



# **D1.3: REPORT ON SEGMENTS OF VULNERABILITY COUNTRY BY COUNTRY BASIS – INSIDE AND OUTSIDE THE OFFICIAL DATA**



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## Executive Summary

This report contains the results of the work conducted to fulfil T1.2 and T1.3 by the contributing partners of the BuildERS consortium. Both tasks focus on vulnerability. To better align this report with the work done in D1.2, these two tasks have been slightly reframed to address two questions:

1. Who is considered vulnerable in a sample of European countries and why?
2. Who is overlooked or not seen?

The report promotes the application of intersectionality as a useful analytical tool to uncover the variety of secondary factors affecting primary factors of vulnerability within the context of crises and disasters, where the multiplicity and fluidity of identities and experiences tend to be overlooked and individuals are simply categorised in so-called 'typical' vulnerable groups. This intersection makes the study on vulnerability more complex, but at the same time more nuanced and helpful for a fine-grained understanding of vulnerabilities. The report calls for a shift in the way we 'talk' about vulnerability. Rather than assessing individuals belonging to a certain group, a better approach could be to take a look at the conditions that hinder them from accessing, understanding and acting upon crises and disaster and therefore improve their ability to deal with extreme events. Thus, the work of reducing vulnerability starts from answering the question What hinders individuals in building capacities?



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## List of Acronyms

BuildERS	Building European Communities Resilience and Social Capital project
D	Deliverable(s)
DDoS	Distributed Denial of Service
DSB	Norwegian Directorate for Civil Protection
EU ERCC	EU Emergency Response Coordination Centre
GRI	Global Risk Index
IOM	International Organization for Migration
IPCC	(United Nations) Intergovernmental Panel on Climate Change
MSB	Swedish Civil Contingencies Agency
NEET	Not in Education, Employment, or Training
NESA	National Emergency Supply Agency
NGO	Non-Governmental Organisation
RVA	Risk and Vulnerability Analysis
SMHI	Swedish Meteorological and Hydrological Institute
T	Task(s)
UNDRR	United Nations Disaster Risk Reduction
WVS	World Values Survey
WP	Work Package

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# 1. Introduction

## 1.1 Background

The BuildERS project covers three main research components in exploring vulnerability and resilience: 1) how they relate to risk awareness and social capital in WP1, mainly from a theoretical viewpoint; 2) institutional settings including organisational architectures, capacities and cultures of collaboration and shared values in WP2; 3) technological tools, processes and methods, to enhance resilience and social capital in WP3, WP4 and WP6.

In regard to the vulnerability component, WP1 investigates how the scholarly research considers vulnerability (see D1.2) and how vulnerability is understood in certain national contexts. This last topic takes its first steps with D1.3.

## 1.2 Aim of the Report

D1.3 aims at offering a better understanding of who is vulnerable by fulfilling T1.2 and T1.3:

*T1.2 Identification of segments of vulnerable populations: Assessing vulnerability includes identifying pre-disaster social and cultural factors that engender and perpetuate inequality, exclusion, and lack of access to and control over resources in a population.*

*T1.3 Identification of segments of vulnerable populations outside the official data: The characteristics of vulnerable segments of populations not picked up by pattern recognition analyses will be mapped by drawing on literature and media reports from a sample of negative events occurring in Europe during the past 15 years.*

Before the approach by which the aim of D1.3 is outlined in more detail, a general remark on the terminology of these two tasks is necessary. According to Turner (2006: 130), segments of population refer to “a delimited set, with unambiguous membership criteria, such as the population of the People’s Republic of China as identified and enumerated in its 2000 census”. Indeed, in this report we take into consideration the national level of a sample of European countries. Within a population there are several vulnerable individuals carrying different types of vulnerabilities and the tasks refer to them as segments of vulnerable populations, following this definition: a “population within a country that has specific characteristics that make it at a higher risk of needing humanitarian assistance than others or being excluded from financial and social services” (Marin-Ferrer et al. 2017, 2017:34).

However, the terminology of T1.2 and T1.3 as for *segments of vulnerable population* needs to be reinterpreted based on the findings from D1.2, to better align this report with concepts and definitions from D1.2. D1.2 presented two narratives on vulnerability, one static and one dynamic. The first defines groups as ontologically vulnerable and, in this vein, fundamentally different from other groups in a society, while the latter understands vulnerability as highly dynamic concept that can apply to every individual. In addition, D1.2 argued that the static understanding of vulnerability contains two challenges: one the one side, it tends to forget the heterogeneity of social groups. On the other side, it limits vulnerability to certain individuals and ignores the fact that everyone can become vulnerable depending on the situation.



Against this backdrop, in order to prevent the project falling into a ‘group’-only narrative, this report broadens its scope to the questions on who is considered vulnerable due to which reasons (T1.2) and on who is/was neglected in previous negative events (T1.3). To answer these questions, this report considers a sample of eight European countries, all belonging to the BuildERS consortium. This chosen limitation to certain countries is used in order to give specific examples from specific national contexts and outline tendencies and issues.

Based on this, T1.2 and T1.3 are understood as it follows:

*T1.2 focuses on who is considered vulnerable and for which reasons in a sample of European countries, by using and analysing national available data, which are retrieved from national public sources.*

*T1.3 looks for to what extent the who and the why related to vulnerability as for T1.2 reach every individual. By using and analysing a sample of negative events occurring in the same countries analysed in T1.2 it will be scrutinized who is currently overlooked.*

In this way, this report builds on D1.2, by addressing two questions:

1. Who is considered vulnerable in a sample of European countries and why?
2. Who is overlooked or not seen?

To answer questions 1, the report gathers information mainly from national surveys and statistics and from official national policy documents (*our official data*) focusing on vulnerability to present the way different national contexts address vulnerability, often labelling elderly, children or poor as ‘typical’ vulnerable groups. This does not represent the BuildERS view, but offers an important insight in how vulnerability is currently considered.

To answer question 2, the report looks for individuals falling outside official data by scrutinising past negative events, such as crises<sup>1</sup> provoked by earthquakes, floods, terrorism etc. within which there are vulnerable individuals that may have not been picked by pattern recognition analyses collected within public surveys or statistics. We refer to them as vulnerable individuals from *outside our official data*.

## 1.3 Structure of the Report

After this introductory Chapter 1, Chapter 2 summarises methods and research design. Chapter 3 focuses on a sample of countries of the consortium including Belgium, Estonia, Finland, Germany, Hungary, Italy, Norway and Sweden to present how these countries address vulnerability. Chapter 4 proposes a series of crises from which it is possible to extract examples of who is vulnerable, who is overlooked and of vulnerability elements. Chapter 5 represents the core of the report, where Chapters 3 and Chapter 4 findings are discussed through intersectionality as a useful approach to assess vulnerability. Chapter 6 contains the conclusion and Chapter 7 lists the references.

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<sup>1</sup> Crisis refers to an unwanted event that leads to consequences which trigger vulnerability. See BuildERS Terminology in Appendix A of D1.2 *Final report presenting the unified theoretical framework on the concepts of risk awareness, social capital, vulnerable segments of society, and their inter-dependencies*.



## 1.4 Relationship to other Deliverables

In general, the overall work within WP1 and the deliverables therein serve as the basis for the subsequent WPs. This report relies on the findings of D1.1 and D1.2 as for the concepts and definitions explored there, while it presents some crises and disasters also explored in D1.4 and D2.2. This report fed a scientific publication (D1.6).

This report contributes to complete the comprehensive knowledge base, together with D1.1 on the first version of the BuildERS theoretical framework, D1.2 on the final version of the theoretical framework, D1.4 on vulnerability and communication behaviour, D2.2 on the understandings and operationalization of core concepts of crisis management such as resilience and vulnerability in different national contexts, and D2.3, regarding social media as an information channel for authorities' campaigns and their use by those vulnerable.

This report provides, as well, the background on vulnerabilities for WP3 and WP4. Finally, the findings are meant to feed the recommendations, which will be elaborated in WP5, and to provide background material for the cocreation of practical innovations of vulnerability assessments within WP6.

## 2. Methods and Research Design

### 2.1 Method

All empirically rich research projects have to make difficult decisions on the sample size, which must be weighed in light of available resources, time constraints, language skills, access to data, etc. There is also the question of depth of analysis versus breadth of analysis. Since the aim of this report is to understand how national contexts deal with the notion of vulnerability, in-depth case-study research was our approach. This approach allowed to find out more on how vulnerability is understood in different national contexts and with regard to certain living situations. Thus, we chose eight countries from the BuildERS consortium, respectively Belgium, Estonia, Finland, Germany, Hungary, Italy, Norway, and Sweden. These countries were chosen due to a general good access of data - outlined in section 2.2 - as well as the fact that these countries were scrutinised also in D2.2 in their understandings of resilience and vulnerability in crisis and disaster management. Some of them - Estonia, Finland, Norway and Sweden - share some similar socio-economic features, for instance a strong welfare state system. Their apparent similarity allows to examine the different understandings and uses of the term vulnerability particularly well. Belgium, Germany, Hungary and Italy, on the other hand, serve as a kind of control sample to see if similar findings might be made in other parts of Europe.

### 2.2 Data collection

Data collections was performed through a scoping study by gathering and analysing data from a variety of sources to fulfil the research aims of T1.2 and T1.3. According to O'Brien et al. (2016: 1), "scoping studies (or reviews) are a method used to comprehensively map evidence across a range of study designs in an area, with the aim of informing future research practice, programs and policy". The research design included steps of collaborative literature searches and iterative analysis of the data (Johannessen et al., 2010), which were collected, through snowballing searches (Jalali and



Wohlin, 2012), from three sources 1) official public international and national surveys and data bases; 2) grey literature, such as public policy documents from international organisations and national governments and newspapers' articles (Schöpfel, 2010); 3) scientific literature. Snowball method is used when the researcher starts out with one central article or book and further pursue references after references using inclusion criteria (Greenhalgh and Peacock, 2005).

In order to get a representative insight in how vulnerability is understood in the sample of countries, data was gathered following both approaches on vulnerability presented in D1.2, searching for *vulnerable groups* as well as the adjective *vulnerable* (which can be linked to individuals, groups and situations) and the noun *vulnerability*. Literature searches, generally, followed standard procedures (Gough and Richardson, 2018; Whittemore and Knafl, 2005) mostly in the national language of the contributing partners, so databases and search phrases differed accordingly. This is an example of search in the case of Norway by using Google Scholar and Oria. The following searches yielded the following hits:

1. Google scholar: "Sårbare Grupper"<sup>2</sup> 350 hits, 13 applicable in first screening, 5 found applicable in second screening
2. Google scholar "vulnerable groups" +crisis +Norway +study +quantitative +disaster +vulnerable +groups +social +"social capital" 378 hits, 1 applicable
3. Google scholar "vulnerable groups" +crisis +Norwegian +study +quantitative +disaster +vulnerable +groups +social +"social capital" 269 hits, 0 applicable
4. Oria "sårbare +grupper +Norge +krise"<sup>3</sup> 30, hits 0 applicable

Since most of the data collected was in the original language of the country, the English translation sought to adhere as much as possible to the original language expressions used in the national data. In addition, for some countries there was an abundance of data, which we sought to systematise and summarize, while for some others the collection was not of large quantity. This explains the differences in length concerning the eight countries. The same issue concerns the description of the crises: the information was retrieved from several sources, mainly on-line newspapers and post crisis public investigations, so the information provided varies in length and details due to the sources we used.

## 2.3 Phases of research

The leader of D1.3 (UiS) instructed the contributing partners to look for and collect data on national understandings and use of vulnerability in crisis, disasters, and disaster risk reduction. This included:

- a) International and national databases and surveys addressing issues of vulnerability (and vulnerable groups), specifically seeking to find how vulnerability is defined;
- b) Main elements/factors explaining vulnerability;

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<sup>2</sup> Vulnerable groups in Norwegian.

<sup>3</sup> Vulnerable groups, Norway and crisis in Norwegian.



- c) Examples of man-made and natural crises, from which it was possible to extract information about vulnerabilities (and/or vulnerable groups);
- d) Potential examples of the multi-dimensionality of vulnerability (and/or multi-dimensionally classified vulnerable groups) at national level.

As for c) in particular, the contributing partners were instructed to provide background information about the crisis (when it happened, where, type of hazard, eventual losses etc.); which individuals were explicitly mentioned as being vulnerable in the collected information; if the crisis affected individuals not mentioned in official national data.

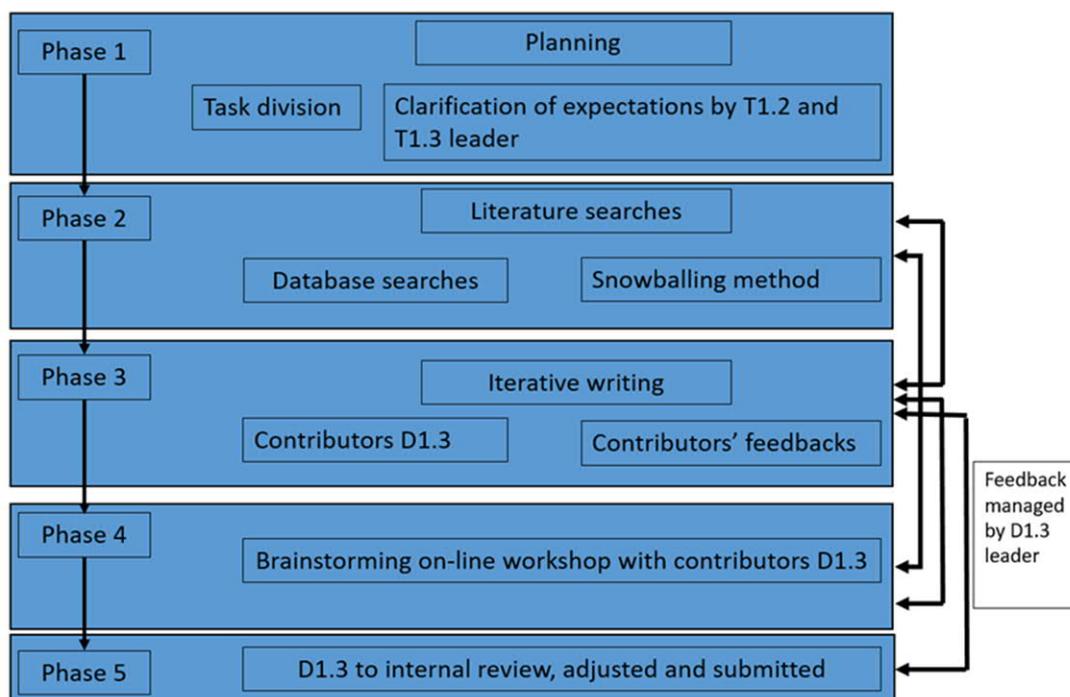


Figure 1. *Research Design*

When the work in phases 1 and 2 was concluded and the leading partner of the report had organised the material received in a draft report, the contributing partners met in a so-called brainstorming on-line workshop (phase 4 in Figure 1). During this workshop, examples of vulnerable individuals and vulnerabilities were discussed to find common patterns. Intersectionality (see Chapter 6) was applied to problematize the underlying factors creating vulnerabilities and to understand better the intersection of multiple social variables and how these variables influence the categorisations of who is considered vulnerable.

This the agenda of the workshop:

*Agenda:*

1. *Aim of the meeting*
2. *Short introduction on intersectionality*
3. *Presentation of national cases from the draft report. Discussion on:*



- *Who is considered vulnerable*
- *Range of vulnerability elements*
- *How we organize the taxonomy/classification*

4. *How intersectionality can help us in our classification*
5. *Next steps*

After the workshop, a new draft was prepared and improved with comments and feedback from the contributing partners. Then, the draft was sent to internal review to fulfil dissemination and ethical standards and for the general review. This report was later updated with the integration of the main comments received during the first and second official review, respectively in June 2020 and in January 2021.

## 2.4 Data analysis

The data collected from the sample of countries was run in phase 3 of the research design (see fig. 1). Data were organised, reviewed and compared through an iterative writing process.

The goal was to:

1. Present the concepts of vulnerability from national data (Chapter 3)
2. Compare the national approaches to vulnerability to detect similarities, differences, and identify eventual general tendencies (Chapter 5)
3. Analyse these general tendencies according to the BuildERS approach to vulnerability presented in D1.2 (Chapter 5)
4. Compare the description of natural and man-made crises according the dynamic approach to vulnerability presented in D1.2 (Chapters 4 and 5)

As the project included data gathered from a variety of national sources, the analytical process was qualitative metanalysis. The various parts on vulnerability in national contexts have been structured in similar ways, although they can vary in length and details due to the type of data we were able to collect.

## 3. Vulnerability in eight national contexts

In this Chapter, we focus on our sample of countries to better understand how these countries define vulnerability. The data on each country was organised according to the following items. Data providing 1) a short overview of the country, focusing on the national risk landscape; 2) vulnerability definitions and approaches in the public and official discourse; 3) who is considered vulnerable and eventually for which reasons.

### 3.1 Belgium

#### 3.1.1 Overview on Belgium



Belgium has as Finland and Sweden and Norway a high level in equality in income distribution (OECD, 2020), also a high level of transparency (17th least corrupted country in the world, see CPI, 2018), and a relative high level of gender equality (ranked 32 of 149 countries, see GGGR, 2018).

In Belgium, risks are categorized into three areas: natural, industrial and social. In the first area the main risks are those related to climate change, like rising water levels and flooding. As for industrial risks, Belgium hosts two nuclear power plants and is surrounded by countries with nuclear sites. In addition, in a small territory like Belgium, there are several industrial establishments classified according to the Seveso Regulations, which could potentially pose risks of fires, explosions, toxic release, and ecotoxic releases. In the third area, terrorism has become a significant risk in Belgium since the 2016 airport and metro station bombings (CCN, 2021a).

### 3.1.2 Vulnerability in Belgium

The main source of information on the understanding of vulnerability in Belgium was the Federal Public Service Interior (Ministry of Interior) website. This Federal Ministry carries the main responsibility to plan and intervene in case of crisis and disasters. The Directorate-General of Civil Security (civil protection) is, indeed, placed under this Ministry. Another important Directorate-General under the same Ministry is the National Crisis Centre (CCN, 2021b; see D2.2). This last one is in charge of preparing emergency plans, from the national to the municipal level, which identify physical places (nurseries, schools, care centres for the elderly etc.) where the intervention of the Civil Security needs to be prioritised. For each place, tailored responses are put in place in case of a crisis or a disaster to meet the needs of those who are considered vulnerable in these physical places (children and elderly, for instance). Then, for risks categorized in the three areas, more groups are taken into consideration. For instance, in case of power outage caused by a storm, these plans mention individuals and households living in isolated parts of the country, like rural areas, and individuals dependent on machines, which, without electricity, may stop working. For man-made risks, these emergency plans considered the physical place hit by a terrorist attack, for instance, as vulnerable (airports, public squares etc.) (DGSC, 2021a). In addition, emergency plans at provincial and municipal level need to take into account “communities, businesses, institutions and individuals who, due to their location or activity, are particularly vulnerable to the damaging consequences of an emergency situation” (FPSI, 2019).

The National Crisis Centre emphasizes in its website the role of individual responsibility in terms of strengthening individual resilience through risk awareness and preparedness. The focus is more on individuals being actors of their own security and knowing how to protect themselves, their families, by giving a proper warning, behaving effectively or not provoking further challenges in a crisis (CCN, 2021c). In general, very little could be found in terms of how vulnerability is defined or who is considered vulnerable in addition to the information provided above.

The Belgian Directorate-General of Civil Security promotes the use of the 112 BE-alert app, which helps to identify at-risk populations according to each operation’s target groups (for instance those close to the epicentre of the crisis, whether they are vulnerable or not) (DGSC, 2021b). Groups are identified thanks to their registration in the app. The police has, as well, an important role in identifying who is vulnerable during a crisis, since they are at the front-line in reaching households and making a first assessment of who needs help. In addition, social services at municipality level have their own list of vulnerable individuals and which resources can be made available for them, in case of a crisis. These are mainly children with difficult family situations, elderly, individuals with substance addictions, and poor or unemployed. The Federal Agency for the reception of asylum seekers (Fedasil) deals



specifically with irregular migrants, including unaccompanied minors, who need assistance (Fedasil, 2021).

## 3.2 Estonia

### 3.2.1 Overview on Estonia

Estonia, one of the three Baltic countries, has made pioneering advances with its innovative e-Estonia initiative – fostering innovative education, virtual business and digital citizenship. Nowadays, the country ranks among the most digitally advanced states in the world. Yet, the digital divide is still present between the older generation, struggling with elementary skills, and the younger generation, which has greater awareness and abilities to ensure its quality of life and wellbeing through ITC services. Estonia’s development has two sides: welfare has increased greatly, but it continues to be unevenly distributed (Tammaru, 2017). At the same time, inequalities are still significant and among the highest in Europe (see OECD, 2020, for income inequalities, for instance). One of the challenges is the still deficient social linkages between the Estonian-speaking and Russian-speaking communities.

The latest national risk assessment released by the Estonian Ministry of Interior is dated 2013 (Otsla, 2016)<sup>4</sup>. According to this risk assessment, the most serious natural, man-made, as well as combined, risks that could affect Estonian citizens are likely to happen outside Estonian territory (e.g. accident in a nuclear power station close-by to Estonian border). Their impact concerns people’s wellbeing and the functioning of critical infrastructures. According to the Estonian Ministry of Interior, the following events can lead to an emergency in Estonia and are thus subject to risk assessment: a flood in a densely populated area; an extensive fire; an explosion; a collapse; a transport accident; an industrial accident; environmental pollution; a mass disorder; mass influx of refugees; an attack on a site; epidemic and poisoning; an infectious animal disease caused by a biological pathogen; a radiological or nuclear accident; a cyber-incident. Besides, an interruption of a vital service can also cause an emergency. According to the Emergency Act of 2017, vital services in Estonia are: electricity, natural gas and liquid fuel supply; operability of national roads; phone, mobile phone and data transmission services; digital identification and digital signing; emergency (health) care; payment services and cash circulation.

### 3.2.2 Vulnerability in Estonia

In Estonia, the term **vulnerability** is frequently used in various official documents and reports dealing with cyber security<sup>5</sup>. What is notable in these texts, however, is that the term is almost always used to refer to infrastructures and technological weaknesses, such as software or hardware issues. For example, the latest annual cyber security assessment Report produced by the Estonian Information Systems Authority (2019) contains phrases such as “whenever devices are vulnerable, that vulnerability gets exploited”, “devices in private and public networks use the same vulnerable software” (Estonian Information Systems Authority, 2019: 8) and “vulnerability on the chips used on

<sup>4</sup> More recent national risk assessments are not made available to public.

<sup>5</sup> “The approach and actions associated with security risk management processes followed by organizations and states to protect confidentiality, integrity and availability of data and assets used in cyber space. The concept includes guidelines, policies and collections of safeguards, technologies, tools and training to provide the best protection for the state of the cyber environment and its users” (Schatz et al., 2017: 66).



the EstonianID card” (Estonian Information Systems Authority, 2019: 51). This observation serves as a useful reminder that in this context, vulnerability is considered a characteristic of the system and not of the people affected by cyber-attacks. However, as the Estonia’s National Cyber Security Strategy (ENCSS, 2018) underlines, the Estonian state and its people are the first to pay for the consequences of cyber-attacks. Peoples’ vulnerability varies depending on the time of the outage (summer-winter, day-night etc.), the presence of vital service providers in their area and the relative position of the problem in the critical infrastructure (Matthewman and Byrd, 2014).

While the notion of cyber-attack is not used in statistical population surveys, they do address individuals who have experienced vulnerabilities due to cyber-attacks. For example, Estonian Statistics measures a “share of internet and computer users aged 16-74 in the last 12 months who experienced at least one of the following security vulnerabilities: Infection with virus or other malware resulting in lost data and/or time; abuse of personal data entered on the internet or other infringement of privacy; financial losses sustained from following instructions in a malicious email, spoofed website; falling victim to card fraud; children accessing inappropriate web content” (ENCSS, 2018: 65).

There is some evidence that individuals who have suffered from computer crime such as fraud learn from their mistakes and take measures to avoid becoming a victim again in the future (Bada and Nurse, 2020: 81). However, people who do not know much about computers and cyber-crime may develop a sense of ‘learnt helplessness’, accept the ‘inevitability’ of becoming victimised by attackers at some point, especially because of the anonymous nature of cyber-crime, and therefore do not take precautions necessary to defend themselves (ibidem: 84). How people perceive and respond to risks related to cyber-attacks is influenced by news media coverage of cyber-crime. For example, in Estonian major newspapers, vulnerability to cyber-attacks has been much discussed in the context of hospitals and medical services.

The policy paper titled the Estonian Civil Protection Concept (Estonian Government Office, 2018) sets the foundation for a more civilian-oriented emergency policy, which encourages greater responsibility of individuals and communities in preventing and coping with crises. The Concept describes as vulnerable those individuals who lack skills and capacities to cope with a crisis or a disaster. In addition, the Concept states that individual vulnerability is “a combination of different factors, which determine the extent of the threat<sup>6</sup> to one’s life and well-being at the time of different crises” (Estonian Government Office, 2018: 65). Another policy paper, the Estonian State Protection Concept (Estonian Ministry of Defence, 2017) highlights that social networks, prevalence of shared values and trust in state institutions represent protective factors against vulnerability. The Estonian State Protection Concept emphasises that these protective factors work towards building social cohesion and solidarity to buffer the negative consequences that risks and crises may pose to the Estonian society.

In general, Estonian official documents consider a variety of psychological, physical, social and economic factors as shaping and influencing individual skills and coping capacities. These factors are described as follows.

**Age.** In the Estonian Civil Protection Concept, emphasis is given to vulnerabilities related to age by considering two age extremes: children (up to 18) and elderly (from 65+ years). A national population Survey (Kantar Emor, 2017) showed that the elderly possess lower capacities to react to a crisis. In Estonia, among individuals from 65+ years, there are significantly more people that would not do

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<sup>6</sup> Threat is a suggestion that something unpleasant or violent will happen, especially if a particular action or order is not followed (Cambridge on line Dictionary).



anything in case of a crisis than those in the category up to 39-years (11% versus 4%). In another Survey, commissioned by the Estonian Rescue Board, the elderly rate their capacities to cope with negative events lower: in the age group of 65+, 48% individuals responded that they would be able to cope in case of extreme weather against the 57% among younger age groups (TNS Emor, 2016). Furthermore, elderly assess their knowledge on all major risks lower than the younger population (TNS Emor, 2016). The same group claims to not possess skills in case of a failure of vital services, compared to younger age groups (70% versus 54%) (TNS Emor, 2016). The same Survey indicates that in case of a crisis, older generations are more likely to stay in the impacted area, while younger individuals are more prone to leave that area. This behaviour can be related to health issues, particularly affecting the lives of the elderly, and thus decreasing their mobility. In case of crises, the elderly with limited mobility may require special assistance from the emergency services and if assistance is not properly offered, their capacities to respond may be lower (Estonian Government Office, 2018). Another important issue related to the elderly is that 36% of the 239 600 individuals living alone in Estonia are older than 65 years (Estonian Statistics, 2019). In case of crises, it may happen that there is no one else to rely on for information or help in evacuation, especially if the individual is physically or cognitively disabled. Another group of people (often overlapping with the elderly) that may need extra care in times of crises is individuals with chronic disease. According to Estonian Statistics (2019), 30% of the Estonian population has a chronic disease or other severe health problems. A chronic disease may decrease the sensory, regulatory or motoric capabilities of an individual, which may impede appropriate response in disaster. Considering that Estonia has a population of 1,4 million, this means that a significant proportion is vulnerable in case of a crisis.

**Cultural belonging.** Besides age, the Civil Protection Concept (Estonian Government Office, 2018) considers individuals the Russian-speaking minority, which accounts for one third of the Estonian population, more vulnerable the Estonian speaking population. This minority is mostly concentrated in the capital Tallinn and the North-eastern part of Estonia (Ida-Virumaa region). Most of the Russian-speaking minority has Estonian citizenship, but speaks little Estonian. One of the aspects that is considered to make this group vulnerable is the fact that this minority often uses Russian media as information source (Me.Media.World, 2014). This may lead to an increased risk of politically motivated reports by Russian media that do not mirror the real situation of a crisis unfolding in Estonia. Furthermore, the TNS Emor Survey (2016) indicates that the Russian-speaking minority is less likely to positively assess its coping skills in case of a failure of vital services, compared to Estonian-speaking population. In addition, the Russian-speaking minority is materially less prepared, rarely possessing an alternative to an electric or gas stove or to central heating, should there be a power outage. Unlike the majority of the population, the Russian-speaking minority rarely has a second home to evacuate to in times of crisis (Estonian Government Office, 2018). Thus, in general the Russian-speaking is less prepared for crises. In addition, the TNS Emor Survey (2016) shows that there is a higher percentage of Russian-speaking individuals who claim to have been affected by a crisis (27% versus 22% of Estonian-speaking individuals). Nevertheless, compared to the Estonian-speaking population, among Russian-speaking individuals, there are somewhat more individuals that claim that they do not take warnings seriously (3% among Estonian speakers compared to 6% among Russian speakers). Compared to Estonian-speaking individuals, among Russian-speakers there are less individuals that would rely on information from national media channels, particularly on radio or various internet sites (79% versus 88% of the Estonian-speaking population).

**Economic situation.** This factor has a direct correlation with material preparedness: purchasing a first aid or crisis preparedness kit, and food stocks is linked to the household's financial situation. Poorer families have less opportunities to prepare themselves for crises materially and may therefore



suffer from the lack of supplies and necessities (Klaos, 2019). Income is also a primary factor in preparing the house estate for crises, for instance major storms, which increasingly hit Estonia (Mölter et al., 2016). Only 1/10 of Estonian households have necessary stocks in order to be prepared for a crisis, while 2/3 of the Estonian population has food stocks for one week (Estonian Ministry of Interior, 2015). In addition, the economic situation influences the purchase of the housing estate. In Estonia, blocks of flats are less expensive than other types of houses and usually purchased by individuals or families with a lower income (Torpan et al., 2019). The part of the population living in blocks of flats (57%) is materially the least prepared to cope with a crisis (Estonian Government Office, 2018). Compared to houses with eight or less apartments, larger blocks of flats' inhabitants tend to be materially less prepared. For example, they are less likely to have a torch, radio with batteries, possibilities to store food, and have alternative heating system. This might be related to the lack of storage place in these households. The concentration of blocks of flats is higher in larger cities in Tallinn, as well as in Ida-Viru region, including Narva, Kohtla-Järve and Jõhvi cities. These are also areas where the Russian minority prevails. While the factors which may contribute to peoples' vulnerability in such situations are generally known by emergency managers, reaching out to particular segments of population to raise their risk awareness remains a challenge (Saar, 2019).

**Spatial segregation.** In certain Estonian regions, this is considered another factor contributing to vulnerability (Estonian Ministry of Defence, 2017). Residents in sparsely populated municipalities (with fewer taxpayers to support local budget), with less economic capacities are considered to be more vulnerable due to their local governments' reduced abilities to offer social care in case of emergencies or under a failure of vital services. The regions with weak physical as well as social infrastructures within health care and education are less able to support their residents. In addition, areas with low level of social movements and volunteerism affect societal resilience (Estonian Ministry of Interior, 2015). Furthermore, according to the Estonian Internal Security Development Programme 2015-2020 (Estonian Ministry of Interior, 2015), 7% of the Estonian population lives in regions where the rescue and response is difficult to reach. These areas are, however, characterised by closer interpersonal relations, which provide better unofficial support in times of emergencies (Head of Tõutsi village, personal interview, 19.12.2019).

**Dependence on vital services** (e.g. electricity, water central heating) **and e-services.** This is described as an increasing and all-encompassing source of vulnerability in Estonia (Estonian Government Office, 2018). Information provision is a vital service as well, but, without electricity, the chances to communicate with the population during a crisis decrease in a country considered the most advanced digital society in the world. Due to the privatisation of many of the vital service providers, the provision is dependent on (global) economic security. In case of cease of information provision service, particularly individuals with smaller social capital are affected (Estonian Government Office, 2018). When usual information channels do not work, the dependence on informal communication networks leaves individuals with lesser networks. Reliance on only informal communication networks may be leave those individuals out of the reach of official crisis guidelines. On the other side, when a cyber-attack causes power disruptions, one can argue that people in rural areas are more likely to have access to firewood, fresh drinking water and enough farm food supplies to go through the outage (Klaos, 2019). As such, spatial segregation is not a negative factor with this type of crisis. The Estonia's national Cyber Security Strategy (2018: 20) also highlights the growth of cyber risks in Estonia due to the raise of new means and methods for committing cyber-attacks.



## 3.3 Finland

### 3.3.1 Overview on Finland

Finland is a Nordic country offering a high level of social services, equality in income distribution (5th lowest in OECD), high level of transparency (3rd least corrupted country in the world) and a high level of gender equality (8th in the world) (OECD, 2020; CPI, 2018; GGGR, 2018). According to Statistics Finland (Statistics Finland, 2019a), the population is relatively homogenous and quite highly educated, with 71% population holding a university degree. The level of risk of poverty or exclusion due to low incomes in Finland is lower than the European average and is particularly targeted at young adults and those over 75 years of age (Statistics Finland, 2019b).

In general, the Finnish welfare system offers a high level of services that have contributed to build and maintain a robust Finnish society, with a high level of trust in authorities and in fellow citizens as well as a general trust in the ability of society to recover from crises. General willingness to help and provide volunteer help during a crisis is diffuse (Kekki and Mankkinen, 2016). However, if economic wellbeing becomes polarised between different demographic groups and regions, this can challenge the Finnish welfare system. For instance, the average age of the population is increasing at the fastest rate among the EU countries and the ageing of the population is not spread equally throughout the land, since the population of the sparsely populated areas is mostly ageing (OECD, 2020; OECD, 2019a).

The first national risk assessment in Finland was provided to the EU in 2015 and the second in 2018 (Finnish Ministry of Interior, 2019). In the latest national risk assessment (Finnish Ministry of Interior, 2019), particular risks, such as hydro-meteorological and climatic risks, were assessed within different sectors, threat scenarios or major disruptions and as the way they could impact vital functions. Altogether 20 threat scenarios/disruptions were identified and assessed. In a report from 2018 (Tuomenvirta et al., 2018), hydro-meteorological and climatic risks were assessed as a combination of the hazard (hydro-meteorological phenomenon), exposure (location of the asset or people at risk) and vulnerability (features of the asset or people at risk), following the 2014 United Nations Intergovernmental Panel on Climate Change (IPCC) 5th Assessment Report concept, where hazard, exposure and vulnerability together contribute to risk formation. Therefore, both the changing climate and the role of socioeconomic factors on the risk formation, now and in the future, were considered.

### 3.3.2 Vulnerability in Finland

Finnish strategic policy documents, such as the national risk assessment, the Security Strategy for Society, the Future Review of the Ministry of the Interior, do not contain a definition of vulnerability. Nonetheless, the term **vulnerability** is used to describe, for instance, the sectors of vital functions that may be threatened by a disruption like a serious pandemic. The Finnish National Emergency Supply Agency (NESA, 2020) defines vulnerability as an exposure to a security<sup>7</sup> threat, and states that the vulnerability of, for example, electronic infrastructure and logistics systems is growing. So, vulnerability is mainly ascribed to infrastructures, as in Estonia, and vital functions.

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<sup>7</sup> Protection of a person, building, organization, or country against threats such as crime or attacks by foreign countries risk (Cambridge on line Dictionary).



In addition, vulnerability is considered in relation to individual security/insecurity and preparedness. The Finnish National Rescue Association is an independent, national, non-profit expert organisation in fire and rescue services, individual emergency planning and civil protection and has provided studies about the relationship between the individual and his/her community and which factors contribute to strengthening or hampering security, safety<sup>8</sup> and coping capacities (SPEK, 2019). In addition, the Association studies the likelihood of various risks and the acceptability of political decision-making (SPEK, 2019). In one of its reports (Kekki and Mankkinen, 2016), the Association argued that individual insecurity, considered as an individual's experience or belief in one's own vulnerability, increases, if an individual feels that he/she does not have the competence to influence his/her private matters. However, insecurity is also related to exogenous factors, not pertaining to the private sphere of the individual. For instance, higher fear of crime than in other types of threats is associated not only with individual vulnerability, but also with signs of disturbance in the surrounding environment or with a weakening of the community's network (Kekki and Mankkinen, 2016: 20).

The Finnish National Rescue Association also conducts national surveys on various topics to feed its reports. For instance, to explore the sense of security and the security of society, a survey was conducted involving about 3 000 Finnish citizens between 18 and 79 years old through interviews by phone. For the respondents, family, close relatives or friends were the main providers of security. Home, livelihood, employment and health were other issues that influence individual security. In addition, the responders highlighted that authority and service structures - including police, rescue services, social and health care, pension and education – and governmental factors, such as peace, independence and democracy, contributed to individual security (Kekki and Mankkinen, 2016). More detailed questions addressed the respondents' coping behaviour in case of a crisis. 87% of the respondents could manage without public transport for more than a week or even longer; 22% could manage without running water for less than a day; 60% could survive without running water for no more than two days. These answers showed that a quite large percentage of the interviewed did not have reserves of water in their homes. Storing groceries was much more common for the respondents, since one every five answered that they could survive more than a week without going to the grocery store. The worst off without water and going to the grocery store were those, who had only sufficient income to cover their expenses. About 50% of the respondents could survive without electricity for up to two days. The smaller the municipality or the further away from the centre, the better the respondents thought they could survive, for example, without electricity. Men answered they could cope with different types of crises better than women could (Kekki and Mankkinen, 2016: 64).

In general, the results of this survey emphasized the importance of family ties, circle of friends and economic and financial community support. According to the survey, the majority of respondents had strong social capital when it came to informal social relationships, their willingness to participate in taking care of common issues, and their trust in other members of the community. The survey showed that the respondents had good social relationships, since they could count on help from their circle of friends or relatives when needed and were able to open up about their personal issues (Kekki and Mankkinen, 2016: 68). In addition, the identification in one's own territory or area and the possibility to influence the place of residence increased the sense of security. In general, respondents felt that the safety of their own area was good for themselves and also for the children, and that they were capable of dealing with crises or risks in their area. The majority of respondents felt that they were

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<sup>8</sup> A state in which or a place where you are safe and not in danger or at risk (Cambridge on line Dictionary).



able to influence their own personal issues and that each individual had a role to play in increasing the common sense of security (Kekki and Mankkinen, 2016: 68). Finally, the respondents perceived the Finnish society and themselves as quite resilient, capable of coping, adapting, recovering and developing despite of risks and crises. However, they did not consider serious pandemics, environmental disasters or problems with energy supply to be very likely (Kekki and Mankkinen, 2016). The newest survey carried out in year 2018 also confirms these results (Kekki, 2019).

In Finland, there are significant differences in crisis preparedness between the urban and rural population: the rural population seems better prepared than the urban population, although the latter shares, in general, the conviction to be well prepared. Segments of population such as families with children and single parents, which in other countries can be considered vulnerable, are not treated as such in Finland. The same concerns the part of the population renting houses instead of owning them (Kekki and Mankkinen, 2016; Kekki, 2019).

The latest Finnish National Rescue Association report (SPEK, 2020) spots out five vulnerable groups in the crisis and disaster context: 1) elderly (65+ years); 2) young adults in an urban environment; 3) low-income/low-educated households; 4) homeless people; 5) undocumented migrants. These groups are described briefly below and for each group social, cultural, economic and political factors have been taken into account to discuss their vulnerabilities.

1) The growth in the number of **elderly** will accelerate in Finland in the next few decades. According to population projections, by the year 2030 there will be over 1,5 million people of 65+ years in Finland - a quarter of the country's whole population (Statistics Finland, 2019a). The quantity of elderly will mostly rise in large cities, where most of them will be ageing in apartments, being less prone to leave their households for other places. However, elderly's preferences of living indicate that many of them would like to live downtown, in urban areas and in an apartment (Helminen et al., 2017). This demographic change places new demands to the state, since the consequences of crises are often more serious for the elderly than for the younger population. In general, aging most likely affects physical and psychological behaviour and makes individuals vulnerable and susceptible to harm (Finnish Ministry of Interior, 2018). In addition, the elderly can be vulnerable for a variety of social, cultural, economic and political factors. Socially, elderly can lack social networks or they have become invisible for service providers, authorities, NGOs and rescue organisations. Culturally, elderly can miss tight family connections. According to Statistics Finland (2019a), people who felt the loneliest were over 75 years of age, 73% of whom were lonely most of the time, while around 29% were so occasionally. Economically, the lack of state resources to provide home care services to all the elderly in need influences elderly's vulnerability. At the same time, the personal economic situation impacts elderly's life. Politically, Finnish state housing policies promote living at home for older people. These reasons influence their exposure to risks. Furthermore, aging may impair adaptation to rapidly changing temperatures, due to climate change. There is a tool co-developed in Finland for assessing adaptive capacity and vulnerability of elderly to climate change. This tool is interactive and web-based and has been developed for mapping and combining indicators of climate change vulnerability of the elderly, by municipality, across three Nordic countries: Finland, Norway and Sweden. It can also be used for projecting temperature related mortality in Finland under different projections of future climate (Carter et al., 2014).

In 2018, the Finnish Ministry of the Interior updated an Action Plan that describes the challenges facing elderly and provides recommendations on how to lessen vulnerabilities in the homes for elderly, to reduce the number of accidents and to prevent and combat maltreatment, violence and crime. These recommendations call for broad-based and close cooperation between different authorities and



organisations. The Action Plan focuses on measures that help to improve inter sectoral cooperation and exchange of information, to promote best practices and to support the work undertaken by counties and municipalities (Finnish Ministry of Interior, 2018).

2) According to Statistics Finland, in 2015, the proportion of the so-called **Not in Education, Employment, or Training (NEETs)** among the age 20-24 was approximately 15%. In 2018, the share had fallen to just under 12%. This means that the share of young people without a post-primary qualification is declining and their employment rate is improving. In particular, the situation of young male has improved. In 2015, nearly 17% of them were neither in work nor studying. At present, their share is 12%. Almost all primary school graduates at age of 16 apply for education and training places are available for the entire age group. Nevertheless, the share of 20-24 year olds without a tertiary qualification is still significant, although the trend has been declining (Official Statistics of Finland, 2020). Since the latest data are not yet published, preliminary insights of the survey from the Finnish National Rescue Association Research Manager indicate that NEET experience social and economic vulnerabilities: they act poorly in the crisis situation and they are at risk of poverty or exclusion.

3) 890,000 Finns or 16,4% of the entire population were at risk of **poverty or exclusion** in 2017, according to Statistics Finland's Living Statistics. The majority of those at risk of poverty or exclusion are low-income people, accounting for 12,1% of the population. After low income, the most common is underemployment, which affects 7,6% of the population. The rarest is severe material deprivation, affecting 2,6% of the total household population (Statistics Finland, 2019b). These groups experience vulnerability according to:

- Social factors: mistrust to mainstream media, they assess their ability to cope low (Kekki and Mankkinen, 2016)
- Economic factors: economic situation affects crisis preparedness (lack of food supplies, for instance)
- Urban factors: Urban population less prepared for crises than rural population (Kekki and Mankkinen, 2016)

4) There are about 5500 **homeless people** in Finland. The following are considered homeless: people who are sleeping outdoors or in the homeless shelters, people living in dormitories and lodgings or in different institutions, prisoners who do not have a permanent apartment after release and people temporarily staying with relatives and acquaintances. Most of the homeless belong to the last group. Luckily, this number is declining - in 1987 there were 20000 homeless (ARA, 2018). Over 60% of homeless people lives in the Helsinki Metropolitan Area. Homelessness is also centred in other large cities. 80% of homeless people are men, but there are also homeless families and couples (ARA, 2018). Three out of four homeless families (77.4%) were single-parent families. A recent trend has been the increase in the proportion of women, young people and immigrants (ARA, 2018).

Finland has a social benefits system, which helps ensure that a person does not immediately end up on the streets after becoming unemployed or seriously ill. Health care is also free or affordable for everyone. The challenge with the forms of support is that a person has to know how to apply for the help he/she needs. The Housing First-model was launched in 2007 to eliminate long-term homelessness by 2015. The main principle followed is that housing is the prerequisite that allows other problems to be solved. In practice, the service providers help clients with getting access to assistance and services guaranteed by the state or municipalities. The Housing First model in Finland



has taken into account the existing social benefits system so that it is utilised as much as possible and is based on understanding homelessness extensively. Therefore, it does not only apply to sleeping rough and it is not a problem that can be solved within just one sector (Y-foundation, 2017).

5) **Undocumented migrants** are people living in Finland without the legal right to do so. An undocumented migrant's residence is not officially known to, or permitted by the authorities. It is estimated that there are between 3,000 and 10,000 undocumented immigrants in Finland although the estimations vary ([www.paperittomat.fi](http://www.paperittomat.fi)). Their number has increased sharply since 2015, due to the so-called migration and refugee crisis. The group of undocumented migrants is diverse. People may end up living in Finland undocumented after a rejection of the asylum, after a negative residence permit decision, after the expiry of a visa or residence permit or if a residence permit has not been applied for. Generally, undocumented migrants wish to legalise their residence and live a normal life as part of the Finnish society. Since undocumented migrants are not able to turn to the authorities the same way as official residents, they are extremely vulnerable to exploitation and mistreatment. They form a particularly vulnerable group whose living conditions is exacerbated by diseases, general poor health conditions, poor or non-existent housing and poverty (Jauhiainen et al., 2017; Nykänen et al., 2017).

## 3.4 Germany

### 3.4.1 Overview on Germany

Germany scores higher in equality in income distribution than Italy, but lower than Belgium and the Nordic countries (OECD, 2020). Germany has a high level of transparency (11th least corrupted country in the world, see CPI, 2018) and of gender equality (ranked 14 of 149 countries, see GGGR, 2018).

According to the INFORM Global Risk Index (GRI) (INFORM, 2021), Germany is considered a country with a low risk of crises and disaster. Nonetheless, Germany has been increasingly subject to extreme natural events, which include thunderstorms and, in recent years, hurricanes with a top speed of over 200km/h, heavy rain, flooding and heat waves. In addition, the coastal areas suffer from spring floods. According to studies on the consequences of climate change on Germany, similar extreme events might increase as well as the risk for droughts and wild fires (Guyer, 2019; Storch et al., 2018). Furthermore, terrorism is considered a high risk in Germany (Karutz et al., 2017: 21). The same holds true for attacks to IT infrastructure (BSI, 2018): in July 2019 a major cyber-attack took down the full hospital network of the south-western German Red Cross, while in 2017 a WannaCry attack affected the Deutsche Bahn, the main railway service (NTV, 2019). In addition, the blackout scenario plays an increasing role for disaster management. Core cases are the Münsteraner Wintersturm (in 2005 heavy snowfall led to an up to four-day long blackout in some affected areas) or a 31 hours blackout in February 2019 in Berlin (Jacobs, 2019).

### 3.4.2 Vulnerability in Germany

Official policy documents do not share a common definition of vulnerability, much less the ones with a legal basis. Frequently, the concept of vulnerability is used, but not defined. In other instances, the term is defined, but the definition varies from institutions to institution. For instance, the German Committee for Disaster Risk Reduction (Tetzlaff et al., 2007) understands vulnerability as future



susceptibility (to extreme weather events) and suggests vulnerabilities should be countered with effective prevention policies (ibid.: 67). The German Federal Office for Citizen Protection and Disaster Support (BBK) specifically suggests that “the interplay between exposition, susceptibility and coping capacity defines the extent of the vulnerability” (BBK, 2013: 18). Furthermore, the German Federal Environmental Agency understands vulnerability as the capacity to adapt to a changing environment (Umweltbundesamt, 2015b: 53). As much as other reports which focus on climate change (see for instance Bundesregierung, 2015; Tetzlaff et al., 2007), the Federal Environmental Agency (Umweltbundesamt, 2015b) as well as a national project on climate governance funded by the Federal Ministry of Education and Research (Dietz, 2006: 23) define vulnerability according to the International Panel on Climate Change (IPCC) as “the propensity or predisposition to be adversely affected. Such predisposition constitutes an internal characteristic of the affected element. In the field of disaster risk, this includes the characteristics of a person or group and their situation that influences their capacity to anticipate, cope with, resist, and recover from the adverse effects of physical events” (Umweltbundesamt, 2015b: 34). Tracing vulnerability back to eco systems analysis (see also Bundesregierung, 2015), vulnerability is today further expanded to social, economic, institutional and ecological risks, as well as their interrelationship (Umweltbundesamt, 2015b: 34).

Even within the same institution, definitions may vary according to the type of threat or risk at hand. For instance, while in October 2015, the Federal Environmental Agency builds upon the IPCC definition of vulnerability, the same agency refers to vulnerability in a narrower sense as “the extent of the risk to the functioning of the entire society, or sociologically speaking, as the extent of the risk to the reproductivity of the society” in the same year (Umweltbundesamt, 2015a: 39), in a report on the risk of climate change to the growth or demise of a society in numbers. The national project on climate governance (Dietz, 2006: 49) concludes that, to counter vulnerabilities, it is nowadays crucial to conceptualise differing levels, starting with the global and ending with the local, including several actors and policy fields. The Federal Ministry for Health (BMG) equally refers to vulnerability and the probability of dying or falling ill (Wasem et al., 2018: 22), while the Federal Government (Bundesregierung, 2015: 123) refers to the vulnerability of society as a whole in tackling the risk of climate change. In this vein, the referent object changes from humankind to one nation or social group, and to the environment.

National crisis planning documents and reports indicate that neither the individual as such, nor individuals’ vulnerabilities in particular are specifically taken into account. When tracing the different definitions and concepts of vulnerability deployed by institutions providing crisis and disaster management in Germany, it seems that the focus is rather on able bodied and German speaking persons (Gabel, 2019). In this regard, it is possible to differentiate three broader social groups: (a) individuals who are able to help themselves (a considered minority), (b) individuals with a lack of preparedness due to missing precaution or a lack of capacities to prepare as needed and (c) individuals who are considered weak and unable to help themselves (elderly, care recipients, persons with disabilities). Official policy documents concerning crisis and disaster management in Germany sometimes specifically mention the term ‘vulnerable groups’. However, they generally refrain from deeper engagement or definitions with said groups and their specificities. As with a clear definition of vulnerability, defining what constitutes a vulnerable group differs from one report and agency to another. Some reports address society as a whole as one big vulnerable group – particularly when considering climate change (Bundesregierung, 2015; Tetzlaff et al., 2007; Umweltbundesamt, 2015b). Yet, other agencies suggest that it is important to analyse different social groups, such as the German Committee for Disaster Risk Reduction (Tetzlaff et al., 2007: 42), which suggests that due to climate change, marginalized groups are especially vulnerable.



On a more conceptual level, the Leibniz Institute for Regional Development and Structural Planning (Christmann et al., 2011: 5) recommends not only conceptualizing different social groups according to their economic, cultural or social capital in case of a risk materializing. Rather, they suggest expanding the ‘vulnerable groups’ category to include the social construction of vulnerability, which means that only a shared assumption that a group is particularly vulnerable makes this group appear so in the first place (ibid.).

Further, the most mentioned vulnerable groups are either the elderly or people with disabilities/special care-taking needs. For instance, the Alliance for Health (GKV) considers vulnerable groups persons with low socioeconomic status, such as the elderly, migrants or persons with detriments to their health (GKV, 2018: 9), whereby it remains unclear which elements differ among these groups or in which situations their status might vary. The Federal Ministry of Health (BMG) frequently analyses vulnerabilities of the elderly or persons which are particularly in need of care (Wasem et al., 2018: 3), but equally refrains from a clear definition of what constitutes a vulnerable group. Dietz (2006: 36) suggests that focusing on reducing poverty does not equal a reduction of vulnerability levels among vulnerable groups. Group most often mentioned are the elderly or sick people (Schweer et al., 2014: 14), who are mentioned in reports on climate change (Tetzlaff et al., 2007), poverty (Dietz, 2006), as well as a potential blackout scenario (Petermann et al., 2010). However, it is noteworthy that no clear analyses are provided as to how and why these particular groups would need special care, much less what this caretaking could consist of. It appears unclear why the elderly and people with disabilities should per se be considered part of the same vulnerable group.

Generally speaking, strategies and procedures for dealing with social groups, who are bare a higher risk, are rare (Bachmann, 2013). Further, no official agency could be determined whose obligation it is to respond to the needs of vulnerable groups – much less so during crises. The only report analysed for the purpose of this report, which mentions the specific organisational requirements for taking care of vulnerable groups is the German Federal Ministry of the Interior (BMI). The BMI (BMI, 2016: 24) suggests that in case of evacuation, specific evacuation measures are to be considered in hospitals, prisons, psychiatric clinics or nursery homes due to the limited capacities to cooperate on behalf of individuals (i.e. elderly, sick, disabled, parents with small children, unaccompanied minors, etc. (BMI, 2016: 25). The German Red Cross seems the agency that has taken up this suggestion in more practical terms. In its latest strategy publication (German Red Cross, 2018a), the German Red Cross promoted a strategy for integrating vulnerability analysis as fundamental instrument of disaster services to tailor relief measures around the specific situational needs of vulnerable individuals (German Red Cross, 2018a). The explicit focus on vulnerable groups by the German Red Cross is to a great extent a result of experiences related to the 2002 and 2013 Elbe river floods, where evacuating elderly people who were being cared for at home posed a major challenge for disaster response personnel (German Red Cross, 2018b). Similar problems related to the needs of specific groups continuously occur during other events, as for example the evacuation due to the bomb diffusion in Frankfurt in 2017 (German Red Cross, 2018b) and the snow disaster in Bavaria in 2019 indicate (German Red Cross, 2019). In general, beside the German Red Cross, strategies to address the needs of elderly people, persons with disabilities and care recipients are rare. In addition, homeless people are seldomly considered specifically (Gabel, 2019).



## 3.5 Hungary

### 3.5.1 Overview on Hungary

Hungary had an employment rate steadily growing until the country was hit by the COVID-19 pandemic in spring 2020, while income inequality pre COVID-19 was in line with countries such as Germany and Poland (OECD, 2020). Hungary shares some features with other countries of this report, such as ageing population and lower labour participation of women due to structural services deficiencies (OECD, 2019b). Hungary scores higher in equality in income distribution than Italy, but lower than Belgium and the Nordic countries (OECD, 2020). Hungary also has a mid-tier level of transparency (ranked 64th least corrupted country in the world, see CPI, 2018), and a relative low level of gender quality compared to the other countries in this study (ranked 102 of 149 countries) (GGGR, 2018).

Since 2012, Hungary follows the EU Risk Assessment and Mapping Guidelines for Disaster Management (European Commission, 2010) to prepare its national risk assessment. The main and most important legal Act on disasters, crisis and their management is dated 2011 and introduced a new national disaster management system in 2013 (Act, 2011). This Act specifies the main natural, man-made and other types of risks, ordered according to the degree of probability. The most frequent natural risk in Hungary are floods. The Hungarian territory hosts, indeed, two large rivers, the Danube and the Tisza, which make 50% over the overall territory subject to this risk (NatRisk, 2016). Other natural risks concern inland waters, intense and continuous snowstorms, other extreme weather conditions (such as storms and heavy winds, extreme cold or forest and bushfire). Man-made risks are dangerous materials or hazardous waste, nuclear and radioactive risks, epidemics (human or animal), contamination of drinking water, air pollution and malfunction of critical infrastructures. The 2011 Act specifies seven main areas for risk assessment (water caused damages, extreme weather conditions, geological threats, forest fires, industrial accidents, migration and aircrafts in trouble). Between 2014 and 2015, the Hungarian government rearranged the seven categories in 12 main areas for risk assessment (extreme weather conditions, water caused damages, geological threats, epidemics, space weather (e.g. solar flare), dangerous materials, traffic accidents, nuclear accidents, terrorism, cyber-attack, defence policy crisis and energy supply crisis). In these 12 areas, 30 main scenarios and 72 sub-scenarios were identified and assessed. Since the introduction of the new national disaster management system in 2013, emergency plans include a classification of institutions to be prioritized in receiving help and support when a crisis or a disaster strikes, such as schools, elderly homes, hospitals, critical infrastructure buildings.

### 3.5.2 Vulnerability in Hungary

In the 2011 Act it was difficult to find a clear definition of vulnerability. As floods and extreme weather conditions are the most common disasters in Hungary, specific research in this field was retrieved. Research on social indicators of vulnerability to floods often relates vulnerability to specific areas such as education, labour market and territorial dimension. Indeed, vulnerability is measured through social indicators (Vári et al., 2013). These social indicators are health, education, savings, opportunities of taking loans, trust in the members of the community and in institutions, and perception on institutional preparedness. These indicators are used to improve the conditions of those individuals who are vulnerable through social policies and state programmes, which include increasing of public spending on education, strengthening social cohesion, introducing contingency loans and improving institutional information for preparedness.



Most of the legal and policy documents related to vulnerability in crises and disasters from the website of the Ministry Interior and the National Directorate General for Disaster Management (NDGDM), responsible for the political and operative risk and crisis management in Hungary, use the term disadvantaged groups, indicating groups that face a problem or a difficult situation in their daily life and whose condition can be exacerbated by the crisis or the disaster. The term vulnerable groups is also used as synonym. Usually, these disadvantaged groups include people with disabilities, elderly, people with bad health conditions and with low income. These are all considered unable to protect themselves and thus in need of particular attention by the national authorities. The same authorities recommend disaster managers and civil protection to address them in appropriate way through tailored materials and guidance to inform about a risk or a crisis (Hungarian Ministry of Interior, 2011). Local emergency plans need to include a classification of institutions that receive a priority (in specific order) when a crisis unfolds, such as schools, elderly homes, hospitals, critical infrastructure buildings. The Hungarian Red Cross is, as well, an important partner for the national authorities and intervenes in crises and disasters since its members are trained to support the needs of vulnerable individuals affected by a crisis. Foreigners and, in particular, tourists are also considered vulnerable in case of crisis, mainly due to lack of understanding of the Hungarian language. This may cause misunderstanding and slower response reaction. To overcome language barriers, national authorities foresee TV and radio announcements in English and German.

## 3.6 Italy

### 3.6.1 Overview on Italy

Italy suffers for long-standing social and economic problems. Italy is at the bottom among the countries of this report as for equality of income (OECD, 2020). Italy also has a mid-tier level of transparency, ranked the 53th least corrupted country in the world, see CPI, 2018). Italy has a mid-tier level of gender quality (ranked 70 of 149 countries, see GGGR, 2018).

Living standards are roughly the same as in 2000 and poverty rates for young people remain high. Regional disparities have widened in recent decades, even more in 2020 and 2021 due to the COVID-19 pandemic. According to the latest Istat Report (Istat, 2020), Italy counts a population of about 60 million residents, with the highest number of individuals over 80 years among the EU-27 (by December 2019 4.3 million people, the 7,2% of the entire Italian population). On the other side, Italy continues with the trend of the decline of births, mainly due to the challenges to conciliate family life and work among women as a consequence of scarce availability of services and insufficient investments for early childhood, still very rigid business work, and division of care work within the family still unbalanced to the detriment of women. This situation is mirrored in the higher unemployment rate among women (10%) than among men (8%). Youth unemployment (age between 15 and 24) is as well high (29.7%) (Istat, 2020).

In Italy a wide range of risks are present. The country is subject to volcanic eruptions, earthquakes, landslides, and flooding (National Civil Protection Department, 2018), as well as to industrial risks and chemical-bacteriological-radiological-nuclear risks (CBRN). Italy is at the top of the list of countries in terms of number and frequency of natural crises and disasters provoked by these risks. Among natural risks, Italy is one of the countries with the highest seismic risk in the Mediterranean, due to the frequency of earthquakes that have historically affected its territory and the intensity that some of them have reached, resulting in a significant social and economic impact (Meletti and Montaldo, 2007;



Istituto Nazionale di Geofisica e Vulcanologia, 2021). There are numerous volcanoes that threaten Italy. In addition to the major Etna and Vesuvius, we can recall the Campi Flegrei, Colli Albani, Ischia, Isola Ferdinandea; Lipari, Panarea, Pantelleria, Stromboli and Vulcano. The areas of the Peninsula most exposed to tsunamis are located in eastern Sicily, Calabria, Puglia and the Aeolian Islands as a result of the high seismic activity. Over 11,000 landslides and 5,600 floods have occurred in the last century, which have affected 70,000 people in the past two decades alone. Among the regions most affected are Calabria, Liguria, Umbria, Valle d'Aosta (Istituto Superiore per la Protezione e la Ricerca Ambientale, 2019). Fires are also a serious risk in Italy, considering that 30% of the state's surface is occupied by forests and that in the last 30 years 12% of the entire forest heritage has been lost in fires (Mirchetti, 2013). In Italy there are more than 1,100 industrial plants (DPC and Legambiente, 2013) treating dangerous and potentially toxic substances. Particular attention is paid to chemical and petrochemical plants, mostly located in Lombardy, Piedmont, Veneto and Emilia Romagna (DPC and Legambiente, 2013). Lastly, the risks related to bacteriological and/or radiological and nuclear contamination are also existent. These are risks both linked to the possibility of terrorist acts and to the fact that, although not using nuclear technologies for the production of electricity, there are 13 nuclear power plants within 200 km from the Italian borders (De Francesco, 2014).

### 3.6.2 Vulnerability in Italy

Italian national institutions working with risks and crisis, such as the Italian Department of Civil Protection, reserve a particular attention to vulnerability. A reference to vulnerability is made in its relationship with risk and exposure in the Italian National Risk Assessment (National Civil Protection Department, 2018), which is based on the EU Risk Assessment and Mapping Guidelines for Disaster Management (European Commission, 2010). In the Assessment, risk is defined through the formula:  $Risk = P * V * E$ . Where  $P$  is the probability that a negative phenomenon will occur with a certain intensity, in a given period of time and hitting a defined area.  $V$  is the vulnerability of people, economic activities, buildings and infrastructures in general. Vulnerability is defined as “the conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards” (National Civil Protection Department, 2018: 15), a definition which matches the one from the UNDRR terminology (UNDRR, 2021), which is also quoted in the EU Guidelines (European Commission, 2010 :10).  $E$  stands for exposure, identifying the value of the elements at risk present in the affected area, both in terms of human lives and of settlements. In the Civil Protection Code, contained in the legislative Decree n. 1, 2 January 2018, there is as well a reference to vulnerability in terms of civil protection activities that need to be performed “with particular regard to people in conditions of social fragility and with disabilities” (DL, 2018). Here, there is a clear reference to those individuals considered vulnerable due to socio-economic and psycho-physical circumstances.

To find out more about these people we took into consideration some categories provided by the Italian National Health Service (SSN), which lists various categories of people who are considered vulnerable. These groups are subject to the Essential Levels of Assistance (LEA), which provide all citizens, free of charge or against payment of a participation fee (ticket), health services. As such, the National Health Service needs know which individuals fall into the various categories, since public resources collected through the general taxation cover the costs. Since these Levels of Assistance can vary from year to year in terms of how many resources the Italian state aims to use to cover the costs, these categories are decided by a Decree of the President of the Council of Ministers (Prime



Ministerial Decree). The latest Degree from 12 January 2017, article 50 (Specific assistance to particular categories) lists the following groups: (1) the disabled (2) persons affected by rare diseases (3) persons affected by chronic and disabling diseases (4) people with cystic fibrosis (5) chronic nephropathic undergoing dialysis treatment (6) people with Hansen's disease (7) people with HIV / AIDS infection (8) persons detained and interned in prisons and minors subject to criminal prosecution (9) pregnant women and maternity protection (10) people with autism spectrum disorders (11) Italian citizens who are abroad (12) citizens of non-EU member states registered with the National Health Service (13) citizens of non-EU member states not in compliance with the residence permit. In addition, in the latest Istat Report (Istat, 2020), some categories are singled out as vulnerable: a) families with one or more members without a fix position. Within this group, a component particularly vulnerable are foreign citizens; b) individuals or families running small businesses; c) individuals or families owning houses in areas with high and very high landslide and flood hazards; d) individuals with pre-existing health conditions. Within this group, a particularly component vulnerable consists of those also with disadvantaged socio-economic conditions.

The Italian Department of Civil Protection as well has spotted out some groups who need help during an emergency. For these groups, the Italian Department of Civil Protection has developed a form for assessing immediate needs (SVEI). Its purpose is to mitigate the discomfort of the population forced to leave their home with particular attention to the suffering of the so-called fragile subjects. These are defined as people who, due to disabilities, age or pathologies, need special assistance and an adequate accommodation to their specific needs (for instance, a hotel, retirement home or nursing home, instead of a temporary shelter). The functioning of SVEI is very simple and is based on the subsequent compilation of two forms. The first is used by trained civil protection volunteers to quickly count displaced people in a hospitalization area, identifying among them those who need specific assistance. The second part, however, concerns only people identified as fragile and is filled in by the local health personnel of the area concerned. This second part consists of an anamnesis and an evaluation of the assisted, on the basis of which type of assistance is needed, including the indications for the mayors on the most correct housing destination and indications on the most suitable means of transport of the vulnerable individual. Some vulnerable groups are not mentioned in the official documents of the Italian Department of Civil Protection, such as migrants. During the 2012 earthquake in Emilia Romagna there were 12-15 different ethnic groups, each one having specific needs related to the type of food and religious habits that could not be properly addressed by the standard disaster emergency procedures of the Civil Protection.

## 3.7 Norway

### 3.7.1 Overview on Norway

Norway is a Nordic country known for its robust welfare system. As Finland and Sweden, Norway scores high in equality in income distribution (OECD, 2020), high level of transparency (4th least corrupted country in the world) (CPI, 2018) and high level of gender equality (2nd in the world) (GGGR, 2018). 80% of the population lives in urban areas. 15% of the population is 67 years old and over. A total of 39% of households consist of people living alone, and these account for 18% of all people in private households. In the population as a whole, there is no significant difference between the percentage of men and women who live alone. However, while single women are in the majority in the elderly population, men make up the majority among those who are younger. One-person



households are particularly common in the centres of the largest cities and in sparsely populated areas. The number of the elderly is increasing every year due to higher life expectation. The level of risk of poverty or exclusion in Norway is lower than the European average. In Norway, the risk of poverty or exclusion due to low incomes relates mainly to single persons (Eurostat, 2018:30)<sup>9</sup>.

The most recent National Risk Assessment Report (DSB, 2019) shows that in Norway events like fires in subsea tunnels, urban floods caused by heavy rain, and medicine shortages have the highest probability to happen in Norway, while long-term electricity rationing, oil and gas blowout and gas emission from industrial plants are those with the lowest probability. This is understandable in a country where the state has heavily invested in the construction of subsea tunnels and the number of floods has increased in recent years (Steen and Morsut, 2019). It can come as a surprise to read that, in the third place, we find medicine shortage, which is a relatively unknown problem in the other countries of this report. However, a report published by the Directorate of Health in June 2019 unveiled that Norway is very depended on the global supply chain for medicines and just a small failure in this system leads to serious problems for the vast majority of the population, especially for vulnerable groups like patients at the hospital or individuals in constant need of medication (Helsedirektoratet, 2019).

### 3.7.2 Vulnerability in Norway

Within the context of crises, disasters and resilience, Norwegian policy documents describe **vulnerability** as “an expression of the problems a system experiences when it is exposed to an unwanted event and problems associated with resuming its functions” (NOU 2000:24, 2000: 18). The same definition is elaborated by the National Risk Assessment Report as it follows: “Vulnerability refers to the problems a system has to properly work when it is exposed to an unwanted event, as well as to the problems the system has to resume its functions” (DSB, 2019:28). A system encompasses infrastructures, value or production chains, organizations or a community at local, regional or national level. The vulnerability of a system affects both the probability that an unwanted event will occur and what consequences it will provoke. To assess vulnerability, the Norwegian Risk Assessment Report raises questions like: 1) Which abilities does the system have to withstand adverse events?; 2) Which abilities does the system have to resist adverse events without having serious consequences? This definition does not make any reference between groups or individuals. The same Report states that vulnerability is the opposite of resilience, which is defined as a “general and dynamic ability to manage stress<sup>10</sup>, and resume original functions” (DSB, 2019: 28).

We looked for an official definition of vulnerable groups in the Norwegian context of crises and disasters, but we did not find one. The term vulnerable groups is used only once in a procedure document by the Norwegian Directorate for Civil Protection (DSB) for the development of comprehensive Risk and Vulnerability Analysis (RVA) for municipalities and is not clearly defined, although the protection of vulnerable groups is considered one of the critical functions of society (DSB, 2018).

Even though an official definition of vulnerable groups does not exist in Norway, many different groups are considered vulnerable in various contexts. By surveying various governmental agencies, we found

<sup>9</sup> New EUROSTAT updated data will be published in May 2021.

<sup>10</sup> Stress: “Chronic and ongoing dynamic pressures within a system, whose cumulative impacts undermine the capacity for sustainability and resilience” (UN-HABITAT, 2018: V).



the extent to which vulnerable groups are relevant for good practices and in need for targeted policies. Norwegian researchers have, as well, studied vulnerability and vulnerable groups. The tables below summarise the findings: age, gender, disabilities and migration status are the most recurrent factors used to define vulnerable groups. Irregular immigrants, in particular, are often considered a vulnerable group in several examples below (UDI, 2019).

<i>Agency</i>	<i>Vulnerable group(s)</i>	<i>Context</i>
Equality and Anti-Discrimination Ombudsman (LDO, 2020)	Romani peoples	Discrimination
International Organization for Migration (IOM Norway, 2019)	Victims of human trafficking (adults and children), underage and unaccompanied children, underage immigrants, immigrants with medical needs, other vulnerable migrants	Immigration
National centre for the minority health (NAKMI, 2013)	Migrants and other vulnerable (undefined) groups	Public health
Norwegian Directorate of Immigration (UDI, 2019)	Irregular immigrants	Immigration
Ombudsman for children (Barneombudet, 2019)	Underage and unaccompanied children, children of poor travellers and children with Romani background	Childcare and immigration
Religious Norwegian human rights NGO (Menneskeverd, 2019)	Deathbed patients	Ethics

*Table 1. Norwegian governmental Agencies dealing with vulnerable Groups*

<i>Research institution</i>	<i>Vulnerable group(s)</i>	<i>Context</i>
Gender research (KILDEN, 2019)	Women inmates, women with immigration background, surrogate women	Gender
Institute for Social Research (ISF, 2019)	Asylum seekers, irregular migrants, elderly	Immigration and age
NORCE - Research Unit for General Practice in Bergen (AFE Bergen, 2019)	Vulnerable patients	Public health
Norwegian Centre for Violence and Traumatic Stress Studies (NKVTS, 2019)	Women	Gender
Norwegian Institute of Public Health (NIPH, 2018)	Immigrants, persons with chronic physical and mental health issues, addictions or low-skilled	Public health
NTNU Research (NTNU, 2012)	Disabled children and young people in reception centres	Immigration
Volda College (HiV, 2019)	School children with psychological, somatic or social challenges	Education
Østfold University College Faculty of Health and Welfare (HIOF, 2019)	Drug addicts	Public health and rehabilitation
Welfare Research Institute (NOVA, 2017)	Elderly, persons with chronic physical and mental health issues, addiction subject to domestic violence	Public health

*Table 2. Norwegian Research on vulnerable Groups in Norway*

In peer reviewed scientific literature about vulnerable groups in Norway in the context of crises, we found an interesting study on vulnerable groups, which categorized vulnerability according to geospatial data as an attempt to quantify vulnerability (Rød et al., 2014). The study focused on people living in high-risk areas for flood hazards in the County of Trøndelag, situated in the middle of Norway, bordering Sweden to the East and the North Sea to the West. The vulnerable groups were described according to general criteria, such as age, income, and type of household. This study was part of a national project about climate change and local resilience, Climres (Climres, 2020).



## 3.8 Sweden

### 3.8.1 Overview on Sweden

Sweden is located in Northern Europe, with a landscape dominated by forest and lakes (SCB, 2019a). The population is just above 10 million people (SCB, 2019b), out of which 87% live in urban areas and the remaining 13% in rural areas (SCB, 2019c). Nearly 20% of the total population are above 65 years of age, while children and youth below the age of 20 make up 23% (SCB, 2019d). Demographic changes have resulted in an aging population, where the number of people above the age of 80 is expected to increase with 255 000 individuals by 2028, an increase with 50% (SCB, 2018a). In terms of income inequality, Sweden has similarly low levels as neighbouring Nordic countries such as Norway and Finland (OECD, 2020). Moreover, levels of trust between people are high (WVS, 2014a), confidence in the government is relatively high (WVS, 2014b), and estimated levels of public sector corruption are low (Transparency International, 2019).

The Swedish Civil Contingencies Agency differentiates between four types of risk categories (MSB, 2016): 1) natural hazards, 2) major accidents, 3) disruption of technical infrastructure and supply systems, and 4) antagonistic hazards. Risks assessed under the category of natural hazards include volcanic eruptions, mudslides, and heat waves. For major accidents, risks included in the analysis are nuclear accidents, fire on cruise ships, and dam failure. Disruptions of technical infrastructure and supply systems manifest themselves as, for example, disruptions in food supplies and contamination of drinking water. Lastly, the antagonistic incidents taken into consideration include bomb attacks, school shootings, and violent disturbances. The national risk and capabilities assessment carried out in the past years makes use of scenario analyses to better understand how different types of risk under each category affect the Swedish population. Based on the scenario analyses, a number of key vulnerabilities have been identified, as well as critical capabilities to be strengthened to cope with these. The first area relates to the capability to ensure continuity in critical infrastructure. For example, there is a need to build capacity to secure the power supply, electronic communication, water supplies, and IT systems in case of emergency. MSB points to serious deficiencies in back-up power supplies, which is problematic due to the cascading effect of loss of power in case of a crisis. Risks that may affect the power supply include storms, breakdown of dams, and antagonistic actions. In terms of water supplies, a lack of back-up supplies or emergency sources are highlighted in the national risk and capabilities assessment. Around 90% of the permanent housing stock is dependent on municipal water supplies, which means that a large part of the Swedish population would be affected in case of a disruption in the drinking water infrastructure and delivery. MSB stresses that there is a lack of contingency plans in groundwater areas, as well as a lack of back-up power in case of a disruption to the energy system, on which the supply of drinking water is reliant.

### 3.8.2 Vulnerability in Sweden

As in Norway, in Sweden, as well, **vulnerability** has been defined at system level. Indeed, the Swedish National Audit Office describes it as a system's (in)ability to function when under stress. Sometimes, also the magnitude of impacts of undesired events are accounted for. Related terms include robustness, defined as the ability to keep providing desired functions when under pressure, as well as the term ability – in the context of risk understood as societal robustness and preparedness (Swedish NAO, 2008). For an in-depth discussion on different conceptualizations, indicators, and ways to measure vulnerabilities, see for example Johansson and Blumenthal (2009).



Electronic communication has come to play an increasingly important role in Sweden, as well. Yet the nature of the dependency on electronic information systems is not always evident. These systems are susceptible to risk in similar ways as national power supplies, e.g., through extreme weather events and antagonistic attacks. Disruptions may cause failure in critical infrastructure such as power supplies, transport systems, and may also limit access to drinking water. MSB has found that few municipal stakeholders have alternative communication channels in place in case of a disruption in the electronic communication systems, thus information sharing in the event of a crisis affecting these systems may not be sustained. As for the transportation system, if a serious disruption would occur, it may result in devastating impacts on society as a whole. Vulnerabilities arise as critical societal functions such as elderly care, emergency care, the distribution of drugs, and the ability of the police, rescue service, and repair services for other forms of critical infrastructure (e.g., power supplies and district heating) are critically dependent on transport infrastructure. Additionally, maintaining a stable food supply is based on functioning transport, and back-up storage supplies are minimal throughout the food supply chain. The second area where risk and a need to strengthen capabilities has been identified is in the ability to securely manage information. Multiple areas in society are dependent on IT systems and information- and cyber security, while this infrastructure is vulnerable to risks such as natural hazards and antagonistic events. Additionally, failure in securely managing information in a crisis might worsen impacts, as access to trustworthy and timely information would not be guaranteed. Information- and cyber security issues highlighted by MSB include rapid technology development, where vulnerabilities can be exploited faster than problems are identified and addressed. Also, there are more individuals that have access to tools that may influence IT-systems, causing harm by small means, as compared to other systems such as the physical electrical system. A third area where capabilities need to be strengthened is in relation to the ability to coordinate action in the event of an incident. Areas in need of specific attention include public-private collaboration, rapid evacuation (e.g., in case of a nuclear accident, mudslide, or terrorist attack), and setting in place procedures for making priorities in terms of resource distribution. Another concern with respect to resources is a lack of personnel with the right competencies to deal with the types of risks covered in the national risk and capabilities assessment. Health care and social services are assessed to be the worst affected across many of the scenarios analysed, with the consequence that the functioning of these sectors will be severely disrupted in case of a serious emergency or crisis (MSB, 2016).

There is no general agreement on how to define or identify **vulnerable groups** in Sweden, and so the process of mapping and analysing vulnerable groups has been approached in different ways in various contexts. One example is related to the implementation of the 2030 UN Sustainable Development Goals Agenda, where Statistics Sweden makes a connection between the principle of leaving no one behind and the issue of measuring progress towards this aim. The 2030 UN Agenda states that all forms of poverty and hunger should be eradicated, while human potential, dignity, and equality should be achieved. These commitments imply that countries should identify, prioritize, and create better conditions for the most vulnerable groups in society. The agenda specifies a number of variables to be represented in a statistical breakdown to identify these groups, such as age, income, gender, race, ethnicity, migratory status, disabilities, geographic location, as well as other indicators relevant to national context (UN, 2015a). While not defining vulnerable groups in Sweden, the reporting from Statistics Sweden aligns with the 2030 UN Agenda in terms of what is perceived as important factors to consider when seeking to meet the needs of those most vulnerable. While the current data collection in Sweden does not allow for a breakdown that captures different segments under all these categories (for example due to legal, resource, and ethical concerns), there is an ambition to better cover these aspects in the future. This is to identify and make visible vulnerable groups (SCB, 2019f).



The study *“Individual’s ability to take responsibility for his or her own safety - Particularly vulnerable groups”* (MSB, 2015) points to the need to understand the underlying factors explaining why individuals might not be able to take full responsibility for their security in times of crises. The study stresses that these factors often are interrelated, and that they change over time, thus vulnerabilities are dynamic and not static. While underlining that it is not possible to make general statements about vulnerabilities among different segments of the population, some examples are still provided of underlying factors that may be important to take into consideration. These factors include financial situation, health, social networks and feelings of belonging, place of residence, ability to cope with stress, and access to information technology. The study also suggests that the following groups might be particularly vulnerable in a Swedish context: people with disabilities, dementia, and psychological issues, people that do not speak Swedish or English, those who are socially isolated, live in an environment that is unsafe, or belong to stigmatized groups, as well as ethical minorities, some migrant groups, and people with different forms of addiction (e.g., drugs, alcohol). However, the authors stress that only parts of these groups are particularly vulnerable to risk, that more knowledge is needed to understand the underlying factors creating vulnerabilities, and that it is important not to generalize or stigmatize (MSB, 2015).

More context-specific examples of how different individuals and groups may be vulnerable can be found in the scientific literature and in documents provided by, for example, interest organizations. In a study on climate change risk conducted by the Swedish Meteorological and Hydrological Institute (SMHI), elderly with poor health, people with low socio-economic status, as well as personnel within low-paid care work, are identified as particularly vulnerable to climate change impacts (e.g., heat waves and spread of new types of disease). Additionally, there is a risk that these vulnerabilities remain “invisible”, which may result in a lack of resources and interventions (SMHI, 2014). Other studies assess vulnerabilities in relation to issues that are not directly related to disaster risk. Examples of findings include that financial vulnerability and material deprivation is most common among unemployed as well as foreign-born Swedes (SCB, 2019e). Among the working population, seven percent still earn less than the EU at-risk-of-poverty threshold, where the most vulnerable are young people, single parents, and foreign-born (SCB, 2018b). There are also findings indicating that single mothers with children and foreign-born women are particularly vulnerable in terms of social exclusion and income insecurity (Swedish National Board of Health and Welfare, 2018). Despite these assessments not having been carried out in a disaster risk context, underlying factors explaining vulnerabilities in these situations might also be of importance when aiming to understand vulnerabilities in times of a crisis.

## 4. Vulnerabilities in past crises

In this Chapter, various man-made and natural crises occurred in the sample of countries are presented. The information on the crises is retrieved by several sources, mainly on-line newspapers and post crisis public investigations, so the information provided varies in length and details due to the sources we used. Some of these sources were in the national language, so the translation in English may differ as for the use of terms and concepts.

This description of crises serves the purpose to provide enough empirical material to identify to what extent the understanding of vulnerability in the eight national contexts is mirrored in the unfolding of crises: who are the vulnerable in these crises and why? Do they differ they the official and public



understanding? Most of all, these crises are considered helpful to answer the question: Are there individuals who are overlooked, and not mentioned in the official data? As such, the tables under each crisis have the purpose to highlight trends or patterns in the data and quickly see vulnerable individuals. These crises will be discussed in Chapter 6 together with what has been provided in Chapter 4.

## 4.1 Natural crises

### 27 and 28 October 2019. Extreme storm in Estonia.

Extreme storms (winds up to 30m/s) are a normality in Southern Estonia. However, the type of storm that occurred in October 2018 had been not seen in Southern Estonia since 1971 (Hindre, 2019). The wind was so strong that an electric power post fell down and there was a power outage that lasted several hours (Kuusk, 2019). The lack of electricity affected the provision of water and the functionality of phone lines and other communication devices, as the telecommunications operators in the region were weakened or taken out altogether. The communication companies' mobile masts ceased to work for two hours after the power outage, when the mobile masts' batteries were exhausted. This also meant that individuals could not reach rescue services on the phone neither send information about their situation.

62 000 households, about 1/6 of the total, were cut off from electricity. The majority of these households were reconnected to the power network within 24 hours, while around 8000 were out of electricity for five or more days. Most of the households were located in blocks of flats, where alternatives to central heating and water supply were not available. In addition, the local hospital, the South Estonia Hospital, was without electricity for eight hours and was powered by backup generators. The hospital could not admit new patients in this situation. A cascading effect was the lack of autonomously-powered gas stations in the Võru region. This meant that also the emergency operators could not re-fuel their tanks and had to spend hours to drive and refuel in other parts of Estonia. This delayed the crisis response to individuals with health problems.

<i>Hazard</i>	<i>Type of crisis</i>	<i>Who is vulnerable</i>	<i>Vulnerability elements</i>
Extreme storm	Power outages	People living in blocks of flats Patients in the local hospital New patients Emergency operators	Type of house Health condition Type of work

*Table 3. Extreme Storm*

### 6-18 June 2019. Water contamination in Norway.

In June 2019, an outbreak of the bacteria *Campylobacter* and *E.coli* hit the Askøy water system. Askøy is a municipality in Hordaland County, the municipality is of moderate size in a Norwegian context with its 28821 inhabitants. 2000 inhabitants fell sick. On 6 June, Askøy emergency medical facilities saw a sharp increase in people with digestive problems arriving at the local hospital emergency room, all coming from the Kleppestø island. Public institutions were alerted and at 18:00 the following day a general alarm was sent via SMS to boil any drinking water in the affected area. On 18 June, the sources of water were considered safe, but the contaminated water source was shut down and water was diverted to the area from a different source on 23 June. Still today, the water is



under continual surveillance to detect in time similar bacteria. One elderly and one child died after digestive complications that may have been affected by the bacteria.

<i>Hazard</i>	<i>Type of crisis</i>	<i>Who is vulnerable</i>	<i>Vulnerability elements</i>
Water contamination	Waterborne disease outbreak	Elderly Children	Age

*Table 4. Water contamination*

### **April 2019. Fire in Estonia.**

In 2019, the Estonian Rescue Board declared a fire hazard period on 6 April following a relatively warm and dry period for that time of the year, a phenomenon experienced across northern Europe. In general, safety precautions applied and fires were forbidden in some built up areas. Nevertheless, the Estonian Rescue Board received more than 600 emergency calls for fighting wildfires in April 2019 (Estonian Rescue Board, 2019). 6 individuals were also killed by the wild-fires. Among those were individuals who had started fire under the influence of alcohol and elderly with limited mobility who were trying to put off the fire that had spread out of control.

<i>Hazard</i>	<i>Type of crisis</i>	<i>Who is vulnerable</i>	<i>Vulnerability elements</i>
Fire	Bush and forest fire	Inhabitants of the affected area Elderly with limited mobility Individuals momentarily impaired	Health effects of smoke inhalation Age Impaired mobility

*Table 5. Fire*

### **January 2019. Wind storm in Estonia.**

This wind storm hit Western Estonia and, in particular, the islands, included the largest island in Estonia, Saaremaa. 10 000 households were left without electricity in Saaremaa, which is 66% of the households of the island region. Families with small children and disabled individuals were the most vulnerable, as they needed extra care in the aftermath of the storm (Vinni, 2019). Gas stations could not pump fuel, mobile services were irregular, kids were sent home from school, card payments did not go through in shops. Already this case was described as a cautionary example of internal security and local government preparedness (or lack thereof) for crises.

<i>Hazard</i>	<i>Type of crisis</i>	<i>Who is vulnerable</i>	<i>Vulnerability elements</i>
Wind storm	Power outages	Families with small children School children Disabled	Lack of services Age Disabilities

*Table 6. Wind Storm*

### **2 January 2019. Snow fall in Norway.**

On Wednesday 2 January 2019, the police received a warning about a heavy snowfall on the Blåbærtinden, also known as Blåbærfjellet (1,442 m above sea level), in Tamokdalen in Troms Country, Northern Norway. The Norwegian Water Resources and Energy Directorate assigned the area a danger level of three out of five, which means considerable risk for a snow avalanche. Five tourists had been hiking in the mountains, three Finnish men, one Swedish woman and one Swedish



man. When they arrived at the tree line, where the vegetation became limited due to the altitude, the Swedish man chose to turn around, discovered that the avalanche had occurred and alerted authorities. The ski trails of the other four entered the avalanche area and they were reported missing. Poor weather and high danger for landslides in the area prevented the search for the four. On Friday morning, almost two days after the avalanche, the weather conditions improved and the voluntary search crews could fly into the area to search for the four missed people. Around 12 noon on Friday 4 January, the search crews found two different avalanches in the area and half an hour later, the police changed the status from missing to suspected deaths' search, after both the National Main Rescue Centre and the police concluded that the four missing persons probably had died in the landslide. Three of the dead were dug out of the snow after two weeks. On 10 July, the police found the last body.

<i>Hazard</i>	<i>Type of crisis</i>	<i>Who is vulnerable</i>	<i>Vulnerability elements</i>
Snow fall	Snow avalanche	Tourists First responders	Faulty risk perception Lack of knowledge concerning the local avalanche risk Not perfect weather conditions (for the first responders)

*Table 7. Snow Fall*

### **Summer 2018. Heat waves in Sweden.**

Summer 2018 was unusually warm in Sweden, breaking previous heat records in multiple places in the country. The heat wave lasted from May to August, July and August being particularly warm. The highest average temperature reported from weather stations around the country was 31.2°C. The long period of elevated temperatures resulted in drought and forest fires (SMHI, 2018a; SMHI, 2018b).

Many actors participated in efforts to reduce risk in relation to the heat wave, including the Ministry of Health and Social Affairs, the Public Health Agency of Sweden, the National Board of Health and Welfare, as well as the Swedish Association of Local Authorities and Regions. Weekly coordination meetings were organized during the heat wave, addressing issues such as what actions the responsible actors were undertaking to help those at risk. The public was directed to sources such as the medical advice service for information on health-related risks, to the World Health Organization for advice on how to prevent adverse health effects of heat, and to the National Food Agency website for information on how to handle food in a safe way in times of high outdoor temperatures. The Government Offices went out with warnings to particularly vulnerable groups, including elderly, young children, chronically ill and people on medication, people with disabilities, and pregnant women (Government Offices of Sweden, 2018). Although, the Swedish reports proposed in Chapter 4 are reluctant to define vulnerable groups, in the context of a heat wave, there is a precise account to which groups need to be address by public authorities. In addition to impacts such as drought and forest fires, the heat wave affected human health. Reported cases of infectious diseases increased during the 2018 heat wave, as compared to the same period during the past four years (Public Health Agency of Sweden, 2018). Furthermore, mortality rates increased during the summer, with an estimated 600-750 excess deaths attributed to the heat (Åström et al., 2019). The reported cases of heat related mortality concerned primarily elderly with heart conditions (Public Health Agency of Sweden, 2018). European studies have shown that increased mortality rates are more common among women as compared to men during heat waves, while previous studies in Swedish contexts have shown the opposite (SMHI, 2011). However, no studies allowing for a further breakdown of the data on reported cases of death during the 2018 heat wave have been found in the literature screening



for the present report. In a follow up study on how the public handled the heat wave and what type of information people had access to, The Public Health Agency of Sweden sent out a survey with 4 600 respondents. One fourth of the respondents reported having suffered mild health related issues due to the elevated temperatures, but only around two percent had needed emergency care. Most of the reported cases of mild health issues concerned elderly, small children, pregnant women, chronically ill, and people with specific types of disabilities. 72% of the respondents reported that they had been changing their habits in some way to cope with the heat. Also, 96% reported that they had the information they needed to cope with the heat, which may indicate a certain level of risk awareness in the case of heat waves among the public (Public Health Agency of Sweden, 2018).

Due to the cool climate, heat waves such as the one experienced in summer 2018 have previously been relatively unusual in a Swedish context. However, as a consequence of climate change, they are expected to become increasingly common. It is suggested that the frequency of extreme temperatures will increase from once every twentieth year to every third or fifth year by the end of the century (SMHI, 2011). Risk arises as the Swedish society is adapted to a cold climate, and what could be perceived as normal temperatures in other countries may be disruptive in a Swedish context. Buildings are constructed to handle cold weather but not heat. The outdoor environment is designed to maximize light, rather than shade. Electronic infrastructure is not equipped with cooling systems, and may break down during extended periods of elevated temperatures. Additionally, there is a suggested lack of awareness in the population around how to act during a heat wave and how the body might respond to high temperatures (MSB, 2015). Against this background, building capacity to handle the consequences of elevated temperatures is of importance for risk reduction and protection of human health, societal functions, and infrastructure (Public Health Agency of Sweden, 2017).

<i>Hazard</i>	<i>Type of crisis</i>	<i>Who is vulnerable</i>	<i>Vulnerability elements</i>
Heat waves	Deterioration of human health Higher mortality Fires	People living in houses with large windows People living in houses without the possibility of adequate cooling Elderly Children Chronically ill and on medication people People with disabilities Pregnant women	Age Reduced health Type of house Gender

*Table 8. Heat Waves*

### **Summer 2018. Forest fires in Sweden.**

Following the 2018 heat wave, multiple places in Sweden experienced severe forest fires during the summer months. Firefighting airplanes and helicopters detected over 500 fires, which is five times as many as during a normal summer (MSB, 2018b). Around 25 000 ha forest land was burnt, and approximately 7 000 rescue interventions carried out in the field (SOU, 2019). The largest fire areas were found in Dalarna (2 500 ha), Gävleborg (8 500 ha), Västernorrland (500 ha), and Jämtland (8 500 ha) (SVT, 2018). The forest fires and related efforts to control them unfolded over a period of several months. In response to high fire risk expected in early summer, MSB organized a number of coordination meetings. The focus was on fire risk reduction, and county administrative boards and other actors participated. On 1 June, several complicated fires were spreading around the country. A few days later MSB reached out to the EU Emergency Response Coordination Centre (ERCC) in a proactive effort, and did also form a specific internal unit for fire management. ERCC firefighting



airplanes arrived to assist with fire control on 10 June, leaving again ten days later. The special task unit at MSB reduced their capacity at the same time. However, the situation got more intense again at the beginning of July, when several severe fires broke out. Helicopters from Norway were called in to build capacity. MSB got in contact with the ERCC again on 16 July, to receive additional support. MSB coordinated help actions with volunteer organizations and the Red Cross on 19 July. On 23 July, large fires broke out in the north of Sweden. The situation was stabilized around 27 July, when also some of the international back-up resources began to leave Sweden. The fire risk was assessed to be back at normal levels on 12 August, and the last remaining international resources left the country the day after (MSB, 2018b).

Taken together, many different actors helped with fire management. Aside from the national and international resources mentioned earlier, also organizations such as the Swedish Armed Forces, the Swedish Transport Administration, Radio Sweden, and the Swedish Maritime Administration played important roles. Additionally, forest owners and residents in the areas affected by the fires contributed with knowledge and resources (SOU, 2019). In addition, over 6 000 people spontaneously signed up as volunteers through the Red Cross (Swedish Red Cross, 2019). No major disruptions to societal functions were experienced during the 2018 forest fires, and no damage to permanent housing was reported. However, around 100 people had to be evacuated from their homes, and the rescue service and other actors working to control the fires faced challenging working conditions. One fire-fighter lost his life in an accident in relation to the fires, but no other severe personal injuries were reported. The group in society most affected was the forest owners, for example through financial losses and feelings of stress and uncertainty. The operational work on fire control in 2018 has been assessed to have followed best practice, but in general Sweden is not sufficiently well prepared for these types of events, in light of potential large and complicated future forest fires (SOU, 2019).

<i>Hazard</i>	<i>Type of crisis</i>	<i>Who is vulnerable</i>	<i>Vulnerability elements</i>
Heat wave	Forest fires	Inhabitants of rural areas First responders Forest owners	Demolishing of property and forest Health effects of smoke inhalation

*Table 9. Forest Fires*

### **December 2017 – January 2018. Snow fall in Finland.**

At the turn of the year 2017-2018, the Kainuu region, Northeast Finland, experienced extensive power outages as a result of the snow burden. Heavy snowfall accumulated heavy snow layers on the branches of trees, causing trees to fall on the electricity lines, leaving thousands of households without electricity. Most of the electricity was recovered quickly, but some had to be discharged for several days. The Finnish National Rescue Association made an online survey about the event. In general, the situation was largely resolved, as the worst power outages occurred in areas where the population was prepared and had the resources needed to survive, such as fireplaces, home supplies and a source of emergency water. According to the respondents, their own attitude and skills also played a key role in the success of the recovery. Although self-reliance and residents' resilience to the crisis seems to have been good, it should be noted that feelings of security were shaken of the most respondents. Respondents raise a concern about the elderly, but also for families with children and farm entrepreneurs as for a slow recovery. The most vulnerable groups in the incident were people depended on electrically-powered health-related devices such as oxygen concentrators at the local hospital.



<i>Hazard</i>	<i>Type of crisis</i>	<i>Who is vulnerable</i>	<i>Vulnerability elements</i>
Snow fall	Power outages	Elderly Families with children Hospitalised patients Farm entrepreneurs	Dependence on electrically-powered health-related devices Age Heath conditions

Table 10. Snow Fall

## 21 August 2017. Ischia earthquake in Italy.

Ischia is an Italian island, located in the northern end of the Gulf on Naples, in southern Italy. The island economy is based on tourism, and during summer, thousands of people reach the island to enjoy its tourist attractions ranging from beautiful beaches to hot springs. On 21 August 2017, a series of earthquake tremors affect the island of Ischia. The strongest occurred at 20: 57 and was located in the municipality of Casamicciola Terme, north of the island. The magnitude of the earthquake was modest, 3,9. Nonetheless, several buildings and a church collapsed, mainly due to poor construction materials. There were two victims, a tourist and a local resident, while several people were rescued under the rubble. The response from the Italian civil protection was prompt thanks to the availability of air and sea assets to reach the island. About 2 000 people needed shelter due to damages to their households and were accommodated in hotels. About 1000 people, mainly tourists, were helped to leave the island during the first 24 hours after the earthquake.

<i>Hazard</i>	<i>Type of crisis</i>	<i>Who is vulnerable</i>	<i>Vulnerability elements</i>
Earthquake	Collapse of buildings	Inhabitants of the island Tourists	Type of house

Table 11. Earthquake

## 24 August 2016. Central Italy earthquake .

At 3:36 a.m. on 24 August 2016 a 5,9 magnitude earthquake hit Central Italy. This is a vast area in the Central Apennines, characterised by small towns and village, like Amatrice, Accumuli and Norcia, attractive for a rich of cultural heritage. In particular, Amatrice was packed with tourists due to a popular Italian food festival. The casualties were 299, 365 the injured, while about 2000 people were in need of a shelter. The Italian civil protection assisted the population, surveyed the damage on buildings, artistic and cultural heritage, provided alternative housing solutions and support to production activities, which were severely damaged.

<i>Hazard</i>	<i>Type of crisis</i>	<i>Who is vulnerable</i>	<i>Vulnerability elements</i>
Earthquake	Collapse of buildings	Inhabitants of the area Owners of economic activities Tourists	Type of house Coincidental location

Table 12. Earthquake



## 10 November 2016. Landslide in Norway.

On Thursday 10 November 2016, a massive landslide occurred in Asakveien in Sørums, a municipality in Akershus County. The area covered was approximately 400 x 300 meters and 60 meters deep. At 15:55, only minutes after the landslide, the local Fire Department was notified by workers in the area. The area was initially not considered safe for first responders: geologists from Norwegian Water Resources and Energy Directorate reported that there were still floating masses and the danger of new landslides. Three Lithuanian men clearing forest and cutting down trees in the area were killed. One of three presumed victims was found by police and voluntary search parties the same day. The two other forest workers were not found. The police eventually concluded the search two days later.

<i>Hazard</i>	<i>Type of crisis</i>	<i>Who is vulnerable</i>	<i>Vulnerability elements</i>
Landslide	Masses on a working site	Workers First responders	Coincidental location

Table 13. Landslide

## 5 - 8 December 2015. Extreme storm in Norway.

The Synne storm was a relatively short-lived, but extremely bad weather event, characterised by the heaviest rainfall since records began in 1897 and violently hit the town of Eigersund between 5 and 6 December 2015. The storm provoked a flood from both rivers surrounding the town, damaging the road system, including the bridges, which cross the rivers, the railway, and households around the harbour and close to the rivers' banks. During the flood, the local crisis management evacuated several hundred people from over 80 houses, while the local home care centre and the local tourist centre had to provide temporary shelters for their guests, elderly and tourists residing there. The flood destroyed a large area of farmland, damaged the town's infrastructure, disrupted road and rail traffic and cut off power supplies in several areas. The total impacted area was the Rogaland and Vest-Agder counties, which are 9 378 km<sup>2</sup> and 7 276 km<sup>2</sup>, respectively. Losses were estimated at more than 1,5 million Norwegian Crowns (Steen and Morsut, 2019).

<i>Hazard</i>	<i>Type of crisis</i>	<i>Who is vulnerable</i>	<i>Vulnerability factors</i>
Extreme storm	Flood	Elderly Tourists House owners close to the rivers	Age Type of house Coincidental location

Table 14. Extreme Storm

## November 2015. Snow storm in Finland.

On Saturday 21 November 2015, a snow storm heavily hit the Juupajoki municipality, Central Finland, leaving its about 2000 inhabitants without electricity. Power blackouts had already occurred since Friday evening, but the entire municipal centre went dark on Saturday afternoon (YLE news, 2015). People relied on battery-powered light sources and candles. The municipal district heating was not working. Residents of blocks of flats and terraced houses without wood-burning fireplaces or stoves were without heating. The street lights had also blacked out. Although the outdoor temperature was close to zero, there was no acute danger for the inhabitants. On Sunday, electricity recovered in the municipal centre after a weekend in darkness (YLE news, 2015). The local retirement home and the water pumping plant operated with reserve power and the use of a generator. The evacuation was



planned, but fortunately inner temperature did not fall under 20 degrees and patients did not need to be evacuated (YLE news, 2015). On the contrary, elderly people living in residential care homes were evacuated to the retirement home. The municipal emergency management was in constant contact with the local rescue services, which faces major problems with mobile phone networks not properly working. He was, as well, in close contact with the operating electric company, which, after a short assessment of the damages, admitted the several days were needed to give the electricity back to all. The regional rescue department was, as well, monitoring the situation.

Snow storms are not a rare phenomenon in Finland, but their increase in number has provoked serious disruptions in the electricity system, as this event showed. As a consequence, Finnish electric companies are currently replacing existing overhead power lines with underground cable networks, which means that the wires are not vulnerable to the weather (YLE news, 2015).

<i>Hazard</i>	<i>Type of crisis</i>	<i>Who is vulnerable</i>	<i>Vulnerability elements</i>
Snow storm	Power outages	Elderly in residential care homes Households in blocks of flats without fire place	Age Type of house Reduced health

Table 15. Snow Storm

### May – June 2013. Floods in Germany.

In the end of May 2013, an extremely high dry soil in most of Germany was met by exceptional rainfalls. This combination caused massive floods from all large river systems in Germany, but the river systems of the Elbe and Danube in the south-eastern part of the country were the ones particularly affected, causing considerable damage (DKKV 2015: 22). In the most severely impacted federal states of Bavaria, Saxony and Saxony-Anhalt, tangible damages comprised with nearly 5 billion Euro more than 80 percent of the total flood damage according to pre-liminary cost estimations (ibid: 32). 14 people lost their lives and another 128 were injured. Intangible damages resulting from the floods included physical and mental health challenges for the affected populations. Especially mental stress prevailed also in the aftermath of the crisis (ibid: 42).

In Germany, the local fire brigades and relief organisations, which are predominantly volunteer based, are the central core of civil protection and crisis management. Generally, they carry the main load with respect to response. However, in 2013 essential help was also provided by spontaneous or unaffiliated volunteers (DKKV 2015: 160; Sächsische Staatskanzlei 2013: 51). Indeed, during the flood and in the immediate aftermath, a large number of citizens coordinated themselves via social media and sought to contribute to the relief operations (Sächsische Staatskanzlei 2013), although they did not have any particular training. As during previous floods, many citizens supported professional responders by building sand back installations, providing food and drinks for other volunteers and organising help for affected people.

In the aftermath of the 2013 flood, a taskforce of the German Red Cross evaluated the flood relief operations. The 2002 flood in Germany had already disclosed major challenges in dealing with specific necessities of a particular vulnerable groups, such as people in need of homecare, as well as psychosocial support in the course of evacuation. The German Red Cross pointed out that the field of home care pose significant challenges for crisis management (German Red Cross 2018a: 14). Due to physical and cognitive impairments and their dependency on support by others, people in need of care are especially vulnerable during crises and disasters (German Red Cross 2018a: 16-19). In the



2013 flood, the evacuation of this vulnerable group posed a major challenge for the relief officers, since the number of people was often underestimated. Moreover, data were lacking to identify where home-cared people lived (German Red Cross 2018a: 8, 21f.).

<i>Hazard</i>	<i>Type of crisis</i>	<i>Who is vulnerable</i>	<i>Vulnerability elements</i>
Exceptional rainfalls	Floods	Households affected by the flood People in need of homecare	Reduced health Location

*Table 16. Exceptional Rainfalls*

### **March 2013. Snowstorm in Hungary**

In mid-March 2013, the suddenly return of severe winter weather caused a violent snowstorm which paralysed almost half of Hungary. Trucks jack-knifed across the key highways, causing traffic jams. Massive drifts severed 160 roads and disrupted five railway lines. Thousands of people were stranded in cars stuck in the snow and had to spend the night in cars or in emergency shelters. Over 100 people were injured in traffic and snow-related accidents. Warning messages were broadcast via TV, radio and mobile. 1500 personnel from the various rescue and emergency agencies (Red Cross, police, firefighters and civil protection) and around 400 volunteers were involved in the emergency response. The storm also left more than 100.000 people without electricity.

<i>Hazard</i>	<i>Type of crisis</i>	<i>Who is vulnerable</i>	<i>Vulnerability elements</i>
Snow storm	Power outages Roads closed Railway stations closed	Travellers Households without electricity	Limited and restricted mobility Lack of heating

*Table 17. Snow Storm*

### **9 and 10 December 2010. Snow storm in Estonia.**

This snowstorm violently raged through Estonia at the beginning of December 2010 (ERR, 2010). Several roads were closed, since municipalities did not have resources to keep the local and state roads open. Many of Tallinn airport's flights were cancelled, while schools were closed. Difficult road conditions and poor visibility resulted in nearly 80 road accidents across Estonia, and, in the conditions of low visibility, one man who had got out of his car stuck in the snow was hit by a passing vehicle and died. In the northeast rural municipality of Viru-Nigula, hundreds of people were stranded in their cars. Two people got lost during the storm and were later found frozen to death. Help took time to arrive because ordinary rescue service vehicles could not move. In highly mobile society, anyone could have got stranded in the car due to extreme road conditions.

<i>Hazard</i>	<i>Type of crisis</i>	<i>Who is vulnerable</i>	<i>Vulnerability elements</i>
Snow storm	Power outages Roads closed	Travellers (car and plane) Children Emergency operators	Limited and restricted mobility Lack of heating

*Table 18. Snow Storm*



## October 2010. Veneto extreme weather in Italy

Between the end of October and the beginning of November 2010, the Veneto region, in the North-East of Italy, was hit by a violent wave of extreme weather: heavy and persistent rains provoke landslides, watercourses overflow and floods throughout the region. 3 elderly died drowning into rivers, while about 170 people were injured. About 4 500 displaced people found accommodation independently or were assisted in the reception centres activated by the municipalities or in hotels. There were also several interruptions to the road network. The event hit directly and indirectly about 500 000 residents. Veneto economy is based on SMEs, which are specialise mainly in the manufactory production, and agriculture with agricultural companies, almost all mechanised and with a high level of specialisation. Both industry and agriculture were damaged as well as homes, road infrastructure, essential services and telecommunications networks.

<i>Hazard</i>	<i>Type of crisis</i>	<i>Who is vulnerable</i>	<i>Vulnerability elements</i>
Exceptional rains	Landslides Floods	Inhabitants of the area Small enterprises	Location Type of house Limited mobility

Table 19. Exceptional Rains

## 6 April 2009. Abruzzo Earthquake in Italy

On 6 April 2009 a violent earthquake with magnitude above 6 hit Abruzzo and the province of L'Aquila in central Italy at 03:32 a.m.. The earthquake, occurred during the night, caused 309 victims and more than 1500 injured. 67,500 people lost their homes. The earthquake also heavily damaged public (included hospitals and a student dormitory) and private structures and the cultural heritage of the area. The earthquake was particularly destructive with Abruzzo's capital city L'Aquila, well-known for its Medieval, Baroque and Renaissance buildings and churches, its elegant piazzas and its fountains (Protezione Civile, 2017). Small towns and villages surrounding L'Aquila, like Onna, Roio, Villa Sant'Angelo, Castelnuovo, Tempera, San Gregorio and Paganica, were severely damaged as well. In particular, Onna and Paganica were totally destroyed.

Given the seriousness of the event, the very first necessary interventions were those of health nature. The Department of Civil Protection, flanked by the Italian Red Cross, immediately took action to set up field health posts, to provide support to overloaded hospital structures and reduce the time required for interventions on the injured.

<i>Hazard</i>	<i>Type of crisis</i>	<i>Who is vulnerable</i>	<i>Vulnerability elements</i>
Earthquake	Collapse of buildings	Students Patients at the hospital Inhabitants injured by the collapse of buildings	Type of house Reduce health Age

Table 20. Earthquake

## 8 January 2005. Extreme storm in Sweden.

On 8 January 2005, Sweden was hit by a storm named Gudrun. With wind gusts reaching up to 42 m/s, equivalent to a hurricane class one, the consequences were severe. Nine people lost their lives



during the storm (Sydsvenskan, 2010), another eleven people lost their lives during the cleaning up afterwards, and 141 accidents were reported in the cleaning up phase (SVD, 2006). The Swedish Energy Agency estimates that 730 000 households lost power, 12 000 of which were still without power 20 days after the storm. Some households were without power as long as for 45 days. Among the households without power, some were located in small remote villages and or secluded rural areas. Other affected services include roads, rail roads, telecommunications, and infrastructure. Gudrun has also been the storm which has affected forest areas the most – 75 million m<sup>3</sup> of trees fell (slightly more than the yearly logging in Sweden). The societal cost for the disruptions to the energy system was estimated to 4-5 million Swedish kroners (Sydsvenskan, 2010; Swedish Energy Agency, 2015). For the forestry sector, insurance companies may have paid to up to 1 billion Swedish kroners to cover the impacts of Gudrun. As storms usually affect larger areas, they are estimated to be costlier as compared to, for example, forest fires (de Lima Fagerlind, 2018). The storm since Gudrun that is on second place in terms of affected forest is the storm Per (14 January 2007) with 12 million m<sup>3</sup> fallen trees<sup>11</sup>. Per is also the only other storm in Sweden that has caused loss of lives – three persons died due to falling trees (Expressen, 2007).

<i>Hazard</i>	<i>Type of crisis</i>	<i>Who is vulnerable</i>	<i>Vulnerability elements</i>
Extreme storm	Interruption of vital services Households without electricity Destruction of forests	Households First responders Households in remote areas	Lack of electricity Lack of water Lack of fuel Lack of workable phone lines Leaving in rural areas

Table 21. Extreme Storm

### Summers 2003, 2010, 2018. Heat waves In Finland.

Despite the fact that summers are cool in Finland, higher temperatures have been registered lately, causing health problems. Heat waves have invested Finland, increasing mortality rates, especially in health care units. For example, the 2003 heat wave in Finland caused over 200 premature deaths, while the 2010 heat wave about 300 premature deaths. The mortality rate increased in particular among those over 75. During the heat wave in 2010, the hospital district of Helsinki and Southern Finland had 60 deaths more than usual during the summer months (Tuomenvirta et al., 2018). The extended heat wave of summer 2018 caused around 380 premature deaths. This information is based on an assessment by researchers at the National Institute for Health and Welfare. Mortality was examined on a 24-day period in July and August during which temperatures were hot across Finland. The effects were focused on the age group of over 65-year-olds, in which daily mortality grew by on average 14% during the heat wave compared to regular rates (Finnish Institute for Health and Welfare, 2019). In 2016, the Helsinki region climate-based vulnerability survey examined people’s vulnerability to floods and heat waves. The survey studied the factors of social vulnerability to climate change, expressed in terms of floods and heat waves, in the Helsinki region. The studied factors were: age, access to health care, income, information use, overcrowding, green areas, social networks, and tenure. The results were presented as vulnerability maps within which divide vulnerability was presented according to different dimensions: sensitivity, enhanced exposure, and the ability to prepare, survive, and recover (Kazmierczak and Kankaanpää, 2016).

<sup>11</sup> Two previous storms were more severe: one in 1969 – 25 million m<sup>3</sup>, and one in 1954 – 18 million m<sup>3</sup>.



In Finland, in general, extreme weather events may affect some people more than others. Individual's vulnerability is determined by their physical characteristics, such as age and health. In addition, vulnerability is affected by people's ability to cope with harmful weather events; be prepared, cope with the actual situation, and the opportunities to repair damages and return to a normal life as quickly as possible. For example, social networks, such as friends and neighbours, improve people's ability to adapt and respond in harmful weather events without long-lasting damages (Kazmierczak and Kankaanpää, 2016). Lonely elderly people may be at risk during long periods of heat wave unless they have friends or relatives who can help them. The living environment can increase or decrease vulnerability. The quality of the housing, the location of the dwellings, and the amount and quality of the green areas affect the impact of floods and heat waves (Kazmierczak and Kankaanpää, 2016). In terms of the heat, non-ventilated interiors comprise big risk. Especially in small dwellings with large windows facing south or west, the indoor temperature can rise to very high levels during the heat wave. This makes the heat a greater risk than extreme cold. In Helsinki, vulnerable groups in most cases are able to go indoors and protect themselves against extreme cold weather conditions (Pilli-Sihvola et al., 2018).

<i>Hazard</i>	<i>Type of crisis</i>	<i>Who is vulnerable</i>	<i>Vulnerability elements</i>
Heat waves	Deterioration of human health Higher mortality	People living in houses with large windows People living in houses without the possibility of adequate cooling Elderly	Age Reduced health Type of house

Table 22. Heat Waves

## 4.2 Man-made crises

### 10 August 2019. Violent extremism in Norway.

The Bærum mosque shooting was a terrorist attack that occurred on 10 August 2019 at the Al-Noor Islamic Centre mosque in Bærum. Bærum is a Norwegian municipality in Akershus county neighbouring the capital city of Oslo. The shooter, identified as Philip Manshaus, was wearing a uniform and helmet when he entered the mosque, shooting his way through the locked door. He was carrying two shotguns or shotgun-like weapons and a pistol. When inside, he opened fire in the room of prayer. Luckily, prayers had just ended, with only three elderly remaining in the mosque. One of the men approached Manshaus and managed to hold him on the floor and to move his weapons away. The two began to struggle and Manshaus injured him. Another of the men in the room then hit Manshaus on the head to subdue him. The police was called by worshippers at the Mosque at 16:07 local time, shortly after Manshaus was stopped and held down by a 65 year old immigrant with experience from the Pakistani air force. Initially, the language barrier hindered the police in their understanding of where the shooting was taking place. Manshaus was in a chokehold when police arrived.

<i>Hazard</i>	<i>Type of crisis</i>	<i>Who is vulnerable</i>	<i>Vulnerability elements</i>
Violent extremism	Terrorist attack	Worshippers at the Mosque	Language Belonging to different ethnic group and/or religion than the terrorist

Table 23. Violent Extremism



**18 August 2017. Violent extremism in Finland.**

The 2017 Turku terrorist attack took place on 18 August 2017 at around 16:02–16:05 when 10 people were stabbed in central Turku, Southwest Finland. Two women were killed in the attack and eight people sustained injuries. Police was informed at 16:02. Three minutes later the attacker, Abderrahman Bouanane, a Moroccan rejected asylum seeker, was detained. At the time of his arrest, Bouanane was using the name Abderrahman Mechkah, which was subsequently discovered to be a false identity. In June 2018, Bouanane was found guilty of two counts of murder with terrorist intent and eight counts of attempted murder with terrorist intent. It was the first time a person had been sentenced for a terrorist crime in Finland. Bouanane was reportedly identified as a soldier of the Islamic State of Iraq and Syria (ISIS). He had been radicalised three months before the stabbing took place. During the investigation, he was discovered possessing ISIS propaganda material and a video of him reciting a manifesto and (Safety Investigation Authority, 2018). A study on jihadism in Finland commissioned by the Finnish Interior Ministry pointed out that “Even though there has been increasingly extensive networking among people interested in jihadism in Finland in recent years, jihadist activism in the country is still quite fragmented and disorganised. There are still no organisations openly engaged in jihadist activism in Finland. Indeed, there appears to be only a few key activists that are capable of and willing to organise and encourage these activities” (Malkki and Saarinen, 2019:11).

<i>Hazard</i>	<i>Type of crisis</i>	<i>Who is vulnerable</i>	<i>Vulnerability elements</i>
Violent extremism	Terrorist attack	The whole Finnish society	Coincidental location close to the attacker

Table 24. Violent Extremism

**5 May 2017. Tunnel fire in Norway.**

The Oslofjord tunnel, which connects the eastern and western sides of the Oslofjord, has been subject to several fires. On 5 May 2017, due to an engine failure, a heavy goods vehicle, loaded with toilet paper, caught fire inside the tunnel while driving up a slope towards Drøbak, a municipality in Viken County in the Eastern part of Norway. The fire escalated quickly and within a short time the heavy goods vehicle, including its load, was completely burnt out. While the tunnel was in the process of being closed, there were some delays in the lowering of the barriers at the tunnel entrances, and several vehicles managed to drive into the tunnel before and while the barriers were going down. Among these were two other heavy goods vehicles that continued driving all the way to the scene of the fire before stopping. There were also incipient fires starting there, but the fire service intervention was decisive in extinguishing the fire and limiting it to only one vehicle.

Since similar events in the same tunnel were studied before (Njå and Kuran, 2014), the table shows the breath of vulnerabilities and vulnerable groups that could be caught in tunnel fires.

<i>Hazard</i>	<i>Type of crisis</i>	<i>Who is vulnerable</i>	<i>Vulnerability elements</i>
Fire	Burning of vehicles	People in vehicles	Reduced mobility Reduced visibility

Table 25. Fire



## 7 April 2017. Violent extremism in Sweden<sup>12</sup>.

Sweden was hit by a terrorist attack on 7 April 2017. During the attack, a truck was stolen and driven at high speed down one of central Stockholm’s pedestrian walkways, hitting pedestrians before crashing into the window of a shopping centre. Five people lost their lives, and additionally 12 people were severely injured. The first call to the emergency number was made at 14:52, reporting a truck driving on a pedestrian street. The call was transferred to the police for further handling. At 14:53 the first call reporting that there were people injured reached SOS Alarm. The incident was first noted down as a traffic accident, but within minutes re-classified as a terrorist attack. The SOS Alarm activated their crisis organization at 14:54. Thereafter, the government offices, MSB, the security services, and county administrative board were informed. Societal functions and service providers were put under large pressure during the attack, including the health care system and the police. A number of public spaces as well as public transport were closed down for an extended period of time (MSB, 2018a). The perpetrator was Rakhmat Akilov, a 39-year-old rejected asylum seeker and a citizen of Uzbekistan, who was apprehended several hours later.

Sweden has been relatively spared from terror attacks, but a modern, open and democratic society is vulnerable to attacks and future incidents cannot be excluded. A trend has been seen where attacks are directed at public spaces rather than societal institutions, causing large consequences and harm to all groups in society (MSB, 2019b). In the 2017 terrorist attack, some groups were identified as particularly vulnerable, mainly due to a lack of efficient spread of information. These groups include persons who do not speak Swedish, as crisis information was initially only provided in Swedish from responsible authorities. Also, people with disabilities and children are groups that may have experienced difficulties in accessing information. When it comes to children and youth, krisinformation.se, the main information provider in times of crisis has had as a policy to primarily reach children and youth through adults in their close surroundings. During the terrorist attack in 2017, many children had left school for the day, and did not have an adult close to them. Hence, there might be a need to re-assess how to reach children and youth in times of crisis. In addition, as a consequence of the shutdown of public transport, thousands of people had to walk to get home, or got stranded. An indirect effect was that child- and elderly care got affected, for example as personnel could not get to work, or as children could not leave schools and day-care centres. Furthermore, a lack of correct information affected the rescue service personnel working at the location of the attack. For example, unconfirmed rumours about a potential bomb or dangerous object being placed in the truck were circulating, creating feelings of worry and fear among rescue personnel (MSB, 2018a).

<i>Hazard</i>	<i>Type of crisis</i>	<i>Who is vulnerable</i>	<i>Vulnerability elements</i>
Violent extremism	Terrorist attack	Swedish society as such Children People non speaking Swedish People not able to go home from work	Ethnicity Language Age Insufficient spread of information Coincidental location

Table 26. Violent Extremism

<sup>12</sup> This section draws mainly on the report Utvärdering av hanteringen av attentatet i Stockholm 7 april 2017: redovisning av regeringsuppdrag Ju2017/05643/SSK, evaluating how the attack was handled by responsible actors (MSB, 2018a).



## January 2017. Water contamination in Finland.

On 26 January 2017, a reporter called to the local health centre and asked if tap water could be a cause of the suspicion of stomach disease in the municipality of Nousiainen, Southwest Finland. For nearly two weeks, the water utility had been searched for a pipe break as tap water was running to the terrain. A debate on the possible contamination of tap water begun in social media. Authorities of the local water utility, supervising authorities and public health service representatives discussed the situation, but as no abnormal amount of disease cases occurred and the location of pipe break was still under investigation, it was decided to monitor the situation (Nivola, 2018). In the next morning, more information of stomach disease patients was received and tap water sampling actions started. The residents were informed of the suspicion of contaminated tap water, chlorination was started, and water boiling warning was published. Efforts were made to inform about the water crisis extensively: on the municipality’s website, on municipality’s Facebook, at the doors of shops and supermarkets, and via an extensive email distribution list to the local councillors and authorities. The official emergency warning was published by the local rescue service (Nivola, 2018). The first laboratory results confirmed tap water contamination and new water boiling warning was published. An extensive household water sampling started. Various responsible organizations started to prepare for expanded and prolonged disruption. The stomach epidemic increased. On 30 January, the pipe breakage point was founded: the tap water pipe, the sewer pipe as well as the storm water pipe were broken. As a result of the pipe breakage, waste water flowed into tap water network (Nivola, 2018). A water tank was reserved for the use of residents. Schools, kindergartens, retirement homes and few farms with production animals were given clean water by tanker trucks. Particular care was taken in the provision of information to potential social exclusion or dementia sufferers. Volunteers distributed paper bulletins about the situation to their and other residents’ homes. With the help of volunteers, all residents of the municipality were informed about the ongoing cleaning actions of water supply network as thorough chlorination was carried out. The residents were also given clean water, if necessary. For example, elderly people who had no relatives to help, were given water bottles to their homes (Nivola, 2018).

The population of Nousiainen is about 5 000 residents. Hundreds of them were affected by stomach disease after drinking contaminated water. The official emergency warning was suspended after one month. There was a long debate on responsibilities, crisis management and communication after the acute situation was ended (Nivola, 2018).

<i>Hazard</i>	<i>Type of crisis</i>	<i>Who is vulnerable</i>	<i>Vulnerability elements</i>
Water contamination	Spread of stomach diseases	Children Elderly Patients at the local hospital Marginalised people Dementia sufferers	Age Poor health conditions Social exclusion

*Table 27. Water Contamination*

## 22 March 2016. Violent extremism in Belgium.

On 22 March 2016, two terrorist attacks at the Brussels airport Zaventem and at the Maalbeek metro station in central Brussels were perpetrated at respectively 07:58 and 9:11. The Islamic state claimed to be the author of the attacks, which left 32 civilians dead and more than 300 injured. The Belgian federal authorities understood immediately that these were terrorist attacks and very quickly put in place a series of security measures on the whole Belgian territory, in particular towards international



stations, regional airports, all means of public transport, nuclear power plants and the port of Antwerp. The Red Cross was the first to reach the impacted areas and mobilized nearly 400 personnel in response to the attacks, deploying emergency medical and psychosocial services and evacuating individuals affected by the bombings. Social workers from the Red Cross were tasked with reuniting families and following-up on other needs (such as stranded tourists). Belgium non-residents (tourists, but also people crossing Belgium via planes or trains) were highly affected due to being stranded in the aftermath of the bombing with no place to stay. Individuals with special medical needs (diabetics in need of insulin, for example) were particularly at risk. They were assisted in the 48 hours following the crisis by Red Cross social workers who helped them find accommodation, medical services, and transportation. Workers at the airport were also injured.

<i>Hazard</i>	<i>Type of crisis</i>	<i>Who is vulnerable</i>	<i>Vulnerability elements</i>
Violent extremism	Terrorist attack	Belgian society as such Travellers Airport and metro personnel People not able to go home from work	Age Insufficient spread of information Coincidental location

Table 28. Violent Extremism

### Spring 2015. Migration crisis in Sweden<sup>13</sup>.

In 2015, over one million asylum seekers and refugees fled from the conflict zones in Iraq, Syria and Afghanistan and crossed the borders into Europe (Migrationsverket, 2018:4). According to official statistics, 162 877 persons applied for asylum in Sweden in 2015 - more than twice as many as in 2014. Of these, over 35 000 were unaccompanied minors who arrived without parents or a legal guardian (ibid.). In comparison to most other countries within the European Union, Sweden had accepted the largest number of refugees and asylum seekers in relation to its population size (Migrationsverket, 2018:42). Additionally, Sweden became a transit country for several thousands of asylum seekers on their way to Finland or Norway (Migrationsverket, 2018:12). The extraordinary high number of people that applied for asylum in Sweden in 2015 was mainly concentrated towards the end of the year, which posed a great challenge to Sweden's public administration (SOU, 2017:27). According to a state official report on the refugee crisis, no Swedish government agency had anticipated the developments that would unfold in 2015 (SOU, 2017:28). The Swedish Migration Agency was under great pressure even before the crisis, with climbing processing times for asylum seekers and uncertain access to asylum accommodations. The capacities of municipalities and other authorities were similarly under considerable strain. Agencies that had past experience of refugee reception, usually driven by events, had better structures in place for cooperating with different actors, were thus better prepared (ibid.).

The most pressing concern during the autumn of 2015 was the accommodation of asylum seekers (SOU, 2017:29). The Swedish Migration Agency was under immense pressure, but had to prioritise accommodation acquisition (ibid.). This prompted various measures such as the use of evacuation

<sup>13</sup> We hasten to mention the controversial use of the word 'crisis', since some observers feel this word exaggerates the event and plays into the hands of right-wing political parties. Indeed, the so-called 'crisis' of 2015 was part of a longer-term, and largely manageable, trend. We use the term here to connote the terminology employed by government officials and agency personnel, who describe this event in terms traditionally associated with a 'crisis' in the academic literature.



shelters, tents and military facilities (Migrationsverket, 2018:12). The Agency succeeded in providing temporary housing in all but one occasion in November 2015 when all accommodation options were exhausted, and a group of asylum seekers had to sleep outside the Swedish Migration Agency's office (ibid.).

The processing of asylum seekers was another urgent issue. To cope, the Swedish Migration Agency simplified the registration of asylum seekers to speed up the process, but it was still lagging behind with registrations (SOU, 2017:29). Hence, a large number of asylum seekers had to wait a long time to register their applications - which also delayed their asylum processes. Unaccompanied minors had to reside in temporary housing in the municipalities they had arrived in, waiting for registrations. Because of the difficulties in organising accommodation, these minors had to move around between different municipalities until the housing issue was solved (ibid.). Overall, when the activities of the Swedish Migration Agency were not functioning properly, it led to difficulties for other government agencies. It also jeopardised the legal rights of the asylum seekers (SOU, 2017:32). A reason behind the latter was the severe shortage of suitable legal representatives (SOU, 2017:30).

During the autumn of 2015, the information the asylum process was not always communicated correctly, which negatively affected the asylum seekers, especially unaccompanied minors (ibid.). When the asylum seekers arrived at ferry terminals and railway stations in Sweden, there was limited or no information available in their languages (SOU, 2017:286). This caused confusion as to who the volunteers on site were and how the asylum process worked. Consequently, rumours and disinformation circulated among the newly arrived (ibid.). There was a shortage of interpreters during the fall of 2015 and many asylum seekers, in particular the unaccompanied minors, were thus not given information about their rights in their own language (SOU, 2017:386). Written information was often given in English, although not everyone could speak English. There were examples of unaccompanied minors that registered their asylum applications with the Swedish Migration Agency, but that did not understand that this meant that they were seeking asylum in Sweden (ibid.). Indeed, one of the most highly publicised vulnerable groups in this instance were unaccompanied minors. In autumn 2015, it could take several weeks or even months until a legal guardian was appointed. The municipalities also failed to make satisfactory checks on the qualifications and background of those who were chosen as legal guardians and have stated that in some cases unsuitable persons were appointed the role. The confusion around legal guardians further delayed the children's' asylum processes (SOU, 2017:385). The official reports confirm that unaccompanied minors were considered the most vulnerable group of the newly arrived asylum seekers during the autumn of 2015. In media reports (Bodin, 2016). In addition, 'missing unaccompanied children' became another particular vulnerable group (Sidner and Morales, 2018; Olsson and El-Mochantaf, 2015). On the same note, the United Nations Committee on the Rights of the Child has criticised Sweden for the disappearance of unaccompanied children and has pointed to the inaction of authorities following these disappearances (SOU, 2017:372). In a debate article published by *Aftonbladet*, the authors emphasised the human, social and economic costs that the Swedish temporary asylum legislation brought in the form of mental illness, social vulnerability and exclusion. They argued that the temporary residence permits set the bar for integration and reduce the incentives to learn Swedish and the opportunities to understand how the Swedish society works. The temporary residence permits also struck hard on traumatised children – “they face a long waiting time with the only hope of a temporary residence permit, and little hop of being reunited with their families” (Hellström, 2017).



An article published during the autumn 2015 by Aftonbladet brought attention to a vulnerable group typically outside the ‘official’ definition of vulnerable groups, namely the so-called transit refugees, who did not seek asylum in Sweden, but wanted to continue their journey to reach other countries. They were particularly vulnerable because neither the municipalities nor the Migration Agency were responsible for them (Tronarp, 2015).

<i>Hazard</i>	<i>Type of Crisis</i>	<i>Who is vulnerable</i>	<i>Vulnerability elements</i>
High influx of migrants	Uncontrolled immigration	Unaccompanied minors Transit refugees Asylum seekers	Language barriers Poor and/or limited information provided by authorities Unprepared national and local reception system Slow processing times Few procedures dedicated to unaccompanied minors

*Table 29. High Influx of Migrants*

### **22 July 2011. Terrorist attack in Norway<sup>14</sup>.**

Friday 22 July 2011, Norway suffered two terrorist attacks. The first against the government quarter in Oslo where a car bomb exploded at 15:25. The second at the Labour Party’s youth organization AUF summer camp on the island of Utøya, where a man in a police uniform began shooting people who were there at 17:21. Five minutes before the first attack, the security centre in the government quarter was notified about an incorrectly parked car at the entrance of the High Block building where the Prime Minister and the Minister of Justice had their offices. The surveillance cameras showed a man in a police uniform leaving the car. There were 250 people at work in the government quarter, while in the nearest streets there were about 75 people. The car bomb explosion affected all these people. The explosion left 8 dead people, 9 severely injured and more than 200 with less severe injuries. The explosion caused major material destruction for hundreds of meters around the High Block building. At 15:26 the police received the first message about the explosion and at 15:28 the first police patrol reported arriving at the chaotic scene: people dead and injured inside and outside the building were laying among glass, documents and building components. The first images showed by the national television were impressive: the government quarter looked like a war zone. In a short time, the television network worldwide transmitted these images.

The national newspaper VG, the regional newspaper Dagsavisen and the commercial broadcaster TV2, which all had offices close to the government quarter, had to evacuate their premises due to the explosion. A witness called the police at 15:34 to report a person in a police uniform holding a pistol in his hand, entering a vehicle. Information - including the vehicle’s license plate number and description of the suspect - was written on a yellow note, and hand delivered to the police operation centre, where it lay for twenty minutes before the witness was phoned back. The license plate number was not transmitted to the police radio until two hours later. Just before half past six, the police operation centres in Oslo, Hønefoss and Drammen received alarming messages from young people gathered on the island of Utøya that a man in a police uniform was walking around and shooting people. Some hide indoors and in the tents, some other run to hide among the trees or in the water.

<sup>14</sup> The main source for this part was the NOU 2012:14 (2012), Rapport fra 22. juli-kommisjonen. Oslo.



Some tried to swim or take a boat over to the mainland. In the social media, this terrible news quickly spread. Many called and sent messages to family and friends asking for help. Many called the police emergency number without getting in touch. Residents and tourists on the mainland close to the island, at risk of their own lives, went out by boat and rescued people. Without this effort, the number of killed people would have been higher. The police arrested the man after over an hour of shooting, at 18:34. He was a 32-year-old Norwegian, Anders Behring Breivik, who had carried out both attacks alone, after a long time planning. With his police uniform and badges he had made himself, he managed to lure out people who were hidden by saying he was from the police. There were 564 people on the island when the man started shooting. 530 of these were young people attending the summer camp. 69 people were killed, 110 were injured, 55 of them seriously. Several of the survivors had to cope with mental and physical health problems afterwards.

During his trial, started 16 April 2012, Breivik described himself as an ultranationalist and justified his acts according to right-wing and anti-Islamist extremism. He stated that he perpetrated the two attacks to defend the Norwegian indigenous people and Norwegian culture against multiculturalism. In his eyes, Norwegian politicians, and especially the Labour Party, betrayed the country through an immigration policy, which would lead to a majority of Muslims in Norway. On 24 August 2012, he was sentenced with the most severe punishment allowed by the Norwegian law - 21 years in prison with a minimum term of 10 years.

The 22 July terrorist attacks are the most shocking and unimaginable crisis Norway has experienced. The crisis management system showed clear deficiencies and inadequacies in the management of the crisis, being this a new and unprecedented crisis for Norway (NOU 2012: 14, 2012).

<i>Hazard</i>	<i>Type of crisis</i>	<i>Who is vulnerable</i>	<i>Vulnerability elements</i>
Violent extremism	Terrorist attack	Public officers in the government quarter People walking and working close to the government quarter Adults running the camp on Utøya Youths on Utøya, the youngest was 11 the oldest 25	Lack of information Coincidental location

*Table 30. Violent Extremism*

#### **4 October 2010. Red sludge spill in Hungary**

On 4 October 2010, at 12:25, the walls of a reservoir containing waste product at the aluminum plant Ajkai Timfoldgyar Zrt broke. 700,000 m<sup>3</sup> of toxic red sludge poured into the villages of Kolontár, Devecser and Somlóvásárhely, in the North West of the country, prompting the Hungarian government to declare a state of emergency. The spill covered about 40 km<sup>2</sup>, killed 10 people, injured 123, and forced the government to evacuate over 400 people. Firefighters reached the scene in about 8 minutes and started rescuing the inhabitants trapped or injured. The Local Defense Committee took immediately action to accommodate the inhabitants without houses and temporary shelters were set up for about 550 people.

There were also concerns that the chemicals from the red sludge would seep into the nearby streams and tributaries that run into the Danube. The authorities responded with rapidity, but they were not so efficient to contain the serious consequence of the spill for human health, environment and material assets. For instance, local residents involved in the rescue operations were not informed on the composition and pH value of the red mud and the biological effect of the slurry. Crucial information on



environmental health issues was published with a delay of several days, with significant initial inaccuracies. A week after the accident, there was still no clear information available regarding the composition of the mud spilled, or of the particulate air contamination. As a result, for several days the people impacted made decisions potentially influencing the rest of their lives based on conflicting information. The national authorities declared a ban on fishing and hunting.

<i>Hazard</i>	<i>Type of crisis</i>	<i>Who is vulnerable</i>	<i>Vulnerability elements</i>
Industrial accident	Contaminated sludge	Inhabitants of the area Volunteers	Lack of information Coincidental location

*Table 31. Industrial Accident*

### **March 2010. Lambro and Po rivers pollution in Italy**

On 23 February 2010 in a refinery undergoing decommissioning, currently used as a deposit for petroleum products by the Lombarda Petroli SpA Company, in the Municipality of Villasanta (Monza Brianza province), in Northern Italy, unknown persons operated the hydraulic pumps of the connecting manifolds between the tanks and the external ones, normally used to transfer products to tankers. This caused, in about 3 hours, the leakage of about 2,600 tons of oil material, of which 1,800 tons of heating and automotive oil (lighter than water) and 800 tons of fuel oil (heavier than water). The hydrocarbons, after having poured into the loading bay of the deposit and being channelled into the sewage system, reached the San Rocco treatment plant, located between Monza and San Maurizio al Lambro, causing it to be blocked. The oils that escaped the purifier, which retained a quantity of about 1,250 tons of material, gradually poured into the Lambro river, which crosses the provinces of Milan and Lodi to flow into the Po on the border between the provinces of Pavia, Piacenza and Lodi. The supply of water for agricultural use was banned.

<i>Hazard</i>	<i>Type of crisis</i>	<i>Who is vulnerable</i>	<i>Vulnerability elements</i>
Industrial accident	Leakage of contaminated material	Local inhabitants Owners of agriculture activities	Coincidental location

*Table 32. Industrial Accident*

### **November 2007. Water contamination in Finland.**

Between 28 and 30 November 2007, treated wastewater (technical water) from the wastewater treatment plant accidentally entered the drinking water network of Nokia, a town in southern Finland. At the beginning of the accident, the wastewater treatment plant was completing installation and maintenance work. The installation work required that the plant's drinking water network was closed for a period of time. At the same time, information-technology-related installation works were also ongoing in another waterworks, and additional household water from neighbouring water supply network was released. Consumers sent several notifications concerning ill-smelling and ill-tasting water to the wastewater treatment plant. The waterworks' personnel concluded that this was caused by the maintenance work and water pipe repair work completed earlier, but started rinsing actions in the water network. In response to the complaints that were accumulating, the health inspector issued



a recommendation that drinking water has to be boiled before using. Soon thereafter, the reason for the water’s contamination became apparent: technical water had entered into the drinking water network because a valve had been built, in breach of regulations, between the sewage network and the drinking water network (Accident Investigation Board, 2007). The local health inspector gave the first announcements to boil water to the media 30 November 2007 in the afternoon. The announcement was shared via Tampere’s radio news programmes, on the town of Nokia’s Web site, and via other media channels (Accident Investigation Board, 2007).

Several hundred calls were made to the Nokia health centre during the night of 30 November 2007, continuing the next morning, obliging the nursing and medical staff to work non-stop. In addition, during the following days, the number of patients, manifesting abdominal pain, began to increase at the health centre. Although, on 3 December 2007, the number of patients at the health centre was similar to previous days, the patients were worsening. At the Tampere University Hospital, the pressure especially in childhood disease emergency care started in the evening, where the situation was described as chaotic. Children who needed hospital care were sent to the Tampere University Hospital, because the facilities and resources of health-care personnel at Nokia Health Centre were too small to treat a large number of child patients. Also, health-care personnel at Nokia Health Centre started to get sick. During the acute phase, between 30 November and 16 December, the Nokia health centre treated a total of approximately 715 Nokia residents (out of about 30 000 in year 2007), while the Tampere University Hospital cared for a total of 167 Nokia residents, 114 of whom were children. Patients also sought health care for the neighbouring municipalities, private medical centres and occupational health care, but no systematic information has been collected on these cases (Accident Investigation Board, 2007).

The contaminated drinking water caused the largest water epidemic ever registered in Finland. According to the Public Health Institute, the use of contaminated drinking water caused various levels of intestinal diseases for more than 8 000 people. Some suffered from symptoms that continued for several months. Some of the sufferers had joint symptoms and, in particular, prolonged illness which caused significant mental distress. The police investigated two deaths linked to contaminated drinking water use (Accident Investigation Board, 2007).

<i>Hazard</i>	<i>Type of crisis</i>	<i>Who is vulnerable</i>	<i>Vulnerability elements</i>
<i>Water contamination</i>	<i>Spread of diseases</i>	<i>Residents in the affected area Children Patients at the local hospital Health-care personnel</i>	<i>Reduced health Age Poor health conditions</i>

*Table 33. Water Contamination*

### **April-May 2007. Cyber-attack in Estonia.**

Cyber-attacks are “events which aim to compromise the integrity, confidentiality or availability of a system (technical or socio-technical)” and these “range from hacking and denial-of-services (DoS), to ransomware and spyware infections, and can affect everyone from the public to the critical national infrastructure of a country” (Bada and Nurse, 2020: 74). They occur each time computer systems are tampered with ill intent to cause harm, such as real destruction of property, loss of business revenue, spread of disinformation, and theft of vital or confidential information (Abomhara and Koien, 2015). Unlike several other threats, cyber-attacks can have global reach, since they do not follow national



boundaries. In this sense, the three-week wave of massive cyber-attacks in Estonia in April-May 2007 represents nowadays the first known cyber-attack against a state. While Russia and Estonia were embroiled in their worst dispute since the collapse of the Soviet Union, a row erupted in April 2007 over the removal of the Bronze Soldier Soviet World War II Memorial in central Tallinn, Estonia was subjected to a barrage of cyber-attacks on 27 April. Cyber-attacks consisted of disabling the websites of government ministries, political parties, three of the country's six big news organisations, two of the biggest banks and firms specializing in communication. A wave of Distributed Denial of Service (DDoS) attacks suddenly swamped websites with tens of thousands of visits, jamming and disabling them by overcrowding the bandwidths for the servers running the sites. The attacks poured in from all over the world, but Estonian officials and computer security experts indicated that, particularly in the early phase, some attackers were identified by their internet addresses - many of which were Russian, and some of which were from Russian state institutions. Defence, government institutions and communication companies closed down the sites under attack to foreign internet addresses in order to try to keep them accessible to domestic users (Postimees, 2007). In Estonia, cyber-attacks are seen as having a potential to cause damage at a much larger scale than any natural hazard (Saar, 2019). In year 2018, the Information Systems Authority (2019) registered 3,390 cyber incidents that affected data or information systems. Estonia remains highly vulnerable to cyber-attack (Ottis, 2018).

Financial scams that started with so-called executive schemes and hijacked email conversations did the most damage, taking small and medium businesses for at least 600 000 € in 2018. Cyber-attacks against banks have halted one of the vital services – the banking system. In a state where most of the payments are conducted electronically this may impede economic activities, but also limit the possibilities to purchase goods necessary for everyday livelihood. From 2018, other noteworthy incidents included cyber-attacks against family medicine centres and leaked health data of soldiers and schoolchildren from state document management systems. Attacks on databases with health info is a major threat to anyone's privacy. Attacks on email systems harm individuals and businesses relying on online communication.

<i>Hazard</i>	<i>Type of crisis</i>	<i>Who is vulnerable</i>	<i>Vulnerability elements</i>
Cyber-attack	Official information systems disabled Information exchange disabled Flooded emails Online media sites disabled Spread of disinformation	Computer users Patients in hospitals Medical services Online social media followers	Limited access to information Delays in health services Exposure to disinformation Violation of privacy

Table 34. Cyber-attack

## 5. Discussion

As introduced in Chapter 1, in D1.2 we presented two narratives on vulnerability: essentialist or static and existentialist or dynamic. The first defines certain groups as ontologically vulnerable and, therefore, refers to a status that cannot be altered. The second narrative understands vulnerability as highly dynamic characteristic that applies to every individual, but on different levels due to an interplay between context or situation and personal conditions. With this in mind, in this part of the report we



present general reflections and comparisons on how the sample of countries understand vulnerability based on the information provided in the previous two Chapters.

## 5.1 Who is considered vulnerable and why?

In general, the group approach to vulnerability seems to dominate in all the eight countries, although this approach is neither designed nor made explicit as a government policy. It can be considered to be the result of how, on average, these countries consider mainly socio-economic factors (so the why individuals are considered vulnerable) rather than to context or situations, intertwined with personal conditions, to understand vulnerability. This allows decision makers and interest groups in the national contexts to spot out certain social groups and label them as vulnerable. In this vein, vulnerability is defined upon fixed individual characteristics which are core indicators of vulnerability - age, income, education etc. – independently from the context or situation: for instance, elderly people are vulnerable in normal times as much as during a crisis and it does not matter whether they are self-sufficient and living in their own household or in an elderly institution.

However, there are still some national differences, which are worth mentioning. Belgium is the only country which considers context as a key issue of vulnerability. However, context is understood in its narrow sense as location in terms of physical infrastructures (airports, schools, care centres) which can be vulnerable due to a crisis or as proximity to the crisis. In Hungary, the term vulnerability seems very seldom used in the documents considered, while there is more focus on certain characteristics that make some individuals more disadvantaged than others. In the Hungarian language, disadvantage is synonym for vulnerable. As such the two terms are used interchangeably. In Belgium, as well as in Estonia and Sweden, vulnerability is very much an issue of individual capacities and abilities. Belgium emphasises individual responsibility in building resilience (and thus lessening vulnerability), while Estonia considers vulnerable those who lack certain skills and capacities. Sweden, as well, considers individual's ability to take responsibility to cope with negative events. Estonia and Finland distinguish between vulnerability of critical infrastructures and vulnerability on an individual and social level. In Finland vulnerability is related to an exposure to a security threat and is, in general, ascribed, like in Estonia, to threats to critical infrastructures and vital functions of the society. Finland is the only country that underlines vulnerability linked to a perception of own security/insecurity. At individual level, both Estonia and Finland consider vulnerability triggered by a threat that affects the individual wellbeing in the case of Estonia, and the sense of security, in the case of Finland. Norway and Sweden consider vulnerability as a system's problem, where system encompasses both infrastructures, communities and organisations, as much as the whole of society. Norway considers vulnerability as related to exposure to an unwanted event, which is a term less precise than security or threats, since an unwanted event includes whichever kind of disturbance to the system, from minor accidents to disasters. Sweden refers, even more generally, to a stress. In Italy, vulnerability is often related to terms such as fragility, disability and special needs. The Italian documents often use the term fragile people/individuals, disabled or people with specific needs. In general, fragility means to be easily harmed and gives the idea that an individual is not self-sufficient and in constant need of assistance in a normal situation, but even more when a crisis or a disaster occurs. The Italian Civil Protection has the most quantitative approach to vulnerability, using a rigid formula to measure vulnerability. For obvious reasons, the national health system has a list of vulnerabilities based on diseases. It is interesting, though, to find in this list also groups such as Italian citizens abroad and non-EU member states citizens. These two categories are very broad and can include healthy individuals or individuals in need of health assistance due to a change of



circumstances. In general, in Germany there is the apparent tendency to differentiate between the vulnerability of humankind (or one nation or the whole of society) versus the vulnerability of specific vulnerable groups (such as elderly, sick, etc.). Vulnerability seems a broadly known concept, but both its social and individual dimensions seem very much neglected, since vulnerability is often described according to certain social groups, which are considered weaker than the mainstream society or unable to help themselves. Two countries seem to give a growing attention to situational factors, Sweden and Estonia, the same countries considering the importance of individual capacities and abilities. In addition, Sweden can be singled out for the effort to avoid rigid definitions of vulnerable groups.

The Estonian official documents and surveys seem to follow categories of vulnerable groups, such as elderly, children, and minorities, determined by age or by belonging to a certain group with specific socio-cultural characteristics. Some of these categories are mentioned in the other states as well. However, the complexities raised by technologies need to be included in the case of Estonia, since they lead to new and different types of vulnerability: increasing dependence of vital services, including e-services and information-technology as means of payment, moving data, identification may be a source of vulnerability in case these e-services cease to work due to a cyber-attack. Indeed, Estonia seems more concerned than the other countries about the spread of technology in all the sectors of Estonian society. On the one side, the increasingly digitalized way of life has improved the competitiveness of the state and the wellbeing of its population. On the other side, Estonia has to deal with the consequences of cyber-attacks. Estonia is a very interesting example of a country, which is developing strategies and antibodies against such threats, not only to shield the society from outside attacks, but also to reduce the technological divide between the older and the younger generation.

In the public documents analysed, gender apparently does not play an important role, with the exception of Norway and Sweden. These two countries are, in this regard, interesting, not only against the backdrop of the gendered policy approach officially taken up by government, but by an urging for all agencies to consider the gender dimension in policymaking. For instance, for the Swedish Civil Contingencies Agency, the impact of a gendered perspective on policy is not easy to discern in their policies. Gender is mentioned as having policy implications, but not as a vulnerability per se, in Sweden, while in Norway, gender is actually addressed as fostering vulnerability.

Socio-economic factors are mentioned, in various degrees, in all the countries as they can produce negative consequences in terms of material preparedness (buying survival kits) and purchase of the housing estate (living in blocks of flats), which influences, in turn, the material preparedness. In Estonia, socio-economic factors overlap with that of belonging to the Russian-speaking minority. While these factors which may contribute to peoples' vulnerability in such situations are generally known by emergency managers, reaching out the Russian-speaking minority to raise its risk awareness remains a challenge (Saar, 2019). The socio-economic factor is, as well, an issue for Estonian sparsely populated municipalities, which have less economic and institutional capacities than Estonian cities. Peripheral areas, laying distant from official response areas and with lower population density usually have lower social capital and community activeness to prepare for and mobilise in case of crises or disasters. This may become a source of vulnerability. In addition, households in blocks of flats have been described as vulnerable due to poorer access to services and fewer economic and structural possibilities for material preparedness. The latter sources of vulnerability are considered particularly articulated among cultural minorities such as the Russian-speaking groups, whose vulnerabilities are further exacerbated by following Russian speaking media. The more situation-specific understanding to vulnerability is not widely acknowledged in Estonia.



Another common factor is age. In all the countries, the elderly are considered a vulnerable group. In Estonia, there is a focus on the capacities to cope with a negative event, which diminish with the advancing of age. In Finland as well as in Germany, in addition to this, there are also a variety of socio-economic factors that make elderly vulnerable. In Italy, elderly are not explicitly mentioned, but the condition of fragility is mainly referred to them, considering, as well, that Italy is the country in the EU-27 with the highest number of individuals over 80.

As for age, as a factor of vulnerability, Finland mentions a group not present in the other countries, such as the NEETs (Not in Education, Employment, or Training). Finland, as well, considers that there are differences in material preparedness between those living in urban areas and those living in rural areas, but with a reverse conclusion compared to Estonia: those in rural areas seem better prepared. The smallness of some municipalities or their distance from the cities is not deemed as an issue fostering vulnerability as in Estonia. On the contrary, those living in small municipalities considered themselves better equipped in case of a crisis.

In Norway, although several governmental and non-governmental agencies have an extensive and constant focus on vulnerable groups, there is no official definition of the term. However, factors some age and gender are often mentioned in the Norwegian documents as inducing vulnerability. Indeed, there is a special attention to children and women in Norway, more than in Estonia and Finland. Other groups which are singled out are elderly, immigrants (as in Finland) and substance abusers. The various agencies seem to base their judgement according to the social model of disability, which distinguishes two dimensions: 1) the impairment, which is the physical, mental or emotional condition of an individual and 2) the disability, which is a potential consequence of how society deals with this condition (Johnstone, 2006). This is an interesting and original way to approach vulnerable groups, since the whole of the society is invested of the responsibility of how to treat individuals with impairments. Still, there is little research on vulnerability and vulnerable groups in the context of crises and disasters.

Sweden is the country that seems to tend the least towards the static understanding of vulnerable groups. Some of the documents we analyse, indeed, state that it is difficult to generalise about vulnerable groups in the Swedish society, as the underlying factors creating these vulnerabilities are context specific, interrelated, and dynamic in nature. However, some examples of dimensions to account for include place of residency, age, financial situation, and health. Thus, in general, also in Sweden, documents and discourses tend to assume vulnerability lies in fairly constant features across segments of society: economically disadvantaged, elderly, physically or mentally impaired, or language deficient. The notion that vulnerability may shift depending on the event, local context, and circumstances is only recently appeared in the Swedish approach, and only through several studies commissioned to explore the idea and one report by a non-crisis related governmental agency (SMHI). Nothing in government policy has yet emerged.

Independently from the type of crisis presented in Chapter 4, elderly, children, and people with disabilities are recurring groups impacted by the crisis. In addition, although the variety of elements of vulnerability is mainly depending on the characteristics of the trigger event (which critical infrastructures or vital services are impacted, to what extent, which area of the country, for instance), still impacted vulnerable groups are quite the same in all the crises and among countries. These vulnerable groups are the same often mentioned by national data on vulnerability in Chapter 3 in all the countries. For instance, in Estonia, vulnerable groups brought up in the official documents analysed are the same impacted by the consequent crises generated by extreme weather events:



elderly, disabled, families with small children experiencing greater difficulties in case of long-term cease of vital services and rural households with poorer access to support services in times of crisis.

Against this background, we identify the following aggregated social groups who are considered vulnerable in most of the countries: a) elderly; b) children; c) physically and/or mentally impaired (broad label to include hospitalized patients and people with disabilities, for instance); d) socially marginalized (irregular migrants, but also elderly in some cases). These groups are similar in the countries analysed, although the various national understandings of vulnerability may differ.

The table below summarises our findings according to the definition of vulnerability, who is vulnerable and for which reasons.

COUNTRY	VULNERABILITY DEFINITION	WHO IS VULNERABLE	WHY
BELGIUM	Communities, businesses, institutions and individuals who, due to their location or activity, are particularly vulnerable to the damaging consequences of an emergency situation	Not spelt out, but only assumed: elderly, children, individuals with disabilities	Individual characteristics (age, disabilities and ethnicity) Socio-economic factors
	Individual responsibility		
ESTONIA	Infrastructures and technological weaknesses	Elderly Children Russian speaking minority Individuals in sparsely populated municipalities Poor households	Individual characteristics (age, disabilities, and ethnicity) Socio-economic factors Spatial segregation Dependence on vital services and e-services
	Combination of different factors, which determine the extent of the threat to one's life and well-being at the time of different crises		
	Individuals who lack skills and capacities to cope with a crisis or a disaster		
FINLAND	Infrastructures and vital functions' exposure to a security threat	Elderly NEETs Low-income/low-educated households Homeless people Undocumented migrants	Individual characteristics (age, disabilities and ethnicity) Socio-economic factors
	Individual sense of insecurity as a subjective understanding of one's own vulnerability		
GERMANY	Future susceptibility to extreme weather events	Individuals with a lack of preparedness due to missing precaution or a lack of capacities to prepare as needed Individuals who are considered weak and unable to help themselves (elderly, care recipients, persons with disabilities)	Individual characteristics (age, disabilities)
	Interplay between exposition, susceptibility and coping capacity		
	Capacity to adapt to a changing environment		



HUNGARY	Difficult to find a definition	Broad categories of disadvantaged groups, unspecified in general but specific to various public institutions	Social indicators of vulnerability: education, health, income
ITALY	The conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards	Broad categories of disadvantaged/fragile groups, unspecified in general, but specific to various public institutions	Individual characteristics (age, disabilities) Socio-economic factors
	People in conditions of social fragility and with disabilities		
NORWAY	Problems a system (infrastructures, value or production chains, organizations or a community at local, regional or national level) has to properly work when it is exposed to an unwanted event, as well as to the problems the system has to resume its functions	Elderly Children Women (pregnant/minority background) People with chronic or momentaneous disabilities	Individual characteristics (age, disabilities, sex, ethnicity) Socio-economic factors
SWEDEN	A system's (in)ability to function when under stress	People with disabilities, dementia, and psychological issues People that do not speak Swedish or English Socially isolated, live in an environment that is unsafe Stigmatized groups Ethical minorities People with different forms of addiction (e.g., drugs, alcohol)	Socio-economic factors Health Social networks Feelings of belonging Place of residence, Ability to cope with stress Access to information technology
	Need to understand the underlying factors explaining why individuals might not be able to take full responsibility for their security in times of crises		

Table 35. Summary on Vulnerability

## 5.2 Who is overlooked?

In this part, we answer the question raised by T1.3 on who is not seen by official data.

The group approach to vulnerability carries a main shortcoming, namely that being vulnerable is often considered an ontological characteristic of individuals. Indeed, all the countries label certain social



groups as vulnerable due to age (e.g. children and elderly) or socio-economic status (e.g. the poor). In addition, the sample of countries refer to recurring groups independently from the specific type of crisis as outlined in several examples of crises above. However, in some of the crises, we can find individuals who are not mentioned in the official data, but, who are, nonetheless, negatively impacted by the crisis. As such, looking at the national approaches on vulnerability and the predominant use of the vulnerable groups approach together with the several examples of crises, it is possible to list three categories of individuals who are not considered. These are:

- (a) Individuals who do not fit within the categories listed in table 35 in 5.1 and are not mentioned in the official data: for instance, first responders, health-care personnel, youths (but not NEETs), travellers, tourists, airport personnel, but also transit refugees and households living in certain type of houses and in certain geographical areas. These individuals are not considered since they do not fall into the ‘typical’ list of vulnerable groups or since they are considered not in need for support and help.
- (b) Individuals who are not considered due to the novelty of risks, since risks depend on technologies that may cause unprecedented crises (see the case in Estonia) or are unexpected risk provoked by extreme ideologies (see the case in Belgium, Finland, Norway, and Sweden). These individuals are not considered since authorities have to deal with new and unknown vulnerabilities.

From the crises, we conjecture also this third category:

- (c) Individuals from the ‘typical’ list of vulnerable groups who do not fit the assumption of being vulnerable: for instance, an elderly person in a strong social context, with experience from previous events and a good physical and mental condition. Since these individuals are considered vulnerable in the static approach, their capacities and resourcefulness are not considered.

A reason for this neglect so far is that the situational aspect of vulnerability and the aspect of choice are both little considered with regard to vulnerability. However, there are individuals who become vulnerable accidentally due to the specific situation they are in like the ones in the category (a). The examples of crises in Estonia and Finland show how households living in certain type of houses and in certain geographical areas are subject to vulnerability. The choice of job, as well, plays an important role, since some people get into vulnerable situations due to their job, as for the cases of crises involving first responders, farm-entrepreneurs and emergency operators. The heat waves and the forest fires in Sweden also indicate that the type of house or the job can make a difference in being negatively impacted by a crisis. In Italy, as well, tourists in Ischia were the group that needed most of the assistance as much as those involved in the Central Italy earthquake in 2016. The same reflection can be done for the January 2019 snowfall in Norway, which involved tourists and first responders alike.

The examples of crises show that there are differences in crisis preparedness between urban and rural areas. Furthermore, the size and remoteness of municipality affects the perception of preparedness: in Finland, the smaller the municipality is or the further away from the centre, the better the residents think they are able to survive in crisis. On the contrary, in Estonia, sparsely populated municipalities, with less economic capacities are considered to be more vulnerable due to their local governments’ reduced abilities to offer social care in case of emergencies or under a failure of vital services. In Sweden as well, people living in certain type of houses, such as blocks of flats, are usually



considered low-income and thus vulnerable in normal times and more at risk when a crisis strikes. The type and location of household (flat/house and urban/rural area) become, thus, factors to taken into account to uncover vulnerabilities outside the official data. This is confirmed also for Finland. There are, indeed, differences in crisis preparedness between urban and rural areas. Furthermore, the size and remoteness of municipality affects the perception of preparedness: in Finland, the smaller the municipality is or the further away from the centre, the better the residents think they are able to survive in crisis. On the contrary, in Estonia, sparsely populated municipalities, with less economic capacities are considered to be more vulnerable due to their local governments' reduced abilities to offer social care in case of emergencies or under a failure of vital services. In Sweden as well, people living in certain type of houses, such as blocks of flats, are usually considered low-income and thus vulnerable in normal times and more at risk when a crisis strikes.

Besides the type and location of the households, there are other groups negatively influenced by a crisis mainly because they were in the crisis area due to their job. Here, the socio-economic background who makes individuals ontologically vulnerable does not seem to play a crucial role. For instance, in Finland and Sweden, farm entrepreneurs and health-care personnel found themselves in a particular situation of being exposed to the crisis (without electricity, suddenly ill or economically damaged by the crisis).

As for category (b), in Estonia, new types of vulnerabilities have arisen, mainly related to dependences on digital technologies with information and communication sharing particularly influenced by cyber-attacks, which potentially can damage the whole of society. The cease of electricity and/or internet connection (due to a storm or cyber-attack) causes severe disruptions also in livelihoods traditionally perceived as socio-economically strong. In Norway, violent extremism from right-wing ideologies has contributed to a new type of crisis, with consequent new groups, which are not mentioned in the official data, which are at risk. Here, two terrorist attacks - 22 July 2011 and the shooting at the Bærum mosque – have drawn the attention on social groups, such as youths and the Muslim community. The so-called migration crisis in Sweden has had the merit to underline that among asylum seekers, there are groups particularly at risk, such as unaccompanied minors and transit refugees.

## 5.3 Intersectionality

As the examples of this report show, the vulnerable groups narrative seems to be predominant in the sample of countries. In this vein, usually vulnerability is envisioned to depend on one factor or dimension only. For instance, age, and thus elderly and children are labelled as vulnerable groups. In contrast, by presenting a range of crisis, we underlined shortcomings regarding this approach and outlined in how far individuals are not seen by crisis management activities. Further, in D1.2, we called for a more systemic use of the intersectionality perspective in research to uncover multiple and overlapping vulnerabilities and provide a more precise picture of the phenomenon, since intersectionality is rarely addressed as a prioritized focus of policy<sup>15</sup>. The intersection of different factors can lead to becoming more or less vulnerable than the vulnerable group approach suggests. In addition, this same intersection can show whether there are different kinds of vulnerabilities carried by overlooked individuals. Against this backdrop, here we present how we can integrate the insights

<sup>15</sup> See also Kuran, C.H.A., Morsut, C., Kruke, B.I., Krüger, M., Segnestam, L., Orru, K., Nævestad, T.-O., Airol, M., Keränen, J., Gabel, F., Hansson, S., Torpan, S. (2020). Vulnerability and vulnerable groups from an intersectionality perspective. *International Journal of Disaster Risk Reduction*, <https://doi.org/10.1016/j.ijdr.2020.101826>.



provided so far with intersectionality in assessing and understanding vulnerability for the BuildERS project. We offer, first, a short introduction on intersectionality.

The theory of intersectionality was introduced in 1989 by the American lawyer, civil rights advocate and leading scholar of critical race theory Kimberlé Crenshaw, to study and understand the oppression of African-American women. Intersectionality became very fast “the cutting edge of contemporary feminist theory” (Davis, 2008: 69), which, since the early 1990s, has explored forms of oppression and discrimination based on various factors like class, ethnicity, age, ability, sexuality and other identities. Intersectionality can be defined as “the interaction between gender, race, and other categories of difference in individual lives, social practices, institutional arrangements, and cultural ideologies and the outcomes of these interactions in terms of power” (Davis, 2008: 68). Lugones (2008: 4) interprets the term as follows: “Intersectionality reveals what is not seen when categories such as gender and race are conceptualised as separate from each other”. Intersections among categories, such as age, gender, ethnical background, ability, sexual orientation, and socioeconomic status, are endless and constantly interact with each other by shaping a series of individual identities, which are part of a broader concept of social (in)equality and power hierarchies (Nightingale, 2011; Bradley, 2016; Djoudi et al., 2016). Intersectionality helps recognizing that social constructs of identities, such as gender and ethnicity, and of identities such as women and men, are not homogenous (Nightingale, 2006; Buckingham-Hatfield, 2000; Leach, 2007). In addition, it opens up for an analysis of inequalities of interacting social identities, which can change over time, to understand the multidimensional complexities of social constructions (Rocheleau et al., 1996; Elmhirst, 2011; Tschakert, 2012; Arora-Jonsson, 2014; Meinzen-Dick et al., 2014; Elmhirst, 2015).

Since age is often mentioned as a factor determining vulnerability, intersectionality can help better understanding how age interacts with other factors, such as income, gender or race. Indeed, the most vulnerable individuals in crises and disasters according to age are often considered children and elderly (Ngo, 2001; Cutter et al., 2003). However, Fothergill and Peek argue that “Age alone does not make a child vulnerable to disaster. Instead, age interacts with many other factors that may render children particularly at risk. Moreover, vulnerability factors tend to build over time and cluster together, resulting in what we refer to as cumulative vulnerability ... a racial minority child with a physical disability who lives in an impoverished household in a hazard-prone area will experience multiple, intersecting forms of social, environmental, physical, and economic vulnerability to a disaster ... it is not solely age or race or ability status or poverty or hazards exposure, but how these risk factors accumulate in a child’s life” (Fothergill and Peek 2015: 23, cf. Tierney, 2019: 146).

In addition, intersectionality contributes to a dynamic understanding of vulnerability, which can shift and change over time. Tierney remarkably explains that the degree of vulnerability does not depend on one dimensional attribution (e.g. to a demographic group, such as elderly or children), but is the result of a complex relationship between different factors, like social class, race, gender and age (Tierney, 2019) to name just a few: “[...] people are not born vulnerable, they are made vulnerable. [...] different axes of inequality combine and interact to form systems of oppression – systems that relate directly to differential levels of social vulnerability, both in normal times and in the context of disaster. Intersectionality calls attention to the need to avoid statements like ‘women are vulnerable’ in favour of a more nuanced view [...]” (Tierney, 2019: 127–128).

This dynamic understanding of vulnerability often refers to a very strong dependency on the situation, which renders targeted disaster relief actions increasingly difficult, as pre-determined categories would not be suitable (Gabel, 2019). Taking into account intersectionality in relation of vulnerability and vulnerable groups means to challenge the diffuse tendency in public policy to categorise groups



in terms of vulnerability to risk and hazards, which ignores or overlooks the within groups' differentials in vulnerability (and resilience) terms. As Tierney suggests “[...] vulnerability has temporal, spatial, and situational dimensions. It exists at particular points in time and in particular locations; while disaster vulnerability is shaped by historical trends, conditions can also evolve and vary in ways that make individuals and groups more or less vulnerable, both in terms of impacts and in terms of outcomes” (Tierney, 2019: 125). In addition, crisis conditions may render traditionally robust individuals vulnerable mainly because of their exposure to the consequences of the crisis in question.

Intersectionality shows how the combination of different factors may lead to become more or less vulnerable than the narrative of vulnerable groups would suggest. In addition, intersectionality, being introduced to understand various forms of social injustice, allows to reflect how multiple social variables result in different positions of privilege and disadvantage. It is, therefore, important to integrate categories of differentiated vulnerabilities as they appear as part of an analysis of vulnerability, rather than merely addressing binary categories such as women and men or poor and rich, which ends up glancing over individual differences and reducing entire demographics to homogenous categories.

## 5.4 Intersectionality of vulnerability factors

In the sections presented above, we listed several elements of vulnerability. Several of these elements mirror what we proposed in D1.2, to divide factors of vulnerability between primary and secondary (D1.2, 2020: 21 – 25). There, we considered primary factors of vulnerability those factors which affect directly vulnerability, while secondary factors have an impact on primary factors. As argued in D1.2, we are aware that this differentiation can be difficult to be provided empirically, but the advantage is that this helps uncovering socio-economic diversities that, in turn, can be analysed through intersectionality. We repropose these factors here:

### (a) Primary factors:

1. Sensitivity: the extent to which individuals, groups and communities are affected by the exposure to risks<sup>16</sup>
2. Exposure: the extent to which individuals, groups and communities are subjected to a hazard. Exposure is a necessary condition for a hazard to become a risk<sup>17</sup>
3. Coping, Adaptive Capacities or Response Capacities: abilities to adjust to changes caused by a crisis or a disaster<sup>18</sup>
4. Anticipation, Resistance and Recovery Capacities: abilities to reducing existing or future possible risks

<sup>16</sup> Smit and Wandel (2006: 286) posit that exposure and sensitivity cannot be separated.

<sup>17</sup> We follow Tierney (2019) and regard exposure as one factor of vulnerability. The separation makes sense analytically because without exposure vulnerability to a crisis or a disaster does not exist. On the other hand, it is difficult to differentiate between exposure and vulnerability, since, according to Tierney, exposure is part of vulnerability.

<sup>18</sup> In our definition of resilience as processes of proactive and/or reactive patterned adjustment and adaptation and change enacted in everyday life, but, in particular, in the face of risks, crises and disasters (see D1.2), we aimed to include all these capacities.



- (b) Secondary (or underlying) factors: gender, age, race, ethnicity, culture, disabilities, income, education, religious belief, spoken languages, insurances, money deposits, availability of/access to social contacts, availability of/access to information, type of house, temporary conditions such as illness or family struggles etc.

In the following table we merged the information on who is vulnerable and on the elements of vulnerability, which, as mentioned above, fall into the category b) secondary factors. The purpose of this table is to serve the further analysis by intersecting secondary factors.

<i>Hazard</i>	<i>Type of crisis</i>	<i>Who is vulnerable</i>	<i>Vulnerability Secondary factors</i>
Wind storm	Power outages Interruption of vital services Households without electricity Destruction of forests	Households in blocks of flats Households in remote areas Hospitalised and new patients Emergency operators/first responders Children Disabled Elderly	Age Disabilities Type of house Income
Fire	Bush and forest fire Fire in tunnel	Inhabitants of rural areas Individuals living alone Elderly with limited mobility Individuals momentarily impaired People in vehicles	Age Disabilities Temporary illness All secondary factors may be applicable here
Snow storm/fall	Power outages Roads closed Avalanches	Households without fire place Travellers (car and plane) Emergency operators Elderly Families with children Farm entrepreneurs Hospitalised patients Tourists First responders	Age Type of house Illness All secondary factors may be applicable here
Cyber-attack	Websites disabled Information systems disabled, information exchange disabled Flooded emails Disabled online media sites Disinformation	All those in need of critical infrastructures (electrical power, water, healthcare, law enforcement, etc.) such as Computer users Patients in hospitals Medical services Online (social) media followers	All secondary factors may be applicable here
Violent extremism	Terrorist attack	Society as such Children People not speaking native language People not able to go home from work Public officers working in the government quarters People walking and working close to the attack Adults and youths on an island	Age Ethnicity Religion Culture  All secondary factors may be applicable here
Water contamination	Spread of diseases	Local residents Hospitalised patients Children Elderly	Age Illness



		Marginalised people Dementia sufferers	
Heat wave	Deterioration of human health Higher mortality Fires	People living in houses with large windows People living in houses without the possibility of adequate cooling Elderly Inhabitants of rural areas First responders Forest owners Chronically ill and on medication people People with disabilities Pregnant women	Age Reduced health Type of house Gender
Landslide	Masses on a working side	Workers First responders	All secondary factors may be applicable here
Heavy storm (wind+rain)	Flood	Elderly Tourists House owners close to the rivers	Age Type of house All secondary factors may be applicable here
High influx of migrants	Uncontrolled immigration	Unaccompanied minors Transit refugees	Age Spoken language Income
Earthquake	Collapse of buildings	Local inhabitants Students Tourists	Spoken language All secondary factors may be applicable here
Industrial accident	Spill of contaminated material	Local inhabitants	All secondary factors may be applicable here

*Table 36. Unified Table of Vulnerability Secondary Factors*

Within the secondary factors, intersectionality becomes a useful analytical tool since it reminds us of acknowledging the variety of dimensions determining vulnerability within the context of crises and disasters, where the multiplicity and fluidity of identities and experiences tend to be overlooked and individuals are simply categorised within groups and, as such, they are labelled as vulnerable (the poor, the elderly, the children etc.). Indeed, a few studies on vulnerable groups in crises and disasters (see Fordham, 1999; Schuller, 2015; Lovell et al., 2019) point out that too often the identities of vulnerable groups are “homogenized in practice without regard for the intersecting traits and continual factors that result in unequal disaster and environmental outcome” (Vickery, 2018: 136). Another important reminder is that we need to avoid generalisations by inserting people in one group or the other, but to recognise that social groups are a mix of social variables. As Fothergill and Peek (2015) argue, it is not age alone that makes a child vulnerable. Age together with other factors, such as poor living conditions, disabilities, ethnicity, can make a child more vulnerable than other children.

Since intersectionality distinguishes vulnerability as the result of societal (power) relations, it is highly useful to analyse those secondary factors that cause injustices and discriminations and finally prevent



people from being emancipated (in the sense of being freed from personal hardship). These secondary factors have an impact on the primary factors since they influence, for instance, coping or recovering capacities and exposure. Thus, in using intersectionality by combining various secondary factors of vulnerability, it is possible to shed a critical and more nuanced look at vulnerable groups that are, *prima facie*, considered to be vulnerable and to answer the question why some individuals are overlooked. However, the insight that vulnerability is an intersectional phenomenon gives vulnerability a dynamic dimension, in that the characteristics that shape vulnerability can change over time, in response to changing bio-physical and socio-economic conditions. A dynamic approach to vulnerability considers vulnerability a situational and relative phenomenon (Hilhorst and Bankoff, 2004: 2–3), depending on the actual exposure (as primary factor) and the interplay between external circumstances and personal conditions (stemming from secondary factors).

If, thus, we consider vulnerability as a dynamic characteristic of individuals, we argue that we should start to study vulnerability by raising the following question: *What hinders individuals in building capacities (primary factor), (in their various forms - coping, adapting etc.)?* To answer this question, we need to look for secondary factors that affect capacities and intersect with them. This means to promote a bottom-up approach, which, rather than assessing an individual belonging to a certain group or a certain vulnerable group according to homogeneous characteristics, assesses the conditions that are an impediment to access resources and means of protection and/or to understand information. In this way, two goals are reached: it is possible to take an additional but alternative approach on vulnerabilities that focusses on specific issues rather than individual characteristics and to intervene to improve individual ability to deal with extreme events.

We offer here some examples of intersection of secondary factors, based on the examples presented above.

#### Intersection of Age + ethnicity + culture + income + spoken language

- Irregular migrants, especially in the case of minor transit refugees in Sweden. A transit refugee is particularly vulnerable because she/he falls out from the reception system a country has, since he/she is considered somebody who aims to reach another country. However, if the same individual is a minor, then the situation becomes more complicated for the national authorities, since is a person in need of care and protection due to his/her age. In addition, the age can also influence his/her experience of fleeing from their home country. A fifteen-year-old teenager probably has different capacities and experiences (primary factor) from a thirty-five-year-old adult. Indeed, much of the discourse on vulnerability during the refugee crisis in Sweden was ascribed to unaccompanied minors. Asylum seekers and refugees in transit are the two most identified vulnerable groups identified in unofficial data in Sweden. However, the intersection of these two vulnerabilities certainly adds complexity to the exposure of unaccompanied children.

The same secondary factors can be applied to the Russian-speaking minority group mentioned in the Estonian official documents.

#### Intersection of Income + type of house + place of residence.

- Estonian and Finnish cases due to storms and, in general, extreme weather events. Here, the centre-periphery dichotomy might be more relevant than previously thought. Living in a rural area is often associated with a higher risk of vulnerability, but that this is not always true. In



Finland, people living in rural areas are more likely to have access to firewood, fresh drinking water and enough farm food supplies to last through the outage than people living in a city.

#### Intersection of Language + availability of/access to information + disabilities

- In the case of 22 July 2011, intersectionality plays a role among those youths who experienced the terror attack on the Utøya island. A particular set of secondary factors rendered them vulnerable in this particular setting, since important messages were conveyed in Norwegian, but not all the youths had Norwegian as mother tongue. In addition, an important survival strategy was to swim away from the island, but not all could swim.

The dynamic understanding of vulnerability prompted by intersectionality seems to be at odds with the general group approach to vulnerability in the eight countries. For instance, often, governmental surveys and reports mentioned elderly as a vulnerable group. Both Estonia and Finland classify people of 65+ years as elderly and thus in need of particular care due to health or economic conditions. But, what about well-off elderly who have good networks and do not suffer from any socio-economic weakness? Are they still subsumed under the vulnerable group label only because of their age? We argue that empirically the elderly are disproportionately often - but not per se - subject to increased vulnerability. However, taking elderly as vulnerable group is a form of stigmatization that needs to be justified by the advantages of doing so. It helps statistically to know that aging population means structural changes in a society and this knowledge is useful to formulate political choices, such as building more retirements homes or provide services for this type of population when a crisis occurs. At the same time, we need to scrutinize in how far governmental reports produce the understanding of vulnerability they actually want to tackle. To some extent, Sweden avoids generalisations about vulnerable groups in the reports and documents we analysed and focuses more on vulnerability underlying factors which are context specific, interrelated, and dynamic in nature. In Norway, it was difficult to find a definition of vulnerable groups, perhaps since Norway focuses on individual and group's abilities to withstand a negative event and these are not necessarily determined by age, gender or socio-economic conditions.

By focusing on the intersections of secondary factors of vulnerability, we can, then, problematise the 'typical' categories of vulnerable groups by challenging their homogeneity:

- a) Elderly: Individuals in the category can be classified in a variety of ways such as men, women, healthy/unhealthy, poor, impaired/not impaired, with minority background, belonging to the majority of the population, living in rural areas or in cities, marginalised and so on. However, the main and most recognized element in official data, besides the age, is usually physical and/or mental impairment.
- b) Children: Individuals in the category can be classified in a variety of variables such as male, female, healthy/unhealthy, impaired/not impaired, with minority background, belonging to the majority of the population and so on. However, the main and most recognized variable in official data is usually age, which implies children's limited agency in crises situations and being dependent on care.
- c) Physically and/or mentally impaired: While the previous categories of elderly and children can be physically and/or mentally impaired, there are other age groups that can fall into this category, for instance young men and women, with minority background or belonging to the majority of the population, wealthy or poor.



- d) Socially marginalized: there can be intersecting elements for this category as well. One should take into account that language barriers, unfamiliarity with emergency services, lack of social capital, age can make the approach to this groups particularly challenging for emergency services.

Through intersectionality, we argue that it is necessary to problematize first and foremost how vulnerable groups are defined and classified in the official data, since individuals falling inside one category may indeed be vulnerable to one type crises, but they can also be *less* vulnerable, if we approach their vulnerability through intersectionality and, thus, we take a closer look at the secondary factors characterising that individual in a particular situation. In addition, secondary factors help uncovering those individuals rarely or not at all mentioned in official data: first responders, but also tourists, for instance.

The model below illustrates our point.

Secondary factors of vulnerability (e.g. Health condition, sex, socioeconomic status etc.)

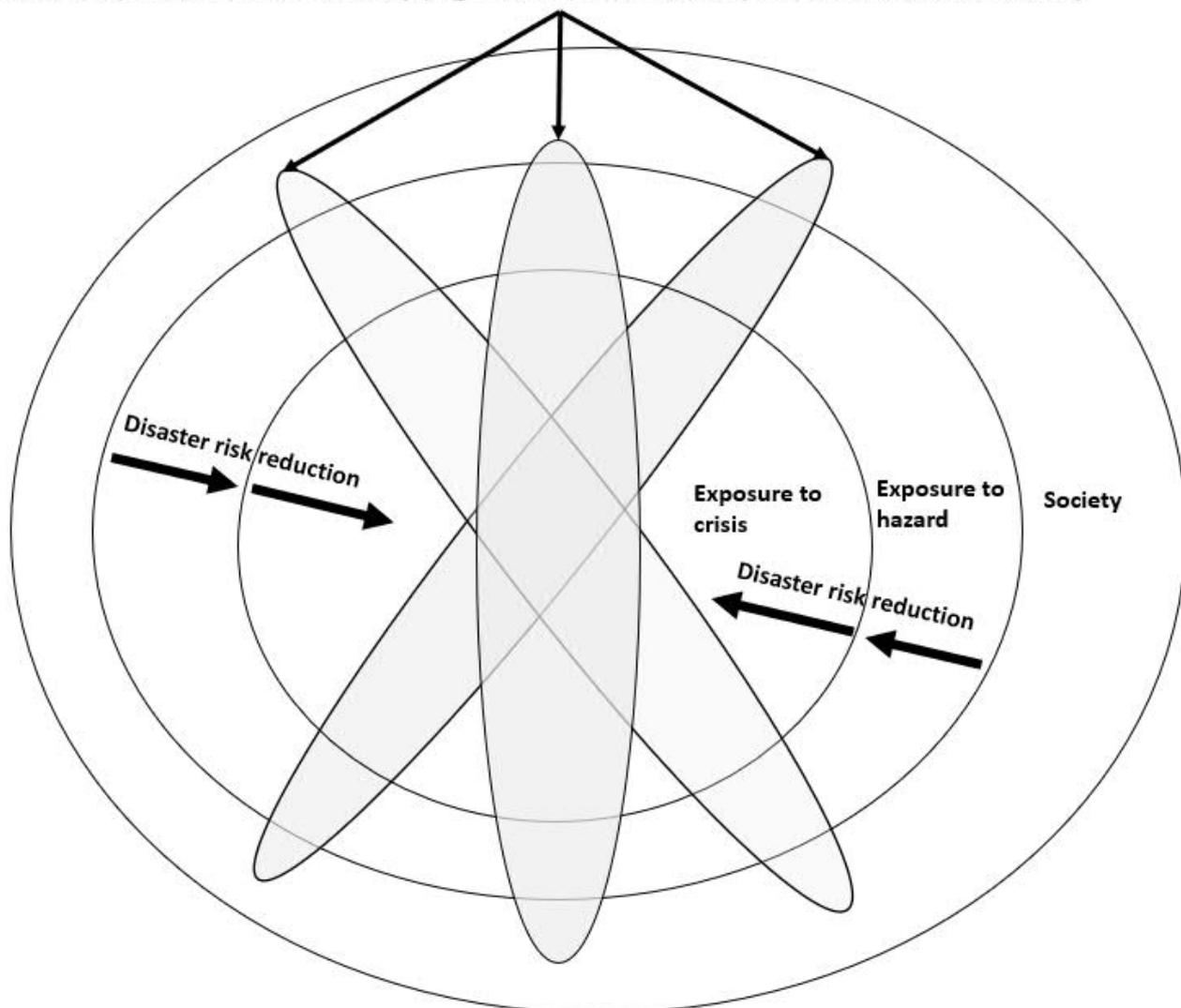


Figure 2. Model for highlighting Secondary Factors of Vulnerability through Intersectionality

The model exemplifies the necessity for disaster risk reduction policies to take into account the variations of secondary factors of vulnerability. For instance, individuals of one particular ethnic group may in one country display elements of vulnerability connected to the categories socially marginalized and age, while in another country individuals within these categories display capacities to cope with crises and disasters and thus, they are less vulnerable. The approach prompted by the model promotes to single out secondary factors, to consider how they intersect, and how these factors become relevant when individuals are exposed to a crisis. This approach can be used in risk management, as well as in all phases of the crisis management cycle.

## 5.5 Proposing an intersectional vulnerability matrix

In the subsections above, we argued that intersectionality is useful to scrutinise the so-called 'typical' vulnerable groups that are considered in different national context. This examination should have the heterogeneity of groups as starting point to find out more about important intersections. We are aware that the categorization of individuals in vulnerable groups for planning purposes is useful for risk and crisis managers, since they can tailor their emergency planning or rescue operations according to specific factors due to which persons are vulnerable. However, fix categorisations can leave individuals overlooked. So, rather than planning for groups, we should focus on planning for supportive needs and in order to reduce barriers.

Against this backdrop, in this subsection, we propose a matrix or tool stemming from intersectionality which can help further research on vulnerability, in addition to provide more practical considerations.

The matrix is inspired by research designs that consider the involvement of informants and participants (Shier et al., 2019) and is intended as an example of operationalization of vulnerability through intersectionality by showing who is included in the analyses on vulnerability and which primary and secondary factors are associated with vulnerability.

This matrix can be used in the three phases of a crisis (prior to a crisis, during and after), as well as 1) a research design tool; 2) an analysis tool during a research; 3) an evaluation tool after the research. It is, indeed, both a research design and a mode of analysis, based on our reflections about vulnerability from D1.2 and this report, and is intended to be built into the methodology of studies and data collection on individuals in order to better understand intersections of vulnerability factors in various social settings.

The matrix is developed according to two phases: a) a participatory phase and b) a vulnerability assessment phase. The phases can be run together, with b) following a), especially if the research foresees a participatory design where informants are involved. If researchers deem, for whichever scientific reason, that the participatory phase is not necessary, research can start directly from phase b).

- a) Participatory phase: this phase guides the research on vulnerability according to phases of research (the first column to the left); the level of involvement of the informants (the four columns in the middle); the role of informants and researchers in driving the research (the column to the right). In this phase, the main questions are: who is invited to participate in the research? How researchers choose the informants? Why some informants fall in different



categories? In the case of BuildERS, this first phase can help framing the work for the cases in WP4, for instance.

- b) Vulnerability assessment phase: in the second phase researchers can consider a particular crisis where informants were involved and start to fill in the table accordingly.

The following table illustrates the matrix.

- a) Participatory phase; As an example: there are individual 1 (falling in the category elderly), individual 2 (falling in the category University student), individual 3 (falling in the category woman with children), individual 4 (falling in the category hospitalised patient) involved in the participatory phase. They all experienced the same crisis (an earthquake, for instance). The four individuals are involved in various degrees in this phase together with the research team.
- b) Vulnerability assessment phase: the four individuals are asked about their primary and secondary factors of vulnerability (via the survey). We repeat here primary and secondary factors of vulnerability:
  - a. Primary factors:
    - i. Sensitivity: the extent to which individuals, groups and communities are affected by the exposure to risks
    - ii. Exposure: the extent to which individuals, groups and communities are subjected to a hazard. Exposure is a necessary condition for a hazard to become a risk
    - iii. Coping, Adaptive Capacities or Response Capacities: abilities to adjust to changes caused by a crisis or a disaster
    - iv. Anticipation, Resistance and Recovery Capacities: abilities to reducing existing or future possible risks
  - b. Secondary factors: gender, age, race, ethnicity, culture, disabilities, income, education, religious belief, spoken languages, insurances, money deposits, availability of/access to social contacts, availability of/access to information, type of house, temporary conditions such as illness or family struggles etc.

Secondary factors are intersected, so for individual 1, we consider a mix of secondary factors (not only the age, but also education, eventual disabilities, income, spoken languages, social contacts, type of house and so on) and we seek to understand how they impact primary factors.

We repeat the procedure for each individual and we look for common patterns. For instance, individual 1 (elderly) and individual 4 (hospitalised patient) have the same education and income; they display similar lack of coping capacities, being exposed in the same way to the earthquake. So, the age in individual 1 is not the key characteristic of vulnerability, since individual 4 is younger. So, on which secondary factors do we need to intervene to improve capacity building, for instance?



Phases in the research process of assessing vulnerability	Phase a) Dimension of decision making and power to participate				Question to be asked in the various phases of the research process
	People are not included	People are consulted	People collaborate	People direct and decide for themselves	
Phase 1. Deciding on the research questions	<i>Individual 1</i>	<i>Individuals 2 and 4</i>	<i>Individual 3</i>	<i>Research team</i>	Who has a say in deciding the research question?
Phase 2. Designing and preparing methods of data collection, sampling procedures	<i>Individuals 1-4</i>			<i>Research team</i>	Who is invited to get involved?
Phase 3 Preparing research instruments (such as surveys)		<i>Individuals 1-4</i>		<i>Research team</i>	Who develops the research instruments?
Phase 4. Collecting data		<i>Individuals 1-4</i>		<i>Research team</i>	Who gets involved in the data collection?
Phase 5. Analysing data and drawing conclusions		<i>Individuals 1-4</i>		<i>Research team</i>	Who has a say in what the conclusions are?
Phase 6. Producing reports	<i>Individuals 1-4</i>			<i>Research team</i>	Who gets credit for the report?
Phase 7. Dissemination of report findings			<i>Individuals 1-4</i>	<i>Research team</i>	Who is actively involved in dissemination?
	Phase b) Assessment of vulnerability of individuals in the three phases of crises				
Pre-crisis phase					Which primary factors of vulnerability are influenced by the secondary?
	<i>Elderly and Hospitalised patient same education</i>				Which secondary factors of vulnerability do individuals have in common?
Crisis phase	<i>Elderly and hospitalised patient same coping (in) capacities and exposure</i>				Which primary factors of vulnerability influenced by the secondary?
					Which secondary factors of vulnerability do individuals have in common?
Post crisis phase	<i>Elderly and hospitalised patient same recovery capacities</i>				Which primary factors of vulnerability are influenced by the secondary?



		Which secondary factors of vulnerability do individuals have in common?
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Table 37. Applied intersectional Approach to Vulnerability

The isolation of primary and secondary factors of vulnerability to be used in the above matrix to answer the questions to the right-side column of phase b) in table 37 can be adapted as needed according to the type of the crisis, the risk or the hazard. The following table 38 illustrates this process both in terms of factors of vulnerability and in terms of intersections, which both are intended to feed *Phase b) Assessment of vulnerability of individuals in the three phases of crises* in table 37. Factors and categories of who is vulnerable were chosen randomly, just to make an example.

Single rows can demonstrate how a person listed in the left side column may or may not be vulnerable, depending on whether that factor of (potential) vulnerability applies (e.g. a person from a migrant background may be financially secure). Conversely, the bottom row demonstrates how categories can be combined to highlight intersectional disadvantage.

	Factors of vulnerability										
	Type of house	Income	Social contacts	Information	Social support	Physical disability	Mental disability	Ethnicity	Language	Religious belief	Education
<b>Categories</b>											
Child											
Student											
Tourist											
NEET											
Elderly											
Hospitalized patient											
Disabled											
Migrant											
Migrant, disabled child											

Table 38. Operationalising intersectional Understanding of Vulnerability



Table 38 can potentially help to code which factors make individuals vulnerable in various phases of crises and also aggregate these factors to show how they are unequally distributed and how certain individuals sharing the same factors are more prone to be vulnerable in certain settings, without actually belonging to typical vulnerable groups.

The matrix or tool provided in this report is one of the possible approaches to vulnerability, but it points towards an intersectional and dynamic understanding of vulnerability. The various BuildERS activities, contained in the most operational WP3 and WP4, can look at this matrix as a source of inspiration to further develop and test their own devices. This matrix, indeed, focuses only on one of the key concepts of the BuildERS theoretical framework, namely vulnerability, according to the goal of T1.2 and T1.3, while WP3 and WP4 have a broader scope by considering, in different degrees, the BuildERS theoretical framework as such.

A way to discuss the validity of this tool or matrix is, for instance, to organise a workshop within WP6 by proposing a case study from WP4 to generate some recommendation for WP5.

## 6. Conclusion

In this report, we took into consideration a sample of eight countries from the BuildERS consortium to gain insights on the way they understand vulnerability. The predominant discourse is supported by a group approach to vulnerability, which considers vulnerable certain social groups characterised by certain features (age, sex, income etc.). This approach considers individuals ontologically vulnerable and labels individuals with a common predominant characteristic as belonging to a vulnerable group, also described as disadvantaged or fragile group.

However, this approach needs to be challenged. On the one side, it carries the concrete possibility to overlook individuals not belonging to typical vulnerable groups. These individuals can be vulnerable or become vulnerable, especially when a crisis unfolds. On the other side, those individuals considered as typically vulnerable can, indeed, have resources and capacities to cope with the crisis and be able to properly respond and recover.

In both cases, an approach to overcome this challenge is to apply intersectionality as useful analytical lenses to better understand the complexity of vulnerability, as a set of primary and secondary factors, which constantly intertwine and change, according to the circumstances. This renders vulnerability a dynamic phenomenon, within which secondary factors of vulnerability play a crucial role in influencing primary factors. Indeed, it is the intersection of secondary factors that can make people vulnerable to crises and disasters, since they influence sensitivity, exposure and capabilities. However, we are aware that this is a challenge per se, since these factors can change in an individual life course. Nonetheless, a systematic use of intersectionality seems to adhere with the Sendai's priority 1 Understanding disaster risk, which states that "Disaster risk management should be based on an understanding of disaster risk in all its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment. Such knowledge can be used for risk assessment, prevention, mitigation, preparedness and response" (UN, 2015).

To reduce vulnerability, policy makers and practitioners need to address, first and foremost, the intersection of secondary factors of vulnerability, by understanding the origins of these secondary factors, their persistence and to what extent the eventual lack of capacities, for instance, can be explained via the intersection of secondary factors. Welfare state and inclusive policies should seek



to reduce gaps in terms of hierarchies and inequalities, concerning social disparities, unbalanced economic distribution, and uneven access to education. This means to start the work of reducing vulnerability from answering the question “What hinders individuals in building capacities (primary factor)?”. Rather than assessing individuals belonging to a certain group, a better approach could be to take a look at the conditions that hinder them from accessing, understanding and acting upon crises and disaster and therefore improve their ability to deal with extreme events. So, instead of planning for groups, the focus should be shifted on planning for supportive needs and for the reduction of socio-economic barriers.

In this vein, research can provide a better and more nuanced picture of vulnerability to help national and local authorities and agencies to formulate specific guides, to hire staff with skills necessary to meet particular needs, to inform vulnerable groups in a particular way taking into account the differences that may coexist within and between groups. For instance, as we propose in tables 37 and 38, research should better use disaggregated data (by age, sex, socio-economic situation, disabilities etc.) to enable in-depth breakdowns of the data to move beyond typical vulnerable groups such as elderly, children, migrants and women when analysing vulnerabilities. Through in-depth breakdowns factors, individuals which are not evident, may emerge and enrich the analysis of vulnerabilities. However, this process, if, on the one side, can help to identify overlooked individuals, on the other side, increases the complexity due to the intersecting of factors.

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## COMMENTS TO THE BUILDERS REVIEWERS ON D1.3 FIRST REVIEW JUNE 2020

COMMENTS FROM REVIEWERS	BuildERS COMMENTS
<p>What kind of patterns of vulnerability are recognized as being decisive for shaping people's capacity to act upon hazards and disasters, depends largely on the (theoretical) lens that underlies the analysis. As such a theoretical framework is not yet developed when the "analysis" for D.1.3 was performed, the evidence presented in D1.3 is very weak. The report basically, presents a collection of case studies and data bases.</p>	<p>We rewrote the analysis of D1.3 based on D1.2, especially using what D1.2 proposed in pages 21 – 25 on the division of primary and secondary factors of vulnerability.</p>
<p>The geographical and cultural scope (Estonia, Norway, Finland, Sweden) is very limited if we look to the ambitious aim of the project (please, refer to pg. 12 1.1. Background and pg.13 2.1. Method "with the aim of informing future research practice, programs, and policies"). We have 27 Member States in Europe. It is recommended to use a better representative sample taking into consideration differences in culture and resilience management (following glossary in D.1.1 Appendix A this term is analyzed from risk resilience lens, which means that big differences in civil protection and vulnerability addressing will be encountered between countries and cultures).</p> <p>At page 19: Chapter 4. "National data and research on vulnerability and vulnerable groups" is focussed on four neighbouring north-European countries "to uncover whether definitions of vulnerability and the categorisation of vulnerable groups vary among countries". The project answer to this specific question could be biased by the limited geographical scope of the research, which risks not to intercept the impact of European diversity, particularly important when addressing "cultures of collaboration and shared values" (page 12). It is suggested to integrate further contributions from project partners representing other European regions.</p>	<p>We argued the following to justify the sample of the countries, at page 16:</p> <p>"All empirically rich research projects have to make difficult decisions on the sample size, which must be weighed in light of available resources, time constrains, language skills, access to data, etc. There is also the question of depth of analysis versus breadth of analysis. In this report, we chose to pursue an in-depth analysis of four countries from the BuildERS consortium, respectively Estonia, Finland, Norway and Sweden. We have taken into consideration these four countries, as a homogeneous sample for our in-depth analysis, to understand how these countries deal with the notion of vulnerability and vulnerable groups. Indeed, these countries share similar features according to the INFORM Global Risk Index (GRI) and they have strong welfare state systems (see Section 4). Precisely because of this homogeneous sample, the heterogeneous use of the term vulnerability and its heterogeneous understanding can be worked out particularly well. In addition, since in the second part of this deliverable we explore vulnerability through intersectionality, we do not need an extensive number of countries to extract multiple social variables underpinning vulnerability to analyse them through the intersectional perspective. Our aim is not to generalise our results across all of Europe to find representative patterns, but rather to understand how these countries deal with the notion of vulnerability, with in-depth case-study research".</p> <p><i>NB: this has not been accepted and we need to revise it in the new resubmission.</i></p>

<p>The term vulnerable groups selected could be in the basis of the confusion and lack of practicality of this deliverable.</p>	<p>See D1.3 par 1.2. We argued that “This report makes an extensive use of concepts and definitions from D1.1 and D1.2 and answers the questions about who is vulnerable and why (see D1.2, 2020: 34). In this report, we aim to promote vulnerability, and the interchangeably used terms vulnerable groups and segments of vulnerable population , as describing phenomena about an acute condition in a certain situation. The way we use these terms in BuildERS underlines that there are people who have a higher risk to be vulnerable because of structural circumstances and inequalities. This is mirrored in the definition from the D1.2’s Appendix A, within which we define vulnerable groups as groups of people sharing similar characteristics making them vulnerable in that they are susceptible to harm or loss. The manifestation of their vulnerability is a situational inability (or weakness) to access adequate resources and means of protection to anticipate, cope with, recover and learn from the impact of natural or man-made risks”.</p>
<p>It is recommended to revise the analysis counting not only in the structural dimensions of those vulnerable (age, culture, health and capacity conditions...etc.) but also in the situational dimensions (e.g. pg. 23 Estonian data analysis points out the difference in potential responses in people living in flats proposing spatial segregation, local government capacities and municipal public services quality as vulnerability factors which are considered in final reflections (pg.26); pg.31 Finish case is also addressing municipalities sizes, remoteness and services, differences between rural and urban, being urban factors specifically mentioned in pg.33, which are surprisingly not considered in final reflections (pg.34) ; in Norway one the risks is Urban Floods (pg. 35), however this is not considered so as to help in the analysis; in Sweden housing stock and municipal services and supplies appear as risks (pg.38), again it is not incorporated in the analysis.</p>	<p>Situational dimensions do not mean rural/urban or type of house, but underline the dynamic approach to vulnerability.</p>
<p>Threat term (please refer to pg. 29 table 3) is not defined, but it is used into the analysis. Stress appears in pg. 36/38 but also not defined. Same with the term exposure, security and safety (used all over the document). Please, complete the analysis and further definitions.</p>	<p>We added footnotes to explain the terms and they were added in Appendix A/glossary of D1.2 as well.</p>
<p>So as to better categorized those vulnerable, difference between shock and stress (both different type of risks) is recommended to be addressed as it</p>	<p>We checked the websites and use the definitions which were relevant for this deliverable.</p>

<p>is relevant and pertinent once national data analysis sections have been developed. Please to revise and countercheck with the definitions of UNHabitat. Please, refer to “Pro-poor Climate Action in Informal Settlements” – glossary <a href="https://reliefweb.int/sites/reliefweb.int/files/resources/Pro-poor%20Climate%20Action%20in%20Informal%20Settlements%20-%20WEB.pdf">https://reliefweb.int/sites/reliefweb.int/files/resources/Pro-poor%20Climate%20Action%20in%20Informal%20Settlements%20-%20WEB.pdf</a> and “City Resilience Profiling Tool Guide” CRPT Guide, pg. 34, <a href="https://urbanresiliencehub.org/wpcontent/uploads/2018/10/CRPT-Guide-Pages-Online.pdf">https://urbanresiliencehub.org/wpcontent/uploads/2018/10/CRPT-Guide-Pages-Online.pdf</a></p>	
<p>Intersectionality section is very well described as for extrinsic and intrinsic dimensions of vulnerability from literature - also applicable to risks – (pg.64-66).  However, all the national data and risks practical analysis is not included.  It is recommended to address questions not only about “who” are vulnerable, but “where” (e.g. rural-urban) and “when” (e.g. tourists in a terrorist attack) and embed please these elements within the systemic approach so as to be better prepared to analyse and work with concrete case studies. Please revise accordingly.</p>	<p>Intersectionality addresses the “why” of vulnerability.  D1.3 scope was not to look for the where and when.  <i>NB: this has not been accepted and we need to revise it in the new resubmission.</i></p>
<p>In some tables (e.g., table 23) “exposure” is listed as “vulnerability factor”. As such, it is too a generic assertion: please provide more specifics on the nature of the exposure and the relationship with the vulnerable groups.</p>	<p>See Chapter 6 and the way we address exposure based on D1.2 pages 21-25.  Page 65 of D1.3:  2. Exposure: the extent to which individuals, groups and communities are subjected to a hazard. Exposure is a necessary condition for a hazard to become a risk.  We follow Tierney (2019) and regard exposure as one factor of vulnerability. The separation makes sense analytically because, without exposure, vulnerability to a crisis or a disaster does not exist. On the other hand, it is difficult to differentiate between exposure and vulnerability, since, according to Tierney, exposure is part of vulnerability.</p>
<p>The deliverable should be revised to incorporate the ‘exposure’ concept and role in an unambiguous and structured way, avoiding the uncertainties triggered, e.g., at page 64 by the paragraph: “3) in</p>	<p>See Chapter 6 and the way we address exposure based on D1.2 pages 20-25.  We revised the issue of exposure.</p>

several crises, exposure is the main, if not the only, element of vulnerability. This is especially true for those groups outside the official data, such as first responders, tourists, workers and people who, by coincidence, were in the crisis area. The fact that they were exposed in a certain way to crises made them vulnerable. In these groups, vulnerability may not be a general characteristic, but depends on the actual exposure and on the situation in question."

## COMMENTS TO THE BUILDERS REVIEWERS ON D1.3 SECOND REVIEW JANUARY 2021

COMMENTS FROM REVIEWERS	BuildERS COMMENTS
<i>D1.3 has not taken into consideration the most critical concerns (structure, rationale, no biased analysis or predeterminate conclusions)</i>	We understand that this deliverable did not satisfy you. As such, we are going to follow your advices to improve its quality.
<i>that could put at risk the credibility of the project; as a consequence, D1.3 lacks consistency within D1.2.</i>	<p>We are surprised about the relevance and crucial role this deliverable has, regarding the whole project. In our view, D1.3 was meant to underline the need for a more dynamic understanding of vulnerability, which seems not to concern the way counties address vulnerability. We aimed to stress the importance to a dynamic approach to vulnerability and offer a way to do so through intersectionality.</p> <p>However, we will build a stronger consistency between D1.2 and D1.3 and revise the whole deliverable according to your comment. We can make a better distinction in the text between vulnerability as defined by countries (so static) and the need to approach vulnerability in a dynamic way.</p>
D1.3 specific comments	
The report based on a different case studies representing northern Europe (Estonia, Finland, Norway, Sweden). It relies on the concept of intersectionality and derives to some primary (basically the subcomponents of vulnerability, i.e., susceptibility, exposure, adaptive/coping capacity) and secondary factors (i.e., gender, age, race, social capita etc.) that shape people's vulnerability.	Subcomponents and secondary factors are taken from D1.2 (pp. 21 – 25), to show which part of D1.2 is deepened in D1.3.
The report has included some of the recommendations. It is better aligned with D1.2 than before but still lacks a systematic analysis	<p>The issue of systematic analysis (or systemic approach?) was raised also in the first review. We answered that in this deliverable the focus was the who and why (through intersectionality) about vulnerability. We understand that this is still a concern for the reviewers.</p> <p>Thus, we will address this by structuring the research questions earlier in the deliverable and use them systematically in a systematic analysis of the national data.</p>
and operational-oriented conclusions regarding vulnerable groups and vulnerability patterns.	We will address this concern by working on offering operational-oriented conclusions.
It has slightly advanced with regards to the first version. However, the report has not advanced as expected in being able to better structure and inform other WPs.	This comment mirrors the concerns above.

<p>At page 14: The geographical and cultural scope (Estonia, Norway, Finland, Sweden) remains limited despite the explanation of the scope method. It could be acceptable within the explanatory section 2.3 Choice of the sample of countries, and the paragraph: "Our aim is not to generalize our results across all of Europe to find representative patterns, but rather to understand how these countries deal with the notion of vulnerability, with in-depth case-study research" (pg. 16).</p> <p>Such a decision not only contradicts the GA and does not fully answer to the RP1 review request of "systemic approach", but represents a missed opportunity to demonstrate the practical feasibility to operationalise the proposed theoretical framework and could jeopardise the project perspectives.</p>	<p>The small sample of countries was an issue addressed also in the first review and we thought we had solved it by the explanation at page 16. However, we read that we have not satisfied the reviewers with this argument.</p> <p>As it currently stands, we need to discuss this at consortium level and find a solution that satisfies the reviewers.</p> <p>As for the last part of this comment, we read that the reviewers have very high expectations towards this deliverable and we will seek to meet them.</p>
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