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# Approaches to ‘vulnerability’ in eight European disaster management systems

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## Abstract

While social vulnerability in the face of disasters has received increasing academic attention, relatively little is known about the extent to which that knowledge is reflected in practice by institutions involved in disaster management. In this study, we chart the practitioners’ approaches to disaster vulnerability in eight European countries: Germany, Italy, Belgium, Hungary, Sweden, Norway, Finland, and Estonia. The study draws from a comparative document analysis and 95 interviews with disaster managers and reveals significant differences across countries in terms of the ontology of vulnerability, its sources, reduction strategies, and the allocation of related duties. To advance the debate and provide conceptual clarity, we put forward a model for explicating different understandings of vulnerability along the dimensions of human agency and technological structures as well as social support through private relations and state actors.

## Introduction

The question of what makes societies and individuals susceptible to extreme events and their consequences is a primary focus of disaster studies (Wisner *et al.*, 2004; Tierney, 2019; Williams and Webb, 2019). Research on the abilities of individuals, societal groups or whole societies to access adequate resources to deal with external stressors is framed within the concept of ‘social vulnerability’ (Wisner *et al.*, 2004; United Nations, 2015). To what degree vulnerability is attributed to individuals, objects, or societies – and what can be done to alleviate vulnerability – depends to a large degree on official understandings of the concept of vulnerability. Definitions not only determine the factors that are considered to influence the coping capacity of the respective referent object (e.g. individual and social conditions such as age, gender, disability, or socio-economic status; or rather, structural and societal conditions). They also include ontological considerations of the nature of vulnerability: Is vulnerability considered a static characteristic of specific social groups, or rather, a dynamic condition that might apply to anyone at a given point in time, in a given event? How vulnerability is defined shapes the way it is addressed in policies and practice of disaster preparedness and response. In some areas, like climate change related risks, social vulnerabilities are addressed in risk assessment (IPCC, 2014) and adaptation planning (Grafakos *et al.*, 2020). The

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COVID-19 pandemic revealed widespread difficulties in anticipating and responding to complex vulnerabilities (UN, 2020; WHO, 2020). The heterogeneity of approaches in tackling vulnerability holds not only true for different crises, but equally for different countries and at times even different institutions within countries. Coming to grips with this heterogeneity requires a comprehensive, cross-country comparison of how vulnerability is defined as well as translated into action by the institutions involved in disaster management in order to enhance our understanding of how vulnerability is politically understood and processed. Yet, such a comparative study is so far missing in the literature.

To address this research gap, this contribution looks at how vulnerability has been defined and used in the disaster management systems of eight European countries: Germany, Italy, Belgium, Hungary, Sweden, Norway, Finland, and Estonia. We first review how the concept of vulnerability is presented and defined in institutional systems of different European countries with varying historical and socio-economic backgrounds. Secondly, we identify the distinct ways in which responding to vulnerability has been organised by those systems.

Our comparative study follows a joint research protocol for document analysis and expert interviews in case study countries over the period of September 2019 to February 2020. Data for the document analysis included legal acts and regulatory documents, official policies/strategies, reports produced by think-tanks, research institutions, and NGOs as well as news media reports. We identified key official documents in each country regarding disaster management and scrutinised them for (a) representations of vulnerability, (b) sources of vulnerability, and (c) approaches to mitigating vulnerability. To complement the data gathered via desk research, the same analytical themes were investigated through 95 semi-structured interviews conducted with public officials working in national government bodies tasked with disaster management as well as representatives of non-government organisations involved in disaster management. Interviewees were selected based on document analysis and by applying the 'snowballing' technique whereby informants guided researchers on to other relevant informants (Brace-Govan, 2004). Our research team used a prevalent research strategy in similar cross-national studies (Chapple and Ziebland, 2018), namely a joint, preliminary analyses of interviews and documents that started by compiling case studies built around a brief answer sheet to thematic questions and a longer more detailed country study narrative. We then conducted qualitative thematic content analysis (Nowell *et al.*, 2017) on the country case studies to identify major commonalities and differences in the ways in which vulnerabilities are defined and treated in different disaster management systems.

The picture we gained is messy, revealing the uses of varying, competing, and fuzzy definitions of vulnerability, sometimes even within the same institution. While this fuzziness complicates the study of vulnerability, it also mirrors the current state of its political negotiation. Quarantelli (1987) has argued convincingly that, when it comes to defining ‘disaster’, for instance, scholars must make assumptions clear, and thus debatable. Such a step is an important one in improving disaster risk reduction – to some extent maybe even more important than forcing a shared understanding. This argument is equally relevant to vulnerability as well. Our study provides useful comparative snapshots of these assumptions, allowing us to reflect on the advantages and pitfalls of the different understandings of vulnerability that are present in academia and practice.

We first review the existing research on vulnerability to identify central conceptual debates. We then present the results of our study, showing how vulnerability is understood and addressed in different countries. We conclude by summarising the analysis and discussing the merits of different official approaches to vulnerability.

#### **Readings of vulnerability in the academic debate**

The academic literature on vulnerability is wide and diverse, but we can discern five key debates regarding the concept. The first is on **who or what is vulnerable**. Throughout the history of disaster research, who or what is considered ‘vulnerable’ has been highly contested. The concept of vulnerability differs amongst academic disciplines owing to their focus on different aspects of risk, e.g. household responses to risk or welfare outcomes (Paul, 2014). This diversity stretches from geographical referent objects described as vulnerable, such as concrete locations (e.g. villages, city quarters, rural areas) and technical referent objects, such as infrastructure (e.g. buildings, industry) to societal referents, such as organisations (e.g. relief organisations, social support organisations) and individuals (e.g. elderly, persons with disabilities) to even situations that render the respective referent objects vulnerable (e.g. living conditions, situations of distress).

Defining the referent object of vulnerability is important, since it determines how vulnerability, as a phenomenon, is approached (UNDRO, 1976; Wisner *et al.*, 2004; McEntire, 2005; Anonymous, 2006). While geographical location can be mainly referred to in terms of exposure and infrastructure additionally from a susceptibility perspective, the vulnerability analysis of societal entities – and even more the socio-technical entanglements – requires a more sophisticated, and somewhat more contested, approach. Looking at how the referent object(s) of vulnerability are officially treated can thus help to understand gaps in support, as well as trends in the perception and consideration of vulnerabilities of individuals and groups (Anonymous, 2006).

Similarly, the **ontological basis of vulnerability** is contested. This terminology refers to the question of: Is vulnerability a property of an entity or is it a condition, which applies due to a specific situation. Or in other words, is being vulnerable something static that cannot be changed or is it dynamic. In current disaster management both approaches can be found often associated with the narratives of 'vulnerable groups' and 'vulnerable situations'.

The 'vulnerable groups' narrative is broadly used both in research and practice. Here vulnerability is often cast as a characteristic attribute of certain societal groups due to their specific conditions (Tierney, 2019; Sparf, 2016). According to this view, groups such as disabled persons or those living in poverty are considered vulnerable and tend to be seen as such not only in specific events but in general; vulnerability becomes static. Although this view is supported by recent crises and events which show that it is often similar individuals who can be considered vulnerable (e.g. children, the elderly, persons with disabilities and socio-economically disadvantaged), there are also strong arguments against taking such an approach (Gabel, 2019). Not only do these findings not hold true for all members of these groups – they are also rather quite heterogenic in their needs and need for assistance. Also, those who are often not considered vulnerable might become vulnerable due to certain situations they are in, framing vulnerability as a characteristic which affects everyone in a certain way. Other authors argue against such an essentialist understanding of vulnerability, describing vulnerability as a situational and relative, and thus dynamic, phenomenon (Hilhorst and Bankoff, 2004, pp. 2–3; United Nations, 2015). This view argues that vulnerability is often in flux and cannot be reduced to a single metric to classify (Adger, 2006). Such arguments often outline two aspects that must be considered: one's exposure (the interplay of circumstances and individual conditions including abilities to respond without suffering, diversity of social groups e.g., the capacities differ among elderly); and second, the interplay of different disadvantages, which lead to a person being vulnerable. While vulnerability is linked to socio-demographic markers such as gender, class, or race, increasing evidence suggests the need for an intersectionality approach (Kuran *et al.*, 2020) that helps to differentiate between the specific ways in which structural factors such as socio-economic inequality, inadequate preparedness policies, as well as situational and temporal aspects, may exacerbate these vulnerabilities. In this vein, to what extent, for instance, a person with a certain impairment becomes vulnerable depends on the specific situation but also on existing social structures and the extent to which those empower these persons (Wisner *et al.*, 2004; Mechanic and Tanner, 2007; United Nations, 2015; Gabel, 2019). Therefore Wisner *et al.* (2004, p. 15) propose speaking of vulnerable situations; a term that in 2015 was also taken up by the UN Sendai Framework. However, this approach is much more complex and therefore much harder to operationalize.

Considering these different approaches for disaster management is important for two reasons. On the one hand, we might differentiate between individual conditions and social context as sources of vulnerability, as we do below. While living in poverty can be considered to widely increase vulnerability (Tierney 2019, p. 127), living in affluent society may not necessarily protect against relative deprivation and marginalisation of individuals (Eriksen *et al.*, 2020). Thus, whether a particular impairment increases vulnerability is very much dependent on the general social approach to reducing barriers and on the specific context. Moreover, if people are deemed ontologically vulnerable, they cannot be emancipated but only protected. This, however, results in the deprivation of their agency, thus in an objectification. On the other hand, differentiation means distinguishing between systemic relations and processes on a macro-level (e.g. the definition of vulnerable groups) and the intersectionality of individual living conditions (Sparf, 2016). In this way, whichever approach is used influences if vulnerability is addressed as an individual condition or a societal one.

To reduce vulnerability, it is important to identify **what the sources of vulnerability** are. In line with Blaikie and colleagues (1994, 23), three levels of factors can be distinguished. Meta-level factors are root factors of societal vulnerabilities, which refer to the fundamental societal challenges such as the distribution of wealth and power (Hartman and Squires, 2006). For example, due to differentiating power relations, people are often marginalised due to deviant needs and/or impairments making their interests less heard in planning for disasters (Krüger, 2019). Macro-level factors refer to the degree of society-specific dynamic pressures, such as the given economic development, demographic change and societal inequalities (Christie *et al.*, 2016). This category, for instance, includes the consideration and equality of certain social groups such as persons with disabilities. Policies oriented towards these sources include national guidelines for individual preparedness standards and the responsibilities these set on citizens to prepare for disasters (Kailes, 2015). An example of society-specific pressures may also include the low trust in news sources and weak public service media which make individuals more susceptible to false claims and malicious disinformation that may put them to increased risk (Hansson *et al.*, 2020; Torpan *et al.*, 2021), as particularly evident from the COVID-19 crisis (Hansson *et al.*, 2021). Micro-level factors describe the specific policy and procedural situations of dealing with a crisis in a given society, such as economic/planning/housing, accessibility, or the use of media, but also the disaster management strategies in dealing with vulnerability (Kailes and Enders, 2007). These strategies, for instance, consider climate change adaptation efforts, which are particularly increasing in urban areas subject to extreme weather events (Grafakos *et al.*, 2020; Hunt and Watkiss, 2011).

Different ways to conceptualise vulnerability are linked to varying assumptions regarding **which actors are tasked with alleviating it**. These are critical assumptions since identifying obligations suggests which potential capacities both vulnerable individuals have, as well as what role the state actors or the non-government sector have in alleviating vulnerability. Official positions reflect broader societal assumptions and influence the robustness of social structures. Who receives what kind of support depends on the conceptualisation of vulnerability, thus the legitimacy of consuming granted resources, and the prevailing distribution of responsibility to cope with disasters (Kaufmann, 2013).

The question of obligation to reduce vulnerability is important also considering the interaction and co-constitution of disaster management and social structures. In different countries, the institutions and actors responsible for vulnerability reduction vary. Therefore, the approaches to vulnerability in different disaster management systems may depend on the structures of national institutions and policies assigned to mitigate vulnerabilities. The role of state has been emphasised as the key actor for reducing the vulnerabilities and enabling resilience since many individuals are deprived of the economic and social resources necessary for (re)acting in response to hazard or crisis (Krüger, 2019).

That said, the social structures in which individuals are embedded are of utmost importance for disaster management purposes (Sparf, 2016, p. 2). Furthermore, as disasters not only produce vulnerabilities but also worsen those which already exist in everyday life (IFCR, 2007; Kelman and Stough, 2015), the reduction of vulnerability is not only a task for disaster management actors but also, for instance, for non-disaster management actors such as care service, social services, disabled persons' institutions.

People outside of formal emergency and disaster management arrangements may help others who are at risk or affected by disasters (Whittaker *et al.*, 2015). Taking a closer look at this cooperation between security and civil society actors regarding vulnerability reduction allows for an identification of gaps to improve support (Wisner *et al.*, 2004; Mechanic and Tanner, 2007).

Finally, the question of **how vulnerability can be reduced** arises in conceptual discussions. According to different understandings of the above-mentioned dimensions of vulnerability, the measures to reduce social vulnerability can differ. At the same time, similar understandings of vulnerability might lead to different approaches for dealing with them in different countries (Räsänen *et al.*, 2020). These differences start with the way vulnerabilities are assessed, depend on the actors responsible to act, and may continue with the specific strategies and tools that are used to reduce vulnerabilities.

Our study started from this theoretical background and looked at the form and extent to which vulnerabilities are considered in national crisis planning and responses. Our empirical evidence confirms that different national disaster management systems reflect different positions on these five central discussions. The following section reviews the empirics, combining the results of country-specific analyses built on official documents, secondary literature, and interview transcripts. The countries analysed here were not sampled in such a way as to allow for generalisation. The selection strategy was mainly a convenience sample: our language competences and access to data led us to these countries. The countries represent both large and small member countries, along with countries traditionally seen as 'new' and 'old' members of the European Union. The analysis provides a useful heuristic indication of the variety and diversity of national European approaches to the question of vulnerability.

### **Vulnerability in national disaster policies in Europe**

Throughout our research, it became clear that few countries take a thorough, in-depth approach to problematising 'vulnerability' or its definitional implications. Moreover, vulnerability was rarely consensually defined within a single country, since various actors held different definitions of vulnerability. Still, through close analysis and assessment of discourses employed and implications stated, some patterns both within and across countries could be identified. This chapter aims at structuring the diverse and partly contradictory definitions of vulnerability along three axes by shedding light on the different referent objects and ontological constitutions of vulnerability, as well as on the different allocations of responsibility to reduce vulnerability.

#### ***Who or what is vulnerable?***

One clear finding is that, across cases, discussion of individuals as the main vulnerable object is limited. National disaster management systems have been mainly focused on the vulnerability of critical infrastructure rather than on individual vulnerabilities in crises. In several instances (e.g. Germany, Finland, Estonia), individuals or 'vulnerable groups' are simply mentioned in national policy documents without specifying who in particular belongs to these socio-demographic groups (e.g., clear definitions for children, elderly, people with special medical conditions), what characterises their vulnerability or what makes certain individuals or groups vulnerable and in which situations. While the term 'vulnerability' is occasionally mentioned in national policy documents on civil protection and disaster management, alternative notions and ways of interpretation are preferred in some countries. For example, in Italy, individual or group vulnerabilities are generally described in



terms of 'social fragility' or 'special needs' of individuals who, despite specific welfare and medical assistance by civil protection authorities, are not self-sufficient (Council of Ministers, 2018; Civil Protection Department, 2019). In Hungary, instead of the vulnerability concept, the term 'disadvantaged group(s)' is frequently used to denote people who are unable to protect themselves against shocks due to their disability, age, health condition, or social status (Endródi, 2015, p. 126).

A more quantified, and natural-hazards (earthquakes) centred, definition of vulnerability related to risk is used by the Italian Civil Protection Department (2018), where it follows the formula:  $Risk = probability * vulnerability * exposure$ . The larger the probability of the hazard and the extent of the exposure, the greater is the risk. The vulnerability component denotes the propensity of the people and activities or infrastructures affected to suffer damage following the occurrence of events (Civil Protection Department, 2018).

Germany and Belgium use aspects of quantifiable as well as more contextualised definitions of vulnerability. The German Federal Office of Civil Protection and Disaster Assistance (BBK 2014b, p. 20) has considered vulnerability as linked to the interplay of three components: *exposure* as the physical affectedness by a (natural) hazard; *susceptibility* as the likelihood to suffer harm caused by an exposure; and *coping capacity* as the availability of resources to mitigate negative effects of it.

In conclusion, the consideration of individual vulnerabilities varies, whereas the definition of vulnerable groups or entities as well as the baseline conditions for rendering situations vulnerable mostly remain vague.

#### ***What is the ontological basis of vulnerability?***

As the theory section above highlighted, academic discussions of the ontology of social vulnerability (whether vulnerability is an absolute feature of certain population or whether it is dynamic, depending on situations) interact with debates over the meta-, macro-, or micro-sources of vulnerability. We thus examine both analytical questions here. While we hold that both perspectives have advantages as well as pitfalls, we primarily aim at collecting and analysing the interviewees' stances on vulnerability rather than providing a detailed conceptual discussion.

The relative and situational nature of vulnerability is highlighted in approaches taken by Sweden, Norway, and Finland. For example, a Swedish Civil Contingencies Agency (MSB, 2011, p. 8) study on natural disasters argues that all approaches to the concept of vulnerability must take into consideration the complexities of local contexts. The study concludes that differences in geographical locations and social contexts create a different understanding of vulnerability. Hence, it remains

difficult – if not impossible – to establish a universal or at least a national definition of vulnerability (ibid). Rather the contrary, as one interviewee in a leading position in an aid organisation stated: the term ‘vulnerability’ was not used at all in his daily work on the ground (Interview at German Aid Organisation 3 12/2019) (which of course does not imply that the phenomenon of being vulnerable is ignored in practice). Given this broad range, references to the concept of vulnerability are highly contextual and make it hard to find general assessments about its consideration. In contrast, a number of interviewees referred to particular groups (particularly elderly people or people in need of care) as being vulnerable per se, which represent a rather static understanding of vulnerability. The German Federal Office of Civil Protection and Disaster Relief defines vulnerable groups along personal abilities as well as situational preparedness. It thus merges different readings of vulnerability by combining situational and ontological aspects (BBK, 2019, p. 15). Moreover, vulnerability is equally ascribed to individuals, groups and materiality, such as infrastructural artefacts. The different referent objects of vulnerability point to different ontological understandings of vulnerability, oscillating between the material fragility of infrastructure to ascribed group characteristics and situational contexts rendering entities vulnerable.

Often, individual vulnerabilities are considered in relation to specific hazards and risk scenarios. The threats that appear to be most acute in a particular society or region also determine which kinds of vulnerabilities become acknowledged (or, on the contrary, overlooked). This selection bias is evident in the case of cyber threats, which are paid increased attention in several countries disaster management system analysed here (Norway, Sweden, Estonia, Finland).

In sum, the picture we gained from the interviews is a fragmented one. While there is a tendency for a situational understanding in many Nordic countries and the dominance of vulnerable group thinking in Germany, Italy, Hungary and Estonia, definitions also varied within countries and across disaster relief actors (and sometimes even within the same disaster relief body). Also, some interviewees ascribed vulnerability to their disaster relief organisation and/or to critical infrastructures (Interview at German Aid Organisation 1 12/2019; Interview at German Aid Organisation 2 1/2020), adding an organisational and technological framing of vulnerability to the picture (Rogers, 2013). These variations might be traced back to different state actors with different responsibilities owing to the kind of hazard which is to be addressed.

#### ***What are the sources of vulnerability?***

Several country studies (Germany, Italy, Hungary, and Estonia) indicate that on the operational level of disaster management, vulnerability is mainly related to an individual’s limited, or inadequate

perceived, self-sufficiency in disasters, which results in a higher need for external assistance. This implies that certain people have a higher propensity to rely on help from their social networks or state institutions when it comes to preparing or responding to a crisis.

In most countries, vulnerability is considered as something that can be reduced through preparation. That means becoming aware of threats, acquiring skills, and material sustenance required for coping. Individuals who have, either independently or in cooperation with their communities, completed necessary preparations for crises are seen as considerably less vulnerable (Estonian Government Office, 2018, p. 30; FHS, 2019). Whereas self-preparedness is generally advised, existing literature warns of the withdrawal of the state from responsibilities in enabling preparedness also by vulnerable people (for more, see the following section on alleviating vulnerability).

Authorities in several countries (Finland, Sweden, Norway, and Belgium) acknowledge that individual capabilities to influence vulnerability are not for the individual to choose, but rather coping capacities very much depend on the structural as well as situational conditions that shape the opportunities to prepare and protect oneself. The reflections by interviewees in Sweden, Belgium and Estonia problematize the *a priori* identification and acknowledgment of certain individuals or groups as 'vulnerable' in crises, because it may lead to stigmatisation and victimisation in society (Interviews at MSB, 12/2019; Brussels-Prevention & Security, 12/2019; Estonian Ministry of Social Affairs, 11/2019).

Combining our first two analytical dimensions (referent object and ontological status), we can identify a variety of examples of individuals or groups characterised as 'vulnerable' to certain hazards or in crises in general. The examples of vulnerable individuals and groups, along with the aspects that are seen constitutive of their vulnerabilities and the specific crisis contexts in which they are mainly described as vulnerable, are summarised in Table 1.

Our analysis shows that individual and group vulnerabilities are mentioned most often in the context of extreme weather events, especially those linked to climate change, but also in relation to disruptions of vital services, accidents and attacks. The overview shows that vulnerability factors can be read either as a group-characteristic or as situational description. Certain individuals or groups like the elderly, children, the chronically ill or persons with disabilities are generally seen as vulnerable to different kinds of threats. Thereby, individuals with heterogeneous backgrounds are grouped into a certain attribute (e.g. elderly) to determine their vulnerability while neglecting their otherwise different contexts and capacities. Their vulnerability is said to be rooted in individual or group characteristics but can also be deepened by certain situational factors. Individual vulnerabilities primarily explained by situational or contextual factors, on the other hand, are threat-specific rather

than universal. The factors that are seen constitutive of individual vulnerabilities often tend to intersect in the case of certain individuals and groups; for example, elderly who live alone or in an institutional setting.

**Table 1.** An overview of factors seen as constitutive of individual and group vulnerabilities

<b>Factors seen as constitutive of vulnerabilities</b>	<b>Examples found in the study</b>	<b>Crisis contexts which might be problematic with regard to these factors</b>	<b>Reference</b>
<b>Mental and physical capacities, Mobility</b>	Elderly; infants and children; persons with disabilities; people with specific health conditions (e.g. people with dementia)	Climate-related and natural hazards (e.g. heatwaves); situations that require evacuation; diseases and pandemics	Italy (Council of Ministers, 2018), Germany (BBK, 2014b), Sweden (MSB, 2014b, 2016), Norway (Helsedirektoratet, 2016), Hungary (NDGDM, 2012), Finland (Tuomenvirta <i>et al.</i> , 2018), Estonia (Ministry of Interior, 2018)
<b>Communication abilities</b>	People having limited access to information due to limited mental or physical capacities or poor language skills (e.g. migrants, tourists)	Crisis situations that are preceded by public warnings; (transport) accidents	Germany (BBK, 2014b), Belgium (Interview at BPS, 12/2019), Finland (Hyvonen <i>et al.</i> , 2019), Norway (Interviews at Oslo og Viken and Nordland County, DSB, 2019), Estonia (Estonian Government Office, 2018)
<b>Social capital and networks</b>	People living alone and/or without personal social networks, inhabitants of isolated areas; non-resident groups	Crisis situations that require evacuation and relocation of people, natural hazards and weather-extremes	Germany (BBK, 2014b), Sweden (MSB, 2016), Estonia (Estonian Government Office, 2018)
<b>Socio-economic status</b>	People living in poverty; recipients of social benefits (e.g. unemployed); socio-economically marginalised (e.g. homeless)	Crisis situations that require self-preparedness and equipment; situations that require evacuation; disruptions of financial services	Finland (Turvallisuuskomitea, 2017; Hyvonen <i>et al.</i> , 2019), Estonia (Estonian Government Office, 2018)

<b>Institutionalised setting</b>	People living in institutional settings (e.g. social and elderly care facilities, hospitals, shelters, prisons etc.); schoolchildren	Crisis situations that require evacuation and relocation of people; on-site accidents (e.g. fires) and attacks (e.g. school shootings); disruptions of vital services	Sweden (MSB, 2016), Norway (Interviews at Oslo og Viken and Nordland County governments and DSB, 2019), Estonia (Estonian Government Office, 2018)
<b>Type and conditions of dwelling</b>	People living at top-floor (e.g. in the case of heatwaves) or basement-floor apartments (e.g. during floods); apartment-buildings depending on central provision of vital services	Climate-related and natural hazards (e.g. heatwaves, floods, storms); disruptions of vital services (electricity, heating, water supply, sewerage)	Germany (BBK, 2014a, 2014b) Hungary (Interview at PVSZ, 12/2019); Estonia (Interview at ERB, 11/2019)
<b>Residential area or geographic region</b>	People living in urban areas with a high exposure to hazards; areas which are isolated; areas of hazardous facilities	Climate-related and natural hazards (e.g. heatwaves, floods, storms, earthquakes); industrial accidents; attacks; disruptions of vital services	Germany (BBK, 2014a, 2014b); Sweden (MSB, 2014b, 2016); Estonia (Estonian Government Office, 2018)
<b>People on the move</b>	Visitors of an area, tourists, commuters, passers-by	Accidents; attacks; transport disruptions fires; disruptions of vital services; climate related and natural hazards	Belgium (Interviews at BPS, 2020); Norway (DSB, 2019).

Broad societal challenges and pressures are rarely addressed in most conceptions of vulnerability. Typically, individual physical and mental capacities, communication behaviour, but also individual social networks are considered as sources of vulnerability. These are related to the individual's capacities, rather than the ability of policies, procedures and structures to appropriately support and enhance crisis coping. The macro-level sources of vulnerability become more prominent when the geographic and infrastructural surroundings of an individual or community are stressed (e.g. hazard-prone areas, disruptions of vital services). However, even when interlinked, these macro-considerations hardly explicitly address welfare issues as structural impediments to disaster coping. Institutionalised settings in which certain individuals or groups, who may already have limited or reduced physical and mental capacities are placed, imply further dependency on the environment and its capacity to protect. Interviews revealed also another situational element of vulnerability –

being on the move or happening to be in the place of an accident – highlighting the situational quality of vulnerability that is not easy to document officially.

***Who is tasked with alleviating vulnerability?***

None of the countries studied here has a specific disaster management authority or civil protection agency whose specific, formal obligation is to research and mitigate disaster vulnerability. Instead, authorities and actors from different sectors and levels of disaster management (national, regional, municipal) generally deal with vulnerable individuals and groups as part of their overall responsibilities related to disaster management. However, their professional competences and preparedness for that usually vary.

*State and local authorities*

At the national level, central authorities (including ministries and agencies) responsible for disaster management generally draft policy guidelines and regulations, conduct assessments, and plan as well as organise risk and crisis communication. In several countries, such as Germany, the disaster management system is designed in a decentralised and subsidiary manner. Therefore, when it comes to making and implementing disaster management policies in some countries, the national level is in a subordinated role. We identified only three countries (Sweden, Finland, and Estonia) in which state-level initiatives were focused specifically on vulnerable groups. For example, the Finnish National Rescue Association (Interview at SPEK, 1/2020) organises trainings, conducts research on vulnerabilities, and builds networks with other authorities and research communities to be prepared for working with e.g. the elderly, people with memory disorders and migrants during a crisis. In Sweden, the Civil Contingencies Agency has organised training in collaboration with a non-profit organisation and municipalities to enhance young people's handling of multiple types of disadvantages, including being socially excluded, in times of crisis (Interview at MSB, 12/2019). In Estonia, the Estonian Rescue Board works on crisis preparedness as part of their home counselling on fire safety, which is targeted at but also aims to identify and advise vulnerable households (Interview at ERB, 11/2019).

At the local level, municipalities and local (social welfare) authorities are generally expected to have information and knowledge about vulnerable individuals and groups among their residents as well as to provide primary emergency assistance to them in crises. However, the extent to which municipalities' respective obligations and tasks are regulated varies significantly between different countries. Social vulnerabilities are addressed by the work of social services on the municipal level

following the law for disaster management (in Norway and Finland) (Rapeli, 2018) and by the law of social and other municipal services applying regardless of the circumstances (in Sweden, Estonia, Germany, Belgium, Italy, Hungary). While in some countries (Sweden and Norway) municipalities are obliged to analyse and consider individual vulnerabilities as part of their risk assessments and/ or emergency plans, in other countries, this is advised, but not mandatory (Germany), and in early stages (Finland, Belgium, Italy) or missing (Estonia, Hungary).

#### *Voluntary organisations*

In most countries (e.g. Germany, Italy, Belgium, Hungary, Norway, Finland), civil society organisations such as the national Red Cross, voluntary organisations working with certain constructed vulnerable groups (e.g. homeless or disabled people), or associations specialised in providing certain types of assistance (e.g. psychological help) have a crucial role in assisting those vulnerable during disasters. In Belgium, for instance, the Red Cross supports citizens within the first 48 hours of a crisis (Red Cross Belgium, 2016). By way of example, the Red Cross were key actors during the response to the terrorist attacks in Brussels airport Zaventem and Maalbeek metro station in March 2016. In Italy, the Red Cross and other volunteer organisations provide healthcare as well as psychosocial assistance to the affected population, focusing particularly on minors and the elderly; as occurred, for instance, during the L'Aquila earthquake (Red Cross, 2010). In Germany, the Red Cross and other emergency organisations also provide relief work, as in the 2002 and 2013 flooding incidents (DRK, 2014). Moreover, the church is actively involved in assisting vulnerable people in crises, especially with psycho-social help, as for example in Finland. In Estonia and Sweden, the Voluntary Defence League has taken the role in helping those vulnerable in disaster situations (Kaitseliit, 2017).

#### *Community responsibility*

In cases where individual, informal preparedness for crises is seen to reduce individual vulnerabilities, authorities encourage citizens' acknowledgement and assistance of other community members' vulnerabilities to various hazards and crises.

Public guidelines proposed for crisis preparedness and appropriate behaviour in crises can remind people to pay attention to and, if possible, help those in need (e.g. BBK, 2018). Noticing vulnerable individuals in their community while preparing for or when in crisis is encouraged, for example, in the Estonian (Ministry of Interior, 2018), Finnish (SPEK, 2020), German (BBK, 2018), and Swedish (MSB, 2018) guides for public emergency preparedness. Such reminders, however, are often rather general without giving primary instructions on how to assist one another in a crisis. The German guide

“Disasters Alarm” represents rather the opposite by providing a concrete action list to prepare for a disaster and particular actions to cope with a disaster (BBK, 2018). In Germany and Finland, the government-coordinated first aid and safety courses encompass self-protection as well as acknowledge the needs of certain social groups (e.g. children, care givers, refugees) (BBK, 2019; Suomen Pelastusalan Keskusjärjestö, 2020).

Only in Norway, based on the interviews and references used here, do municipalities have a coordinated active role in advising people on how to prepare for crises and recognise those who would need assistance in such situations. For example, Oslo municipality in Norway, in its crisis preparedness guidance, encourages people to think about others with impaired vision, hearing or mobility in their neighbourhood or community, as well as about persons who do not understand Norwegian or English and may thus need help in a crisis (Oslo kommune, 2019).

In addition to government and public sector initiatives, voluntary aid organisations can also significantly contribute to citizens’ awareness and acknowledgment of vulnerability factors, as the findings from different countries (e.g. Finland, Belgium, Italy) suggest. In Belgium, for example, the national Red Cross has programmes where people can volunteer to visit isolated elderly people in their homes or at asylum centres (Interview at Red Cross Belgium, 12/2019). However, these programmes convey implicit assumptions of normal capacities and run the risk of unduly transferring responsibility to individuals without regard of their actual coping capacities. Scholars argue that this is problematic if the mitigation of vulnerability remains a demand rather than a political goal that is pursued by means of providing adequate capacities (Krüger, 2019).

#### ***How to reduce vulnerability?***

National policies and regulations on disaster management generally do not include specific requirements or tasks concerning how authorities should deal with vulnerable individuals or groups in the context of prevention, preparedness, response and recovery. Even if general principles oblige respective authorities to consider certain individual aspects or needs, the question of how this should be done remains often open.

Finland is one of the few countries in which rescue services responsible for assisting individuals in accidents and crises have their own organisational and procedural guidelines on how to deal with individuals and groups defined as vulnerable. The Finnish National Rescue Association, for example, has prepared trainings and materials focusing on specific groups such as ethno-cultural minorities



(SPEK, 2020). Rescue services are also prepared to assist the elderly in care institutions or people with disabilities (Interviews at SPEK South-West area, 12/2019; South-East area, 1/2020).

In most cases, the responsibility for creating and/or implementing guidelines on how to assess and respond to individual vulnerabilities in crises falls on municipalities and local authorities. Specific guidelines on municipal support to vulnerable groups in crises exist in Norway, Finland and Belgium. For example, Belgian municipal plans need to consider a broad range of referent objects from individuals to institutions who are particularly vulnerable due to their location or activity (FPS, 2019). In Norway, the regulation concerning municipal emergency preparedness includes references to vulnerable groups such as children and youth, and asylum seekers and refugees (Helsedirektoratet, 2016; DSB, 2018).

In other countries (Germany, Italy, Hungary, and Estonia) guidelines for local municipalities exist only on a very general level. For example, the Estonian Civil Protection Concept (Estonian Government Office, 2018) highlights the need for assessing the number of people with special needs in local municipalities. In Hungary, the emergency plans prepared by municipalities or workplaces ought to specify conditions for 'disadvantaged groups' (Ministry of Interior, 2011) but there is no central guideline on how to do that.

#### *Assessment of vulnerability*

One approach to reducing vulnerabilities is to start with a vulnerability assessment. Such assessments are predicated on the idea that results can provide a basis for the allocation of resources for preparedness, response and recovery. We found different types of assessments and surveys that vary in their thematic scope and focus, including *ex ante* and *ex post* analyses, as well as various methodological approaches conducted in different countries' disaster management systems.

Such assessments are conducted in advance, to improve preparedness. However, they can also be carried out during and after the crises. The few *ex-ante* analyses conducted by the national authorities aim to identify social groups that may be vulnerable to certain hazards or possible crises in society. In several countries (Sweden, Finland, Norway, Belgium, Estonia and Germany) national assessments for climate change mitigation and adaptation also cover the definition of vulnerable individuals following the EU Adaptation Strategy (COM, 2013). The Finnish assessment of climate risks, for instance, indicated that particularly elderly people suffer from heat waves and warmer winter weather (Tuomenvirta *et al.*, 2018).

In Sweden and Norway, national vulnerability assessments also cover other risks. Swedish government agencies are required to conduct annual risk and vulnerability analyses, which primarily concern accidents involving dangerous chemicals, extreme weather conditions, and disruptions in technical infrastructure (Sveriges Riksdag, 2006, p. 942). Here, too, the elderly are singled out as vulnerable with regard to various risks, especially those living alone or in care facilities (MSB, 2014a, 2016). Similarly, in Norway, several national analyses of vulnerable groups regarding various accidents have been conducted over the years (Haldorsen and Munch-Olsen, 2011; Norwegian Government, 2012; Interview at DSB, 12/2019).

In Sweden and Norway, municipalities took the lead on risk assessments and identify vulnerable individuals within their territory as part of their prevention and emergency planning strategies. For example, in Norway, the respective municipal level risk and vulnerability analyses have pre-identified several vulnerable groups: people depending on home care in the case of extreme weather events that hinder mobility; high school students in the case of school shootings; tourists who lack local networks (ibid). In Germany, the Federal Office of Civil Protection and Disaster Assistance (BBK) has published guidelines for assessing individual vulnerability to heat waves, heavy rainfalls and floods at a community level (BBK, 2014a, 2014b). Moreover, the BBK provides examples of vulnerable groups as a precondition for the subsequent strengthening of disaster resilience (BBK, 2019). However, as is the case in many of the countries studied here, we did not find evidence of how these guidelines have been used in practice.

Only in Italy did we find evidence of assessments conducted during a crisis to identify vulnerable individuals in an emergency (e.g. people who need special assistance). During crises, the Italian Civil Protection Department collaborates with municipalities to assess the immediate needs of those individuals identified as the most fragile, also based on a recently issued questionnaire formula (Civil Protection Department, 2019).

*Ex post* analyses are carried out to learn about the experiences of residents or groups most affected by a disaster. For example, the Finnish National Rescue Association (SPEK, 2017) conducted a survey among the local residents of the City of Pori in Finland after a fire at a titanium dioxide manufacturing facility in 2017. In Hungary, a social impact analysis was conducted after the red sludge disaster in the south-western part of the country in 2010 (Ferencz and Bartal, 2015), indicating the increased tensions between Roma and other inhabitants compared to relations before the disaster (ibid).

Criticism has been raised against the use of risk assessments, often by state authorities themselves. A study by the Swedish Civil Contingencies Agency (2010, p. 28) argues that identifying vulnerable

groups is extremely difficult, and it is challenging to include those results in the preparation of emergency planning measures. The study questions the implications of pointing out vulnerable groups publicly, as well. Other actors demand a sound analysis of needs and vulnerabilities according to international and national standards (DRK, 2018, p. 9). Yet, the collection of adequate information on individual vulnerabilities requires coordinated efforts between different local authorities, services and sectors, which, however, may not always succeed. The results of such analyses can thus be misleading.

#### *Risk and crisis communication*

Risk and crisis communication efforts are also growing as a way to address vulnerabilities and needs of individuals. Most countries had communication guidelines in place to that effect. In Hungary, rules related to disaster management mentions that 'disadvantaged groups' should be informed about the eventual crisis appropriately by applying tailored materials and guidance (Ministry of Interior, 2011). In Norway, the same principles are included in national communication policy and equally applied in the field of disaster management (Fornyings- og administrasjonsdepartementet, 2009). Oslo municipality, for instance, has translated its guidelines on household preparedness for crises into several languages and has shared these translations with other Norwegian municipalities (Interview at County Government of Oslo and Viken, 12/2019). The German Ministry of Interior published a guideline on crisis communication acknowledging the necessity of a transparent dialogue with the population that recognises needs and thus grants the authorities credibility in its problem solving competence (BMI, 2014).

Authorities interviewed for this article also pointed out deficiencies in informing vulnerable individuals about hazards and emergencies. In the case of emergencies, it can be difficult to reach people who do not have enough knowledge of the national language(s), or who do not use national or local information channels (Interview at Brussels Prevention and Security, 12/2019). The needs of migrant groups as well as foreigners involved in emergencies are increasingly addressed in the context of disaster management in several countries (e.g. Germany, Italy, Belgium, Sweden, Norway, Finland). Yet, risk and crisis communication may not be adjusted to the needs of other vulnerable groups, such as disabled individuals. For example, in Sweden and Germany, public address systems used for emergency warnings have been criticised for the lack of adaption to sensory impaired individuals (Bachman, 2013; UN-HRC, 2015; DRK, 2018; Interview at MSB, 12/2020).

## Discussion

The empirical findings presented here reveal a rather mixed picture of how vulnerability is approached. Not only is it addressed in different ways but also to differing extents and via different structures in and across countries and sectors.

While countries like Sweden, Norway and Finland tend to have a more contextualised – thus qualitative – *understanding of vulnerability*, Italy has a more categorical, quantifiable approach. Belgium and Germany combine aspects of both. In Hungary and Estonia, but also in Germany, vulnerability is attributed to certain groups, mainly pre-determined based on socio-demographic factors (the elderly, chronically ill, or socio-economically deprived).

There are pros and cons to all approaches. By categorising individuals as genuinely ‘vulnerable’ due to ascribed and familiar characteristics (e.g. age, gender, disabilities), relief operations can focus on speedy response during a disaster. But the downside is an implicit tendency of stigmatisation of certain populations and a lack of nuance regarding support needs. Not all elderly people of the same age have the same needs. Because of a variety of individual factors, needs can differ substantially amongst those who are subsumed under the same ‘vulnerable group’. Dynamic, or situational understandings of the nature of vulnerability put the type of disaster or shock upfront in planning, rather than emphasising the similarity of particular groups (Gabel, 2019). This mitigates the risk of stereotyping people. However, such an understanding of vulnerability is rather abstract and although used in the Sendai Framework, difficult to be made actionable in disaster relief operations. This can finally result in a lack of action, since the onset of a disaster brings other priorities.

Similarly, the idea of ‘vulnerable groups’ conveys assumptions about the nature of vulnerabilities and produces (vulnerable) populations. The notion of ‘special needs’ individuals is one such example. Following Kailes and Enders (2007), that very term suggest persons posing an extra – non-normal – burden on disaster management structures. Neither the importance of guaranteeing all citizens access to information, nor the individuals’ demand to receive information or warnings is by any means ‘special’. However, disaster management organisations may nevertheless see this as ‘additional effort’. In this way, security politics in general and disaster politics specifically are the product of and can perpetuate normative assumptions about and within society.

Our empirical material indicates that typically, individual capacities, communication behaviour, and social networks are considered as *sources of vulnerability*. These tend to intersect in the case of some individuals and groups (e.g. elderly in institutional settings) and may be exacerbated by certain situational factors. However, vulnerability is rarely seen as triggered by local strategies (e.g. segregation due to planning), procedures (e.g. poor crisis preparedness of care homes and hospitals)

and structures (e.g. areas lacking alternatives to existing vital infrastructures). Our data thus reveals a prevailing lopsided idea of vulnerability that neglects some root causes for uneven coping capacities between different parts of society. Even in affluent countries included in this study, the pre-existing systemic inequalities in societies are perpetuated during crises as well as the subsequent recovery phases. This has been demonstrated in previous research (e.g. see the case of Hurricane Katrina in (Tierney, 2019, pp. 136-143) and holds true for the COVID-19 pandemic. In the latter, lower income populations having higher infection rates due to fewer possibilities to work from home or poorer access to tests (Shadmi *et al.*, 2020; Chang *et al.*, 2021). Even in countries with a strong welfare system, risk information and official warnings may not be accessible to homeless, non-native language-speakers or individuals with mental disorders. Similarly, novel telehealth and online learning services are not accessible to everyone (Shadmi *et al.*, 2020).

The specific approaches to individual vulnerabilities studied here appear to be rather selective due to the specific national contexts, histories, and the variety of threats recognised by that society. Following Kathrine Tierney (Tierney, 2019), societies co-produce and co-construct disasters. The only commonality seems to be the recognition that extreme weather events, often linked to climate change, may produce coping problems for vulnerable individuals. Largely due to pan-European disaster management efforts to highlight that problem, climate change adaptation efforts do consider aspects of social vulnerabilities (Grafakos, *et al.*, 2020; Orru *et al.*, 2018).

We find that *vulnerability reduction strategies* and conceptions of *who should mitigate vulnerability* tend to place the burden on individuals by neglecting those structural issues rendering some more susceptible to the consequences of disasters than others. Risk and crisis communication strategies are widely used while the provision of economic and social support structures for crisis preparedness and response may be inadequate. Similarly, we found an array of public guidelines urging citizens to look after ‘the vulnerable’. But these lack specificity and can easily lead to an abdication of institutional/state responsibilities. Moreover, this stance on vulnerability renders ‘the vulnerable’ to passive receivers of help by depriving any sort of agency or competence (Krüger, 2019).

Many preparedness measures in the countries studied stem from the communal level, including municipalities (social and welfare authorities) and non-governmental actors. Except for some evidence of growing municipal-level initiatives in Sweden, Norway, and Belgium, municipalities are usually provided only with limited guidance on how to fulfil that task. In other countries, this is in early stages (Germany, Italy) or missing (Estonia, Hungary) and vulnerable groups are primarily pre-determined based on external attributions. Based on the example of climate change adaptation (Reckien *et al.*, 2018, 2019), the municipalities provided clear policy guidance from national

government can better mitigate social and infrastructural vulnerabilities in these extreme weather events. Moreover, municipalities with experiences in disaster relief have a more nuanced understanding of their own capacities and limitations.

One reason for the lack of nuance and understanding of social and cultural contexts shaping disaster vulnerability is a lack of disaggregated census data on social diversity (Mazurana et al., 2013). Disaster management agencies tend to be disconnected from social services and any meaningful understanding of societal diversity. They have little training or knowledge of individual needs (IFCR, 2018). This general issue is also represented in the gap between disaster management and social actors (see e.g. Gabel, 2019 for Germany).

Our extensive interview material and scrutiny of relevant documents indicate that too little research has been carried out on vulnerable individuals and groups to better comprehend their risk perceptions, crisis preparedness and response strategies. Yet, this empirical work is necessary to ensure that individuals identified as vulnerable are not considered passive. Whether official expectations of individual vulnerabilities at the municipal level matches appropriate institutional arrangements (e.g. guidelines and resources for assessment, risk and crisis communication) in different countries remains to be explored in more detail.

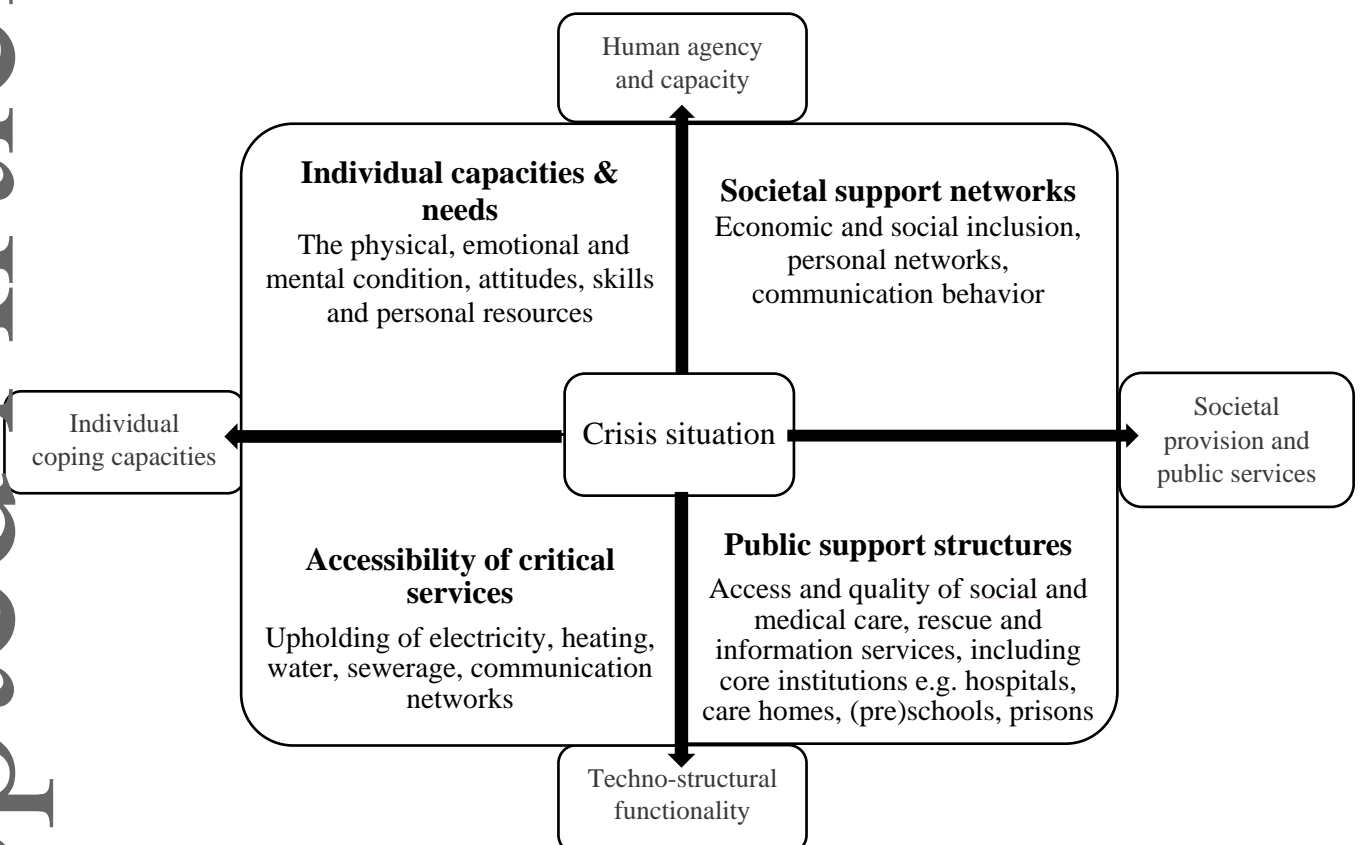
The importance of differentiated approaches, acknowledging both individual characteristics as well as societal structures, must also be considered by European officials increasingly involved in devising collective crisis and disaster management policies. At best, European level guidelines seem most useful, rather than legislation or a 'one size fits all' approach. While understanding the diversity in causes and conditions of vulnerability is just a first step towards a more nuanced approach to effective policy, it is a critical one in tackling the root causes of vulnerability rather than only focusing on its symptoms.

Furthermore, in order to be able to use the existing ideas and procedures to reduce vulnerability in the most profitable way, it is necessary to make diverse conceptual assumptions about vulnerability explicit. Only then can societies debate the issue, and only then can scholars make cross-country comparisons and consider generalisability. Therefore, we suggest that future guidelines on vulnerability should answer five key questions:

- Who or what is considered vulnerable?
- Is vulnerability considered static or dynamic?
- What are the considered sources of vulnerability?
- Who is tasked with alleviating vulnerability?
- What are measures to reduce vulnerability?

Moreover, we would argue that the *sources* of vulnerability need more consideration in disaster management policies due to an ever-increasing societal reliance on such support, particularly in affluent, technology-dependent societies with relatively strong social care systems. We suggest that for a more systematic understanding (assessment and response), the identified factors of social vulnerability could be categorised across two dimensions: (1) are these sources primarily the result of human agency or technological functionality, and (2) are they more dependent on individual coping capacity or societal support structures (Figure 1).

Figure 1. Conceptual dimensions of 'social vulnerability' in disaster management.



In a specific crisis situation, vulnerability could be conceptualised, on the one hand, in terms of human agency and capacities as well as the functionality of the surrounding technological and political structures. On the other hand, vulnerability may be seen as a function of the availability of social (material, psycho-social and informational) support through private relations and/or through societal provision (institutional care). In our view, both dimensions should be included if one seeks to devise a comprehensive definition of vulnerability as in crisis, these factors of vulnerability intersect and their impact is amplified or attenuated by the situation characteristics (e.g. individual proximity to hazard source, measures applied in specific situation).

Finally, there are limitations to the method of cross-national comparative qualitative analysis applied in this study. The mapping of varying interpretations of vulnerability across countries is challenging

due to the country-specific connotations of the terms used in various documents and by the interviewees. Research team members' knowledge of the local socio-cultural contexts, including the institutions and policies involved in national disaster management, helped to mitigate the risks of misrepresenting country data. Having multiple interviewees from each country allowed us to further compare and re-check the validity of information provided about its disaster management system.

## Conclusion

Although vulnerability is one of the core concepts in current disaster risk reduction strategies, what is understood and done in this regard differs remarkably across countries and institutions. Disaster management policies and practices are often shaped by fuzzy, competing, and theoretically incongruent understandings of *who* is considered vulnerable, due to *what reasons*, and *who* should do *what* to alleviate vulnerability.

We found various pre-determined and context-specific conceptualisations of vulnerability applied in eight European disaster management systems. This empirical diversity should stimulate further theoretical debates about appropriate ways of approaching and tackling vulnerability. Our results suggest that before a consensual approach to vulnerability can be developed to improve disaster management in Europe, policy makers and disaster management practitioners should always make transparent their assumptions and definitions of 'vulnerability'. We have put forward a heuristic model for understanding the factors of vulnerability across the dimensions of human agency and technological structures as well as social support through private relations and state actors. This could guide risk analysis and planning for major hazards and could be further adapted to particular types of disasters.

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#### **Interviews at institutions, month of interview**

(For the rest of the interview sources used as a background for this analysis - see Orru et al., 2020)

BPS, Brussels-Prevention & Security, December 2019

Belgium Red Cross, December 2019

Estonian Ministry of Social Affairs, November 2019

ERB, Estonian Rescue Board, South Regional Rescue Centre, November 2019

SPEK, Finnish National Rescue Association, January 2020

SPEK, Finnish National Rescue Association, South-West area, December 2019

SPEK, Finnish National Rescue Association, South-East area, January 2020

DSB, Norwegian Inspectorate for Civil Protection, December 2019

Nordland County Municipality, December 2019

Oslo and Viken, County Government, December 2019

MSB, Swedish Civil Contingencies Agency, December 2019

PVSZ, Hungarian Civil Protection Agency, December 2019

German Aid Organisation 1, December 2019

German Aid Organisation 2, January 2020

German Aid Organisation 3, 12/2019

German Local Disaster Authority 01/2020