *http://www.hse.gov.uk/comah/buncefield/miib-final-volume1.pdf*.

Meerkat, H.; Kolo, P. & Renson, Q. (2015): UNICEF/WFP Return on Investment for Emergency Preparedness Study. Munich, Germany: Boston Consulting, Germany.

Ministry of Defence (2013): French White Paper on Defence and National Security – 2013. edited by Ministry of Defence. Paris, France: Government of France.

Ministry of Security and Justice (2010): *Risico- en Crisisbarometer.* [pdf] Available at: https://www.nctv.nl/onderwerpen_a_z/Risico-en-crisisbarometer/index.aspx [Accessed on 03.10.2012].

Ministry of Security and Justice. (2013): National Manual on Decision-making in Crisis Situations – The Netherlands. edited by National Coordinator for Security and Counterterrorism. The Hague, the Netherlands: National Coordinator for Security and Counterterrorism.

Moynihan, D. P. (2008): "Combining Structural Forms in the Search for Policy Tools: Incident Command Systems in U.S. Crisis Management", *Governance* 21 (2): 205–229. doi: 10.1111/j.1468-0491.2008.00395.x.

Moynihan, D. P. (2009): "The Network Governance of Crisis Response: Case Studies of Incident Command Systems." *Journal of Public Administration Research and Theory.* doi: 10.1093/jopart/mun033.

Multi-hazard Mitigation Council (MMC) (2005): Natural hazard mitigation saves: An independent study to assess the future savings from mitigation activities. National Institute of Building Sciences. Washington DC, available http://c.ymcdn.com/sites/www.nibs.org/resource/resmgr/MMC/hms_vol2_ch1-7.pdf?hhSearchTerms=Natural+and+hazard+and+mitigation (14.07.2015).

National Audit Office (NAO) (2008): "New Dimension – Enhancing the Fire and Rescue Services' capacity to respond to terrorist and other large-scale incidents", *HC 1050 Session 2007–2008,* available: http://www.nao.org.uk/wp-content/uploads/2008/10/07081050.pdf.

Nationaal Coördinator Terrorismebestrijding en Veiligheid (2015): www.crisis.nl.

NCTV (2015): National Coordinator for Security and Terrorism: Annual Plan 2015. Dutch Ministry of Security and Justice, The Hague.

Neumayer, E.; Plümper, T. & Barthel, F. (2014): "The Political Economy of Natural Disaster Damage", *Global Environmental Change,* Vol. 24, pp. 8–19.

New Zealand Ministry of Civil Defence & Emergency Management (2010): Community Engagement in the CDEM context. Civil Defence Emergency Management. best practice guide [bpg 4/10].

New Zealand Civil Defence Emergency Management Act 2002.

New Zealand Government (2015): http://data.govt.nz.

New Zealand Governor-General (2015): National Civil Defence Emergency Management Plan Order 2015, 2015/140.

New Zealand Ministry of Civil Defence & Emergency (2008): National Civil Defence Emergency Management Strategy 2007, http://www.civildefence.govt.nz/assets/Uploads/publications/national-CDEM-strategy-2008.pdf.

New Zealand Ministry of Civil Defence & Emergency Management (2015): http://www.getthru.govt.nz.

New Zealand Ministry of Civil Defence & Emergency Management (2015): What's the plan Stan, http://www.whatstheplanstan.govt.nz.

New Zealand Ministry of Civil Defence and Emergency Management (2015): National progress report on the implementation of the Hyogo Framework for Action (2013–2015).

New Zealand Ministry of Civil Defence and Emergency Management (2015): http://www.civildefence.govt.nz/cdem-sector/exercises/national-cdem-exercise-programme.

New Zealand Ministry of Civil Defence and Emergency Management (2015): http://www.civildefence.govt.nz/resources/new-zealand-coordinated-incident-management-system-cims-2nd-edition.

New Zealand Ministry of Civil Defence and Emergency Management (2012): CDEM Capability Assessment Report: Part 1, April 2012, http://www.civildefence.govt.nz/cdem-sector/monitoring-and-evaluation/cdem-monitoring-and-evaluation-programme.

New Zealand Ministry of Civil Defence and Emergency Management (2012): CDEM Capability Assessment Report: Part 2, April 2012.

New Zealand Natural Hazards Research Platform (2015): http://www.naturalhazards.org.nz.

O'Brien, G. & Read, P. (2005): "Future UK Emergency Management: New Wine, Old Skin?" *Disaster Prevention and Management: An International Journal,* Vol. 14 (1), pp. 353–361.

O'Brien, G. (2008): "UK emergency preparedness: a holistic response?" *Disaster Prevention and Management: An International Journal,* Vol. 17 (2), pp. 232–243.

Oosting Committee (2001): Report on Enschede Fireworks Disaster, www.minbzk.nl.

Petit, F.; M. Collins, & Fisher, R.E. (2011): "An index to analyze resilience of critical infrastructure." In. The CIP Report, George Mason University, School of Law, Washington.

Pitt, M. (2008): Pitt Review: Learning Lessons from the 2007 floods, available: http://webarchive.nationalarchives.gov.uk/20100807034701/http:/archive.cabinetoffice.gov.uk/pittreview/_/media/assets/www.cabinetoffice.gov.uk/flooding_review/pitt_review_full%20pdf.pdf (03.08.2015).

Power, W. (2013): Review of Tsunami Hazard in New Zealand, GNS Science Consultancy Report, 2013/131: 174.

Prior, T. & Herzog, M. (2014): Public interpretation of risk information: decisions and action, Risk and Resilience Report 10, Center for Security Studies, ETH Zürich.

Rhodes, C.; Hough, D. & Butcher, L. (2014): Privatisation, *Research Paper* 14/61, House of Commons, available: http://www.parliament.uk/briefing-papers/RP14-61.pdf.

Roth, F.; Herzog, M.; Giroux, J. & Prior, T. (2014): Civil Protection Trend Analysis 2025. Opportunities and challenges in the areas of the Environment, Technology & Society. April 2014, Center for Security Studies (CSS), ETH Zurich.

Roth, F. & Prior, T. (2014): "The boundaries of building societal resilience: responsibilization and Swiss Civil defense in the Cold War", *Behemoth. A Journal on Civilisation,* 7, 2, 103–123.

Schraagen, J.M.; Huis Veld, M. & De Koning, L. (2010): "Information sharing during crisis management in hierarchical vs. network teams", *Journal of contingencies and crisis management* 18 (2): 117–127.

Schweizerischer Städteverband (SSV) (2013): Sichere Schweizer Städte: Gefährdungen, Strategien, Handlungsoptionen. Schweizerischer Städteverband and Ernst Basler + Partner AG.

Scolobig, A.; Prior, T.; Schröter, D.; Jörin, J. & Patt, A. (2015): "Towards people-centred approaches for effective disaster risk management: Balancing rhetoric with reality", *International Journal of Disaster Risk Reduction,* Vol. 12, pp. 202–212.

Sherve, C. M. & Kelman, I. (2014): "Does Mitigation save? Reviewing cost-benefit analyses of disaster risk reduction", *International Journal of Disaster Risk Reduction,* Vol. 10, pp. 213–235.

Smith, J. (2003): Civil Contingency Planning in Government, *Parliamentary Affairs,* London: Hansard.

Southern California Earthquake Center (2015): www.shakeout.org/california.

Stern, E. (2015): Strategic Crisis Management Exercises: Challenges and Design Tools – Draft Report.

UK Cabinet Office (2014): Preparation and planning for emergencies: the National Resilience Capabilities Programme, available: https://www.gov.uk/preparation-and-planning-for-emergencies-the-capabilities-programme (28.07.2015).

UK Cabinet Office (2013): UK Civil Protection Lexicon, Version 2.1.1., www.cabinetoffice.gov.uk/cplexicon (30.07.2015).

UK Cabinet Office (2012): Chapter 4, Local responder risk assessment duty, Revision to Emergency Preparedness, available: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/61027/Chapter-4-Local_20Responder-Risk-assessment-duty-revised-March.pdf.

UK Cabinet Office (2011a): Strategic National Framework on Community Resilience, available: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/60922/Strategic-National-Framework-on-Community-Resilience_0.pdf.

UK Cabinet Office (2011b): Community Emergency Plan Toolkit, available: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/60925/Community-Emergency-Plan-Toolkit.pdf.

UK Cabinet Office (2010): Civil Contingencies Act Enhancement Program, Program Initiation Document, available: *https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/60886/CCA-Enhancement-Programme-PIDv1.7.pdf*.

United Nations Office for Disaster Risk Reduction (UNISDR) (2009): Terminology on Disaster Risk Reduction, Geneva: UNISDR. *http://www.unisdr.org/files/7817_UNISDRTerminologyEnglish.pdf*.

United Nations Office for Disaster Risk Reduction (UNISDR) (2015a): Making Development Sustainable: The Future of Disaster Risk Management. Global Assessment Report on Disaster Risk Reduction. Geneva, Switzerland: United Nations Office for Disaster Risk Reduction.

United Nations Office for Disaster Risk Reduction (UNISDR) (2015b): Making Development Sustainable: The Future of Disaster Risk Management. Global Assessment Report on Disaster Risk Reduction. Geneva, Switzerland: United Nations Office for Disaster Risk Reduction (UNISDR), *http://www.preventionweb.net/english/hyogo/gar/2015/en/gar-pdf/GAR2015_EN.pdf* (14.07.2015).

United Nations Office for Disaster Risk Reduction (UNISDR) (2014): Making Cities Resilient Report, Participating Local Governments, available: *http://www.unisdr.org/campaign/resilientcities/cities* (10.08.2015)

United Nations Office for Disaster Risk Reduction (UNISDR) (2012): Making Cities Resilient Report 2012, My city is getting ready! A global snapshot of how local governments reduce disaster risk, 2nd edition, UNISDR, available: *http://www.unisdr.org/files/28240_rcreport.pdf*.

United Nations Office for Disaster Risk Reduction (UNISDR) (2009): Terminology on Disaster Risk Reduction, Geneva: UNISDR. *http://www.unisdr.org/files/7817_UNISDRTerminologyEnglish.pdf* (23.07.2015).

U.S. Department of Homeland Security (DHS) (2008): National Incident Management System. Washington, DC: Government Printing Office.

Waugh, W.L. Jr. (2000): Living with Hazards, Dealing with Disasters: An Introduction to Emergency Management, M.E. Sharpe, Armonk, New York, NY.

Waugh, W.L., & Streib, G. (2006): "Collaboration and Leadership for Effective Emergency Management." *Public Administration Review* 66: 131–140. doi: 10.1111/j.1540-6210.2006.00673.x.

World Bank & ODI (2015): "Unlocking the Triple Dividend of Resilience: Why Investing in DRM Pays off". *Policy Brief,* GFDRR and Overseas Development Institute. Washington DC: World Bank.

Appendix 1: Electronic Participation

The e-Participation index assesses the use of online services to facilitate provision of information by governments to citizens ("e-information sharing"), interaction with stakeholders ("e-consultation"), and engagement in decision-making processes ("e-decision making").

10.04 E-Participation Index

The E-Participation Index assesses, on a 0-to-1 (best) scale, the quality, relevance, and usefulness of government websites in providing online information and participatory tools and services to their citizens. | 2013

RANK	COUNTRY/ECONOMY	VALUE
1	Korea, Rep.	1.00
1	Netherlands	1.00
3	Uruguay	0.98
4	France	0.96
4	Japan	0.96
4	United Kingdom	0.96
7	Australia	0.94
7	Chile	0.94
9	United States	0.92
10	Singapore	0.90
11	Colombia	0.88
12	Israel	0.86
13	United Arab Emirates	0.84
14	Bahrain	0.82
14	Canada	0.82
14	Costa Rica	0.82
17	Greece	0.80
17	Morocco	0.80
19	Italy	0.78
19	New Zealand	0.78
19	Spain	0.78
22	Estonia	0.76
22	Kazakhstan	0.76
24	Brazil	0.71
24	Finland	0.71
24	Germany	0.71
24	Latvia	0.71
24	Oman	0.71
24	Peru	0.71
30	Mongolia	0.69
30	Norway	0.69
30	Russian Federation	0.69
33	China	0.65
33	Ireland	0.65
33	Kenya	0.65
33	Lithuania	0.65
33	Portugal	0.65
33	Sri Lanka	0.65
33	Tunisia	0.65
40	Austria	0.63
40	Belgium	0.63
40	India	0.63
40	Moldova	0.63
40	Slovak Republic	0.63
45	El Salvador	0.61
45	Mexico	0.61
45	Qatar	0.61
45	Sweden	0.61
49	Georgia	0.59
49	Montenegro	0.59
51	Philippines	0.57
51	Saudi Arabia	0.57
51	Venezuela	0.57
54	Argentina	0.55
54	Denmark	0.55
54	Egypt	0.55
54	Luxembourg	0.55
54	Thailand	0.55
59	Albania	0.53
59	Armenia	0.53
59	Malaysia	0.53
59	Mauritius	0.53
63	Rwanda	0.51
64	Iceland	0.49
64	Panama	0.49
64	Poland	0.49
64	Turkey	0.49
64	Vietnam	0.49
69	Jordan	0.47
69	Malta	0.47
69	Romania	0.47
72	Hungary	0.45
72	Zimbabwe	0.45
74	Azerbaijan	0.43
74	Kuwait	0.43
74	Ukraine	0.43
77	Bolivia	0.41
77	Kyrgyz Republic	0.41
77	Serbia	0.41
80	Bangladesh	0.39
80	Ghana	0.39
80	Slovenia	0.39
80	Tanzania	0.39
84	Switzerland	0.37
85	Bhutan	0.35
85	Madagascar	0.35
85	Senegal	0.35
88	Croatia	0.33
88	Dominican Republic	0.33
88	Guyana	0.33
88	Honduras	0.33
88	Mozambique	0.33
88	Namibia	0.33
88	Nigeria	0.33
88	Pakistan	0.33
88	South Africa	0.33
97	Botswana	0.31
97	Cyprus	0.31
97	Trinidad and Tobago	0.31
100	Indonesia	0.29
100	Iran, Islamic Rep.	0.29
100	Lebanon	0.29
100	Nepal	0.29
100	Timor-Leste	0.29
105	Yemen	0.27
106	Bulgaria	0.25
106	Czech Republic	0.25
106	Ethiopia	0.25
106	Paraguay	0.25
106	Seychelles	0.25
111	Angola	0.24
111	Malawi	0.24
113	Gabon	0.22
113	Gambia, The	0.22
113	Macedonia, FYR	0.22
116	Cambodia	0.20
116	Guatemala	0.20
116	Jamaica	0.20
116	Lao PDR	0.20
120	Côte d'Ivoire	0.18
120	Haiti	0.18
120	Zambia	0.18
123	Cameroon	0.16
123	Mali	0.16
123	Swaziland	0.16
126	Burkina Faso	0.14
126	Lesotho	0.14
126	Suriname	0.14
126	Uganda	0.14
130	Tajikistan	0.12
131	Barbados	0.10
131	Cape Verde	0.10
131	Nicaragua	0.10
134	Algeria	0.08
134	Chad	0.08
134	Mauritania	0.08
134	Myanmar	0.08
138	Burundi	0.06
138	Libya	0.06
140	Guinea	0.02
n/a	Hong Kong SAR	n/a
n/a	Puerto Rico	n/a
n/a	Taiwan, China	n/a

SOURCE: United Nations Department of Economic and Social Affairs (UNDESA), *UN E-Government Development Database* (retrieved November 27, 2014)

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