CapHaz-Net

Social Capacity Building
for Natural Hazards
Toward More Resilient
Societies

Toward More Resilient Societies in the Field of Natural Hazards: CapHaz-Net's Lessons Learnt

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Structure

Executive Summary

The CapHaz-Net consortium intended to identify and assess existing practices and policies for social capacity building in the field of natural hazards and to elaborate strategies and recommendations for activities to enhance the resilience of European societies to the impacts of natural hazards. During the course of CapHaz-Net it became increasingly apparent that authorities and organisations involved in managing natural hazards as well as residents and local communities exposed to natural hazards are increasingly confronted with new challenges and tasks that they need to consider and address. This not only relates to the potentially increasing risks associated with the occurrence of natural hazards due to, among other drivers, the consequences of climate change and on-going urbanisation processes in metropolitan areas. It also relates to changing legislative frameworks and, an increasing complexity of the management process itself. This creates to new roles and responsibilities that communities at risk as well as organisations involved in the management process are expected to be able to deal with. CapHaz-Net argues that this transformation of risk management into risk governance is a major trigger of the need to consider social capacity building at different scales more thoroughly in the future.

→ CapHaz-Net understands social capacity building as a long-term process that starts early and fosters mutual and continuous learning. It is a process where information is made available and different types of knowledge are shared. Social capacity building is based on the cooperation and interaction of a variety of individuals and groups of actors. It is aided by risk governance, better understood by assessing social vulnerability and risk perceptions, and realised through methods of risk communication and risk education.

CapHaz-Net achieved to outline a strategy and develop specific recommendation framing social capacity building as a long-term process that starts early and should fosters mutual and continuous participatory learning processes. Six principles structure this strategy, whereas these principles are based both on insights gained through the extensive literature reviews and on insights gained from three Regional Hazard Workshops. These principles are translated in more specific recommendations and guidance throughout this document

Principle 1: Identifying vulnerabilities and prioritising the needs of the most vulnerable

→ The most vulnerable members of the community should be identified and this process of identification should be a participative process which involves members of the community and, preferably, the most vulnerable themselves.

→ The identification of the most vulnerable as well as their needs should be taken into account in short term emergency management as well as long term strategic management.

→ Funds and other types of support should be made available for the most vulnerable in order to better prepare for, cope with and recover from the negative impacts of natural hazards.

→ Education and skills development also need to be made available to all actors in order to better prepare for, cope with and recover from the negative impacts of natural hazards.

Principle 2: Making information available

- Information about hazards, risks and vulnerabilities should be made easily accessible and presented in a manner that is understandable to non-specialists.
- Information about responsibilities, rights and obligations of different actors should be clearly communicated with a focus on the implications they have for authorities and communities at risk.
- Information about outcomes of decision-making processes should be transparent and clearly communicated to local (and other) communities.
- Information from different sources on the same issue (e.g. warning or recommendations what to do in emergency case) should be consistent and congruent.
- Information should be presented in a holistic manner; taking into account other risks and issues that affect everyday life quality (e.g. climate change, health, wealth, etc.)
- New ways of making information available to reach the population at large should be explored, tested and applied without losing sight of traditional modes of information provision.
- Information should be shared among organisations working at different levels (e.g. national, regional and local).
- Research results should be made easily accessible in different languages and should be presented in a manner that is understandable to practitioners.

Principle 3: Being participatory and inclusive

- Efforts should be made and resources utilised to identify and engage with the community in order to raise awareness of the opportunity for participation in the decision-making process as well as what impact participation can have and how to get involved.
- Local expertise and knowledge should be considered in the assessment of risks and vulnerabilities as well as in decision-making processes on policies, plans and specific measures. It is beneficial to include not only local knowledge but also different types of knowledge, thus involving experts from different disciplines throughout a process.
- Not all actors can or should be involved at every level. It is important to identify which actors should be involved and when, at what stage of the decision-making processes they should be involved and to what end.
- It is important that any attempts at participation have a clear objective which is communicated from the outset. It is important that community members are informed from the beginning of the influence that they can have on the decision-making process. Otherwise, a lack of clearly communicating the intended objective can have negative consequences for the participation process itself as well as its outcomes (Twigger-Ross et al. 2011).
- In order to ensure that all interests are taken into consideration during a participatory process, it is important that the process of assigning trade-offs between each of the options needs to be open to public input and new forms of decision-making.
- A participatory process should enable and facilitate not only a learning process but also network building to leave a heritage for the participants and the community. Moreover participation should be an effective tool for sharing responsibilities among decision-makers and citizens and for providing justifications for risk management decisions.
- Participation is not restricted to communication with the public. Rather it also takes place as cooperation between different organisations (horizontal) and within one organisation (vertical). While for some hazards (again triggered by EC directives, such as the Water

Framework Directive and the European Floods Directive; EC 2000 and 2007) vertical, inter-organisational, and partly even transboundary cooperation has gathered momentum in recent years, from other hazards a strong institutional fragmentation is reported (e.g. heat-related hazards; Supramaniam et al. 2011). In such a case, it is important that the roles and responsibilities of different organisations working on the management of the same hazards are clear and that there is communication between them.

Principle 4: Building networks

- Communication should aim at building or strengthening formal and informal networks and reinforcing adaptive capacity, especially at the level of local communities. This means engaging in a continuous and dynamic process of establishing durable relationships among residents, interest groups, organisations, and institutions involved in risk mitigation and management (Steinführer et al. 2009). The importance of building long-term networks that increase motivation to act is a critical aspect of all three stages of a natural hazard (pre-event, during and post-event).
- People rely more on advice, opinions and behaviour from people that surround them in their daily lives. A promising way to get across messages and to encourage specific actions in the face of risk might thus be to team up with 'local champions' (e.g. key people strongly embedded in different local social networks and beyond).
- A communication strategy that enables dialogue between actors with different forms of knowledge and interests is needed. It involves stakeholders and people at risk in the pre-assessment of the risk and in the planning and decision-making on structural and non-structural measures through two-way communication (Höppner et al. 2010).
- Social networks can be employed for warnings and calls to action in communities at risk. Effective one-way communication but also two-way channels that allow for feedback and confirmation are required. Such communication should employ a mixture of formal communication and utilise local networks to disseminate warnings (Höppner et al. 2010).

Principle 5: Starting early

- Risk education should be an obligatory part of formal and informal education from childhood onward as social capacity building for natural hazards is a never-ending effort. Ideally, it should thus be a life-long process of social learning. For the time being, however, according to the results of our study, the majority of (secondary) educational systems in Europe are underdeveloped with regard to education about natural hazards; therefore we particularly recommend strengthening formal education.
- Teaching about natural hazards and their impacts needs to apply different approaches (e.g. various media and tools). A shift towards comprehensive understanding of the relations between natural and social processes is required.
- As well as learning about the hazard, students need to be taught what to do in the event of an emergency.
- Natural hazards education should include locally based forms of participatory learning focused on a specific locality, concrete events, environments and relations.
- Local communities can contribute to both formal and informal risk education of children and teenagers. Flood markers, local archives and eye witnesses of past events should be included as valuable sources of local knowledge.

Principle 6: Sharing responsibilities fairly

- → Public funds should be made available to support individual/communal adaptation and coping measures (e.g. making properties resilient to natural hazards), rather than this being dependent upon the differentiated and uneven availability of resources within households and communities.
- → The delegation of responsibilities to other levels (e.g. local level) or other actors (e.g. community members) needs reconsidering social vulnerability as this transfer might create new vulnerabilities if it is not accompanied by additional resources.
- → In the aftermath of a disaster, funds should be made available for mitigating unequally distributed recovery capacities.
- → Organisations need to work together with other agencies and organisations (e.g. NGOs, private sector) when delivering pre-event (e.g. raising awareness), event (e.g. warning and emergency response) and post-event (e.g. providing shelter and support) responsibilities.

1 Introduction

Capacity building is increasingly gaining relevance in efforts to reduce the impacts of natural hazards and disasters. At least, this is the impression the reader has when reviewing documents of international and national organisations aiming at reducing the devastating consequences of natural disasters. The Hyogo Framework for Action 2005–2015, for instance, promotes the decentralisation of authority and resources to promote local-level disaster reduction and acknowledges that for such a shift to take place, capacity building efforts are required. This includes, inter alia, to build institutional capacity and to build understanding and awareness about natural disasters (UNISDR 2005, 2011a and 2011b).

However, literature on capacity building efforts is predominantly related to the development context. It usually implies the transfer of knowledge and technology from the developed to less developed countries and to more vulnerable parts of the world. In this respect, European countries are viewed quite often as capacity builders. Yet, a closer look reveals that also European countries also take up the notion of capacity building (DKKV 2009). According to the National Progress Report on the implementation of the Hyogo Framework for Action of the German Committee for Disaster Reduction (DKKV), a major strategic goal for Germany is the "development and strengthening of institutions, mechanisms and capacities at all levels, in particular at the community level, that can systematically contribute to building resilience to hazards" (ibid., 4). To give another example: one of the most insightful European post-disaster reports of the past years, the UK Pitt Review (Pitt 2008) particularly stresses the need of organisational capacity building at different levels, including at the municipal level. As these two examples highlight, that is also an increasing awareness among European societies to think about and develop more specific strategies of how to enhance capacities in order to better prepare for, cope with and recover from the negative impacts of natural hazards.

As a consortium of social scientists we argue that capacity building is first and foremost a social endeavour. Therefore, we rephrased the term to *"social capacity building"*. As a result of the situation previously described, the following questions arise:

- Why is social capacity building becoming a relevant concept for natural hazards research and practice in Europe?
- What needs to be done to develop and improve social capacities?
- What should be the goals of social capacity building efforts?
- Should these goals be the same for each individual, each organisation, and each community?
- Who defines who is lacking social capacities (and who does not)?

When trying to answer these questions, the following aspects need to be considered. On the one hand, there is a long history of research, dating back to the 1930s, which focuses on "social disasters", particularly in geography and sociology (Carr 1932, White 1945, Mileti et al. 1975, Drabek 1986, Quarantelli 1989, Burton et al. 1993, Hewitt 1997). CapHaz-Net thus stands "On the Shoulders of Giants" (Steinführer et al. 2011). On the other hand, social science research itself is highly fragmented. For example, risk perception studies or vulnerability assessments run along disciplinary boundaries and are more advanced for certain hazards (particularly for flooding, Kuhlicke and Steinführer 2010b) than for others. Even more importantly, we could not identi-

fy any substantial scholarly contributions to social capacity building as a holistic approach in the scientific debate surrounding natural hazards in Europe. In short, although a lot of work on the social aspects of natural hazards has been completed in the past, fragmentation of knowledge still prevails.

1.1 The main message of this report

Throughout this document we argue that authorities and organisations involved in managing natural hazards as well as residents and local communities exposed to such hazards are increasingly confronted with new challenges and tasks that they need to consider and address. This not only relates to the potentially increasing risks associated with the occurrence of natural hazards due to, among other drivers, the consequences of climate change and on-going urbanisation processes in metropolitan areas. It also relates to changing legislative frameworks (e.g. the European Floods Directive; EC 2007) and an increasing complexity of the management process itself. This creates new roles and responsibilities that communities at risk, as well as organisations involved in the management process, are expected to be able to deal with. The transformation of risk management into a wider frame of *risk governance* is both a major trigger and the context within which the need to consider social capacity building at different scales should be considered and understood. New non-state actors, including individual citizens and those from the private sector, are joining those with more established hazard management roles in the risk governance process. Although this process is not taking place evenly across Europe (Merz et al. 2010, Walker et al. 2010), it is possible to draw out some broad implications to highlight social capacities that need to be developed in order to encourage more resilient societies.

→ *CapHaz-Net understands social capacity building as a long-term process that starts early and fosters mutual and continuous learning. It is a process where information is made available and different types of knowledge are shared. Social capacity building is based on the cooperation and interaction of a variety of individuals and groups of actors. It is aided by risk governance, better understood by assessing social vulnerability and risk perceptions, and realised through methods of risk communication and risk education.*

The major results of the project were summarised in the “Knowledge Inventory” (Deliverable 10.1; Kuhlicke and Steinführer 2010b) and in the CapHaz-Net Policy Briefs (PB I-III). The main objective of this final report is to provide a structured summary of the CapHaz-Net project by proposing six principles that recapitulate our findings not only from the extensive literature reviews (Kuhlicke and Steinführer 2010a, Walker et al. 2010, Höppner et al. 2010, Tapsell et al. 2010, Wachinger and Renn 2010, Komac et al. 2010) but also from the Regional Hazard Workshops carried out in 2010 and 2011 (Supramaniam et al. 2011, Bianchizza et al. 2011, Begg et al. 2011; all accessible at www.caphaz-net.org).

These principles are:

- Principle 1: Identifying vulnerabilities and prioritising the needs of the most vulnerable
- Principle 2: Making information available
- Principle 3: Being participatory and inclusive
- Principle 4: Building networks
- Principle 5: Starting early
- Principle 6: Sharing responsibilities fairly

These principles encourage a conceptualisation of social capacity building efforts that not only aim at reducing the impacts of natural hazards, but also serve as a basis for improving the relationships between organisations involved in the management of natural hazards and local communities exposed to natural hazards. In order to operationalise the findings of the project, these principles form the basis for a guidance tool that allows for the assessment of existing social capacities as well as highlighting those capacities that may need to be developed by organisations or communities. At the same time, these principles are the basis of the recommendations which aim at providing input for future actions that encourage more resilient European societies,.

1.2 Basis of the report

This report is based on three years of research activities conducted between 2009 and 2012 by the CapHaz-Net project, a consortium of 8 research institutions from 6 European countries. During a first period of 18 months an extensive literature review was conducted to document the state of the social science research on natural hazards in Europe (and partly beyond). This was done by the respective work package (WP) leaders and in tandem with the consortium members. The literature review was expanded upon by the means of three CapHaz-Net Thematic Meetings with the following themes:

- Social capacity building and risk governance (Lancaster, UK, November 2009)
- Risk perception and social vulnerability (Haigerloch, Germany, March 2010)
- Risk communication and risk education (Ljubljana, Slovenia, June 2010)

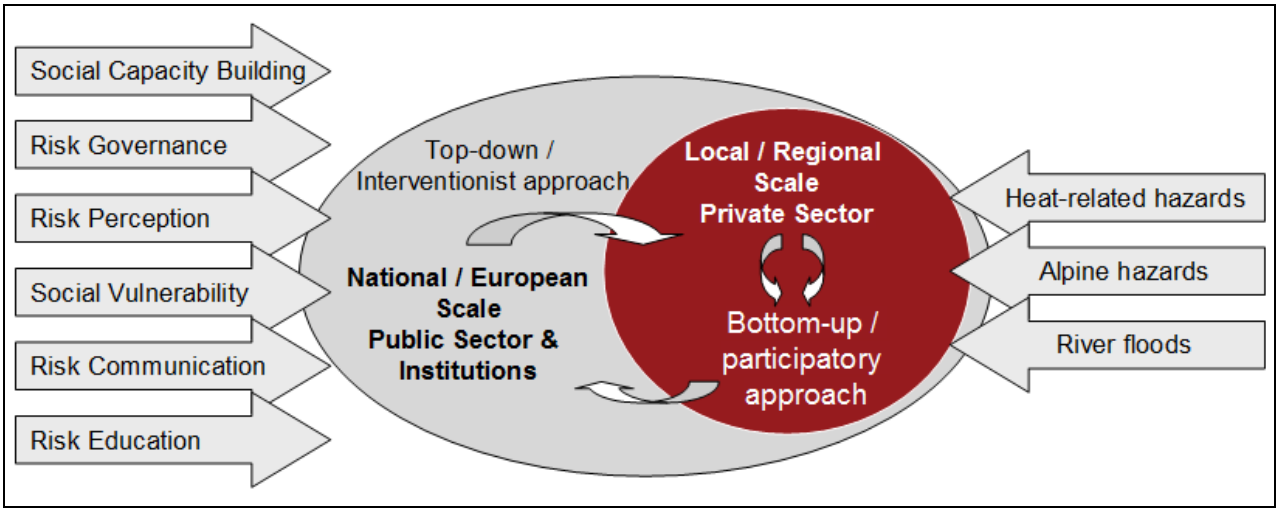
In total 126 scientists, practitioners and stakeholders from 17 European and non-European countries participated actively in the three CapHaz-Net thematic workshops and, in doing so, considerably broadened our knowledge about existing studies far beyond the typical scope of English-written research.

Furthermore, CapHaz-Net aimed at better understanding current social capacity building efforts in Europe in regards to the management of natural hazards by considering different endeavours and activities of both risk management organisations and local communities. This was achieved by assessing lessons learnt from three so-called Regional Hazard Workshops in different regional settings across Europe and with respect to different hazards.

The workshops focused on:

- ⟶ Institutional settings and cooperation with regard to heat-related hazards (droughts, forest fires and heat waves) in Southern Europe (Barcelona, Spain, October 2010)
- ⟶ Social capacity building for alpine hazards (Gorizia, Italy, April 2011)
- ⟶ Participation in Central European flood risk management paying particular consideration to the European Floods Directive (Leipzig, Germany, May 2011)

The practical workshops were made up of 130 participants from 12 different counties across Europe as well as participants from the USA and Australia. The aim of the workshops was to downscale existing knowledge gained during the first project phase to different risk governance settings and regions across Europe by taking into account various natural hazards. Stakeholders from different backgrounds, including local and regional policy-makers, and scientists met to discuss existing practices, approaches and legal tools in European risk management. The structure of the project is expressed visually in Figure 1 below.



Source: authors' considerations

Figure 1: Thematic structure of CapHaz-Net

2 Social capacity building in changing landscapes of risk governance

The central assumption of this report is that authorities and organisations involved in managing natural hazards, as well as local communities exposed to natural hazards, are increasingly confronted with new challenges and tasks they need to consider and address. In order to better understand these new challenges, it is necessary to analyse recent changes in the governance of natural hazards in Europe.

Wider changes in society and in ways of conceiving, organising and structuring the coordination of societal objectives inevitably shape the manner in which natural hazards are dealt with. In a general sense, a broad shift is taking place in regards to how societies are governed. This is also relevant to the handling of natural hazards as it is to other societal concerns such as crime, housing, economic regeneration or transport. Although these shifts are expressed in different ways across Europe, two broad changes were identified throughout the CapHaz-Net project:

- A shift in the distribution of responsibility from state to local actors, and
- New tasks emerging for authorities and professional actors in the field of natural hazards management

The following two sections will shed more light on these topics.

2.1 Changing distributions of responsibility

Walker et al. (2010) explain that we are seeing a shift in control and responsibilities in the management of natural hazards in a number of European countries. This shift includes a “hollowing out of the state”, which refers to ‘‘the loss of functions upwards to the European Union, downwards to special-purpose bodies and outwards to agencies’’ (Rhodes 1997, 17). The formerly largely linear chain of command has given way to a more complex structure based on networks, as subnational organisations communicate directly with supranational organisations, such as the European Union, and vice versa. Nation states are no longer the only important players in the system. What is more, there are no longer single authorities. Rather there is a “multiplicity of actors specific to each policy area” (ibid., 51). Although the management of natural hazards has always involved multiple actors beyond the public sector, a recent shift towards a greater diversity of actors at different scales and the development of new roles and stronger forms of collaboration has been noted (Christoplos et al. 2001).

While this shift may also result in new forms of authority and control as well as a possibly changing distribution of responsibilities, for Rosenau (2004), this new governance is still about the exercise of authority, but through employing a broad range of strategies, including shaping people’s shared norms and habits, informal agreements, negotiations, etc. These shifts are also partially reported with regard to natural hazards, as it is increasingly acknowledged that pure technical or structural solutions along with the demand for an ‘absolute protection’ against the negative impacts of natural hazards are not achievable (which is, for example, mirrored by the Strategy Natural Hazards in Switzerland; PLANAT 2004 and 2008). In several European countries, public strategies of ‘Making Space for Water’ (UK; Defra 2005) or ‘Ruimte voor de Rivier’ (Netherlands; PKRR 2006; additionally for Poland see Begg et al. 2011, 46) as well as policy initiatives which attempt to encourage householders and businesses to make their buildings more resistant and/or resilient to floodwaters highlight such shifts. Similar changes are also tak-

ing place in relation to the problem of water scarcity, as the CapHaz-Net workshop in Barcelona on heat-related hazards revealed (Suprmaniam et al. 2011; cf. also Chappells and Medd 2007). In these ways, those at risk – residents, businesses, farms, infrastructure managers, etc. – are gradually transformed into risk managers and active participants of the multi-scale risk governance network as they are encouraged or even required to take more responsibility for their actions. This process of "responsibilization" (Garland 1996) and "privatisation of risk", respectively (Steinführer et al. 2008), includes attempts to define these actors as agents that need to take decisions and choices with regard to the prevention and mitigation of hazards. However, as the examples in Table 1 reveal, this process is not taking place with the same intensity across Europe.

Table 1: Different degrees of responsibilisation in selected European countries with respect to flood risks

Germany	England	Italy	France	Slovenia
Demanding Citizens in areas prone to flood hazards are obliged to take adaptation measures in accordance with their possibilities and abilities.	**Encouraging** Flood policy actively encouraging householders and businesses to be prepared and to increase their resilience.	**Encouraging** Citizens share responsibility for civil protection activities with a number of public actors.	**Not expected** Citizens are not encouraged to reduce their vulnerability.	**Not expected** Citizens are not encouraged to reduce their vulnerability.

Source: Walker et al. 2010

2.2 New tasks in natural hazard management

Increasingly during the last two decades, a shift from attempts to control nature and protect citizens from the impact of natural hazards towards more integrated management approaches can be observed in many countries across Europe. This also creates new tasks and challenges for authorities and professionals involved in the field of managing natural hazards.

- A more *comprehensive approach* to natural hazards assessment is required. This approach should consider not only the hazard itself but also other dimensions such as the vulnerability of people, buildings and infrastructure, as well as prevention and mitigation options and strategies that are still adaptable and resilient to uncertain future developments (Kuhlicke and Kruse 2009, Merz et al. 2010).
- *A participative decision-making approach* to natural hazards is required. Risk governance is often equated with the idea of "good governance". Tompkins et al. (2008) associate good governance of disasters with stakeholder participation in decision-making, democratic access to knowledge as well as transparency and accountability in relation to policy decisions. Further principles highlighted are openness, effectiveness, coherence and fairness. Meanwhile, a number of policy documents explicitly refer to the idea of 'good governance' (Defra 2005, PLANAT 2008, IRGC 2009). The European Floods Directive (2007/60/EC), for instance, encourages Member States to involve "interested parties" within the development of flood risk management plans (EC 2007, Article 10). However, the exact definitions and guidelines regarding how one should go about participation (i.e. who should be involved and how) are not clearly prescribed by the Directive, instead this is a task of each Member State.

→ The management of natural hazards requires continuous communication with a multiplicity of actors. Merz et al. (2010) state with regard to flood risk management: "The increasingly prominent role of non-structural measures requires a much larger involvement of the public, and a functioning dialogue on the flood risk and mitigation options is an essential element of an integrated flood risk management" (ibid., 522). The task of risk communication has thus become more challenging and more complex. The increasing number and diversity of actors that are perceived to have a legitimate stake or right to be involved in risk management and governance comes with multiplying expectations of how risk communication should be enacted and what it should ideally achieve (Höppner et al. 2010). Risk communication has been enshrined as a fiduciary responsibility of official bodies in a number of European and international policy documents and translated into national law and regulation, though to varying extents across countries (Wright et al. 2006). It is important to note that although guidelines on the communication of technological, chemical, food and health risks have emerged, there is hitherto no generic document that specifically sets out legal requirements or recommendations for the communication of natural hazards at the European level (Höppner et al. 2010).

The consequences of such changes in governance and the new challenges that natural hazards pose are manifold and can hardly be summarised here. However, they have immediate implications for any attempt to build social capacities for natural hazards. This implies, for instance, the need to employ good practices of risk communication and to establish trustful relationships between and within organisations as well as between organisations and the public, to handle the increasing complexity of the management process itself and to identify and handle new responsibilities and duties that emerge out of these governance changes. Table 2 attempts to draw together some of the key features of this 'new' risk governance by considering the possible positive and negative ways in which these features may materialise in the governance of natural hazards.

Table 2: The implications of shifts to governance for the governance of natural hazards

New forms of governance	Governance of natural hazards	Potential positive implications	Potential negative implications
Networks of multiple actors beyond the state	Government agencies, private sector utilities, businesses, community groups, householders	Different voices are heard; different skills, knowledge and capabilities are drawn on; better communication and coordination	Unclear accountability; illusion of involvement; tokenistic inclusion; slow decisions and compromise solutions
Multi-level governance networks	International agreements; cooperation between nations; regional and local networks	Greater flexibility, sharing of skills and resources; more cooperative solutions between levels	Unclear distribution of responsibilities; conflicts between scales; disaster capitalism
Diverse forms of control	Communication and persuasion; use of market mechanisms; regulation of private companies	More effective and efficient ways of achieving policy objectives	Reliance on market mechanisms disadvantages those with fewer resources; fragmentation and ineffective regulation
Distributed responsibility	Sharing of responsibilities with private sector, NGOs and individuals	Empowerment; more effective action; local decision-making; more resources	Unclear responsibilities; fragmentation of policy making and policy implementation; under resourced and marginalised groups may become more vulnerable

Source: adapted from Walker et al. 2010

In order to utilise these findings CapHaz-Net has developed a heuristic framework which enables the tentative assessment of the state of structures of governance that exist in a given country. This framework enables:

- Any chosen national, regional or local natural hazard governance context to be profiled against a set of eight governance characteristics
- Positioning of the current situation for each governance characteristic along a spectrum
- The direction and strength of past and expected future change either towards or away from the present situation to be indicated

The eight governance characteristics cover key matters of:

- Governance level and scale (national, regional and local)
- How much those at risk are expected to be responsible for protecting themselves
- The culture of stakeholder participation in the governance system
- The type of insurance provision in place
- The extent of public risk communication
- The balance between governance tasks and available resources

These provide a set of broad characteristics that can be applied in a generic way for different hazards. Table 3 provides an example of how this assessment can be applied.

Table 3: Flood risk in the UK, 2012

Strong national policy framework	Weak national policy framework
Strong role for regional institutions	Weak role for institutions
Strong local/municipal role	weak local/municipal role
Major responsibility on those at risk to protect themselves	Minor responsibility on those at risk to protect themselves
Strong culture of multi-stakeholder participation	Weak culture of multi-stakeholder participation
High reliance on segmented and marketised insurance	Low reliance on segmented and marketised insurance
Extensive public risk communication	Very little public risk communication
Good balance between governance tasks and available resources	Imbalance between governance tasks and available resources

Source: Walker and Tweed 2012

3 CapHaz-Net's lessons learnt

This section outlines some of the key findings of the Caphaz-Net project. It highlights some general dimensions of social capacity building and then proceeds to continue by proposing 6 principles and a number of more specific recommendations. The chapter also reflects that many international organisations have developed tools to assist in enabling capacity building. Among others, the United Nations, the World Bank, the World Trade Organisation and the International Monetary Fund consider capacity building as being central for their mission (Eade 2005, 1-22). They share a few things in common, such as the aim to assist people and institutions to develop skills, abilities, resources, and knowledge but also responsibilities to enable them to better adapt to and cope with a rapidly changing and increasingly complex environment (e.g. Johnson and Thomas 2007). The UN, for example, not only have a long-standing interest in capacity building, they also ascribe capacity building a strategic importance when defining it as a process that enables people and institutions to learn "to transform themselves as necessary in response to changing situations and requirements" (Maconick 2002, 4-5). However, although the term 'capacity building' is to be found in such policy documents, there is still a great deal of debate centring on the question of what it actually might mean. In the following we outline some of the key insights from previous research from different disciplines (cf. also Kuhlicke and Steinführer 2010a). It is argued that social capacity building

- ⟶ should follow and based on interventionist and participatory approaches
- ⟶ should be a multi actor processes involving both communities and organisations
- ⟶ should be a long-term iterative learning process
- ⟶ should consider and focus on different kinds of capacities

3.1 Social capacity building for natural hazards

Social capacity building: Interventionist and participatory approaches

Today's notion of 'capacity-building' is implicitly rooted in "earlier ideas concerning participation, empowerment, civil society, and social movement" (Eade 2005, 10) and was shaped by the work of Paulo Freire and the impact of Liberation Theology in Southern America in the 1970s and 1980s (ibid.). In this understanding, the process of learning is not meant to be one-way, rather the importance of developing skills and competences to solve problems in a participative manner was emphasised. This also implies that particularly poor and marginalised people, in addition to other members of society, should have "the right, and the capacity, to organise and challenge authority in order to create a society that is not based on exploitation and oppression" (ibid., 11). This understanding gained particular relevance within the development context, by containing a strong community involvement component. It was intended to stimulate a process that would be consistent with the goals of the "self-help approach to community development" (Christenson and Robinson 1980) to increase autonomy and agency of individuals and communities (Pavey et al. 2007, 92; cf. also Kaplan 2000, Craig 2007, Barker 2005, 13). It is hence a process which aims at encouraging community members to take "local ownership" of the agenda, rather than simply responding to an externally defined requirement or deficit (Nunn 2007, 470).

'Capacity building' rose to worldwide prominence during the 1990s as a result of the sustainable development and Agenda 21 movement initiated by the United Nations Development Program (UNDP) and the United Nations Commission on Sustainable Development (UNCSD).

The aim was to build capacity "for the formulation of plans and strategies in support of sustainable development" (McGinty 2003, 5). In contrast with earlier descriptions, this understanding views social capacity building as an intervention by an external organisation that aims at initiating or promoting an endogenous process by concentrating on specific aspects such as human resource development, organisational, institutional as well as legal development (Craig 2007, 341).

In the European context, community capacity building was first mentioned in 1996 in a report to the European Commission (EC 1996, 68). Here capacity building was considered, above all, as a remedy to negative economic development (Craig 2007, 341). It was regarded as an approach that tries to initiate and foster economic development by enhancing capacities of people in specific disadvantaged communities to participate in the labour market.

To structure the debate, we propose to distinguish between an (a) interventionist approach on the one hand, and a (b) participatory approach on the other. This difference is also utilised to elaborate relations to subsequent topics and was further elaborated throughout the second half of CapHaz-Net.

- *Interventionist approaches*: The focus is on the public sector and organisations involved in the management of natural hazards (cf. also Nunn 2007). It aims at stimulating and supporting capacity building in specific sectors, localities, or regions by providing measures, strategies, and entire policy frameworks (McGinty 2003, Craig 2007). An external institutional framework or organisation is set up in order to intervene and to initiate and promote endogenous processes (Land 2009); it is hence aiming at enabling social capacity building (cf. also Gualini 2002) by including rules and norms "structuring the interaction" of people and creating the "power to achieve purposes that would be unreachable in their absence" (Scharpf 1989, 152, quoted in Gualini 2002, 36). Involved organisations from the public sector may develop such a frame, be responsible, and control its implementation as well as its evaluation. Private actors may be involved in various stages and to varying degrees.
- *Participatory approaches*: The focus is particularly on communities. Such an approach aims at empowering actors by increasing their autonomy and agency (Pavey et al. 2007) to "develop their own self-confidence and skills to challenge prevailing local and wider structures of domination" (Pelling 2007, 375). Here the focus is on locally driven and locally owned capacity development processes. The Hyogo Framework for Action 2005-2015 clearly supports such approaches by identifying it as one of its priorities: "Both communities and local authorities should be empowered to manage and reduce disaster risk by having access to the necessary information, resources and authority to implement actions for disaster risk reduction" (UNISDR 2005, 5). This is a relevant statement as it clearly underlines the interconnectedness of disaster risk reduction efforts with an empowering and participatory approach (cf. also Pelling 2007, 374).

Capacity building as a multi-actor process

There is broad consensus that the local level and/or the level of communities are the most appropriate settings for realising social capacity building efforts. Yet, community is a concept far from self-evident; there are 'geographical communities' (for example, a whole village or an urban neighbourhood), 'communities of circumstance' (which emerge by chance or due to structural features, such as school classes) and 'communities of interest' (which come into being due to a

stated interest or legitimate stake in a certain issue) (CCS 2009). They might exist in the long run or come about temporarily. In any case, they are not stable in time. Moreover, each community (of whatever type) should not be understood as one single actor, as their members are neither homogeneous nor do they have one single interest or view on a certain issue. Rather, local and other communities are characterised by internal social differentiation and a number of diverse interests. Issues like social conflicts, social inequity and social exclusion need to be taken into account when approaching communities (cf. also Pelling 2007).

→ When using the term *'community'* in this document, we always mean *local communities*. This includes residents at risk, actors from the voluntary sector as well as private actors (e.g. local companies). Local communities might be independent territorial units or parts of larger settlements, such as neighbourhoods within a city.

However, social capacity building must not be restricted to private persons, such as residents or households. A great number of public and private organisations are major actors of risk management. We therefore also propose to focus on actors particularly from the public sphere, more specifically on:

→ *Organisations and authorities* involved in managing natural hazards (e.g. municipal or regional authorities, hazard protection agencies, ministries etc.) which include both specialised entities as well as organisations that also have other responsibilities (e.g. regional planning agencies). These organisations and authorities are not only developing other actors' capacities but potentially need capacity development themselves.

Capacity building as a long-term iterative learning process

Underlying most efforts is the assumption that capacity building is linked to some kind of process or performance. The efforts depart either from an observed lack of skills, resources, practices, abilities, knowledge etc., which need to be remedied or from some kind of inadequate performance which needs to be improved by a specific process (e.g. training, education, discussion, partnership, participation, empowerment or experience exchange) (cf. also Brown et al. 2001, Kay and Alder 1999). Very generally, there are three elements involved in capacity building: a status quo, which is defined by a lack of capacity, a means or a process attempting to improve the situation and an expected outcome or a defined objective characterised by more capacities (cf. Figure 2).

Source: authors' considerations; design: annalogie.de

Figure 2: Elements involved in capacity building

→ Instead of a linear process social capacity building should be seen as an iterative learning process which needs to take into account different stocks of knowledge and experience as well as different kinds of expectations. This learning process can be seen in a range of documents compiled after major disasters, for example, the Kirchbach Report in Germany after the 2002 flood (Kirchbach et al. 2002). Besides such one-off reviews, there are also long-term iterative processes, as, for example, after the 2007 floods in England (Pitt 2008) or after a series of catastrophic events in Switzerland in 1999 (PLANAT 2004). The Pitt review for England was followed by a government response paper and two progress reports (Defra 2008, 2009a and 2009b). Therefore, disaster events provide the possibility to scrutinise previously established policies, practices and actions (see also Felgentreff 2003). In this sense, social capacity building should be organised as a learning process that recognises and takes into account the mismatch of expectations and actual results; that is to reflect and if appropriate adapt established practices, norms and policies (Kuhlicke and Steinführer 2010a). Such attempts may even lead to questioning the very basis of practices, norms, structures and cultures of the entity of interest itself as well as the context of actors and structures involved (Argyris and Schön 1978, Ramalingam 2008, Johnson and Thomas 2007).

→ Instead of being paternalistic, social capacity building needs to pay particular attention to the interrelation of capacity builders and those lacking capacities. Attempts at building capacities always face the potential problem of taking a paternalistic stance, in the sense that an actor or a group of actors is considered by an outsider as lacking a certain skill, a resource or a capacity. Capacity building is quite often applied "by donors to recipients" (Nunn 2007, 470) whereas the need for capacity building is defined by external actors. According to Beazley et al. (2004) the weakness of the 'deficit model' is that it pays no attention to the capacity of institutions to overcome inherent barriers to engagement. It has been argued that the problem often lies not with communities but with the institutions, structures and processes that affect them (Supramaniam et al. 2011). This implies that the interrelations of 'capacity builders' and those 'deficient' in a certain capacity need to be carefully taken into account (cf. also Figure 3). This is surely a central challenge of social capacity building for natural hazards: Who defines what and based on which (empirical) grounds, who is lacking what kinds of capacity, by which means or processes capacity should be improved (with which resources, which actors involved) and what should the outcomes look like?

Source: authors' considerations; design: annalogie.de

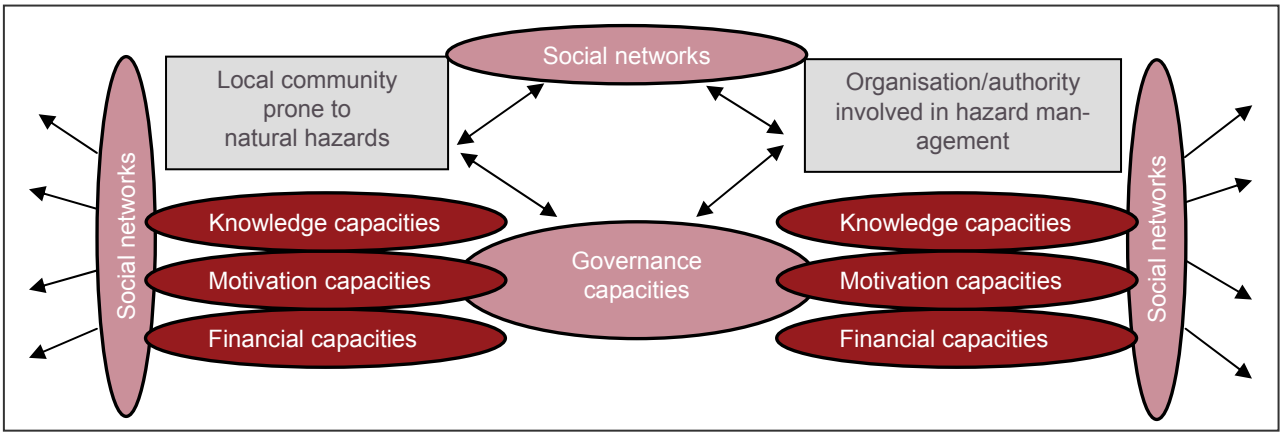
Figure 3: Elements involved in social capacity building for natural hazards – reconsidered

Typology of social capacities

Based on a thorough literature review as well as the input of participants in different workshops, a typology was developed outlining five different types of social capacities (Kuhlicke and Steinführer 2010b, Höppner et al. 2010). These are knowledge, motivation, social networks, financial resources and governance capacities (see also Figure 4):

- *Knowledge* comprises various types of knowledge. These are available in different forms and degrees of codification. This capacity thus includes both formal (e.g. written-down) and non-codified (e.g. local) knowledge.
- *Motivation* relates to the general willingness to take notice of and deal with natural hazards. This understanding includes awareness, responsibility and ownership. As a means to establish or trigger risk-related motivations, emotions (e.g. linked to previous disaster experience), incentives (e.g. co-funding for hazard-proof buildings), interests (e.g. because assets are in areas of risk) and trust (e.g. in authorities or other members of community) were identified.
- *Social networks* relate to the possession and exploitation of social capital which describes the "aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalised relationships of mutual acquaintance and recognition" (Bourdieu 1986, 248). In CapHaz-Net's conceptualisation, social networks are considered to be a key social capacity as they might act as transmitters of all other capacities mentioned in this typology. Furthermore, they are used in interactions among and between communities and organisations. Yet, social networks should not be romanticised, as they not only contribute to internal cohesion but might also lead to fragmentation (as mirrored, for example, by sub-networks).
- *Financial resources* include incentives, public and private funds as well as insurance policies. There is a strong link to governance capacities as financial resources are often related to issues of distribution, transparency and perceived justice/injustice.
- *Governance capacities* relate to participation opportunities and fair governance. Across Europe we found a highly diversified governance landscape of risk management (e.g., strong vs. weak, paternalist vs. non-paternalist approaches).

These social capacities are either owned by an individual, an organisation or a community (knowledge, motivation, finances) or these actors have access to them (social networks, governance capacities). Governance capacities are considered to be a key resource to enable interactions between private and institutional actors (such as local communities and organisations). Social networks, then, are transmitters of knowledge, motivation and financial capacities and establish links among and between local communities and organisations and beyond (cf. also Figure 4).



Source: authors' considerations

Figure 4: Types of social capacities in local communities and organisations and their relationships

3.2 Six principles of social capacity building

Social capacity building is defined as the process of (re-)discovering, enhancing and developing the aforementioned types of capacities (Kuhlicke and Steinführer 2010a, 2010b). In this framing it is clearly a normative and at the same time, a rather abstract concept. Therefore, in the course of the project a number of principles – as *general normative statements* – were developed to steer the process of social capacity building. These principles take the different types of capacities, the major fields of research (risk governance, social vulnerability, risk perception, risk communication and risk education) as well as the findings of the Regional Hazard Workshops into account:

- ⟶ Principle 1: Identifying vulnerabilities and prioritising the needs of the most vulnerable
- ⟶ Principle 2: Making information available
- ⟶ Principle 3: Being participatory and inclusive
- ⟶ Principle 4: Building networks
- ⟶ Principle 5: Starting early
- ⟶ Principle 6: Sharing responsibilities fairly

In the following, these principles, that aim to guide social capacity building activities, will be explained in more detail. This will be fulfilled for each principle in four steps: Firstly, the principle is embedded within the scientific debate and challenges are outlined within the context of risk management ('background'). Secondly, we will further specify the principle by considering its relationship to social capacity building and provide examples of good practices from across Europe ('what does it mean for social capacity building?'). Third, we will discuss the relevance of the principle in light of policy approaches and scientific discussions ('why is it relevant?'). Finally, based on the former descriptions, recommendations for how to improve social capacity building for natural hazards are provided ('recommendations').

The role of the 'good practice' boxes

In the course of the CapHaz-Net project, a continuous debate with stakeholders, practitioners and scientists from across Europe took place. One of the most valuable outcomes of this discourse is a number of practices applied in social capacity building in the field of natural hazards. They are mostly related to efforts of risk communication and/or risk education with many of them being described in more detail in the WP 5 and WP6 reports (Höppner et al. 2010, Komac et al. 2010).

In the following sections, a small selection of 'good' practices will be presented and discussed in text boxes. We consciously avoid the term 'best' practice as one-size-fits-all approaches are not applicable in risk management in Europe due to its prevalent institutional, cultural and political diversity. A practice is always rooted in regionally and/or locally based risk cultures and modes of risk governance (see also Magnan 2010, 19). Our assessment of a certain practice as a 'good' one is based upon our normative model of social capacity building. Therefore, we tried to include only practices that address more than one social capacity (e.g. not only knowledge but also motivational capacities). These good practices were chosen according to our best knowledge. We aimed at finding different examples in a range of European countries, being aware that similar practices might exist elsewhere. We also attempted to cover various hazards, although most of the practices refer to floods which are not only Europe's most frequent hazards but also those best covered by risk communication, risk education and risk management tools.

The practices should thus be read as real examples that are neither representative nor singular. Rather they shall illustrate different modes of social capacity building concerning natural hazards in Europe. Yet, a major limitation needs to be noted: As only a few of these practices were evaluated with respect to their effectiveness in relation to awareness raising and/or actual behaviour, suggesting these 'good' practices is basically a non-verified hypothesis that awaits testing through future research.

Principle 1: Identifying vulnerabilities and prioritising the needs of the most vulnerable

Background

'Vulnerability' assessments aim at identifying and understanding why certain groups of people, buildings, infrastructures and assets may be more exposed, more sensitive and/or more susceptible to the impacts of natural disasters than other groups. Generally, there is an increasing realisation that natural hazard prevention and mitigation need to address not only the hydrological or meteorological factors, but also the economic, social and political factors influencing wider society and underpinning the impact of hazardous events (White and Howe 2002). While all people living in hazard areas may be physically vulnerable (by being exposed to a given hazard), the social impacts of hazard exposure as well as people's capacities to cope with and adapt to such hazards often fall disproportionately on the most disadvantaged people in society, such as the poor, ethnic minorities, children, the elderly and disabled. These groups often have the fewest resources with which to prepare for a hazard, tend to live in locations of highest risk, in substandard housing, and/or are characterised by a lack of knowledge or insufficient social and political networks necessary to take advantage of resources that would speed up their recovery (Dunning 2009, NRC 2006). Yet, in-depth research on social vulnerabilities in Europe is a research field with many questions unanswered and more hypotheses than reliable findings (Kuhlicke et al. 2011). Vulnerability assessments are increasingly accepted as a requirement for the effective development of emergency management capability, and have been recognised as being integral to understanding the risk of natural hazards (Blaikie et al. 1994). However, in the European context, thorough vulnerability assessments are mostly restricted to economic dam-

age potentials and impacts. More sophisticated assessments are only beginning to be considered in management practices. Among others, the European Framework Projects MOVE[1], ENSURE[2] and emBRACE[3] are currently developing assessments tools.

What does it mean for social capacity building?

Although many different views on how to define vulnerability exist, there seems to be a general consensus that it is constituted by two different components: 1) an external component of exposure to natural hazards and social structures and processes which are difficult to change, and 2) an internal component, which relates to people's susceptibility, their awareness of, as well as knowledge about, natural hazards. This includes their motivation and attitude to act and take responsibility, as well as their ability to access the kinds of financial and other resources needed to prepare for, cope with, recover from and adapt to the negative impacts of natural hazards.

There are different types of vulnerability assessments: taxonomic-deductive and participatory-inductive approaches (Wisner et al. 2004, Wisner 2005, Pelling 2007). Both approaches follow different aims and purposes that rely on different methods, focus on different spatial levels, and allow different degrees of participation:

→ *Taxonomic, deductive vulnerability assessments*: Such assessments aim at identifying areas, groups or sectors with the greatest needs (i.e. a high level of vulnerability) by relying on different indicators and indices. The underlying hypothesis of such assessments is the existence of a strong positive correlation between socio-economic and/or demographic status and vulnerability. There have been many different indexes developed over the last decade (for an overview: Birkmann 2006). The spatial level may go from the level of neighbourhoods, to the local, regional, national and international level. One purpose is to identify vulnerable areas to set priorities and develop intervention measures and strategies aimed at reducing the vulnerabilities of areas or population groups with the greatest needs; it is hence policy oriented (for an example see Box 1).

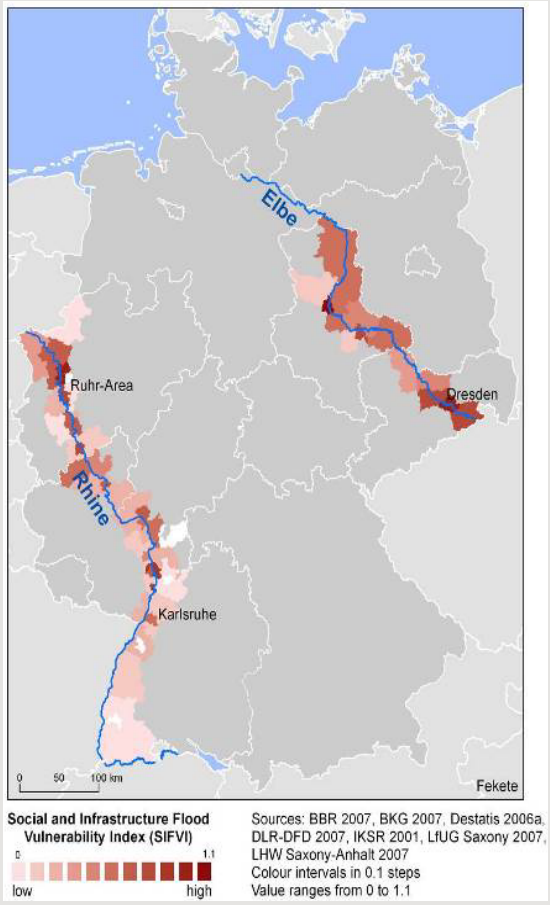
[1] http://www.move-fp7.eu/

[2] http://www.ensureproject.eu/

[3] http://embrace-eu.org/

Box 1: Vulnerability assessments in Germany

Social vulnerability was investigated in all counties along the Elbe and Rhine rivers in Germany. In the study the City of Dresden and the Ruhr area emerge as especially vulnerable areas because of population density, exposure levels and values of social susceptibility. A social and infrastructure flood vulnerability index (SIFVI) was developed by using demographic variables (see map). It combines social status, location and flooding exposure. Data were aggregated at a range of scales. The validation set were 1,700 households along the Elbe and the Rhine. There were some difficulties in collecting data in the federal German system. Another challenge lay in the choice of scale and which effects are specific at a county level. The relevancy and use of indicators varied depending on the scale of application of the methodology. It was argued that social inequalities are not in and of themselves indicators of vulnerability, and that therefore social vulnerability in this case study needs a new perspective. It seemed important to the researcher to point out that the event probability is not a vulnerability measure, and to differentiate between economic and social vulnerability.



Source: Fekete 2010, 90

→ *Participatory, inductive vulnerability assessments*: Such assessments aim to better understand actors' perceptions of their own vulnerabilities and capacities in order to identify and strengthen various forms of capacities and to raise awareness on the local or regional level and, finally, to develop locally embedded and applicable adaptation and coping measures. As they follow an inductive approach such assessments do not have a clear hypothesis in mind but rather provide the space to allow actors to develop definitions of their own vulnerabilities and capacities. There have been many different techniques developed and applied during decades such as Participatory Rural Appraisal (PRA), Participatory Action Research (PAR), 'sustainable livelihoods' (SL) (e.g. Chambers 1983, Chambers and Conway 1992, Winchester 1992, Moser 1998, Cannon et al. 2003), community or citizen-based risk assessments (Wisner 2006b), as well as participatory disaster risk assessment (Pelling 2007). They have so far mostly been applied to non-European cases. An example of these types of assessment is provided in Box 2.

Box 2: Participatory Rural Appraisal (PRA) in Scotland

Community involvement has been emphasised in rural policy in Scotland since 1992. Since then the need to involve communities in the development of policies and actions which affect them has been stressed. “This is in part a response to EU policy on subsidiarity, and also to the difficulties created by an increasingly centralised and fragmented policy landscape” (Halhead 2001, 2).

Participatory Rapid Appraisal – Moray

In order to gain insight into local conditions and build connections with its local communities, a local enterprise company, Moray, Badenoch and Strathspey Enterprise employed a PRA approach to community engagement. This enterprise has linked its own work to the results of the PRA and has also contributed to the Community Plan. It has been noted that this “is a rare example of such a participatory approach being used by a public body. The work has focused on gaining and prioritising the ideas of each local community, using participatory appraisal methods. Local community agents have been trained to facilitate the process. The community appraisals used 3 simple questions to gain information about the area: ‘What do you like and dislike about your area and what are your ideas for improvement?’” (Halhead 2001, 2). Inputs were obtained through community workshops and interviews. The inputs were listed and described in detail before being prioritised by each community and used as the basis for action planning.

Community Agents – LEADER II Programme for Rural Inverness and Nairn

With a population of 28,000, this programme area placed a strong emphasis on working closely with its communities in order to “identify their needs, develop projects and build confidence and capacity” (Halhead 2001, 2). Central to their approach was the use of ‘LEADER agents’. The role of the 14 LEADER agents was to provide a direct link between the Programme and the community and help facilitate the PRAs. The agents were local people, selected by their communities. They received a small annual wage, and their expenses were covered for attending meetings and related expenses. The Programme tried to ensure that each agent was a member of the Community Council. Some concerns were raised about the democratic accountability of the agents and there were issues in finding a suitable agent for each community. However, the agents were a driving force behind the Programme. “They provided invaluable access to local knowledge by bringing the experience of different communities together to identify and agree needs, priorities and resources. Experience showed that the use of agents proved its value through the varying amount of activity and projects coming forward from communities according to whether they had a LEADER agent working with them and the quality of the agent. The agents also helped the communities to access information and training and improve local management skills. Most communities would have liked the agents to also provide direct management and development” (Halhead 2001, 2).

Source: Halhead 2001

→ *Integrating taxonomic and participatory assessments*: Recently, attempts were made at integrating taxonomic and situational approaches which allow for cross-location or cross-regional comparison but are still context-sensitive (Moser 1998, Kuhlicke et al. 2011). Similarly, Kolkman et al. (2005; 2007) advocate a frame reflection and mental model mapping technique to enable mutual understanding between decision-makers, experts, and stakeholders. Burgess et al. (2007) propose a deliberative mapping methodology to engage experts and citizens in an interactive dialogue on problem framing and option definition that might be adopted for the appraisal of natural hazard risks. Kenyon (2007) and Scolobig et

al. (2008) have recently presented participant-led multi criteria approaches for evaluating flood mitigation measures (cf. also Box 3).

Box 3: Social Multi-Criteria Evaluation (SMCE) of flood mitigation

Malborghetto-Valbruna in Northern Italy presents an interesting case in which deductive and inductive methods of vulnerability assessments (taxonomic and participatory approaches) have been employed.

Malborghetto-Valbruna is located in the Valcanale Valley in the Friuli Venezia Giulia region. At the time of the study (2005), it was home to 1,028 residents. After a flash flood in 2003 which caused the evacuation of 600 people and €435 million in damage, a debate began between advocates of structural measures and those who proposed a governance-based approach to risk management which focuses on resilience and local knowledge.

The fieldwork included:

1. Socio-demographic data from secondary sources
2. Qualitative information gathered through semi-structured interviews, and
3. Statistical data obtained through a questionnaire
4. The application of the Social Multi-Criteria Evaluation (SMCE) requires specifying scenarios and criteria. The development of scenarios is followed by the selection of relevant criteria and finally different methods are used to compare the scenarios. Scenario and criteria were defined directly by the experts involved in the study and SMCE was developed on the basis of the results of the interviews. The methodology allowed identification of the most preferred scenario, according to the criteria provided by experts and stakeholders.

It was argued that the SMCE can help facilitate dialogue between stakeholders and it addresses well the problem of the existence of different languages of valuation, that is, different outlooks on what vulnerability reduction should achieve and how it can be achieved. The strength of SMCE is its capacity to simultaneously represent these languages of valuation.

The 2003 flash flood and the risk mitigation works (source: Malborghetto-Valbruna municipality)

Source: Scolobig et al. 2008

Why is it relevant?

European societies are socially differentiated and even partly polarised. Pre- and post-disaster governance practices should address – or at the very least not increase – the existing socio-economic inequalities that make people vulnerable to the effects of natural hazards.

The topic of ‘social vulnerability’ has also gained relevance in the policy arena:

→ The measuring of vulnerability and risk is considered as a key activity within the final document of the World Conference on Disaster Reduction, the Hyogo Framework for Action 2005-2015 (UNISDR 2005). The framework underlines the fact that the impacts of disas-

ters on social, economic and environmental conditions should be examined through indicators or indicator systems to assess vulnerability.

→ The European Floods Directive (2007/60/EC) requires Member States to conduct a preliminary risk assessment that includes "an assessment of the potential adverse consequences of future floods for human health, the environment, cultural heritage and economic activity, taking into account as far as possible issues such as the topography, the position of watercourses and their general hydrological and geomorphologic characteristics, including floodplains as natural retention areas, the effectiveness of existing manmade flood defence infrastructures, the position of populated areas, areas of economic activity and long-term developments including impacts of climate change on the occurrence of floods" (EC 2007, Article 4/c). Thus, the Directive only demands the assessing and mapping of the numbers of people at risk (cf. also ibid., Article 5/a) and to not yet further differentiate in different social groups that might be affected in a different ways by the impacts of floods.

The rationale behind measuring vulnerability and the use of vulnerability indicators has been summarised by Birkmann (2006) who discusses different definitions and conceptual frameworks used by the different schools of thought. Generally, information on social vulnerability helps to, among others, define where the greatest need is and set priorities, determine actions (e.g. by improving intervention tools), anticipate undesirable states, inform policymakers and practitioners, alert the public and raise awareness, stimulate discussion, represent social responsibility, and look at the social roots of vulnerability. Table 4 and Table 5 summarise some of the key findings from the literature.

Table 4: Strengths, possible limitations and challenges of taxonomic, deductive vulnerability assessments

Strengths	
Puts the issue of social vulnerability on the public agenda and into the "heart of government thinking"	Benson 2004
Provide information for strategies measures and plans	
Provides simple and understandable information and allows comparison of the vulnerability of specific areal units (e.g. locality, regions, nation states)	Fekete et al. 2009
Possible limitations and challenges	
Often fail in that they produce too many 'false positives', as, for example, not all elderly people are equally vulnerable throughout the entire risk cycle	Wisner 2004
Mostly rely exclusively on statistical (e.g. census) data or on the use of quantitative techniques neglecting the local/regional context	Wisner 2004, Harvey et al. 2009
Challenge of down-scaling the assessment as many national-level assessments can result in loss of information and capturing local pockets of variability	Pelling 2007
In the European context there is a lack of empirical studies of social vulnerability hampering the validation of indices and indexes	Tapsell et al. 2010, Fekete 2009, Kuhlicke et al. 2011

Source: Kuhlicke et al. 2011

Table 5: Strengths, possible limitations and challenges of participatory, inductive vulnerability assessments

Strengths	
Actors can identify and assess their own vulnerabilities and capacities Allows the integration of local stocks of knowledge, experiences, and perceptions into the assessment Makes different and possibly conflicting views and opinions apparent and allows mutual learning processes	Pelling 2007, Bankoff et al. 2004
Possible limitations and challenges	
Up-scaling is a challenge as results are dependent on the definition context and therefore, making comparison and aggregation across locations difficult	Pelling 2007, Fekete et al. 2009

Source: Kuhlicke et al. 2011

Recommendations

- The most vulnerable members of the community should be identified and this process of identification should be a participative process which involves members of the community and, preferably, the most vulnerable themselves.
- The identification of the most vulnerable as well as their needs should be taken into account in short term emergency management as well as long term strategic management.
- Funds and other types of support should be made available for the most vulnerable in order to better prepare for, cope with and recover from the negative impacts of natural hazards.
- Education and skills development also need to be made available to all actors in order to better prepare for, cope with and recover from the negative impacts of natural hazards.

Principle 2: Making information available

Background

One of the major lessons learned throughout CapHaz-Net's focus on regional practices and experiences was that in many regions and localities across Europe a substantive amount of information and first-hand experience exists, be it in the form of narratives, leaflets or maps on the likely impacts of hazards or concrete practices of how to mitigate them. At the same time, this information and knowledge is all too often not shared both among and between different authorities and organisations operating in the field of hazards management as well as between authorities and the public. In the Regional Hazard Workshops both institutional fragmentation and a lack of transparency of decision-making became obvious (Bianchizza et al. 2011, Supramaniam et al. 2011, Begg et al. 2011). However, in order to be able to make informed and effective decisions, the availability of reliable and relevant information is of central importance.

What does it mean for social capacity building?

Making information available first of all relies on one-way communication with (almost) no feedback mechanisms. Most prominently, this relates to notice boards, mailing lists, public meetings to inform residents or other actors and making documents and plans publicly accessible. Such communication measures and strategies may have many different purposes such as raising awareness, encouraging protective behaviour, or warning residents at risk. Such approaches have in common that they are mostly developed and implemented by a responsible public organisation.

Information can be shared with regard to the following aspects:

- *Hazards:* This includes, for example, the likelihood of their occurrence and their spatial extension. Equally relevant is information about historical events and the possible future likelihood of their occurrence.
- *Vulnerabilities:* This refers to the identification of exposed areas, groups and neighbourhoods with special needs, hotspots such as hospitals, kindergartens, schools, retirement homes etc.
- *Legislation, policies, plans, and laws:* This includes, among others, documents that define responsibilities, rights, and obligations of different actors. It needs to be clearly communicated which implications they have for authorities and citizens. This seems particularly relevant as shifts in governance are placing more and more responsibility for preparedness and mitigation in the hands of the community, whereas many community members are not aware of this newly emerging responsibility.
- *Measures and actions:* This includes, among others, information about concrete measures that help individuals to better prepare for hazards, or to better understand how to behave in case of an emergency.
- *Organisations and governance:* This includes knowledge about organisations involved in and charged with the responsibility of managing risks and what their roles are. Moreover it includes knowledge about contact points, networks and key persons as well as about the process of risk management in general.
- *Warnings:* This relates to information regarding weather forecasts and announcing and disseminating information in relation to possible or impending danger.

Ideally, information provision and sharing can and should go through different modes, channels, and tools and is guided by the purposes and functions of the communication effort. Communication occurs in written (e.g. newspaper, letter, report, internet), oral (e.g. lecture, storytelling, conversation) and non-verbal/visual modes (e.g. gestures, body language, sign language, facial expression, images, movies etc.; Table 6).

Table 6: Characteristics, channels and tools of information provision

Description	Channels and tools
Information provision as a type of one-way communication is characterised by at-a-distance/indirect communication of information with no feedback mechanism	Leaflets, brochures, information packs, video, newsletters Reports, documents, protocols Exhibitions/displays (non-staffed) Advertising Media (TV, radio, newspapers) Internet (information provision)

Source: Höppner et al. 2010

In the research literature information provision as a means of risk communication is seen relatively critically but particularly in immediate crisis situations and under financial constraints it might be a cost-efficient as well as effective communication technique (Table 7).

Table 7: Strengths, possible limitations and challenges of information-providing communication tools

Strengths	
Cost-effective and low transaction costs	Lundgren and McMakin 2009
May be a necessary and quite efficient way of warning actors about an immediate possible crisis in order to stimulate a prescribed behaviour	Gutteling and Wiegman 1996, Lundgren and MacMakin 2009
Possible limitations and challenges	
Seems to have a positive effect on awareness, but hardly any effect on behaviour, learning and active engagement	Moser 2010
Cannot overcome the expert/lay dichotomy and hence the view that risk communication is mostly about information transfer	Plough and Krimsky 1987, Morgan et al. 2001
How to bring together the instrumental side of risk communication with normative (e.g. the right to be involved on the grounds of democratic emancipation) and substantive rationales (contribute values, perspective and values)?	Lundren and MacMakin 2009

Source: Kuhlicke et al. 2011

Box 4 provides an example of a communication practice which involves communication from a local authority to the community.

Box 4: Action plan to prevent the effects of a heat wave on health (POCS), Catalonia/Spain

Type of hazards and the risks involved: Heat waves.

Position in the risk cycle and measures: Prevention, preparation, implementation of non-structural measures and warning.

Purposes/functions/content of communication/specific challenges/difficulties: Raising awareness, informing on how to behave before and during a heat wave; improving coordination between 18 responsible organisations.

Actors in communication: Regional to local authorities (Civil Defence to municipalities: CD has elaborated a tool to elaborate local census for heat waves, including vulnerability mapping and an inventory of climatised facilities); regional and local authorities to the public.

Communication tools, channels and time dimension of communication: Leaflets (covering precautions, symptoms and mitigation measures) for general public, hospitals, nursing homes, municipalities; hotlines; media alerts.

Appraisal of good aspects of practice: The administration uses different communication channels and tools particularly to address age groups differently vulnerable to the negative impacts of a heat wave. Specific behaviour advice is given. Season-adapted communication messages (different in summer times). Regular evaluation and improvements since 2003.

Appraisal of poor aspects of practice: Top-down approach only. Might cause complacency among communicating agencies.

Contribution to social capacity building: Potentially builds knowledge and raises motivation to deal with heat waves; contributes to network capacities by triggering cooperation of different organisations at the regional level as well as between regional and local levels (Catalan health care system, the Meteorological Service of Catalonia and the General Directorate for Civil Defence).

Institutional setting: The action plan responds to the recommendations that the Spanish Ministry of Health Care and Consumption provided to the different Autonomous Communities after the summer of 2003.

Source: Höppner et al. 2010, Supramaniam et al. 2011

Why is it relevant?

Information provision as a type of risk communication is a major topic of international policy documents:

- Its relevance is underlined by the Hyogo Framework for Action 2005-2015 as governmental organisations should "provide easily understandable information and disaster risk reduction and protection options, especially to citizens in high risk areas, encourage and enable people to take action to reduce risks and build resilience" (UNISDR 2005, 9). Yet, this dimension should not only relate to providing easily accessible information about natural hazards, it should also include the task of providing information about legal and regulatory systems.
- The European White Paper on Governance 2001 demands for transparency in decision-making processes (EC 2001).
- Article 10 of the European Floods Directive states: "In accordance with applicable community legislation, Member States shall make available to the public the preliminary flood risk assessment, the flood hazard maps, the flood risk maps and the flood risk management plans". (EC 2007)
- Warning plays a vital role in reducing the impacts of natural hazards (e.g. European Flood Alert System/EFAS).

Making information available in order to improve knowledge and motivation capacities is, above all, a central task at different levels of government authorities (for an example see Box 5).

Box 5: National information system on disaster risk reduction, Administration for Civil Protection and Disaster Relief of the Republic of Slovenia

Type of hazards and the risks involved: Particularly earthquakes but also flash floods, avalanches, lightening.

Position in the risk cycle and measures: Prevention, implementation of non-structural measures and warning.

Purposes/functions/content of communication/specific challenges/difficulties: Raising awareness, informing on how to behave before, during and after hazard events.

Actors in communication: National administration to the public.

Communication tools, channels and time dimension of communication: Website, leaflets and brochures to inform about hazards and on the measures that should be taken before, during and after a hazard event. Noteworthy is also the 'Psychological First Aid' leaflet. Procedures and behaviour advice are published on the homepage. The public is notified by articles in printed media and radio broadcasting. Educational activities are also organized for children. Warnings are published via teletext and a poster with graphics showing warning signals and directions is displayed in all multi-residential, public and business buildings. Urgent announcements are disseminated through national and local TV and radio stations. Educational spots for TV broadcasting are in preparation.

Appraisal of good and/or poor aspects of practice: The administration uses different communication channels and tools. Specific behaviour advice is given and attention is paid to the adverse psychological effects of events.

Contribution to social capacity building: Potentially raises awareness and builds knowledge on how to behave before, during and after an event.

Institutional setting: The administration prepares the material that is used at the national and local level. It is responsible for all kinds of hazards. Natural hazards and particularly earthquakes seem to have a high profile.

General reflection: To our knowledge, the communication has not been evaluated with respect to its purposes and social capacity building. The description is based on a MONITOR project report (MONITOR 2008).

Sources: adapted from Höppner et al. 2010; www.sos112.si/eng/index.php

Recommendations

- ⟶ Information about hazards, risks and vulnerabilities should be made easily accessible and presented in a manner that is understandable to non-specialists.
- ⟶ Information about responsibilities, rights and obligations of different actors should be clearly communicated with a focus on the implications they have for authorities and communities at risk.
- ⟶ Information about outcomes of decision-making processes should be transparent and clearly communicated to local (and other) communities.
- ⟶ Information from different sources on the same issue (e.g. warning or recommendations what to do in emergency case) should be consistent and congruent.
- ⟶ Information should be presented in a holistic manner; taking into account other risks and issues that affect everyday life quality (e.g. climate change, health, wealth, etc.)
- ⟶ New ways of making information available to reach the population at large should be explored, tested and applied without losing sight of traditional modes of information provision.
- ⟶ Information should be shared among organisations working at different levels (e.g. national, regional and local).
- ⟶ Research results should be made easily accessible in different languages and should be presented in a manner that is understandable to practitioners.

Principle 3: Being participatory and inclusive

Background

One of the major lessons learned throughout the CapHaz-Net project was the relevance of being participatory and inclusive in the context of managing natural hazards. Participation and involvement were found to be at the heart of any effort to develop and improve social capacities to prepare for, cope with and recover from the negative impacts of natural hazards.

The need for more effective participatory processes has also become a significant theme in the scientific discussion on natural hazards. For example, an influential statement of key principles of sustainable hazard mitigation (Mileti 1999) includes the importance of participatory processes and the involvement of more than those with scientific or technical expertise (see also Principles 4 and 6). Schneider (2002) stresses the need to integrate emergency management into processes of community planning and development and argues for the need to see disasters as “community-based problems requiring community-based solutions” (ibid., 143). Pearce (2003) similarly stresses the importance of public participation within a framework of community planning that integrates closely with disaster management. For Tompkins et al. (2008) ‘good governance’ of disasters is related to stakeholder participation in decision-making, democratic access to knowledge and transparency and accountability in relation to policy decisions.

The Regional Hazard Workshops (Bianchizza et al. 2011, Supramaniam et al. 2011, Begg et al. 2011) and an inventory of 60 risk communication practices in Europe (Höppner et al. 2010) revealed that in many regions across Europe, participation is already taking place at various levels and with respect to different aims. However, to make participation both effective and credible, its design, intention and aims need to be clearly defined and ideally with in a participatory approach.

What does it mean for social capacity building?

Participation is a rich and diversely understood concept. The Oxford English Dictionary defines participation as "to have a share in" or "to take part in," thereby emphasising the rights of individuals and the choices that they make in order to participate (cited in Mathbor 2008, 8). However, there exist a wide range of different types of participation. There is plenty of literature on participation and it is generally understood as a desirable situation to aim for and achieve. For example, Arnstein (1969) compares the idea of citizen participation to eating spinach: "no one is against it in principle because it is good for you" (ibid., 216).

Generally, participation is based on two-way communication modes (Höppner et al. 2010). More specifically, CapHaz-Net proposes to distinguish three degrees of participation (Begg et al. 2011; based upon Arbter et al. 2007): consultation, decision-influencing (co-deciding) and inter-organisational exchange. While the first two categories focus on different intensities of interaction between decision-makers and the interested parties at risk, the third category relates exclusively to interactions between different authorities:

→ *Consultation* is a form of two-way communication which actively seeks information from or discussions with different actors through dialogue (Box 6). It aims at receiving some kind of feedback, for instance, that previously provided information is understood and adapted. It also intends to allow different actors to express their opinions and views on a planned project. Examples of this participant strategy are public meetings with discussions, opinion surveys, citizen panels, or a request for comments (Arbter et al. 2007). However, decision-makers may or may not take the feedback of the interested parties into account.

Box 6: Austrian Water Act: multi-stage and early and effective public consultation

The Austrian Water Act (WRG) can be seen as a positive example of early and effective public consultation. There is a six-month period to make comments though this timeframe comes from the European Water Framework Directive (2000/60/EC; EC 2000). Plans shall be published on several websites and announced through major newspapers. Modifications and updates of plans are covered as it is clear that all options are open when public participation takes place. Notably, the act foresees that the public can submit comments to the documents that formed the plan and not only to the draft plan itself. Thus the plan is only compiled once this process has taken place.

Source: Justice and Environment (2008)

→ *Co-deciding* aims at creating open and mutual exchange while allowing the identification of different or similar opinions, worldviews and values among and between different actors; on the other hand, it also aims at the participants actively influencing the final decision-making process. Examples are study-groups, round tables, citizen juries, mediation procedures etc. (Box 7; see also Arbter et al. 2007, Kenyon et al. 2001).

Box 7: Co-deciding: Spree Forest watercourse margin project in Brandenburg, Germany (2001–2013)

Type of hazards: Droughts, water shortages due to the reduction of water flow under conditions of dam operations and climate change especially in summer. Occasional man made flooding as a prevention measure.

Position in the risk cycle and measures: Prevention, implementation of non-structural measures. Conservation and restoration of natural and near-natural components, particularly by stabilising the water regime.

Purposes/functions of communication, content of communication and specific challenges/difficulties: Transmission of ideas of nature conservation in accordance with constraints of water management and water structures.

Target groups: Voluntary nature conservation groups, farmers, representatives of the travel industry, fishermen, hunters, land owners and water authorities.

Actors in communication: Project office of the Zweckverband Gewässerrandstreifenprojekt Spreewald, a special purpose association (founded by a group of regional administrative districts), interdisciplinary moderation team, representatives of all target groups.

Communication tools, channels and time dimension of communication: Phase 1 (setting of a Maintenance and Development Plan by a regional participation process, 2001–2003) was accompanied by a moderation procedure which included situation and conflict analyses, interviews with representatives of interest groups, agreement on rules of cooperation. Included information events, exhibition, development of a project logo, contact with media; working groups for information exchange and discussion, moderated plenary (43 meetings with 1,600 participants). Phase 2 (presentation, examination and implementation of the plan 2004–2013) is accompanied by working groups, a moderation plenary, public relations work and a homepage.

Appraisal of good and/or poor aspects of the practice: Several hundred people from the Biosphere Reserve administration, regional offices, associations and organisations and the concerned land users have worked together on the large conservation project. Without the intensive cooperation in the strategy group, the organisational support of the employees in the project office and the commitment of the Spree Forest population, the moderation procedure to support the Maintenance and Development Plan would not have been feasible.

Contribution to social capacity building: Distributes and exchanges expert knowledge to the public. Information events bring interesting and important themes like climate change, biodiversity or water management to inhabitants of the region. The residents

Institutional setting: This large scale conservation project is the first in Germany, which is composed of two phases mentioned above. Further large-scale conservation projects of the German Federal Agency for Nature Conservation (BfN) are structured in this way.

General reflection: The project is a rare good practice example of two-way communication in the field of natural hazards: The exchange of information between experts and the concerned public – and even more the chance to take part in decisions about the measures adopted in the region – has led to a better understanding of the interests of the different stakeholder groups and also of the implications of climate change. To have a direct contact to a contact person and to experts has led to a behavioural change among the people involved in the project: they now support the regional preventive measures against droughts and for nature conservation.

Source: GRPS (n.d.)

→ *Inter-organisational exchange* aims at coordinating actors from different organisations or sectoral decision-making structures to be aware of each other's programmes and initiatives and not to duplicate efforts or to interfere (Holg 2002; see also Box 8).

Box 8: Inter-organisational exchange: Trans-boundary river management

Trans-boundary river management is important in regards to supporting the catchment approach demanded by the Water Framework Directive. In the Elbe River catchment, at the level of international law, the Agreement on the International Commission for the Protection of the Elbe River (ICPER) (since 2007 also coordinating the implementation of the European Floods Directive), and a number of other bilateral agreements and treaties between Germany and the Czech Republic, such as the treaty between the Czech Republic and the Federal Republic of Germany on Cooperation on Transboundary Waters, as well as the Neighbourhood Agreement, the Environmental Protection Agreement and the Frontier Waters Agreement are of relevance.

The ICPER maintains a network of international monitoring stations. The Action Plan for the Flood Protection in the Elbe River Basin was prepared within the ICPER framework and was based on Mapping of the Existing Level of Flood Protection in the Elbe River Basin of January 31, 2001, and on the evaluation of September 2001. The Action Plan plays an important role in connection with a transnational approach of coordinated flood protection measures. Although it does not constitute a legal instrument, it represents a binding political commitment. The Action Plan entails the following measures:

- Measures for increasing water retention capacity in the drainage basin, including water bodies and polders;
- Precaution measures in flood prone areas: their delineation, declaration and proper utilisation;
- Technical flood protection measures; and
- Non-structural flood protection measures: flood warning, information and education.

Source: Krysanová et al. 2009

Participation can furthermore take place on different levels: policies and legislation, plans and programmes, and projects which all comprise of structural and non-structural measures (distinction based on Arbter et al. 2007):

→ *Policies and legislation* describe an overarching level where goals and general directions of development are defined. These policies and legislation include long-term strategic decisions made on the levels of parliaments, governments or high-level administrative bodies. They are usually expressed in a rather abstract way and outline the general framework for risk management. Examples of this level are the European Floods Directive and Water and Planning Acts.

→ *Plans and programmes* include specific measures and instruments, which aim to reach a given goal (Arbter et al. 2007). An example of this level is the "Action Plan for Flood Protection in the Elbe River Basin" by the International Commission for the Protection of the Elbe River (ICPER 2008; Box 8) or the Action Plan to prevent the effects of a heat wave on health (POCS; Box 4).

→ At the *project level* specific measures are planned, described in detail and implemented (Arbter et al. 2007, EIB 2007). For example, a flood protection wall may be constructed in a specific community or a local warning system may be installed. Such measures in flood risk management are defined and distinguished as structural or non-structural measures.

The active involvement of interested parties, when undertaken, relates to the development of projects, plans/programs and policies/legislation and thus neither to the assessment of hazards, risks and vulnerabilities nor to their mapping. To involve members of the public during the assessment and mapping phase potentially moves the consultation and active involvement of actors further 'upstream' where both the problems are defined (e.g. what is at risk?) and the pathways for reaching the final outcomes are predetermined. Table 8 summarises main strengths, limitations and challenges of participatory approaches.

Table 8: Strengths, possible limitations and challenges of participatory approaches in natural hazard management

Strengths	
Seems to have positive influence on risk perception, behaviour, engagement and social and mutual learning.	Moser 2010, Mosert et al. 2008, Stanghellini and Collentine 2008, Slinger et al. 2007 Lundgren and McMakin 2009
Acknowledges the relevance of underlying values and norms and aims at gradually eliciting and exchanging these values.	Kasperson et al. 1992; Bouwen and Taillieu 2004; Joseph et al. 2008, Earle and Cvetkovich 1995,
Increases trust in governing organisations and improves relationships and achieves wider acceptance of measures and hence reduce conflicts and improves mutual understanding.	Kolkman et al. 2005, 2007, Arnstein 1969
Possible limitations and challenges	
Practicability, given time and financial constraints in management practice.	Lundgren and McMakin 2009, Arnstein 1969 Junker et al. 2007
Limited interest of the wider public to be discursively involved in flood management	

Source: Kuhlicke et al. 2011

Why is it relevant?

For about two decades now, there is a continuous and – with respect to natural hazards – even increasing emphasis on participation in national, European and international policies (cf. also Höppner et al. 2010).

- The Agenda 21 of the 1992 Rio Conference on Environment and Development recommends that the broadest possible participation should be encouraged. It advocates a 'community-driven' approach in its Principle 10 demanding that "environmental issues are best handled with participation of all concerned citizens, at the relevant level" (UNDP 1992).
- The European Floods Directive encourages in its Article 10 that Member States shall actively involve "interested parties in the production, review and updating of the flood risk management plans" (EC 2007).
- The Aarhus Convention 2001 asks for access to environmental information and public participation in decision-making (EC, 2012).

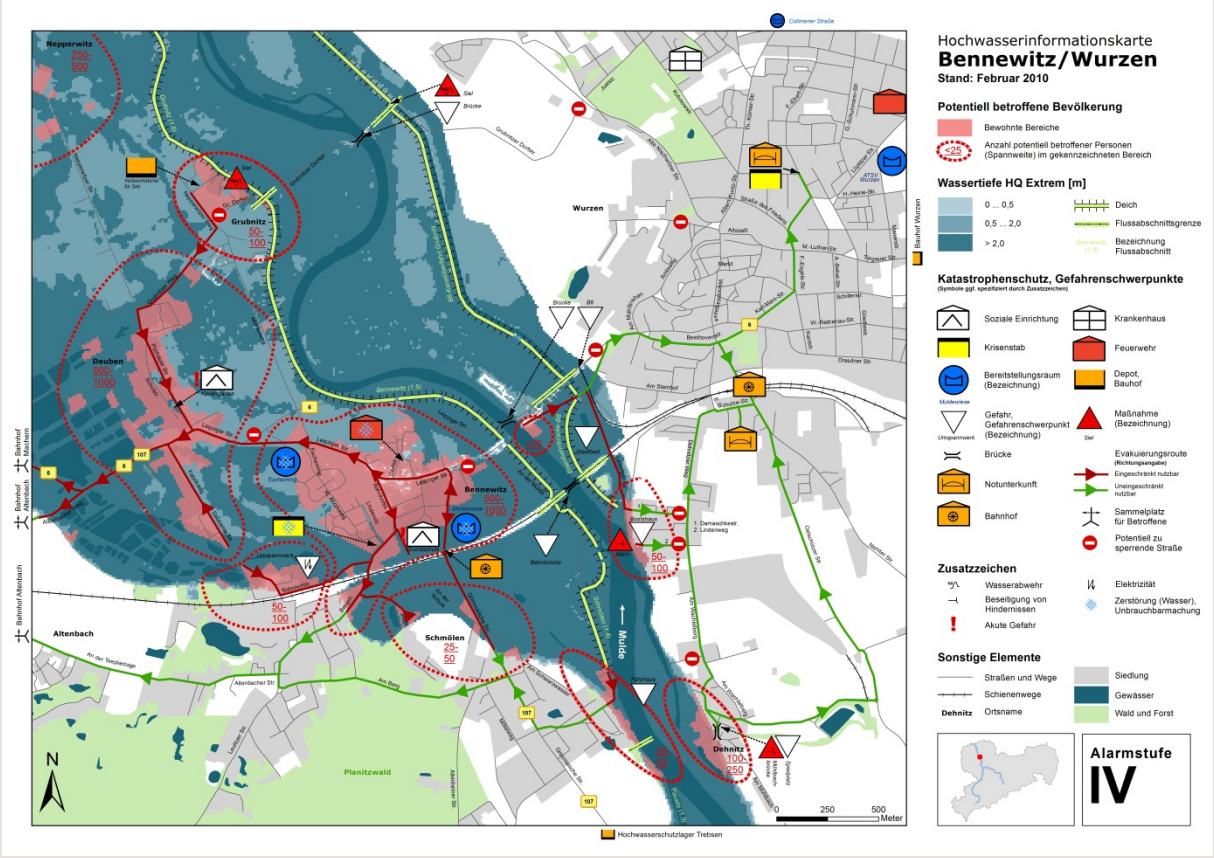
Apart from the mentioned polices and regulatory frameworks there are also instrumental and substantial reasons (Fiorino 1989, Stirling 2004) why participation and inclusion are relevant.

- There are *instrumental rationales* for participatory assessment, mapping and decision-making approaches as they may contribute to building trust between actors from the public, administrative and scientific sphere but also to raising people's awareness and motiva-

tion for taking actions to mitigate the impacts of hazards (Stirling 2004, Correia et al. 1998, Laurian and Shaw 2008). This is at least implied by findings of risk perception and risk communication studies (Stanghellini and Collentine 2008, Slinger et al. 2007). Wachinger and Renn (2010) therefore underline that "research indicates that people become more aware of floods and are more motivated to initiate protective action if they are involved in a participatory exercise. This seems mainly due to a shift towards greater trust in authorities and the experts" (ibid., 46; see also Moser 2010, Mosert et al. 2008). Furthermore, a project funded by Defra found that it is "encouraging that a community that has been involved in a genuine participatory exercise (either through facilitated historic and/or scientific projects) or a community that has been involved in management decision-making will have already begun to 'own' its flood risk environment and will have developed a sense of trust towards the facilitators" (Speller 2005, 5). There is an increasing body of literature suggesting that two-way, participatory communication may be more suitable for reaching the goal of improving social capacities with respect to coping and adaptation (Burningham et al 2008, Hagemeier-Klose and Wagner 2009, Fuchs et al. 2009, Klinke 2009).

Box 9: Enhancing flood maps by considering the needs of different actors (RISK MAP)

The RISK MAP project is an example of how decision-makers, map producers and map users (strategic planners, emergency managers, affected and interested public) were involved in risk analysis, namely the enhancement of flood maps in terms of content and visualisation. The substantive rationale was to increase the breadth and depth of knowledge that contributes to a decision. Multiple hazard parameters, risk criteria and symbologies (the effectiveness of the symbols used) were tested and maps improved accordingly, i.e. to the needs of the three main user groups (strategic planners, emergency manager, population at risk). By doing so, maps could be used more effectively and support public participation, both during their creation and as a tool. Approaching mapping in this way and including local knowledge in addition to sophisticated model results can help develop motivation, improve knowledge, raise awareness, increase the acceptance of measures and strengthen trust in authorities and other actors.



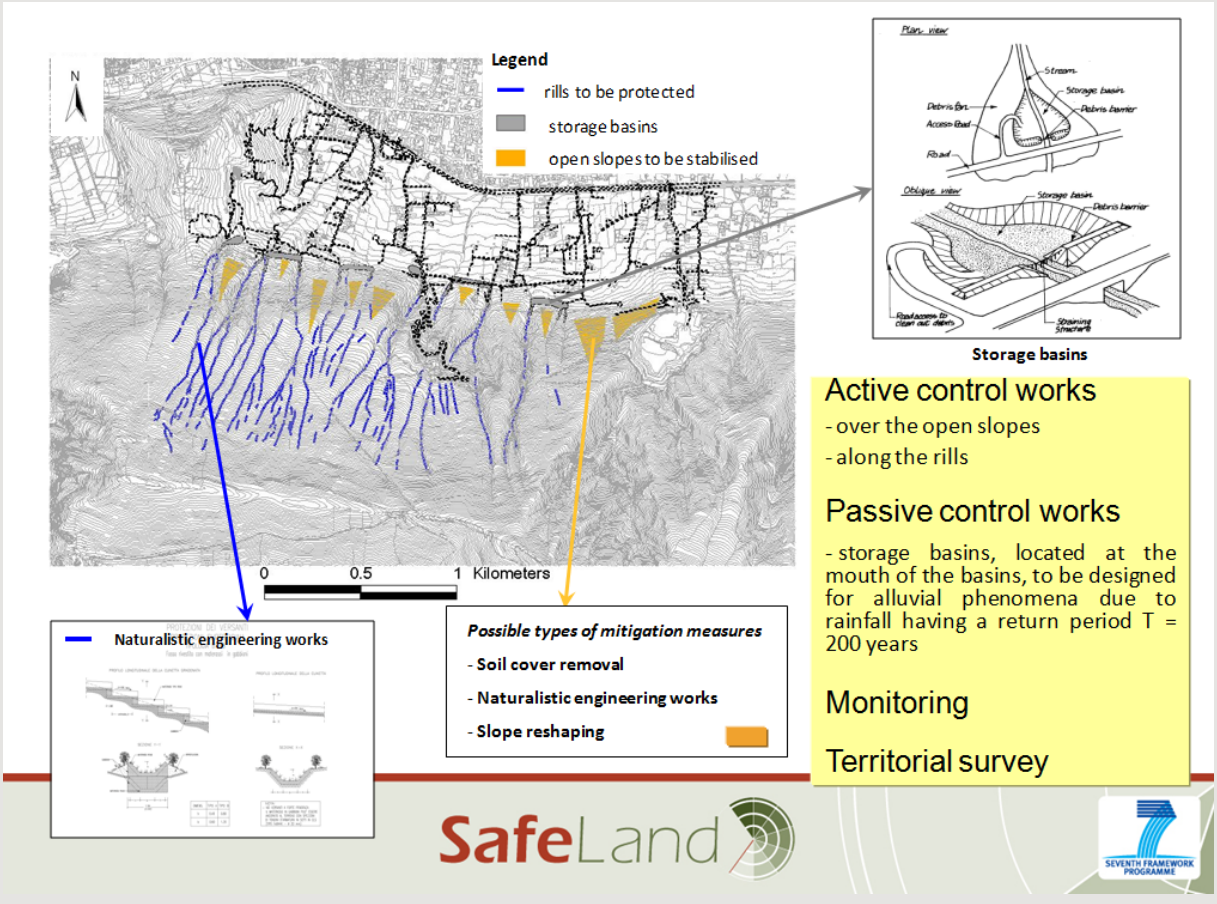
Source: adapted from Meyer et al. 2012

→ There are also *substantive rationales* for using participatory approaches. These rationales relate mostly to the increase of the breadth and depth of knowledge that contributes to a decision-making process, as participation allows for the inclusion of tacit or local knowledge that can improve the quality of an assessment and mapping results (Stirling 2004, Correia et al. 1998). The CapHaz-Net workshops revealed that many residents and members of local organisations have personal experience of natural hazard related events and hence have a good understanding of their local area. The works of Correia et al. (1998) and Leone and Lesales (2009) show that local knowledge can be incorporated into modelled maps to produce an improved product. Their research has shown that, in some cases, the public was correct to doubt or query the accuracy of map data, providing exam-

ples where the public contested map contents and that this has provided enhanced knowledge for experts and cartographers. From this perspective, participation has been shown to improve the quality of maps (Haynes et al. 2007, Klinke 2009, Correia et al. 1998; see Boxes 9 and 10).

Box 10: A participatory process on landslide risk mitigation

A participatory process for selecting risk mitigation measures was tested in Nocera Inferiore, southern Italy (SafeLand project, FP7). Local stakeholders were involved through a number of meetings discussing various options for landslide risk reduction. The mitigation packages were prepared on the basis of extensive fieldwork, including semi-structured interviews and a public survey, aimed at better understanding local views and perspectives. Each package included a different mix of structural and non-structural mitigation measures, including relocation. On the basis of the results of the working groups, a compromise solution for risk mitigation was presented and discussed with the participants. The participants reached a unanimous consensus on fundamental priorities, i.e. the improvement of the warning system, the implementation of an integrated system of monitoring and territorial survey and the stabilisation of the open slopes with naturalistic engineering works. Much more debate was devoted to the relocation of residents from the most at risk areas and/or the need to build passive structural works, especially on private properties. Notwithstanding the difficulties in reaching a shared "compromise solution" for risk mitigation, the results demonstrate the value of citizen participation in landslide risk mitigation decisions and highlight the role that participation can play in risk management more generally.



Source: http://www.safeland-fp7.eu

Recommendations

Participation and involvement of different actors affected by risk management were found to be at the heart of social capacity building in the field of natural hazards. Today, the emphasis on the importance of participation has made its way into frameworks and policies. However, the void between policy and practice still exists. In other words, although participation is seen to be an important part of social capacity building also in the field of natural hazards, the issues surrounding who to involve, at what stage of the decision-making process and with what resources, continuously create challenges for decision-makers as well as communities.

- ⟶ Efforts should be made and resources utilised to identify and engage with the community in order to raise awareness of the opportunity for participation in the decision-making process as well as what impact participation can have and how to get involved.
- ⟶ Local expertise and knowledge should be considered in the assessment of risks and vulnerabilities as well as in decision-making processes on policies, plans and specific measures. It is beneficial to include not only local knowledge but also different types of knowledge, thus involving experts from different disciplines throughout a process.
- ⟶ Not all actors can or should be involved at every level. It is important to identify which actors should be involved and when, at what stage of the decision-making processes they should be involved and to what end.
- ⟶ It is important that any attempts at participation have a clear objective which is communicated from the outset. It is important that community members are informed from the beginning of the influence that they can have on the decision-making process. Otherwise, a lack of clearly communicating the intended objective can have negative consequences for the participation process itself as well as its outcomes (Twigger-Ross et al. 2011).
- ⟶ In order to ensure that all interests are taken into consideration during a participatory process, it is important that the process of assigning trade-offs between each of the options needs to be open to public input and new forms of decision-making.
- ⟶ A participatory process should enable and facilitate not only a learning process but also network building to leave a heritage for the participants and the community. Moreover participation should be an effective tool for sharing responsibilities among decision-makers and citizens and for providing justifications for risk management decisions.
- ⟶ Participation is not restricted to communication with the public. Rather it also takes place as cooperation between different organisations (horizontal) and within one organisation (vertical). While for some hazards (again triggered by EC directives, such as the Water Framework Directive and the European Floods Directive; EC 2000 and 2007) vertical, inter-organisational, and partly even transboundary cooperation has gathered momentum in recent years, from other hazards a strong institutional fragmentation is reported (e.g. heat-related hazards; Supramaniam et al. 2011). In such a case, it is important that the roles and responsibilities of different organisations working on the management of the same hazards are clear and that there is communication between them.

Principle 4: Building networks

Background

This principle builds upon the previous one by highlighting that it is not only relevant to be participatory and inclusive during the assessment and decision-making, but also to establish and de-

velop networks and to build trust. This ensures that these networks operate to their best potential and over a long period of time. This finding was one of the major lessons learned throughout the CapHaz-Net project. Social networks are not only relevant for interactions between and among organisations but also between organisations and communities at risk. Communication, for instance, occurs between individuals, groups, private and public institutions, in small or mass communication settings, face-to-face or mediated by technical devices. Communication may take place within and across local, regional, national or international levels. Involved actors can be regarded as nodes in communication chains or networks between which information and other resources flow in one or many directions. The strength, stability, frequency and direction of the information flow and the centrality of the actors are the defining characteristics of such networks (cf. also Höppner et al. 2010, 12). In regards to natural hazards, particularly, besides specialised risk organisations volunteer civil protection networks are of critical importance. Volunteer corps' have a long history and tradition in many parts of Europe. In many cases they have the characteristics of an institutionalised network for hazards with specialised emergency management. They represent a major link between the professional organisations and local communities. In places where such historical networks are missing it can be attempted to establish them by creating new networks (e.g. resilience fora in the UK).

What does it mean for social capacity building?

CapHaz-Net's understanding of network capacities (see Section 3.1) implies the ability to establish and stabilise trustful relationships among and between different organisational and individual actors at different scales.

Social networks form an important nexus between the individual and social structures (Burt and Minor 1983). In the context of natural hazards they are important sources for information, material compensation, emotional support, motivation and physical help. They are, thus, transmitters of different social capacities and also enable interactions between members of local communities and representatives of risk management organisations. But there are contradictory hypotheses concerning the actual role of social networks in different situations. There is, first of all, the 'strength-of-weak-ties' hypothesis (Granovetter 1973, 1983) which holds that heterogeneous social networks – resting in various social and local contexts – have more diverse information about a certain topic than a close network consisting of persons who are similar in various socio-economic and socio-demographic dimensions. With respect to coping with the negative impacts of natural hazards, a variety of information channels (hence: networks of weak ties) might help an endangered person to assess a hazardous situation more appropriately than a network built upon strong ties; the coping behaviour might then be more successful. But, secondly, one can also reflect upon the 'strength of strong ties' meaning that dense networks of people that are based on long-term interactions and trust can be easily used as a resource in a stressful situation. Frequently interacting (i.e. closely connected) people are more likely to share similar information, attitudes and beliefs (see also Scherer and Cho 2003).

Flood-related research in Germany (Steinführer and Kuhlicke 2007) found that informal social networks of friends, relatives and neighbours are indeed the most important source of help in the phase of emergency, recovery and reconstruction comprising physical, emotional and financial support. In the preparation and warning phase, people rely on different networks in order to receive, refine and validate uncertain or unexpected information. In this respect, interactions with specialised emergency organisations proved to be even more trustworthy in the immediate

hazardous situation than informal ties with co-residents. With these organisations having left the affected areas, people once again successfully activated their social networks in the local community and beyond and received a variety of material, physical and mental support which often preceded the material compensations provided by public authorities. The analysis found evidence for both the strong and the weak ties hypothesis. Social networks restricted to the local community and its surroundings, for example, tended to provide no valuable (surplus) information in the preparation and warning phase since basically all residents of the affected location relied on the structurally same sources of information. Hence, exclusively local networks did not function effectively. Strong social networks exclusively located outside the region, on the other hand, made these residents more vulnerable to a lack of help mainly in the recovery phase (ibid.).

Box 11: Education and training courses for avalanche safety services and the idea of 'local natural hazard advisors' in Switzerland

The event analysis of the avalanche winter 1999 indicated that especially communities, which are not regularly faced with critical avalanche situations, had deficiencies in dealing with the extraordinary avalanche situation. Therefore, within the project "Intercantonal Early Warning and Crisis Information System IFKIS", a concept for education and training was developed and established in the following years. Since 2000 two or three courses took place every winter either in German, French or Italian. In total, 1,000 participants from all regions of the Swiss Alps attended these courses between 2000 and 2011. Education and training is performed at two levels: At level A, participants are educated in several modules in observing the snow and avalanche situation and in combining all available information and data in order to make safety decision in settlements, for traffic routes and for infrastructure facilities (e.g. power plants). At level B, decision-makers are educated in making and organising safety measures (e.g. closures, artificial avalanche release). For each level, repetition courses are offered every two years (Bründl et al. 2004). These courses have enabled communities to better deal with critical avalanche situations as experiences from past winters have shown.

The experiences with the IFKIS courses and the insights gained from analyses of past flood events in Switzerland were the starting point for the idea to establish local natural hazard advisors also for other natural hazards than avalanches. There is evidence that for successful mitigation and coping behaviour "the on-site availability of all kinds of expert knowledge" is required (PLANAT 2012). The project wants to particularly strengthen local knowledge in communities at risk. Local natural hazard advisors will be qualified by the Federal Office for the Environment (BAFU) which will provide financial support, the content and an expert pool. The training is thought as a 'teach the teachers'-model: 'natural hazard trainers' are trained by the BAFU at cantonal level. They then prepare the advisors in the municipalities, communes and regions. The advisors will become part of the local and regional task forces. In case of emergency, they shall provide official information and connect it with on-site observations and local experience. They shall furthermore support the elaboration of contingency plans (Schmid 2011).

From the perspective of **social capacity building**, local avalanche safety services and natural hazard advisors are transmitters of knowledge about (local) hazards. They shall build motivation to engage in risk management and establish relationships across organizations at local and regional scale (ibid.).

As potential advisors the BAFU considers especially persons with already strong links to civil protection, such as policemen and policewomen, fire fighters, health-care professionals but also forest rangers with a sound knowledge of the territory (PLANAT 2012).

Sources: Bründl et al. 2004; Schmid 2011; PLANAT 2012 (http://www.planat.ch/en/authorities/prevention/; accessed 29 May 2012)

The CapHaz-Net project found that in regards to the preparation phase of hazard management, local mediators emerged as important go-betweens between local communities and risk management experts and responsible bodies. In Italy, Austria and Slovenia the volunteers of civil protection and fire fighting (described in more detail in the next section) can be regarded as local mediators due to their manifold local social networks. In other contexts, such figures have been created on purpose by risk management organisations (such as the 'local champions' in the UK) or are about to be established. Box 11 describes the idea of 'local natural hazard advisors' currently prepared by the Federal Office for the Environment (BAFU) in Switzerland, while Box 12 describes a project which aims at developing the skills of actors at the local level in order to become more resilient through strengthening early warning systems.

Box 12: OWARNA – Optimisation of early Warning and AleRting for Natural hAzards

Another experience in this field was gained during the project OWARNA: Optimisation of early warning and alerting for natural hazards. This project was approved by the Swiss Federal Council in 2007 and runs until 2010.

This project implemented measures aimed at the improvement of preparedness and response, as the federal authorities are convinced that this is key to reduce damage from disastrous natural events and could contribute to such reduction up to a 20%. It was thus essential to ensure that the safety chain of warning-alerting functions well, from collection and transmission of data, to modelling and forecasting for the issuance of warnings and bulletins, to distribution of information that is correctly understood at local level, in order to implement correct responses.

The OWARNA project implied the implementation of measures such as business continuity management for federal offices, the improvement of forecasting models and the review of legal basis. It also aimed at the improvement of communication among different levels of operators and to the population, through web-based platforms.

Within the OWARNA project also the training for 'local natural hazard advisors' was implemented. The flood of 2005 showed that at local level there was a limited capacity to interpret the official information ad to turn it into actions. The creation of the natural hazard advisor aims precisely at filling this gap, by training local operators. These operators are part of regional task forces and thus are able to diffuse official warnings, combined with their own on-site observations and local experience. They role should also be to assist the council of local authorities in the elaboration of contingency plans. The federal offices train the cantonal trainers that in turn train the local (municipal) advisors.

Implications for social capacity building:

The Steering Committee contributes to the establishment of relationships cross national institutions from different 'sectors'; this in turn contributes to the strengthening of institutional capacities. The joint information platform for natural hazards helps to build on the knowledge about hazards and its diffusion; the same can be said of local advisors. Their training also enhances the motivation towards mitigation behaviours and helps establishing relationship across regional institutions.

Source: Bianchizza et al. 2011

Why is it relevant?

The scientific discussion on the relevance of social networks in the context of natural hazards and disaster is still emerging (Nakagawa and Shaw 2004). Neither social capital nor network theories appear to be of major importance in the research on natural hazards and disasters (Barton 1969, Hurlbert et al. 2000, Kirschenbaum 2004, De Marchi et al. 2007, Steinführer and Kuhlicke 2007). From the climate-change perspective, Pelling and High (2005) argue that "social

capital offers a lens through which to study the coevolution of social networks and norms in the production of adaptive capacity among collectives" and, thus, of learning and of social change (ibid., 308). Considering a variety of social capital approaches in their applicability for vulnerability research, Bohle (2005) particularly highlights those approaches "that seek to promote opportunities, those that facilitate empowerment, and those that enhance security" to be worthwhile in development research (ibid., 65). Generally, the interest in networks within social vulnerability studies represents a shift towards a concern for the relations between agents, which act to reduce or improve individual and collective capacity to anticipate, cope with and recover from the impact of a natural hazard. From this perspective, attention focuses on networks between individuals, social groups, organisations, authorities, according to their given and accepted roles and their ways of acting or operating. In this way, social vulnerability can be conceptualised in a more systemic way, rather than considering it as just the sum of properties or attributes of individuals.

In more practical terms, the relevance of networks is particularly obvious with regard to the aforementioned voluntary organisations. Such networks are prepared in case of emergency and also have a strong presence in the territory. They are the operative branches of civil protection (and fire fighter brigades, respectively) that intervene first when a disastrous event occurs. As already highlighted, they are also an important source of the networks at local and regional level. In Italy for example in 2010 the voluntary system included a total of 3,322 organisations with altogether 1,200,000 volunteers (i.e. almost 2% of the national population; Renzulli 2010). Germany, Slovenia, Austria have a strong tradition of volunteering among fire fighters, and also in Poland and Portugal more than 95% of all fire fighters are volunteers (Steinführer 2012). It becomes clear from these figures that voluntary organisations are one of the main pillars on which risk management organisations at least in some parts of Europe rests. There is also a professional component to these organisations that plays a crucial role for what concerns technical expertise and coordination of actions. Moreover Slovenia, northern Italy and the Austrian region of Carinthia have not only strong volunteering but also cooperative trans-alpine networks (Bianchizza et al. 2011).

These volunteers were highlighted as important local mediators between the residents and risk management organisations in the previous section due to their 'node' function and linkages to a range of single networks. However, in countries with a strong presence of volunteers, mediators of different nature are likely to be needed as well, in order to bridge the gap between the different domains of knowledge pertaining to the variety of actors involved in natural hazards management. Both volunteers and mediators represent the link between the organisational experts and authorities and the communities at risk. Moreover, the 'safety paradox' is applicable with respect to both voluntary and professionalised risk management organisations: the more efficient they are, the more local communities at risk but also other organisations rely on them.

Further networks particularly relevant for authorities and organisations in charge of risk management considered very relevant are the ones created within European projects. For instance, the 'River Basin Agenda' that the municipality of Vipiteno/Sterzing (Italy) benefited from a network created within INTERREG III B. International networks allow the exchange of experience and expertise and are deemed as valuable by the local authorities that thus strengthen trans-national cooperation.

Recommendations

- Communication should aim at building or strengthening formal and informal networks and reinforcing adaptive capacity, especially at the level of local communities. This means engaging in a continuous and dynamic process of establishing durable relationships among residents, interest groups, organisations, and institutions involved in risk mitigation and management (Steinführer et al. 2009). The importance of building long-term networks that increase motivation to act is a critical aspect of all three stages of a natural hazard (pre-event, during and post-event).
- People rely more on advice, opinions and behaviour from people that surround them in their daily lives. A promising way to get across messages and to encourage specific actions in the face of risk might thus be to team up with 'local champions' (e.g. key people strongly embedded in different local social networks and beyond).
- A communication strategy that enables dialogue between actors with different forms of knowledge and interests is needed. It involves stakeholders and people at risk in the pre-assessment of the risk and in the planning and decision-making on structural and non-structural measures through two-way communication (Höppner et al. 2010).
- Social networks can be employed for warnings and calls to action in communities at risk. Effective one-way communication but also two-way channels that allow for feedback and confirmation are required. Such communication should employ a mixture of formal communication and utilise local networks to disseminate warnings (Höppner et al. 2010).

Principle 5: Starting early

Background

Integration of natural hazards in school curricula or even earlier is often not taken into account as a means to build social capacities, both within the scientific discussion but also in more general strategic policies. This is a lost opportunity, as it might help to prepare the ground for more sustainable social capacity building in that it arouses interest, motivation, awareness and a basic knowledge of hazards, involved risks, and the kinds of information/action that is needed. When started at a young age, natural hazard education increases the chance of forming good individual practices and is hence an alternative and arguably more promising way to encourage the development of behaviours that prevent or mitigate risk rather than trying to change behaviours that are well established and have been practiced by an individual for a long time (Verplanken 2010). Formal risk education (at school) has a very strong focus on the development of further skills, such as the ability to/knowledge of how to learn, where to get information, how to use it and how to increase personal and collective safety (Komac et al. 2010).

What does it mean for social capacity building?

Risk education is understood as part of the wider sustainability and environmental education paradigm. It refers to the purposeful transfer of more generalised (thematic, organisational or technical) knowledge on hazards and risks from professionals in teaching institutions to usually (but not necessarily) younger persons within a formalised setting. Yet, stressing the idea of 'starting early' is not to say that adult education is meaningless. Risk-related learning is a lifelong process. But CapHaz-Net drew a (somewhat artificial) line between risk education and risk communication – first, because one can indeed define them in different ways when considering the process, power relations and the organisational context influencing them as well as its motivations

(Table 9), and secondly to particularly highlight that risk education for children and teenagers and its (long-term) effects is a highly neglected field of natural hazards research (Komac et al. 2010).

Table 9: Distinguishing risk communication from risk education along different dimensions

	Risk communication	Risk education
Process	One- or two-way information/know-ledge transfer in a certain risk situation / on purpose or not	More generalised knowledge and skills passed on to other persons / on purpose
Power relations	Two or more parties with (ideally) symmetric relationship	Two parties with asymmetric relationship
Organisational context	Low(er) degree of formalisation and institutionalisation / only general communication rules apply / specific roles emerge with the process	Formalised and institutionalised rules and roles / takes place within specialised organisations / group-specific
Motivation	Transfer of risk-related knowledge / ranges from short term (warning) to long-term (social capacity building)	Transfer of not only knowledge, but of worldviews and skills (learning to learn)

Source: Kuhlicke and Steinführer 2011

Like every education activity risk education includes learning different skills. Risk education is a crucial component of social capacity building and, as such, a life-long process which includes all age groups and goes well beyond mere dissemination of knowledge. It also includes capacity building on a motivational and procedural basis, as teaching always includes the notion of 'learning to learn'. To start with in this rather poorly developed research field, CapHaz-Net focused primarily on formal education (e.g. the curriculum and materials employed within this context). This can be justified, for instance, by the fact that children and teenagers are mostly not part of risk management exercises and formal participation processes. Yet, within compulsory institutional settings (what schools typically are) they can be easily addressed. However, risk education is by far not restricted to formalised schooling, but rather includes a wide range of arenas, tools, actors, and materials within the broad field of Education for Sustainability (EfS). Moreover, children are also regarded as major transmitters of risk-related knowledge to their parents and other people in their social network (Cardona 2004, Stoltman et al. 2004, Wisner 2006a). We should not neglect the role of 'teaching-the-teachers' as equally important for improving risk education at schools.

Risk education approaches can be distinguished in (a) curriculum based, standardised education and (b) participatory and locally embedded education. It is apparent from the previously outlined understanding of education that curricular based, standardised education is the rule and that in most cases only within an existing curriculum can participatory and locally embedded education tools be applied.

→ *Curriculum based and standardised education on natural hazards:* Such modes of education are based on a clearly defined and prescribed curricular specifying relevant stocks of knowledge to be transmitted within specific subjects, measurable steps, outcomes, and aims. They are embedded in the larger education systems (cf. also Wisner 2006a). Its overall conditions are constructed around the teacher as the central transmitter of knowledge and mostly rely on textbooks and ready-made material (Box 13).

Box 13: Optional primary school subject focusing on natural and other disasters, Slovenia

In 2009, an optional subject "Protection against natural and other disasters" was introduced in school education in Slovenia. The subject is offered in 7–9th classes of the primary school at the extent of 35 hours annually and it may be taught by teachers of subjects that are related to environmental studies. A pupil may attend the subject for one year.

The course content focuses on acquiring basic knowledge and skills regarding the occurrence of natural and other hazards in Slovenia, and on understanding the relationships between modern society and natural hazards. Pupils learn about influences of lifestyles and attitudes to the environment and their impact on natural hazards. References are made to natural and other risks in the local environment. Pupils are also told about the most common measures to prevent natural hazards and how to take action in case of disasters. The importance of volunteering with the focus on fire brigades is stressed. Pupils are encouraged to develop an active attitude to the environment and are stimulated to maintain a willingness to help others and possibly volunteer in natural hazards-related services.

The curriculum was prepared by the Administration for Civil Protection and Disaster Relief of the Republic of Slovenia which works in the framework of the Ministry of Defence. The curriculum was approved by the Ministry of Education. The curriculum is based on recommendations of the European Parliament and the Council on key competences for lifelong learning from December 2006.

Sources: Komac et al. 2010, Administration for Civil Protection and Disaster Relief of the Republic of Slovenia (http://www.urszr.si, http://www.sos112.si/eng/; accessed 15 April 2012), EC 2006

→ *Locally based forms of participatory learning focus on a specific locality, concrete events, environments and relations.* They are driven by the demand of the students and pupils to learn more about their immediate environment and its stressors. It includes other actors familiar with the concrete locality (e.g. NGOs, local fire brigade, local authorities, scientists etc.) and their specific expertise. Such learning stimulates engagement with the local environmental situation as well as with personal histories of relatives and the wider civil society (Kuhlicke et al. 2011). Participative learning is an effective way to provide information about natural hazards to people who do not have any previous and/or direct experience with such an event. Furthermore, by such an approach skills can be developed through dialogue (see Boxes 14–16).

Box 14: Memo-Risk, France

The Memo-Risk operates in the Loire River basins since 2004 and it brings together local councils and governments with residents and pupils. Students conduct surveys on local hazard situations and vulnerabilities under the supervision of the mayor and thus contribute to the overall awareness of the local population. The survey results become furthermore a vital data source concerning local particularities, patterns of vulnerability and awareness. The results are not only presented within school but also to the urban population, to politicians and other decision-makers. In this sense the project includes participatory elements of risk education with the aim of making the population more aware of hazards in their local environment.

Source: UNISDR 2010

Box 15: 'Experiencing' an earthquake in the Natural History Museum in Toulouse, France

Seismic activities and volcanoes are one thematic focus of the Natural History Museum in Toulouse in south-western France. By different visual, audible, textual and tactile means visitors can learn about natural hazards – the physical phenomena as well as about concrete events. One part of the exhibition is devoted to the 1967 earthquake in Arette (French Pyrenees). While watching a film from within a residential home – a man reading the newspaper, having some food (see photo) and, step by step, facing signs of an imminent earthquake of increasing intensity until most objects in his kitchen fell or broke – the visitor himself/herself is standing on a vibrating plaque and experiences (at least an idea of) the trembling earth.

Besides natural history museums, specialised disaster museums also exist. The best-known such institution was opened in Kobe in 2002. It encompasses a natural science museum, a research institute, and a training centre. In a two-year period it had 1.2 million visitors, 42% of whom were young people (Disaster reduction and 2010). Since then, a network of such museums has been established with participating institutions from Italy, Turkey, Armenia, India, Algeria, the US, Nepal, Bangladesh, China, Japan, and Papua New Guinea (Wisner 2006a, 24).

Sources: http://www.museum.toulouse.fr (accessed 25 May 2012); Komac et al. 2010; Disaster reduction and human renovation institution 2010; Wisner 2006a

Box 16: School initiatives with Civil Protection and Municipal Administrations – Attimis Primary school, Municipality of Faedis, Friuli Venezia Giulia Region

Name: Cresciamo sicuri (Growing up safely)

Actors involved: primary school pupils; teachers; volunteers and employees of Civil Protection and Fire brigades. Project funded by the regional Civil Protection.

Activities: In 2007 the regional Civil Protection agency of Friuli Venezia Giulia funded a pilot a project of risk education in the primary school of Attimis. The project “Cresciamo sicuri” (Growing up safely) was directed to both primary school and kindergarten children and included actions aimed at the recognition of risks derived from both natural and domestic hazards. The project, in its 2 years of development, aimed specifically at providing the children with the following tools/knowledge:

- development of awareness about real risk situations;
- adoption of appropriate behaviour for specific risk situations;
- understanding and perception of ‘fear’ as a useful feeling to recognise risk;
- knowledge of symbols /signs that signal danger;
- knowledge of right numbers to call for intervention in a specific hazard situation;
- knowledge of the role of different actors in the field of hazard management.

The **main themes** chosen to develop this project were fear (from personal experience through fiction, to fear related to specific natural hazards such as floods and earthquakes), water, earth, and fire. These three natural elements were explored in their potential to become hazards. Scientific lectures given by experts of civil protection explained what floods, earthquakes and fires are, and in what way they are threatening for human beings. Also, an historical overview of natural hazards in the area was developed by the students, through interviews with inhabitants of the municipality that witnessed the earthquake in 1976 or the flood in 1958 and research of articles on these events in the archives. Practical sessions also took place. The students visited the local civil protection unit headquarters, to see equipment and understand actions that take place in case of emergency. Furthermore, the local forest brigade guided the students on a visit of the local river, focusing attention on the water course and natural and human elements that affect the flow. The themes were all developed in parallel, within different subjects already present in the school curricula. The approach to risk education was therefore holistic and multidisciplinary and developed naturally within the frame of established curricula.

Source: Komac et al. 2010

Why is it relevant?

In recent policy documents, it is widely agreed that education for disaster reduction must become an integral part of any educational strategy aimed at promoting and creating thriving and sustainable societies (e.g. UNISDR 2006 and DKKV).

→ The Hyogo Framework for Action 2005–2015 contains several links to capacity building and inter alia especially mentions risk education referred to as "the transfer of knowledge, technology and expertise to enhance capacity building for disaster risk reduction” (UNISDR 2006, 5). What is more, several international organisations provide education programmes in natural hazards, and many of them rely on the implementation of the Hyogo Framework and the United Nations Decade of Education for Sustainable Development 2005–2014.

However, education efforts with respect to natural hazards are highly under-researched, maybe, because education and textbook research are somewhat separated from the disciplines which are usually considering natural hazards and disasters (for an exception: Ronan et al. 2010, Vitek and Berta 1981). Therefore, with respect to this topic, CapHaz-Net could not build upon equally grounded and long research traditions as, for example, with respect to social vulnerability, risk perception or risk communication. Central findings from the literature are summarised in Table 10 and Table 11.

Table 10: Strengths, possible limitations and challenges of curriculum based, standardised education on natural hazards

Strengths	
Enables the introduction of the topic into schools and hence prepares a frame stimulating and encouraging engagement with the topic of natural hazards.	
May increase trust in science and thus in information on risk management	
May contribute to an improved understanding of underlying natural and societal processes resulting in decreased vulnerabilities.	
Contributes to the acquisition of procedural knowledge (ability and knowledge of how to learn, where to obtain information about natural hazards and so on).	
Seems to contribute to a higher degree of preparedness and knowledge among pupils, although the empirical basis remains small.	Ronan et al. 2010
May contribute to a further spreading of knowledge via personal networks (e.g. parents etc.).	
Possible limitations and challenges	
If the system is very standardised it may be difficult for teachers to innovate and provide space for hazard related experimental learning	Wisner 2006a
Precondition is to train teachers in new knowledge and skills related to natural hazards (e.g. if topic is newly introduced to a curriculum)	
Needs the development of human resources, as well as infrastructural, organisational and institutional contexts	Muturi 2005

Source: Kuhlicke et al. 2011

Table 11: Strengths, possible limitations and challenges of participatory, locally embedded education on natural hazards

Strengths	
It is suggested that hands-on, experiential learning based on local experiences, events, and stocks of knowledge is the most effective way of educating pupils; however, empirically this is not yet investigated.	Wisner 2006a
Allows the integration of different actors from the public and private sphere (e.g. NGOs) for integrating different stocks of knowledge and expertise.	UNISDR 2010
Stimulates engagement with the local environmental situation, as well as with personal histories of relatives and wider civil society.	
Possible limitations and challenges	
If the system is very standardised it may be difficult for teachers to innovate and provide space for hazard related experimental learning.	Wisner 2006a
Depends mostly on the commitment of individual teachers or schools.	

Source: Kuhlicke et al. 2011

Recommendations

→ Risk education should be an obligatory part of formal and informal education from childhood onward as social capacity building for natural hazards is a never-ending effort. Ideally, it should thus be a life-long process of social learning. For the time being, however, according to the results of our study, the majority of (secondary) educational systems in Europe are underdeveloped with regard to education about natural hazards; therefore we particularly recommend strengthening formal education.

- ⟶ Teaching about natural hazards and their impacts needs to apply different approaches (e.g. various media and tools). A shift towards comprehensive understanding of the relations between natural and social processes is required.
- ⟶ As well as learning about the hazard, students need to be taught what to do in the event of an emergency.
- ⟶ Natural hazards education should include locally based forms of participatory learning focused on a specific locality, concrete events, environments and relations.
- ⟶ Local communities can contribute to both formal and informal risk education of children and teenagers. Flood markers, local archives and eye witnesses of past events should be included as valuable sources of local knowledge.

Principle 6: Sharing responsibilities fairly

Background

This final principle specifically arose out of the changes observable in flood management over the last two decades or so which can be characterised as a shift from flood control and protection towards a more integrated flood risk management in many countries across Europe. For decades, flood risk management used to be considered to be a pure collective good and in many countries it had been the exclusive task of the state. With the more recent notion of risk management responsibilities and duties are increasingly shifted to the local level while encouraging or even demanding the involvement of public and private parties. Additionally, a normative idea of how the very management process should be governed is at least implicitly made reference to, underlining the relevance of communication (e.g. Renn 2008) and encouraging the consideration of principles of 'good governance', i.e. openness, participation, accountability, effectiveness and coherence (Defra 2005, PLANAT 2008). This principle underlines that these shifts in how risks are managed create new responsibilities and burdens for organisations as well as for communities at risk (cf. also Walker et al. 2010) that need to be shared fairly.

What does it mean for social capacity building?

Sharing responsibilities fairly can be briefly defined as sharing the burden of loss or the benefit of gain as a result of a risk as well as the measures and strategies to mitigate their negative impacts in a socially acceptable and agreed way. This means, for instance, that the intervention in one part of a river should have no negative consequences for inhabitants living in other parts of a floodplain. If such negative impacts are not avoidable a means for compensation should be developed (cf. European Floods Directive, Article 15; EC 2007). Furthermore, it might also mean sharing the burdens of adapting to and coping with the impacts of hazards fairly between different levels (e.g. local, regional, and national) as well as between private and public parties. In Great Britain, for instance, there is process of shifting responsibility to the local level observable. It can be argued that in the UK, governments continue to set flood policy but at the same time seek to shift responsibility for costs and actions to other segments of society (Watson et al. 2009). The recent emphasis on the 'Big Society' which had led to changes to legislation with the emergence of the Localism Act (2011) highlights the importance of local actors in decision-making processes. For example, local communities are encouraged to become involved in the development of neighbourhood plans which influence the development and land use policies in a particular area. However, these plans can only affect the type, design and location of new developments. In other words, they cannot be used to stop development. In this case, the decisions

about development are still ultimately made by government officials but the opportunity to become involved in decisions around how that development takes place is open to the public (DCLG 2011).

Why is it relevant?

Generally, the idea of sharing risks and responsibilities fairly is stressed in the field of risk management and in documents such as ISO 31000 which discusses the importance of risk transfer. However, although there has been an emphasis on the importance of participation and the necessity of re-distributing responsibility (see Principle 3), the way to go about doing this fairly is less clear. The following three processes – the involvement of multiple actors, the notion of 'good governance' and the transferred responsibility to the local level – underlie the relevance of considering this principle in social capacity building efforts in order to improve the way in which natural hazards are managed. All of these processes are inherently linked and face the overarching problem of funding. The ability of actors to attract finances is of great importance to the likelihood and success of multiple actors becoming involved in the management process (see Box 17).

Box 17: Actors involved in the flood recovery process – The Hull flood, UK

Whittle et al. 2010, have identified four kinds of front line workers that emerge during the recovery process:

- Permanent and temporary staff whose jobs were created specifically to deal with the issue of flood recovery. For example, Charlotte was employed by Hull City Council's Flood Advice Service through which she provided assistance to flooded residents – both over the telephone and in person – on a range of issues, from dealing with insurance claims to resolving issues with building contractors and helping poorer residents access additional forms of financial aid.
- Those whose pre-existing job roles were transformed to deal with flooding issues. The best example of this in Hull was the work of the community wardens. Hull's community wardens work in neighbourhood teams across the city to help residents with issues of concern to them, such as anti-social behaviour, vandalism and environmental problems. However, after the floods, the wardens were enlisted to perform a range of activities, from evacuating schools and care homes on the day of the floods, through to helping residents fill out assistance forms and performing caravan safety checks during the longer-term recovery process.
- Traditional intermediary roles. The flood recovery process consisted of a heightened role for well-known intermediaries who exist to bridge the gap between individual residents and the various companies and agencies that they need to deal with after a flood. The clearest example of this is the work of the loss adjusters and the Citizen's Advice Bureau.
- Informal work that was carried out in a voluntary capacity by community groups across the city. For example, Hazel belonged to a church in the heart of a badly flooded area of the city. She described how, despite having only 17 members, the church was able to respond flexibly and quickly to the needs of the local community in ways that were impossible for larger, more bureaucratic organisations that were restricted by funding constraints or organisational protocols regarding recovery.

Source: Whittle et al. 2010

→ Although the management of natural hazards has always involved multiple actors beyond the public sector, a recent shift towards a greater diversity of actors and the development of new roles and stronger forms of collaboration seems to occur in many European countries (see Section 2.1). This implies that policy initiatives attempt to encourage householders and businesses to make their buildings more resistant and/or resilient to the impact of natural hazards. In this way, those at risk – residents, businesses, farms, infrastructure

managers, etc. – are considered as risk managers and thus become active participants of the multi-scale risk governance network. This process thus includes attempts to define these actors as agents that need to take decisions and choices with regard to the prevention and mitigation of as well as response to hazards. This process might result in new inequality as the ability to take over more responsibility (e.g. by making individual properties more resilient to the impact of a hazard) depends, in part; on the financial resources of a household.

- The increasing prominence of ideas of 'good governance' associated with stakeholder participation in decision-making, democratic access to knowledge as well as transparency and accountability in relation to policy decisions, is creating new responsibilities both for involved organisations as well as for communities at risk but also requires additional resources. Actors need to be made aware of what is expected of them, they need to accept this responsibility and finally, they need to have the required capacities to be able to fulfil such responsibilities. In the CapHaz-Net Regional Hazard Workshops, it became obvious that there is a lack of knowledge by many authorities at the local level on how to effectively set up public participation (for example in the course of implementing EC directives, such as the European Floods Directive (EC, 2007); Bianchizza et al. 2011, Begg et al. 2011). This suggests, in part, to equip actors with the necessary resources and skills and to assist them in developing the needed capacities. Additionally, roles and responsibilities need to be clearly defined among different actors involved in the participation process. Furthermore, the tendency to place increasing responsibility in the hands of actors outside of the State governmental functions needs to be fairly balanced.
- As a third process, we observed an increasing tendency to place greater responsibility at the local level. While central governments at the national and European level still set general policies, at least in some countries – and most prominently in the UK – there is a certain tendency to shift responsibilities but also costs associated with the management of natural hazards to the local level (Box 18).

Recommendations

- Public funds should be made available to support individual/communal adaptation and coping measures (e.g. making properties resilient to natural hazards), rather than this being dependent upon the differentiated and uneven availability of resources within households and communities.
- The delegation of responsibilities to other levels (e.g. local level) or other actors (e.g. community members) needs reconsidering social vulnerability as this transfer might create new vulnerabilities if it is not accompanied by additional resources.
- In the aftermath of a disaster, funds should be made available for mitigating unequally distributed recovery capacities.
- Organisations need to work together with other agencies and organisations (e.g. NGOs, private sector) when delivering pre-event (e.g. raising awareness), event (e.g. warning and emergency response) and post-event (e.g. providing shelter and support) responsibilities.

4 Social capacity building in practice – a guidance tool

The following section expands upon the recommendations that are provided at the end of each principle and suggests ways to operationalise these recommendations through a set of guidelines. As we recognise the potential for different interests, in regards to who manages hazards and the challenges that they face, the following section provides guidelines separately for communities and organisations. Throughout this document we have argued that authorities and organisations involved in managing natural hazards, as well as residents and local communities exposed to natural hazards are confronted with new challenges and tasks that they need to consider and address. This not only relates to the potentially increasing risks associated with the occurrence of natural hazards; it also relates to changing legislative frameworks (e.g. the EU Floods Directive; EC 2007) and the increasing complexity of the management process itself. This creates new roles and responsibilities that local communities at risk, as well as organisations involved in the management process, are expected to be able to deal with. This guidance thus encourages a conceptualisation of social capacity building efforts that not only aim at reducing the impacts of natural hazards, but also serve as a basis for improving the relationships between organisations involved in the management of natural hazards and local communities exposed to them. It should allow for assessing existing social capacities as well as highlighting those that may need to be developed by organisations or communities.

How to read the guidelines

These guidelines are based on findings from previous empirical studies as well as on the insights gained throughout the Regional Hazard Workshops. They offer a way of operationalising the findings and the overarching recommendations of the project and provide suggestions of how organisations might go about gaining an understanding of the capacities that they have at their disposal and what capacities might need to be further developed. Furthermore, these guidelines offer a platform for communities to have a say in how they are involved in natural hazards management activities and how these activities might be improved. The guidelines 'specify thus all of the recommendations described in the previous sections. However, not all of the recommendations have been included in both of the guidelines as it was felt that some are more appropriate for organisations rather than communities.

4.1 Guidance for building social capacities of organisations

The following section provides an overview of the purpose and structure of the guidance tool to assess social capacities of and within organisations. This guidance is designed for government agencies and other public authorities that are charged with the responsibility of emergency preparedness and response, as well as private organisations and NGOs in this field. Such organisations might be specialised in risk and emergency management or perform this task as part of other roles that they are responsible for within their workplace (e.g. municipal councils or local development initiatives).

What is the purpose of the organisational assessment?

→ *Identifying capacities and vulnerabilities with regard to potential natural hazards:* Participants would be encouraged to develop, and then complete, the questions provided based on their knowledge regarding the given hazard. Answers should be given from the perspective of their roles and responsibilities within their own organisation, as well as their ability (capacity) to be able to fulfil these responsibilities. By going through this guidance,

the participants will be encouraged to think about the hazards they are dealing with and gain help in being able to identify the capacities and vulnerabilities of their organisation to fulfil its responsibilities. In this way capacities that need particular attention are highlighted.

→ *Developing networks:* Through applying this guidance tool the participants would be encouraged to identify who they work with and how they work with them. In doing so, not only will the participants identify the actors that they already work with but also actors that they might be able to work with in the future.

→ *Raising organisational awareness for its capacities:* Besides the concrete outcome of the assessment the process of how to get there is considered as equally important. Problems within the organisation as well as in its interaction with other organisations and the public, but also potentials might become obvious that the actors were not aware of before the assessment procedure. Thus, a modification of the concrete guiding questions is both expectable and desirable.

Principle 1: Identifying vulnerabilities and prioritising the needs of those who are most vulnerable – organisations

Recommendation	**Specification**
The most vulnerable members of the community should be identified and this process of identification should be a participative process which involves members of the community and, preferably, the most vulnerable themselves.	We have identified the most vulnerable within the community.
	We have identified the most vulnerable within the community by also including the knowledge of local residents and/or organisations in the assessment.
	We have identified the most vulnerable within the community by also including at least some of them.
The identification of the most vulnerable as well as their needs should be taken into account in short term emergency management as well as long term strategic management.	We have taken the needs and requirements of the identified members of the community who are particularly vulnerable to the risks related to natural hazards into account in emergency and evacuation plans.
	We have taken the needs and requirements of the identified members of the community who are particularly vulnerable to the risks related to natural hazard into account in our long term efforts for disaster risk reduction.
Funds and other types of support should be made available for the most vulnerable in order to better prepare for, cope with and recover from the negative impacts of natural hazards.	We have made available/we are aware of funds and other types of support that are available for the most vulnerable in order to help them to prepare for, cope with and recover from the impact of a hazard (e.g. for drought: installing private water tanks for storing water or retrofitting grey water systems).
	We have made available/we are aware of funds and other types of support that are available to help people recover from the impact of hazards (e.g. for floods: elevation/raising houses so that the lowest floor is above the flood level).
	A central information point/other ways of informing the public was/were created in order to inform residents of the opportunities available to them in regard to funding mechanisms and other types of support.
Education and skills development also need to be made available to all actors in order to better prepare for, cope with and recover from the negative impacts of a disaster.	Education and skills development is available for our organisation to help us better deal with hazards and work with other organisations as well as with local communities at risk/affected in the past.
	We provide education and skills development to local communities at risk/affected in the past so as they are better able to deal with the impacts of natural hazards.

Principle 2: Making information available – organisations

Recommendation	Specification
Information about hazards, risks and vulnerabilities should be made easily accessible and presented in a manner that is understandable to non-specialists.	We have made the following information available to local communities at risk/affected in the past: (a) information about the hazard the community is prone to, (b) information about their vulnerabilities (physical: number of houses and infrastructure that may be exposed; social: groups that might be particularly affected (e.g. according to age, income, health, etc.), (c) information about hotspots that need particular attention (e.g. elderly homes, kindergartens, schools etc.).
	Information is presented in a holistic manner; taking into account other risks and issues that affect everyday life quality (e.g. climate change, health, wealth, etc.).
New ways of making information available to reach the population at large should be explored, tested and applied without losing sight of traditional modes of information provision.	We inform local communities at risk/affected in the past about hazards and vulnerabilities through the following channels: (a) notice boards in the community (b) digital channels (e.g. online maps) (c) local / regional newspapers (d) radio (e) TV (f) public meetings to inform the public (g) forums or municipal activities (e.g. Agenda 21) (h) brochures and leaflets (i) others.
Information about responsibilities, rights and obligations of different actors should be clearly communicated with a focus on the implications they have for organisations and communities at risk.	We have made information available to the community regarding their responsibilities and their rights.
	We have specified the implications and given the community advice on concrete steps they should consider, for example: (a) how to respond (e.g. emergency plans) (b) concerning the recovery procedure (e.g. insurance) (c) concerning mitigation and preparedness actions (household retrofitting options).
New ways of making information available to reach the population at large should be explored, tested and applied without losing sight of traditional modes of information provision.	We have informed the public about responsibilities and rights through the following channels: (a) notice boards in the community (b) digital channels (e.g. online maps) (c) local / regional newspapers (d) radio (e) TV (f) public meetings to inform the public (g) forums or municipal activities (e.g. Agenda 21) (h) brochures and leaflets (i) others.
Information is provided in a transparent and consistent manner.	Information about outcomes of decision-making processes is transparent and clearly communicated to local (and other) communities.

Principle 2: Making information available – organisations

Recommendation	Specification
	Information from different sources on the same issue (e.g. warning or recommendations what to do in an emergency case) is consistent and congruent.
	Information is shared among organisations working at different levels (e.g. national, regional and local).
	Research results should be made easily accessible in different languages and is presented in a manner that is understandable to practitioners.

Principle 3: Being participative and inclusive – organisations

Recommendation	Specification
Efforts should be made and resources (e.g. financial and organisational) utilised for engaging with the community in order to raise awareness of the opportunity for participation in the decision-making process.	We have the feeling that we have enough financial and organisational resources available to engage with communities.
	We have made the efforts to approach a range of actors in communities in order to raise awareness about the opportunities for participation in decision-making processes.
	We have approached a range of actors and offered the opportunity to participate in decision-making processes.
Community members should be considered and/or actively involved in the assessment of risks and vulnerabilities as well as in decision-making processes on policies, plans and specific measures.	We work together with a range of different actors involved in the management of natural hazards, for example: (a) public (e.g., individuals and residents), (b) organised interest groups (e.g., NGOs, community groups), (c) professional organisations (e.g., businesses, government agencies) (d) scientists.
	We provide representatives from the following groups with the opportunities to give feedback and input on the results of any official hazard and vulnerability assessment: (a) public (e.g., individuals and residents), (b) organised interest groups (e.g., NGOs, community groups), (c) professional organisations (e.g., businesses, government agencies) (d) scientists.
	Community members are actively involved within our: (a) hazard and vulnerability assessments (b) development of specific policies (c) development of local risk management plans.
	Community members are involved directly in the implementation of specific measures (e.g., warnings systems, dikes).
Participation should have a clear objective which is clearly communicated from the outset. It is important that community members are informed of the influence that the can have on the decision-making process from the beginning.	We have developed clear objectives in regards to the aims and goals of involving the public/representatives of the public before the activity has commenced.

Principle 3: Being participative and inclusive – organisations

Recommendation	Specification
	The influence that different participants can have on the decision-making process is communicated clearly before such activity has taken place. This is being done through: (a) council communications (leaflets, etc.) (b) dialogue with interested groups (c) public meetings (d) other activities.

Principle 4: Building networks – organisations

Recommendation	Specification
Organisations should aim at building and/or strengthening formal and informal networks and reinforcing their capacity to prepare for, cope with and recover from the impact of a natural hazard, especially at a community level. This means engaging in a continuous and dynamic process of establishing durable relationships among residents, interest groups, organisations, and institutions involved in risk mitigation and management.	We constantly work together with a number of local representatives beyond the immediate field of hazard management, for example: (a) housing associations (b) residents associations (c) local councils (d) health providers (e) churches (f) other actors.
	We make use of existing networks to organise activities related to risk mitigation and management, for example: (a) town meetings (b) workshops (c) community activities (fetes, festivals, exhibitions, etc.) (d) other activities.
The management process should work with the social networks of communities (e.g. 'key community leaders' from the community). People rely more on advice, opinions and behaviour from people that surround them in their daily lives. Thus, networks are a promising way to get messages across and to encourage specific actions in the face of risk (emergency warning, how to respond, recovery, and mitigation and preparedness measures).	We have identified community leaders, developed a rapport with them and discussed some of the problems and solutions surrounding hazard management. These community leaders are, for example: (a) volunteer emergency response groups (e.g. fire brigades) (b) church representatives (c) representatives of other local associations (Agenda 21, sport clubs, etc.) (d) others.
	We have also engaged the community leaders to help disseminate information to the wider community.

Principle 5: Starting early – organisations

Recommendation	Specification
Risk education should be an obligatory part of formal and informal education from childhood onward. *Teaching about natural hazards and their impacts needs to apply different forms, media and tools. A shift towards comprehensive understanding of the relations between natural and social processes is required.*	Natural hazards are a topic which is extensively dealt with in school curricula in our region.

Principle 5: Starting early – organisations

Recommendation	Specification
	Teachings on natural hazards in schools utilise a range of different media and tools (e.g. textbooks, films, excursions, etc.).
	Teachings on natural hazards in schools teach both the physical science of natural hazards as well as the social processes which influence the social impacts of natural hazard events (management structures, risk perceptions, past events, etc.).
	Students are taught about the: (a) impacts of a given hazard, (b) what can be done to prevent the hazard (e.g., climate change/sustainability), and (c) actions that can be taken to limit negative effects in the event of a hazard at school (emergency plans and drills) as well as (d) actions that can be taken outside of the school context (e.g., fire – stop, drop and roll, call 112, where local safe houses are, etc.).
Natural hazards education should include locally based forms of participatory learning focused on a specific locality, concrete events, environments and relations.	Our organisation is involved in education efforts at local schools and/or universities in our region with regard to: (a) development of curriculum, (b) development of emergency plans, (c) guest demonstrations, (d) facilitation of drills.
Local communities can contribute to both formal and informal risk education of children and teenagers. Flood markers, local archives and eye witnesses of past events should be included as valuable sources of local knowledge.	Our organisation is actively involved in making knowledge about past events in the region public (e.g. by encouraging/financing the display of hazard markers, creation of natural trails, development of information boards).
	Our organisation encourages community leaders to go to schools and offer their personal experience of past hazardous events.

Principle 6: Sharing responsibilities fairly – organisations

Recommendation	Specification
Public funds should be made available to support individual/communal adaptation and coping measures (e.g. making properties resilient to natural hazards), rather than this being dependent upon the differentiated and uneven availability of resources within households and communities.	A variety of funding mechanisms is available to the public to mitigate and adapt to risk from natural hazards.
The delegation of responsibilities to other levels (e.g. local level) or other actors (e.g. community members) might create new vulnerabilities if it is not accompanied by additional resources and support reflecting the new responsibilities.	Additional resources are available to help the community deal with the responsibility of mitigating and adapting to risks from natural hazard.
In the aftermath of a disaster, funds and support should be made available for mitigating unequally distributed recovery capacities.	In the case of a natural hazards event, funds are available to treat areas most affected.

Principle 6: Sharing responsibilities fairly – organisations

Recommendation	Specification
	Support networks are available to help deprived and badly affected areas recover from a natural hazards event.
Organisations need to work together with other agencies and organisations (e.g. NGOs, private sector) when delivering pre-event (e.g. raising awareness) during the event (e.g. warning and emergency response) and post-event (e.g. providing shelter and support) responsibilities.	We make data and information available and share them among different agencies and organisations in charge of risk and emergency management.
	We have regular meetings with other agencies and organisations in charge of risk and emergency management.
	We cooperate with other agencies and organisations in charge of risk and emergency management.

4.2 Guidance for building social capacities of local communities

The questions provided below aim at providing a guideline to some of the issues that might be relevant for communities in regards to identifying and building social capacities to better prepare for, cope with and recover from the negative impacts of natural hazards. The following section provides an overview of the purpose and structure for a community capacity building assessment.

What is the purpose of a community assessment?

- *Assisting local communities in identifying appropriate ways related to how to enhance, develop, and build different kinds of social capacities:* In this sense, this guidance tries to contribute to a better understanding of the current situation in a community.
- *Sharing experiences of natural hazards and their management and identifying existing, or possibly lacking, social capacities in regards to potential natural hazards in the respective area:* By using the guidance, members of a community should be able to identify the capacities of their community and therefore, identify which capacities need particular attention and changes for the next steps.
- *Raising awareness:* This exercise could be seen as an awareness raising activity that helps different members of a community mutually learn and provide information concerning natural hazards and past events in their area. It thus encourages a shared awareness and potentially improved general understanding of the hazard and the roles, responsibilities, capacities of and relationships between different actors.
- *Highlight the 'internal' capacities of a community by drawing out the level of interest as well as ability of the community to become involved in management processes:* This can be used to inform policy in regards to future attempts to involve the community by highlighting the barriers to such involvement. The guidance therefore focuses on the 'internal' capacities of a community as well as on the interrelations of communal and organisational, administrative actors. The latter point is of particular relevance as the quality of the relationships between actors is one of the key 'indicators' and/or condition for enhancing capacities (network capacities).

Principle 1: Identifying vulnerabilities and prioritising the needs of those who are most vulnerable – communities

Recommendation	**Specification**
The most vulnerable members of the community should be identified and this process of identification should be a participative process which involves members of the community.	Have you identified the administrations/organisations responsible for the management of hazards in your community?
	Are you aware of members of the community that might be more affected by the impact of a hazard than others (e.g. elderly, handicapped)? (e.g. by risk mapping)
	Have the members of the community that you have identified also been identified by the responsible administrations?
	Have members of the community been involved in the identification of areas and/or social groups that might be more severely affected than others?
The needs of those found to be most vulnerable should be taken into account in short term emergency management as well as long term strategic management.	Are the needs and requirements of the identified members of the community who might be in particular severely affected by the risks related to natural hazard included in emergency and evacuation plans?
	Are you aware that the needs and requirements of the identified members of the community who are particularly vulnerable to the risks related to natural hazard are included in our long term efforts for disaster risk reduction?
Funds and support should be made available for the most vulnerable in order to better prepare for, cope with and recover from the negative impacts of natural hazards.	We know that funds are available for the most vulnerable in order to help them to prepare for, cope with and recover from the impact of a hazard (e.g. for drought: installing private water tanks for storing water or retrofitting grey water systems).
	Is funding available to help people recover from the impact of hazards (e.g. for floods: elevation/raising houses so that the lowest floor is above the flood level)?
	Has a central information point/other ways of informing been created in order to inform residents of the opportunities available to them in regard to funding mechanisms (e.g. through the local council or government agency)?

Principle 2: Making information available – communities

Recommendation	Specification
Information about hazards, risks and vulnerabilities should be made easily accessible and presented in a manner that is easy to understand.	Have you identified all the natural hazards that your community is prone to (e.g. floods, droughts, forest fires, avalanches, earthquakes, etc.)?
	Are you aware of information available from organisations responsible for the management of natural hazards in your area with regard to: (a) the hazards our community is prone to and (b) the number of houses and infrastructure that may be exposed and the residents that might be particularly affected (e.g. according to age, income, health, etc.), (c) hotspots that need particular attention (e.g. elderly homes, kindergartens, schools etc.)?
	In which ways are information communicated to the community? (a) notice boards in our community (b) digital channels (e.g. online maps) (c) local / regional newspapers (d) radio (e) TV (f) public meetings to inform the public (g) brochures and leaflets (h) others.
	Which form of communication does the group think is most effective? (a) notice boards in our community (b) digital channels (e.g. online maps) (c) local / regional newspapers (d) radio (e) TV (f) public meetings to inform the public (g) brochures and leaflets (h) others.
Information about responsibilities, rights and obligations of different actors should be clearly communicated with a focus on the implications they have for authorities and communities at risk.	Are you aware of the legal requirements of different actors (e.g. the general public, responsible organisations) in regards to their responsibilities for managing risks from natural hazards (e.g. legal frameworks and policies)?

Principle 2: Making information available – communities

Recommendation	Specification
	Does the group believe that this information is clearly communicated?
	Are you aware of how such frameworks and policies affect communities (e.g. the responsibility of community members to protect themselves for potential hazards), e.g. with regard to: (a) How to respond (e.g. emergency plans) (b) Recovery procedure (e.g. insurance) (c) Mitigation and preparedness actions (household retrofitting options)
	In which ways are information communicated to the community? (d) Notice boards in our community (e) Digital channels (e.g. online maps) (f) Local / regional newspapers (g) Media (radio/TV) (h) Public meetings to inform the public (i) others
	Which form(s) of communication does the group prefer? (a) Notice boards in our community (b) Digital channels (e.g. online maps) (c) Local / regional newspapers (d) Media (radio/TV) (e) Public meetings to inform the public (f) others
Information about outcomes of decision-making processes should be transparent and clearly communicated to the communities.	Does the group believe that decision-making processes are clearly communicated by responsible organisations?
Information from different sources on the same issue (e.g. warning or recommendations what to do in emergency case) should be consistent and congruent.	In your experience, is information from different sources about risks in your local area: (a) understandable (b) consistent
	In your experience, was information from different sources concerning a past event in your local area: (a) understandable (b) consistent

Principle 3: Being participative and inclusive – communities

Recommendation	Specification
Efforts should be made and resources (e.g. financial and organisational) utilised for engaging with the community in order to raise awareness of the opportunity for participation in the decision-making process.	Does the group feel that responsible organisations have enough financial and organisational resources to engage with communities?
	Does the group feel that efforts have been made by responsible organisations to actively engage them in decision-making processes?
	Does the group feel that efforts have been made by responsible organisations and were offered the opportunity to participate in decision-making processes?
	In your opinion, what would be the most effective way for communities to be approached?
Community members should be considered and/or actively involved in the assessment of risks and vul-	Does the group agree that their views and interests are taken seriously and into account during the decision-making process in regards to policies (e.g. National Planning Framework (2012), UK or the Drought Decree (2007),

Principle 3: Being participative and inclusive – communities

Recommendation	Specification
nerabilities as well as in decision-making processes on policies, plans and specific measures.	Spain)?
	Does the group agree that their views and interests are taken seriously and into account during the decision-making process in regards to plans (e.g. urban/regional development strategy such as where new developments should be located)?
	Does the group agree that their views and interests are taken seriously and into account during the decision-making process in regards to specific implementation measures (construction of a dike)?
	Does the group agree that their views and interests are taken seriously and into account during the assessment of hazards and vulnerabilities?
	What does the group think might be some of the barriers involved in engaging or getting the community to take part in assessments and decision-making processes?
Participation should have a clear objective which is clearly communicated from the outset. It is important that community members are informed of the influence that they can have on the decision-making process from the beginning.	If there is a participatory process, does the group believe this process has a clear objective; if yes, was the community able to influence it?
	Does the group believe that the community's ability to have an impact on the decision-making process is clearly communicated from the outset? If yes, did the community have an impact on the decision-making process?

Principle 4: Building networks – communities

Recommendation	Specification
Communities should aim at building and/or strengthening formal and informal networks and reinforcing their capacity to prepare for, cope with and recover from the impact of a natural hazard, especially at a community level. This means engaging in a continuous and dynamic process of establishing durable relationships among residents, interest groups, organisations, and institutions involved in risk mitigation and management.	Does your community have strong networks of residents and organisations that share information and work together in regards to managing, responding to and recovering from natural hazard events? If yes, who are the main actors involved? If no, what do you think the main barriers are?
The management process should work through the social networks of communities (e.g. 'key community leaders' from the community). People rely more on advice, opinions and behaviour from people that surround them in their daily lives. Thus, networks are a promising way to get messages across and to encourage specific actions in the face of risk (emergency warning, how to respond, recovery, and mitigation and preparedness measures).	If there are networks, when are they most active? (a) Before (e.g. preparedness measures), (b) During (e.g. emergency warnings, information on how to respond, etc.), (c) After (recovery and mitigation)
	Do these actors have support from responsible organisations? (a) from the municipality (b) from regional authorities (c) from emergency organisations (e.g. fire brigades) (d) from other organisations.

Principle 5: Starting early – communities

Recommendation	Specification
Risk education should be an obligatory part of formal and informal education from childhood onward. Teaching about natural hazards and their impacts needs to apply differ-	Are natural hazards a topic which is dealt with at schools?
	Do teachings of natural hazard in schools utilise a range of different media and tools (e.g. textbooks, films, excursions, etc.)?
	Do teachings of natural hazards in schools teach both the physical science

Principle 5: Starting early – communities

Recommendation	Specification
ent forms, media and tools. A shift towards comprehensive understanding of the relations between natural and social processes is required.	of natural hazards as well as the social processes which influence the social impacts of natural hazard events (governance structures, risk perceptions, past events, etc.)?
Education on natural hazards should also include locally based forms of participatory learning focus on a specific locality, concrete events, environments and relations.	Do teachings of natural hazards in school use local examples of natural hazards?
	Are you aware that teachings of natural hazards employ participatory learning methods in your local community (e.g. children are encouraged to participate and share their experiences)?
	Are children taught about the: (a) impacts of a given hazard, (b) what can be done to prevent the hazard (e.g., climate change/sustainability), and (c) actions that can be taken to limit negative effects in the event of a hazard at school (emergency plans and drills) as well as actions that can be taken outside of the school context (e.g., fire – stop, drop and roll, call 112, where local safe houses are, etc.)?

Principle 6: Sharing responsibilities fairly – communities

Recommendation	Specification
Public funds should be made available to support individual/communal adaptation and coping measures (e.g. making properties resilient to natural hazards), rather than this being dependent upon the differentiated and uneven availability of resources within households and communities.	Is the group aware of public funds to support individual/communal adaptation and coping measures (e.g. making properties resilient to natural hazards)?
	Has support in the form of education and skills development been made available to your community so that people can learn to better adapt to and cope with the effects of natural hazards?

5 Future research topics for social science research on natural hazards

In spite of all the insights gained in the three project years, social capacity building as understood by CapHaz-Net needs future research – due to an on-going transformation of the modes of risk governance, non-specified linkages between risk perception and actual behaviour, continuing social vulnerabilities, challenging needs to improve risk communication and under-researched risk education activities and, last but not least, due to an inevitable European diversity. In this section major research gaps are addressed (in more detail: Kuhlicke and Steinführer 2010b).

⟶ *Social capacity building* in the sense suggested here is not restricted to the general public. Rather it is a cross-cutting challenge of local and social communities but also of different types of organisations, whether they are highly professionalised (e.g. emergency corps) or operate on a more general level (e.g. regional environmental authorities). Due to changing landscapes of risk governance, more demands are posed particularly on organisational actors to engage with risk communication and risk participation but also with new forms for assessing risks and vulnerabilities. This poses new tasks and demands on organisations involved. In many parts of Europe, however, these organisations seem to be insufficiently prepared for these new tasks, there is thus a need to more systematically understand the relevance of social capacity building both on the side of communities at risk and organisations in charge.

⟶ *Risk governance* and its on-going evolution form a research field with many open questions. We could not identify any substantial scholarly contribution dealing thoroughly with the governance of natural hazards within Europe that covers a wide range of countries and pays attention to the institutional diversity, path dependencies and legacies. Research is needed that analyses the interactions of multiple actors working across different scales, diverse forms of responsibility and increased 'privatisation of risk' as well as the effects of these processes for future risk management. In this context, it is important to investigate whether new forms of governance can lead to benefits such as reduced damages from natural hazards as well as greater flexibility, communication and coordination between actors and the empowerment of local communities, or whether there are also negative implications such as the reduced accountability of different agencies and the continuing dominance of the most powerful actors involved. Open issues furthermore relate to the question to what extent differences between forms of risk necessitate different forms of governance process and whether there are important differences between types of natural hazard that need to be taken into account for future risk governance and its analysis. The consequences of austerity programmes for governance capacities, competencies and allocation of responsibilities are also a key area to be examined.

⟶ *Risk perception*, one of the most established fields of social science research on hazards, focused so far on technological risks and on the underlying heuristics, values and assumptions that lead to more or less acceptance of novel technologies. There is still a major research need with regard to natural hazards and how individual, social and cultural determinants influence natural hazard perception. CapHaz-Net revealed a particular lack of sys-

tematic and empirically well-designed research with regard to the connections between risk perception and people's ability and willingness to apply preventive measures for disaster risk reduction. One question again refers to European diversity: Are there differences in the perception of trust, responsibility and accountability with respect to authorities and risk managers in different social contexts and European countries? If yes, what implication does this have for risk management and loss prevention? Open research questions stretch beyond the hitherto hazard focus and need to include the perception of risks associated with climate change. Then, questions of complexity and uncertainty and their subjective framing and relevance for actual behaviour emerge.

→ *Social vulnerability* research with respect to natural hazards has so far predominantly focused on developing countries and/or the North American context. In Europe it is still an emerging field of research (though becoming more mature in recent years in the course of FP6 and FP7 funded projects such as FLOODsite, MOVE or ENSURE). The objectives of any further research would be to contribute to a better understanding of how social vulnerability in relation to natural hazards can be reduced across Europe in order to increase people's resilience. An improved understanding of social vulnerability is particularly needed with respect to earthquakes, heat waves, droughts and volcanic eruptions as these appear to be under-researched. A possible topic emphasis could be laid on how potentially vulnerable groups such as migrants and transients adapt to and cope with their vulnerability. An improved understanding of how individuals, but also organisations and communities, perceive their own and other groups' vulnerabilities would also be useful. A better understanding is also needed of responses to, and remaining barriers to, addressing social vulnerability. For example, what are the social, economic, political, legal and institutional processes which produce, exacerbate or perpetuate social vulnerabilities? How do processes such as an ageing population and increasing economic polarisation across Europe contribute to different vulnerability patterns across Europe? What role does the recovery process that follows a disaster have in influencing or maybe even reinforcing vulnerabilities? What remains unaddressed is the relational nature of vulnerability, namely that vulnerability is in part an effect of relations, of the institutionalised patterns of interaction within a community and above all between the former and the acting organisations and authorities, as established at regulatory or routine levels. Apart from that, there is also a need to better understand what are next steps in closing the gap between what science is providing with regard to vulnerability assessment and what policy is demanding form science.-

→ *Risk communication* is key to any effort in building social capacities in a long-term perspective. Yet, there is a lack of systematic empirical knowledge on how risk communication strategies influence people's, organisations' and a region's capacities to cope with natural hazards and which conditions enable or inhibit them establishing efficient long-term risk communication strategies. Conditions and effects of risk communication strategies should be considered comprehensively including physical, individual, social, organisational, political and cultural aspects. More attention needs to be paid to the question of how evaluations of the impacts of communication efforts, and their contribution to social capacity building could be implemented in practice (e.g. as a part of broader resilience assessments). Furthermore, little is known about the influence of design and framing on the suc-

cess of (particularly: two-way, dialogical) risk communication efforts in the field of natural hazards and it seems that, although a key to successful information transfer, these issues have been largely neglected by researchers so far.

→ Among all the topics considered, *risk education* is the one mostly under-researched in the field of natural hazards. Here both fundamental and applied research is needed to investigate whether and how risk education influences risk perception, social vulnerability and behavioural changes. Currently there is a lack of evaluation and research in the field of (school) risk education in Europe leading to a lack of knowledge about the efficacy of risk education. A problem of different responsibilities of institutions involved in risk education has been identified and should be investigated in detail. There is a need for multidisciplinary risk education but a lack of financial, institutional and other means to achieve it. Further research on partnerships (local, regional, state, EU), responsibilities (personal, institutional) and liability in risk education is needed. Risk education can be related to climate change, sustainability, and sustainable development, building capacity in an uncertain world or other similar issues. We recommend testing different aspects of risk education in pilot studies because risk education is supposed to have long-term effects on people's beliefs, motivation, responsibilities, trust, behaviour, and coping strategies. Risk education should occur within a specific social and spatial context – regional and local educational programmes can have a substantial long-term effect. Countries that share common natural hazards (e.g. in shared river basins) should address educational information for students through joint efforts (development and publication of curricula, textbooks). There is a clear need for further research of indigenous knowledge related to natural hazards in Europe. Last but not least, risk education should not neglect the educational values of the internet and other media, arts, and literature.

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