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Focus and Scope

GRF Davos' innovative e-journal aims to support the establishment of a worldwide risk community, committed to sharing know-how and expertise by a constant process of dialogue – a crucial but still insufficiently implemented element of a truly integrative approach to risk reduction and disaster management. Planet@Risk provides:

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- theories, methods and tools for analysing, modelling and addressing these risks and disaster
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Editorial

We live in a changing and increasingly complex and more vulnerable world. Disaster risks entail ever more international and global impacts and unforeseen cascading effects. One example is the drought in the U.S. farm belt in 2012 that triggered a global food price crisis and further limited the access to food for the over 1 billion people suffering from hunger. Another example happened in 2011 with the strongest earthquake ever measured in Japan triggering a tsunami that caused over 15'000 casualties and very severe damages to the Fukushima nuclear power plant finally resulting in severe radioactive contamination over hundreds of square kilometres. The 2011 flood in Thailand hampered the global supply chain for hard disks, which is another example. The outbreak of the highly pathogenic avian influenza has stated an example that only an internationally coordinated approach will pay off. In order to reduce such complex and multifaceted risks and to prepare, respond and recover from such events an integrative risk approach is needed. It is of utmost importance to include all the various risks into one and the same decision making process to allocate the resources effectively and efficiently. Natural hazards, technological and biological risks, climate change, land degradation, loss in biodiversity, water scarcity and natural re-

source depletion, but also health risks, food safety and security have to be analyzed and assessed within a holistic approach.

In this issue of *Planet@Risk* the state of the art collections, grey literature summaries, case studies for good practices and scientific reports shall provide guidance to governments and non-governmental actors alike on why they should and how they can, together, reduce risks and vulnerabilities and to increase resilience and sustainability.

I would like to thank the authors for their substantive contributions they share with us, and the Editorial Board members who secure the quality of the journal with their valuable work. I wish you a lot of new insights with this issue of *Planet@Risk*!

Walter J. Ammann

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The Co-Production of Scientific Advice and Decision Making under Uncertainty: Lessons from the 2009 L'Aquila Earthquake, Italy

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Abstract – On 22 October 2012, seven members of the Italian Major Risk Commission were found guilty the injuries of 4 and manslaughter of 29 people in relation to the 2009 earthquake that hit L'Aquila, a town in Central Italy. These members were sentenced to six years in prison for failing to meet their obligations to adequately analyse seismic risk and provide clear, correct and complete information, which might have saved many lives. The case has not yet been concluded. Thus far, the debate has mainly focused on the scientific, legal and communicative aspects of the verdict, while the institutional dimension, including the co-production of scientific advice and decision making, has received less attention. Co-production processes shape how scientific advice is used to make real world decisions and how different priorities, tasks, purposes and organizational cultures of scientists and practitioners can influence the decision making process. We argue that understanding the event and the legal aftermath requires a knowledge of the deep epistemic uncertainty intrinsic to the nature of scientific advice as well as the responsibility overlaps of scientists-turned-decision-makers. Another relevant institutional aspect is the concern of the national and local authorities that the population would over-react to anything other than a reassuring message. We discuss the consequences of this framing of the emergency management problem in terms of public control rather than public safety. We argue that an effective warning communication should inform people about the precautionary actions to undertake as well as the risks, benefits, and costs of their decisions, thereby allowing them to make sound and responsible choices.

Keywords – *epistemic uncertainty, science policy co-production, emergency communication, communication paradoxes*

1. Introduction

Providing scientific advice to decision makers has never been easy, and it is particularly difficult when the facts are uncertain and the stakes are high, as it is in issuing a warning for a natural disaster (Funtowicz and Ravetz 2008). One aspect of the communication difficulty is that scientists work in a world of uncertainties and probabilities, while practitioners and decision makers often prefer straightforward answers and clear suggestions about what to do, especially when facing a crisis (Cash et al. 2006; McNie 2007; Sarewitz and Pielke 2007). However, even if they have different priorities, tasks, objectives and even understandings of the problem, scientists and prac-

tioners must cooperate in order for effective decision-making to take place, especially when scientific knowledge plays a determinative role. Given the differences in purposes and organizational cultures between the scientific and institutional communities, difficulties arise in conveying scientific uncertainties, in defining what is an acceptable level of risk and who has the responsibility to set the thresholds, and ultimately in making science useful for practitioners. Yet, notwithstanding these difficulties, decisions are co-produced through the interactions between these communities. Co-production processes shape how scientific advice is implemented on the ground. In its own turn, this advice can have relevant consequences for local residents, as was tragically demonstrated by the 2009

earthquake that hit the Italian town of L'Aquila.

The L'Aquila case shows how decisions become particularly difficult in cases of deep epistemic uncertainty and institutional overlap – i.e. when there are major gaps in the ability to understand phenomena and outcomes, coupled with overlapping roles, responsibilities and mandates in the decision making processes. The moment magnitude (Mm) 6.3 earthquake claimed more than 300 lives and injured more than 1600 people. It also represented a “worst case scenario” for scientific advisors, because it led to the conviction of seven members of the Italian Major Risk Commission for negligence in providing hazard-assessment advice before the earthquake. The allegation claimed that the scientists failed to fulfil their obligations to i) provide clear, correct and complete information that might have saved many people lives and, ii) adequately analyse seismic risk (as reported in the verdict n.380/2012). Following their conviction, the members were sentenced to six years in prison and fined several million euros. At the time of this writing (August 2013), the accused scientists are appealing the verdict and legal experts anticipate that the final resolution of the case may be years away.

This case provides a sobering opportunity for reflection for those who deal with disasters and disaster research, for several reasons. As we will describe in the following sections, the verdict caused heated reactions. So far, the debate has focused on the scientific, legal and communicative aspects of the verdict, while the institutional aspects have received less attention. Here, we focus on the institutional facets of the phenomenon and more precisely on the role of scientists as advisors in the decision-making process as well as the multiple institutional and communicative issues that influence how science advice is given and received. In order to comment on these issues, we start by providing a description of what happened in L'Aquila before and after the 2009 earthquake.

2. The L'Aquila earthquake

2.1. The seismic swarm and the 6th April event

At 03:32 on 6 April 2009, a devastating Mm 6.3 earthquake struck the city of L'Aquila and its province, also named L'Aquila, in Central Italy. In addition to claiming more than 300 lives and injuring more than 1600 people, the disaster destroyed some 20,000 buildings and left 66,000 people temporarily displaced with an estimated damage of some 16 billion USD (Ozerdem and Rufini 2013; De Marchi 2013 b). The main shock had been preceded by a seismic swarm with hundreds of modest phenomena up to a magnitude Mw 4.0 on 30 March 2009. This swarm originated approximately half a year earlier in October 2008. Given the long duration of the swarm, residents were understandably alarmed. In such a tense situation, the numerous unofficial warnings by a technician formerly working in a laboratory of the National Research Council captured

significant media attention. On the basis of radon measurements that he had performed, he insisted that a major earthquake was soon going to occur. His unofficial warnings particularly outraged the head of the National Department Civil Protection (NDCP), who reported him to the authorities for diffusing alarming news. He also subsequently convened a meeting of the Major Risks Commission, which is a consultative body of the National Service for Civil Protection for “providing advice about forecast and prevention of the various risk hypotheses” (art. 9 l. 225/1992, last update l. 100/2012)¹.

The meeting of the Commission took place on 31 March in L'Aquila with the aim to “provide the citizens of Abruzzo with all the information available to the scientific community about the seismic activities of the previous weeks” (verdict n. 380/2012: III). As reported by the head of the NDCP, there was a “need to reassure the residents and to organize an event for the media (operazione mediatica)” (ibidem: 131). Already prior to the meeting, reassurance was provided to journalists and residents by a member of the Major Risk Commission stating that the seismic situation in L'Aquila was normal because of the continuous discharge of energy due to the seismic swarm (ibidem).

The need to reassure the population was also related to the fact that the situation had grown very tense and residents were confused by contradictory information. Moreover, given a history of such tragedies, such as a 1703 earthquake that killed more than 3,000, the recourse of action in the face of such swarms for the local population has been marked by high risk aversion with people frequently choosing to go outside to be safe in case of an earthquake.

During the meeting, it was reaffirmed that no scientifically sound method exists to predict earthquakes. The Commission came to the scientifically correct conclusion, that there is deep uncertainty and thus did not provide any specific line of action: “it is unlikely that an earthquake like the one in 1703 could occur in the short term, but the possibility cannot be totally excluded.” (statement of a member of the Major Risk Commission). Today, science is still unable to predict earthquakes and seismic swarms are not robustly linked to large seismic events. Seismologists agree that it is not possible to identify *a priori* a seismic sequence that anticipates a large shock with respect to many other seismic sequences that do not end with a big earthquake. For example, according to Grandori et al. (2009), only 2% of swarm activity has been linked to large seismic events and there is no theory that links precursor signals conclusively to severe earthquakes. L'Aquila is such an example because the town had already experienced swarm episodes in earlier times, which did not lead to a large earthquake.

The meeting was followed by a press conference where no specific measures of protection were suggested while it was reiterated that no scientifically sound method exists to predict earthquakes.

¹The Major Risk Commission activities are of a techno-scientific and advisory type and include providing guidance in connection with the forecast and prevention of the different risk situations. Among others, the Commission, which usually meets every two months, defines research needs for the Civil Protection, evaluates results and assesses risks

2.2. *The verdict*

Three and a half years after the event, a court case received major media attention. On 22 October 2012, seven members of the Italian Major Risk Commission were found guilty of manslaughter of 29 persons and injuries caused to 4 others. The 781-page verdict, made publicly available on 18 January 2013, is the result of a penal process which included 31 hearings from September 2011 to October 2012.

Some relatives of the victims claimed that because they believed the official information, their family members and themselves chose not to apply protective measures and did not leave their homes on the night of 6 April. As noted in the recently published verdict, the statements made during the press conference by the members of the Commission caused a “psychological reaction consisting in a double mechanism: i) collective removal of the seismic fear, ii) strong belief in the reassurance indications and assessments provided by the Commission, which has been favoured by its credibility and authority” (verdict n. 380/2012: 574). Moreover the judge focused on what he defined as contradictory information provided by the scientists which -the judge argues- reassured the population, likely also due to an “amplification effect” guaranteed by the media. As one example of contradictory information, the judge cited the excerpts of interviews by two members of the Commission: “Any earthquake forecast does not have scientific foundation” and “The scientific community tells us there is no danger because there is an ongoing discharge of energy” (ibidem: 375). These excerpts of interviews clearly illustrate the difficulties in conveying scientific uncertainty. So far, the existing discussion on L’Aquila earthquake has focused on the scientific, legal and communicative aspects of the verdict, such as earthquake forecasting, scientific proofs during a trial and uncertainty communication. In the next section, we will summarise the key points of this heated debate.

2.3. *The reactions to the verdict*

Earthquake forecasting represented one of the main topics discussed in relation to the L’Aquila case. Before the verdict, more than 5,000 scientists signed an open letter to the president of Italy, stating that the seven Italians face (unfair) criminal charges for failing to predict the earthquake. Pinpointing the time, location and strength of a future earthquake in the short term remains, according to a scientific consensus, technically impossible (Hall 2011). Seismologists from all over the world have expressed their support for the convicted colleagues, including support letters from more than thirty associations (for an overview see <http://processoaquila.wordpress.com/international-support/>; Nosengo 2010; Hall 2011; Aspinall 2011; Cartlidge 2012; Marzocchi 2012; Wyss 2013; Amato et al. 2013). The reactions have been focused on the lack of accepted scientific method for earthquake prediction, the ignorance of the general public (or even the jurists) about the concepts of probability or uncertainty and, more in general, on the scientific aspects of the verdict which has

even been defined as a “lawsuit against science” (Amato et al. 2013; Marzocchi 2012).

The solidarity statements point out that it is not the fault of the scientists if the public and even the jurists are unable to understand what uncertainty in hazard and risk assessment really means and that better education should be provided. “If the jurists would have a correct perception of probability, this trial would have never started” (Gasparini and Leone 2012: 1). Indeed “the accusation implicitly follows a logical fallacy: ‘if scientists say that an event is unlikely, but this event actually happens, this means that the scientists are wrong’” (Marzocchi 2013:17). Many colleagues of the seven convicted add to this point by highlighting how the verdict wrongly assumes that there is a responsibility of scientists for the correctness of their assertions. The reactions from the legal community have also been heated, but they focused on different issues such as the concept of acceptable risk, the causal nexus between the experts statements and residents’ behaviours, and more in general on the issue of scientific proofs during a trial, e.g. what proofs should be used and how to evaluate the quality of scientific evidence (Zalin and Butti 2013; Tallacchini 2013; Masera 2013).

Finally, what happened in L’Aquila has also been interpreted as a failure of science communication. For example, Ropeik (2012) maintains that “the trial was not about science, not about seismology, not about the ability or inability of scientists to predict earthquakes. These convictions were about poor risk communication, and more broadly, about the responsibility that scientists have as citizens to share their expertise in order to help people make informed and healthy choices.” Beyond this we provide some additional reflections on the role and responsibility of scientists in the production of scientific advice for decision makers.

3. *The co-production of scientific advice and decisions*

Depending also on the (disciplinary) perspectives that are used to interpret what happened, many lessons can be derived from the L’Aquila case. So far, the institutional side of the decision process has received little attention. We argue that the presence of deep epistemic uncertainty intrinsic in the scientific advice coupled with unclear and mixed roles of the scientists-turned-decision-makers are fundamental to understanding the event and the legal aftermath. Two aspects are particularly relevant, one is related to responsibility overlaps and the other to the need of emergency managers to reassure the public and control overreactions of the residents.

3.1. *Role and responsibility overlaps*

After the meeting held on 31 March in L’Aquila, the members of the Italian Major Risk Commission simultaneously acted as advisors, public officials, and decision makers (without necessarily being aware of it). As reported in the minutes of the meeting, the aims were to: i) provide an objective evaluation of the seismic events, also in relation with what can be forecasted; and ii) discuss and pro-

vide advice about the warnings (Presidenza del Consiglio dei Ministri 2009). In other words, the scientists were requested to provide suggestions not only on scientific issues but also on decision making. Moreover, as reported in the verdict, “the Commission, due to a pre-established [by the head of the NDCP] communication strategy, was not addressing its advice to the Civil Protection Department, but directly to the population” (verdict n.380/2012: 175). To understand this point it is important to clarify that the Commission is a national consultative body representing the formal communication channel between the NDCP and the scientific community². Its activities are of a techno-scientific and advisory type and in case of events of great intensity (defined as “Type C events”, law 225/1992, law 401/2001, law 100/2012), the Commission is in charge of providing evaluations and assistance to the NDCP. On this basis, the last one (directly or through its local branches at the regional, provincial and municipal level) provides information to the population.

The legislation clearly distinguishes the role of the scientific advisor from decision makers, but the border between provision and communication of scientific information is easy to cross.

In this case, the scientists acted as advisors, public officials, and decision makers at the same time. It is clear that this overlap of roles influenced the entire communication process. In this way the scientists have been made co-responsible, if not entirely responsible, for the decision on how to communicate the risk to the population. Their role and related responsibility (of which most of them were not even aware of, see Boschi 2013) deflected the attention from the national and local decision making bodies for managing emergencies, and it also reflected the difficulties of those in power to actually make a decision on whether or not to evacuate an area. This is where the co-production of scientific advice and decision making became particularly difficult. In Italy, as in many other countries, the mayor is the ultimate responsible authority for issuing a warning after having consulted the provincial and regional authorities (l. 225/1992). The Italian legislative framework for warnings varies across the regions, but in general the laws do not provide specific tasks for different hazards. Indeed some hazards, like floods or storms, can be more easily associated to warnings, than for example earthquakes. In addition to false negative warnings as in the case of L'Aquila, false positives can have huge negative consequences and those in charge typically fear both situations (Woo 2011). For example, after the Sarno landslide in 1998 (which killed 137 residents), the mayor was sentenced to five years in prison and interdiction from public roles because he did not give an order to evacuate the town (Corriere del Mezzogiorno 2011). Another example is that one of the reasons why the New Orleans mayor was reluctant to order a city evacuation in 2005, when Hurricane Katrina hit the city, was the fear that the city government would be sued for disrupting local tourism (Woo 2011).

3.2. Public control and public safety

The relatives claimed that the behaviour of the victims was influenced by the reassuring information provided during the press conference by the members of the Major Risk Commission. As repeated several times in the verdict, the aim of the Commission meeting was actually to reassure local residents and to spread the message through the mass media (court verdict n.380/2012: 169). The meeting was followed by a press conference where no specific measures of protection were suggested to the citizens. However, it was also reaffirmed that no scientifically sound method exists to predict earthquakes. Reassurances were provided to journalists and residents that the seismic situation in L'Aquila was normal and “favourable because of the continuous discharge of energy due to the seismic swarm” (court verdict: III).

Finding ways of reducing residents' psychological stress after months of minor tremors and avoiding panic was a major concern for practitioners and emergency managers. As reported in the minutes of the meeting of the Major Risk Commission: “The problem is worsened because the population is worried and alarmed from uncontrolled voices which cause panic. We have to understand what is going on from a scientific point of view and provide reliable/certain information” (Presidenza del Consiglio dei Ministri 2009: 2). In other words, national and local authorities seemed to be motivated by a concern that people would over-react to anything other than a calming message and the risk management problem was therefore framed in terms of public control rather than public safety (De Marchi 2013 a).

Such behaviour is not new and has been reported in several other cases and studies in the field of psychology, sociology of disasters and risk communication (e.g. Quarantelli and Dynes 1972; Otway and Wynne 1989). Research results have shown how fear can be an effective mechanism in the event of an impending and unpredictable danger. And indeed fear is a mechanism that keeps animals (including humans) alert in dangerous situations, as opposed to panic, which triggers life threatening behaviour. Unfortunately, avoiding panic is such a major concern for public authorities that they often fail to make the appropriate distinctions between fear and panic, focusing their attention on the possibility of panic and assuming that residents would adopt life-threatening rather than life-saving behaviours.

In risk communication research, this concept has already been defined as the information targeting paradox (Otway and Wynne 1989). This paradox concerns the assumption of the public authorities that the dissemination of emergency information must be restricted to avoid public overreactions and panic. The same authors also defined another paradox, which can be relevant for the case of L'Aquila, i.e. the information cultures paradox, which arises from the awareness that each organization reflects its own information culture need. Science and decision-making are separate domains with very different forms of

²This definition is reported in the official website of the Italian Civil Protection Agency.

legitimization, and therefore have different ways of producing and defining uncertainty, usable knowledge and information, etc. (Fischhoff 1995, 2013; McNie 2007). In this case the main objective of scientists and researchers was to deal with uncertainties in hazard and risk assessment. The main objective of practitioners was instead to avoid liability in case of damages or, even worst, losses in human life.

4. Discussion

The case of L'Aquila is particularly tragic and complex as a risk that could not be robustly predicted turned into an actual disaster. There are other disasters that can be predicted and where early warning is effective. Yet uncertainty is a key issue to reckon with as well. As described in the previous sections, a key problem was the deep epistemic uncertainty and the fact that it is still not possible to provide clear information on the role of seismic swarms as earthquake precursors. Yet, an important question remains: How could available information reassure the population? Or, more in general: How could any kind of information reassure the population, if earthquakes cannot be predicted? (De Marchi 2013 b) How can this information be communicated to citizens while taking into consideration two contradictory goals, i.e. to avoid messages leading to overreactions by population and to provide information under conditions of epistemic uncertainty?

Beside the lessons that can be learned from research in sociology and risk communication (see section 3.2), there is also a need to better understand not only the kind of information that scientists can provide, but also the purpose of this information and how it fits in the decision-making chain. The quality of a decision cannot be evaluated separately from the process, which leads to it and requires transparency and accountability.

To summarise, we argue that to better understand the co-production of scientific advice and decision-making in the case of deep uncertainty, the role and mandate of scientific advisors needs to be carefully evaluated and explicitly defined. This raises a number of questions, such as who should actually be responsible for decisions about the warning, how this responsibility should be shared with local population, what is the purpose of the scientific advice provided by experts, who are the recipients, and to what extent are they responsible for their own actions and decisions. An effective warning should inform people about potential protection action to undertake and about the risks, benefits, and costs of their decisions, thereby allowing them to make sound and responsible choices (Fischhoff 2013).

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Current Measures to Address the Social Vulnerability of Children in Disaster Risk Reduction - Exploring the European Union's Disaster Risk Reduction Strategy¹

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Abstract – To reflect the increased global recognition of Disaster Risk Reduction (DRR), the European Union has generated a common DRR strategy under the European Community Humanitarian Office, ECHO, or more specifically its Disaster Preparedness mechanism, DIPECHO. As the EU classifies DRR as humanitarian assistance, its DRR policy tends to surround a needs-based approach to disaster risk management, focussing on addressing immediate risks to natural disasters, where slow onset risks are often labelled as a causal factor, and thus a development issue. Such classifications can generate a grey area in managing initial and slow onset risks, where particularly susceptible groups can face increased vulnerability. Children represent one vulnerable societal group where social risks may go unacknowledged in DRR strategies. Often the risks identified in DRR policies focus on technical or infrastructural risks associated with disasters, and social risks tend to be disregarded. DRR policies tend to discount social vulnerability, as social risks are considered too difficult to quantify. While recognition of vulnerabilities surrounding disasters is essential to policy formation, this must be coupled with acknowledgement of the resilience of social groups, including children. While there has been a positive shift in the EU's recognition of children in several of its foreign policy initiatives, this paper assesses whether this recognition is fully reflected in its current DRR policy or programming.

Keywords – European Union, disaster risk reduction, social vulnerability, child rights, human rights

1. Introduction

When a disaster occurs children are often overlooked, yet they can be the worst affected. At the time of a natural disaster children may be frightened or traumatised, while also being at risk of separation from their families, without forms of identification, and can become potential victims to many forms of exploitation or abuse. While a disaster cannot be avoided, such risks faced by children can be prevented or lessened. Often disaster response comes to an end and recovery and reconstruction programmes have not yet commenced, generating a grey area where the protection of children and their rights are neglected. By reinforcing child-centric measures in DRR programming to reduce the risks of a disaster faced by children, such a grey area can be avoided. This paper adopts a holistic approach to such risks by recognising all such dangers faced by children during and after a disaster. The risks

children can be exposed to during and after a disaster are diverse. They may vary from health concerns of malnutrition or diseases, to physical injuries such as disabilities, abuse and exploitation, for example, through participation in forced labour or as child soldiers or sexual abuse. Psychological damage, increased poverty or separation from their families, are long-term effects that also need to be considered. Disaster Risk Reduction (DRR) policy formation and subsequent programming assist in reducing risks throughout the disaster cycle. Children represent one vulnerable societal group where social risks may be under-acknowledged in DRR strategies. Often the risks identified in DRR policies focus on technical or infrastructural risks associated with disasters, and social risks tend to be disregarded. DRR policies tend to discount social vulnerability, as social risks are considered too difficult to quantify. While recognition of vulnerabilities surrounding disasters is essential to policy formation, this must

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be coupled with acknowledgement of the resilience of social groups, including children, and a child's right to resilience. Child rights are confirmed under the United Nations Convention for the Rights of the Child (UNCRC). Established in 1989, the UNCRC is currently the most ratified UN Convention in the world with 194 signatories, including all Member States (United Nations Treaty Collection, 2010.). The UNCRC legally binds international actors into protecting all areas of human rights, whether social, economic or political (UNICEF, 2009). While the UNCRC does not specifically mention a child's right to resilience, or the protection of children and their rights in context of disasters, and surrounds a more political or legal context, its content is transferable and valid in relation to natural disasters. The UNCRC ensures the protection by states of the four main principles of: non-discrimination, the best interests of the child, the right to life, survival and development, and also the views of the child (Office of the High Commissioner for Human Rights, 2009), all of which encompass a child's right to resilience. Often such rights are disregarded during and immediately after a humanitarian crisis as chaos ensues and consequently children are overlooked. It is crucial states and international organisations conform to this Convention when addressing child rights in DRR legislation, to ensure their efforts in protecting children and their rights in DRR policies are consistent and comprehensive. This paper adds to current literature previously generated in peripheral fields of social vulnerability, European foreign policy and the protection of children and their rights in disaster risk reduction policies, and the role of human rights in humanitarian assistance or immediate aid. It amalgamates these themes to discuss the inclusion of child rights within the European Union's (EU) DRR policy and subsequent programming through a rights-based approach. A rights-based approach to DRR assists in integrating rights further into DRR policy and subsequent programming. This approach not only highlights children as vulnerable, with specific risks and needs in times of disaster, but also their potential resilience and autonomy in the different stages of the disaster cycle. Participation in DRR policy formation and programming can assist with a rights-based approach to community-based disaster risk management, where groups are empowered at a local level. As the world's largest humanitarian aid donor agency, the Directorate General for the European Community Humanitarian Office (ECHO) has over the last decade had an increased awareness in DRR, which mirrors those efforts of states and humanitarian organisations in DRR projects and policies since the formation of the Hyogo Framework Agreement in 2005. There has also been acknowledgment from DRR actors of the need to recognise children as not only vulnerable throughout the disaster cycle, but also as social capital in disaster risk management. This paper first discusses social vulnerability in the context of natural disasters, which is expanded on within the scope of child vulnerability or resilience surrounding disasters. The subsequent section presents a rights-based approach to children and DRR, to highlight a child's right to resilience and all the rights that encompasses. More specifically, this conceptual platform helps

to evaluate the case of the European Union, where the final section looks particularly at EU foreign policy formation and areas where the supranational entity has recognised children in its DRR strategy, as part of its external action.

2. Social vulnerability in the context of natural disasters

Attributing the causal factors of a disaster to nature, rather than societal constructs, may be successful in averting technical or geographical risks, yet does little to lessen the effects of social risks faced by vulnerable groups. Gilbert (1995) considers a disaster as disturbing societal relationships, and the progressive dissolution of the relationships between local actors and processes. Dombrowsky (1995) takes this notion further, referring to the works of Carr (1932), with the perception of disasters as not only consequences but causal factors of disasters where imbalanced social structures are then put under pressure when natural forces overwhelm the system. The end of the 20th century saw a spike in research focussed on sociological and epistemological aspects of disasters (See Dombrowsky 1981; Dombrowsky 1995; Hewitt, 1983; Hewitt 1995; Hewitt 1997; Kreps, 1985; Oliver-Smith; 1999; Quarantelli, 1999a; Quarantelli, 1999b; Wisner, 2004), representing a shift away from the dominant view of disasters as a technical study. Phillips et al. (2010:13.) state that the rise in social-centric disaster research has resulted in the substantiation of social vulnerability as being closely intertwined with local history and the governing and economic constructs of communities, where the *"characteristics of a disaster resilient society – or the lack thereof – are noticeable in these studies,"* (Phillips, Ibid).

Previously, such a humanistic approach to disasters was overshadowed by the science-based approach to disaster research where nature is the root cause of disasters, and addressed through technical means. Hewitt (1997:5) explains while the majority of those undertaking disaster research would not reject the idea there are economic and social aspects associated with the risks of a crisis, the dominant argument positions these influences as dependent on the geophysical nature of disasters.

"My own background is research into the physical environment and geo-hazards. Yet, I have come to believe that social understanding and socially just and appropriate action are the more crucial issues for the contemporary disaster scene. And while I would welcome a clearer picture of the social content of this work (...), the main problematic for us does seem to be the social construction of disaster. That concerns the often covert and taken-for granted way in which social conditions or 'realities' shape how we think about and act toward disasters." (Hewitt, 1998: 76)

This shift in mind-set is increasing amongst the disaster community. However, recognition of social risks is yet to be mainstreamed amongst policy makers and practitioners, both in the international and domestic context. Firstly, they remain restrictive to primarily addressing physical risks, where social risks are all too often con-

sidered as too difficult to quantify. This is chiefly the case in the phases of assessment, and monitoring and evaluation in disaster management. Secondly, while immediate risks may be captured, slow onset risks can be regarded as a developmental issue, and consequently ignored in other phases of disaster risk management, such as through DRR programming. This is the case for many of social groups which face slow onset risks. The following section looks specifically at child social vulnerability, with a discussion of responses to immediate and slow onset risks.

3. A discussion of child vulnerability and child resilience

"You need to do much more than you are doing to reduce risks. Why should any children look like this if they are malnourished, or crushed, or flooded? We should be saying 'Why? How can you accept this?'" (Ressler, 2003)

The statement above from Ressler, published a decade before time of writing this paper still applies today. Children form a sector of society extremely vulnerable to natural disasters. The risks children can be exposed to during and after a disaster are diverse as they vary from immediate consequences such as family separation or physical injuries abuse to longer term issues of malnutrition, diseases, abuse, exploitation, psychological damage, or increased poverty. It is estimated the number of children under the age of fifteen affected by climate-related disasters alone will be increased in the next ten years to an estimated 175 million children per year (UNICEF, 2010: 10). Along with infrequent disasters such as earthquakes or tsunamis, increases of natural disasters due to the adverse impacts of climate change render children more susceptible to threats to their wellbeing and their right to protection. Director of the Swedish Commission on Climate Change and Development, Johan Schaar supports this stating: *"the effects of longer and more intense droughts, repeated floods and shifting seasons are severely hampering their education and creating community pressures that result in children being more at risk from economic and sexual exploitation. Consequently, climate change is causing child rights to become even more difficult to safeguard, as adults, communities and governments do not fully appreciate the threats to their children's future or are increasingly powerless to fulfil their responsibilities to protect them,"* (Polack, 2010).

Despite this recognition of slow onset risks, and the need for a more proactive approach to risk reduction, states have a tendency to focus on supporting children after a disaster by tending to their immediate needs, and long-term effects are disregarded. Often, only risks which occur as an immediate repercussion of a disaster are accounted for within disaster management strategies, whereas other risks such as abuse, exploitation, intra-family violence, or trafficking are ignored in policy formation, despite their on-going nature rendering them potentially more detrimental to a child's future. Child vulnerability such as abuse or exploitation following a disaster, are not confined to rapid onset disasters such as tsunamis or earthquakes. Children located in countries

susceptible to slow onset climate-related disasters such as heat-waves, droughts, floods, flash-floods, or mudslides can also be exposed to such threats to their wellbeing, yet often it is the repercussions of these frequent, low impact disasters which go undetected (UNICEF, 2012: 45). Current international and national DRR frameworks often do not acknowledge physical and psychological abuse and exploitation as a repercussion of a disaster or included in disaster mitigation strategies. While states may believe longer-term effects should be left to subsequent phases of development, often these risks fall into the grey area between immediate aid and development, and children remain vulnerable. Such a superficial approach in policy formation marginalises children. Not only are community structures not in place to reduce said risks in the immediate aftermath of a disaster, children are also not prepared for the associated risks of other impending crises. These aspects of the social vulnerability of children must be acknowledged within DRR strategies through the adoption of a preventative rather than reactive response to risks in order to avoid this grey area.

By adopting holistic approach to child vulnerability, and embedded the subsequent needs within DRR policies and subsequent programming is not, however, to say that children are inherently vulnerable surrounding a disaster. Tierney and Oliver-Smith describe 'social units' as having specific 'assets and deficiencies' surrounding a disaster (Tierney and Oliver-Smith, 2012: 129). Often the stress is on the latter, rather than the former. Children are often stereotyped as passive victims or as being dependent on adults, and rarely considered as social capital. On the contrary, children often can have a fundamental role to play in all phases of disaster risk management, through the participation in DRR policy formation and subsequent action at a local level. In recovery phases, children also may need to act independently, for instance if their parents have been displaced, or are occupied with post-disaster recovery actions. In the context of manmade disasters, Hart and Tryer (2006: 10) support children should not be considered as irrefutably vulnerable, as during and after a disaster, children often need to make decisions, act autonomously, and care for themselves and possibly additional family members. This is not only a benefit to provide a different lens to reducing the disaster risks, but the right of children to participate in both the formation of those policy formation and the implementation of those policies.

4. A rights-based approach to disaster risk reduction and children

The basis of the human right-based approach to disaster management transcends the provision of immediate humanitarian assistance in the form of disaster relief, as implemented through a needs based approach. Instead, this approach recognises the right of individuals and communities to protection and resilience throughout the disaster cycle by acknowledging both physical and social risks in both DRR policy formation and subsequent DRR project implementation. Alongside this acknowledgement of so-

cial vulnerability, is the requirement of policy makers and practitioners to empower social groups through participation in the decision-making process, whilst remaining accountable and transparent in their implementation phases of the resultant policy. As a report from the humanitarian policy unit of UNICEF (2003) indicates, *"A human rights-based approach to programming places equal emphasis on outcomes and the process by which outcomes for children and women are achieved."* When evaluating human rights within the sphere of DRR, the implementation of DRR policies can itself become an issue of human rights. Carmalt and Dale (2012: 67) explain that the creation of DRR policies indicates a respect for the human right to protection, in this case against a hazard or risks of disaster, and as a consequence the employ of such legislation will then protect the lives of those at risk. Whereas, if a state is aware of a frequent or infrequent form of disaster which it is vulnerable to but does not generate a DRR policy, it is in breach of its obligation to protect its citizens and their right to life, (Carmalt and Dale, 2012: 68). By embedding human rights into DRR strategies, rights will not be disregarded during a time of crisis, as the policy will ensure community structures are strengthened to protect children and their rights. Thus, acknowledgement of specific social groups, which may be at risk during disasters, including children, and their rights must be taken into consideration in disaster management policy formation to cover the entire disaster cycle. The universality of human rights is progressively being recognised through the upholding of humanitarian principles by states and donors, where the Good Humanitarian Principles of independence, humanity, neutrality and impartiality underpin many of the humanitarian and development policies of states and donors, (Development Initiatives, 2011: 91). Conversely, such policies continue to be based on the provision of immediate aid, or a needs-based approach rather than employing a human rights-based approach to disaster management. Indeed, the UNICEF unit also indicated a lack of support of a human rights approach by humanitarian agencies: *"This belief stems from a tendency to understand the human rights-based approach as limited to civil and political rights, and to discount the collapse of the (even limited) enjoyment of social and economic rights which also tends to happen in crisis situations. Believing that the safeguard of human rights should wait until the armed conflict or emergency is over is counter-productive."* (UNICEF, 2003: 3). It may be a change in attitude is required for policy makers to implement a rights-based approach to DRR. Rather than focussing on the vulnerability of social groups, marginalised groups can be considered as resilient in certain aspects of disaster management (see Jones et al, 2010, 3; De Bruijne, Mark et al. 2010; 13). While they have specific needs, they also have specific capabilities in a disaster context. By indicating *a child's right to resilience* (which therefore embraces all the individual associated rights under the UNCRC applicable to a disaster context), rather than explicitly citing a child's right to protection in policy formation, infers not only their vulnerability but is complemented by embracing the attitudes of the child to be resilient. The acknowledgement

of the right to resilience will facilitate dialogue surrounding children and DRR strategies at all levels (international, national and local), through a positive shift in attitudes toward children in disaster risk management. Participation in the creation of policies is an important aspect of a rights-based approach to disaster risk management, and assists in a child's resilience, particularly through local-level initiatives. Involvement of vulnerable groups in legislative processes results in the voicing of the actual risks and concerns of those communities who must deal with the aftermath a disaster (Futamura et al, 2011). Instead of foreign powers coercing or regulating those at risk, it is more effective to empower them to construct accountable, community-based solutions to the crises situations (Kaldor, 2007: 285). During and post-disaster, children form one of the groups who are most at risk when there is a crisis, yet are the least listened to. In the past children have also been seen as unimportant or incompetent, and consequently are excluded from the formation of policies. Not only is it a child's right to participate in disaster mitigation and policy formation under Articles 12 and 13 of the UNCRC (United Nations Treaty Collection, 2010), they can provide a different insight to a situation or potential risk to that of adults. Hart and Tryer (2006: 4) confirm there is an increasing belief that a person is still able to influence their own, or someone else's, life for the better, no matter what their status in society. Peek (2008) supports this, stating how certain attributes of children such as their intelligence, imagination, vitality and access to social networking exemplify the different means through which children can contribute before, during or after a disaster. Many humanitarian organisations have been involved in increasing child participation by performing focus groups with children in countries prone to disasters. In one research report, Plan International states: *"By providing the opportunity to be directly involved in disaster risk reduction activities, young people can develop skills to be better prepared for potential threats, and participate in efforts to protect their safety and wellbeing,"* (Plan International, 2010). Case studies by scholars and humanitarian organisations alike carried out in certain at-risk regions, such as the Asia-Pacific, have shown that children are keen to contribute to local DRR activities and are capable of doing so, while also being aware of potential risks associated with a disaster that can threaten their survival, (Polack, 2010; Mitchell et al, 2008; Plan International and World Vision, 2009; UNICEF, 2007). In the Philippines, the relocation of a school, necessary due to dangerous landslides, caused controversy as most adults were against the repositioning, while the children were in favour of the move. By utilising student bodies to support their rationale and coordinating with the local authorities, the students' proposal gained a strong majority in the final vote to relocate the school on a safer site and was built to withstand earthquakes (Plan International, 2007). In Cambodia, children were conscious of their right to protection and identified threats such as child labour, malnutrition or poverty as consequences of droughts that would necessitate such protection (Polack, 2010). Such an approach has been acknowledged by the EU, as exemplified in the 2008 Action plan on Child Rights

in External Action, which highlights the need to respect the views of children and adolescents (European Commission, 2008). Such objectives must be supported by empowerment opportunities for children to develop relevant leadership and negotiation skills, interaction with child advocates and those involved with children, and capacity-building within the authorities to allow for effective child participation (European Commission, 2008).

5. Assessing the EU's recognition of children and child rights in its disaster risk reduction strategy

EU values, present and upheld throughout EU legislation encompass the respect for, and defence of, human rights. Recent decades have demonstrated an increasing acknowledgement from the EU of the importance of protecting human rights. This has been depicted in the recognition of human rights in EU law, both in independent human rights legislation such as the EU Charter of Fundamental Rights, (European Commission, 2000) and by consciously embedding human rights into focal areas of EU legislation, including the EU Consensus for Humanitarian Aid, to underpin any action it participates in when there is a disaster, and coincide with other overarching external action mechanisms, such as the Common Foreign and Security Policy, where EU principals of upholding human rights, governance and rule of law are firmly established. In spite of this, these fundamental values portrayed in the umbrella guiding documents of EU foreign policy do not necessarily filter down to the individual mechanisms, such as DRR, where the rights of vulnerable groups such as children are not mentioned.

EU umbrella external policies have recently integrated child rights into EU humanitarian aid policies. Article 39 of the 2007 Consensus for Humanitarian Aid highlights the vulnerability of children and some protection strategies for gender or sexual abuse (European Community, 2007: Article 39). The creation of the Commission Communication "A Special Place for Children in EU External Action," and two supporting working documents in 2008, have become fundamental in promoting a rights-based approach to children and the protection of their rights in EU humanitarian action during times of crisis (European Commission, 2008). The Communication affirms the responsibility of the EU and Member States to international and regional agreements, while broadly stating the areas of EU external policy where children and adolescents can participate, such as in trade policy, political dialogue, development cooperation and humanitarian aid (European Commission, 2008: 7). The adjoining working document, "Children in Emergency and Crisis situations", presents itself as a general outline of the dangers children are exposed to in crises situations while including preventative measures to specific threats. This is a promising initiative to address the vulnerability of children and risks they face, yet is not all-encompassing of the potential forms of exploitation or trauma children can face after a natural or manmade disaster.

The above child-centric policy package has become fundamental in promoting a rights-based approach to

children and the protection of their rights in EU humanitarian action during times of crisis. The policy package takes a predominantly holistic approach in highlighting immediate and slow onset risks and child vulnerability, attached to both natural and manmade disasters. However, these overarching guidelines addressing child vulnerability in external action do not translate to the specific policy area of DRR, where reference to child risks remains minimal and if alluded to, only apply to immediate risks of natural disasters, not within the field of manmade disasters, nor are long-term risks acknowledged.

This Communication, as an existing EU external action policy is supported by the Lisbon Treaty, but was implemented under Article 180 of the Treaty establishing the European Community (European Community, 2002), and does not have the same validity as if it were instituted under the Lisbon Treaty. Yet the Lisbon Treaty provides EU humanitarian action with a legal basis for such policy formation. Under Article 214 of the Treaty of the Functioning of the European Union, the EU's humanitarian aid policy became an independent policy as a function of EU external actions (Caprile, 2009: 18). As a result, the 2009 Communication was an excellent foundation to formulate the EU's strategic basis for future DRR actions under the new legal basis.

While there have been some significant legislative developments by the EU and certain Member States towards respecting child rights, there is still much room for improvement to ensure harmonisation of child rights policies across Europe, both in internal and foreign policy formation. Institutional changes under the Lisbon Treaty represent various opportunities for the EU to streamline its external action mechanisms, and assist with coherence amongst its Member States, thus promoting a more united and influential interface as a global actor. The High Representative of the Union for Foreign Affairs and Security Policy, with the assistance of the European External Action Service (EEAS), gives the EU the potential to act in a more unified manner in its external relations (Duke, 2008: 15). The EEAS brings together the various areas of EU foreign policy, in particular the Common Foreign and Security Policy and European Security and Defence Policy, in conjunction with Member States' diplomatic services (Quille, 2009:5). While representing a form of EU external action, humanitarian aid, and by association DRR, remains yet to be incorporated into the EEAS. Such a decision to exclude humanitarian aid and DRR from under the umbrella of the EEAS was based on the reasoning that humanitarian aid, and by association DRR, should continue to be independently administered by DG ECHO. As stated in a European Parliament Policy Briefing of the Lisbon Treaty, DG ECHO can then continue to act autonomously, without the "potential 'imposition' of foreign policy priorities" (Caprile, 2009:19).

One of the goals of the Lisbon Treaty is to streamline the EU's mechanisms for external action and become more cohesive. This has been achieved in one facet of external action through the 2010 Joint Communication on EU civil protection and humanitarian assistance, to create a European Emergency Response Capacity for disaster response,

based on Member States assets and pre-determined contingency plans, (European Commission, 2010). The initiative transfers the civil protection mechanism to be administered under ECHO, but with the support and implementation of the EEAS. Focussing on response, the initiative identifies the complementarity of DRR programming, particularly by "maximising synergies between DRR and adaptation to climate change, so that, for example, financial support for prevention, recovery and reconstruction activities increase resilience to future crises," (European Commission, 2010: 6).

This is a valuable statement in mainstreaming DRR through specific external action mechanisms. But what of the rights-based approach which Lady Ashton (European Commission, 2011: 4) famously stated as 'running as a silver thread through a truly integrated range of external policies,' to underpin EEAS action? In theory, the universality of the rights of marginalised groups is recognised throughout EU external action policy and subsequent action. The implementation of the joint initiative could in effect have two outcomes for the conveyance of human rights in disaster risk management. One could argue the European Emergency Response Capacity harmonises EU external action mechanisms to result in a cohesive policy response and European engagement in a disaster setting, therefore assisting in the defence of human rights. The joint initiative of the EEAS with its humanitarian equivalent, ECHO, where rights are often considered to be subordinate to immediate needs, would then substantiate the upholding of human rights, as one of the founding values of the European Community. Alternatively, mergers of external action instruments could hinder the upholding of EU values such as human rights, by operating through separate EU agencies, and national priorities can impinge on the delivery of assistance. As a consequence human rights could be side-lined in lieu of an immediate, rapid response to a disaster scenario by the EU, where indeed a needs-based approach is assumed, and rights are considered to be part of the future phases of reconstruction or development assistance.

6. Conclusion

A comprehensive DRR policy to enhance community resilience will strengthen social structures within a community and result in a strategy to protect and utilise those structures when a disaster takes place. As a result, the associated social vulnerability of children surrounding a disaster is avoided, or at best lessened. Despite states approving the International DRR Framework of Hyogo and performing subsequent progress reports, and humanitarian principles underpinning domestic policies, increased knowledge exchange between actors at all levels is needed for DRR programming to address child vulnerability and increase child resilience. The EU and its Member States are not immune to this lack of effectiveness in knowledge sharing in DRR partnerships. Nevertheless, it has the strength legislatively and financially to regulate this. The primary barrier in achieving a comprehensive DRR strategy towards children for the EU surround its insti-

tutional configuration for external action, chiefly due to an overlap of roles of EU agencies and implementing barriers for European and third country governments and partner organisations. Both of these factors impede effective assistance and in turn lead to a grey area between humanitarian and development assistance. By reinforcing a child's right to resilience within EU DRR policies to reduce the risks faced by children, this grey area can be avoided. It necessitates embracing not only immediate threats but pre-existing and long-term threats in order to fully protect children throughout the disaster cycle. While this could cause institutional complications between EU agencies, ECHO and the EEAS, it would also be founded on the EU's common values of respecting child rights, and thus assist in intertwining EU values and its external policy objectives. Such a policy would increase the EU's participation in child-focussed DRR projects in the global arena, and support third countries in the implementation of their own disaster management and disaster risk reduction strategies. It is hoped that with the new legal foundation for humanitarian aid and DRR under Lisbon, a comprehensive policy can be formulated based on a rights-based approach to address child rights in external action, as the rights of those at risk are yet to be confirmed in a DRR strategy. This approach must be mirrored in EU Member States domestic humanitarian aid and DRR policies as there has been little acknowledgement of the need for child participation in Member States. The integration of child rights into EU external policies, particularly EU humanitarian aid policies, shows promise but given the lack of cohesion amongst Member States and incomprehension of all risks faced by children during times of crisis, there is much room for improvement. For the EU to be effective as a global actor in the area of DRR, harmonisation of Member States' policies, and the recognition of children in such policies, is essential. By including children who are at risk in policy formation, local vulnerability is then mitigated through grass-roots child-centred external action.

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Using Word Clouds for Risk Perception in the Field of Public Health – the Case of Vector-Borne Diseases

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Abstract – Due to environmental and socio-economic changes, emerging zoonotic diseases will be an increasing challenge for public health in Europe. The risks and the consequences triggered by vector-borne diseases (VBD) for public health in Europe are just starting to emerge in public awareness. This is clearly shown by recent events such as Chikungunya in Italy and the spread of Crimean-Congo haemorrhagic fever (CCHF) in Europe. The EU-funded project ‘Biology and control of vector-borne infections – EDENext’ is dedicated to these diseases that are transmitted by vectors such as mosquitoes, ticks, etc. Within EDENext a holistic, transdisciplinary public health approach towards vector-borne diseases was developed. It defines the term “Public Health” in the scope of this project and suggests a re-conceptualisation of public health by adapting the risk governance framework developed by the International Risk Governance Council (IRGC) for this purpose. The IRGC approach is distinguished from more classical risk governance approaches, inter alia, by an explicit inclusion of a systematic concern assessment (of public concerns and perceptions) as the other part of risk appraisal that is scientific risk assessment. This innovative risk governance approach towards public health will be introduced and exemplified in Germany by the hantavirus disease that is transmitted via rodents. This paper shows first results of a risk perception study based on focus-group discussions with the general public in three endemic regions in Germany. With the method of word clouds first risk associations of focus groups participants are visualized, in order to capture various risk perception patterns of the hantavirus.

Keywords – risk governance, public health, risk perception, risk communication, vector-borne diseases, word clouds

1. Introduction

Environmental and socio-economic changes mean that emerging diseases, particularly vector-borne diseases, will become an increasing challenge for the risk governance of human and veterinary health in Europe and in the world as a whole. The risks and the consequences triggered by vector-borne diseases for (veterinary) Public Health in Europe are just starting to emerge in public awareness. The European project ‘biology and control of vector-borne infections in Europe’ (EDENext) brings together 46 partner teams from 22 countries in a health-focused project under the European Commission’s 7th Research Framework Programme to investigate the biological, ecological, epidemiological and social components of vector-borne infections. One task within the EDENext project is the improvement of VBD risk governance of Public Health with a systematic approach for analysing, assessing, managing and communication of VBD. In or-

der to meet the new challenges of Public Health, a re-conceptualization of Public Health is suggested and outlined within the EDENext “White Paper: Public Health and Vector-Borne Diseases. A New Concept for Risk Governance” (2012, see also: Schmidt et al 2013). A general model, the so-called ‘Risk Governance Framework’, which was developed and proposed by the International Risk Governance Council (IRGC), is adapted, applied and operationalized for the first time to Public Health. The proposed EDENext risk governance model for Public Health will be exemplified by the mice transmitted hantavirus disease in Germany.

2. Risk perception of the hantavirus in Germany

2.1. Theoretical framing: IRGC Risk Governance Framework

The International Risk Governance Council (IRGC) is a privately funded, independent non-profit organisation that was founded in 2003 and is based in Lausanne. Its mission is to support governments, industry, non-governmental organizations and other organizations in their efforts to deal with major and global risks facing society and to foster public confidence in risk governance. In 2005 the IRGC published its first White Paper on 'Risk Governance. Towards an Integrative Approach'. The IRGC framework model encompasses five elements (IRGC 2005, 2008): (1) Pre-assessment, early warning and 'framing' of the risk; (2) appraisal (combining scientific risk assessment and concern assessment); (3) characterisation and evaluation; (4) management and (5) communication of a risk. The model shall assist decision-makers in preparing decisions that are characterised by scientific uncertainty, complexity and ambiguity – also known as systemic risks (Renn et al., 2001, IRGC, 2008). The model was designed to be compatible with competing risk analysis approaches, although it puts particular emphasis on the aspect that risk assessment should not just include scientific risk assessment, but also include a systematic analysis of public concern and perceptions. However, this model had not been applied so far to Public Health. The Public Health group within EDENext has done so and addressed questions such as: What does the IRGC framework mean for Public Health? How can the different phases be conceptualised for Public Health? This task has been performed by the EDENext project and the results of this approach are shown in the EDENext White Paper (2012) (see also: Schmidt et al 2013). This article will address the importance of taking into account risk perception of the public in Public Health decision-making.

2.2. EDENext public health definition

EDENext follows a holistic, interdisciplinary and multi-level approach towards Public Health: "Public Health is concerned with questions of prevention, rather than healing and it is concerned with health on a population-level rather than on an individual level. Moreover, it is concerned with the facilitation of health equity in the society through the mobilisation of political, social and economic resources. Hence, Public Health considers various determinants of health, such as ecological environment, political structures, socio-cultural patterns, economic living and working conditions, social and community networks or individual lifestyle factors" (Schmidt et al 2013).

2.3. Study design

EDENext is examining the risk perception and risk communication of two VBDs: hantavirus disease, a disease transmitted by mice, and Crimean-Congo hemorrhagic fever, transmitted by ticks, in five countries: Macedonia

and Turkey for the Crimean-Congo hemorrhagic fever and Finland, France and Germany for the hantavirus disease. In all countries the top-down approach in regard to risk communication is examined by conducting in-depth interviews with experts from responsible risk management institutions and organisations, such as ministries in charge and public health organisations as well as stakeholders concerned with the respective VBD (such as health insurances, professional organisations of farmers, pest controllers, etc.). The risk communication approach is complemented by comprehensible literature research on that topic in each country. In the following, the focus will be laid on the hantavirus risk perception of the concerned public in Germany: how do they perceive the risk, what do they know about the risk and what kind of coping strategies will they apply to handle and, potentially, prevent the risk? The risk perception study with the public was performed by using focus group research as a qualitative tool. Three focus groups with 10-12 persons were held in Germany in three different endemic regions, based on a semi-structured topic guide. Qualitative research is explorative in its character and allows addressing questions about beliefs, motives and reasons for a particular behaviour, which was particularly useful for our research interest. Within the focus groups one emphasis was to acquire first risk associations of the participants towards the hantavirus in order to capture various risk perception areas and to facilitate the discussion. To get a first impression about different patterns on risk perception and their importance in relation to each other we used the method of word clouds. Its basic idea is the visualization of keywords or terms mentioned by the participants according to their quantity in relation to others. To our knowledge it has not been used so far for risk perception purposes. All interviews were recorded and transcribed and the conducted data were investigated by using the MAXQDA software for qualitative data analysis.

2.4. Epidemiological situation and preventive actions of hantavirus in Germany

Hantavirus is transmitted via inhaling aerosols of bank vole droppings carrying the virus. The most common and PH relevant hantavirus in Germany is the Puumalavirus. Hantavirus can trigger nephropathia epidemia (NE) in humans, a flu-like disease that can lead to acute renal failure. There is no vaccination available yet. Therefore, the promotion of adequate protection measures, such as wearing a breathing mask during sweeping activities or to ensure adequate ventilation during clean-up work in the attic or garden sheds, plays a central role in prevention campaigns. Since 2001, when the hantavirus has become a notifiable disease in Germany, over 8000 cases of hantavirus have been reported. Considerable fluctuations in the prevalence over years could be observed. Peak years were 2007 (1688 cases), 2010 (2017 cases) and, the highest peak 2012 (2769 cases). Moreover, there are endemic and non-endemic counties within the 16 German states meaning that preventive risk communication strategies have been introduced by health authorities on the county or

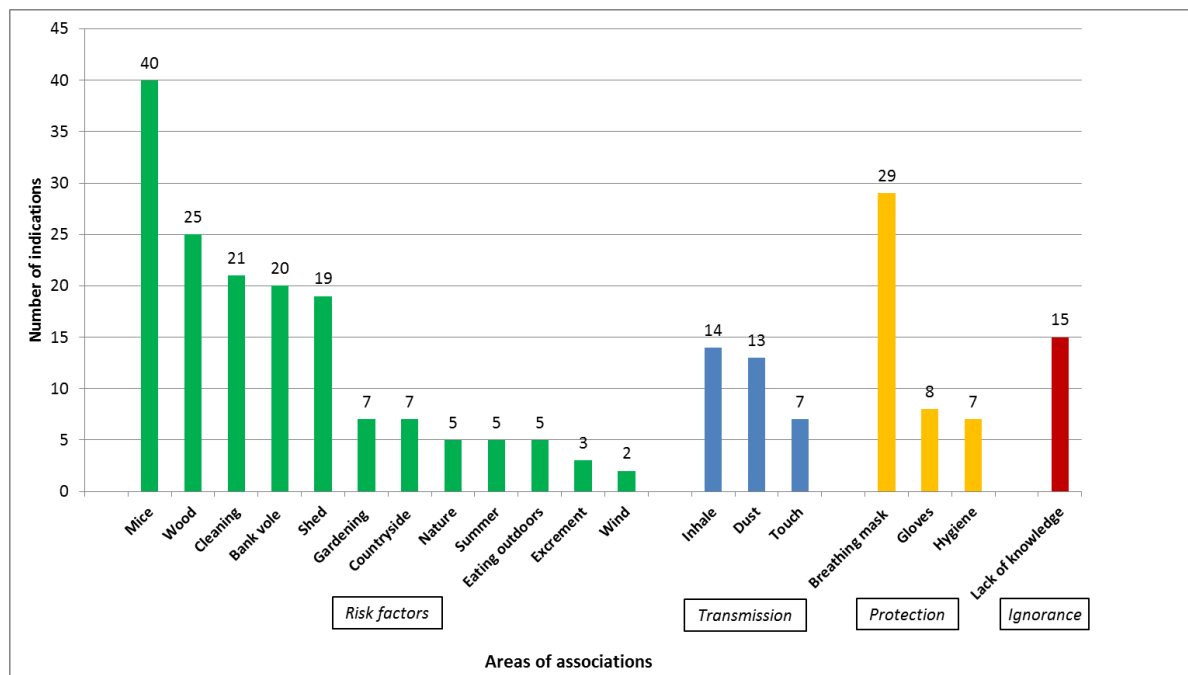


Figure 1: Quantified first hantavirus risk associations in endemic German regions by focus group participants

state level. Due to the fact that health policy is the responsibility of the states a variety of different risk communication strategies could be detected ranging from warning signs in urban forests up to information campaigns in co-operation with the local media (radio or newspapers) or the distribution of information sheets via general practitioners.

2.5. First associations with the hantavirus in the German focus groups

To facilitate the discussion and to get an impression about different risk perception patterns the first question addressed to the participants was: 'What are your first associations regarding the hantavirus or mice transmitted diseases? Participants were then provided a collage composed of newspaper headlines from the respective local newspaper. The headlines referred to news reporting on previous Hanta outbreaks in this region, including photographs also, if available, acquired from the local newspaper. Figure 1 shows the quantified first hantavirus risk associations in endemic German regions by focus group participants.

The analysis of this first associative phase in regard to risk perception patterns was done by using the visualization technique called 'word cloud' (or tag cloud). Word clouds are typically known as a web 2.0 tool for visualization. It is a weighted representation of text data, a method, where keywords or terms are quantified in relation to others. In the analysis of the focus group discussions, this method was used to represent the number of referred words associated with risk factors or other expressed associations towards the Hantavirus. The named factors associated with Hantavirus are coded and counted. The word clouds were created on the homepage

www.wordle.net. Word clouds have been created for each focus group and for all focus groups together. Figure 2 shows the summarized response for Germany in a word cloud.

We can distinguish within the word cloud and figure 1 four different areas of associations: (a) risk factors, (b) protective measures, (c) ways of transmission and (d) persons who felt uninformed (lack of knowledge). (a) Risk factors should be further distinguished between (i) the agent of the disease (mice or, more precise, bank voles and their excrements); (ii) environmental risk factors (including: wood, countryside, nature, shed, wind, and summer) and (iii) risk behaviour (including: cleaning, gardening, and eating outdoors). (b) Protective measures include hygiene, breathing mask and gloves. (c) Ways of transmission were mentioned as follows: dust, inhale, and touch. (d) Persons who reported to be uninformed were subsumed as 'no information about risks'. For obvious reasons, the disease agent, or rather vector, mice and the more specific term bank vole were the most mentioned association with this rodent-borne disease. However, surprisingly, the fact that this disease is transmitted via aerosols of the excrements was hardly mentioned by the participants. Environmental risk factors such as wood and sheds were frequently mentioned, which indicates that some knowledge and sense of risk about the VBD is already available in the examined endemic regions. The most frequently mentioned association in regard to risk behaviour, cleaning (of sheds, attics, etc.) also shows sensibility for the most relevant risk factors known from epidemiological studies. Overall the protective measure breathing mask was mentioned second most frequently after the agent mice. This already shows that official information campaigns were recognized by the public of endemic regions as these campaigns basically focus upon



Figure 2: Association word cloud of hantavirus disease risk in endemic German regions

breathing masks as one of the most important protective measurements. Although the infected excrements were hardly mentioned, several participants recalled inhalation of the dust as one major way of transmission of the agent. Throughout all groups some participants mentioned their personal ignorance about VBD risk factors in common.

3. Conclusion

We can conclude that the risk perception of the general public in regard to health related issues, here the hantavirus, includes different and distinguishable elements which should all be taken into consideration when risk perception is concerned: risk factors, protective measures, known ways of transmission and the feeling of not being (properly) informed. This shows that risk perception is intrinsically bound to knowledge and ignorance of a given risk: Risk factors have to be known in order to be remembered and the same applies to protective measures and potential ways of transmission. Ignorance, expressed as a feeling of not being properly informed, is also an important element which influences the risk perception of the public. It was also shown that the word cloud tool, not yet used for risk perception research, is an easy to use and effective way for visualization of the perception of risk. Meaningful risk communication (or health communication) strategies can only be established on consolidated knowledge of the risk perception of the public and its stakeholders, including what they know and what they don't know. This is particularly relevant when health is concerned, as the risk perception of the public has a high potential to prevent a given risk, the infection or disease, and to influence the effectiveness of Public Health interventions. The EDENext risk governance concept for Public Health provides a systematic and holistic approach to be used by Public Health authorities in order to facilitate management of (emerging) health risks for the public today and in the future.

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The Benefits of Alerting System Based on Standardised Libraries¹

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Abstract – The understanding of the alert content and trust by the recipients can be influenced by the alert message composition. This paper discusses advantages and disadvantages of an alert library based method to compose alert messages that aims at achieving harmonized alert messages all over Europe in terms of content and style. Additionally, it builds on further advantages by making use of the storage and processing capabilities of state-of-the-art receiving devices, based on the alert library method to compose alert messages.

Keywords – alert message, alert libraries, risk, hazard information.

1. Introduction

Early warning systems have the potential to significantly reduce the impact of crises in terms of injuries and losses to life and property from existing hazards. However, this statement is only true if alert messages to the population are actually received, noticed, understood and trusted by those at risk. The understanding of the alert message content and trust by the recipients can be influenced by the alert message content, delivery mode and style. Recipients are more likely to trust the alert and implement the right protective actions when the alert message includes sufficient information about the hazard, i.e. type, location, time, intensity and certainty, as well as guidance on protective actions and issuing source (PPW, Perry et.al, Mileti, et.al.). Specific guidelines related to the alert message style are also identified, e.g. most important information should be provided first, so that the use of headlines is recommended (Working Group on Natural Disaster Information Systems). It is also important to avoid the use of ambiguous and complex words, expert jargon or complex sentences and misspellings in the alert message that could cause a complete different meaning in the message than the desired one. Additionally, European countries have an added difficulty: the variety of cultures and languages combined with a significant migration and tourism movements make it even more complex to inform effectively the (whole of the) population at risk for a given incident.

Harmonized or even standardized ways to compose alert messages throughout Europe (and even beyond) could significantly help to address these issues and improve the effectiveness of alert messages, concerning the level of understanding of an alert message and trust on it. On the one side, standards can enforce the use of identified best practices in the literature that are not yet systematically followed, minimizing human errors at the same time. On the other side, the ambiguity introduced by the cultural diversity in Europe can be also minimized, when targeting mixed crowds, if the style and methodology to compose alert messages is harmonized. In this context, this paper discusses the use of alert message libraries, which can contribute to a harmonized methodology to create alert messages.

2. Alert message content: required information items

With the purpose of creating a harmonized methodology to formulate alert messages, and given the discussion in the introduction, it appears very suitable to create alert libraries that can be used to compose alert messages in a modular manner using standardized terminology that can be translated into any language. Departing from the recommended information items in the introduction, we can abstract the recommended alert message content as in Fig. 1 in at least 7 information items:

¹This article is based on a presentation given during the 4th International Disaster and Risk Conference IDRC Davos 2012 on "Integrative Risk Management in a Changing World - Pathways to a Resilient Society", held 26 - 30 August 2012 in Davos, Switzerland (<http://idrc.info/home/>).

- **Hazard Type:** a hazard is a potential source of danger or risk. Hazards can be of different nature (natural, man-made accidental, man-made induced in purpose) and can be categorized in many ways. The relevant information in the alert message is however the hazard type, i.e. a term that identifies the situation with a single word (or a closed expression).
- **Location at Risk:** the location at risk can be identified in many ways with different levels of granularity. For example, administrative areas can be used (country/region/locality), GPS coordinates to indicate centre and radius or a polygon that can be displayed in a map or known areas of interest.
- **Time:** the time refers to the expected hazard onset and can be easily encoded using date and time variables for very accurate message, whereas general terms can be used when the available information is not accurate enough. Additionally, the validity time of the alert message can be communicated.
- **Intensity:** information about the hazard intensity shall provide the recipient with an indication of the level of risk or potential impact. For specific types of hazards, some intensity scales are widely known, even if the exact definition of the different intensity levels is unknown to the majority of the population. An example of this is the Richter scale. The intensity dictionary can include the applicable intensity levels to specific hazard types, if they exist, and also incorporate general terms to indicate intensity.
- **Certainty:** indicating the certainty associated to the knowledge on the hazard onset is important to improve trust (Mileti et.al., Working Group on Natural Disaster Information Systems), to minimize the long term impact on trust and actual alert impact due to past false alarms. A similar information item could be indicating the striking likelihood.
- **Source:** it is a matter of trust that the recipient can recognize who (which authority) issued the alert message. Provided that, according to every country's organization in terms of disaster management, only a limited number of authorities are entitled to alert the population, it is feasible to envisage a list of authorized alert message issuers. Even, the same alert message should be endorsed by several authorities (Perry et.al., Mileti et.al.).

While it is unrealistic to think of a pre-defined alert message for each possible situation, it is realistic to envisage a limited dictionary for each information item in Fig. 1. By combining the applicable values of each information item to a specific emergency situation, the composition of

alert messages for a very large spectrum of situations can be addressed. Table 1 provides some ideas on keywords and coding examples for each of the information items that should be present in an alert message.

3. Using alert message libraries

We propose that an alert library be a set of limited (but extendable) dictionaries, each of them covering a specific alert message information item, i.e. containing the keywords and codes applicable to that information item (as in Table 1). Of course, an alert message shall not appear as a telegram (terse, short messages), but should be composed as simple but complete sentences. The variety of languages present in Europe makes this issue complex as different languages have different syntax rules and semantics; therefore, some intelligence is required to cope with this variety. Let an 'alert message processing function' be an engine that gets as input the selected keywords and/or codes from the alert libraries and compose a coherent alert message out of these inputs. The process of composing an alert message by using alert libraries is depicted in Fig. 2. First, the user (authority) selects the applicable keyword (or code) for each information item out of the alert libraries, i.e. she/he configures the alert message; then the alert message processing function generates an alert message with the correct syntax out of the codes and keywords selected; the composed message is then delivered. With this method, several advantages can be foreseen:

- the way to compose an alert message is completely standardized (in terms of content and style)
- the same lexicon and structure are always used to compose alert messages
- jargon cannot be used if the libraries are defined without jargon
- typing errors are avoided

These advantages come to the cost of lower flexibility. Indeed, in a fully automatized system to generate alert messages according to standardized method and dictionary, one could argue that future (not foreseeable yet) crises cannot be coped with. However, alert libraries should not be understood as completely static entities. In fact, dictionaries can be (and should be) updated whenever required to enclose newly appearing crises and any relevant improvements.

Looking at long term solutions, a further step can be developed based on the use of alert libraries, exploiting the capabilities of state-of-the art receiving devices in terms of

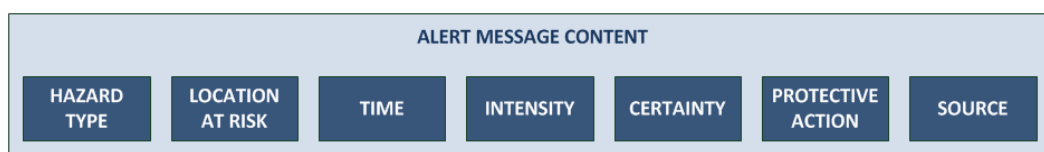


Figure 1: Alert message content abstraction

Table 1: Alert libraries keywords and coding examples

	Explanation	Exemplary value
Hazard Type	Term indicating the type of hazard	Earthquake, Tsunami, Forest fire, Volcano eruption, Chemical explosion, Flash flood, Hurricane, etc.
Location at Risk	Term or code indicating the area at risk. This can be an administrative area (e.g. Country, Region, Locality), known risk areas, areas of interest (e.g. public buildings) or areas indicated by GPS coordinates.	Country, Region, Locality, Area of interest, GPS coordinates
Time	It refers to the onset time of the hazard and can be encoded using the format dd/mm/yyyy – hh/mm/ss or in general terms, such as imminently, soon, today, tomorrow, etc.	dd/mm/yy – hh/mm/ss, Imminently, Soon, Today, Tomorrow, Etc.
Intensity	It indicates the expected intensity with which the hazard will (or has) hit the location at risk. It can be indicated by known scale systems that are applicable to the hazard type (such as the Richter scale) or using general terms, such as “Severe, Moderate”, etc.	Richter scale, Severe, Moderate, Light, Minor
Certainty	It shall indicate how sure the source is about the information provided. It can be expressed in general terms referring to likelihoods.	Observed, Very likely, Likely, Possible, Unlikely, Etc.
Protective Action	It indicates the protective action to be implemented by the recipients of the alert message.	Stay in, Close windows, Get out, Take shelter, Do not approach the area, Etc.
Source	It indicates the identity of the alert message source. It shall be the unequivocal name of a civil protection authority and can be encoded with a unique identifier.	Identifier

processing power and storage capacity. Let's assume now that the user (authority) configures the alert message by selecting the right options (keywords, codes) for each information item to match a specific emergency situation, but the alert message processing engine only configures and generates a machine-readable coded message, rather than a full textual message. Thus, only the coded message is transmitted over communications technologies, which significantly decreases the capacity requirements to transmit the (encoded) alert message. Assuming that the receiving devices store the alert libraries and have a local alert message processing engine, the receiving device can “decode” the alert message out of the received code and present the alert message in a comprehensive manner to the device owner in the right language, as depicted in Fig. 3, assuming that the encoding of each information item is universal. In a way, this would work similarly to a navigation device, which only receives GPS coordinates and requires the receiving device to store the relevant maps to display the location information correctly.

Additionally to the advantages identified above regarding understanding and trust to the alert message, this approach adds other advantages derived from the dramatic reduction in the required capacity to transmit the alert message: (i) lower cost to transmit the alert message and (ii) lower delay to receive the alert message. The first advantage is nice to have for the sustainability of alerting services. The second advantage can become very significant for rapid onset hazards and opens the door to the use of very low capacity systems to disseminate alert messages, e.g. using satellite navigation services to embed alert messages (De Cola, et.al.). This approach opens

further possibilities regarding social inclusion, by client-based applications at the receiver device. First, the (citizen) can configure the application to compose and deliver the alert message in its preferred language. If alert libraries are standardized, this is only a matter of downloading the alert library for the right language. Second, the user can also configure the application to deliver the alert message in its preferred mode, i.e. text, speech, and even video. Multimodal approaches to deliver alerts (i.e. exploiting various modalities and their combination) have the potential to increase the likelihood that the alert information will be received (noticed and understood) by the target audience, including groups with special needs, i.e. increasing inclusion (Sullivan, et.al., Langdon, et.al.)

4. Exercise with end users in the Alert4All project

Within the EU-FP7 co-funded project, a workshop with end users was carried out to exercise different aspects of an integrated system to disseminate alert messages to the population. Among others, an exercise was organized to let the participants experience two completely different paradigms to compose alert messages: the first based on letting them compose the alert message by inserting free text, the second based on the principles of using alert libraries as explained above. For this purpose, two graphical user interfaces (GUIs) were implemented to manage the alert dissemination system in a fictive scenario that was a concatenation of events in short time to add the stress component to the exercise. The participants had to send alert messages in three different languages to the fictive population using the free-text based system for the

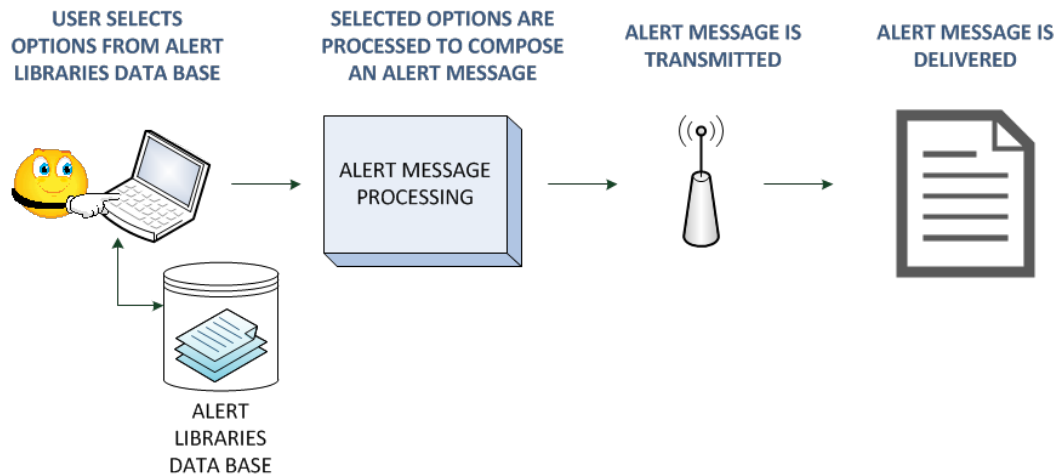


Figure 2: Using alert message libraries

first 3 events and the library-based system for the 3 last events of the scenario. For the free-text based system they were allowed to use online translators to cope with the multi-language requirement of the exercise.

With this exercise, the end users experienced that the alert library based system was requiring significantly lower time to deliver the alert message, especially for the low-capacity systems included in the exercise, than for the free-text based system. When using the free-text based system, the users were not paying attention to the actual content of the alert message, i.e. whether the required information items were included, and the messages were so extensive in some cases that they could not be displayed in the limited sized windows (i.e. they would not be completely displayed in one single message in a real device). This means that for the four teams in the exercise, the style and content of the alert messages significantly deviated from each other and some of them could only be partly displayed. This, according to the best practices identified in the literature, would jeopardize the understanding and trust (in the long term) of citizens, as the message content would strongly depend on the actual person op-

erating the system at the moment of the crisis. Finally, the multi-language feature was excellently covered by the alert library-based system, as the operators only had to care about configuring the alert message and the system automatically created the message in the three requested languages. With the free-text based system, translations were not fully comprehensive, subject to online translator errors. Still; the preferred solution for end users was to have a library-based concept with the option to add free text to the alert message whenever required, e.g. when the libraries do not contain the right solution for a specific crisis. Further details on the exercise and the results can be found in (Mulero Chaves, et.al.).

5. Added value to integrative risk management and conclusion

This paper proposes a concept for a harmonized method to compose alert messages in terms of content and style with the aim at encouraging discussion in this area to promote the standardization of alert libraries. A harmonized method to compose alert messages for European countries

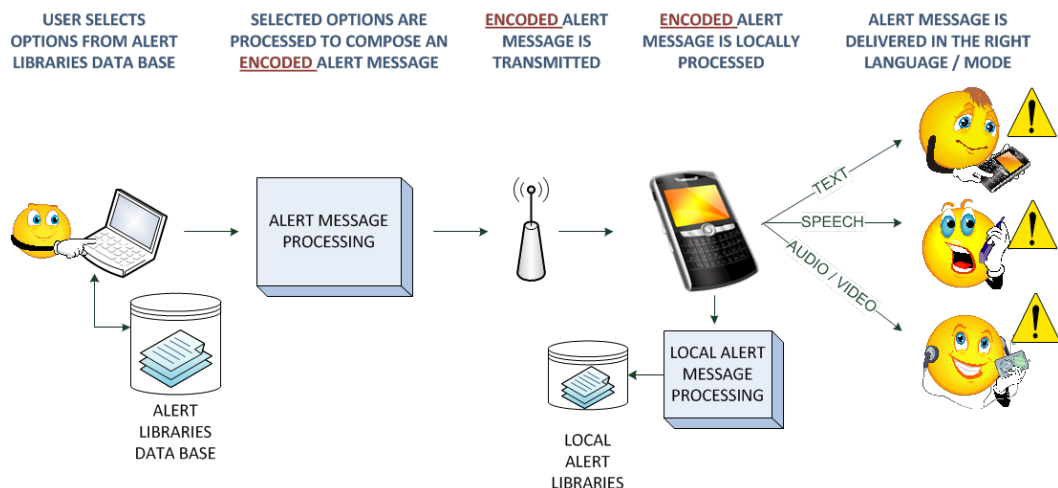


Figure 3: Advanced alert message concept based on alert message libraries

is very appealing to improve the level of understanding by the population of the alert message wherever they come from, wherever they are, given the variety of cultures and languages in European countries combined with a significant migration and tourism movements. Human errors, such as the use of complex words and sentences, jargon and even spelling errors can be avoided with this method, additionally to the harmonized style and alert message composition anywhere by any authority. By introducing advanced concepts, even additional advantages such as lower required capacity per message and lower alert message delivery delay can be achieved, allowing the dissemination of alert messages also through very capacity-limited communications systems. Embedding alert messages in the satellite navigation signal is very appealing given its robustness in front of major disasters and always increasing penetration of navigation-enabled devices, but is only possible if the alert message can be embedded in a very small message format.

An exercise carried out within the Alert4All project has provided evidence of the need to harmonize the methodology to compose alert messages, as the content, size and style of the alert message significantly differ depending on who is the specific person operating the alert dissemination system. Human errors such as spelling errors, complex sentences and words are not avoided in free-text based systems. In the exercise the users did not even make sure that the text they were writing would fit in the displayed window at the receiver side. Additionally, multi-language alert messages were ambiguous as the users did not have sufficient knowledge in the requested languages (English, Spanish and Portuguese) to compose by themselves coherent error-free alert messages (the participants of the exercise had the following nationalities: British, Spanish, Portuguese, Norwegian and German). In all these aspects, an alert-library based system showed significantly better performance at the price of less freedom when composing alert messages (it is however questionable whether this is actually a disadvantage) and assuming some intelligence and storage capabilities at the receiver side (which is not an issue for state-of-the-art devices).

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Forwarding a Challenging Task: Seven Elements for Capacity Development for Disaster Risk Reduction¹

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Abstract – Capacity development for disaster risk reduction is an important process to substantially reduce disaster losses, which threaten sustainable development and the achievement of the Millennium Development Goals. This paper presents seven elements for capacity development for disaster risk reduction that has been applied in practise with noteworthy results. The seven elements are: (1) Terminology, (2) Local context, (3) Ownership, (4) Capacity assessment, (5) Roles and responsibilities, (6) Mix of activities, and (7) Monitoring, evaluation and learning. Although this set of elements should not be seen as a comprehensive methodology in itself, the seven elements for capacity development for disaster risk reduction still highlight vital aspects and seem to be a both conceptually and pragmatically interesting path to follow for increasing the impact and sustainability of projects.

Keywords – *capacity development, capacity building, disaster risk reduction, disaster risk management, disaster management, disaster.*

1. Introduction

Disasters are not evenly distributed in the world. Developing countries are bearing the brunt of the death and destruction (UNDP, 2004: 9-27; Twigg, 2004: 2; Fordham, 2007: 340), and the international community has identified capacity development for disaster risk reduction as a vital tool to substantially reduce disaster losses (UNISDR, 2005). However, not all capacity development projects have resulted in improved capacity for disaster risk reduction in the intended countries (UNDP, 2004: 76-77; CADRI, 2011: 7-8). One reason for this may be lack of analysis of the relevant risks and initial capacities within the countries in question, as a foundation for project planning and implementation (Schulz et al, 2005: 7; Twigg, 2004: 289; Becker, 2009). The division of roles, responsibilities and ownership may be vague and understood differently by different partners. External experts are often involved during short periods, do the work themselves, apply ready-made solutions, and leave before any institutional memory have been created. Thus ignoring established systems, strategies and capacities, which result in the creation of parallel structures and processes (Twigg,

2004: 289; Becker et al, 2013: 4), and in the deterioration of project results soon after external expertise is withdrawn (UNCRD; SEEDS, 2002: 1). Capacity development projects for disaster risk reduction often focus on the training of individuals without paying sufficient attention to organisational issues, structures, and how such organisations interact with each other (OECD/DAC, 2006: 3; UNDP, 2007: 5-7), making the little capacity that may have been developed in the project liable to staff turnover. It seems in other words that there is lack of guidance for capacity development for disaster risk reduction.

The purpose of this paper is to present seven requisite elements for effective capacity development for disaster risk reduction identified in the literature and give examples of how they can be used in practice. The seven elements are:

1. Terminology
2. Local context
3. Ownership
4. Capacity assessment
5. Roles and responsibilities
6. Mix of activities

¹This article is based on a presentation given during the 4th International Disaster and Risk Conference IDRC Davos 2012, held 26-30 August 2012 in Davos, Switzerland (<http://idrc.info/home/>)

7. Monitoring, evaluation and learning

2. Seven elements for capacity development for disaster risk reduction

There are no commonly accepted definitions for capacity development or disaster risk reduction among all stakeholders (Eriksson; Gustavsson, 2007: 13). The same terms are defined in different ways by different organisations (Thywissen, 2006: 10-11; Twigg, 2004: 12), and concepts are often used interchangeably, e.g. capacity development and capacity building (OECD/DAC, 2006: 9; Schulz et al, 2005: 13). The used terminology relies often upon abstract concepts that are difficult to translate into objectives and practical activities (Eade, 1997: 2; Lopes; Theisohn, 2003: 1; UNDP, 2007: 3). Hence, the same terms are defined in different ways by different organisations, resulting in a detrimental “Babelonian Confusion” (Thywissen, 2006: 10-11).

To design a project for capacity development for disaster risk reduction, it is important to first analyse and understand the local context (UNDMTP, 1997: 55; OECD/DAC, 2006: 17), including general political, social, cultural, economic, physical, and environmental factors (Wisner et al, 2004: 49-52; Coppola, 2007: 146-158; UNISDR, 2004: 16) and to understand the relationships and dependencies between individuals or organisations (Schulz et al, 2005: 31). However, there is often a lack of such analysis, increasing the risk of creating parallel structures (Twigg, 2004: 289; Schulz et al, 2005: 7) and reducing the effectiveness of the project (Becker, 2009).

One of the cornerstones for capacity development is ownership, which means that the primary responsibility and ownership for capacity development rests with internal partners² and that external partners³ have supportive roles (UNISDR, 2005: 3-5; OECD, 2005: 3-5). Involving people through participatory approaches is essential to establish ownership and commitment (Anderson; Woodrow, 1998: 28; UNDP, 2007: 17), and the sustainability of capacity development projects has been shown to increase in direct relation to the level of participation and ownership of the internal partners (Fukuda-Parr et al, 2002: 12). However, there is lack of consensus on what ownership means (Lopes; Theisohn, 2003: 29; Schulz et al, 2005: 23) and the lack of local ownership in capacity development is still a main reason for the failure of many projects (Lopes; Theisohn, 2003: 29-31).

In order for capacity development for disaster risk reduction to be effective, it must be clear in its purpose. Therefore, there is a need to focus on the analysis of risks that the internal partners face and the analysis of capacities that are currently available to manage them. This is in general capacity development literature often referred to as capacity assessment (UNDP, 2009: 21-24; UNDP, 2008), but there is a lack of methods and tools for capacity assessment that are tailored for disaster risk reduction. Without sufficient capacity assessment, there is a risk of external partners misunderstanding their internal partners' capac-

ity needs (Ebrahim, 2007: 16).

When working in partnership, clear and mutually agreed roles and responsibilities for all partners are necessary. Especially as external partners can take on different roles, ranging from providing technical services to facilitating the capacity development process. Which role that is taken should depend on what the internal partner needs and what the external partner is able to do (Motes; Hess, 2007: 117). Whatever role taken, it should never undermine local ownership (Lopes; Theisohn, 2003: 29), but instead create awareness, motivate and engage the internal partners in taking ownership (Whitmore et al, 2003: 24). However, in practise the division of roles and responsibilities is often vague and understood differently by different partners, and external partners have often a tendency to have a “right answers” approach to capacity development (OECD/DAC, 2006: 7, 15).

As capacity development entails activities on various levels, i.e. legal and institutional frameworks, systems of organisations, organisation and human and material resources (Becker et al, 2011: 4), it is necessary to address challenges on all of them by implementing a mix of activities, on short and long term (UNDP, 2008: 23; UNDP, 2009: 25). The reason for this is that changes at one level often require changes at other levels too (CADRI, 2011: 9; UNDP, 2007: 13; Coppola, 2007: 300), as the levels are interdependent (UNDP, 2007: 13). Nevertheless, the focus of many capacity development projects for disaster risk reduction is often on training individuals without paying enough attention to organisational and institutional issues (UNDP, 2007: 5-7; OECD/DAC, 2006: 3).

The purpose of monitoring and evaluation is to measure the progress and results to determine whether the project has caused any actual change towards the overall objective, continuously (monitoring) or periodically at predetermined points in time (evaluation) (Ortiz; Taylor, 2008: 2). However, evaluations are often done at the end of a project and have short-term perspectives that usually miss to assess long-term consequences (Twigg, 2004: 353) as a result of projects often being directed by budgetary time cycles or annual budgets (UNDMTP, 1997: 59). Monitoring and evaluation is not only for validating results, but also for learning from experience.

To summarize, the seven elements for capacity development for disaster risk reduction are:

1. Terminology – understanding key concepts as well as how other stakeholders understand them.
2. Local context – understanding the basic political, social, cultural, physical, environmental, economic and institutional context of the project, including who are its stakeholders and organisational set-ups that may feed into the project risk analysis and conditions for engaging.
3. Ownership – ensuring local stakeholders having ownership over the capacity development process.
4. Capacity assessment – understanding risks and the current capacities available for disaster risk reduction,

²An internal partner is a partner belonging to the organisation attempting to develop its own capacity.

³An external partner is a partner belonging to an organisation attempting to support the development of the capacity of another organisation.

and determining commonly accepted capacity development objectives among stakeholders.

5. Roles and responsibilities – ensuring local stakeholders to assume leading roles and external stakeholders to assume supporting and coaching roles, and that all stakeholders understand this division.
6. Mix of activities – addressing capacity development needs in a systematic and holistic manner, acknowledging dependencies between stakeholders, sectors, levels, etc.
7. Monitoring, evaluation and learning – ensuring continuous monitoring and timely evaluation of the actual effects of capacity development projects and their activities, and use these inputs for learning.

These elements are mentioned frequently in the literature and thus seem to be important. The elements should be seen as flexible and as a foundation, with the possibility to extend with other elements that may have been left out from this study. In other words, we do not claim that the seven elements constitutes a complete framework, but that each of them is crucial for grasping and improving capacity development for disaster risk reduction.

3. Application of the seven elements

The seven elements have so far been used for analysing how external partners approach capacity development for disaster risk reduction and for gap analysis and evaluation of three capacity development projects.

3.1. *External partners ideas concerning capacity development for disaster risk reduction*

35 semi-structured qualitative interviews were conducted with external partners who work with disaster risk reduction and capacity development in the international community. The purpose of the study is to analyse how external partners approach capacity development for disaster risk reduction and to compare and contrast between them based on the seven elements (Hagelsteen; Becker, 2013: 4-13).

The results of this study indicate that there is a high degree of terminological ambiguity regarding what disaster risk reduction, capacity development and ownership means in theory and practice. There are also different notions of understanding the local context, capacity assessment, as well as the division of roles and responsibilities. Focus is most often on training individuals and not having a holistic and systemic approach with a mix of activities. There seems to be a lack of procedures of what results to assess, how to monitor and evaluate projects, as well as how to capture and share lessons learnt and who should do it. Thus, the study reveals that there are substantial discrepancies in the responses between the informants, as well as a gap between theory and practice in relation to the seven elements.

3.2. *Gap analysis*

During 2011 a consultant for MSB (a Swedish governmental agency active in international humanitarian assistance and development cooperation), performed an evaluation in the form of a gap analysis of three capacity development for disaster risk reduction projects in Pakistan, Armenia, and Tajikistan. The gap analysis was based on project documents and reports. The gap analysis was guided by the seven elements, which proved to be a useful guide for undertaking the evaluation.

The results from the gap analysis indicate that concepts are used interchangeably and that there is a lack of explanation of the various disaster risk reduction and capacity development concepts. The gap analysis also reveals that the project documents do not provide details about if and how local context analysis, risk assessment, the definition of roles and responsibilities and capacity assessment are explicitly undertaken. The gap analyses also note the lack of adequate baseline information to monitor and evaluate projects, and that there is an emphasis on “hard” or service delivery capacities over “soft” dimensions of capacity development.

4. Added value to integrative risk management

The seven elements have proven useful for analysing stakeholders’ notions of capacity development for disaster risk reduction, for gap analysis and evaluation of existing capacity development projects, and may be used to inform the design and implementation of future capacity development projects. However, the seven elements should not be seen as a comprehensive methodology for capacity development for disaster risk reduction. The elements should be considered as guidance with an explicit focus on softer or more process-oriented aspects. These aspects are at least as important as the technical ones to reach success in the project, but are often overshadowed by technical ones in this case disaster risk reduction.

The seven elements have also proved an asset in connection with teaching at post-graduate programmes at universities and in interaction with different stakeholders in society. The seven elements have been used as a guiding structure during lectures and to guide discussions with stakeholders, locally, nationally and internationally, when talking about capacity development for disaster risk reduction. During these discussions all the seven elements have been identified and recognized as important elements for capacity development for disaster risk reduction.

5. Conclusion

The set of seven elements appears to be useful both theoretically and pragmatically, as there seems to be a need for a capacity development framework for disaster risk reduction focusing on these issues. However, as stated earlier, the seven elements should not be seen as a comprehensive methodology for capacity development for disaster risk reduction as such, but as a reminder of key requisites

for effective capacity development for disaster risk reduction. The seven elements could then form a foundation for the development of such comprehensive methodology, perhaps with the addition of elements that have been left out in our studies so far.

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Women's Health in Natural Disasters: A Vulnerability Analysis¹

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Abstract – Women are among the most vulnerable groups of society in natural disasters. In this regard, the aim of the present study is to identify the influential factors of women's vulnerability in natural disasters and proposing strategies to reduce the risk. This study has been conducted in Iran consisting a narrative review and a qualitative study (focus group discussion) in order to determine the views of decision makers and to propose strategies for improving approaches to reduce women's vulnerability in disasters. The main findings of this study include: lack of needs assessment regarding women in disaster situations; insufficient legal support of women; need for more credits to be allocated for women in disaster management issues; absence of enough female experts in the field of disaster management; lack of women's presence especially in the responsible government agencies; constant use of men as relief and rescuers without having women in the team; and lack of specialized centers to train women for relief and rescue activities.

Keywords – women's health, vulnerability analysis, natural disasters, qualitative study

1. Introduction

Disasters that happen in the last few years have necessitate the focus on special needs of women in various disaster cycles especially during and after disasters (Seaman and Maguire, 2005). The gender role of women has caused them to be under the death threat due to their social, cultural and biological differences in comparison to men (Meleis, 2005). From the health view, the consequences of floods in New York in 1972 can be an example. This flood which followed the hurricane Agnes, have made the water polluted with chemical toxins and caused the spontaneous abortion in many pregnant women in 1973 (Cordero, 1993 and Janerich et al., 1981). Also, the tsunami that affected the Indian Ocean in 2004 is another example in which the cultural issues caused the increase in women's death. In this disaster, the death rate of women was three times than men. In a study by Carballo in 2005, the reason for women's vulnerability was mentioned as cultural problems, since most of women did not know how to swim and therefore could not survive. Also some common traditions in that area such as, keeping the long hairs, caused women to get trapped in the debris caused by floods and therefore got drawn. In addition, livelihood problems and

attempt to protect the children were among one of the social factors which was identified by Carballo et al., 2005.

After the natural disasters, women are usually under the threat of sexual harassment. Chaos, insecurity, problems in social relations, and the pressure on women for providing food and settlement in emergencies can result in their sexual abuse and threat of the sexually transmitted diseases. The impact of these events can bring many negative consequences in long-term (Sapir, 1993 and Carballo, 2005).

Risk analyses consist of two parts: hazard analysis and vulnerability analysis; and recent part refers to the factors which cause a society deal with natural disasters or man-made crises and complex emergencies (Baas et al., 2008). Based on this definition, those people who suffer injuries and damages against the occurrence of these events are called vulnerable populations. Research findings and experience from previous disasters have shown that women are among the most vulnerable groups of society in natural disasters (Fothergill, 1996, and Izadkhah and Jahangiri, 2013). However, problems of women in the broad context of disasters and emergencies have only been addressed recently. Gender usually has not been a conscious criterion employed by relief agencies to effectively assist the so

¹This article is based on a presentation given during the 4th International Disaster and Risk Conference IDRC Davos 2012, held 26-30 August 2012 in Davos, Switzerland (<http://idrc.info/home/>).

called "vulnerable groups" in their special needs when an emergency or disaster occurs. Vulnerability of women is a fact, based on the larger number of women and woman-headed households in emergencies and on the responsibilities borne by women related to the stability of the domestic group, including a disproportionate responsibility for dependent children.

Using Iran as a case study is because Iran is considered as one of countries most under the threat and at risk of natural disasters in the world. Thus, disaster management and disaster risk reduction are among important issues in this country. If disaster management is a collection of theoretical concepts and practical measures that is done in three stages; pre, during and post disaster, risk analysis should be addressed at the first step in pre-disaster stage. In this regard, the aim of the present study is to identify the influential factors of women's vulnerability in natural disasters and proposing strategies to reduce the risk.

2. Methods

This study has been conducted in Iran in 2007-2008 which consists of two types of research and data collection:

- The first part is a narrative review of the written documents, electronic books and sources as well as related published papers.
- The second part is a qualitative study (Focus group discussions) in order to determine the decision maker's point of view and to propose strategies for improving approaches to reduce women's vulnerability in future disasters.

Fifteen experts and executive practitioners who have participated in the first seminar on Disaster Management agreed to participate in this small-scale study.

3. Results

The findings of this research suggest a wide range of problems and shortcomings which can be considered as causes of vulnerability of women in disasters and will be addressed afterwards in the next two sections.

3.1. Narrative review

The findings and results of the causes of women's vulnerability in disasters were the following issues which are somehow in accordance with existing national and international cases:

- Financial dependence on male members of households with illiterate or low-literate women and their passive roles in family and community, especially in rural areas and small towns (Maleki, 2010);
- The physiological conditions of women - such as pregnancy and lactation - also supervision of children and their specific needs in this era, places women among one of the vulnerable groups in the society (Mothers Health Program in Crises 2003);

- Women experience the greatest stress due to their multiple responsibilities and generally inferior social status (Izadkhah and Jahangiri, 2013). It is well known that stress weakens a woman's resistance to diseases and adversely affects her ability to undertake essential economic and family activities;
- Lack of full presence of women in public organizations where the large number of managers are men, particularly in disaster management. This actually leads in ignoring women main needs in disaster situations;
- Marginalization due to lack of adequate decision-making power and control over resources which is one of the most striking common elements between women in developing countries and those in disaster prone areas;
- The health of women affects the well-being of their family, and often their entire community. A woman's health is the key to survival and health of her children. Her knowledge of diet, preparation of food, and personal and household hygiene figure importantly in the health of her family. Also, her common role as birth attendant may have a direct impact on the health of a large part of the community. An unhealthy woman, who cannot properly provide for herself, clearly cannot attend to the needs of her family and others;
- Also, following the disaster event, due to the lack of job opportunities and high number of female headed households, the number of women who are unwillingly forced into doing jobs which are not accepted by society increases (Al Gasseer et al., 2004). This could also be counted as an underlying abuse of women and to promote prostitution;
- There is a need to investigate the causes of women's vulnerability in disasters with regard to the specific characterization of each country especially developing countries such as Iran (Izadkhah, 2008). The existing traditional and cultural limitations which Iranian society imposes on women can intensify their vulnerability.

3.2. Qualitative study

Based on the interviews and meetings with the focus group, the main findings of the influential factors of women's vulnerability in natural disasters were:

- Lack of need assessment regarding women in disaster situations;
- Insufficient legal support of women;
- Need for more credits to be allocated to women in disaster management issues;
- Lack of women's presence especially in the responsible government agencies;
- Absence of enough female experts in the field of disaster management;
- Constant use of men as relief and rescuers without involving women in the team; and
- Lack of specialized centers to train women for relief and rescue activities.

4. Conclusions

Disasters that have occurred in recent years reveal the necessity of considering specific needs of women in various stages of disaster management cycle, especially during and after the disaster (Seaman and Maguire 2005). Women are more than men at risk of morbidity and mortality because of their gender role in terms of social, cultural and biological aspects (Meleis, 2005).

The main strategies that could be suggested in this paper in order to reduce the vulnerability of women in disasters include: increasing public education; activating women's communication networks; reinforcing practical skills for women facing disasters; reinforcing women's NGOs for the purpose of forming humanitarian activities in crisis prevention; legislation for supporting women; conducting appropriate research and present the results to relevant authorities; allocating roles for women in relevant organizations; defining special positions for women in the headquarters and dispatching teams in disaster regions; and training skills in all areas related to women's health especially in reproductive health in natural disasters and crisis situations.

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A Disaster Management Framework for Coping with Acts of Extreme Violence in School Settings: A Field Study ¹

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Abstract – The present study is part of a 5-year research project on disaster management planning for coping with acts of extreme violence in schools. The project was funded by the SSH Research Council of Canada and carried out by an academic team from University of Quebec at Montreal (UQAM) in collaboration with researchers from six countries². In this article, the “Pressure and Release” and the “Triangle of Risk” models were used to identify (a) the root causes and the dynamic pressures that can increase the vulnerability of the educational system to hazards related to acts of extreme violence in schools, and the susceptibility to the impact of these hazards; (b) the main deficiencies in preparedness, and; (c) the challenges raised by the intervention process and the disaster recovery stage. The findings of this study have been integrated in a comprehensive framework that can be used to address the process of disaster risk management at each stage of the “risk cycle” (prevention, intervention and recovery).

Keywords – disaster risk management; man-made disaster; educational system; school violence; school shooting; contingency planning.

1. Introduction

We live in an era of space travel, DNA decryption, and spectacular advances in nanotechnologies. Yet, human beings still have little control over Planet Earth, and seem powerless when faced with natural or man-made disasters, such as the 9/11 terrorist attacks, the Indian Ocean tsunami of 2004, the Fukushima nuclear accident and the H1N1 pandemics. Moreover, disasters, which until recently were mainly the result of natural and technological hazards seem to be diversifying in their roots and patterns. The World Health Organization has reported that, between 1990 and 1999, “globally, approximately two billion people were affected by natural or technological disasters.” Nevertheless, after 2000, new types of disasters have emerged that seem to be related to social issues. For instance, the World Disaster Report dealt in 2000 with “chronic health crises” and then, in 2010, with the food crisis “that has caught the world by surprise.” (World Disaster report, 2011). Also, after 2000, some new social phenomena - such as ‘work violence’ and ‘school violence’ - have become subjects of concern for national governments. According to Akiba et al. (2002: 830), school violence has

become “a global phenomenon that affects one of the core institutions of modern society to some degree in virtually all nation-states.” The school shootings are part of this new form of extreme violence in schools.

For the purpose of this study, a school shooting is defined as a multiple-victim act of extreme violence perpetrated on school’s premises, generally by a school-related perpetrator (student, former student, teacher, or outsider with ties to the school or its community) who carefully plans the act in advance. Therefore, schools should prepare contingency plans “to enable timely, effective and appropriate responses to such events and situations.” (United Nations, 2009:7).

2. Presentation of the research project, research goal and research strategy

The present study is part of a 5-year research project that was funded by the SSH Research Council of Canada in 2008. A project team was established to study the new form of extreme violence in schools and to understand why and how school shootings occur.

To conduct this project, the research team used two

¹This article is based on a presentation given during the 4th International Disaster and Risk Conference IDRC Davos 2012, held 26-30 August 2012 in Davos, Switzerland (<http://idrc.info/home/>)

²The first author of the present article is the project leader.

methods, namely the 'Ethnographic Content Analysis' (ECA; Altheide, 1987) and the 'case study' method (Yin, 2012).

The investigation began in 2008 with a pilot project of six events (six pilot cases). An ECA was performed for each. The open-ended protocol that was designed and subsequently refined, the purposive sample of documents and the theoretical saturation that was reached in each of these six cases, as well as the main themes and sub-themes that emerged from the ECA, are reported in Dumitriu and Donia (2009). In the following years, the number of events that the research team has investigated rose to 111 (the results were reported in Dumitriu, 2013) and then to 160 (the present study). Data was collected from various databases, governmental reports of inquiries into these events, police reports, court records, school records, newspaper articles, scientific articles, books and book chapters that were written by authors who were directly involved in these events and archival documents.

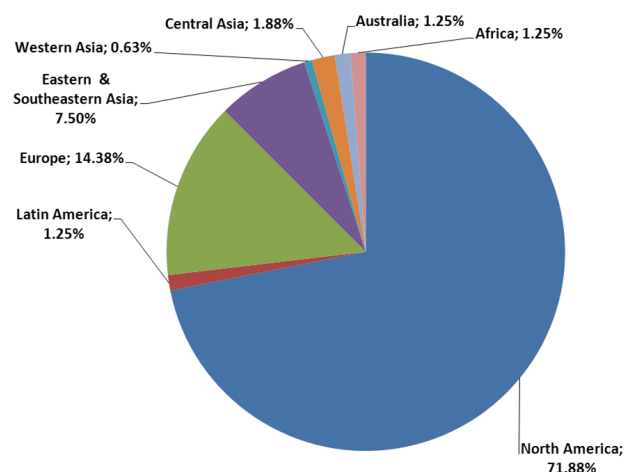


Figure 1: The 160 school shooting events worldwide (1900-2013) and their distribution by region

In total, about 38,300 document pages and 2,000 web pages were investigated using paper-based and computer-based ECA, and 21 research assistants contributed to the gathering and sorting of data under the supervision of the project leader (triangulation through multiple evidence and multiple researchers). Because new school shootings events occurred each year while the project was underway, data about these events were collected continuously and then analyzed. The themes and sub-themes that emerged in the ECA process were grouped to form 'categories' that have been integrated in theoretical models or research frameworks, which were used to conduct the second stage of the project. During the second stage, field data were collected through interviews and focus groups and then data were analyzed using the case study method. Two distinct types of frameworks were used. They were

- a the 'crisis management' framework that enabled us to explore the themes that were organization-bounded, and;
- b the 'disaster management' framework, that en-

abled us to study all of the stakeholders (school, police, medical teams, policy makers, etc.) and their interaction - before, during and after the events.

The results obtained by adopting the 'disaster management' approach and the case study method are reported in this article.

3. Research questions, research framework, method and sample

This article attempts to provide answers to the following research questions.

- a What are the root causes of extreme violence in schools?
- b What are the common characteristics and circumstances (if any) of the schools, communities, or countries in which school shootings occurred and how could these characteristics make schools and communities susceptible to the damaging effects of man-made hazards driven by violent behaviour?
- c How must schools and communities prepare to deal with school shooting situations, and;
- d what are the main challenges raised by the intervention process and the disaster recovery stage?

To find answers to these questions, The "Pressure and Release" model (Blaikie et al., 1994) and the "Triangle of Risk" model (Birkman, 2006) have been combined in an integrated framework (Figure 2) that has been used to

- a design the multiple-case study,
- b define the data collection protocol and prepare the interview guide, and
- c compare, at the end, patterns from theory with those revealed by data analysis.

The research framework shows the chain of progression of vulnerability (Figure 2). Based on UNISRD terminology (UN, 2009), we define "vulnerability" as the characteristics and circumstances of the school and/or educational system that make it susceptible to the damaging effects of man-made hazards. The vulnerability to a specific hazard has its roots in 'pre-existing conditions' that can emerge within the organization or its external environment (stage 1). The framework in Figure 2 shows that the existence of various 'pressure points' may increase the vulnerability of an organization to hazards (stage 2). Finally, some 'unsafe conditions', such as unsafe location, unprotected buildings, lack of appropriate infrastructure, lack of preparedness actions, etc., may further increase the organization's vulnerability.

25 of the 160 school shootings in Figure 1 were selected for in-depth analysis by the case study method (Yin, 2003). Field data were collected in these schools' communities by semi-structured interviews and/or focus-groups

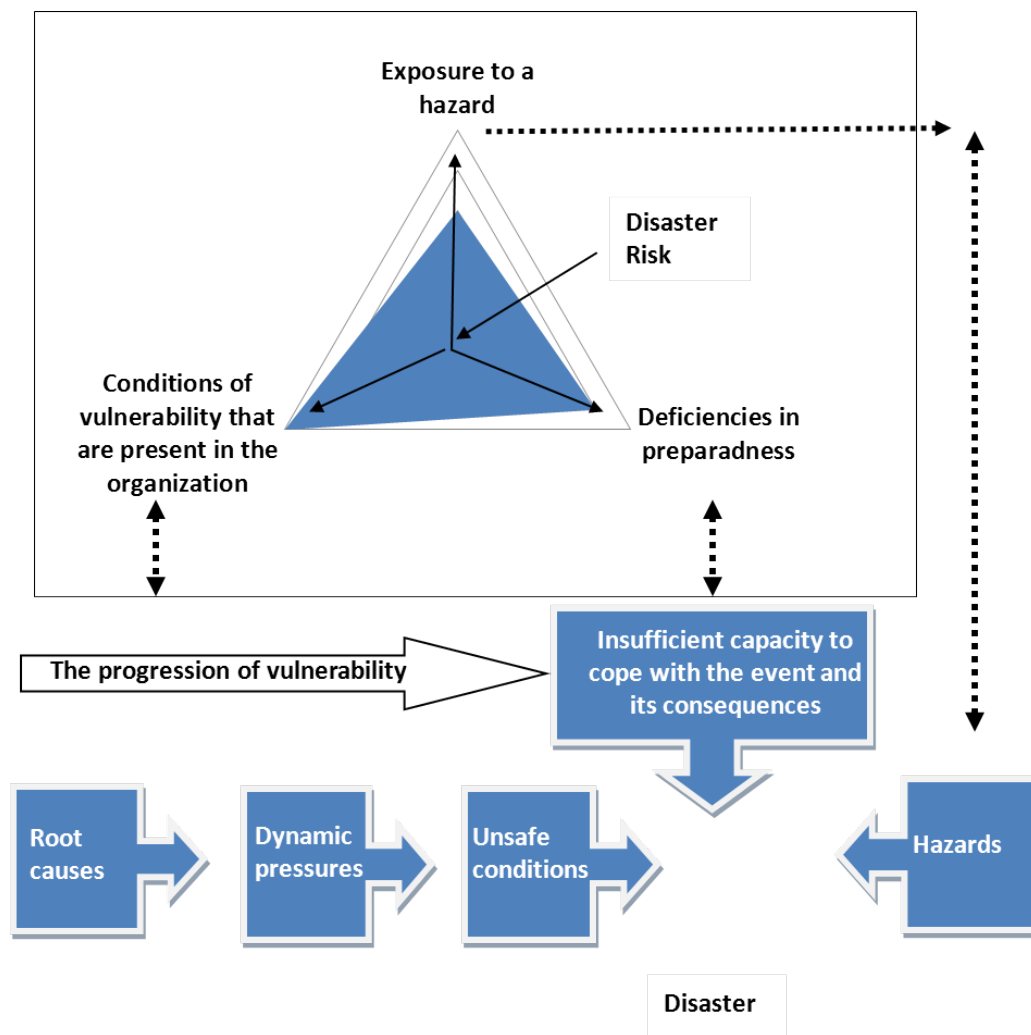


Figure 2: The Research Framework

with relevant stakeholders:

1. senior officials of the Ministry of Education,
2. municipal officials of some of these communities,
3. health professionals at various hospitals,
4. members of the emergency medical teams or law enforcement agencies,
5. lawyers, prosecutors and court judges who presided over the cases,
6. psychologists who assessed the shooters before or after the shootings event,
7. relatives of some shooters, some of their former friends, and in some cases the shooters themselves,
8. in the case of ten schools that agreed to participate directly in this study, teachers and school administrators/employees, students, victims and their relatives.

The composition of the sample in Appendix 1 was established following Yin's recommendations regarding the use of multiple-case studies that are selected to predict similar results (direct replications) in various contexts. Each of these 25 events is considered to be a 'typical' school shooting situation, as the term is defined in this study. The cases in the sample differ in terms of

1. type of the school (primary/secondary school, college or university),
2. school's size (number of enrolled students),
3. location (country and community- large/small city, village, township or unincorporated area),
4. school demographics,
5. time of the event,
6. shooter's age and ties with the school.

17 of the 25 events in our sample, occurred in North America. This is consistent with the distribution by region of the 160 worldwide events in Figure 1. Moreover, the composition of the sample permitted comparisons of cases and enabled us to follow a pattern-matching logic.

4. Findings and discussion

4.1. Exposure to hazard and root causes

The results show that 68.7% of the 163 school shooters who perpetrated the 160 school shootings were students or former students. Some of them were graduate students enrolled in various master or doctoral programs (e.g., [2], [3], [8], [10], [12] in Appendix 1. Most of them were described

Table 1: School shooter's ties with the school (160 school shootings)

The school shooter	Number of cases [%]
Student (including university -graduate/postgraduate)	55.21%
Former student	13.50%
Teacher/Professor	5.52%
School employee	3.68%
School-related individual	7.98%
Outsider (no ties with the school)	14.11%
TOTAL : 163 perpetrators/160 school shootings	100%

by their colleagues and teachers as “straight A students” or “high achievers”. In other cases (e.g., [1], [5], [19], and [23]) the shooter was a professor, a school employee or a school administrator. Some of the shooters were ‘outsiders’ with ties with the school community (e.g., [4], [7], [15], [20], and [21]). Finally, in some cases the shooter was an outsider with no tie with the school, its students or its teachers (e.g., [14]).

The results in Table 2 show that generally, the school shooter wanted to get revenge on the school and/or some individuals: (a) specific teachers/university professors, school's administrators, and/or dissertation advisers who, he believed, ‘had wronged him’ (e.g., [3], [5], [6], [8], [10], [11], [19], and [23]); (b) specific students who had bullied him (e.g., [9], [13], [22] and [25]); (c) a specific ‘identity group’ that is defined by religion/specific skills/race or ethnicity/gender (e.g., [9] and ([12]), and; (d) ‘the school’ as a symbol of organizational injustice/ social injustice or as a cultural symbol (e.g., [9], [11], [12], [16], [17], [19], and [20]).

Our results show that the roles of mental health-related issues and bullying in school shootings seem to have been overstated by other researchers in the field. Only 11 of the 163 shooters suffered from a mental illness that had been diagnosed well before the event by health specialists. Also, it appears that bullying is rarely, by itself, the main cause of a school shooting. We found that only seven cases in our sample were related to severe bullying, in addition to other factors. Instead, perceived social and/or organizational injustice appears to be a more important cause of school shootings. Thus, in 15 of the 25 cases, the issue was mainly organizational and involved various aspects related to (a) organizational justice; (b) intergroup conflict in organizational settings, and (c) social justice-related issues, such as social equity and relative deprivation. With a few exceptions, these organizational aspects have not been addressed in previous research on school shootings. Finally, in three cases ([2], [14], and [24]), the shooter's ‘motive’ is rather unclear.

4.2. Pre-existing vulnerabilities

Two categories of pre-existing vulnerabilities of these schools have been identified (Dumitriu, 2013).

1. Structural vulnerabilities:

- *School level/national level-* at least one of the fol-

lowing characteristics: (a) absence of clear principles of individual accountability for school administrators; (b) inflexible educational systems (do not allow students to change paths during their study period); (c) ambiguities and/or omissions in the following policies and procedures: hiring and firing policies; policies and procedures for the evaluation of faculty members, including tenure guidelines; the research policy, including guidelines regarding the use of grant funds; the student exclusion policy; the admission procedure, and; (f) rules and regulations dealing with disruptive and violent behavior of students and staff, academic mobbing, bullying, and discrimination.

2. Cultural vulnerabilities:

- *Organizational level* - at least one of the following characteristics: (a) individualism/lack of “school connectedness” (Blum, 2005); (b) favoritism; (c) demanding academic environment/ pressure to perform better; (d) rigidity and self-sufficiency; (e) lack of ethics-related values; (f) “laissez-faire” culture; (g) tolerance of violence; (h) dysfunctional group dynamics.
- *National level:* countries with (a) low “Power Distance” (such as this term was defined by Hofstede, 2001); (b) high “Individualism” (Hofstede, 2001), and/or (c) strong “gun culture”

4.2.1. Structural vulnerabilities

Many of these schools have some common organizational characteristics.

- *The Hiring/firing/evaluation and promotion policies*

In many of the school shooting events that were investigated (e.g., [1], [5], [10], [19], [20], and [23]) the root cause was somehow related to some ambiguities and/or omissions in the hiring/firing/evaluation & promotion policies of the schools involved. These policies – that were rather vague and lacked rigor - have contributed to creating frustration among the members of the organization and thus, have induced in the organization a vulnerability to violence-related hazards. Consequently, some conflicting situations emerged:

Table 2: School shooter's motives

Categories of shooters	Motive/root cause	Aggravating/precipitating factors
Students/former students (generally, white males between 11 and 21 years of age)	• has experienced longstanding bullying at school for: his appearance/ overzealousness at school/some homophobia related issues • has been expelled/suspended (from a specific course or from school) • has been teased because of his difficulties in verbal communication (lack of proficiency in English/immigrant or other reasons) • has felt persecuted or harassed by specific teachers, and; was unhappy with the grades that they had given him • has been faced with poor group dynamics in school and an organizational culture that seemed to favor one student group over the others	• "typical" middle to upper-middle class families. In some cases, parents have separated or divorced • in a few cases: a severe and abusive father/domestic violence/ neglected child (lack of attention from parents) • some used stimulants like Ritalin or Adderall -probably, to obtain better grades • some cases of autism disorders - "selective mutism" or "Asperger syndrome" - the patient is not supposed to be a danger to himself or to others
Graduate/postgraduate students (generally, white males between 36 and 43 years of age)	• conflict with his/her thesis adviser (alleged "intellectual exploitation") • teased by his peers for his difficulties in verbal communication (lack of proficiency in English)	• financial difficulties-large amount of debt and housing stress; in some cases, first generation immigrants • death of a relative/ or a good friend
University professors school administrators (white males and women; generally in their 40s or their early 50s)	• felt isolated/persecuted/perceived as a whistleblower • intellectual "exploitation" • "unfair" dismissal • has been denied tenure	• no other specific issues
School employees/former employees-/school administrators (white males between 36 and 55 years of age)	• teased by his colleagues who spread rumors about him/her or about his/her family members • "unfair" decision made by the school in his regard (dismissal or others)	• no other specific issues
Outsiders with or without ties to the school (generally, white males between 30 and 55 years of age; but occasionally women)	• seeks revenge against the school population/ school community that was perceived as: (a) a symbol that contradicted his or her religious beliefs or political views; (b) a symbol of social injustice; or (c) a symbol that reminds him/her of a tragic event in his or her life	• some health issues: (a) post-traumatic stress disorder; (b) obsessive- compulsion disorder, or; (c) schizophrenia • death of a parent, child or good friend

- a conflicts of interest and bias in decision making;
- b various 'pressure groups' and subtle academic mobbing, and;
- c open conflict between the members of the evaluation/promotion/ firing committees and the teachers or employees concerned by the decisions made by these committees.

The school shooting that occurred at Concordia University (Montreal, 1992) provides an example of such a situation. After almost thirteen years of alleged "intellectual exploitation" (Arthurs, 1994:12, Independent Committee of Inquiry), Dr. Fabrikant, a tenure-track professor, complained about the administrators of the Engineering Department, who, he claimed, had co-authored many of his scientific articles, without actually contributing to them, and had repeatedly refused him tenure in order to con-

tinue to maintain control over his research activity and publications. When the internal inquiry ordered by Concordia's Board of Governors dismissed his allegations, Dr. Fabrikant filed a lawsuit against Concordia administrators and made explicit threats to specific professors. In response, Concordia administrators began to search for a specific provision in the CUFA Agreement (Concordia University Faculty Association) that would have allowed them to fire him. However, Concordia University's policy for firing a professor made no provision for those who exhibit threatening behavior. Meanwhile, Dr. Fabrikant applied for a gun permit, purchased guns, and then committed the shootings on August 24, 1992. The two independent external committees of inquiry into the shooting stated that in fact Dr. Fabrikant had been entitled to obtain tenure and identified many ambiguities in Concordia's policies that allowed some professors to abuse their

administrative powers. In regards to the psychological impact of tenure denial on some people who desperately strive for social status and financial success, but who are, instead, suddenly confronted by financial stress and social marginalization, it should be emphasized that three more school shootings that were driven by tenure denial have occurred since the event at Concordia University ([19], [20], and [23] in Appendix 1).

- *The Research Policy*

The lack of clear guidelines regarding ethical behavior in research, including the use of research funds and the circumstances in which dissertation advisers co-author scientific articles with their doctoral students, has led, in some of the cases investigated, to internal conflicts when some members of the organization accused others of unethical behavior, claiming that they

- a misused the research funds, and/or
- b took credit for their work and research results.

In some cases (e.g., [5]), they were tenure-track professors. In some other cases (e.g., [3] and [8]), they were graduate students who claimed that their advisors were trying to artificially prolong their periods of graduate studies in order to take advantage of their research work. In the end, they shot their advisors and/or the members of the dissertation committee. For instance, Theodore Strelski, (42), a Ph.D. student at Stanford University, was “fed up with his years of quiet desperation” (Waggoner, 1985). He was in his 16th year of his doctorate program and felt that his advisor “had belittled him” and “had unfairly delayed his graduate study” (Bartholomew, July 2003). He and his wife were struggling to survive financially because universities in North America forbid Ph.D. students to work during their Ph.D. program. They could have qualified for welfare, but Strelski was too proud to ask for social assistance. They finally separated in 1974 and his wife asked for a divorce in 1978. Two months later, he carried out the shooting at Stanford University, killing his advisor and himself. The school shooting perpetrated at San Diego State University by Frederick Martin Davidson in 1996, and that perpetrated by James Easton Kelly at the University of Arkansas in 2000 followed a similar pattern.

- *The Student exclusion policy*

In some cases (e.g., [11] and [17]) the shooter had been expelled from a course or from school and felt that the decision made by teachers or school administrators in his regard, had not been fair. Some of the students expelled from school began to work whereas others enrolled in other schools, but later returned to their school premises and perpetrated the shooting. Their targets were those who, they believed, contributed to their expulsion. For instance, Robert Steinhäuser - a student enrolled in his last year of studies at Johann Gutenberg Gymnasium in Germany - was expelled six months before graduation because he attempted to avoid a test by providing the school

with a forged medical certificate. In the months following the expulsion, he tried unsuccessfully to enroll in other schools. On April 26, the day when his classmates were sitting the final exam, he headed to school and killed thirteen teachers, before committing suicide.

Our findings show that a student exclusion policy that is perceived as ‘unfair’ or ‘discriminatory’ by students could induce in the organization a vulnerability to violence-related hazards. These results are in line with those of Jost and Kay (2010: 1131) who suggest that people react unfavourably to inequity “only if it results from a decision that was made by another person” and when “they believe that a different decision could have reasonably been made.” Researchers have identified a whole range of defensive attitudes that individuals develop to deal with the inequity experienced. These attitudes range from “defeatism, quietism and resignation” (Merton, 1938: 681) to anger (Greenberg, 1987) and a rebellious attitude.

- *The Admission procedure*

Some specific features of the admission procedures in schools and universities could make these organizations vulnerable to violence-related hazards. These features include, but are not limited to: (a) a very formal admission process leading to a rigid academic path that does not allow students to change paths during their study period; (b) a student recruitment strategy and an admission procedure that are designed to attract foreign students, but that do not consider the related aspects (social assistance, integration process, guiding centers, etc.); (c) an admission procedure focusing exclusively on the academic results of the candidates while totally ignoring their antecedents in terms of behavioral problems or mental illness and/or their special needs in terms of medical care and assistance. These issues have been raised in many situations such as [3], [10], [11], [12], [14], [16], and [17].

4.2.2. *Cultural vulnerabilities*

The organizational cultures of many of these schools have some common characteristics. The same is true for the national cultures of the countries in which these school shootings occurred.

- *Organizational culture*

In many of the 25 cases analyzed, some particular features of the organizational cultures induced a tense relationship between different subgroups in the organization. This, in turn, led to the isolation of some members, including those who perpetrated the shootings. At the time of the event, Stanford University (1978), Monash University (2002), Gutenberg-Gymnasium (2002), Dawson College (2006), and Virginia Tech (2007) had organizational cultures that possessed many characteristics of an “A11T /A11S” culture (Figure 3). Other organizational cultures (e.g., Dunblane Primary School; Columbine High School, and; Islas Malvinas School) were a combination of different features of an “A12” culture. For instance, Columbine

School's culture and type of relationship	Teacher	Student
Teacher and school management to:	A11T: An "individualistic" culture - The school leaders exert great pressure on the teachers to perform - A numbers-driven approach to assessing individual performance (students and staff) - Strong internal competition- poor cooperation among teachers - Self-interest is more important than common interest - Low level of interaction between the new members of the organization and the well-established ones	A11S: A "low connectedness culture" - The teachers exert great pressure on the students to perform academically - The relationship is strictly professional with no individual effort made to increase the number of students "connected" to the school - A "students by numbers" attitude with no specific actions to integrate new students and/or foreign students; poor social support - Few extracurricular activities
	A12T: A "laissez-faire" culture – at least one of the following characteristics: - Poor control of the various activities in which teachers are involved and poor ethics –related values - Poor leadership; 'conflict of interest' is tolerated by the institution - Professors/teachers are interested mainly in obtaining extra revenue by teaching at various campuses abroad or through industry-school links	A12S(1): An "elitist" culture - Some groups of students appear to be favored over the others or A12S(2): A "gang" culture - Violent writings, verbal/physical violence, racist attitudes, odd behavior, and odd appearance are tolerated

Figure 3: Types of organizational cultures of the schools in our sample (either A11T or A12T; A11S or A12S)

school seemed to favor a certain "elite" (students with exceptional athletic performance) – fact that represented a major stressor for other students who did not possess such abilities, among them the shooters themselves. Students and parents complained that athletes teased others students and that they enjoyed many privileges at school, but school administrators did not consider these repeated complaints. Instead, some students formed their own organization ("Trench Coat Mafia") that emerged as a balancing counter-force to the other groups in school (i.e., 'the athletes,' some religion-based / ethnicity-based groups, etc.). Then, some of its members decided to initiate a school shooting and targeted specific student groups in school, including 'the athletes'. Another feature of Columbine's culture was its tolerance of verbal and physical violence, racist taunts, students' odd appearance (students wearing odd clothes), and violent writings (Dumitriu, 2013).

- *National culture*

Most of the countries in which these 160 school shootings occurred have strict laws that regulate the confidentiality of personal information. This prevents, or at least limits, the disclosure of sensitive information, such as a

person's medical, academic, and criminal records.

Also, these countries share two cultural characteristics: 'High individualism' and 'Low Power Distance' (as these characteristics are defined in Hofstede's model of national cultures). These issues are discussed in Dumitriu (2013).

An easy access to guns and/or a strong 'gun culture' are among other common characteristics of some of these countries (Figure 4).

4.3. *Dynamic pressures and the progression of vulnerability*

Three categories of dynamic pressures that appear to be related to this type of hazard were identified (Dumitriu, 2013):

- a 'rapid growth strategy' that was adopted by the school just prior to the shooting event (all schools in Appendix 1, except for [6], [13], [15], [22] and [25]);
- a highly competitive environment in which the school operated and means that it has chosen to surpass its competitors (e.g., [3], [5], [12] and [17]); and;

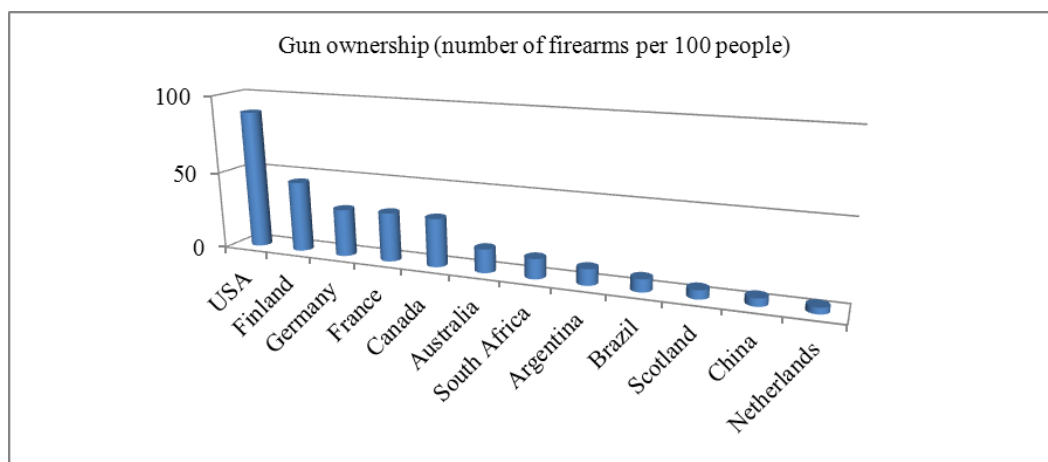


Figure 4: Gun ownership by country (for countries in which school shootings occurred) Source: Compilation of data by the authors. Data from “The Small Arms Survey 2007” (Graduate Institute of International Studies in Geneva)

- c specific budgetary constraints that the school confronted at the time of the event (e.g., [5], [6], [12] and [13]).

One school shooting that illustrates the role played by these three ‘dynamic pressures’ is the one that occurred at Monash University in 2002. Since 2000, ‘international education’ (‘Onshore’ and ‘Offshore’ international students) has become one of the main service industries in Australia, which has contributed largely to Australia’s GDP. With the rapid increase in the number of international ‘Onshore’ students and the decrease in government funding, universities had difficulties in providing the necessary social services that they needed. At that time, Monash University had initiated a ‘rapid growth strategy’ and was very concerned with finding ways to improve performance in three main areas:

- a teaching;
- b research, and
- c international education (Table 3).

Many of the foreign students enrolled on its Australian campus struggled to cope with the high academic standards imposed by Monash, while facing social stresses related to their integration in a new economic, cultural and social context. One of their greatest difficulties was to become proficient in English. Although Monash University set up a Language and Learning Service, the number of international students was increasing at such a rapid pace that this center could no longer cope with the increasing demand for assistance (Rees, 2002). A Chinese graduate student, who was teased by his colleagues for his lack of proficiency in English and who was very frustrated because students and teachers did not understand his oral presentations, climbed onto his desk on the day that he was scheduled to give his oral presentation and opened fire at students and teachers, yelling, “You never understand me!” (Rees, 2002:1).

4.4. Unsafe conditions

Researchers have identified many contextual factors that are related to the onset and development of aggression

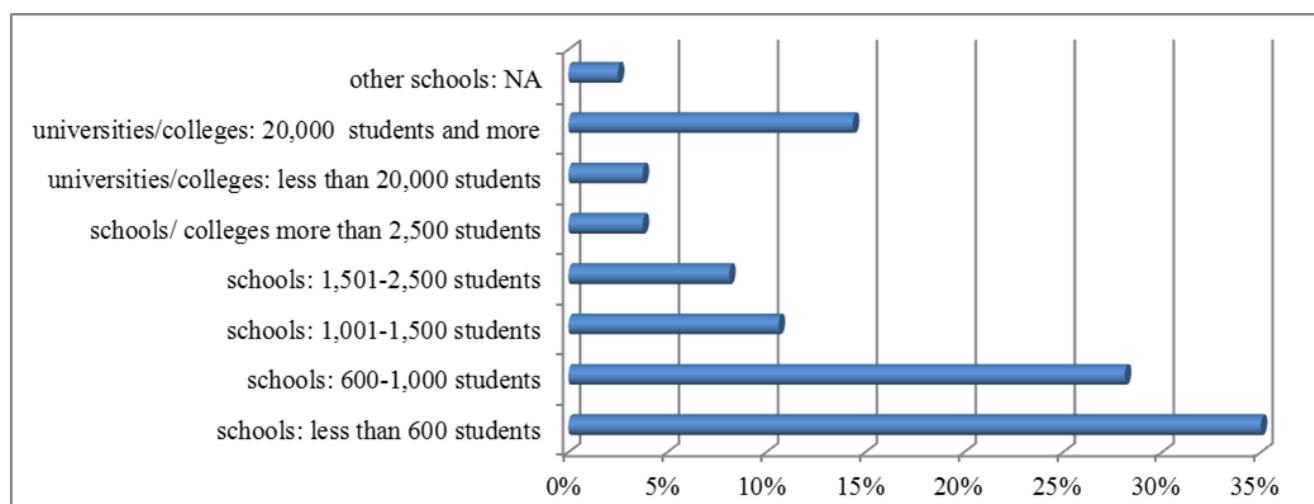


Figure 5: Size distribution of 160 schools that experienced a school shooting event

Table 3: Dynamic pressures at Monash University in 2002 (Source: Dumitriu et al., 2009)

Rapid growth and diversification	Highly competitive environment and a numbers-driven approach to assessing and monitoring performance	Government policy in terms of education and tough budgetary constraints
• The largest public university in Australia (55,000 students in 2002) • <i>Service diversification</i>: extensive number of courses offered in arts, commerce, engineering, education, law, medicine and science. • <i>International scope</i> (2002): (a) 'Offshore' students: "Monash University Malaysia", a joint venture with a local business conglomerate; "Monash South Africa", a wholly-owned subsidiary; an European academic center in Italy; "Monash University Center" in London; Distance education in over 40 countries; pre-university programs in China, Singapore and Indonesia. (b) 'Onshore' students: 4,146 new international students enrolled in 2002 in its campuses in Australia, a 30% increase over 2001.	• A "research-focused tertiary institution"-founding member of the "Group of Eight", (1999) known as the group of "Australia's Leading Universities" • Strategic plan 1998-2002: high academic standards • A numbers-driven approach in setting its objectives (2002): to increase (a) the number of students by funding source; (b) its Median Tertiary Education Rank (TER scores); (c) the proportion of fields of study at Monash where the overall satisfaction of graduates equals or exceeds the national average; and (d) the percentage of its teaching and research staff members who have published in at least one of the best scientific journals (A1/B1/etc.).	• Goal: internationalization of higher education, especially in the Asia Pacific region; "they even went to their respective countries to recruit them." (i.e., the students; Rees, 2002). • Important contribution made by the Australian education service industry to Australian exports and to country's GDP. • <i>State governments'</i> funding policy: in 2001, the <i>State governments</i> contributed to university funding less than half of the amount received from universities, through payroll tax (Rees 2002). In response, some universities made cuts in their social costs and/or delayed social investments.

and youth violence, such as neighborhood crime, neighborhood disorganization, gang membership, poverty, and antisocial parents and peers (Lipsey and Derzon, 1998). Our results show that none of the above mentioned factors applies to school shooting situations.

• The Family

The results show that family-related factors are not an important source of "unsafe conditions" in school shooting situations. Most of the school shooters of 24 years of age and younger were white males who grew-up in "typical" middle to upper-middle class families, with both parents working to keep the family financially secure. In many cases, both parents were well educated and had bright professional careers as business owners, company executives, professionals in various fields, educators, lawyers, etc. The "adult shooters" (25 years of age and older) were white males or white women, most of whom were married with children and had a normal family life.

• The Community

The results show that two types of communities appear to be more vulnerable to such hazards:

- a the affluent neighborhoods with low criminality rates, in small suburban communities/small commuter towns/ unincorporated areas (usually, less than 30,000 people), which have experienced rapid growth and prosperity and have predominantly a white, educated population and;

- b large metropolitan area/multi-ethnic cities. What these two types of communities have in common is a 'low sense of community.'

Although some people in the small communities in which these school shootings occurred described their community as a 'close-knit community,' most of these communities were in a period of transition and rapid growth, with new people settling there each day. Moreover, many of these small communities are in fact 'dormitory towns' (also known as "bedroom communities") as their inhabitants work in other towns. For instance, about 90% of Newtown's residents (white population of 95.1%) commute to work in other cities (such as New York and Stamford) or work from home (Economic Development Commission, Newtown/Connecticut, 2012). The estimated median household income is \$111,506 and 53% of the population of age 25 years and more have a university degree.

• The School

The results of this study show that small isolated schools in virtually closed communities (e.g., [15]), as well as larger schools in rural communities and that have their own campus police (e.g., [17],) or universities and colleges that are located in the hearts of major cities (e.g., [12] and [14],) are all vulnerable to such events. However, small and medium-sized middle schools in small communities (rural/suburban/ small commuter towns) and large colleges and universities in large multi-ethnic cities seem to be more vulnerable (Figure 5).

All areas in a school are equally vulnerable to such attacks. In some cases (e.g., [9] and [14]), the attack took place in open spaces (e.g., school cafeteria/ main hall/auditorium/schoolyard) or in specific locations (e.g., the library or the gymnasium). In some other cases (e.g., [5], [11] and [17]), the shooter entered specific classrooms and/or offices, shooting as he passed. Finally, in a two of the 160 cases the perpetrator opened fire from the highest building of the school, shooting at pedestrians who were passing by in the street (case [2]).

4.5. Deficiencies in preparedness

In some cases, the lack of preparedness led to poor decisions and to delays in the intervention process (Table 4).

4.5.1. Contingency planning and security measures

Most of the primary and middle schools that were investigated had no CMP when the shootings occurred. Some colleges and universities (e.g., [9], [12], and [17]) had an 'all-purpose' CMP, but, generally,

- a it did not contain specific provisions for school shooting situations,
- b teachers and students were not instructed how to act in such a situation, and
- c no drills specific to such an incident had been conducted.

For instance, in 1999, when the school shooting occurred at Columbine Highschool, all schools in Jefferson County School District (JCSD) had to conduct fire drills on a regular basis (on a monthly basis in elementary schools, quarterly in middle schools, and bi-annually in high schools). The CMP of JCSD recommended some intervention measures for school violence, building explosion, hazardous materials spills/releases, bomb threats (including procedures for locker searches when necessary) (U.S. National Fire Data Center, April, 1999), etc. However, there were no training programs for teachers and administrators who, instead, were instructed to follow the procedures recommended in the CMP. At Columbine High School, no specific responsibilities for these actions had been assigned and no specific drills had been conducted. Seven years later, the lesson still had not been learned. At the time of the shooting, Dawson College (2006) had no CMP/CPT, and teachers and students interviewed on the day of the event insisted that they had never received instructions on how to act in such a situation.

Moreover, many schools did not have any of the basic security measures mentioned in Table 4. In some cases (e.g., [12], [13] and [25]), the shootings unfolded in a specific classroom before or during the class and the perpetrator was a student who was attending that class. Consequently, none of the above security measures could have prevented the tragic event from happening. In some other cases, in which the attack was perpetrated by an outsider in a primary or a middle school (e.g., [7] and [15]), a visitor sign-in policy along with a strict control of access to the

building could have discouraged him from entering the school. Finally, in some other cases, the shooters were students or former students who entered specific classrooms, shooting as they passed (e.g., [11] and [17]). If the classroom had door locks operable from the inside, much of the carnage could have been prevented.

4.5.2. Police intervention

In almost all of the events that we have studied, a local police team was first to arrive at the school. However, in many countries, local police do not have the authority to intervene in such a situation and are required to await the arrival of the SWAT team (in the US), state police team or other agencies. In all the 25 cases, these procedures led to important delays in the intervention process. For instance, first police officers from *Polizeiinspektion Erfurt Mitte* arrived at Gutenberg-Gymnasium at around 11:08 am, but at 11:11 police headquarters asked Thuringia *Landeskriminalamt* to send *Spezialeinsatzkommando* (SEK) units to the school. As the SEK teams were late, at 11:15 the Thuringia police decided to enter the school. The first SEK team reached the school only at 11:35 (Figure 6).

In some cases (e.g., [14], [15] and [17]), the police were already at school as the shootings unfolded, but remained outside the school, awaiting for instructions for the SWAT team, securing the school area by establishing a "crime scene perimeter," or setting up an incident command center. While observing these rules and regulations is necessary, the time that these actions take and the resources that they mobilize are often subject to criticism. In fact, in many cases, police entered the school after the shooter killed himself or had been immobilized by teachers and students (Figure 6).

In some other cases (e.g., [5], [7], [12] and [13]), the police arrived at the school after the shooting ended, but still took their time to put in place the above mentioned protection measures before entering the school and before allowing medical teams to assist the wounded. In 1999, the *Columbine Review Commission* recommended that police take all necessary measures "to stop any ongoing attack in the school" instead of wasting time outside the school. Unfortunately, the procedures have not changed since then, and in many cases the police intervention is "a textbook example showing how quickly and efficiently killing can commence in the presence of a closely established police containment perimeter" (Armellino, 2007).

4.5.3. The Emergency Medical Teams intervention

The Emergency Medical Teams (EMT) are responsible for managing the triage and transportation process. However, in many countries, they are not allowed to intervene before the police declare that the crime scene is safe. They should

1. conduct an initial assessment of the incident (size and medical implications) and decide what additional resources are needed in terms of qualified human re-

Table 4: Deficiencies in preparedness

Prevention and Preparation
• Lack of a Contingency Management Plan (CMP) • A CMP existed, but it had not been put to the test (emergency drills and exercises) and/or did not specify a meeting place where students and relatives could reunite immediately after such an event. Thus; when the shooting occurred, the students who escaped were left by themselves • No Contingency Planning Team (CPT) established in advance or; large school/university and too many teams/too many members and no clear responsibilities assigned to them; inadequate knowledge of the required abilities, number, and affiliation of members in a CPT • Lack of reporting mechanisms and conflict resolution and rumor control procedures that would have allowed parents, students and school staff to detect warning signs and anonymously report possible threats • Poor security measures- lack of: door locks operable from the inside/ visitor sign-in policy/student badges/policy or means to control access to the building. No fence installed, campus not enclosed • Files/records containing personal student data did not exist, were not up-to-date or were not readily available to the police.
Intervention
<i>Police:</i> • Very bureaucratic structures and very rigid regulations, resulting, in some cases, in long delays and ineffective intervention • Delays in the evacuation process – the police had no knowledge of the different areas of the school and the school did not provide the plan(blueprints) of the school • Delays in the victim identification process: no accurate information was provided by the school management in a timely manner <i>Emergency Management Teams (EMT):</i> • Poor assessment of the incident (size and implications) and thus decisions were not necessarily the best with regards to: (a) resources needed (equipment and qualified human resources) and (b) trauma centers or hospitals to which victims were transported. • Delays caused by the interaction with the police
Communication
• Poor communication among the various stakeholders; no campus spokesperson (designated and trained in advance) • Poor communication with the media (inform the community about the incident and; rumor control)

sources and equipment -ambulances, buses, private vehicles and helicopters;

2. establish a command center responsible for communication with the trauma centers in the area, hospitals, police, etc.;
3. establish priorities for treatment and transportation of each wounded person (immediate/ delayed/minor/deceased”), and;
4. coordinate the transportation of victims.

The analysis revealed some difficulties that the EMT encountered in assessing the resources needed or in choosing the trauma centers for the wounded. For instance, during the tragic event at the Amish school, the first EMTs who arrived at the school were unable to assess the situation properly because the rules and regulation in place in Pennsylvania prevented them from approaching the victims before the crime scene had been declared safe by the police. They asked for “Basic Life Support” (BSL) services, which are ambulance services provided by trained respondents. However, these services do not include ‘drug therapy,’ which the Amish girls needed. Only later, when they realized that the situation was more critical than they had initially thought, they asked for “Advanced Life Support” (ALS) services. Also, the decisions made by the EMT about the hospitals to which the girls were sent may not have been the best choices that they could have made. Some of these trauma centers could not provide paediatric services and were not properly equipped for neurosurgery and other interventions that the Amish girls needed. Consequently, they were flown by helicopter to an out-of-county trauma center, from which some were later flown to Philadelphia Children’s Hospital.

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School administrators have little control over the decisions made by the EMT. However, each school could prepare a list of the trauma centers in the area along with the main assets and capabilities of each, to help the EMT to

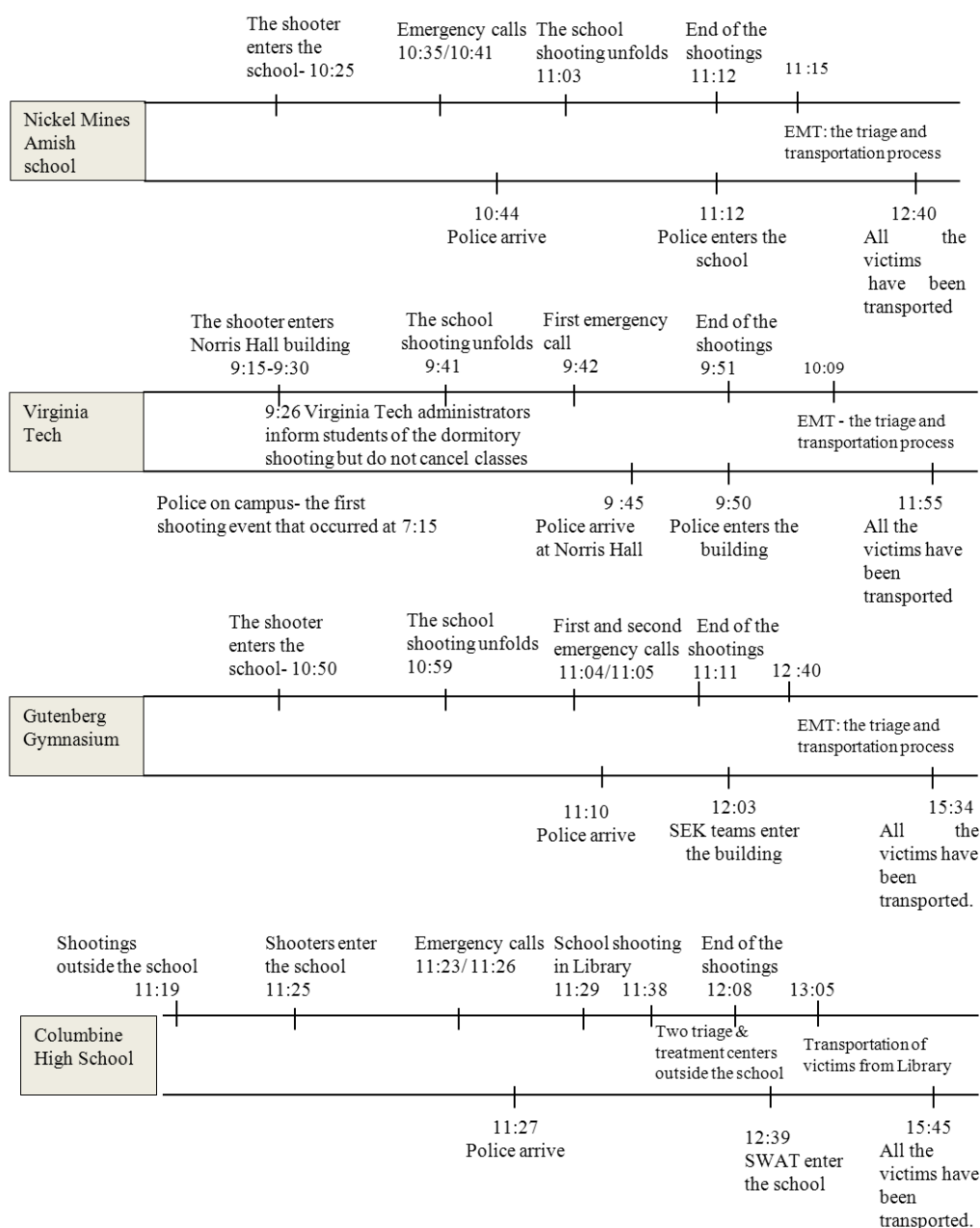


Figure 6: Difficulties and delays in the intervention process

make better decisions.

The selection of location in which to establish a triage/transportation center also emerged as a challenging issue. For instance, in the Columbine case, a first triage/treatment center was set up in Clement Park (north of the school building). However, with students fleeing the building through all of the 25 doors, it was soon realized that more triage/treatment centers were necessary. A second triage area was established at Yukon/Caley, but soon after it was recognized that that area was isolated, preventing the EMT from communicating with hospitals, police, and other agencies.

4.5.4. The communication process

The challenge posed by the communication process during and after the event is twofold. On the one hand, all the 'stakeholders' (various intervention teams, school management, teachers, students and parents) should be able to communicate effectively with one another. At the same time, each of the three key stakeholders - the police, school administrators, and EMT - should communicate with the media by means of a single/unique spokesperson and a rumor control process should be put in place.

Many difficulties in communication were encountered by the stakeholders.

1. *Telephone lines:* the telephone lines of the schools became overloaded. At Columbine, all 75 classrooms

were equipped with telephone lines. Other schools (e.g., Dunblane Primary School and Nickel Mines School) had only one main telephone line. Finally, the Amish school had no telephone line at all.

2. *Dispatch Centers*: an important increase in inbound calls was noted in the dispatch centers that requested additional dispatchers to respond to the 911 calls. Also, in some cases, the EMT and the police had separate dispatch centers, which caused a certain delay in communication.
3. *Web sites*: the schools' web sites were affected by the sudden traffic overload that prevented all access to it. For example, Virginia Tech had a high-traffic website (150,000 hits per hour), but on the day of the event its traffic reached 148,000 hits per hour.
4. *Radio communications*: the radios used by various intervention teams that arrived at school operated on different bandwidths.
5. *Media*: in some cases, the school addressed students during the event through "many voices," as no specific spokesperson had been designated in advance. In other cases, there was little interaction and cooperation among the various spokespersons representing the three main stakeholders (school/police/EMT) and consequently, many contradictory statements were made.
6. *ICT devices*: When the shootings occurred at Virginia Tech, the university had a modern ICT (Information and Communication Technology) system including a unified, multimedia messaging system that was not fully operational at that time. These ICT technologies help to notify students and declare a lockdown on campus as soon as such an incident occurs. However, since the first assessment of the situation made by Virginia Tech at that time was incorrect (it was thought to be an act of domestic violence, which posed no threat to students), the university did not immediately use the system to notify its student population of the event and to initiate the lockdown procedure (see Figure 6).

4.6. The recovery process

During the recovery stage, these schools had to deal with various challenges:

1. *Conflict management*: managing the social tensions between the school and the parents. Examples for challenges and measures adopted:
 - Virginia Tech: the victims' families were not satisfied with the inquiry conducted by the Virginia Tech Review Panel and asked Governor Kaine to reopen the case.
 - Islas Malvinas School: during the recovery period, three successive management teams resigned due to the hostile atmosphere encountered among parents, students, and school staff.
2. *Symbolic management*: restoring the morale of students and teachers, dealing with students and teachers

who wanted to move to other schools. Examples for challenges and measures adopted:

- Gutenberg-Gymnasium: 30% of teachers were shot and others decided to leave the school; the recruitment process during the recovery period was unsuccessful.
 - Virginia Tech retained the services of an image management company at a cost of approximately \$600,000.
3. *Asset management*: rebuilding/reconverting the building in which the school shooting occurred, installing new security devices. Examples for challenges and measures adopted:
 - Cost of demolishing/building a new school: Nickel Mines school, Dunblane school
 - Replacement costs at Sandy Hook Elementary School: \$60 million.
 - Columbine High School and Virginia Tech reconverted the buildings in which the shootings occurred. The costs incurred by Virginia Tech: 6.3M\$ (from which (a) renovations, cleanup, and relocations - \$1 M; (b) door upgrades/ locks replacement of handles - \$2 M; (c) a new unified alert system - about \$1 M.
 4. *Change management*: lessons learned and organizational changes, a new school safety policy/ new research hiring and firing policies, etc. Examples for challenges and measures adopted:
 - Concordia University: new policies addressing (a) conflicts of interest, (b) intellectual misconduct in academic research, (c) financial misconduct and misuse of research funds, and (d) criteria for determining authorship.
 - Concordia University: new policies addressing (a) conflicts of interest, (b) intellectual misconduct in academic research, (c) financial misconduct and misuse of research funds, and (d) criteria for determining authorship.
 - Columbine High School: new "Code of Student Conduct" adopted by the school district: (a) 450 grounds for suspension or exclusion; (b) all stakeholders must share and disseminate information from student records, including "disciplinary information"; (c) control of the written content of students' published papers; (d) student dress code; (e) secret societies/gang activity.
 5. *Psychological consequences*: counselling services and costs. Examples for challenges and measures adopted:
 - Gutenberg-Gymnasium: one year after the shooting, 100 students were still receiving psychological counselling.
 - Dawson College: 7% of the school community reported post-traumatic stress between 2006 and

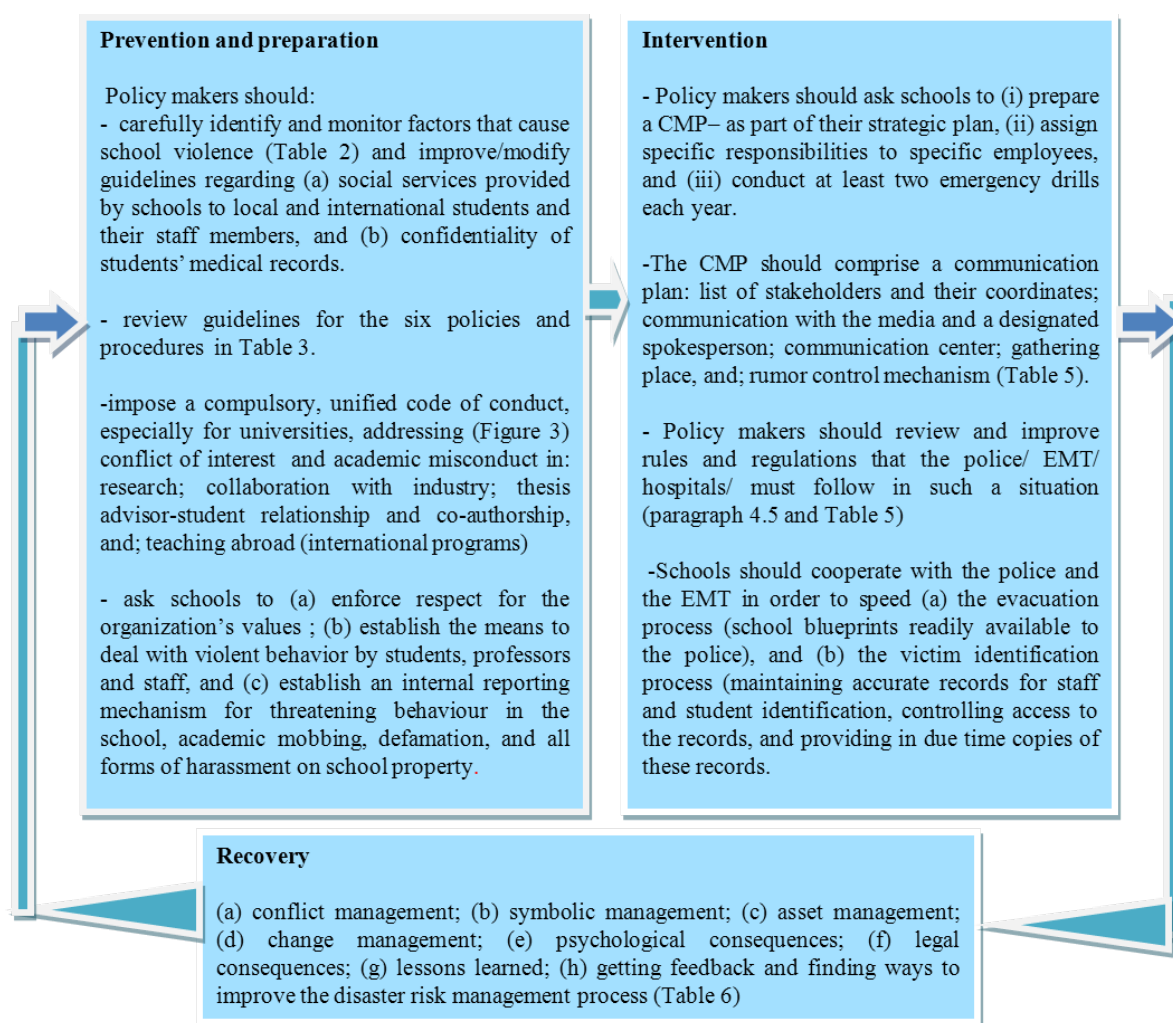


Figure 7: Integrative Risk Management (IRM) for dealing with school shooting situations

2009 (Louis-H. Lafontaine Hospital).

- Virginia Tech: 712 students and staff members were assessed/treated by Virginia Tech medical personnel in the five to six months following the shootings; addition of four full-time mental health professionals at Cook centre; assistance for victims - \$2.65 million
- Dunblane Primary School- costs of social services of £928,177
- Sandy Hook Elementary school: \$4 million for support to families.

6. *Legal consequences*: attorneys costs and settlement with victims' families. Examples for challenges and measures adopted:

- Virginia Tech: (a) \$11.1 million in financial compensation for victims' families and injured survivors, of which Virginia Tech's part is \$3.3 million; (b) \$1.7 million for lifetime health insurance costs for those who were seriously injured; and; (c) the university was fined \$55,000 by the U.S. Department of Education.

5. Conclusion, limitations and future research

5.1. Added value to integrative risk management

The findings of this study support the United Nations' model of disaster risk reduction and have been integrated in a comprehensive framework (Figure 7) that can help policymakers and educational institutions to enhance institutional resilience by

1. dealing proactively and effectively with the new emerging risks that are related to school violence, and
2. improving the process of disaster risk management at each stage of the "risk cycle", i.e., prevention, intervention and recovery.

5.2. Limitations of the study and future research

The research process undertaken in this study complies with all of the requirements of the case study method formulated by Yin (2012). Moreover, as we have studied 25 organizations in the same manner and used the same framework, we have, in fact, designed an embedded, multiple-case study. Consequently, the "ensuing

data can provide greater confidence in the findings” (Yin, 2012:7). Nevertheless, the challenge of generalizing from case studies is significant. As Yin (2012:9) explained, the “*statistical generalizations*” differ from the “*analytic generalizations*” and “for case study research, the latter is the appropriate type”. Moreover, “the sought-after generalization is not that of a conclusion but, rather, more like a working hypothesis.” Because “confidence in such hypotheses can then build as new case studies [...] continue to produce findings related to the same theoretical propositions” (Yin, 2012:10), in the future we will extend the number of events to be investigated with the case study method, by considering the 135 events remaining in our database.

Also, we would like to emphasize that our findings are based on data from schools in which incidents of extreme violence occurred. Accordingly, caution should be exercised in generalizing results to all schools and contexts.

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Appendix

Table 5: Sample of cases

Nr.	Country & date of event	School & school enrolment (at the time of the event)	Community & population at the time of the event	Perpetrator, age and ties with the school
1.	USA (South Pasadena, California); May 6, 1940	South Pasadena Junior High School (900)	small town; 14,536	Verlin Spencer, 38; teacher and school principal
2.	USA (Austin, Texas); Aug. 1, 1966	University of Texas (30,000)	town; 204,000	Charles Whitman, 25; graduate student
3.	USA (Stanford, California); Aug. 18, 1978	Stanford University (12,866)	NIA (13,000; students not included)	Theodore Streleski, 42; Ph.D. student
4.	Canada (Montreal, QC); Dec. 6, 1989	École Polytechnique (6,000)	metropolitan area; 1.76 M	Marc Lépine, 25; outsider
5.	Canada (Montreal, QC); Aug. 24, 1992	Concordia University (40,000)	metropolitan area; 1.78 M	Valery Fabrikant, 52; tenure-track professor
6.	USA (Grayson, Kentucky); Jan. 18, 1993	The East Carter High School (817)	small town; 3,800	Gary Scott Pennington, 17; student
7.	Scotland (Dunblane); March 13, 1996	Dunblane Primary School (640)	commuter town; 7,900	Thomas Hamilton, 43; outsider with ties to Dunblane school
8.	USA (San Diego, California); Aug. 15, 1996	San Diego State University (26,800)		Frederick Martin Davidson, 36; graduate engineering student
9.	USA (Colorado; Columbine Valley); April 20, 1999	Columbine High School (2,000)	NIA near Littleton; 40,340	Eric Harris, 18; and Dylan Klebold (18); students
10.	USA (Seattle, California); June 28, 2000	University of Washington in Seattle (DNA)		Dr. Jian Chen, 42; a Chinese Resident physician
11.	Germany (Erfurt); April 26, 2002	Gutenberg Gymnasium (700)	town; 207,000	Robert Steinhäuser, 19; former student
12.	Australia (Melbourne); Oct. 21, 2002	Monash University (55,000)	metropolitan area; 4.1M	Huan Yun Xiang, 36; a Chinese graduate student; Australia resident
13.	Argentina (Carmen de Patagones); Sept. 28, 2004	Islas Malvinas School (400)	small town; 30,000	Rafael (family name not disclosed), 15; student
14.	Canada (Montreal, QC); Sept. 13, 2006	Dawson College (10,000)	metropolitan area; 1.8 M	Kimveer Gill, 25; outsider
15.	USA (Nickel Mines, PA); Oct. 2, 2006	West Nickel Mines School (27)	rural community; 4,000	Charles Roberts, 32; outsider with ties with the Amish
16.	Germany (Emsdetten); Nov. 20, 2006	Geschwister Scholl (700)	small town; 36,000	Sebastian Bosse, 18; former student
17.	USA (Blacksburg, VA); April 16, 2007	Virginia Tech University (26,000)	suburban community; 48,000	Cho Seung-Hui, 23; student
18.	Finland (Kauhajoki); Sept. 23, 2008	Kauhajoki School of Hospitality (150)	town; about 14,000	Matti Juhani Saari, 22; student
19.	USA (Huntsville, Alabama); Feb. 13, 2010	University of Alabama in Huntsville (31,347)	town; 180,105	Amy Bishop, Anderson, 44; professor - tenure track faculty position
20.	USA (Panama City, Florida); Dec. 14, 2010	DNA t	own; 36,484	Clay Duke, 55; outsider with ties to the school
21.	China (City of Weifang); April 30, 2010	Shangzhuang Primary School (390)	town; 100,000	Wang Yonglai, 45; outsider with ties to the school (local farmer)
22.	Brazil (Rio de Janeiro); April 7, 2011	Tasso da Silveira Municipal School (NA)	metropolitan area; 6.6M	Wellington Menezes de Oliveira, 23 ; former student
23.	USA (Jacksonville, Florida); March 7, 2012	Jacksonville Episcopal School (849)	town; 821,784	Shane Schumerth, 28; teacher (tenure-track position)
24.	USA (Newtown, Connecticut); Dec. 14, 2012	Sandy Hook Elementary School (456)	commuter town; 27,000	Adam Lanza, 20; former student; home schooled
25.	USA (Kern County; California); Jan 10, 2013	Taft Union High School (900)	small town; 9,400	16 years old student (a juvenile - can't be named)



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A Wind Erosion Case Study in an Alpine Environment (Davos, Switzerland) Compared to Wind Tunnel Experiments with Live Plants¹

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Abstract – It is generally accepted that the (re-)establishment of a protective vegetation cover is the most promising and efficient measure in restoring degraded land in the long term. Sustainable protection against wind erosion requires adequate information about suitable plant species regarding ecological aspects as well as with respect to their proper contribution to wind erosion control. The latter, however, is widely lacking. The goals of the presented field study are to record reliable data on windblown erosion rates under natural alpine conditions and to cross-link the findings with the results of wind tunnel experiments. A wind erosion test field was established at 2409 m a.s.l. in an alpine meadow including two test tracks. One track is left as is, representing the naturally alpine vegetated soil (10–20% plant cover). The other track is equipped with a plastic covering sheet, mimicking desertified soil (0% plant cover). Blue and red quartz sand was spread on the vegetated and sheet-covered track, respectively, to visualise and measure the effect of vegetation on wind erosion control. Compared to the bare soil it was found that only small amounts of sand from the vegetated plot were transported, even during heavy wind events. Related to the seasonal course, the overall ratio varied from 1:19 to 1:717. Qualitatively similar findings, however quantitatively less pronounced, resulted from the wind tunnel experiments (ratio = 1:15). Under consideration of all available information, the comparison with data from the field experiment considering only the configuration that best coincide with the wind tunnel set-up yields at least a 70-fold higher impact of plants on wind erosion control under natural conditions. The difference implies that the sheltering effect of vegetation in nature is much higher than found for wind tunnel runs, even when using live plants.

Keywords – vegetation, wind erosion control.

1. Introduction

Worldwide and, in particular, in the Himalayas and on the Tibetan Plateau, snow and glaciers are important both on a regional scale, providing water supply, and on a global scale, indicating climatic changes. Observations in the field and experiments have consistently been confirming that thin debris layers accelerate the ablation rate of underlying snow or ice (Han et al. 2006). The rapid increase in aeolian sediment transport due to large-scale devastation of protecting vegetation has been verified (Wang & Shen 2009). Wind erosive processes considerably intensify desertification and contribute to glacier decline and speed-up of snow melting both inducing climate change, erosion and sliding (Fujita et al. 2007). The increase in de-

sertification, snow and ice melting as well as soil instabilities are cross-linked phenomena. Thus, successfully inhibiting the main trigger contributes to the amelioration at large.

Re-vegetation is accepted as the most efficient strategy to combat wind erosion and desertification in the long term. Intact vegetation considerably contributes to the stability of the near-surface soil structure (Burri et al. 2011b, Sutter-Burri et al. 2013) with important consequences regarding the soil-atmosphere interface including water and radiation balance and topography. Moreover, vegetation shelters soil from the impact of wind by reducing its erosive force, trapping windborne particles, and providing loci for deposition (Okin et al. 2009). With a certain lag, vegetation recovery and the reduction of ae-

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Social Unrest: A Systemic Risk Perspective¹

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Abstract – In this paper we develop a framework of social unrest within a complex understanding of systemic risk. The term ‘systemic’ describes the extent to which any risk is embedded in the larger contexts of social and cultural aspects that shape our understanding of risk, influence our attention to causal relationships and trigger our activities for handling these risks. Social unrest can be grouped into this concept of systemic risks. It can be a cause of risk to others, it can be a consequence of experiencing risk (for example a terrorist threat) or the manifestation of such a risk (the actual terrorist attack) or it can be a promoter of a risk chain that is located in other functional systems of society (for example financial crisis). Since social unrest is more a process of escalation than a finite state of the world we have conceptualized the term in form of a step-by-step escalation scheme. Each step makes social unrest more severe. We assume that people who will engage themselves publicly on any subject have to be dissatisfied with their situation or perceive a problem that they would like to address. Even if people are dissatisfied nothing will happen unless that dissatisfaction is displayed in some kind of public arena. Unsatisfied people have to become active (e.g. organization of protests). If public expression of dissatisfaction and the organization of protest does not help to improve the situation the probability for further social mobilization increases. Social mobilization goes beyond expressing dissatisfaction. It comprises all activities that require an organizational effort to concentrate forces, to develop and enact a strategy for gaining public attention and for putting pressure on those who are targeted to make changes. In the course of this process, activities may get more and more radical, in particular if these collective protest actions are ignored or even oppressed (examples may be wild strikes, regional boycotts or blockades). Then the continuum enters the next step: violent outbreak. This can ultimately lead to civil war.

Keywords – *social unrest, risk, systemic risk*

1. Introduction

Risks can generally be understood as the potential for experiencing harm. More specifically it denotes the likelihood of a scenario leading to adverse effects caused by an activity, event or technology. The causal chain is not always one-directional. In ordinary terms, a risk agent (hazard) impacts on a risk object that is of value to individuals or society as a whole. The impacted risk object can then be the cause of further risks to other objects or even trigger a feed back to the source of the hazard. Damages arising from such events can generally be described as physical or psychological harm to objects that humans value. This may be the loss of property, health or even life (Renn/Zwicky 2008). Since objects that humans value

are at stake the term risk does not only denote an analytical concept of how to link hazards with potential damage to valuable objects but also a normative orientation to mitigate, reduce or avoid risks. The idea of interaction between hazard and risk object and the focus on analytical as well as normative perspective is also major starting points for dealing with the connection between risks and social unrests. Social unrest can be viewed as a risk: depending on its manifestations objects that humans value can be threatened by violence or other forms of social outrage. Social unrest, however, can also be the trigger or the initial hazard leading to damage in other areas, for example economic losses due to technological sabotage or boycott. Social unrest is hence cause and effect in a complex risk web that links technological, natural, social and cul-

¹This paper is a revised version of the final report of the authors to the OECD (Jovanovic et al. 2012)

tural drivers. This situation is best described in the framework of systemic risks. The term 'systemic' describes in this context the extent to which any risk to human health, the environment, the economy or individual well-being is embedded in the larger contexts of social and cultural aspects that shape our understanding of risk, influence our attention to causal relationships and trigger our activities for handling these risks.

Our goal in this paper is to develop a framework of social unrest within a complex understanding of systemic risk. On order to reach this goal we will try to identify triggers and drivers for the emergence of social unrest and, based on this functional analysis, to design policy options telling us how to avoid, mitigate or handle unrest. The framework should enable us to improve our understanding about the circumstances that may trigger social unrest, how intensely that unrest is likely to materialize and what interventions promise to deescalate the conflict or even avoid social unrest in the first place. In order to identify a basic understanding of social unrests we give a general definition of the subject in a first step. In a second step we outline an analytic model that can be used to capture the combined effects learned from the case study analysis. In order to identify relevant drivers and cluster of drivers we will investigate a case study with the financial crises in Greece as topic. The main question is how the events there did or could cause social unrests. In a forth step we will give a synopsis between the model and the case study trying to illustrate our assumptions.

2. Theoretical part

2.1. Definition

Our literature review revealed that the term social unrest is not frequently used in scientific research. Most definitions are operational, that means the term is explained by using indicators of their measurement. Such definitions are not conceptual but empirical (Dury/Olson 1998; Zhang et al 2005). Our common experience associates social unrest with protests in the form of peaceful as well as violent demonstrations, strikes and with acts of civil and political violence. This first impression is supported when we take a closer look at the indicators that are used in operational definitions by scholars. For example, Keidel links social unrest with a protest that includes more than eight persons. The intensity of social unrest can be measured by the number of demonstrations, riots, armed infringements and strikes within a year (Keidel 2005).

Within the semantic area of activities that underlie social unrest protests, demonstrations and political violence are most frequently mentioned. These manifestations are also part of another social science tradition, i.e. the theory and concepts of political participation. That concept includes actions that are operated by citizens aiming at influencing collective decisions on several levels of the political system (Barnes/Kaase 1979). Kaase distinguishes conventional and unconventional political participation. While conventional participation includes activities such as voting or writing letters to the editor, unconventional

political participation includes activities such as signing petitions, demonstrations, boycotts, sit-ins, rent and tax strikes, traffic blockades and wild strikes (Kaase 2002). This listing of unconventional activities seems to be close to the list we found in the literature about social unrests. Activities associated with social unrest are often linked to unconventional political participation. Conventional political participations such as elections or the attendance of a political event are definitely not part of social unrest. Seen from a theoretical perspective it can be concluded that activities that are designed to serve a specific function within a functional system belong to the ordinary, expected and conventional form of serving this function, while unconventional or unexpected forms of expressing a desire for change or intervention can turn into social unrest. Even those unconventional forms may be functional if the corresponding system is in urgent need of a radical reform. So in view of this line of argument social unrest is not necessarily dysfunctional but its manifestations appear as unexpected, unplanned, often spontaneous as well as unconstrained or uncontrollable within the functional system in which they occur.

The analytical division between conventional or unconventional is hence contingent on time period, location and culture. What appears to be a common form of political expression in one country is seen as major deviant behavior in another country. Social unrest is not a term that can be defined irrespective of the context in which it is used. Any political system constructs a boundary between conventional and unconventional. That boundary is fluid, however. We conclude that social unrest is an expression of collective dissatisfaction with the political system and manifests itself in unconventional forms of protest behavior. The exact definition of what is regarded as unconventional and the degree and extent of collective actions that constitute the demarcation line between protest and social unrest cannot be defined in advance but relates to the context in which social unrest is studied. Social unrest can be seen as an extreme expression of social mobilization with major impacts for society, with the proviso that the extent of the term "major" is subject to wide cultural, social and individual interpretations.

2.1.1. A stepwise approach to conceptualize social unrest

As has been outlined in the last two chapters the basic assumption of our approach is a continuum underlying a range of collective actions that may or may not meet the cultural construction of what is regarded as social unrest. Social unrest does not occur out of the blue. Our attempt is to identify steps that gradually lead to social unrest. For unfolding the model we come up with ideas for factors and drivers stemming from the case studies, but also we go a more deductive way and try to identify further important variables out of the body of theory. With every step taken, the probability for an escalation towards more unconventional forms of protest will rise. The model is thought to be cumulative, each steps taken is a necessary condition for the next step. At each step we want to investigate which interventions or actions are likely to escalate

or de-escalate the situation. These interventions or events are then triggers for reaching the next step or going back one step. A return to the previous step does not mean that the risk is gone but that the likelihood of further escalation is reduced.

Communication of dissatisfaction

Within the body of literature the concept of social production functions emerges as an appropriate candidate for explaining dissatisfaction. "The theory states two universal goals: physical well-being and social well-being). These are accomplished through five main instrumental goals (stimulation, comfort, status, behavioral confirmation and affection)" (Ormel et al 1999). We assume that individuals strive for these goals. The means to reach these goals can be deduced from the theory of rational choice. Within this school of thought it is assumed that individuals choose the most effective and efficient means for reaching a pre-determined goal. The production functions illustrate the relationship between goal attainment and personal costs. Risks occur if either the degree of goal attainment and/or the extent of costs are uncertain. Often it depends on the actions and decisions of others if one's expectations become true. These contingencies express themselves as risks to the individual decision maker.

Social mobilization theory claims that individuals express dissatisfaction in public arenas if the costs of going public are low and the expectation that somebody will respond to it high. In cultures where the expression of dissatisfaction is encouraged we will find more public manifestations of dissatisfaction than in those culture in which such behavior is politically or socially sanctioned. However, the likelihood of further escalation rises if people face high costs of expressing dissatisfaction. The reasons is obvious: If people decide in spite of high costs to go public they are much more inclined to organize themselves and mobilize other citizens than in a situation where there is no obstacle to expressing dissatisfaction.

If one turns specifically to the experience of risk, we can be more specific. Psychometric research has demonstrated the properties of risks and risk-related situations that amplify or attenuate the feeling of being endangered or threatened. The main characteristics that shape risk perception include voluntariness, personal control, dread, impression of inequities, blame, familiarity and others. Risks that are perceived as dreadful, involuntarily or out of personal control trigger more stress and concern than risks that are taken voluntarily, have no or minute catastrophic potential and allow personal control. Accordingly we can expect people sharing a perception of high risk to be more inclined to express dissatisfaction than those with low risk perception. This insight is useful when diagnosing the types of risks that could trigger the first steps of social unrest. If people face risks such as the global financial crisis they will probably associate a feeling of dread, involuntariness, lack of control and blame with this crisis, while other collective risks such as car accidents with a high death toll are attenuated due to the perception of voluntariness, personal control and lack of catastrophes.

In addition to the well-known psychometric variables one needs to consider two other relevant factors. The first

factor relates to the perception of inequity or injustice. Even small risks are seen as intolerable if the persons exposed to this risk believe that all the benefits of the risk-bearing activity are reaped by others. The financial crisis may be a good example of such a perception of inequity. More frequent are risk situations in which people believe that they are expected to take all the risks while only sharing a small proportion of the benefits. If people feel to be treated unfairly they are not only dissatisfied with the resulting risk they are also deeply disappointed about the way that political or economic decision makers have violated their sense of justice. This will contribute to a loss of trust, the second factor that is likely to promote a feeling of dissatisfaction. Trust is particularly important in cases of lacking personal control. If people do not trust the operators and/or the regulators they will most likely be dissatisfied with the situation and express this publicly (Renn/Zwicky 2008).

2.1.2. Organization of protest

The escalation from expressing dissatisfaction to organized protest rests upon many conditions. First, the number of people that share the same feeling of dissatisfaction must be large enough to form a larger group. Secondly, the potentially affected individuals must know of each other and find a way to communicate to each other. Most important, however, is the motivation to invest time, effort and often finances to start an organization or relate to an existing organization. The theory of collective behavior, most notably the studies by Mancur Olson, provides some hints of what motivates dissatisfied people to become organized. Olson claims that the organization of interests is the more likely to occur the more the benefits of such collective actions can be exclusively used by the members and not shared with non-members. Again rational actor theory provides the explanation: if everybody benefits there is no incentive for each individual to get active since one can reap the benefits without investing one's own resources. This free rider position is the main reason for a lack of organized groups that engage for goals that are in everybody's interest (Olson 2004). Common interests are connected with individual interests. Common goods serve common interests and are available for every member within the group (Leuffen 2006).

The emergence of groups depends for Olson on the size of the group in relation to the rest of the population. If the group is too small it may not be visible in the political arena. Potential members will not even bother to join since the organization demands resources but does not promise any realistic opportunity for success. The same is true if the group is very large. Then each individual has no incentive to join because his or her engagement adds only marginal benefit to the success of the group. So recruiting new members will be difficult in particular if non-members will also benefit from the group's success. In this respect it is crucial to have the right size: small enough to provide motivation for each individual to join and large enough to convey a realistic expectation that the group's goals are reached (Olson 2004).

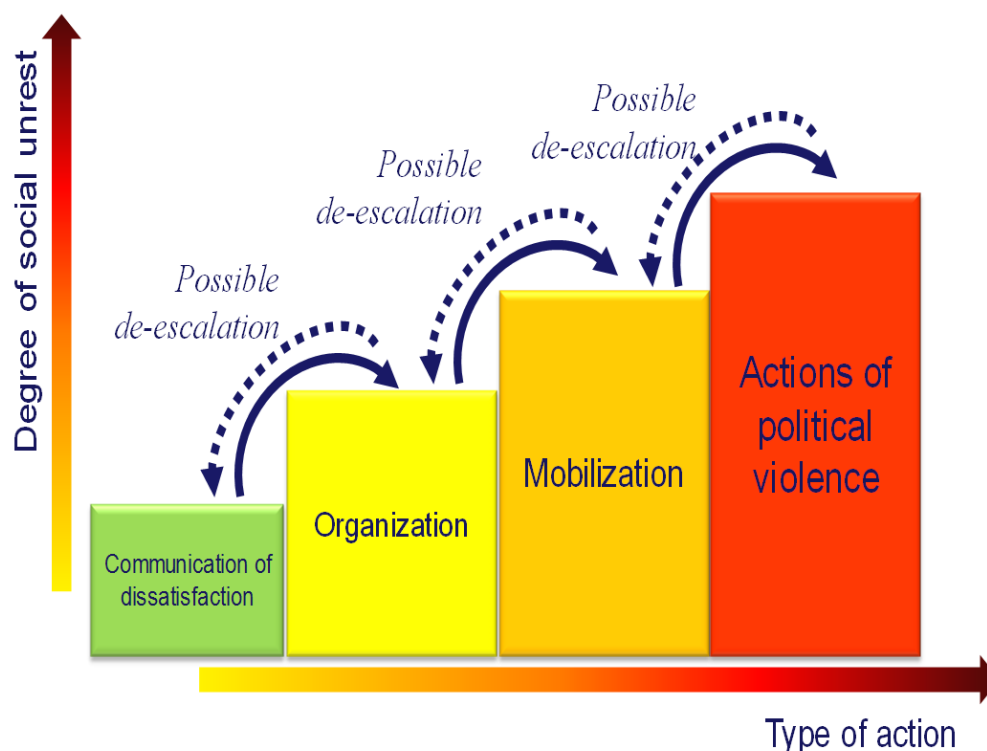


Figure 1: Ladder of social unrest

2.1.3. Mobilization of protest groups

Organized groups could use their momentum and strength to influence the policy making process by using legal and conventional means. What counts as legal and conventional depends on the culture in which the organization is located. Strikes may be legal forms of protest in one culture but not in another. At the next step of our escalator the question arises what motivates organized protest groups to choose unconventional forms of expressing their claims. To answer this question we will have a closer look at resource mobilization theories. Resource mobilization theories use the rational action paradigm to explain the procedure of selecting the most appropriate means for reaching pre-defined goals (Klandermans 1984). Most conventional forms of influencing decisions rely on the means of money, power, value commitment, evidence and social solidarity. These means are called resources (McCarthy and Zald 1977).

If a group has little access to resources or is not allowed to use its given reservoir of resources the likelihood that illegal and/or unconventional modes of actions are selected increases steadily. Resource mobilization theory predicts that particularly groups with highly motivated individuals will retreat to unconventional forms of protest if other channels of influencing public decision making are not available or simply ignored. This insight leads to the normative conclusion that, for a society that attempts to avoid unconventional forms of protest, the availability of channels for communication and decision making as well as access to resources are crucial.

In addition, theorists of social mobilization have dis-

cussed more formal properties of groups that tend to use unconventional means for reaching their goals. Organizations need a minimum of money and commitment of its members to initiate unconventional protest. They require also some experience and knowledge about the effectiveness of their actions. In addition, they must take into account the potential support by people who are either sympathetic to their cause or at least indifferent. If these bystanders perceive the actions as non-proportionate or illegitimate the protest movement can easily break down or the legal authority faces far less public resistance against the use of force to break the protest. If the protest is supported by large portions of the population the protest is reinforced and the legal authorities face major difficulties in justifying force or other radical forms of sustaining order. It is self-evident that the total number of participants (the more participants the higher the likelihood of success), the dedication of the members, (dis-)trust in the official authorities, and the common appeal and resonance of the cause of action among the total population increase the chance that even unconventional means are perceived as acceptable and may become more attractive for the respective organizations (Geissel/Thillmann 2006). In addition, escalation is likely to occur if the response by public authorities (police or military force) to first signs of violence or unconventional methods is perceived as being out of proportion.

2.1.4. Mobilization of protest groups

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2.1.5. Mobilization of protest groups

Deliberate and organized civil violence is the last step of escalation. Such planned violent acts may even result in

civil war. Occasional uncontrolled violence is always a risk when large masses of people take their protest to the streets. In most cases such acts of isolated violence do not lend themselves to further escalation. On the contrary, most protest organization distance themselves from violent outbreaks if there were neither planned nor secretly tolerated. In most countries, civil violence is seen as a clearly illegitimate action of protest. So if violence occurs the leaders of the respective protest organizations can either distance themselves from the violence or blame the other side for having provoked the violence. Yet they normally will try hard to reduce the extent to which its members use force during protest actions. Although small pockets of violence can also initiate a route of gradual escalation, this is rather unlikely.

The picture changes dramatically if protest organizations plan or tolerate the outburst of violence as means to promote their cause of action. The leaders of these organizations may not disclose their strategies publicly and insist in the public on a peaceful pathway to pursue their cause. Secretly, however, they encourage their members to use violence and justify these actions later as "spontaneous" outbursts of public frustrations. In most cases, organization need to legitimize their radical protest by blaming the other side to perform major acts of civil rights violations or to exploit one part of the population to the benefit of the other part. Often such accusations are linked with ethnic, religious or class-related differences which tend to amplify motivation and willingness to use violence. Many outbreaks of civil violence are also expressions of major unresolved geographic conflicts (Misra 2008). In any case, a call to violent actions requires a major cause. Such causes may appear not very dramatic or as being highly exaggerated by an outside observer, what counts is that they are believed by those who are sympathetic to the cause (not only the activists). Furthermore, there must be a common conviction among the activists and their sympathizers that the conditions will only change if violence is used. Both conditions can transform a peaceful movement into a radical uprising that leads to numerous acts of violence.

It is not clear, however, how such a gradual escalation evolves over time and what factors are causing the stepwise escalation from mere dissatisfaction to civil war. There are many case studies but we still lack a coherent theory of what leads to violent outbreaks and what measures can help society to prevent them. In line with our arguments, Kepplinger has outlined a typical escalation scenario that starts with the rise of critical positions towards one's own society or parts therein. If this criticism is not taken up by any authority, small protest groups will emerge who will start to recruit members for joining their cause and to use the media for legitimizing their actions (Kepplinger 2009). Broad media coverage in conjunction with some demonstrative actions makes the cause a top topic in the respective society. This experience of sudden prominence encourages the protest groups to become more pronounced in their communication and often more radical in their demands. If the public authorities ignore the protest or employ rather harsh counter-measures, the

conflict is likely to escalate. Yet even if public authorities signal openness to the demands and try to accommodate the protest groups they may fail to de-escalate the situation. Many protest leaders may interpret this as a sign of a weakness and take the opportunity to fight for even more radical changes in the political system. So both a too strong as well as a too lenient approach may actually contribute to the escalation. Most effective is probably a step-by-step approach by which negotiations with the protest groups and the setting of clear boundaries are used intermittently.

3. Illustration

3.1. Financial crisis in Greece 2010

In 2008 various demonstrations and strikes took place in Greece as a response to the lack of job opportunities among young people. This protest was present not only in Athens but also in almost all larger cities in Greece. The demonstrations were aggravated by the death of a demonstrator who was shot by the police on Dec 2008 (Eckert 2008). In the end, university campuses, radio stations and even the studios of the National Television were occupied by protesters (Sotiris 2010).

Reasons for this first outbreak of public dissatisfaction are numerous: Young people are faced with a more than 20% unemployment rate in Greece in the year 2007 which is one of the highest rates in Europe (Tausch 2009). Even with a university graduation it is difficult to get a decent job in Greece (Sotiris 2010, Bratsis 2010). This situation became even worse with the introduction of the Bologna process that caused a tendency to de-link university degrees from professional qualifications, and made the opportunities for a well-paid job even more uncertain. Furthermore it was considered to legalize private higher education in Greece that is normally excluded by the constitution. So all in all the protest movement of young people in Greece was triggered by the perception of social misbalance and inequities as well as the experience of missing reactions by the public authorities (Sotiris 2010).

In contrast to similar uprisings in France or other countries, the riots in Greece seemed not to be limited to a certain group of young people such as students or socially disadvantaged youngsters but included a large cross-section of society within the younger generation. Some authors explain this breadth of the movement by referring to the fact that all young people in Greece face similarly bad employment conditions (Sotiris 2010). However, some observers detect a new quality of protest in this Greek case. Most demonstrations happened in different cities during the same time employing similar strategies and means of actions. The demonstrations were obviously coordinated by using modern communication technology, in particular cellular phones. The riots in Greece calmed down in 2009 but with a further decrease of economic prosperity in the country mainly linked to the world financial crisis, experts expected a new wave of uprising in 2010. And this expectation turned out to be true.

With the advent of the world economic crises and a na-

tional new debt of about 13% of the Greek national budget, the Greek economy faced a serious financial crisis. Those new debts endangered the stability of the Euro. Driven by demands of the EU and the International Monetary Funds, the Greek government and parliament passed a plan on 06 May 2010 that included drastic measures for getting the national debts under control in exchange for monetary guarantees by the EU and the IMF. The Greek government promised to reduce national debts to 3 % of the gross national product in 2011 (this amounts to 25 billion Euros). To reach this goal the Greek government decided to reduce the wages for governmental employees, to lower pensions and to increase the value-added tax. Also taxes on products like tobacco or alcohol were increased. Military expenses were also reduced (SpiegelONLINE 2010 a ; SpiegelONLINE 2010 b). Against these massive measures of reducing governmental spending, many people (this time not only the young) started protesting. The reasons for the protest are manifold: Only around 40% of the interviewees of a representative survey by „Kathimerini“, a daily press organ, believed in the ability of Greece government to resolve the financial crisis and social problems within the country (Pick, 2010) . Many people in Greece live below the poverty line - in 2008 around 20%. During the protests mainly organized by the labor unions violent outbreaks occurred causing the death of three people. After this dramatic event the riots came to an end.

3.2. Reflection of the case in light of the theoretical model

In the case of financial crises people seemed to be dissatisfied with their situation. On the grounds of our assumption the situation can be described in the following way: Many people feared to find no job, to lose their job, to be faced with a decline of social status or feared not being able to earn enough income to hold up their common standard of living. As nobody would seriously fear famine in that country we face mainly a problem of psychological well-being with a physical component. At the same time many people might have felt to be treated in an unfair way, as they had to pay for the financial crises without being at fault. In their eyes the failures were done by others who were not made accountable for their inability to provide effective and fair countermeasures. They were also accused of reaping some benefits from this crisis. Many Greeks had been disillusioned about the financial institutions in their country even before the global financial crisis took place. So the global financial crisis made the situation even worse. The vulnerability of the Greece society was very high to be hit by the financial crisis as the government had overspent their budget for many years. In addition, the social vulnerability was high as the country had witnessed numerous protests against alleged injustice over the last three decades, most notably in 2008. In terms of consequences it is obvious that the country faced financial losses and individuals were forced to pay higher taxes or to forego economic benefits. Also four lives were lost as a consequence of the riots. The affected people had not voluntarily taken this risk and had no personal control over its outcomes. In addition, the people

were quick in blaming economic and political institutions for the crisis. Accordingly the attribution of trust to the key actors was low. Most Greeks did not believe that the Greece government was able to resolve the problems. In addition to the feeling of strong dissatisfaction, the costs of the protesters to take to the streets and make their outrage visible were low, as Greece provides the opportunity of public demonstration as an essential right to citizens as integral part of its democratic system. All this has led to an open communication of dissatisfaction among the Greek.

The next step: organization of protest can also be traced in the Greek case study. First of all the dissatisfied groups in 2008 as well as in 2010 were large enough to make a difference in public opinion and were well organized in order to form a rather coherent movement. So the possibility was given to be publicly recognized in the political arena. The main actors knew each other and were powerful enough to mobilize the public effectively. In 2008 the group consisted mainly of students - a hint for the thesis that well educated people are more expected to start a movement in 2010 also other groups like employees and workers were involved. In both cases networks were formed in which individuals had personal contacts to each other and were able to organize mass demonstrations and joint actions. Maybe this fact helps to explain the motivation of the individuals to join the organization: This is less probable in the case of the student protests. In 2010, however it appealed to almost all classes in society: there were enough incentives for a larger coalition to join the protest. The protests in 2010 included activists from labor unions and small businesses. These new groups hoped for revisions of the governmental plans which in their eyes were biased to the disadvantage of the poorer sections of society. The fact that those groups already existed and were well organized facilitated their participation and kept the costs for mobilization low. It is also important to note that the financial crisis evoked feelings of being treated unfairly and that the big guys would get away with it while the little guys were asked to take most of the burden.

Why did the organized groups become active? Many protest groups had not enough access to money and power to stimulate conventional forms of influencing politics. So they resorted to unconventional forms of protest. This is less dependent on the availability of monetary resources and relies more on the ability to provoke the attendance of mass media. In 2008 the death of the young protester (interpreted as sign of violence that should not happen in a open political system) has triggered the outbreak of the protests among students. So the ground for more protests was well prepared when the financial crisis stroke. The press was alerted and through their extensive coverage enabled the organizers to receive nationwide attention and visibility. They were able to coordinate the protest mainly by using the public media as well as mobile phones and the internet. The provision of communication infrastructure seems to play an important role in this case.

The outbreak of violence during the protests 2010 signaled the end of the protests. Since the violence originated from the side of the protesters their moral integrity

was challenged and the great wave of sympathy towards the protesters came to an abrupt end. The government also amplified this by disseminating the information that protesters refused to help saving people from a deadly fire. In the end it was shown that these allegations were not true but given the allegation in the popular press the protest movement basically collapsed.

4. Conclusion

With the help of rational choice theory we could outline five motives that people strive for (stimulation, comfort, status, behavioral confirmation and affection). The theory helps us to explain why people decided to act, but not which specific ways they preferred to express their dissatisfaction. We assume, in accordance with the scientific literature, that dissatisfaction originates in a misfit between personal expectations and perceived reality. The expectations as well as the perception of how these expectations are met in reality depend on social and cultural norms and values. This assumption could be illustrated in our case studies. The perception or actual experienced harm induced by an event or an activity is directly related to the degree of people's dissatisfaction. In the terms of rational choice theory we could say that people confronted with harmful events are unable to reach their expected goals. In theory they would try to change that situation by initiating actions that promise to reach the predefined goals again. Whether they are able and motivated to act against the barriers of reaching their goals depends on the costs associated with the action and the benefits that they are likely to gain when the actions succeed. In terms of the rational actor paradigm individuals calculate the costs of involvement and protest against the product of probability and expected revenues of being successful. Such calculations will not be performed in any conscious act of deliberation but more or less as an internalized process of weighing the pros and cons (Jaeger et al. 2001). Furthermore, as resource mobilization theory suggests the likelihood of success as well as the costs for protests are highly dependent on the actions of others. The more people join the movement the more likely the success and the lower the individual costs. At the same time, with more people to join the movement, the incentive to play out the free rider role also increases. So the success of a movement rests on the perception of each actor that s/he can count on the solidarity of many others but that his or her personal involvement is crucial for serving the common cause. In the Greek case it was apparent that each protester had the feeling to be embraced by a large movement but, at the same time, it was essential for each individual to turn to the streets even if one more protester would not make much of a difference. Furthermore, as the balance between costs of engagement and probability of success indicates, the degree of dissatisfaction has to reach a special plateau (threshold) before it seems rational for an individual to invest time and resources in protest movements since the success of such movements is always contested and uncertain while the costs of one's own engagement are truly certain and inevitable.

Both the motivation to act and the assessment of costs and benefits depend highly on the images that are portrayed in the public sphere. A highly influential factor here is assumed legitimacy. In addition to personal gains and losses people are driven by the quest for social recognition and socio-cultural identity. Both aspects are highly dependent on the perceptions of others and the portrayal of the cause in the public media. The importance of legitimization was highly visible in the case of the Greek protest movement. The movement almost collapsed when three “innocent” bystanders were killed as a consequence of protesters’ inability to provide access for the rescue teams. Individual actors do not want to be involved in any action that appears as being illegitimate in the eyes of their respected reference groups. Turning to the second step, we outlined reasons why people organize themselves in interest groups. Rational actor theory would predict that people organize in groups if they can gain a collective good exclusively and if the costs of becoming organized are low. The case studies confirmed this insight from theory and specified some of the conditions for the likelihood that dissatisfaction can translate into organized protest. A major condition for the emergence of an organized protest is a real or easy-to-construct fit with an already existing agenda of major interest groups. If nobody is there to pick up the dissatisfaction of the affected individuals it is very unlikely that the individualized protesters would be able to organize themselves. In the case of the Greek finance crises the unions were the natural partner for the dissatisfied people.

The third step addressed the issue of mobilization. According to rational actor theory, organizations calculate the expected benefits for using conventional versus unconventional forms of protest. This calculation is ultimately related to the perceived probability of success. However, the value of the probability assessment depends on many variables. These include: the expected reactions by public authorities, the solidarity effects by the general population, the major images that are conveyed by the public media, the impression of legitimacy for the protest goals and means of reaching them and the availability of solutions if the protesters have success in changing the course of actions. In addition to cost-benefit considerations, mobilization depends on the access to resources and strategies. Important here are factors such as the knowledge of how to organize and protest, to deal with the media and to control the emotions of those who feel deeply dissatisfied. Lack of control was one the major reasons that delegitimized the Greek protest when protesters blocked the entrance for rescue operations. Our case studies also demonstrated the importance of new media like mobile phones or the internet. Access to these new media provide timely tools for coordinating protest even across distant areas and to disseminate opinions, pictures and reports to a wider public. Turning to step 4 we concluded that the management skills of the public authorities are the main drivers for escalating violence. Again the issue of legitimacy is crucial here. It all depends on who is responsible for the increased violence in the public eye. If the public authorities are blamed the protest movement

can respond adequately and counter the violence with similar violent actions. However, if the public believes that the violence has been caused by the protest movement the sympathy will be attributed to the public authorities. This may indicate the end of the protest movement or at least a phase of re-sorting and re-organizing the movement. The description of the escalation ladder leads to the question whether we can identify causes or triggers that are responsible for each stage of escalation or de-escalation. Some of these causal factors have been mentioned in the previous sections. Looking over the entire escalation chain one driver appears to dominate the escalation process: institutional failure to respond to the protest in the various stages of protest articulation.

In the very early stages protest movements are often simply ignored or ridiculed. Once the protest movements evolve into more powerful organizations they are either criminalized or labeled as deviant outsiders. This strategy of segregating the movement from the rest of society encourages the members of the protest groups to become more radical and determined to fight for their goals. As soon as they start to use violence public authorities often tend to overreact by using undue force. This leads to a spiral of violence on both sides. The other extreme of giving in and retreating quickly may be just as detrimental for sustaining public order as is the use of excessive violence. In the end both under-reaction and overreaction may fuel the escalation of the process. In addition, if public institutions are not functioning at all or appear to be incoherent and arbitrary civil violence is most likely to increase. What can government and other responsible actors do to promote de-escalation? Organizational theory can provide some clues of how a route of de-escalation can be pursued. First, public institutions should develop monitoring services that detect the emergence of dissatisfaction and unease within the population. One important variable to watch is the perception of fairness. If public decisions are seen as unfair or unjust it is likely that people feel motivated to express their discontent in public. Another important factor is the alleged or real violation of religious or value-laden beliefs and convictions. High trust in governmental institutions can act as a moderator in this situation. Often people lack the expertise or the knowledge to understand complex decisions so that they need to trust that the “right” decision has been made. Trust in the competence of the decision making bodies can overcome a lack of understanding in the rationale of public policies (Short 1984). However, trust cannot be manufactured and is itself a product of experience that in the past even difficult-to-understand decisions turned out to benefit society as a whole.

So if public officials face a loss of trust or experience a wave of dissatisfaction they need to act immediately. The effectiveness of public protest is not a question of how many people are dissatisfied but how many of them are willing to articulate their protest in the public arenas. Most often 5% of individuals out of a affected population who are willing to act in the public is already enough to make the protest movement visible in the public eye and to attract massive media attention. Therefore it is essential

to install a monitoring system that does not only include public surveys but also more focused methods of social sciences (such as focus groups, media analysis, and surveys among special groups). Once the monitoring system detects a high degree of dissatisfaction, in particular if special groups are involved or issues of fairness and belief are affected, policy makers should respond by a revision of policies (if justified), a better strategy to communicate the rationale for existing policies and an open debate about how to deal with the problems. Such actions could already be sufficient to stop the escalation process from the beginning.

At the second stage, i.e. organization of protest movements, public authorities can provide platforms for these movements to voice their opinions, to develop alternative strategies and to have access to those who are legitimate decision makers. Often it is sufficient that these organizations experience that they are taken seriously, their arguments are taken into consideration and their values and preferences are respected by public authorities. They may still continue to protest and oppose governmental policies but is very unlikely that they will then use force to press for change.

During the third and fourth step of increasing violence institutions may retreat to neutral and highly respected individuals and organizations for facilitating a negotiated agreement between the protesters and the public authorities. In addition, the response to violence should be proportional to the extent of the original violation yet decisive enough to demonstrate to others that violence is not tolerated. To fulfill their function of keeping order public institutions should avoid the impression that their authority is in doubt. "Authorization can be seen as a process by which norms supporting the exercises of authority by a given agent are defined and enforced by a subordinate unit. Authority is legitimate power" (Scott 1987). If people have the feeling that there is no public authority left they may even join the protest movement as a means to be on the winning team or to re-establish order.

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