

# Dealing with Natural Disasters: Managing Floods in Norway

Carina S. Lillestøl • Lise H. Rykkja



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Uni Research Rokkan Centre  
Nygårdsgaten 5  
5015 Bergen  
Phone +47 55 58 97 10  
Fax +47 55 58 97 11  
E-mail: [rokkansenteret@uni.no](mailto:rokkansenteret@uni.no)  
<http://rokkan.uni.no/>

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CARINA S. LILLESTØL

AND

LISE H. RYKKJA

STEIN ROKKAN CENTRE FOR SOCIAL STUDIES

UNI RESEARCH AS, BERGEN

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# Introduction

Crises, such as floods, give rise to important political–administrative challenges. Preparing for sudden adversity, and the capacity to respond and adjust course in the face of crises are major and necessary assets for governments. Such government capacities are at the heart of public problem-solving and include the capacity to coordinate, to regulate, to deliver services and analyze needs and consequences. These capacities can assist governments in their implementation and sustaining of policies for improving crisis management performance. However, different actors may emphasize different capacities and means at different times and in different situations, creating difficulties for learning.

This working paper focuses on politics under non-routine conditions and the generation of governance capacity in crisis management<sup>1</sup>. It presents an empirical case study on floods in Norway, examining two floods (in 2011 and 2013) that took place in *Gudbrandsdalen*, a valley in the south-eastern parts of Norway. Extreme rainfall combined with exceptional amounts of snow-melting in the mountains led to severe flooding in the river of *Gudbrandsdalslågen*. Two municipalities: *Nord-Fron* and *Ringebu* lie alongside the river borders and were hit exceptionally hard. Both floods escalated and caused massive destructions in the two municipalities. Evacuation operations and the closing of critical roads made crisis management difficult.

In addition to examining this particular case, the working paper aims to provide more general insight about crises and how they are dealt with in the Norwegian context. The paper takes a public policy and organizational perspective to analyze governance capacity in crisis management, with a particular focus on the management of floods. The main research question concerns what government structures and capacities are used in such a crisis, how they function, and how they are modified in the aftermath of a crisis. To this end, the paper examines whether crisis management performance can be said to have improved and to what degree learning from the two floods was gained. The case study provides insight on how two similar incidents (floods) were handled by the same actors, at the same locations, on two different occasions. An important aspect is whether or not the two floods resulted in any structural changes, at central level in the Norwegian

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Directorate for Civil Protection (DSB) and the Norwegian Water Resources and Energy Directorate (NVE), and at local level in the two municipalities that were affected.

In the following, we first present an outline of the case study providing more details on our particular focus. Here, we also explain our approach to the possibilities of learning after a crisis. Second, we present the Norwegian political-administrative context and the main actors responsible for handling the floods. In the next two sections, we lay out our analytical framework, research methods and data. Thereafter, we present our analysis of what happened in the two floods. In the last part of the paper we draw some conclusions about lessons learned and possible policy implications.

## The case study

Comparing two similar incidents at two different points in time provides an opportunity to see whether crisis management improvements and learning happened between the two floods, as well as what happened regarding these aspects after the second flood in 2013. In particular, we look at what happened in the two municipalities, examine the actions of the County Governor (*Oppland County*) and study more specifically the relationship between the two responsible agencies at the national level of government, DSB and NVE. The responsibilities that the two agencies hold have been delegated to them from two different ministries: The Ministry of Justice and Public Security (JD) and the Ministry of Petroleum and Energy (OED).

According to a critical report from the Office of the Auditor General of Norway (2015: 8) evaluations and other measures to follow up crises have not been given sufficient attention at all levels of government. This reduces the learning potential from one crisis to the next considerably. Our starting point is that administrative capacity at different levels of government and lines of responsibility and accountability are important for crisis management performance, both in a crisis and in its aftermath. Also, the nature of the crisis is important.

Floods are generally categorized as natural crises, distinguishable from man-made crises (Rosenthal and Kouzmin 1993). Both natural and man-made crises demand a range of unique crisis management techniques (Boin et al. 2005: 107). The distinction between man-made and natural crises is not clear-cut, however. Crises following from floods can be seen as being man-made to the extent that people settle in flood-endangered areas, often in spite of government awareness of that

risk. A division between intended- and unintended events brings in an element of human action (Mitroff and Alpaslan 2003; Perrow 1984). Floods are, however, in general unintended. Compared to intended, man-made crises, unintended natural crises are easier to prepare for and manage since they are more predictable and tend to be repetitive – sometimes at steady intervals and therefore less unique.

Crisis management has two dimensions: an operative and a strategic level. In this paper we focus mainly on the strategic level. We study relevant organizations and the people within these that hold political power and central administrative positions. These actors hold formal authority and legitimacy and are expected to focus on the larger institutional, political and societal consequences of the crises facing society (Boin et al. 2005: 8). Strategic tasks concern the prevention of the impact of adversity. This means prioritizing handling of the political and social consequences of the crises, but also trying to maintain public support (Boin et al. 2005: 4). Crises may also be seen as «windows of opportunity» for the strategic leaders, creating incentives to initiate and implement lasting changes to the government system (Kingdon 1995).

The crisis management in 2011 and 2013 is discussed in relation to a four-phase model of crisis management, including mitigation/prevention, preparation, response/consequence management and recovery/aftermath politics (Comfort, Boin and Demchak 2010). Our interest is mainly with the last two phases. Lessons learned and the implications of such lessons on policies and organizational structures of government are core concerns.

According to vulnerability assessments done by NVE for regional and local authorities in Norway floods are expected events and can therefore be characterized as reoccurring crises. Reoccurring crises are particularly stimulating for learning (Boin et. al. 2005: 117). Learning from crises is strongly desired by all actors and has attracted much academic attention in recent years. The bulk of this literature points to the difficulties of such learning, however (Boin and 't Hart 2015). Crises may result in sudden changes, but while there is often a strong wish to learn certain crises may produce incremental rather than radical policy and structural changes owing to cultural path-dependency and resistance (Boin, McConnell and 't Hart 2008). Media, salience, and organizations within the policy area may promote learning, but learning is also impeded by political constraints, competing advocacy coalitions, and confusion about the nature and impact of a crisis (Christensen, Lægreid and Rykkja 2016).

Learning can be defined in various ways. In this paper learning is observed through alterations implemented in bureaucratic structures, incorporated in the formal

procedures of the organization (Dekker and Hansén 2004), but also seen as experiential learning. This understanding differentiates between learning as a result and learning as a process. Both dimensions are in focus in this paper. Learning as a *process* concerns how experiential learning is obtained. It takes place when the individuals involved in events obtain experience and actually learn from their experience. Getting from when people within an organization learn, to when organizations themselves learn, is tricky. Learning as a *result* concerns the product of the crisis process; it is the outcome of the crisis management performance (Olsen and Peters 1996).

Crises give opportunities for experiential learning, but can also create superstitious learning, that is, learning where the connection between the causes and outcomes of an event are unclear or misattributed (March and Olsen 1975). This is frequently the case in the face of uncertainty, and even more likely if the crisis is transboundary (Boin et al. 2014). One may also face a situation of over-learning when the attention towards the most recent crisis adverts attention away from other risks (Boin and 't Hart 2015). On this note, crises can be argued to both facilitate learning and to create obstacles for it (Stern 1997).

The floods in Gudbrandsdalen can be seen as natural intractable crises, where the risk was well known. The floods were anticipated, but interference to deal with their escalation was almost impossible (Gundel 2005: 112). The floods reached a 200-year flood level at both occasions, the chance of which is normally extremely low (Norwegian Red Cross 2014: 7). The floods had devastating consequences for the small communities and the cost for repairs reached millions of Norwegian kroner (NOK). The floods uncovered multiple challenges for the actors involved and for the communities affected by them on both occasions. Despite this, the overall impression after studying the floods is that the crisis management performance was exceedingly better in 2013 compared to 2011. The analysis done for this paper shows that all levels of government handled the crisis better, especially in the operative phase of the crisis. The number one explanatory factor from the actors' perspective is that they learned from the experiences from the flood in 2011. Most important, the short timespan between the two events led to a stronger focus on preparation. When the timespan between natural crises is larger, the challenge of learning will be greater. This is evident in the case of Gudbrandsdalen, where another massive flood hit in 1995. This floods impact and level of destruction seemed to have been forgotten by the time another flood hit in 2011. The heightened capacity for crisis management performance in 2013 was noticeable in the operative phase of the crisis, but not so much in the aftermath of the floods,



however. These aspects and explanatory factors to why this might be the case will be elaborated further in the next sections of the paper.

## The Norwegian context

Crisis management and learning from past events calls for a hybrid approach to organizing for future events, where there is both room for flexibility as well as clear lines of coordination between the actors involved (Christensen et al. 2015). According to one widely acknowledged definition, a crisis can be defined as a serious threat to the fundamental structures, values and norms of a system that under time pressure and a high degree of uncertainty will demand complex and tough decisions being made on all levels of government (Boin et al. 2005: 2). The crises analyzed for this paper can also be seen as typical examples of *wicked problems*, defined as societal problems that transcend sectorial boundaries of public organizations, administrative levels and policy areas (Christensen et al. 2011, Rykkja et al. 2014: 109). They present immense challenges to the governments' resources and capabilities.

The policy field of civil security or societal safety in Norway has for many years been characterized by strong line ministries, fragmentation and weak coordination between actors on all levels of government (Christensen et al. 2015: 353). This lack of formal coordination has led to accountability problems in the government system, creating confusion concerning responsibilities when crises hits. This ambiguity in responsibility-relations continues after the crises are over and lead to accountability-processes becoming prominent. One explanation for why accountability is so difficult to place in the Norwegian government system is related to the impact of contemporary administrative reforms, notably New Public Management (NPM) reforms and more recently so-called Post-NPM reforms (Christensen and Lægreid 2007). The NPM-reforms impaired coordination and accountability in general and cross sectoral- questions especially, also within the field of civil security. Post-NPM reforms were implemented to re-centralize public administration in order to better cope with the increased fragmentation of the government system implemented over time by NPM-reforms, and has also impacted the organization and processes of crisis management implemented by the government.

Governmental crisis management in Norway is founded on four explicit principles: The principle of responsibility, the principle of equality, the principle of proximity and the principle of collaboration (JD 2008, JD 2012). The four principles create several dilemmas for the actors involved. The principle of responsibility demands

that each sector and unit takes responsibility for dealing with a crisis within its own area of competence. At the same time a crisis also needs a strong, coordinated and sometimes supreme leadership. The principle of equality demands equality in the management of different scenarios, but is also dependent on extraordinary measures and flexibility. The principle of proximity demands that crises should be dealt with at the level closest to the situation. At the same time there is also often a need for guidance, directives and overview from a superior level. The principle of collaboration calls for cooperation between all relevant actors, but leadership from a government ministry or agency is often necessary. The principle has guided relations between actors involved in the Norwegian rescue services for a long time, especially meant to mobilize civil society and voluntary organizations in crises. It was introduced as a more general principle in 2012 in order to ensure cooperation between different government authorities as a result of the findings and conclusions from the 22 July Commission after the terrorist-attacks in 2011 (NOU 2012:14).

## The actors

In Norway there are three levels of government, in which the actors for this paper function (Table 1). Intersecting responsibilities and accountability relations create tensions both hierarchically and vertically between the levels, and horizontally between different sectors. The central government level consists of 15 ministries in addition to the Prime Minister's Office and a range of agencies with more specific functions. The Ministry of Justice and Public Security (JD) has the overall coordinating functions within the area of internal/societal security. DSB sorts under this Ministry. NVE is responsible for ensuring the management of Norway's water resources – hereunder flood management – and sorts under the Ministry of Petroleum and Energy (OED). The Ministry of Climate and the Environment (MD) and the Norwegian Environment Agency have responsibilities within the area of climate change, which may also have effects pertaining to extreme weather and flooding.

DSB has been delegated the responsibility of supporting JD's coordinating capacity concerning civil protection. The agency reports to the Ministry about its work and also on the situation on the lower levels of government. The NVE was originally set up as a directorate for power-supply under OED. OEDs primary task is to coordinate the use of energy resources and they are responsible for securing a holistic energy policy. NVE's tasks have changed considerably in recent years and now include water management, the promotion of efficient energy markets, cost-effective energy systems and efficient energy use.

The County Governor in Oppland has responsibilities on the regional level. The County Governor's tasks are not grounded in a particular law, but it is built on constitutional regulations (Kgl. res. 1981). The instructions for their work were updated in 2015 and their coordinating functions were strengthened (JD 2015). The role of the County Governor is contradictory as they are instruments for central government in county affairs but also traditionally serves as a conveyor of the municipalities' wants and needs towards the central government. The County Governor hierarchically sorts under the Ministry of Local Government and Modernization (KMD) but is also assigned duties on behalf of other ministries; this fact emphasizes the fragmented structure of government administration in Norway.

The 428 municipalities in Norway run by rules of local self-government. This is not incorporated in constitutional law, but established by tradition. Most municipalities function by a chairmanship principle; this includes the municipalities explored for this case study, Nord-Fron and Ringebu.<sup>2</sup> The municipalities are responsible for completing tasks set out by the central government, including securing its population's safety and a fair distribution of public services based on regulations set by the authorities. The municipalities' responsibility for crisis management and preparedness has been both strengthened and widened in recent years. Previously one law regulated their work on natural crises: the Planning and Building Act of 1985. In 2010 a new Civil Defence Act was passed, putting the municipalities at the forefront of preparedness. According to the new regulations, regular risk and vulnerability analyses are mandatory (JD 2010). Also, if not stated otherwise, the municipalities are responsible for funding activities under the Act. Because of lack of funds and revenue, this is difficult for many municipalities. Information from our interviews show a differentiation in resources between the two municipalities studied for this paper. Resources were said to be important in both cases, but the access to such resources is significantly higher in Nord-Fron due to its large power supply industry. The need for state funding therefore is much more pronounced in Ringebu. Informants emphasize that a lack of resources to follow-up recommendations from central government and to gain necessary competence for preparedness is troubling. In general, the lack of funding creates dilemmas for local public spending and prioritization amongst vital measures becomes pertinent. Relating to floods in particular, a difficult consideration is whether resources should go to rebuilding housing or towards securing the community for future floods. The

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<sup>2</sup> In the chairmanship model a steering committee is chosen from the Municipal board, with proportional political representation. The committee is led by the administrative executive/mayor deputy (Rådmann). This model contrasts to a parliamentary model where leadership is political but can also be removed from office between elections.

last option includes building competence and acquiring new knowledge, which implies the employment of (more) qualified personnel.

*Table 1: The organization of government resources responsible for handling floods*

	<b>Level of government</b>	<b>Sector authority</b>	<b>Lead Agency</b>
<b>Central government</b>	Ministry	OED	JD
	Directorate	NVE	DSB
<b>Regional government</b>	County Governor	County Governor	County Governor
<b>Local government</b>	Municipality	Municipality	Municipality

## Lead agency: The Norwegian Directorate for Civil Protection (DSB)

In 2003 the Directorate for Civil Protection and the Directorate for fire- and electrical safety was merged to form a new agency: DSB (NSD 2003). Its tasks are to keep track of risk and vulnerability in society and to prevent and prepare for adverse events (Office of the Auditor General of Norway 2015: 15). DSB was specifically created to strengthen, renew and unite the work on the field of societal security and safety in Norway. Although this was the initial intention, the Office of the Auditor General of Norway has on several occasions raised concerns about the lack of coordination between the JD and DSB and pointed out that this severe weakness might inhibit the quality and efficiency of their work (Office of the Auditor General 2015: 8).

DSB controls and supervises other government actors within the area of civil protection and societal safety, provide evaluations and organize different types of exercises. DSB also organizes The Norwegian Civil Defence, an operative reinforcement resource that can be called upon to ensure better crisis management performance in a crisis (DSB 2013: 14). This makes them a ‘lead agency’ within the area of societal safety.

In addition to its supervisory functions, DSB supports the JD’s coordination function concerning societal safety and civil protection; it interprets and analyzes information from other relevant agencies, from the regional level and from local authorities (DSB 2012a). In the aftermath of the two floods studied here, DSB was delegated the responsibility of evaluating the government’s crisis management

performance. A main goal of this evaluation was to provide guidelines that could improve performance in future crises. DSB's budget was strengthened after the events on the 22<sup>nd</sup> of July 2011. This increase in funding continued throughout 2013, but has since been reduced.

DSBs relationship towards NVE is most clearly defined in its supervisory/audit function. Exchange of information, data and cooperation between the two agencies regarding which themes that need supervision is regarded as essential (DSB 2013: 46). Upon request from the Office of the Auditor General a joint *forum for supervision* was established in 2008 to provide guidelines for the flow of information between the two agencies (NVE 2009). A joint collaboration agreement was established in 2009 (NVE 2011).

Sector authority: The Norwegian Water Resources and Energy Directorate (NVE)

NVE was founded to ensure the management of Norway's water and energy resources (Kleivane 2011). Its central mission is to ensure an environmental focus, efficiency and relevant income from the water and energy sector. Related to this is its central role in preventing and preparing for future floods and NVE has become a lead actor in the national work on power supply safety in Norway.

NVE is a national resource in the estimation of flood-endangered areas and a guiding partner for the municipalities' development and planning in these areas (OED 1997: 4). It audits local- and regional authorities within the sectoral competence area of OED and is therefore regarded as sector authority within their field.

The directors of NVE and DSB meet yearly to discuss topics of mutual interest. The joint collaboration agreement established in 2009, however, is regarded by the actors as being loosely exerted in practice and more relevant for electrical safety than in preparedness for floods. It seems therefore that the collaboration between the agencies regarding floods in particular is rather underdeveloped. DSB lacks formal authority, resources and means to have any real influence on NVE and for ensuring the implementation of suggested measures after a crisis. DSB's coordinative function is not adopted in formal regulation, although they do pass on information from situation reports provided by the County Governor in coordination meetings with other state agencies at the regional level, to the JD. There have been several attempts to create networks between the directorates, but these attempts have not succeeded or even in some cases been abandoned, arguably because of low priority in both organizations. To date there is no formal

agreement between the two directorates specifically, except within the area of electrical safety and control. Central actors expect a formalization of DSBs coordination role to be adopted shortly, however. According to them there is a strong need for this kind of collaboration, and they also see the fact that there is a will to formalize this to indicate a clear dedication towards decreasing the fragmentation within the field.

## Analytical framework

### Administrative capacities

Administrative capacities are at the heart of public problem-solving and necessary assets for governments when facing increasingly demanding challenges in modern society (Lodge and Wegrich 2014). They include coordination capacity, regulatory capacity, delivery capacity and analytical capacity. These capacities can be seen as means to enhance learning, and can assist governments in their implementation and sustaining of new and innovative policies for improving crisis management performance. Different actors may emphasize different capacities and means at different times and in different situations.

The Norwegian government has over the last decades been characterized by an increasingly fragmented structure (NOU 2003:19). Therefore, its *coordination capacity* is important. The capacity to coordinate is about the competence of individuals and bringing together and aligning organizations from different backgrounds under tricky conditions (Lodge and Wegrich 2014: 13). Coordination capacity concerns both the vertical dimension, between actors and organizations at different administrative levels, and the horizontal dimension, between actors and organizations at the same level. In the Norwegian context, coordination problems are related to two central governance doctrines. The principle of ministerial rule strengthens vertical relations within central government and weakens horizontal ones. A principle of local authority strengthens coordination within the local authorities but weakens relations between central government and the municipalities. At central level, the most pressing issue is that government agencies are not communicating very well. This is instigated by the sectorized bureaucratic jurisdiction, escalating when securing their own agencies' interests becomes more important than working together and facing the challenges and problems together as a whole (Lodge and Wegrich 2014: 13). *Regulatory capacity* concerns the state's ability to control and regulate through audit bodies, providing new regulation in areas that previously was not formally regulated and the general expansion of synoptic control (Lodge and Wegrich 2014: 11). In the case of preparing for and

dealing with floods, this concerns areal planning and also audit regime. *Delivery capacity* puts things into action and concerns the resources that are used to insure the public's safety. It concerns capacity to act in a crisis, to manage the crisis in the operative phase and the provision of adequate resources to do so. *Analytical capacity* concerns the governments' knowledge, information and projections of future events (Lodge and Wegrich 2014: 14). In crisis, this concerns predicting risk and producing adequate risk and vulnerability analyses and flood warnings. The critics of this aspect have pointed to a lack of sufficient expert knowledge in government, arguing that bringing transboundary sources of expertise into government is necessary to solve transboundary problems. Table 2 shows the administrative capacities according to each actor's focus and responsibilities. Explanations of how these capacities were used in the events specific to this paper is discussed and elaborated in the next section of the paper.

Table 2: Administrative capacities in crises

	Local level	Regional level	Central level	
Administrative Capacities	Municipalities	County Governor	DSB	NVE
<b>Coordination capacity</b>	Sets crisis management-staff in crisis, which all activities are coordinated through	Coordinating actor regionally, based on the Instructions for societal security and preparedness (2015)	Coordinating actor at central government level Has through the county Governor responsibility to ensure the municipalities work on societal security	Gives counselling and guidance to the county Governor and the municipalities  Coordinates the preparedness planning for power supply
<b>Regulatory capacity</b>	General emergency preparedness responsibility locally, to insure public safety  Ensured through the Civil Defence Act (2011)	Driving force for the work on social security in the counties.  Audits the municipalities' work with societal security and their risk and vulnerability assessments according to the Civil Defense Act (2011)	Enforces the Civil Defence Act (2011)  Professional authority and supervisory role for the County Governors' work on societal security and crisis management  Gives guidelines and advice to local and regional levels on matters of civil protection	Delivers guidelines for the municipalities to use in their work with floods and landslides/avalanches  Issues flood warnings and forecasts
<b>Delivery capacity</b>	Sets crisis management-staff in crisis, consisting of the top politicians and administrative staff in the municipality.  Coordinates locally.  Maintains vital social functions and ensures the local community's «life and health»	Provides guidelines and coordination in crises and extraordinary situations  Organizes an emergency council at county level in a crisis. Central actors involved meet to cooperate and communicate in the event	Deploys the Civil Defence in a crisis  Coordinates situational reports from the county Governor and informs the JD in the crises	Responsible for the national flood warning-service. Operates a 24 hour-preparedness line for flood- and avalanches/landslides  Gives professional advice to the municipalities and the police.  Partakes in the county emergency councils in crisis
<b>Analytical capacity</b>	Assesses own performance and evaluates learning in the aftermath of	Documents events, provides evaluations by actors involved in	Evaluates the government's work in a crisis	Provides evaluations and reports assessing the events



	Local level	Regional level	Central level	
Administrative Capacities	Municipalities	County Governor	DSB	NVE
	floods Provides risk and vulnerability analysis at local level	the aftermath of both crises Provides risk and vulnerability analysis at County level		

## Research methods and data

Our paper is based on qualitative analysis of data collected from public documents, semi-structured interviews, official reports and evaluations of the floods, and other generic web-based information. This includes government White papers (Stortingsmelding), government letters of allocation and Official Norwegian Reports (NOU). Two reports from the DSB, the evaluations in the aftermath of the floods in 2011 and 2013 (DSB 2012b, DSB 2013) were crucial. Both of them were based on reviews of relevant documentation, meetings with actors taking part in the crises, and information gathered through surveys. In addition, participation in seminars and conferences was also a part of the methodical gathering of information in 2011 (DSB 2012b).

In total 12 semi-structured interviews were done for this case study in DSB, NVE, with the County Governor of Oppland and in the two municipalities. All interviewees had central positions in their respective organizations at the time when the crises hit. The informants from DSB had worked mainly with the evaluations in the aftermath of the crisis, but also with operative crisis management on a higher level during the floods. Additional interviews with the mayors, civil engineers working especially with floods, and the security chiefs in the two municipalities were also done. The main goal of the interviews was to gain more in-depth knowledge from different perspectives about how the crises were handled, how well they were handled and also what had been done learning- and experience-wise to increase the understanding and preparedness for future crises. Each interview lasted for approximately one hour.

The interviewees were *elite-informants* who hold positions of power and influence as a result of their formal positions (Marshall and Rossman 2011: 155), and they were expected to have rather detailed knowledge of the case(s) in question. The

informants for this study were carefully chosen for their formal positions in the crisis management of the floods, for their knowledge of the case in particular and/or for floods and flood management in Norwegian government in general. They were all a part of the political and administrative elite and were therefore assumed to possess knowledge and unique information that would not be obtained from public documents alone (Andersen 2006: 281). Detailed interview guides were developed for each interview.

It is difficult to say to what extent the opinions and information that the informants gave were influenced by the position(s) they held or their personal opinions. Objective information is hard to come by when analyzing a crisis. We cannot know whether informants felt the need to «over»-report that learning had been achieved in their organization, for example. Personal bias and/or professional loyalty towards their own agency may have affected their answers. In order to avoid this as much as possible, we tried during the interviews to establish a shared understanding of the subjects and themes discussed.

## The two floods

In 2011 and 2013 large areas alongside the river *Gudbrandsdalslågen* were flooded. No lives were lost, but there was massive property damage and damage to vital infrastructure in the affected communities. In 2011, the telecommunications networks in the whole region were down because of the extreme weather, causing severe problems of coordination and information sharing. The actors' coordination capacity was limited and the communication from government to the general public was almost non-existing as a result.

Our analysis of the DSB report from 2013 shows that some measures and recommendations were followed up on after the flood in 2011, but others were not. This finding is supported by a White Paper on flood and landslides in 2012 (OED 2012). The coordination- and delivery capacity of the involved actors was not of satisfactory character. According to the 2013-report's main conclusions, the safety of the affected communities was not secured and important measures to that effect had not been followed up by the responsible actors (DSB 2013: 5). NVE was one of the main actors mentioned by DSB in this regard (DSB 2013). After 2011, several emergency measures were needed to secure the communities against future crises. According to NVE, they received funding to complete the measures but were forced to prioritize between different measures and between which local communities needed their resources the most. Because of the more serious situation in Kvam in the municipality of Nord-Fron they received more support, while certain actions in

Ringebu were not prioritized. A lack of resources in NVE and the short timespan between the two floods were given as reasons why the measures had not been implemented when the flood hit again in 2013. This perception was supported by the municipalities in the study, and by the informants that were interviewed in NVE. The planning- and completion phase of public affairs in government was seen as slow. This was related to what was seen as a poor 'upgrade' in safety measures from one flood to the next. NVE had originally estimated that rebuilding after the flood in 2011 would take approximately three years. Unfortunately, the second flood hit before that. A subsequent flood on the west coast of Norway in 2014 also diverted central government attention away from Gudbrandsdalen.

## Phases of crises

Placing events in crises into different phases can be a useful analytical tool. Comfort, Boin and Demchak (2010) present four phases of crisis management that will be used here: Mitigation/prevention, preparation, response/consequence management and recovery/aftermath politics. The four-phase model contributes with important insights when analyzing the crises in Gudbrandsdalen in 2011 and 2013. The phases will be presented and discussed in relation to the case specifically. Our main attention is on the last two phases of crisis management especially; response/consequence management and recovery/aftermath politics. This is where experiences and knowledge is obtained and utilized. The main goal is to develop knowledge for improving routines for the next potential crisis (Fimreite et al. 2014: 16).

### Mitigation/prevention

In this phase, attention is typically directed towards systematic risk-awareness and historical events in an effort to analyze whether or to what extent the community is exposed to various risks. Producing scientific knowledge on possible risks and to expose the areas that might be vulnerable in a society is of key importance. Regulations, inspection, analysis of past events and reshaping organizational structures are tools for preventing future disasters. The most important tool to reduce the chance of injuries and damages to infrastructure and housing is to steer the future community development away from the areas most endangered by flooding (DSB 2013). This is grounded in the assumption that flooding is a natural part the annual cycle of a river and that no measure can reduce or eliminate the floods entirely. Despite this, measures to move people or buildings further away from the river were not prioritized by the municipalities or NVE. According to DSB, government authorities should prioritize those measures that have the highest

societal benefits and are cost-efficient (DSB 2013: 31). The NVE develop *flood maps* for endangered areas, which are used for planning and preparedness purposes. In its report from the floods both in 2011 and 2013, DSB emphasized that these maps ought to be updated and strengthened.

In the aftermath of the flood in 2011 DSB (2012b: 3) requested that the municipalities improved their work on risk and vulnerability assessments. When DSB evaluated the flood in 2013, their conclusion was that risk and vulnerability assessments had been done more in depth and in more of the municipalities (DSB 2013: 6). This indicates that the municipalities were more dedicated towards the measures to prevent flooding set out by the central government.

## Preparation

Natural disasters are impossible to prevent entirely (Comfort, Boin and Demchak 2010: 3). With this in mind the government must nevertheless prepare for future events and realize that crises can hit at any moment. Lines of responsibility and coordination hierarchically and vertically must be clarified, and first responders must be ready and trained for the tasks ahead. All available resources must quickly be mobilized when crises occur.

Relevant to the preparation phase HYDRA, a research program initiated and led from NVE from 1995–2000 emphasized that existing flood protection measures have a large impact on how much damage floods does to a society (Eikenes et al. 2000). To accurately predict how and where extreme weather will hit is a difficult task, however. There is uncertainty concerning when this kind of weather will hit, for how long it will last and what the exact consequences from them will be. Coordination between actors and the sharing of both risks and costs is vital to ensure better crisis management performance.

Additional funding for preparation for flooding in Norway is a pressing issue. According to our informants, NVE needs more resources pooled towards their regional offices in order to support the fulfilment of measures locally. Funding is perhaps even more in want in the municipalities. Both agencies (DSB and NVE) agreed to this in our interviews. A central argument was that crises happen on the local level. Therefore, this is where preparation measures are needed the most.

## Response/consequence management

Adequate response and consequence management is needed to minimize damage and to sustain the crisis. In this phase, coordination and communication among the

involved actors is often problematic. The actors face uncertainty and struggle to work efficiently and to choose the right response strategies. Responsibility lines are often unclear and there is uncertainty concerning which actor should make which decisions (Comfort, Boin and Demchak 2010: 4).

According to DSB (2013) the coordination capacity of all involved actors clearly improved from 2011 to 2013. DSB, NVE, the affected municipalities and the County Governor methodically evaluated the 2011 flood and various measures have been taken as a consequence of these evaluations. According to DSB, there was particularly potential for improvement in crisis management by the County Governor when the flood hit in 2011. The threshold for setting the County emergency council was apparently too high, indicating that the council was not used to the extent that was necessary (DSB 2012b). The County emergency council met more frequently in 2013 compared to 2011 (DSB 2013), and this was emphasized as a very positive development in our interviews. The recommendations that were not followed up from 2011 to 2013 were related to the mapping of the risk of flood in side-streams, areal planning, introduction of security measures, and information about traffic from local government.

After the flood in 2011, delivery capacity was conceived as challenging by all evaluators. Lack of ways to communicate was seen as the number one contributing factor. In 2013 improvements had been made to the telecommunications networks securing better communication and therefore also improvements in coordination capacity. In 2015 a new national digital network for the police, health services, and fire and rescue services (*Nødnett*), which had been under planning since 2007, was implemented throughout the country. Although there have been some start-up problems, this is seen as a milestone to facilitate communication between those involved in the operative phase of a crisis – including floods.

Recommendations to improve the different actors delivery capacity in terms of handling floods were maintained after 2013, but DSB outlined in their report that there were considerable improvements from the first crisis to the next on all levels of government (DSB 2013: 5). The lack of full completion of all recommendations from 2011 was mainly explained by the short timespan between the events and even shorter timespan since the evaluation from the DSB was presented. Both floods were calculated to hit every 200 years (Norwegian Red Cross 2014: 7). The minimum legal requirement today is to secure buildings against 200-year floods. A lack of government funding towards such measures is, however, claimed to reduce the ability to implement such requirements.

The risk awareness was significantly higher when the flood hit in 2013 and the actors involved also cooperated better. The situation-reports came in at a quicker pace and more frequently. The alerts from NVE via the County Governor to the municipalities came in several days in advance compared to the situation in 2011. This can be seen as a large improvement in delivery capacity. It was also seen as a vital factor for improved crisis management performance during the second flood.

The main impression from the County Governor's audits is that the municipalities are increasingly aware that certain actions are needed for preparing for natural disasters and that they increasingly do take this into account in their areal planning. Climate change and the increased frequency of floods in the region makes the municipalities see the importance of areal planning, risk and vulnerability assessments and preparedness planning. The incidents in 2011 and 2013 together were therefore said to have contributed to an increased awareness that societal security needed to be taken seriously at the local level (County Governor of Oppland 2013: 7).

In 2012 NVE reorganized and founded a new Audit and Preparedness Department. A crisis support-unit was established under this department to support the other departments in NVE to perform their tasks. According to our information this reorganization did not come as a direct result of the floods in 2011/2013, but more as a result of a growing need for support and coordination in natural disasters more generally. The establishment of the new department can be seen as an element of learning obtained through the experiences with certain crises, and the floods in 2011 and 2013 among them. Our informants interpret the establishment of the new unit within NVE as an improvement and as evidence for a stronger priority towards new tasks and also indicating that NVE has increased their dedication towards crisis preparedness. The reorganization is seen to demonstrate internal learning within NVE's own organization, a goal that the informants emphasize as rather important.

In the municipality of Ringebu, resources were deployed towards building competence on floods and natural disasters after the flood in 2013. The project was shut down only two years later, however, due to a lack of funding. This shows that although local authorities may be dedicated to and motivated for preparing for future crises, they are often forced to prioritize differently when available resources and funds are scarce.

The County Governor's activities were especially highlighted in the reports following up the flood in 2011. DSB emphasized that the County Governor's risk and vulnerability assessments were improved in 2013 compared to 2011, and pointed out that the guidelines for the County Governors coordinative role had been

updated and that the vulnerability of telecommunication networks was reduced (DSB 2013: 5). The County Governor has an important coordinating role in a crisis. In our interviews, the County Governor stressed the significance of this coordinating role also in the aftermath of a crisis, and argued that there was a need for a further formalizing of the County Governor's responsibility in this respect. This would help clarify accountability issues that may arise after a crisis. The County Governor emphasized that they prioritized tasks on societal security matters and also expressed a clear interest in developing their work on this field.

### Recovery/aftermath politics

A major goal in the recovery/aftermath phase is learning. In this phase, decisions made and actions taken in the previous phases are analyzed and the governmental actors responsible will be held accountable. The politics of crisis management affects how the crisis is framed. The actors often have different opinions about how the crisis was handled and may result in *blame games* or blame avoidance strategies between different government actors (Hood 2007).

In the case of the two floods, attention to the crisis response-phase was far more prominent than what can be said about the recovery/aftermath-phase. Nevertheless, some improvements concerning the aftermath-phase were implemented after the flood in 2013. In the follow-up, DSB was asked to deliver a status report on the follow-up of recommended measures from the evaluation report in 2013 (DSB 2015a). According to this report, most of the recommendations from the 2013 report were acted upon or on the way to be, although some suggested actions were only partly followed up. Three measures were only partly addressed according to DSB: (a) improving risk and vulnerability analysis in the municipalities, (b) strengthening the efforts of NVE to secure exposed buildings and infrastructure, and (c) improve preparedness planning in the municipalities.

After the flood in 2011, housing was rebuilt according to existing standards in both municipalities with the approval from the NVE. In 2013, these houses were again destroyed because of the flood. Pertaining to this, a core concern for the municipalities was an upgrading of the Natural Disaster Law (*Naturskadeloven*), a law under the responsibility of the Ministry of Agriculture and Food (LMD).<sup>3</sup> According to this Law, the municipalities are responsible for securing against damages from natural crises in the local community. Both DSB and the

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<sup>3</sup> Several other laws regulate the prevention and preparedness for natural disasters. The most important ones are the Planning and Building Act, the Civil Protection Act, the Natural Disaster Law and the Water Resource Act. In addition the Building Construction Regulations (TEK10) and other guidelines from the NVE regulate certain responsibilities and actions.

municipalities claim that government funding for rebuilding houses after floods is not sufficient, however. DSB recommended amendments to the law after both floods in 2011 and 2013 (DSB 2012b, DSB 2013) pertaining to levels of rebuilding. The Natural Disaster Law will apparently not include any major changes in this respect when it is due for revision in 2017, however (DSB 2015a: 5). The argument is grounded in the principle of proximity, which makes the municipality and the landowner responsible for rebuilding after a flood or other damaging event (DSB 2015a: 5).

Personal knowledge and experience gained from the floods for performance and learning was highlighted as very important by all informants. To have been directly involved in the actual crisis and to have worked under the uncertainty and tough conditions that the crises created was seen as crucial. Several informants emphasized that this is something that one cannot train for, and that not even planned exercises and drills come close to such actual, hands-on experience. Many of the same people were active in the crisis management of both floods. This was highlighted as important for learning between the two floods. The actors also argued that this led to better and more cooperation and coordination between those involved. In 2013 the exchange of knowledge and information between already acquainted responders was higher and the bar for taking initiative and making contact had been lowered. These aspects indicate that stability of personnel, combined with in-depth evaluations might enable crisis-induced learning. Interpersonal knowledge and informal personal bonds created in a crisis is unique and often reduces the bar for calling in favors from one another in a similar situation. Learning and experience from a crisis needs to be diffused throughout the organization as a whole, however.

Local elections held after the flood in 2011 resulted in considerable political shifts in the two municipalities and both Mayors were replaced. There are no indications that this was related to the crisis management during or after the floods, however. Although some of the administrative staff working closely with the flood in 2011 was still assigned similar duties in 2013, many of them had been replaced. Even though the shift in personnel was considerable, the 2013 flood was seen as better handled than the flood two years before in both municipalities. Also the municipalities' resilience was seen as fundamentally better when the crisis hit in 2013. The number of administrative staff with responsibility within the area had risen, although very few were still dedicated to the task full time. Awareness of the risk of floods had risen. The shifts in staff took place directly after the flood in 2011 and the new staff became directly involved in the aftermath phase of the first flood. They also took part in efforts to rebuild, in evaluation and documentation work, and



were also trained by administrative staff working during the 2011 flood. Experiential learning achieved by those working with both the floods, and a feeling that they also managed to share these experiences with the new staff are relevant explanations for the overall sense of improvement in crisis management performance between the two floods.

Accountability and responsibility was seen as problematic in 2011 and also in the aftermath of the 2013 flood. NVE had on several occasions asked DSB to clarify the lines of responsibility both in the operative phase and in the aftermath of crises. DSB issued general recommendations about this in their report in 2013 but no formal signals or demands concerning the division of responsibilities were issued from DSB to the relevant actors in the follow-up. DSB expressed a certain understanding for the interest in such a clarification, but were reluctant to contribute to *blame-games*. According to our informants, they were hindered by a lack of formal and legal authority on matters transcending sectors and could not interfere with other actors with sectoral responsibilities. DSB stressed the need for a *follow up*-report that could concretize the recommended measures and responsibilities.

After the flood in 2013 DSB and JD invited all involved actors to a way forward-seminar, a new activity introduced that year (DSB 2015b). The actors were invited to present their perspectives, discuss solutions for future crises and also elaborate on measures taken after the floods. This initiative exemplifies DSB's interest in strengthening analytical capacity within the area. The stated aim was to create an arena for gathering involved actors to discuss common challenges, the use of public resources and issues concerning prioritization. DSB emphasized the need for more reports after events, highlighting that one report for evaluating is often not enough.

The evaluations from DSB after the two floods faced internal criticism. The reports were said to be weak on the methodological side and not transparent enough, a point of high priority in the DSB highlighted by our informants. DSB asserted that the weak methodical foundations of the reports might explain why some actors at the local lower levels were skeptical about implementing the suggested measures. Since the flood in 2013, DSB has investigated possible alternatives for a report-based evaluation system with an aim to improve their capacity for analyzing future events.

## Lessons learned and policy implications

According to our analysis there was considerable activity to enhance crisis management performance concerning floods immediately after 2011 and 2013, both at the local and at the central level. A main impression is that this was, and still is, an important issue for the relevant actors, and that they all express clear intentions to increase their efforts to ensure better prevention and crisis management also in the future. Overall, the main actors agreed that the flood in 2013 was handled significantly better in most aspects compared to the flood in 2011. Despite this, the Office of the Auditor General concluded in a report from 2015 that the potential for learning from incidents and training for future events in the Norwegian context are not sufficiently exploited (Office of the Auditor General of Norway 2015). A report from DSB in 2015 also revealed that not all measures that were proposed after the two floods were followed up (DSB 2015a). The Auditor General argued that evaluation reports after unwanted events and after training for unwanted scenarios had not been given enough attention and had not been prioritized by central government. This was also emphasized by DSB in our interviews. A relevant point mentioned by our informants in this regard was that the evaluations often have to be submitted within a few weeks after the incident has happened. This may imply that methodical choices and analytical competence by those performing the evaluations have shortcomings. This was seen as a clear weakness in analytical capacity at the central government level.

A main finding from our case is that a systematic implementation and provision of resources for ensuring organizational learning from past events and training for future events was lacking. DSB emphasized that they were working on improving their system for analyzing past events and ensure learning from evaluations. A core concern from the perspective of DSB was to slow down the internal training-interval and relocate resources towards existing evaluations with an aim of enhancing learning. Making sure that learning from events and training is diffused throughout the whole organization was highlighted as a priority, emphasizing that learning should not only stay with the individuals participating in the events and reflecting awareness that important organizational learning takes place when knowledge is shared and disseminated between individuals within an organization. In this case, carefully documenting past events was one concrete method used to ensure this. Previous experience tells us that collecting and documenting experiences can evolve into organizational learning and bring on organizational change as a result. Often, such documentation is not enough, however. Sharing and disseminating knowledge must also be ensured through processes of participation and interaction (Elkjaer 2003). Problems associated with crisis-induced learning are, typically, a lack of

automatic instigation of investigations, a lack of a systematic approach to such investigation and a lack of objective, third party evaluations (Deverell 2015). Despite good intentions, our case study demonstrates shortcomings on all these dimensions.

In conclusion, we find that there are pressing problems regarding the authority and capacity of central actors (in this case, DSB) to coordinate different actors in their efforts to manage floods. DSB lacks regulatory capacity and has to rely on providing informal pressure, through guidance and advice. Organizing by sector and specialization by purpose, as in the case of DSB, and specialization by process, as in the case with NVE, creates complexity and additional coordination problems. There are also problems concerning risk awareness and attention in more 'normal' times.

At the same time, there are signs of an improved crisis management in the aftermath of the two floods. First, there was a growing dedication towards all dimensions of administrative capacities by the actors involved in the management of the floods. The roles of the different actors were clarified and strengthened. More documentation, more thorough evaluations and follow-up seminars were key measures after the 2013 flood to secure learning for the actors involved. Second, personal knowledge and experience with actual events is an important asset for the organizations involved. The personal relations between participants in the County emergency council and actors from the municipalities and state agencies was seen as of crucial importance for a well-functioning and efficient crisis management performance. Also, the short timespan between the two floods gave those responsible for managing the crises fresh input of how to handle their responsibilities. The mobilization of resources was seen as better in 2013, especially by the municipalities themselves. An important improvement in 2013 was also that NVE had increased their warning interval and therefore alerted the municipalities earlier than in 2011.

Although the crisis management performance according to the municipalities themselves improved in many aspects, the municipalities still emphasized that more competence and capacity for securing their own communities against future events was necessary. In addition, NVE emphasized that there was a need for more regional funding to follow up its tasks in the municipalities and also a need for more detailed knowledge on the situation in the municipalities. DSB claimed that NVE did not have sufficient delivery capacity in this respect (DSB 2013: 5), and agreed that an increase in NVEs funding regionally was necessary. This topic was raised once more when western parts of Norway were hit by a flood in 2014. An evaluation report following up this event found that the affected municipalities were not sufficiently prepared (Dannevig, Groven and Aall 2016). The communities in

question lacked sufficient risk awareness and necessary measures to prevent flooding. This led to massive damages to infrastructure and housing. This emphasizes even more strongly the need for competence and capacity at the local government level to increase risk-awareness and preparation in municipalities located in flood-endangered areas.

From our case study, we can conclude that central actors with responsibility for crisis management and for handling floods in the Norwegian government emphasize the importance of having a well-functioning, cross-sectoral coordinating agency in crisis management. DSB considers its coordination capacity to have been steadily improving over the last years and that its role in dealing with cross-sectoral questions and challenges has been clarified. This is explained by heightened expectations and demands set for their coordinating role by the Ministry, the Government and other central governmental actors. Our impression is that things have speeded up after 2013. DSB's responsibilities have been expanded in order to support, coordinate and synchronize efforts on the directorate level of government. DSB and the NVE also increasingly cooperate in audits where their responsibilities overlap. Since the establishment of DSB the Ministry of Justice's responsibility for coordination of cross-sectoral questions and challenges also has been expanded. This expansion of tasks has been demanding for DSB and has led to a reorganizing of resources. Nevertheless, DSB emphasizes that the Ministry prioritizes these tasks. In this process, additional and adequate funding and resources has been provided. The more active role that the DSB has taken on in coordinating work at the agency level has also grown out of acceptance of this from the other agencies. It is expected that DSB's coordinating role will be further formalized in official documents in 2016 and that this will further empower DSB further to perform its coordination function. A concrete anticipated coordinative measure is that situation reports from the County Governor will be merged with corresponding reports from DSB before they are sent to the Ministry. This means that DSB may obtain a role as a «hub», where information from all levels of government is coordinated before it is conveyed to the Ministry.

Our overall impression is that NVE does not experience a close relationship to the DSB, somewhat contradicting what DSB says. This might change if or when DSB's coordinating role at the agency level becomes more formalized. DSB's coordinating role was also emphasized by the County Governors. A further specification of coordination and cooperation between the different actors on the various levels of government is expected clarify responsibility for decisions, the follow-up of recommendations, and also making more clear who are not doing their jobs correctly and sufficiently according to their missions.

Increased attention towards coordination capacity, both hierarchically and vertically, can overall be seen as an important step to improve societal security. The fragmented government system complicates the clarification of responsibilities and causes accountability feuds. Actors who work in different agencies often do not cooperate and exchange information. This is especially the case when they are not bound by formal cooperation-agreements or by personal relations or knowledge of those working in other agencies. Ensuring that experience from the local level reaches the central level is difficult, and likewise that instructions and advice from the central level to the local municipalities regarding prevention and preparedness for floods are heeded.

Ensuring learning from actual crises, either personally, by way of someone else's experience, or in the history of the organization, is of crucial importance for increasing future crisis management performance. Individual and experiential learning needs to be infused within the whole organization. An increased focus and prioritization of more systematic evaluations is vital. Personal relationships, personal knowledge and familiarity between actors of different sectors are important for establishing and maintaining well-functioning networks. Working together on cross-sectoral projects is one such way to enhance coordination and for clarifying accountability relations. This means that informal mechanisms as well as formal structural arrangements and adequate resources to support such networks are necessary.

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