BUILDERS D4.5

IMPACTS OF ELBE FLOODING DISASTERS ON SOCIALLY UNDERPRIVILEGED GROUPS AND LESSONS FOR RESILIENCE IMPROVEMENT

Project acronym: BuildERS

Project title: Building European Communities' Resilience and Social Capital

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Executive Summary

The BuildERS project aims to help improve government policies to enhance the resilience of European populations. The project focuses on the most vulnerable aiming to reduce their vulnerability and to increase their resilience. This study is part of work package (WP) 4 “Case Studies: Practicalities and innovations reducing vulnerability” and presents task 4.5 the German case study “Lessons learned from Flooding Disasters during 2002, 2006 and 2013 with special focus on underprivileged groups in urban (Dresden) and non-urban environments (in the State of Saxony)”.

In this case study, the German Red Cross together with University of Tübingen focus on social innovation by exploring what needs to be considered to make disaster management and technologies appropriate to serve all members of societies. In this vein, our case study does not focus on specific social groups but rather a geographical area. By using such an open approach, we aim to find out more about who became vulnerable for which reasons in different disasters in the Dresden area. Due to insights that are to be expected from the current situations, the case study was extended to include the COVID-19 pandemic and crisis management.

First the existing research is summarised and an overview on the crises is given. Then the report describes the research design, the interviews (n=20) and the survey (n=118), their connection with the relevant concepts of the theoretical framework from D1.2 and the data collection and analysis as well as ethical aspects of the research. It is shown how crises situations differ in their perception, how disaster management was perceived and to what extent social diversity is considered in the measures of crises management. The contextuality of vulnerability and the influencing factors are explored. It is pointed out how crisis management measures can create vulnerability and that disaster management and social service personnel themselves can become vulnerable during crisis. Finally, it is highlighted how some people can evolve in crisis and benefit from the situation. The analysis of the survey demonstrates that participants of the survey who scored higher on *social vulnerability*-indices, which were constructed based on indicators measured as part of the survey, were also affected worse by both floods and the ongoing COVID-19 pandemic. In addition, except for the health status of participants and whether or not they had an officially recognized disability, their socio-demographic characteristics were only to a very limited degree correlated with how severely they were affected by the inspected disaster. The same holds true for the association of socio-demographic characteristics with *social vulnerability* among the respondents.

The results of both parts of the study are discussed with regard to more specific social innovations. Relevant topics are the distribution of responsibility in and the consideration of social diversity in disaster management. The need to consider individual autonomy is pointed out. The importance of psychosocial wellbeing as a factor for resilience and vulnerability is discussed. It is shown how social cohesion and social capital influence vulnerability. Finally, it is explained how disaster management needs to consider the embeddedness of disaster management personnel. Following this discussion of points to consider, the innovation potential of the results and their linkages to the theoretical framework are discussed. The discussion of the results of T4.5 and its implication for existing technologies and developing new technologies complete this report.

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List of Acronyms

AB	Advisory Board
Adm	Administration
AUPIK	Aufrechterhaltung der ambulanten Pflegeinfrastrukturen in Krisensituationen (Maintaining outpatient care infrastructures in crisis situations)
BBK	Bundesamt für Bevölkerungsschutz und Katastrophenhilfe (Federal Office for Civil Protection and Disaster Assistance)
BuildERS	Building European Communities Resilience and Social Capital project
COVID-19	Coronavirus Disease 2019
D	Deliverable
DKKV	Deutsches Komitee Katastrophenvorsorge e.V. (German Committee for Disaster Reduction e.V.)
DM	Disaster Management
DoA	Description of Action
EKUT	Eberhard Karl University of Tübingen
EU	European Union
GRC	German Red Cross
INVOLVE	Verringerung sozialer Vulnerabilität durch freiwilliges Engagement (Reducing social vulnerability through volunteering)
KOPHIS	Kontexte von Pflege- und Hilfsbedürftigen stärken (Strengthening the contexts of those in need of care and assistance)
MoWaS	Modulares Warnsystem
n	Number of Cases
NGO	Non-Governmental Organization
NINA	Notfall-Informations- und Nachrichten-App (Emergency information and news app)
OLS	Ordinary Least Squares
SatWaS	Satellitengestütztes Warnsystem (Satellite-based warning system)
SoSe	Social Service Organisation
T	Task
THW	Bundesanstalt Technisches Hilfswerk (Federal Agency for Technical Relief)
UN	United Nations
WP	Work Package

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1. Introduction

The Sendai Framework for Disaster Risk Reduction 2015-2030 (UNISDR 2015) advocates for accessible and inclusive crisis management. In line with this, the BuildERS project aims to help improve government policies to enhance the resilience of European populations. The project focuses on the most vulnerable aiming to reduce their vulnerability and to increase their resilience. This study is part of work package (WP) 4 “Case Studies: Practicalities and innovations reducing vulnerability”. WP4 has multiple objectives:

> *Multiple case analysis of WP4 has the following objectives: i) tools and guidelines development, since the practicalities related to technologies and other tools must be field-tested, piloted or simulated before considering their up-scaling and transferability to other contexts; ii) demonstrations of how the tools, techniques and technologies can be applied and utilised; iii) empirical testing of what works and what does not work in practice; the cases serve also policy, strategy and other recommendations to be given in the latter work packages; iv) multiple case studies offer additional materials for the comparative analyses and supplement the field surveys and questionnaires offering a wider base for synthesis and increase the reliability and validity of conclusions drawn from the research; v) innovation, identification and proof-of-concepts (DoA, p. 28).*

This report presents task 4.5 the German case study “Lessons learned from Flooding Disasters during 2002, 2006 and 2013 with special focus on underprivileged groups in urban (Dresden) and non-urban environments (in the State of Saxony)”. In this case study, the German Red Cross together with University of Tübingen focus on social innovation by exploring what needs to be considered to make disaster management and technologies appropriate to serve all members of societies. In this vein, our case study does not focus on specific social groups but rather a geographical area. By using such an open approach, we aim to find out more about who became vulnerable for which reasons in different disasters in the Dresden area. Due to insights that are to be expected from the current situations, the case study was extended to include the COVID-19 pandemic and crisis management.

In this regard the German case study addresses the objectives mentioned above as follows: Using a twofold research design (objective iv) that combines expert interviews and a quantitative survey previous (floods) and existing (pandemic) disaster management measures are scrutinized against their ability to support individuals or reduce their vulnerabilities in disasters (objective iii). Based on their results not only the theoretical framework of D1.2 and approaches such as the model of Orru et al. is evaluated (objective v) but also recommendations on social strategies and potential technological support for them are developed (objective I and ii).

This report first summarises the current state of research on floods and the COVID-19 pandemic with a focus on vulnerability. It then describes the research design, the interviews (n=20) and the survey (n=118), their connection with the relevant concepts of the theoretical framework from D1.2 and the data collection and analysis. This is followed by the presentation of the results of the expert interviews and the survey. It is shown how crises situations differ in their perception, how disaster management was perceived and to what extent social diversity is considered in the measures of crises management. The contextuality of vulnerability and the influencing factors are explored. It is pointed out how crisis management measures can create vulnerability and that disaster management and social service personnel themselves can become vulnerable during crisis. Finally, it is highlighted how some people can evolve in crisis and benefit from the situation. The analysis of the survey begins with a brief descriptive inspection of the socio-demographic composition of the survey, the reported

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impacts of the analysed disasters and the distribution of the responses to the self-assessment of the participants ability to deal with different types of disasters and the assessed importance of different individual characteristics within the sample. Afterwards the construction of the indices for the dimension of interest of *social vulnerability* based on an explorative factor analysis is documented and reported. Finally the association between the different variables of interest is reported and also interpreted. The reader is therefore provided with an overview of the associations that are present within the survey sample between the impact of the investigated disasters, the *social vulnerability* dimensions, socio-demographic characteristics of the participants and the included self-assessment questions. The results of both parts of the study are then discussed and the points to consider for disaster management and the development of technologies that take social diversity into account are outlined. Relevant topics are the distribution of responsibility in and the consideration of social diversity in disaster management. The need to consider individual autonomy is pointed out. The importance of psychosocial wellbeing as a factor for resilience and vulnerability is discussed. It is shown how social cohesion and social capital influence vulnerability. Finally, it is explained how disaster management needs to consider the embeddedness of disaster management personnel. Following this discussion of points to consider, the innovation potential of the results and their linkages to the theoretical framework are discussed. The discussion of the results of T4.5 and its implication for existing technologies and developing new technologies complete this report.

2. Case Descriptions

To give the reader some context regarding the disasters examined within the German case study the following section provides a brief overview of the studied events. It gives a quick summary of both the spatial and temporal extension of the flooding disasters of 2002, 2006 and 2013 in Saxony as well as the number of people affected by them. Regarding the current COVID-19 pandemic it provides a brief timeline of the development of the pandemic in Dresden and the surrounding area as well as the number of victims claimed by the pandemic in Saxony. The section will also provide an overview of key actions taken by state actors to limit the impact of the pandemic in Saxony.

2.1. Flooding Disasters

2.1.1. The flood of 2002

The flood of 2002 in the German federal state of Saxony was caused by extreme rainfalls during the 11th, 12th and the early hours of the 13th August 2002 in Saxony and the bordering Czech Republic. These rainfalls caused a serious rise in the water level of the Elbe river and its tributaries, starting from the 12th August. Due to floods caused by the Elbe and its tributaries multiple cities and smaller communities in Saxony were severely damaged. In the time from the 14th August until the 18th August the Elbe itself overflowed its banks and flooded large parts of the state capital Dresden and other smaller cities and communities on its shore (Kirchbach, H. P., Franke, S. & Biele, 2002, p. 13).

While other parts of Germany, and also parts of Austria and the Czech Republic, were gravely affected by the flood as well, this brief summary of the flood disaster will concentrate on its effects in Saxony due to the focus of the case study and this region being the worst affected one overall (Deutsches Komitee für Katastrophenvorsorge, 2003, p. 8).

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The flood caused the death of 20 people on Saxony and injured 110 (Kirchbach, H. P., Franke, S. & Biele, 2002, p. 13). It directly affected 337,000 people in Saxony and caused the evacuation of tens of thousands of people, approximately 35,000 in Dresden alone (Deutsches Komitee für Katastrophenvorsorge, 2003, p. 8). In total the flood caused approximately 6 billion Euro in damage in Saxony alone (Deutsches Komitee für Katastrophenvorsorge, 2003, p. 8)..

In Dresden the flood peak was reached at the 17th August with a water level 940cm and a peak flow of 4,680 m^3/s. Such a drainage rate normally occurs every 150 to 200 years, while such a water level has never been reached before in Dresden (Deutsches Komitee für Katastrophenvorsorge, 2003, p. 13). The average water level in Dresden during the summer is 154 cm and drainage rate averages around 255 m^3/s during summer (Bundesanstalt für Gewässerkunde, 2017). This exceptional event caused the flooding of large parts of the inner city of Dresden (see Figure 1).

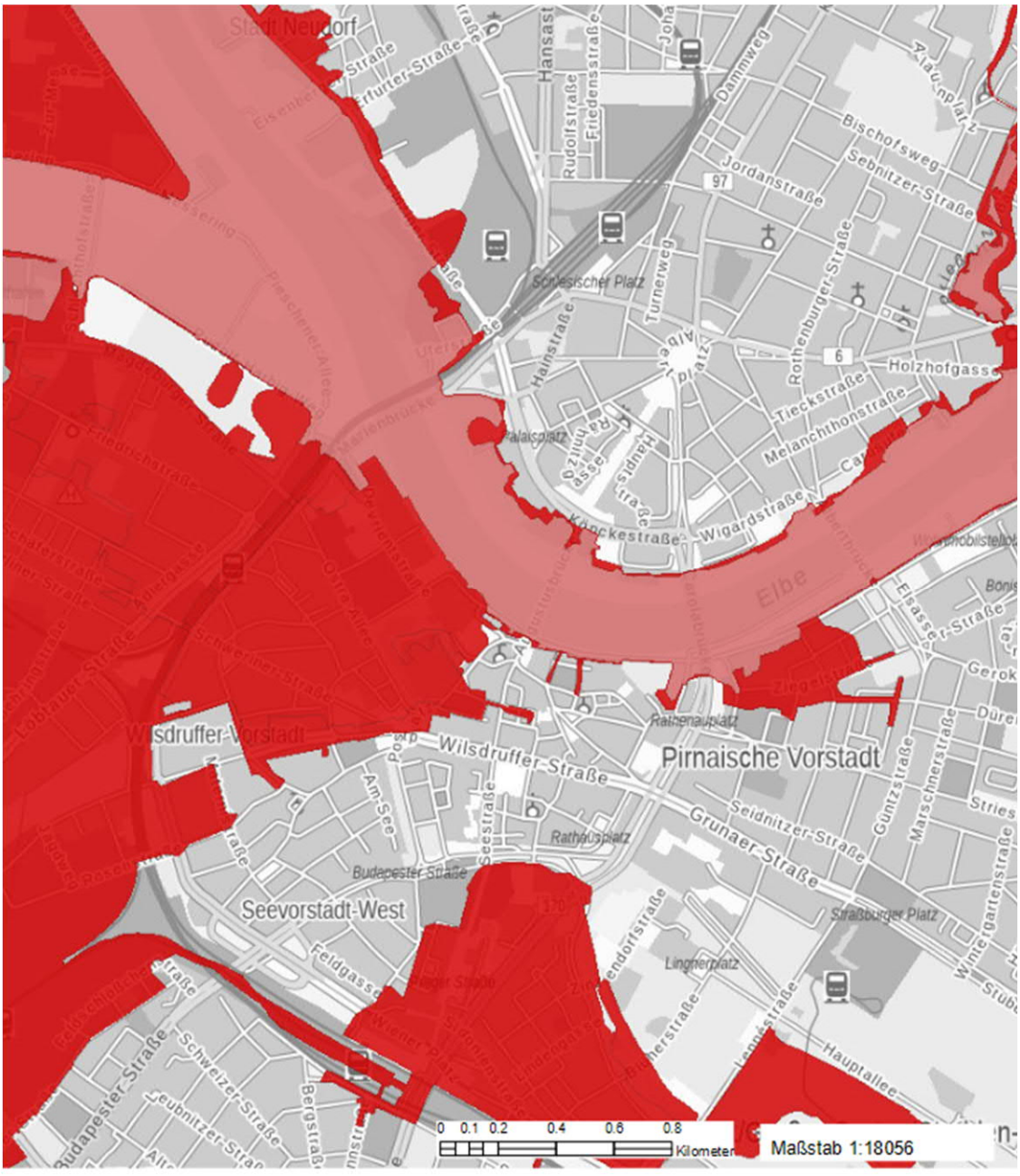

Figure 1: Flooded area in Dresden in Dresden in 2002, Source: Freistaat Sachsen

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In total 15,500 soldiers, 2,200 federal policemen, 2,835 members of the The Federal Agency for Technical Relief (THW) (the German federal civil protection agency), 12,500 state policemen from Saxony and other Gemran federal states, 23,000 firefighters and 7,804 members of aid organizations were deployed during the disaster. Therefore a total of 63839 professional disaster relief workers were active during the flood. Furthermore approximately 23,554 private unorganized helper were also active during the flood and its direct aftermath (Kirchbach, H. P., Franke, S. & Biele, 2002, pp. 193–211). This high number of helpers active during the flood further emphasizes the seriousness of the disaster.

2.1.2. The flood of 2006

Although the flood of 2002 was classified as an event that on average only takes place once per century, in 2006 the Elbe region was again hit by an exceptionally strong spring flood. Although in some places it even caused a higher peak water level than the flood from 2002, overall, it didn't reach the intensity of the former event and did not cause the same level of damages. For example, all dikes in the affected areas were able to withstand the flood. Consequently, it also didn't cause a comparable level of investigations into disaster management strategies and therefore, while still taken into account, only is of minor importance for the German case study (Undine, 2002).

2.1.3. The flood of 2013

In June 2013, the areas bordering on the Elbe river and many other areas in central Europe, were hit by a third large flooding event that also fulfilled the characteristics of a "flood of the century". The ongoing flooding in Central Europe began after several days of heavy rain between the 31st of May and 2nd of June 2013. Germany was among those countries worst hit by the floods. Flooding and damages in Germany have primarily affected its south and east federal states, in particular Saxony, while the flood crest progressed down the Elbe and Danube drainage basins and tributaries. Due to the extremely wet spring weather prior to the flooding, soils in Germany were showing record levels of moisture already prior to the heavy rains in late May. This in turn led to greater runoff when the intense rain began and subsequently to high water and floods in other rivers and river systems in Germany. From the 3rd of June onwards, disaster alerts were declared to an increasing extent in Saxony. After the heavy rain period from late May/beginning of June other sporadic showers and rainfall kept the risk of further flooding at a risky level for several days and therewith prolonged the acute phase of the catastrophic situation. The levels of flood waters in Germany exceeded in some areas those seen in the "once in a century" floods of 2002 along the riverbanks of Elbe and Danube.

In the course of the floods almost 34,000 people in Saxony were affected by evacuations, 13,300 alone in the state capital of Dresden (Sächsische Staatskanzlei, 2013, p. 49). But despite all efforts the flood still killed 14 and injured 128 people (Deutsches Komitee Katastrophenvorsorge, 2015, p. 163).

According to the German re-insurance company Munich disaster costs for Germany may have been the highest ever recorded in the country's history. Out of the total 12-billion-euros losses that the floods caused across Central Europe, about 3 billion euros were covered by insurance companies. Overall, while flood prevention measures have improved tremendously since 2002 and the state of Saxony was much less affected than by the previous flood, it still had tremendous impacts and therefore provides a highly interesting research opportunity for the German case study (Sächsische Staatskanzlei, 2013).

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Until the 9th of June 2013, the fire brigades deployed about 75,000 relief forces to affected communities, including personnel being recruited from not affected federal states (Deutscher Feuerwehrverband, 2013). The THW was on duty in all areas affected by the floods with about 6,000 of its relief forces. Besides measures for safeguarding dikes and sandbag installations for flood protection, the focus of THW lies on technical and logistical support (Technisches Hilfswerk, 2013). On average about 3,000 to 4.000 volunteers from regional branches of the German Red Cross were deployed to the command and situation centre of the national headquarters of the German Red Cross (GRC) during its activation between the 4th and 13th of June 2013 (DRK, 2014, p. 19).

The GRC has been supporting people affected by the heavy floods in multiple affected areas. Along numerous rivers the water rescue and mountain rescue service of the GRC evacuated private households, nursing facilities and rescued people directly from using boats and helicopters (ibid.).

Besides the work of educated relief workers of the state associations and relief organisations, thousands of citizens organised themselves on a community level along the Danube and Elbe rivers to rescue their own houses or to help others affected by the floods. This self-organised volunteer work covered measures such as filling sandbags, building sandbag installations, providing shuttle services, material for recovery or food and drinks for the volunteers. In Dresden, 5,000 citizens organised themselves via social media such as Facebook and Twitter.

2.2. The COVID-19 pandemic

The last case examined within this case study is the currently still ongoing COVID-19 pandemic within Saxony. While the general global developments of the pandemic are assumed to be well known to the reader, this section provides a brief overview of the development of the pandemic in Saxony in particular so the reader can gain a good understanding of the development of it in the area of interest of the case study.

The first COVID-19 case in Saxony was identified at the 2nd March 2020 (MDR, 2021). Since than it first appeared that Saxony, similar to the other federal states within eastern Germany, would be able to deal relatively well with the pandemic. Until the end of October 2020, the COVID-19 seven-day incidence remained consistently below 50 infections per 100,000 inhabitants (see figure 2). But starting in October 2020, the incidence rate began to rise sharply, as it did in other parts of Germany, peaking around Christmas with a seven-day incidence of 444 across all 0f Saxony. In the county *Sächsische Schweiz-Osterzgebirge* the incidence rate even rose up to 628.3. Afterwards, the incidence rate declined again and during the following weeks Saxony, together with Germany as a whole, managed to push the incidence rate again below 100 infections among 100.000 inhabitants. By the 16th February 2021 the incidence was down to 62.6. Since than Saxony has again faced a moderate increase of the infection rate, followed by a stagnation on a relatively high level. At the 30th April 2021 the seven-days incidence in Saxony stood at 210.7 (Freistaat Sachsen, 2021b).

As a consequence of the beginning pandemic the state of Saxony has implemented a first lockdown in the middle of March 2020. These measures included closing most public facilities as well as schools and kindergartens. Due to relatively low infection rates the state gradually relaxed the imposed restrictions again throughout April to July 2020. As the infection rates started to rise again, beginning in October 2020 new restrictions were imposed. By November Saxony, along with the rest of Germany, has entered a second lockdown which again closed down most of the public live within the state. In December sever travel restrictions and curfews were imposed for regions affected particularly

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bad. When infection rates started to decline afterwards schools and kindergartens were allowed to open again under strict hygiene conditions at the end of February and the beginning of March. The last major change in the COVID-19 policies implemented by state of Saxony took place at 23rd of April 2021, when the state government implemented the previously Germany-wide standardized "*Bundesnotbremse*", which implemented stricter restrictions based on regional incidences (Freistaat Sachsen, 2021a).

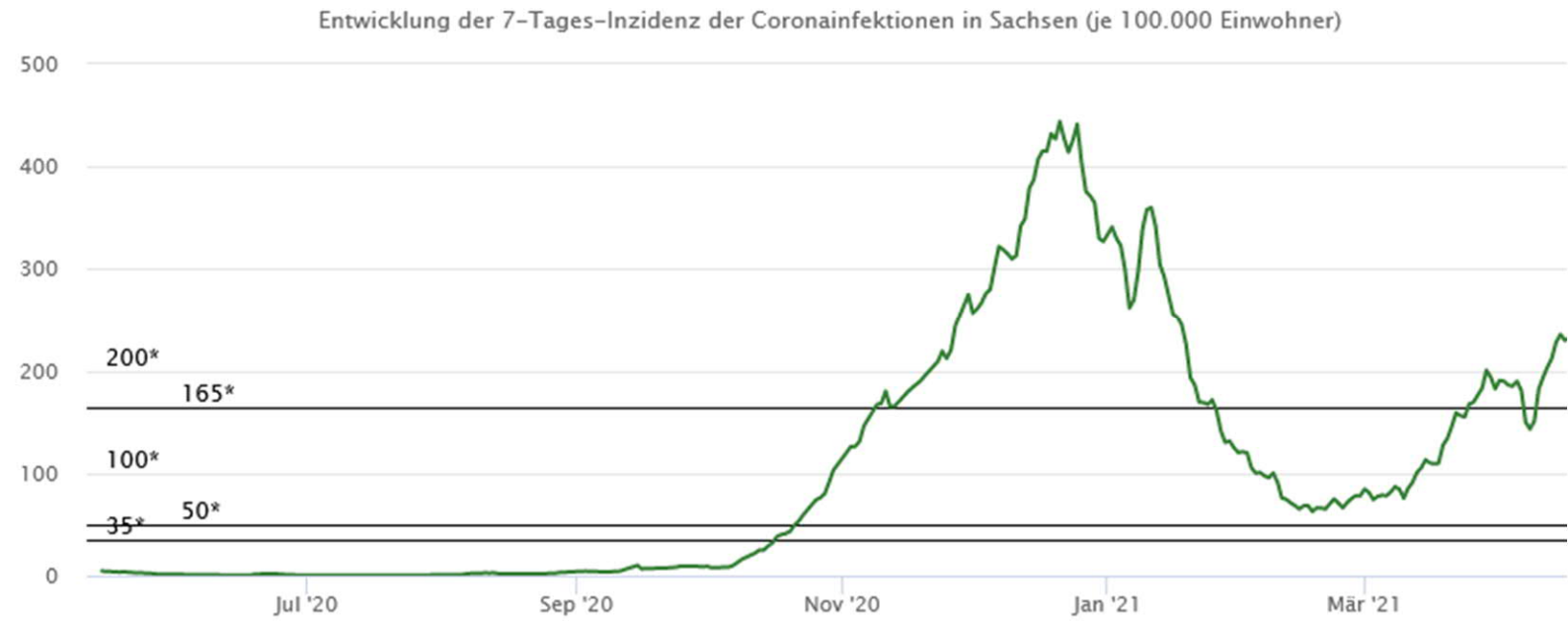

Figure 2: Development of the seven-day COVID-19 incidence in Saxony, Source: (Freistaat Sachsen, 2021b)

The COVID-19 vaccination campaign in Saxony started, as in the rest of Germany, after Christmas 2020. Since than 1,000,144 citizens of Saxony have received at least one vaccination by the 29th April 2021. This translates to a population share of 24.6%, making Saxony the German federal state with the lowest relative vaccination rate at the end of April 2021 (Bundesministerium für Gesundheit, 2021).

By the end of April 2021 263,176 people in Saxony have been proven to be infected with COVID-19 and 9,100 have been died with the disease. This translates to a fatality rate of 3.5% among the people who have been diagnosed with COVID-19 (Freistaat Sachsen, 2021b). Given this high number of fatalities it is self-evident that Saxony is currently seriously affected by the ongoing COVID-19 disaster.

3. State of the Art

The following chapters outlines the state of the art regarding existing research on social vulnerability in German regarding the Elbe flooding in Dresden in 2002, 2006 and 2013 as well as the ongoing COVID-19 pandemic. It closes with a short section on vulnerability related research on Germany from previous BuildERS research activities in other WPs.

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3.1. The consideration of vulnerability in the assessment of the Elbe flooding

The flooding of 2002

The Elbe flooding in August 2002 sparked intense efforts to re-evaluate and to improve the disaster response capacities in the affected federal states. In its aftermath both the state government of the Free State of Saxony and the German Committee for Disaster Reduction e.V. (DKKV) closely investigated the circumstances that allowed it to happen and made recommendations on how the protection against similar future events could be improved (Deutsches Komitee für Katastrophenvorsorge, 2003; Kirchbach, H. P., Franke, S. & Biele, 2002).

In their detailed report, Kirchbach, Franke & Biele (2002) provided an extensive overview of the legal, administrative and historical context within which the flood took place, and how the different involved government agencies and relief organizations reacted to it. They also derived some recommendations regarding potential improvements for future disaster preparation and management from their analysis. Their major focus was on the need for measures that are aimed towards the improvement of the coordination between different agencies and aid forces and the centralized leadership of these actors as well as technical flood prevention measures (Kirchbach, H. P., Franke, S. & Biele, 2002, p. 227).

They also provided some recommendations that aimed towards improving direct interactions with the population. One important recommendation concerned the lack of a state-wide emergency warning system in order to create a general capability of the state to warn its citizen about dangers, also by making sure that emergency agencies have access to the media for information purposes (pp. 227-228 & 247). Regarding the evacuation of local populations that were severely threatened by the flood, the report generally focused on the overall well-functioning evacuation and rescue of the general population. But it also scrutinized the lack of evacuation plans for many hospitals and recommended to evacuate retirement and nursing homes to specially prepared emergency shelters (pp. 228-229 & 245-246). While the implementation of all these measures surely would benefit the protection of the general population, and therefore also those most vulnerable, no special consideration of the needs of these individuals were made, as the authors chose a more general analytical approach.

Other measures proposed by the authors of the DKKV (2003) focus on the involvement of the public in the planning and discussion of disaster protection concepts. This includes strengthening the private personal provision in the form of building, financial (insurance-based), and behavioural risk provisioning. In order to empower people to take preventive measures, they need to be informed about the risks they are facing and need to get timely and informative warnings about incoming floods (Deutsches Komitee für Katastrophenvorsorge, 2003, 6 & 20-21)

The central aim of the DKKV (2003) report was to encourage a new risk culture in the context of handling flooding events that accepts the regular occurrence of floods and aims on acknowledging existing risks and continuously analyses and tries to reduce and handling them. This strategy also strives to establish a closer collaboration of disaster preparedness and management. It also understands vulnerability as a defining aspect of risk, namely how susceptible victims are to the effects of a disaster (Deutsches Komitee für Katastrophenvorsorge, 2003, pp. 8–9). Many of their recommendations encouraged the government to take actions in order to reduce the impact of future

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floods, starting with emphasizing the importance of developing an interdisciplinary, area-oriented risk management system, that allows for balancing interests of different policy areas.

The flooding of 2013

After the second "flood of the century" in only eleven years has hit Saxony in 2013, the DKKV (2015) again investigated how the damage of the disaster could have been reduced and how similar events in the future can be managed better.

Overall, the report concluded that most recommendations made by the report from 2013 were implemented and that the accompanying problems therefore were reduced since the last huge flood. This development made it possible that the disaster management during the flood of 2013 significantly improved and that the negative impact and damaged caused by the newer flood was reduced compared to 2002 (Deutsches Komitee Katastrophenvorsorge, 2015).

The authors identified two factors that determine whether people implement private provisions or not: their risk awareness and particularly whether they think their measures are effective against floods. While most people that are threatened by floods were aware of the risk in 2013, only half of them were convinced that the measures taken by them are effective. Because of this, and to further improve public risk awareness, additional and sustained information campaigns are needed. Furthermore, the authors also advised to take private provisions into account as part of public planning and to keep in mind that floods can also cause non-material damages to the physical and psychological health of their victims. Interestingly, the heterogeneity of the public and that different groups having different needs and capabilities for making provisions was also pointed out. The authors thereby hinted at the differing vulnerability of population groups (pp. 92-120).

Significant improvements have been implemented regarding the communication capabilities and behaviour of official actors. While the prediction and warning capabilities of the German public authorities had been subjected to strong criticism in the report from 2002, the DKKV notes that by 2013 the quality of the predictions and warnings have continuously improved. Communication, predictions and warning became more centralized than before and made use of modern communication technologies, like social media, and a wide range of more traditional media channels. This development enabled emergency services to reach a wider range of varying groups and significantly improved the knowledge of the population about ways to react to flooding and gave them more time to prepare for them. At the same time, the authors still did not pay special consideration to vulnerable groups (even though reports such as Bachmann (2013)presented a highly problematic view on the recognition of deaf people (2013)) regarding possible ways to reach them and how well they were informed in 2013 (pp. 123-142). Also, most disaster information systems in Germany, like SatWaS and MoWaS didn't consider the particular needs of deaf people and therefore aren't suited to reach them. This deficit was also illustrated by the frequent lack of sign-languages interpreters or even subtitles during television broadcast with crisis related news (Bachmann, 2013, pp. 20–26).

Regarding the coordination and communication between and within the emergency services improvements were noted, but the author noted that much potential for further improvements remains (Deutsches Komitee Katastrophenvorsorge, 2015, 158-159 & 168-169). Furthermore, it was also pointed out, that while citizens were included in the planning and approval process for the implementation of new flood prevention measures, their participation was limited to giving input on

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how an already scheduled measure should be implemented, without being included in the decision process whether the measure is necessary and desirable at all.

The authors of the DKKV study didn't made any special recommendations regarding any specific needs for assistance by individuals which were more vulnerable to the events, aside from their more general recommendations. But they developed some considerations that can be understood as starting points for the development of flood prevention measures specifically aimed on vulnerable people. While reviewing the evacuations that took place during the 2013 flood the report pointed out, that relief organisations criticized the lack of available support capacities for the evacuated people, so that they can adequately care for the evacuees. It also noted the importance of adequate long-term psycho-social support for the flood victims. Further, the authors also pointed out the importance of keeping the needs of "special groups like elderly, sick or people in need of nursing care" especially in mind. In this regard for instance, they concluded that when addressing the public, officials should keep the heterogeneity of the general population in mind and should adapt their communication strategy (particularly regarding their wording and the medium used to reach their addressee) accordingly. The same principles should also be expanded to information that are communicated to the public before and during a crisis (pp. 189-190). Finally, the authors also pointed out that, as an overarching principle, hazard and risk analyses should always be kept up-to-date and continuously monitored in order to adapt them to new social and natural developments, like the ongoing climate- and demographic change. In addition, implemented measures should also be kept sufficiently flexible to adapt them to new evaluations. Thereby, the DKKV also implicitly kept the possibility open to adapt its recommendations to include a stronger focus on the most vulnerable individuals.

It can be argued that the lack of interest in the needs of the most vulnerable is specific to the reports on the causes and impacts of the flood catastrophes due to their particular focus. But this assumption can be refuted by considering the general disaster guide of the German Federal Government (BBK, 2018). This guide considers multiple natural and man-made disasters, like power outages, fire, the release of chemical, biological and nuclear hazardous substances, and, at length, flooding events. It provides its readers with a guideline on how they could prepare themselves for such disasters, how they should behave and react during the disasters and, at least in case of flooding, what they should do in the immediate aftermath of them. Throughout the whole length it focuses on recommendations that builds on an image of society that assumes able-bodied persons with sufficient financial resources and good German language skills as its reader. Only while discussing the threat posed by a fire the guide briefly considers the special needs of persons with disabilities and of deaf persons in particular (Gabel, 2019). But its recommendations are limited to advising those concerned to request special assistance while evacuating and to buy a fire detector with an integrated flashing light, respectively (BBK, 2018, pp. 48–49). Overall, the guideline gives the heterogenous distribution of vulnerability in society only a passing and perfunctory consideration. In addition, there are no other accompanying publications, that especially focuses on the needs of vulnerable population groups. It thereby documents the currently still lacking awareness of public disaster management agencies for the needs of especially vulnerable persons.

Research on vulnerability after 2013

While the official reports on the flood disasters of 2002 and 2013 by the DKKV (2003; 2015) and Kirchbach, H. P., Franke, S. and Biele (2002) and many other agencies so far have not paid any particular interest to most vulnerable populations and little attention on the factors which constitute individual vulnerabilities (they rather have built upon findings of other international studies which refer

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to certain vulnerable groups), the events raised interest in studying vulnerability on an individual level. For instance, the German Red Cross (GRC) has followed through with two projects that focused particularly on potential ways to improve disaster management capabilities regarding particularly vulnerable groups: INVOLVE and KOPHIS.

INVOLVE was launched in 2015 based on requests made by members of the GRC to increase research on "Strengthening the Resilience and Self-Help Capacities of the Population through Disaster Management". Because the concept of resilience is closely associated with the concept of vulnerability, increasing the resilience of the population against hazards can, to a certain extent, also be understood as a reduction of their vulnerability in this regard (Deutsches Rotes Kreuz e.V., 2017, pp. 7–8). Three topics central to strengthening resilience and self-help capacities were identified. The first major factor was the availability of a sufficient number of volunteers that are willing to help in case of a disaster. This need is already addressed by multiple efforts that aim on recruiting new disaster management volunteers from social groups that are still underrepresented in as volunteers and by efforts to improve the inclusion of new forms of volunteering (like unaffiliated volunteers) in disaster management efforts (Deutsches Rotes Kreuz e.V., 2017, pp. 15–18). As the second factor, knowledge about the target groups of disaster assistance and their needs was identified. This factor for increasing resilience can be outlined by two key questions: "Who needs help when crises and disaster strikes?" and "What are the needs of the people affected by crises and disaster?" (Deutsches Rotes Kreuz e.V., 2017, p. 19). Furthermore, the GRC also stresses the need to assess the actual needs of individuals in society and not simply base their need assessment on the assumptions of the helpers. Therefore, the assessment of vulnerabilities and needs was aimed to include different population groups, which was not a standard procedure of disaster management so far (Deutsches Rotes Kreuz e.V., 2017, pp. 18–20). The third and final important factor identified during the INVOLVE project was the existence of social networks that connect different locally relevant actors of disaster management. It should in particular facilitate the connection between the different areas of operation within an organisation, the connection with other organisations working on disaster managements and with organisations working with people that are most vulnerable (for example health providers and nursing services (Deutsches Rotes Kreuz e.V., 2017, 21, 30-31). Based on this, INVOLVE identified two key components for future disaster management. On the one hand it should particularly focus on intensifying networks of disaster management structures with external actors before a disaster occurs to improve their knowledge about the needs of people potentially affected. This enables the services to provide affected population groups with the help they require and improves their capacity for self-help. On the other hand, the implementation of a social space analysis was emphasized. Through the analysis emergency services can gain a comprehensive overview of the needs of the population living in a certain area in case of a disaster, but also of the potentially useful skills and resources of the residents (Deutsches Rotes Kreuz e.V., 2017, p. 38).

KOPHIS was inspired by the observation of members of the emergency services involved in the disaster response to the flood from 2013, that the rescue, evacuation, and support of older people receiving ambulatory care at home proved particularly difficult during the disaster. The reason for this complication was the unavailability of information regarding their total number within a certain area, their address, and their needs. KOPHIS strived to address these challenges and thereby improve the support of care recipients during future disasters (Deutsches Rotes Kreuz, 2018, 7 & 9-10). A first step in decreasing the vulnerability of the elderly and care recipients was to raise awareness on the risk for disasters and to develop and prepare emergency plans in order to increase their resilience (p.20). But because of high level of technological dependency of these individuals, the common lack of available nursing staff, and frequent communication problems with the available staff due to

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language barriers – a large portion of German care workers come from other countries – the high physical vulnerability of those individuals often makes quick assistance by disaster services a necessity (p. 20-21). Furthermore, their needs are also often overlooked during crises and they are also disproportionally often affected by poverty, thereby further reducing their capability to prepare for disasters (pp. 22-26). Due to their increased vulnerability, their growing number, the limited resources of emergency services, and the lack of preparations elderly and care recipients disproportionally often became victims of disasters. This was also the case during the floods in 2002 and 2013 in Germany. The research of KOPHIS is continued by the currently ongoing project AUPIK.

All three projects, INVOLVE, KOPHIS and AUPIK emphasised the importance of taking a closer look on vulnerability not only of certain groups but especially within them to find out more about the heterogeneity of these groups.

3.2. Vulnerability in current COVID-19 pandemic related studies

COVID-19 and the measures to contain the pandemic affect all people in Germany to a greater or lesser extent. The pandemic makes it clear that “vulnerability is general and concrete at the same time – that it affects everyone on the one hand, but by no means everyone equally on the other" (Lessenich, 2020, p. 460). Vulnerability research finally came to a new attention during the current COVID-19 crisis. Not only that on a practically level recommendations for instance on the broad inclusion of sign language interpreters was taken up (NDR, 2020), also on a research level social vulnerability got scrutinized once again. Regarding the question of who is particularly affected, there has been much public talk about risk groups, vulnerability and vulnerable groups. However, this primarily refers to the elderly and people with pre-existing conditions; others, such as refugees or poor people, are less often brought into focus. Current research shows that migrants and refugees in particular have become vulnerable as a result of the crisis; they are more frequently affected by unemployment, precarious working and housing conditions increase the risk of infection and social services fail (Falkenhain et al., 2021; Giesing & Hofbauer Pérez, 2020; Hövermann, 2020). As a result of the pandemic and the associated containment measures, schools were closed and responsibility for education increasingly shifted to the private sector. This leads to a particular burden on children and young people, but also on women, who do even less paid work and even more care work during the time of the pandemic than before and are thus also burdened by financial worries (Allmendinger, 2020; Globisch & Osiander, 2020; Hövermann, 2020; Jentsch & Schnock, 2020; Kohlrausch & Zucco, 2020). However, there are also indications that men are sometimes more involved in childcare than before the pandemic (Globisch & Osiander, 2020). People with low household incomes and low levels of education, as well as people in atypical employment, are particularly affected by worries and financial losses (Hövermann, 2020). People from disadvantaged backgrounds are more frequently exposed to the COVID-19 virus due to their working and living conditions and suffer more frequently from severe courses of infection due to previous illnesses and precarious working and living conditions (Hövermann, 2020; Wahrendorf et al., 2020). Unemployed people had to be treated in hospital more often than employed people (Dragano et al., 2020). However, this is not inherent to the groups themselves; rather, due to structural social inequalities, these people are already in a life situation before crises, which is characterised by increased vulnerability. This can then be exacerbated by a corresponding crisis, so that people have a higher risk of becoming vulnerable. This happens especially if no political or crisis management measures are taken against it. The effects of the pandemic and the measures to contain it are thus highly socially unevenly distributed. Butterwegge (2020, p. 499) examined different levels of affectedness or impact of the pandemic

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(effect of the pandemic, of the recession exacerbated by lockdown, etc., as well as effect of state aid) and concludes that "the groups of people hardest hit by the COVID-19 pandemic [are] only marginally considered in the state aid packages – if at all". Building on these observations, Lessenich (2020, p. 459) argues, following Judith Butler, that the socio-political sovereign "makes the symbolic decision as to who can be considered vulnerable" and that "what is responded to with vulnerability policies of all kinds does not correspond at all to what those affected would say if they were asked" (ibid., p. 460).

3.3. Vulnerability related research regarding disaster management in Germany from the BuildERS context

In addition to these studies on the Elbe flooding of 2002, 2006 and 2013, and the ongoing COVID-19 pandemic, the German case study builds on empirical works performed in WP2 of the BuildERS project. Here in D2.2 “Case Country Analyses and a cross-country comparative Analysis of the Functioning of Disaster Resilience Systems” experts from different contexts of the German disaster management were interviewed regarding their understanding of the vulnerability concept and its implementation into practice. In this report the authors documented, that the risk assessment regarding vulnerable groups is still in its early stages in Germany and that the relevant authorities are also only beginning to develop adequate emergency plans that take vulnerable groups sufficiently into account (Orru et al., 2020, p. 28; Orru et al., 2021). Furthermore, not much emphasis is placed on the establishment of pre-crisis social networks for vulnerable groups, despite them being a key component for a successful crisis response (Orru et al., 2020, 37, 42; Orru et al., 2021). Still, the authors also identified some improvements regarding state actions that are aimed to assist vulnerable groups during disaster. On the one hand, the communication with vulnerable groups, while still often being deficient, experienced significant improvements in recent years. Furthermore, the authors also note that the German government has published a “guideline for assessing individual vulnerability to heat waves, heavy rains and floods at a community level” (Orru et al., 2020, p. 32). But it remains unclear how and even if these guidelines were used in practice. Furthermore, no comprehensive database on vulnerable persons exists in Germany due to data protection reasons.

This lacking attention to the needs of those most vulnerable, and in particularly to the needs of people with disabilities – which are highly neglected in current German disaster management (Committee on the Rights of Person with Disabilities, 2015) – documented in the above listed sources is particularly remarkable because already back in 2014 the Council of Europe published its “Guidelines for Assisting People with Disabilities during Emergencies, Crises and Disasters” (D. Alexander & Sagramola, 2014), in which the recommendations of the European Disability Action Plan were summarized. These guidelines were unequivocal in their demand that an action plan for the equal treatment of people with disabilities, and also the elderly, during all phases of disaster preparation, management, mitigation, and the rebuilding process afterwards must be developed and implemented. But based on the previous literature review it appears that these recommendations so far were not implemented in practice.

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4. Methodology

The following chapter will present the research design and research questions as well as the relevant concepts of the theoretical framework. Following that, the research methods will be described.

4.1. Research Design

The BuildERS project aims to strengthen societal resilience, especially of the most vulnerable groups against natural and man-made hazards. When people with a high risk of becoming vulnerable are excluded from emergency plans or policy measures to combat a crisis, their vulnerability increases. Therefore, it is crucial to explore who exactly is vulnerable and why individuals become vulnerable. Which situation need to be changed? In order to contribute to this goal, the German case study "Lessons learned from Flooding Disasters during 2002, 2006 and 2013 with special focus in underprivileged groups in urban (Dresden) and non-urban environments (in the State of Saxony)" was extended to include the COVID-19 pandemic. This allows for a comparison of both crises and an investigation of the role of social capital for disaster resilience and vulnerability more thoroughly.

In line with D1.2 of the BuildERS project, vulnerability represents the idea, that disasters are not only the result of a hazard but of its interplay with a society or individual, which is appropriately prepared to deal with this threat. It is a multidimensional and intersectional concept. Every individual is potentially vulnerable depending on the situation a person is in. Therefore, we want to focus on “vulnerable situations“ (according to Wisner et al. (2004)). Speaking of “vulnerable situations“ allows for influencing the situation during an earlier stage. At the same time, recent studies show that there are individuals who will very likely be vulnerable in a multiplicity of situations. Respectively, the argument goes that there are factors, which contribute to persons having a higher risk of being vulnerable (e.g. elderly, children, persons with disabilities) (Gullette, 2006; Sparf, 2016). Combining both, the German case study follows a critical approach to existing ideas about those who are considered vulnerable by different actors. Our aim is to get to know the unknown, to find out, whose needs were not addressed by authorities, who is considered vulnerable and what makes them vulnerable.

Aiming to achieve this, the German case study consists of two parts: a qualitative research part and a quantitative research part. The qualitative part focuses on vulnerability and explores who is vulnerable and the reasons influencing this from the perspective of experts. The quantitative part systematically examines the relationships between disaster types, the ability of affected people to deal with different types of disasters, vulnerability and resilience, social capital and socio-demographic factors. The survey is directed at the citizens of Dresden and the surrounding area. This division of the study into two parts is intended to address different target groups and to complement the results on to limit possible blind spots of the researchers. The next part of this chapter will present how the relevant concepts were operationalized in both parts of the case study, as well as a description of the implementation and methods.

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Table 1: Overview of both studies, Source: Own table

Qualitative Study	**Quantitative Study**
Explorative interviews	Web based survey
Open-ended questionnaire	Predominantly closed survey questions
20 interviews	118 valid questionnaires
Interviewees are experts from disaster management agencies, city administration, social service departments as well as social service providers	Participants are recruited from the general population of the area of interest who survived the flooding in 2013 and the current COVID-19 pandemic
Explores the intersectionality of vulnerability; what makes people vulnerable and who is vulnerable	Explores associations between vulnerability, resilience, social capital and risk perception

4.2. Theoretical Concepts of the BuildERS framework and their operationalisation

Vulnerability:

Following the theoretical framework of D1.2, we assume that people are not vulnerable per se due to certain stable characteristics, but rather that vulnerability occurs situationally due to various factors in interaction with actual exposure. We understand vulnerability as "a condition that can be found at a particular point in time and is the consequence of historical and ongoing societal forces that create a disproportionate potential of loss, and also for experiencing poorer outcomes as a result of loss" (Tierney, 2019, p. 125). This means that there may be people who are at higher risk of becoming vulnerable. However, this is not essential and has emerged from historically developed societal (inequality) structures. When social circumstances change, who is vulnerable individuals also change. Vulnerability is therefore dynamic and changeable. This intersectional understanding of vulnerability makes it possible to explore differences in vulnerability within a specific group, such as people with disabilities. We examine this contextuality and intersectionality of vulnerability precisely in our study.

We aim for scrutinizing existing ascriptions of vulnerability and finding out who is vulnerable in what situation in the qualitative part of our study. An open-ended questionnaire, where we address vulnerability from different angles/perspectives focuses on the situational aspect. The structure of the open-ended questionnaire allows interviewees to verbalize their own experiences of occurring problems and the reasons why they occur without restricting them by a specific understanding of vulnerability or who is vulnerable. To allow interviewees to report experiences and issues relevant to them, we ask open-ended questions about their experiences with crises. We approach the phenomenon of vulnerability at different levels: First, the open-ended questionnaire **focuses on the problems** that occurred. Subsequent **questions focus on the need for help** and the question of **who was vulnerable**. In the further course, we ask about **the situations and life circumstances** that make people vulnerable. After exploring different facets of vulnerability with the interviewees, the open-ended questionnaire moves to dealing with the response to the disaster: We ask about the

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assistance provided and explore the **strengths and weaknesses in dealing with vulnerability-enhancing situations** by asking what went well or poorly in dealing with particularly hard-hit people during the crisis. This complex also includes questions about collaboration with other actors (all of the above questions are asked first in relation to the flood and then in relation to the pandemic). Thus, in addition to the various facets of vulnerability, the questionnaire sheds light on the extent to which disaster management was mindful of the previously described problems and able to cope with them in rescue measures as well as the strategy for coping with the disaster. Subsequently, the open-ended questionnaire moves on to look at a more general/abstract level. Interviewees are asked about their opinion on people they mentioned earlier (exemplary living situations, which the interviewees addressed in their narrative, are mentioned) being referred to as vulnerable in research and public debate. This question focuses on what interviewees understand by vulnerability, who they describe as vulnerable, and what makes people particularly vulnerable. In doing so, the **intersectionality** and **contextuality of vulnerability** is addressed. To correct the researchers' own blind spots in their perspective, the interviewees are asked whether there are people or living situations that they experienced as being vulnerable who have been hardly featured in the public debate so far. This question aims to open up and correct the researchers' perspective since this can generate clues as to which vulnerable situations are not seen. By selecting our interviewees not only from disaster management and city administration, but also from social services, the study tries to make those visible who often remain invisible in the discourse around vulnerability and disasters. New knowledge about vulnerabilities can be generated through this. The interviews conclude questions about what the interviewees would like to see when they think about society's approach to disasters and whether anything has yet to be addressed that they consider important. This conclusion places the focus once again on the things that the interviewees experience as relevant. Thus, this question also serves as a corrective to the researcher's perspective. To reduce prejudices, stereotypes and biases we aimed to avoid the term vulnerability as much as possible and substitute it with a focus on specific situations and challenges people have to overcome.

With the quantitative part of the study, we also involve the general population to minimize blind spots and provide visibility to often overlooked vulnerabilities through the research. In the survey, we differentiate between objective sociodemographic variables that can influence the risk of being vulnerable (e.g., the age of respondents) and less tangible factors contributing to the vulnerability in the face of disasters (e.g., the strength of a local social network a person can rely upon in times of disasters). With that, we open up the definition of vulnerability and focus on how the ‘objective’ description of vulnerability factors might not overlap with experienced vulnerability.

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The data analysis of the German case study is further influenced by the work of Orru et al. (2021) on the conceptual dimensions of 'social vulnerability' in disaster management.

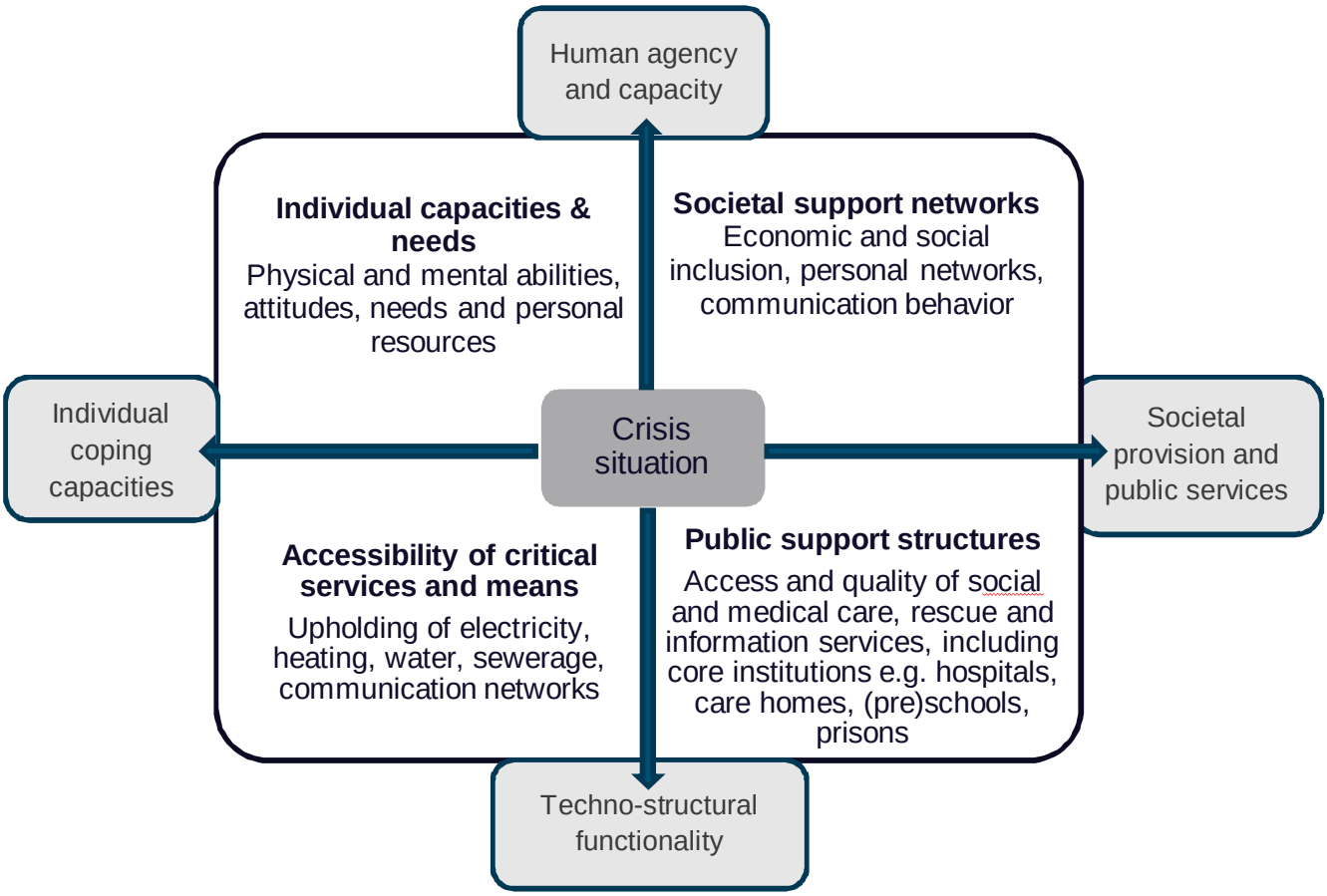

Figure 3: Conceptual dimensions of 'social vulnerability' in disaster management, Source: (Orru et al., 2021)

In their paper, Orru et al. (2021) state, that the vulnerability of a person differs greatly across different disaster types and is caused by the social context the individual is embedded in. These contextual dependencies can be differentiated in four conceptional dimensions along two axes: The two poles of the first axis are "individual coping capacities" and "societal provisions & public service". The poles on the second axis are "human agency & capacity" and "techno-structural functionality". The first conceptual dimension of Orru et al. (2021) is the *Individual capacities & needs*-dimension, which focuses on the "the physical, emotional and mental condition, skills and personal resources" of individuals and is characterized by combining the level of "human agency and capacity" as well as the "individual coping capacities" present in a person. The second dimension is the *Social support networks*-dimension, which primarily describes the "Economic and social inclusion, personal networks, communication behaviour". It represents the level of both "human agency and capacity" and "societal provision and public services" an individual has access to. The third conceptual dimension is the *Accessibility of critical services and means*, which describes the capability to uphold "electricity, heating, water, sewerage and communication networks". This dimension is located at the intersecting point of both "individual coping capacities" and the "Techno-structural functionality" of a society. Finally, the last conceptual vulnerability dimension outlined by Orru et al. (2021) are *Public support structures*. In their framework this dimension is concerned with the "Access and quality of social and medical care, rescue and information services, including core institutions e.g. hospitals, care homes, (pre)schools, prisons…" and is placed at the intersection of the "Techno-structural

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functionality" of a society and its "Societal provision and public services". Within this case study Orru et al.'s framework was used to structure the data analysis as well as the presentation of the results in chapter 4.

Resilience

Resilience is derived from the Latin word *resilire*, which means to bounce back, jump back (D. E. Alexander, 2013). In psychology, it is used to describe the ability to adapt and deal with difficult events. However, the concept is not limited to the mental state of individuals, but is also used to describe the adaptability and resources in dealing with crises of organizations, societies, etc. As Dunn Cavelty et al. (2015, pp. 3–4) point out, "Resilience is mysterious: she can be in many places at the same time, takes on various forms, slips into different subject-bodies, and eludes clearly-defined dimensions of time – some say she is only ever emergent in essence. She is a typical postmodern heroine, existing in different universes, with various stories of origin – her multiple personalities imbue different characteristics, normative concepts, and ways of interacting with subjects". Similarly to vulnerability, resilience is considered a dynamic concept within the German case study. In this regard, specific measures to increase resilience might not benefit everyone and might even raise new challenges for others. Therefore, we understand the importance of scrutinizing existing measures in order to increase resilience and improve the ability of citizens to use them.

In the interviews we ask about what works well in the crisis regarding people in vulnerable situations and how circumstances lead to being vulnerable. This also triggers answers about circumstances that make people resilient.

In the survey, resilience is measured through 1) the types and scale of preparations the persons who survived had made before an event. 2) how well they were informed about the disaster risks existing in their living area, and 3) the amount of resources they could draw from to cope with catastrophe impacts. Their resilience in the aftermath of a disaster will be measured through 1) the respondents' ability to recover from catastrophe consequences, and 2) proficiency in overcoming all negative effects of the event. All the data is interpreted with the BuildERS resilience concept in mind. We ask for example about the preparations taken and about the reasons behind them not preparing (e.g., financial and not enough space), which connects to the criticized perspective on resilience often being used as a neoliberal concept.

Social capital

Social capital and especially social networks are an important complex that influences vulnerability. In our study, we also focus on economic capital, which is related to social capital. Bourdieu defines social capital as "the aggregate of the actual or potential resources which are linked to a durable network of more or less institutionalized relationships of mutual acquaintance or recognition" (Bourdieu, 1997, p. 51). Social capital is unequally distributed according to the inequality structures of a society and is not equally accessible to all. Social capital is also strongly influenced by context. Social capital works through and circulates through social networks (Aldrich, 2012, p. 30). A distinction between *bonding*, *bridging* and *linking* social capital can be drawn (Lindberg Falk, 2017, p. 29). *Bonding* social capital refers to close emotional relationships with others, such as friends or family. *Bridging* social capital connects people across different groups, for example ethnic or economic groups. *Linking* social capital describes the connection of citizens with people who hold positions of power and can thus influence the distribution of resources (Aldrich, 2011, 83f.). Social networks and

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social capital can be important resources in the event of a disaster, but they are not equally accessible to everyone. Thus, they can further reinforce social inequality.

In the qualitative part, we ask the experts with great openness, so they can show us which factors they observe as a relevant influence for vulnerability. We do not explicitly ask about social capital, but it has been addressed as an important factor influencing vulnerability in almost all interviews. Social networks came up repeatedly as a relevant vulnerability factor in the qualitative part of the study and were systematically examined in the quantitative part.

In the quantitative part, we focus more explicitly on social capital. We have multiple survey questions that focus on the different levels of social capital which can be found in ongoing discourses on social capital, such as economic, cultural, social and symbolic capital. Social Capital is operationalized in terms of for instance 1) physical distance the survey participants have to cross to reach the next person able to support them, 2) their opinions about the willingness of friends, neighbours and family to help in case of a disaster and 3) their social standing within the community.

Risk awareness and risk preparedness

Risk awareness and risk preparedness are also factors influencing vulnerability and resilience: people have to get information about risks and crises and they have to understand them and be able to act on them. Especially the latter aspect is of importance here, as in our view one can distinguish between (a) a conscious ignorance of risk and (b) the inability to act according to a known risk.

In terms of its operationalization, we did not specifically for risk awareness in the open-ended questionnaire, but it has come up as something that can have great influence and is connected to social inequalities.

In the survey risk awareness is assessed by asking about known risks of potential disasters at the respondents' place of residence and whether respondents had access to information about how to prepare themselves. In addition, it is also asked whether they were informed about the appropriate behaviour during a disaster beforehand.

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Table 2: Summary of operationalisation of theoretical concepts, Source: Own table

	Qualitative Study	**Quantitative Study**
Vulnerability	Asks for: • Occuring problems • Need for help • Who was/is vulnerable • What situations and life circumstances influence vulnerability • Assistance that was provided • Strengths and weaknesses in dealing with vulnerability-enhancing situations	Asks for: • Sociodemographic variables that can influence the risk of being vulnerable • Factors that can influence vulnerability, for example social capital
Resilience	Asks for: • What works well in crises for people in vulnerable situations • Questions about vulnerability also triggers answers on what makes people resilient	Asks for: • Types and scale of preparation • Received information on disaster risks • Amount of resources to cope with crisis • Ability to recover from crisis • Proficiency in overcoming negative effects of crisis
Social capital	Does not ask specifically for social capital, explores the topic when it came up. Interviewees addressed the relevance of social capital and social networks.	Asks for: • Physical distance to the next person able to give support • Their assessment on willingness of friends, family and neighbours to give help in crisis • Social standing within the community
Risk awareness and risk preparedness	Does not ask specifically for social capital, explores the topic when it came up. Interviewees addressed the influence on vulnerability and connection to social inequalities	Asks for: • Known risks of potential disaster • Access to information about measures to prepare • Received information about appropriate behaviour during disaster

4.3. Collection and analysis of the qualitative data

Since our study investigated two events that took place at different points in time, and also due to our research interest, we chose to conduct interviews. Through open qualitative research, we wanted to allow interviewees to focus on the issues they find relevant in the context of our research questions (Flick et al., 2017, 22ff.; Flick, 2017, 26ff.; Strübing, 2013, 18ff.). This allows researchers to generate new knowledge and be surprised by field experiences. The processuality of qualitative research was particularly interesting for our study as the collection of interviews took place over several months. As

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a result, some interviews were conducted at a time when COVID-19 cases were relatively low and others when cases were very high. Accordingly, there were also varying degrees of constraints at the various times of interview. Reflexivity refers to the fact that, "depending on the frame of reference, a situation, an object, or an utterance is interpreted differently" (Strübing, 2013, p. 21). Correspondingly, statements in interviews must be interpreted in their respective context.

The sample of the case study was spatially limited to Dresden and the surrounding area. We followed the theoretical sampling method developed by Glaser and Strauss (1967). Although we pre-structured the selection of the interview partners with the help of relevant criteria, we did not determine the interview partners a priori. To learn who was/is vulnerable during the crises and to find out more about the life situation of these people we interviewed 20 people from three sectors:

- From **disaster management** (administrators as well as people working for organizations such as GRC) (7 people),
- from **city/county administrations** (4 people),
- and **social service providers** (9 people).

Interview partners were found through the referral of the GRC, online research and referral of other interview partners. According to their fields of work, the interviewees have different perspectives on disasters and people who are vulnerable. Some of the interviewees experienced both crises (and were involved in disaster management), while others were only able to report on the COVID-19 pandemic. The diversity of interviewees should help supplement blind spots in disaster management perspectives and allow us to focus on those not yet considered in disaster management. Overall, the recruitment of interviewees proved difficult: the pandemic massively increased the volume of work in all three areas mentioned above, and there were some people who were unable to participate in our study due to capacity constraints. For this reason, the time period for conducting the interviews has been delayed and extended. While the pandemic is very recent, the floods happened a long time ago. Accordingly, all interviewees could tell something about the situation during the pandemic, but only some could tell us about the situation during the floods. Those who witnessed the floods remembered them surprisingly well and could tell quite a bit about them. Nevertheless, one must keep in mind that these memories have settled over the years and are framed from today's perspective. An interesting fact about the sample is that it consisted of ¼ male and ¾ female interviewees. The interviewees from disaster management were almost all male. This may be a coincidence or due to the fact that disaster management in Germany tends to be male dominated. It was not possible for us to interview people from social services providing psychological support, such as crisis hotlines, as their capacities were extremely limited due to the increased number of people needing help during the pandemic. That said, the people we interviewed represent a broad spectrum in terms of their work with people in vulnerable situations. The areas in which they work include complexes such as addiction, homelessness, domestic violence victims and women's counselling as well as single parents, family support, help for children and youth, migration, inclusion of people with disabilities, as well as relevant contacts within the administration and people working directly in disaster management. Due to this sample, which does not include all vulnerable living situations (i.e., people who are institutionalized, people in jail), limitations of our study arise.

The data collection was carried out by means of semi-structured expert interviews. "Open-ended interviews require [...] engagement on the part of the subject and the researcher" and they are "linked to a degree of disclosure of one's own everyday life for the participants that is hardly manageable in

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advance" (Flick, 2017, p. 142). Interviews with an open-ended questionnaire were chosen because they are well suited for research interests "that relate to specific professional and everyday practices, whose representation is to be grasped primarily through the mode of description and argumentation, and where it is important that certain areas are dealt with in detail in each case" (Przyborski & Wohlrab-Sahr, 2014, 126f.). The interviewees were told about the research interest and received information about the BuildERS project in advance[1]. We gave a more detailed overview of the topic complexes to those who inquired about the questions which would be asked in the interview. This was especially important for the interview with the hearing employee of a counselling centre for the deaf, who consulted her deaf colleagues in advance and then gave a mix of her colleagues' experiences and her own experiences and observations as a counsellor in the interview. The open-ended questionnaire was pre-structured in terms of content from the "general to the specific" (Przyborski & Wohlrab-Sahr, 2014, p. 140). We developed the open-ended questionnaire using sensitizing concepts found through a literature review and the work of D1.2. After asking interviewees to briefly introduce themselves and their organization, we asked them to think back to the floods (or think about the pandemic) and simply tell us what it was like/what it is like. This request generated a narrative that "optimally presents the interviewer at the beginning with a condensed view of the problem that already contains several problem dimensions" (ibid., p. 140). The interview with an open-ended questionnaire always moves between openness and structure respectively the criterion of openness and the criterion of specificity (Strübing, 2013, p. 92). Further on, the questions on vulnerability presented above were asked. Due to the pandemic, the interviews were conducted by telephone, digitally recorded, and subsequently transcribed. The material was analysed using qualitative content analysis, enriched with Grounded Theory techniques. First, the data was approached using sequential analysis. The interviews were then broken down using a mixture of inductive and deductive category formation. Through inductive category building, codes and categories, such as in vivo codes, were developed from the material through open coding. Guided by the "method of constant comparison" (Strübing, 2010, p. 15), codes became more pointed out and selective. In deductive category formation, pre-determined, theoretically based aspects of evaluation were applied to the material. In Mayring's (2010, p. 58) words, theory is a "system of general propositions about the object under investigation" or "the gained experiences of others about this object." This was based on the theoretical framework of D1.2 and the model of Kati et al. By combining both techniques, a code tree/category system was developed and used for further coding. Relevant text passages were identified and grouped by the corresponding category. An anchor example (Mayring, 2010, p. 65) was assigned to each of the codes, for example a text passage exemplifying this category. In the process of coding, individual codes were added. Through iterative-cyclical procedures (Strübing, 2013, p. 143), connecting elements were elaborated by switching between the analysis of the material, conducting of interviews and examination of relevant theories. During coding, analytical ideas and thoughts were recorded in memos (Strauss & Hildenbrand, 1994, p. 33). Boundaries between the different codes were also recorded in memos. A joint interpretation session with colleagues, established intersubjective comprehensibility and thus ensured the quality of the analysis (Strübing, 2005, p. 326).

[1] The information sheet and the privacy consent sheet can be found in the annex.

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4.4. Collection and analysis of the quantitative data

The quantitative study aimed at supplementing the insights gained by the qualitative analysis by widening the focus of the data collection process. Instead of focusing solely on the input of experts, working for disaster management agencies or state institutions, citizens were also included in order to achieve this. To achieve this aim and to collect the required data, an online survey has been carried out on the survey platform *SoSci Survey*. Before the survey commenced all participants were informed about the subject of the survey, the implementing parties, and the research context of the survey within BuildERS. They were furthermore informed about the publishing and data removal policy of the results and the steps undertaken to ensure anonymity of the participants. To ensure an easy and robust measurement of the variables, the questionnaire consisted of a mixture of items inviting closed-end, half-open and open-end responses with a particular focus on dichotomously coded and Likert-scaled variables. This ensures an easy and robust measurement of the variables of interest and facilitates the quantitative analysis of the association between them (Carifio & Perla, 2007; Norman, 2010). The participants could also skip any question they did not want to answer or explicitly could choose a "Non-Response" answer option.

Recruiting the required number of survey participants was achieved by spreading the survey link and an accompanying call for participation through the usage of the newsletter list of the state association of the German Red Cross in Saxony, the monthly municipal letter of the city of Pirna, and through the online presence of the city of Dresden. These distribution channels were chosen because they made it possible to reach many citizens, originating from differing social strata, in the areas of interest.

While the authors are aware that this self-selecting sample will not be representative for the targeted population and most likely overrepresent people who are particularly interested in disaster related topics (Khazaal et al., 2014), it is still deemed to be a valid and useful approach to creating a first explorative overview of factors potentially contributing to vulnerability as well as resilience and their possible relation to sociodemographic characteristics, given the resource constraints faced by the case study. Of course, conclusions made based on this convenience sample should be checked for their validity regarding the general population through the usage of a representative sample in future research. The questionnaire was online and collected responses from the 11th of December 2020 until the 15th of March 2021. 238 people viewed the survey while 118 participants completed the survey in total and provided valid and complete responses. The largest share of the overall survey attrition occurred early on in the survey with 65 of 120 people who did not finish the survey stopping on the second survey page. This amounts to a usable n of 118 for the quantitative study.

The questionnaire was informed by the five explorative interviews. During its construction, the authors aimed particularly towards including measurement instruments capable of assessing the level of difficulties respondents had to face during flood disasters and the COVID-19 pandemic. It further aimed to include how badly they were affected by the impacts of these two disaster types[2]. In addition, the number and types of challenges faced during the disasters were assessed. These three types of disaster effects were assessed in four dimensions, for both flooding disasters and the current COVID-19 pandemic: The survey questionnaire assessed the financial, physiological and psychological

[2] While the questionnaire also assessed the experiences of participants with other disaster types, like wildfires or winter storms, a preliminary analysis of the results has revealed that only a small number of participants has experienced any other disasters besides floods and the current pandemic. Consequently, no other disaster types were included in the analysis.

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challenges posed by these disasters, as well as the overall experience of participants with the disasters. Furthermore, special attention was given to operationalising the different dimensions of vulnerability and resilience and translating them into suitable indicators. The main sources for the framework underlying the development of the indicators used in the questionnaire were the four dimension of social vulnerability outlined by Orru et al. (2021) and the D1.2 theoretical framework (cf. Kuran et al., 2020). In particular, three of the four dimensions of *social vulnerability* described by Orru et al. (2021) were of interest for the quantitative part of the study and were translated into measurable indicators. The first one was the *Social support networks*-dimensions of vulnerability, which was operationalised by both measuring the social and economic capital held by a respondent (Bourdieu, 1997, p. 57). The relationship of a respondent to their family as well as their neighbours was assessed, their social status within society was asked for and their income was also measured. The second dimension of interest was the *Individual capacities & needs*-dimension, which was operationalized by asking respondents about items measuring their risk awareness and crisis management skills. They were for example asked how many preparational measures they have implemented, how well informed they felt about disaster risks at their place of living and reactions to them and if they volunteer or work in disaster response organizations. The final operationalized vulnerability dimension was the *Public support structures*-dimension. This dimension was operationalized through indicator variables measuring how satisfied respondents were with the official reaction to the two disasters and if they ever experienced difficulties with understanding public disaster warnings due to reasons which were out of the direct control of the warning institution (like technical problems on their part). The methodological framework of an online survey with a self-recruiting sample is ill suited for the assessment of the resilience of critical utilities, like electricity, against disasters in the area of living of the respondents. Therefore, the quantitative part of the German case study did not focus on the *Accessibility of critical services* vulnerability dimension and consequently also did not include indicators operationalizing this dimension in the questionnaire.

The resilience, as measured by the survey, was also defined by these three vulnerability dimensions and only marked with positive denomination. If a respondent displayed characteristics that are associated with a lower level of vulnerability in this dimension, it was assumed that they were better able to resist and overcome challenges posed by disasters in this dimension and were therefore considered less vulnerable and more resilient in this dimension (and vice versa).

Additionally, to the previously outlined variable, socio-demographic variables, like gender, educational background, ownerships of official disability card and comparable indicators were also assessed. Finally, respondents were asked to self-assess their ability to deal with the challenges posed by disasters. In addition, they were asked to rank the following individual characteristics focusing on dealing successfully with disaster: The physiological constitution of a person, their psychological constitution, social network, income level and language skills. During the conceptualization and drafting process of the survey questionnaire multiple pre-existing questionnaires, surveys and suitable questionnaires were used as references (e.g. Steinführer and Kuhlicke (2007) & Contreras and Kienberger (2011)). The questionnaire was thoroughly pretested by six social scientists who were not associated with the case study in order to identify and correct problematic items and definitions. Based on their recommendations the questionnaire was thoroughly updated and finalized before it was put online

A descriptive analysis of variables of interest was carried out as the first analytical step of the data analysis process in order to gain an overview of the distribution of their expressions within the survey sample. With this step during analysis, it was possible to gain an overview of the socio-demographic characteristics present within the sample, how, on average, the floods and pandemic adversities have

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been perceived and how the responses to different facets of *social vulnerability* as well as the assessment questions were distributed within the sample. In order to achieve this aim, both summary statistics as well as graphical representations of the distribution (predominantly bar- and density plots) of the variables of interest were inspected.

The next section of the analysis focuses on the construction of the indices, representing the three *social vulnerability*-dimensions of interest. In order to construct these indices, an explorative factor analysis has been carried out. It used a principal factor solution as its factoring method due to its capability of seeking the fewest possible number of factors capable of accounting for the common variance, also known as the correlation, of the indicators of interest. Additionally, it also allows for residuals in the indicators. As the rotation method a direct oblimin rotation was chosen because it allows, as an oblique rotation, for correlation between the factors (Fabrigar & Wegener, 2011; Gorsuch, 1997). After preparing the relevant variables for the analysis and confirming that they are suited for the factor analysis, a preliminary graphical analysis has been carried out in order to determine the optimal number of factors. This analysis determined a number between three and five factors to be potentially well suited for the factor analysis. Based on this insight, exploratory factor analyses with three, four and five factors were carried out and their results were compared. Based on a close inspection of the different factor loadings of the three different models, the model with three different factors was selected as the basis for the index construction. It allowed for the clearest attribution of the indicators to the individual factors with relevantly high loadings while also being consistent with the underlying theoretical framework of this study. The explorative factor analysis therefore serves to attribute the indicators constructed during the survey design phase to the *social vulnerability* dimensions of interest by identifying their association with each of the dimensions. By doing so, it also allows to exclude indicators with insufficient association with any of the three vulnerability dimensions from further analysis. The threshold for the exclusion of indicators was set at an absolute factor loading of 0.3. After the indicators were attributed to the three factors, each factor was identified with one of the three dimensions of interest, based on the theoretical fit of the indicators contained by it with the dimensions.

These three factors were then used to construct indices representing their associated vulnerability dimensions of interest. To ensure that the weighing of the different indicators based on the calculated factor loading was successful, the scales of the different variables were standardized before the index construction was implemented. The indices were constructed by weighing the values of the indicators attributed to their underlying factor by their factor loadings. After the indices were constructed and checked, the direction of the association between the indices and vulnerability was also unified, leading to a higher score on an index implying a higher level of vulnerability in the respective represented dimension. Finally, the correlation between the constructed indices and the different indicators, as well as the correlation between the three indices, were also checked to make sure that the indicators are strongly correlated with the respective index they are associated with. This also ensures that the indices measure distinguishes vulnerability dimensions.

In the final phase of the analysis the association between the different variables measured by the survey was inspected. During this analysis phase the association between variables measuring the difficulties and impacts experienced during floods and the COVID-19 pandemic and the three vulnerability dimensions were assessed, as well as their association with variables measuring socio-demographic characteristics. An assessment over the extent to which the dimensions of vulnerability are correlated with socio-demographic characteristics of the respondents also took place. Finally, the relationship between self-assessment questions and the other variable types was inspected. It was checked to which extent the self-assessed capability to deal well with a disaster correlated with the

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actual experience during disasters, the vulnerability dimensions of the respondent and their socio-demographic characteristics. In addition, it was explored how the self-assessed importance of individual characteristics related to the vulnerability and resilience of the respondents, as well as their socio-demographic characteristics. Because some of the variables describing the experience of respondents during disasters were not normally distributed, a nonparametric correlation coefficient had to be used. Additionally, in multiple instances, the normality assumption for the residuals of an OLS regression has also been violated, thereby preventing the usage of an OLS regression for analysis. Due to this, the *Spearman's rank correlation coefficient* was selected particularly because it allows for the calculation of a correlation coefficient for both interval- and ordinal-scaled variables, as long as they are associated by a monotonic relationship, whether it is linear or not (Lehman, 2005, p. 123; Myers & Well, 2003, p. 508). Due to the non-representative sample used for the analysis the identified associations cannot be generalized to the overall population living within the area of interest. But the authors are confident that the identified associations can still serve as a contribution to explorative research regarding which personal characteristics can contribute to vulnerability in different contexts. These findings can then serve as a starting point for future research which evaluates them for their generalizability.

4.5. Research ethics

1) **Expert interviews:** The German case study conducted qualitative interviews with experts who work with vulnerable people, not with vulnerable people themselves. All participants, after being informed about the project and its privacy procedures, voluntarily participated in the interviews and the survey. They received an information sheet about the BuildERS project and information on data protection with the interview request in written form via e-mail.[3] The participants were once again informed verbally about data protection before the interview. They were able to interrupt or stop the interview at any time. This did not result in any disadvantages for them. The interviewees signed an informed consent form.

   The interviews were conducted in German. Working with a translator was possible but was not taken up by the interviewees. The interviews were conducted by telephone, recorded by voice recorder and transcribed by members of EKUT. The audio files were stored in an encrypted container and will be deleted after the end of the project. The interviews were anonymized during the transcription. Personal information, such as the name or the exact job title, was not transcribed but replaced by letters. This is particularly important to ensure that interviewees do not suffer any disadvantages as a result of their participation or their statements. To prevent the identification of the interviewees their exact job description is not revealed in this report or other publications. Wherever necessary a broad description of their work position is given in a generalised matter. This is important to contextualise their statements while protecting their anonymity. That means that we will describe someone as working in administrative disaster management but will not reveal what position they work in. The findings and quotes are presented anonymously in the presentation of the results.

[3] Both can be found in the annex.

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2) **Survey:** The survey data was conducted in German. The survey data was collected anonymously. No data containing personal information as well as data allowing for the identification of respondents was collected or sent. In addition, all data reported in the report has also been aggregated, thereby making conclusions on individual responses further impossible. By submitting the survey participants agreed with the collected data being used for research purposes. Participants were offered the option of withdrawing their participation at any time during the completion the survey. This did not result in any disadvantages for them. Furthermore, the participants were informed about the planned deletion of all collected survey data after the conclusion of the BuildERS project. The city Dresden as well as the Amtsblatt Pirna and the social media team of the GRC helped to spread information about the survey to recruit participants. They were contacted via e-mail and videocall on Teams. They received a sheet with information about the BuildERS project and had the possibility to ask questions.

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5. Results

This chapter presents the results of the qualitative interviews and the quantitative survey. The discussion and points to consider for recommendations will be based on this.

5.1. Results of the qualitative interviews

The findings of the 20 interviews with experts of authorities, crisis management and social service providers are presented in eight sections. They discuss the perception and response to the flooding and pandemic, the extent to which social diversity was considered and vulnerability is understood as contextual. Section 4.1.5 is structured according to the model of Orru et al. and presents findings regarding the four dimensions of social vulnerability. The final sections outline findings on disaster management measures as a source of vulnerability, the affectedness of disaster management personnel and the potential to evolve for some in these two events.

5.1.1. Crises situation: The perception of different events

Further findings dealt with the perspective on extreme events and way in which different interviewees based on their (working) context described differences and similarity between the Elbe flooding of 2002, 2006 and 2013 and the ongoing COVID-19 pandemic.

The floods in Dresden were limited in their local impact. In some cases, there was nothing in certain parts of the city indicating a currently ongoing disaster in another part of the city (DM5). The COVID-19 pandemic on the other hand does not have any underlying local restrictions – the biological hazard threatens everyone, and the consequences affect all of society. According to their differences in local extent, different people were/are affected by these different situations.

The studied disasters also vary in their visibility: The flooded city and town districts could easily be observed by eyesight and a lot of picture or video footage was shown in the media. Even people who did not live in the affected areas thus got a visual impression of the situation. This is hardly the case for the current pandemic. Although there are visualizations of the virus or pictures of hearses, these do not seem to have the same impact as people's own experience of the floods.

> *"The floods I can feel and I can see. The pandemic I can not see. [...] I can see the water, I can touch it, I can feel it. The virus, I only notice when I really have it and I feel miserable. And even when I'm feeling sick, I still don't know if I have the virus or if I have anything else" (DM1).* [4]

The pandemic seems to be a much more abstract disaster and is experienced in a more indirect manner for many people.[5] Speaking with Eva Horn (Horn, 2014, p. 111), the pandemic for some can be conceptualized as a disaster without an event. This was probably exacerbated by the precautionary paradox: The fact that initial measures were taken early in Germany meant that the number of sick people at the beginning of the pandemic was relatively low, which led to the very

[4] This may be one reason contributing to the division of the population into people who believe in the virus and the pandemic and those who do not (cf. 20210126_HiOrg).
[5] The pandemic being less visible to the population is the perspective of our interview partners. Of course, there are many people (e.g., doctors, nurses) for whom the pandemic is very visible. The visibility of disasters also depends on the perspective.

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measures being experienced by the population as "drastic" and "now difficult to understand" (DM1). While the flood was a temporary issue with a foreseeable end (SoSe8), the pandemic has now lasted over a year.

However, not only the studied disasters differ from one another. In all of the interviews we conducted, the reaction of the population or the way they dealt with the extreme situation and the associated mood among the population were described in very contrasting terms. Consistent with the research (DRK, 2014; Herbert Saurugg, 2017; Schulze et al., 2015), the interview partners (regardless of their work context) describe a

- "great cohesion" among people during the floods (DM2, Adm4, SoSe8),
- a strong "we-feeling" (DM3, cf. also Adm1),
- great engagement and mutual helpfulness (SoSe4, DM3), and
- a lot of exchange among those affected (SoSe8).

During the floods, people were able to actively participate which had a positive effect on how those affected dealt with the situation (Adm1). This observation is also supported by research on stress (Hobfoll, 2001). During the pandemic, the focus of crisis management is on "not doing" (SoSe3) (e.g., not meeting with friends and family, not going to the movies).

The COVID-19 pandemic, on the other hand, is leading to

- "great uncertainty" (Adm1),
- Loneliness (DM2)
- and isolation (Adm2)

both among the population and among social service providers. It is reinforced by constantly changing rules and measures (ibid.). "This sentence, I have no one to talk to, comes up quite often" (DM2). According to our interview partners, old people (DM2) and children (SoSe4) are particularly affected by loneliness. There is "a lack of cohesion" (SoSe8). Help offers are also described as more isolated and not organized by family centres, authorities etc. as it was during the floods and the refugee crisis (ibid.). Since the action radius of people needing help is smaller, they are for example particularly dependent on visitors coming to their homes, which is not possible due to the measures taken to contain the pandemic (Adm2). These people are thus more affected.

Additionally, to loneliness and isolation, increasing general and health-related fears as well as fear of the future in particular are perceived as a widespread problem (SoSe7, SoSe8). The insecure situation, which for many is characterized by a lack of everyday structure, is particularly difficult for people who are mentally unstable, mentally ill or at risk of addiction. The lack of everyday structure is also particularly difficult for children (SoSe7). In addition, the interviewees observe how multiple stresses, such as being a single parent and working in a home office, lead to excessive demands that trigger problems (SoSe4). These stresses also emerged from the measures taken to deal with the pandemic (e.g. home schooling).

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5.1.2. General disaster management in the area and the distribution of responsibilities

Disaster management in the studied region is perceived as well functioning by most interviewees as it is able to provide for basic needs and physical rescue from dangerous situations (Adm1).

Nevertheless, different perspectives on the responsibilities of disaster management become striking in the interviews: Disaster management stakeholders have a very clear idea of what their tasks are (e.g., organizing emergency shelters) and what they are only to a limited extent or not at all (e.g., providing food in the emergency shelter, flood protection of private buildings). They see the latter as the responsibility of the citizens themselves (Adm2).[6][7]

During the floods, people in need of care had to be evacuated and housed in emergency. Difficulties arose because the management of a nursing home then wanted to give their employees time off, because they thought that the personnel in the emergency shelters would also take care of the nursing home clients. Disaster management did not consider themselves responsible for this and merely assisted in organizing the care (DM3). Citizens in Germany are required to have a supply of food to sustain themselves for the first few days in the event of a disaster, but at the same time there is no penalty if this is not done. One participant from the emergency organisations argued that this cannot be a responsibility of civil protection because it is not designed for this purpose (DM3). At the same time, it was argued that the population is for the most part not yet aware of this task (DM5). Some of the interviewees from disaster management critically reflect on the recommendations of the BBK for individual preparedness (BBK, 2018) and the individualized responsibility associated with them, as space and financial resources are needed to adhere to them. Since this is not possible for some people due to their life situation, they need assistance when they can no longer go shopping regularly on their own (DM1). Furthermore, the interviewed disaster relief workers observe a lack of understanding about what happens during a disaster and what measures are useful.

Social service providers, recognise the problems arising in people's everyday lives and how they are permanently affected by the disaster even after the initial physical rescue. They make less of a distinction between disaster management and social politics, but rather situate them as belonging together to a certain extent. This makes it clear that disaster control is responsible for the acutely threatening situation, but that there is still a need for further assistance (SoSe3). This illustrates a lack of interlinking the disaster with what followed after the disaster, so that in some cases there are no offers of help regarding longer-term effects.

Disaster relief workers report that it was during the pandemic when they first learned what support options and support needs existed in the first place, since a lot of certain counselling and social

[6] "Keep calm" is mentioned as the "first civic duty" (DM1) – calmness is understood as an important prerequisite for dealing appropriately with disasters.

[7] The interviews also reveal a certain skepticism toward volunteers. They are often over-committed and do things haphazardly, which is often not helpful (e.g. DM5). Controlling this dynamic is a burden on the operations management (DM1). Overall, there were more helpers than needed during the 2013 floods, for example. During the floods, there were a lot of (material) donations from all over Germany, which was difficult to manage for the disaster control and also tied up emergency personnel having to take care of the distribution of donations (and sorting out what could no longer be used).

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services were discontinued (DM1). This suggests that disaster response is, to some extent, detached from other support structures – and thus not integrated into a larger strategy to reduce vulnerabilities.

Following the above-mentioned difference in opinion as to who has which responsibilities, an interviewee from the disaster management department explains that for vulnerable people, mainly social services and educational measures for those most vulnerable are considered helpful in this situation, but not necessarily investments in material things (such as vehicles) (DM1). Interestingly, elsewhere that same interviewee describes that during a bomb evacuation they had no vehicles to evacuate people using wheelchairs. The only thing available so far are vehicles that can transport people without mobility impairments or injured people. It is not always considered that there might be persons who do not fit this categorization (DM1). Contradictions in the interviewee's narrative are apparent here. While they have many ideas about what material investments would be helpful for disaster response (they have already collected a file of ideas for this), they associate vulnerable people more with social services and outreach that they (as disaster management practitioner) do not necessarily feel responsible for. It seems here that vulnerable people do not seem to have a relevant place in their plans for disaster response.

Further, the interviewee goes on to explain that while emergency organisations can think about the extent to which vulnerable groups are affected before an operation, they will only act if needs for assistance are indicated to them. "And of course, if no one tells us that they're miserable, then we're not going to know. Because we don't even have the resources to ask everybody, are you okay?" (ibid.). This demonstrates that there is currently little capacity in disaster management to consider everyone in response actions, also they do not see a responsibility for emergency personnel to actively look for those in need.

Voluntary help was a big topic during both events. While during the flooding volunteerism was both considered very valuable but also hindering, during the pandemic an interesting case emerged from migrants who wanted to help contain the pandemic by organizing mask donations from Asia. This unfortunately was not very welcomed by the responsible disaster management task force (Adm2); the reason for this were not clear.

5.1.3. Consideration of social diversity

The extent to which social diversity is considered in disaster management of the studied area and is included into disaster plans and response varies.

The high relevance of an inclusive response to disasters has been repeatedly pointed out regarding the accessibility of information and public communication. There appears to be increasing consideration of limitations in the provision of information by the authorities: During the pandemic, flyers with extra-large type were displayed in places where older people frequently spend time (Adm2). Messages are interpreted into sign language more often than in the past (SoSe6). Discourse overall seems to be increasingly inclusive and is perceived to be more advanced compared to the past (SoSe7).

One interviewee reflects that there are, however, still people and needs that are not seen. They do try to adapt their public relations work (e.g., through posters on buses and trains),

> *"But still: If someone either doesn't want to or is really, well, absolutely isolated at home, you won't reach them" (Adm2).*

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The interviews repeatedly reveal that the relevant offices or representatives are aware of the needs of the people they are responsible for, but the higher-level offices are less sensitive to these needs. At the beginning of the pandemic for example, information was available only in German. Translations into English or other languages were not available until one and a half weeks later. It took even longer for information on COVID-19 and residency rights to be translated on the homepage. There was a "reacting communication [...] no active inclusive communication" (Adm4).

The interviews show that the needs of certain people hardly played a role in the initial reaction and were then included after their representatives became involved –

> *"the target groups that deviate from an imagined average German citizen (German: 'Deutsch-Normalo') [were] relatively quickly forgotten again in such crisis mode" (Adm2).*

Especially in the initial reaction to disasters, a certain idea of normality is often invoked – that these are people who can help themselves and understand information in German without restriction. This does not include people with disabilities relying on sign language or plain language, nor does it include people who do not understand German (ibid., SoSe6). It is suspected that the people who work in disaster management or the fire brigades have few contacts with such people in their everyday lives thus leading to their needs being forgotten (Adm2). The people who most often were thought of from the beginning of the pandemic were the elderly.

Interviewees describe a change as the pandemic progressed. Communication problems occurring at the beginning of the pandemic hardly seem to exist any longer. While the information available at the beginning of the pandemic was completely in German, multilingualism in public relations became the new standard as the pandemic progressed (ibid.). This shows that there is an openness towards incorporating specific communication needs, even if they were forgotten in the initial response. Thus, the pandemic may also lead to more diverse communication in disaster management.

The digitization of communication was experienced as helpful in enforcing accessible communication as it expands the repertoire of arguments: if it is unclear who exactly is looking at something or watching something, it is even more important that it is accessible for everyone (Adm4). Technological solutions such as video telephony helped people stay in touch with each other and enable social service providers to maintain their services even during a lockdown. Here, technological solutions were able to alleviate problems that would not have been possible through classic disaster response (DM1).

Although crisis communication strategies were understood to have improved over the course of the pandemic, new problems regarding the consideration of social diversity have arisen. This can especially be seen when it comes to making vaccination appointments: Deaf people cannot make an appointment via phone call. Making appointments online also presents barriers for older people who are not familiar with the internet. It is also unclear whether an interpreter will then be provided at the vaccination appointment itself. Thus, problems arise at various points for people in vulnerable living situations.

Over and over again it becomes apparent that the initial response in the management of the crisis is not inclusive and is later on corrected and improved. This repeatedly results in periods in which vulnerabilities are not (or not sufficiently) considered. During the COVID-19 pandemic, this mechanism can be observed in slow motion. Since the pandemic is a rather slowly moving crisis, these gaps are not instantly noticeable in the number of victims. However, it remains to be assumed that such gaps can become fatal in faster moving crises. The response to the disaster is therefore not

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perceived as inclusive: "Inclusive it is not. Inclusion would mean we have this from the beginning [...] and everyone is included" (Adm4).

People who live in vulnerable situations, but do not take much space in public discourse and are hardly involved in public support structures also exist. According to our interviewees during the pandemic, these include, for example, children in transition between primary and secondary school, single elderly people living alone, children of addicted parents, children who live in children's homes and lonely people. In the perception of the interviewees, the public discussion at the beginning referred mainly to occupational groups and only gradually included the needs of vulnerable people in the discussion. The framing has changed in the process: While emergency child care was initially discussed under the rubric of "system relevance," it is now also discussed in terms of social disadvantage (cf. SoSe8).

People who are lonely and have few friends and social contacts are also perceived as vulnerable and hardly are subject of public debates (cf. SoSe4, SoSe5). Therefore, "one cannot just say: The older or the more in need of care, the less support. But rather: The more isolated." (Adm2).

People who are stigmatized and discriminated against often have little access to public support structures. Social stigmatizations thus lead to or increase vulnerabilities. In the interviews for example the particular vulnerability of Muslims or People of Colour, who become vulnerable through aggression directed against them, is described (cf. Adm2).

5.1.4. Vulnerability and its contextuality

The interviewees have different understandings of vulnerability: some advocate a more group-based definition, while others emphasize the intersectionality, societal roots and situational dependency of vulnerability (see also Wisner et al. 2004). In particular, social service providers and political representatives of people who are at an increased risk of becoming vulnerable emphasized that "they [cannot] help" (SoSe2) being in a vulnerable living situation.

Vulnerability is described in several interviews as a concept that also has a negative association such as a strong focus on fragility and needing help. This is perceived as not being true "because I always think, 'Nope, [...] they are still tough and in the middle of life and actually want to participate'" (Adm4). By focussing on their vulnerability, the capacities and resources of individual tend to be overlooked (IFRC, 2004, pp. 13–16).

Interviewees stated that even for those who are usually considered highly vulnerable in crisis situations, this assumption might not be appropriate. An interviewee recounts doing a walk-through with homeless people at the beginning of the pandemic, showing her and others their places. She was surprised by the "survival resources" (Adm1) these people had. While unhoused people need support in terms of material care and information about infection control, they had lower levels of psychosocial concern than other people (cf. ibid.). Another interviewee knows a woman who was a patient of a mental health facility for suicidal thoughts during the pandemic and yet had the strength to participate in the press and correct their articles in the context of masks and hearing loss (cf. Adm4). Although the interviewee emphasizes that these assessments are of course only anecdotal and cannot be generalized, they suggest that even those who are in a very vulnerable life situation are not left without resources during a disaster.

Also, the classification into categories like "the good pensioners, the bad homeless. Or the poor pensioners and those who are to blame themselves" (DM2) is criticized. Such evaluations can further

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increase vulnerabilities by influencing resource distribution and stigmatizations aggravating/worsening life situations. Especially in municipal political discourse, interviewees experience that the perspective that all people in a group (e.g. migrants) are vulnerable is accompanied by the association (and corresponding positions and argumentations) that this group of people is problem-ridden and causes problems for society (cf. Adm2). This, in turn, can perpetuate or create social inequalities, which in turn affects the risk of becoming vulnerable.

Some interviewees believed that for example people who suffer from addiction or unhoused people can be considered vulnerable (cf. Adm1). Other interviews repeatedly showed that vulnerability arises from "multiple stressful situations" (SoSe4). People who have a disability or need care are not automatically perceived as more vulnerable: "so you can't draw this causality automatically. [...] I am sure that there are correlations" (Adm2, see also Stough and Mayhorn (2013)). Migrants are also not perceived as vulnerable per se. They become vulnerable if other circumstances such as illness, persecution, social disadvantage, discrimination, trauma are added to their migrational background (cf. Adm2). Certain people have an increased risk of becoming vulnerable, but whether they actually become vulnerable depends on other factors (Wisner et al., 2004).

Vulnerability is also highly contextual: Deaf people who meet each other are not disabled. "After all, the disability only arises in contact with hearing people who cannot sign" (SoSe6). The social basis of vulnerability is revealed here. In a society that is equally accessible to all, access barriers and vulnerabilities are reduced. However, when people with limitations are viewed as 'different' and are not integrated into society (and thus are not having their needs addressed), vulnerabilities arise.

Vulnerability is also related to the nature of the disaster and the type of hazard. During a pandemic, those who are older or have a pre-existing condition are at increased risk, while during other disasters such as floods or storm damage, people with little financial resources are particularly affected (this often also influences how resilient one's home is to weather) (cf. ibid.). An interviewee from disaster management also explains that the extent to which people are affected depends on the event itself and their own preparation, "So what is a vulnerable group here? I can't tell you like that. I wouldn't know how to classify them" (DM5). The interviewee is not aware of any particular vulnerability in the stakes due to a disability or age limitations. People who use wheelchairs would usually know very well where to position themselves so that they could be rescued from a building (cf. ibid.).

Another actor from disaster management also understands vulnerability as vulnerability to external influences and thus dependent on the disaster, where

> *"classically vulnerable population groups are elderly people, children, people with a migrational background, people with disabilities. [...] I generally would not subscribe to that [...] that they are all equally vulnerable" (DM1).*

It seems that in disaster management, the focus is primarily on the connection between the type of disaster, as well as individual preparation and vulnerability.

The context influences vulnerability, who becomes vulnerable and how they become vulnerable. In the following, we will show how vulnerability can be created or reinforced by a crisis or the actions taken to address it.

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5.1.5. The role of certain vulnerability factors

In the following sections findings regarding specific vulnerability factors are outlined. The structure thereby builds on the four vulnerability axes outlined by Orru et al. (2021)(see also chapter 3.2).

5.1.5.1. Individual Capacities and needs

Individual capacities and needs refer to the role of aspects of the individual condition for becoming vulnerable.

Being impaired. Individual capacities and needs influence vulnerability. These include, for example, physical or mental impairments, as well as people's psychological stability, but also their financial resources.

Mobility impairments are described as an important factor for vulnerability: People who have limited mobility and are dependent on assistance are in a highly vulnerable situation. During disasters, they rely on assistance that goes beyond mere evacuation and includes preparation for evacuation, as they cannot easily pack their belongings and leave their homes (cf. Adm4).

During the floods, deaf people were also evacuated. Since the people who were on disaster relief duty did not know sign language, a massive communication problem arose. To be able to communicate with these people, the local counselling centre for the deaf was then contacted. They organised an interpreter or did social work on site themselves (cf. SoSe6). In Germany, there is no nationwide emergency call or app for those who cannot hear or speak. So far, there is a fax that deaf people can contact in emergencies. A corresponding app is in development. Evacuations are often announced by loudspeaker. People whose hearing is impaired do not hear these warnings. Since there is not yet a systematic solution for this, non-hearing persons often rely on their social network, e.g., neighbours, to let them know. Digitization and the widespread use of smartphones helps deaf people stay in touch with others and have thus contributed to a reduction of their vulnerability in regard to accessing information.

One interviewee also observes intersections between being deaf and other characteristics such as age. For instance, it is easier for younger deaf people to adjust to new situations and new technologies. Another characteristic is the lack of education: As deaf persons are not well integrated into the German education system, this is a systematic problem (cf. SoSe6). People who have little education often have problems understanding and classifying information. Finally, being deaf is particularly problematic for those who are refugees from different cultural and language backgrounds or those who have other impairments, intersecting with it (e.g. deaf-blind people) (cf. ibid. On the topic of intersectionality and disability in case of disaster see also ULSS20 Verona (2007, p. 5)).

Financial capital. The financial situation can be a factor that increases vulnerability (Birkmann, 2008, p. 16). In families with few financial resources and no (or too few) appropriate devices, children quickly lose touch with school during the pandemic home schooling. Thus, their already vulnerable situation becomes even more precarious. For people with little money, the purchase of masks designed to protect against COVID-19 is a much greater burden in comparison to those with sufficient funds. Thus, the financial situation can have a very direct impact on the likelihood of being affected by a crisis. In particular, with respect to financial resources, interviewees see severe impacts that will continue even after the pandemic is contained, such as when rent payments that were suspended must then be paid back (cf. DM2). Also, during the floods, the financial situation was a vulnerability factor: Especially

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elderly people and people with little money were dependent on accommodation in emergency shelters (cf. DM1).

Individual autonomy. The great desire to remain independent, especially among older people, can prevent them from asking for or accepting help (cf. DM2, similar findings are also made in D4.4). It is therefore not enough that a social network is in place. The contacts have to be supportive and helpful and people have to make use of them in the first place. For some people, it is more difficult to build a stable social network because of stigma. This can also become problematic within stigmatized groups, an interviewee reports for example that deaf people with a migrational background or those who are not heterosexual are discriminated against within the group of deaf people correspondingly have an even smaller circle of friends (cf. SoSe6).

Interviewees also emphasize that although they can offer help, those affected must have the freedom or individual autonomy to decide whether they want to accept it (cf. Adm4). Thus, there are also people who refuse to accept the digitalized offers of social service providers. These were people who used their services before but do not want to use the digital services now.

Another aspect of individual autonomy focuses on the issue of classifying people as vulnerable: one interviewee recounts that they were approached by a woman who uses a wheelchair and complained that some hygiene concepts excluded the participation of people who belong to the ‘risk group’. The woman distanced herself from this and stated that she wanted to decide for herself whether she belonged to a ‘risk group’ or not and also wanted to decide for herself whether to take the risk or not (cf. Adm4). Here it becomes apparent that the external assignment to a ‘risk group’ can also be experienced as an intrusion to individual autonomy. The interviewee concludes: "Well, we can never say who is vulnerable. People have to tell us themselves." (ibid.)

More relevant than belonging to a group, however, according to an interviewee from civil protection, is one's own behaviour and one's own compliance with safety measures (cf. DM1). Vulnerability is thus located situationally – It is by no means fixed characteristics that lead to an increased risk, but situational behaviour. At the same time, vulnerability is thereby individualized: If one does not become vulnerable because of one's own behaviour, then, conversely, one tends to be responsible for their own vulnerability. This shows an attribution of responsibility to individuals in line with neoliberal argumentation (cf. SoSe3). Social structures, which make protective behaviour possible in the first place, are lost from view. Here again, the different perspectives of disaster control and those who provide social services become apparent.

5.1.5.2. Societal support networks

The dimension of societal support networks considers the broader contacts of individuals and the overall social context they are embedded in.

Social capital and the role of the social context. Social capital and social networks influence vulnerability (cf. D1.2). By helping each other, people can buffer the effects of extreme situations, for example by sheltering friends or family during a flood (DM1). Social networks can also address needs during the pandemic. When someone is quarantined, the person usually relies on outside food supplies. In most cases, friends or family take over this task; if this is not possible, then neighbourhood help can offer support (ibid.). Neighbourly relations and acquaintances are also an important part of social capital during crises (Adm4).
During a pandemic, however, many contacts with other people can also pose disadvantages:

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> *"Well, if I basically isolate myself from society because I don't have anyone, then the probability that I will collect COVID-19 from someone is extremely low. And that means I can't be affected at all. Conversely, however, those who have many social contacts, who interact a lot with people, naturally have a much higher probability of contracting COVID-19 because they have caught the virus somewhere. But in that case, it is also an advantage for them," (ibid.),* because others will take care of them.

Since social contacts are limited by the pandemic, they are lacking as a resource, for example, for women living in violent relationships or for single parents (SoSe2, SoSe4). Social networks can still be maintained through technology, although this is usually easier for younger people than for older ones (SoSe6). Being part of social networks also contributes immensely to people's psychosocial wellbeing (DM1). Accordingly, social capital can be important for the psychological resilience of people affected by crises. However, some social contacts can also be hindering to coping well with a crisis: if social networks increase anxiety or anger, they can be counterproductive (SoSe3). People who have few social contacts are more dependent on social services (SoSe3). Being integrated into professional help systems creates a safety net, which is based on professionalized social capital. The need for help can be made visible and thus also addressed through social contacts and institutionalised help systems. Those who are not involved in networks "are then somehow out of it. And falls through the hole. Like a network with holes where people fall through but you never see who falls through" (Adm4). The needs of these people are then often unknown and they are not offered help accordingly.

5.1.5.3. Public support structures

Finally, vulnerability factors with regard to the public support structures were mentioned by the interviewees. These refer to authorities as well as NGOs.

Social support structures. In order for public support structures to be able to provide good support to people in crisis, they must remain active and functional through the crisis. They must also be responsive to the different needs for assistance that existing. Two important factors for success in this regard are funding and knowing who needs what kind of assistance.

Low financial resources increase the vulnerability of individuals as well as organizations and projects. In the interviews, it repeatedly emerged that many forms of assistance for people in vulnerable situations are project-based. They must be applied for and approved over and over again, and there is little long-term security. Furthermore, most projects tend to be underfunded. For some associations, the COVID-19 pandemic also became a financial burden. They had to purchase cell phones and laptops in order to maintain their services in digital form (SoSe2). In some cases, funding for social services such as school support was also discontinued (SoSe8). At the same time, some associations lost funding opportunities through lectures etc., while at the same time they had to continue paying rent for their office space. Unsecured funding ties up capacity and burdens staff.

Not only social support services, but also disaster management itself outlines a need for more funding. As there is greater social and political awareness of civil protection during or after crises, such situations are used to try to secure better funding overall or even for specific construction projects for flood protection or purchase of equipment (DM1).

Technological equipment in a broader sense also influenced vulnerability during the pandemic: in areas of Germany with poor internet connection, it was much harder or sometimes almost impossible for people to stay connected to school or socially (SoSe3).

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Communication between disaster management and social service providers. Other examples also show that there is room for improvement when it comes to communication and cooperation between the disaster management and the city administration and the representatives of vulnerable groups. In the first lockdown in 2020, there was a crises team that included the care network coordinator in addition to disaster management staff and high-ranking representatives of the city administration. This allowed the interests of people receiving care to be considered. Other representatives of, for example, persons with disabilities, the elderly, women, foreigners and refugees were not involved, so issues that specifically affect the living situation of these people could not be brought in. Overall, the process was perceived as lacking transparency for the representatives. There was no information about who was on the crisis management task force and who could be contacted with questions or indications of special support needs (Adm4). One suggestion in this context was that there should be a diversely staffed body to collect the inquiries, concerns and needs arriving at different points in the city government. This body could then assist with ensuring that preventative strategies can be developed.

During the pandemic the interviewees were often surprised by new requirements and sometimes had to implement them with little support, while others were helped by city administrations. It was often not that clear whether they had to wear masks while working or not. There were also different regulations leading to inequality between employees of the same social service provider (for example, employees in children's homes are tested whereas employees in the kindergarten are not, although there is no lack of testing resources). This makes it difficult for leaders to deal with the crisis and hard for staff to understand the measures. As a result, this difficulties in understanding the measures continue until a measure is implemented – "the implementation always comes after the decisions and they sometimes take two weeks, three weeks and that is just too long" (SoSe8). During the COVID-19 pandemic, there were also locations with regular consultations between the disaster management office and other offices (e.g., youth welfare office, social welfare office). Collaboration then ensured that childcare was provided for critical infrastructure workers (ibid.). During the floods, there were relatively few interfaces with authorities such as the local youth welfare office (DM1). Collaboration with other actors seems to be dependent on the situation and location.

The interviews show some positive examples regarding cooperation between disaster organisations and other authorities. An evacuation concept for the target group "elderly and persons in need of assistance" was jointly prepared, which sets clear responsibilities and competencies. This concept is the result of the processing of a bomb evacuation in 2018 (Adm2). This shows that it is possible to make disaster plans inclusive. In particular, people with dementia require one-to-one accompaniment, which "must first be considered in terms of personnel [...] that has to be available in such cases" (Adm2). This aspect of “being considered” or being seen is of utmost importance in terms of being able to communicate and to become relevant for being recognized in disaster preparedness planning.

The issue of psychosocial support. In many interviews, the psychosocial condition of the people is mentioned over and over again. Crises give rise to fears and insecurities which have not yet been adequately addressed in Germany.

This deficiency is reported for both the floods and the COVID-19 pandemic. Poor psychosocial condition is observed in a wide variety of people, regardless of their financial situation, social inclusion etc. The loss of everyday structures during the pandemic is perceived as a problem for many different people, especially for children, but also for addicts or people with mental illnesses. The lack of structure worsens their situation (SoSe8).

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People can cope with stressful experiences in different ways. Crisis situations can also bring back memories of past events, which can lead to (re-)traumatization or increased anxiety. This was a particular issue for older people during the floods, as they were afraid of losing their homes and were reminded of their war experiences by the large presence of the Bundeswehr (SoSe3, DM6).

Resilience in the psychological sense is repeatedly described in the interviews as something making a relevant difference. Although a need for support did not manifest everywhere (DM1), most interviewees perceived an increased need for psychosocial support. Differences in perception may be local or due to the timing of the interview (the interview was conducted in July 2020, while the majority of interviews were conducted in late 2020/early 2021). As described above, a lack of adequate psychosocial support can be constituted (Adm1).

Particularly during the COVID-19 pandemic, people complain that there is no initiative by the federal government to offer psychological tips on how to deal with the situation or psychosocial support in general (Adm1).[8] The assistance provided to people who are particularly in need of support and help is perceived to be non-systematic and isolated. It is dependent on individual committed people (e.g., teachers, social workers) and thus becomes a matter of luck. There is no additional support for vulnerable people "and they are left to their own devices a bit, I find, in crises" (SoSe3). Existing assistance is described as a "drop in the bucket" (German: Tropfen auf dem heißen Stein) (ibid.). The interviewees report that people are left alone in their overwhelming situation and that many measures of practical aid (e.g., social work in families that supports in everyday life, street work) are missing. The church can be a resource, since such forms of support work are often organized within religious congregations (SoSe3). A gap in care can be partially filled like this. However, this only helps part of the people – those who are not religious or whose congregation is less committed will not see any release from these measures.

Further, crisis management is often perceived as unsettling (SoSe3); according to the interviewees, this leads to general uncertainty among the population. In particular, people in need of help are dependent on clarity and a stringent procedure that gives them a sense of security (Adm2, SoSe7).

With regard to addressing these psychosocial needs, one participant from disaster management argued that they had thought of offering psychosocial support, since an increased need was expected, while also saying that it might not be their responsibility as an emergency organization (DM1). They see the need for psychosocial support for people who are perceived to "display psychological problems" (German: auffällig) and see this as part of their responsibilities (ibid.). During the 2013 floods, there were also counsellors who advocated that all those affected by the floods needed psychological support. However, there was no corresponding capacity, so people who were "unnoticeable/low-key" (German: unauffällig) did not receive support (ibid.). Taking a citizen's view, this might be supported by the potential reasons that psychosocial support is usually not associated with disaster response. Another possible reason is that people were more likely to turn to social service providers to help them cope with the psychosocial problems they encountered, rather than disaster services.

One interviewee tells us that they counsel refugee families who are housed in group homes with poor conditions. They live in very stressful living conditions as a whole family in a small room with no space

[8] Psychosocial care in Germany was already inadequate before the pandemic (e.g., very long waiting times for therapy places). The pandemic situation exacerbated this situation.

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to retreat in difficult circumstances. Some families have a more positive underlying attitude, while others have a more depressive underlying structure, which has a significant impact on how the difficult situation is managed (SoSe3). This psychological resilience is clearly linked to social structures by the interviewees. They criticize the individualistic society individualising responsibilities. Many offers of help also focus on the individual without taking the environment or context into account. The individualization of responsibility is experienced as weakening self-esteem –

> *"Which I personally find totally unfair, because I often see people from these groups who are totally committed and fight like lions, but achieve far fewer effects than someone who has more favourable circumstances, and therefore never reap the rewards for their efforts. And that, yes, then again reinforces the feeling of this perceived inferiority. [...] if the societal view is like this in our country, it is often not possible to bring people individually to form their own different point of view for evaluating their situation. And even if you manage it selectively, [...] the deficits are named again. And bang they are back in there, in this view from the outside. [...] And that unfortunately increases this vulnerability in this cycle" (ibid.).*

Here, the impact of social structures and social inequality on capacities to cope with difficult situations and disasters becomes very clear. Certain structures and phenomena creating or cementing inequality thus increase people's vulnerability. However, this also shows that reducing social inequality can help people cope with disasters and have more psychosocial resources. In this cycle, people are not strengthened to use their resources. Instead, the focus on individual deficits solidifies vulnerabilities that have been created by the situation.

5.1.6. Creating vulnerabilities through crisis management measures

The interviews reveal that crises influence vulnerabilities in three ways: (1) they create vulnerability, (2) the actions taken to address the crisis create vulnerabilities, and (3) crises and the actions to address them reinforce existing inequalities and vulnerabilities.

(1) Crisis can create vulnerabilities: There were seniors affected by the floods who had previously managed to live independently and were included in the community without being seen as specifically vulnerable in everyday life. Due to the floods they were pushed to leave their homes and therefore became highly dependent on assistance (DM2, SoSe8). This amount of need for assistance was not known to the aid organizations beforehand (ibid.).

Further people with middle to higher incomes, who were not considered as specifically vulnerable before, needed help with evacuation because they were not prepared for a flood of such a big impact (SoSe3). Similarly, the lockdown during the pandemic and the associated home schooling created challenges and decreased capacities due to the triple load of child care, home schooling and work.

A disaster like the Elbe floods puts many affected people in a state of shock or trauma, increasing their vulnerability in the situation (SoSe8).

Finally, an issue that came up was racism and stigmatization towards people with Asian roots that was not visible before (Adm2). However, this was responded to with public

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relation measures such as interviews by a senior member of the administration in order to reduce stigma.[9]

(2) **The actions taken to address the crisis can create vulnerabilities**: Another important point which can be found in several interviews is that disaster measures themselves can create vulnerabilities. During the pandemic, mandatory masks became a problem for people in vulnerable situations. People who cannot wear masks due to physical or mental limitations are severely restricted. Although there is an exception for these people in the state regulation, the operators or the people working in supermarkets, buses, etc. have domiciliary rights and can deny entrance to people not wearing masks. Thus, these people are in a constant state of uncertainty as to where they will be granted access and where not. Fearing the behaviour of people who do not believe in COVID-19 or simply do not want to wear a mask, little is said about the people who need this exemption (cf. ibid.). The mask requirement also brings increased difficulties for deaf people who depend on seeing mouth movements to understand what someone is saying. These communication needs are increasingly taken into consideration by official bodies and corresponding exceptions are recorded in the regulations (SoSe6).

As a result of the measures to prevent the spread of COVID-19, many people in Germany have been put on short-time work or laid off. Especially those who are now unemployed have become vulnerable due to the pandemic (SoSe1). The fact that many people have been affected by the pandemic and its accompanying measures and experience precarious living conditions now is also reflected in the fact that an aid organization that issues identification badges for food distribution issued 90 new ones in October 2020, while there were only 3-4 per month issued before (DM2).

The loss of a job becomes a major problem especially for families, which goes as far as existential hardship. In the context of the pandemic, the interviewees observed a strong uncertainty in the middle class overall (cf. ibid.). Due to closed schools and home-schooling while also working in home office, major conflicts arose even in families that previously had no problems (SoSe3). Children from families with a high level of education who had not previously become conspicuous were now also affected of this. Children and adolescents in particular were strongly affected by the school closures and became vulnerable due to the new situation. The interviewees perceived this as a strong psychosocial burden (ibid.).

For parents working in system-relevant professions, home schooling is not compatible with the increased workloads of their jobs (SoSe8). With regard to their psychosocial condition, new vulnerabilities also arise for older people who are well integrated, due to contact restrictions (cf. Adm1). A citizen survey in Dresden showed that alcohol consumption increased during the lockdown, especially among the middle class (Adm1). As a result of the measures taken to combat the pandemic, most people in Germany became less resourceful regarding their psycho-hygiene and social life, since social contacts are very

[9] He is himself married to a woman who is from an Asian country. This could be another example of someone who is a very dedicated person. The interviewee framed it explicitly as a personal commitment rather than a systematic response to a systematic problem.

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severely restricted (SoSe8). A special survey by the Germany-Barometer Depression confirms this observation and shows that psychological stress increased immensely during the pandemic compared to the situation during the first lockdown.[10]

During the flood, people were evacuated, the injured were collected centrally in a hangar, and triage was used during their medical care. One of the evacuees was a heavily pregnant woman who went into labour and gave birth in the hangar. The interviewee took care of her and observed that the majority of the people in the field were men who seemed overwhelmed with childbirth. In addition, there was no privacy protection of any kind. Thus, the woman giving birth found herself in a highly vulnerable situation (DM6).

(3) Crises and the actions to address them reinforce existing inequalities and vulnerabilities: For many people who already suffered from vulnerable living conditions before, the pandemic or the mitigation measures have made their living situation worse. Research has shown that disasters reinforce pre-existing social inequalities and reinforce vulnerabilities (Sparf, 2016; Wisner et al., 2004). This is also reflected in the interviews. Unhoused people for example were previously able to earn money by begging or collecting bottles. Due to lockdowns, closed stores, and less everyday mobility, these sources of income have greatly diminished or dried up altogether (Adm1). Areas where they could otherwise go during the day or when it was cold outside were thus also no longer accessible. At the same time, support services such as meeting places, shower facilities etc. were closed (SoSe5, SoSe7). At times, there was only one open shower facility left for homeless people and some of those who wanted to use it had no (financial) resources to get there (Adm1). The pandemic and the measures taken to limit it worsened the situation of homeless people on two levels: On the one hand, their daily routines and self-help options were no longer available. On the other hand, (despite the already worsened situation) support services provided by city councils or social service providers were also failing. The behaviour of police officers in enforcing the lockdown rules added to the stigma. Homeless people who met in fours were told to comply to the rules of the lockdown and go home. Yet "[they] don't have a home" (SoSe5).

While most social service providers made efforts to keep their support services open during the pandemic and lockdown, and many reported that they digitized their services to a tremendous degree, this was not enough. It was often perceived as insufficient, as interpersonal contact cannot be replaced and is crucial for psychosocial support (Adm4). Most of them made their offers take place on site again as soon as it was possible. For example, work projects for addicts were held on site again after an interruption, since the risk of relapse for the clients was considered particularly high and they needed the support provided by the projects (Adm1). Meetings on site were also not possible for self-help groups for a longer period of time, which put a lot of clients in stressful situations. For people with addictive disorders, use has long been a strategy for coping with anxiety, making them particularly vulnerable in a pandemic fraught with fear and anxiety. High risk is also perceived among those on the cusp of addiction. The emotional stress of the pandemic and the loss of everyday structure may cause them to develop an addiction as a coping mechanism (Adm1). Addicted and homeless EU citizens were already in a highly

[10] https://www.deutsche-depressionshilfe.de/forschungszentrum/deutschland-barometer-depression/id-2021

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vulnerable situation before the pandemic, as they have few resources and there is little specific support for these groups. Their situation was worsened by the restrictions (Adm1).

For women affected by violence in close social relationships, the contact restrictions have limited an important resource for their empowerment and point of contact as a safe place to escape to – "the safe places have been missing" (SoSe2). Working from a home office meant little time they could spend alone, without the perpetrator, and so there was no timeframe in which they could seek help. Since more people than usual needed help such as the psychosocial crisis service, access to help was more difficult and even more limited than before (ibid.). Financial difficulties or poor infrastructure (such as internet) became increasingly relevant during the pandemic and can thus amplify vulnerabilities.

During the Elbe floods, those affected also had a need for psychosocial counselling (cf. SoSe3). Already existing problems, for example within families, were intensified by the floods (cf. ibid.). Crises in general intensify already existing vulnerable life situations, "such a pandemic brings them [...] right into extreme situations" (DM2).

More generally put, crises and extreme events bring "the famous barrel to overflow. Because then there's just one more shovel on top" (SoSe4). The connection between disasters and vulnerability is summarized by one interviewee:

> *"through such disasters, if it is not done well, exclusion, lack of participation, and even discrimination can arise. And consequently, […] a crisis, has the potential on the one hand to intensify problems that are already there, and on the other hand, of course, to pile up new barriers for people who previously had no problems." (Adm2).*

5.1.7. The vulnerability of disaster management and social service personnel

During crises, disaster management and social service personnel can also become vulnerable. They are physically and psychologically stressed by their deployment and engagement. People who are deployed in disaster management or work in social services during a crisis may be affected in two ways: On the one hand they might have to work much more – sometimes even without appropriate breaks – in times of crisis such as the pandemic. On the other hand, they may also be affected themselves by the crisis. This double burden is observed especially for the COVID-19 pandemic (SoSe8).

During the floods there were also corresponding situations where social service providers were affected by the flood, both privately and with the facility in which they work. They were then removed from the flood situation of the facility to reduce the stressors (SoSe8).

Overall, a large increase in the workload of social service providers is observed as a result of the pandemic, with some being assigned completely new tasks. During the pandemic, increased sick leave was also observed, which was explained on the one hand by using sick leave even for minor cold symptoms, and on the other hand by the increased workload on employees (SoSe8). This in turn increases the workload of other healthy employees. Due to the discontinuation of the joint presence in the office, new structures had to be developed in which mutual support could still be maintained (SoSe2). Interviewees report that they still have to process their experiences (Adm4, DM6).

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Some of them are partly disappointed with themselves for not developing a plan before the lockdown. They therefore had to overcome a first state of shock in which they had to think about what they wanted to do and what their tasks were.

Since a large part of civil protection in Germany is based on voluntary commitment, it can also happen, as observed during the pandemic, that there are helpers who say they will not participate in such a mission (DM3). During the pandemic, this is especially true for people who do not have a medical background and have not dealt much with infectious events before. Thus, when disaster strikes, there may be even fewer emergency personnel than previously thought.

These stressors are often accompanied by other challenges. With regard to the floods, an interviewee from the disaster management office recounts that emergency personnel from the fire department was insulted during the floods, which made the mission more strenuous and stressful (DM5).

Another point was that the lack of resources. During the flood operation, sometimes an insufficient supply of food and drinks, especially coffee, was available for the emergency forces. At some times, personnel was short as a person outlines with regard to a lack of medical staff. The interviewee cared for a woman who had to give birth in a hangar during the floods while no trained gynecological staff was available. They experienced the situation as very special and challenging (DM6).

These various factors can contribute to disaster management and social service personnel becoming vulnerable, which can then impact crisis relief.

5.1.8. Evolving in the course of the crisis

In the material, however, there are also examples of crises not being traumatic, but people coping well with them or even being strengthened in the disaster situation.

One interviewee experienced one of the floods as "it sounds stupid now, but an adventure [...] Because nothing really happened" (Adm1). Due to the fact that the flood water receded relatively quickly and due to the joint commitment to cleaning up after the flood, some people did not experience it as a major disaster. This certainly related to the strength of one's own consternation though. "Giving up was not an option" (SoSe4) and there was a great sense of community that expressed itself in strong energy to clean up and rebuild. During the floods, many people were able to help themselves and were able to rebuild themselves – "crises are also always an opportunity" (SoSe4). This is not only true for individuals, but also for organizations or cities. This effect was delayed, but a few years after the floods the city appeared more beautiful than before (ibid.). In this vein, crises can also reveal inner resources. One interviewee state that during the evacuation of a children's and youth home, the clients complied very well and, in some cases, 'functioned' better than in everyday life. There was less conflict and more of a sense of community than usually (SoSe8).

Crises can also suspend obligations of everyday life. One interviewee suggests that families who have many resources and live well together were able to use the lockdown during the pandemic to spend more time together (SoSe2). The lockdown also resulted in some relaxation of the situation in high-conflict families because pressure was taken out of everyday life. Without the outside influences, some families were able to manage their lives better. The calmness brought by the lockdown was also perceived as positive by many (ibid.).

Crises can lead to people who do not have a support network standing out and being seen. This has a positive effect after the disaster, as those people can then be integrated into appropriate assistance

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(Adm2). Support offered can then improve people's living situation in the long term, making their overall situation less vulnerable.

5.2. Results quantitative part

The following part of the results section of the German case study summarizes and reports the analysis of the general population survey, which was carried out between 11th December 2020 and 15th March 2021 and reached an n of 118 valid responses. The quantitative analysis is presented in three sections starting with a descriptive overview of key variables of interest and their distributions.

5.2.1. Descriptive Analysis

As the first step of the quantitative analysis process, the descriptive inspection of relevant variables managed to succeed with providing multiple relevant insights in the statistical distribution of their values. They were thus assessed as part of the quantitative component of the German case study.

5.2.1.1. Social Demographics

As a starting point of the descriptive analysis, a brief inspection and description of interesting socio-demographic indicators of the survey sample is carried out.

The first variable of interest is the age of the respondents. On average, respondents were 40.16 years old, with a median of 38 years. The distribution is slightly left skewed and it appears that survey participants are, on average, younger than the population average in Saxony, which was 46.6 years in 2015 (cf. Sächsische Staatskanzlei, 2017).

Regarding the gender of the participants, the survey is relatively representative. 43.2% of the respondents identified themselves as male, while 50.8% were female. 2.5% reported their gender as diverse and 3.4% did not answer the question.

Remarkably, only 2 survey respondents reported having a migration background. The survey sample can therefore be considered highly homogenous in terms of the ethnicity of the participants.

72.9% of the respondents stated that the city they are currently living in has 100,000 or more inhabitants. A large share of the survey sample therefore lived in major cities at the time of the survey. Given the regional focus of the case study and the methods used to recruit participants, it can be assumed that these 72.9% predominantly originated from Dresden.

The mode household size of survey participants was a one-person household[11]. This leaves 68.4% of the respondents, who lived in a household with 2 or more inhabitants. On average, 2.274 inhabitants lived in a household, while the median household size was 2.

When it comes to disabilities among the survey participants, 17.8% reported that they suffer from a health problem which negatively influences them in their day-to-day life, despite their usage of medication and/or suitable auxiliary means. Furthermore, nine participants reported that they also

[11] 31.6% of the participants reported so

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have an official disability card, with seven of them also reporting experiencing restricting health problems.

Participants were also asked to report their highest educational degree. Most often, they reported having a Master degree or an equivalent[12], followed by a completed professional training[13]. Interestingly, 42.2% reported having an academic degree of some kind, while only one person stated not having completed education at all. Overall, the survey sample appears to be disproportionally highly educated.

As a final step of the inspection of social-demographic sample characteristics, the share of religious people among the survey sample was inspected. It appears to be quite low, with only 8.5% of the valid response stating that they are a member of a religious community. A plausible reason for this observation is the generally low rate of religious people within the former territory of the German Democratic Republic.

5.2.1.2. Impact of disasters

As the next step of the analysis, the ability of the survey subjects to deal with the current COVID-19 pandemic and previously experienced floods was compared. Regarding the ability to deal with the general impacts of floods, the data clearly illustrated that the share of survey participants who struggled dealing with the COVID-19 pandemic was much higher in comparison to the floods. While 73.9% of the participants which gave a valid response to the survey question were able to deal well or mostly well with the disaster, this was only the case for 54.3% of the valid responses regarding the COVID-19 pandemic. Something even more striking is that 24.1% of the respondents reported that they cannot or most mostly cannot deal with the COVID-19 pandemic, while this is only the case for 9.8% of the respondents for floods. It is possible that a so-called *memory failure* contributes to the

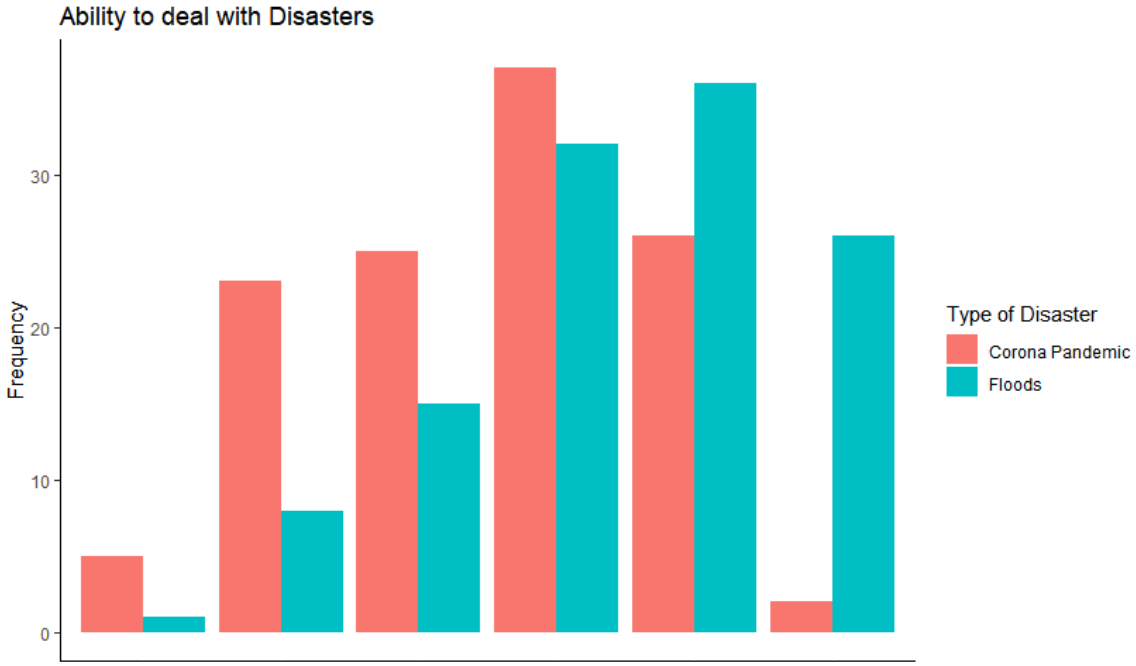

Figure 4: General Ability to deal with disaster (n = 118), Source: Own graphic

[12] 29.3%
[13] 24.1%

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relatively benign memories regarding floods since the memories for these disasters date back to at least seven years ago. There is a possibility of respondents simply forgetting about the actual severity of the situation back then and overestimating the severity of the pandemic when compared to the flood. On the other hand, it can be assumed that severe experiences in a person's life, such as the potentially catastrophic impact of a flood, cannot easily be forgotten due to their distinctiveness and importance for the person (cf.Groves et al., 2011, pp. 222–226). Therefore, it seems likely that at least the respondents who were hit the hardest by the flood still remember its effects mostly accurately.

The number of nonresponses regarding people who experienced floods being higher is due to universal confrontation of all survey participants with the COVID-19 pandemic, while not all surveyed people had previously experienced a flood.

Regarding the other surveyed dimension, this identified difference between flood disasters and the COVID-19 pandemic receives further support. Overall, the survey participants were better able to deal with floods regarding their financial, physiological, and psychological wellbeing than they were regarding the COVID-19 pandemic.

During floods they were the least affected in their physiological wellbeing[14], but reported the worst impacts regarding their psychological wellbeing[15]. In contrast to the relatively mild challenges presented by the floods, people were much more affected by the pandemic, while still being worse than the impact of the floods, and reported worse impacts across all measured dimensions, when compared to the floods. Interestingly, the impact of the pandemic, while still being worse than the impact of the floods, was perceived as relatively mild regarding the financial situation of the participants. They expressed more concern regarding their ability to deal with the other impact dimensions of the pandemic[16]. The dimension in which the survey participants were affected the most during the pandemic was the psychological one[17], which is probably less surprising. Overall, it can be determined that the currently ongoing pandemic is perceived as harder to deal with by most participants, especially in comparison to what they remember from the times when they were affected by flood disasters.

Most participants also stated that they perceive impact of the pandemic as much worse than the floods, even though the pandemic is still ongoing. This observation is particularly well illustrated by the overall general impact of the two disasters. While only 18.5% of the valid respondents feels any remaining negative impact from the floods, 82.8% feel a negative impact of the pandemic. 25.9% even feel a serious impact or worse. Of the 81.5% who do not experience any overall lasting negative impacts of the floods some people even stated, that in retrospect the floods had a positive impact on their life. 14.8% of all valid responses stated that this has been the case, while only 1.7% reported that their life is positively influenced by the current pandemic. Again, it should be kept in mind that while the COVID-19 pandemic is currently taking place, the experiences with flooding disasters date back between 18 and seven years ago.

[14] Only 7,6% stated that they could not or mostly could not deal physiologically with a flood
[15] 22,8% stated that they could not or mostly could not deal psychologically with a flood
[16] 14.5% stated that they could not or mostly could not deal financially with the pandemic
[17] 43.6% stated that they could not or mostly could not deal financially with the pandemic

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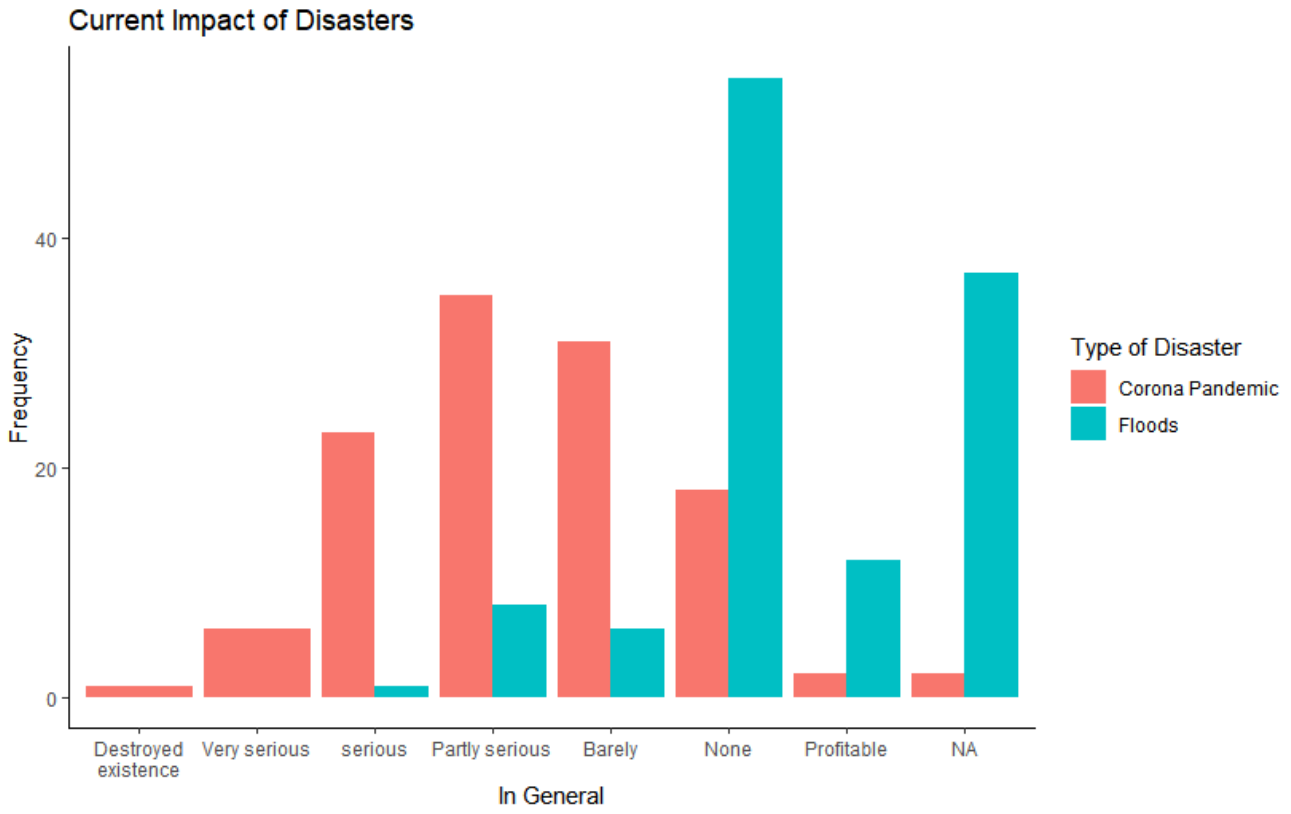

Figure 5: General Impact of disaster (n = 118), Source: Own graphic

This picture is also confirmed by the other impact dimensions. In both cases people feel the worst impacts in terms of their psychological wellbeing. But while 27.3% of the surveyed people still feel a negative impact of the floods on their psyche, 90.7% of the valid survey participants state that they feel a negative psychological impact of the pandemic. Interestingly, participants express the least negative impact of the pandemic on their finances[18], while their physiological wellbeing is the least affected dimension regarding their flood experiences[19]. Regarding the floods, the psychological dimension is with 11.7% of all responses the most often mentioned as the area of experience in which respondents were able to profit from the impacts of the floods. Quite some respondents (7%) stated that they were able to profit from the floods in the financial dimension. Unfortunately, no further information on how they were able to profit is available.

Finally, the tendency towards perceiving the current pandemic as a more serious disaster than the floods is somewhat counterbalanced by the number of challenges the survey participants reported in the context of each disaster.

While participants on average reported 2.2 challenges[20] for the COVID-19 pandemic, they reported on average 3.4 challenges[21] for their flood experience. This higher number of faced challenges during floods can potentially be attributed to the overall more physically intrusive and devastating nature of a sudden flood in comparison to a slowly unfolding pandemic. Due to the large number of physical

[18] 59.4% report no negative impact
[19] 88.9% report no negative impact
[20] With a median of 2
[21] Median: 3

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damages caused by a flood disaster, it simultaneously can interrupt critical infrastructures as well as threaten physical property of afflicted people, while a pandemic is much less devastating on a purely physical/material dimension due to its lack of material destruction capabilities. The number of challenges a person faced during a disaster does of course not necessarily imply that these challenges were more severe than one catastrophic challenge could be. But due to the quantitative nature of this study part, a thorough weighting of the different challenge types has not been feasible and efficient to implement. Regarding the COVID-19 pandemic, the by far most frequently mentioned challenges were the contact restrictions and the isolation caused by the pandemic[22]. Only approximately half as many people mentioned the second most common challenge: Dealing with its psychological impacts[23]. The third most commonly mentioned pandemic-related challenge was ensuring the availability of medical support[24]. Regarding the challenges faced during the floods, protecting one's place of living was the most commonly mentioned challenge[25], followed by ensuring an adequate supply of food and water[26] as well as an energy supply[27]. People who have not experienced a flood yet were also asked which challenges they think they would have to face during a flood. Differentiating from the challenges mentioned by people who actually had experienced a flood, they mentioned rebuilding most frequently[28]. This statement was, in accordance with the respondents who lived through a flood also followed by the challenge of ensuring an adequate supply of food and water[29]. The third most frequently imagined challenge, again differing from the responses of the previous group of research subjects, was going through an evacuation[30].

5.2.1.3. Social Vulnerability indicators

After inspecting key variables describing the impact of disasters on the surveyed people, the next step of the descriptive analysis shifts attention towards variables serving as indicators for the different dimension of vulnerability.

The first interesting variable in this regard deals with how satisfied people were with the official response during the disasters. Only 18.5% of the valid response expressed dissatisfaction or strong dissatisfaction with the reaction during the floods, while 46.3% were satisfied or strongly satisfied. Contrary to the perceived performance of official actors during the floods, the official response to the pandemic was evaluated much more critically. 48.6% of the respondents expressed dissatisfaction or strong dissatisfaction, while only 17.1% were satisfied or strongly satisfied. It is noteworthy, that the responses for the survey were collected between December 2020 and the middle of March 2021. Therefore, it is quite plausible that the dissatisfaction with the official response regarding COVID-19 grew further by the time this report has been written at the beginning of April. On the other hand, it is also plausible that the participants have a more positive opinion about the official reaction to the floods in retrospect than they had at the time of the disaster.

[22] Mentioned 100 times
[23] Mentioned 34 times
[24] 30 times
[25] 42 times
[26] 38 times
[27] 33 times
[28] 13 times
[29] 12 times
[30] 11 times

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Regarding the number of preparations for disasters implemented by survey participants, the evaluation shows that most people did not implement a lot many of them. On average people implemented 4.04 disaster preparations, with a median of four. 12.7% of the participants implemented no preparation measures at all. The most commonly implemented disaster preparation measure was the installation of a disaster warning app (like NINA). This measure was implemented by 68 respondents. It was followed up by ensuring that the personal medical cabinet at home remains well staffed[31] and by having a supply of wood and water at home[32]. The most common reasons reported by respondents for not having implemented more preparatory measures were them not having enough space available to do so, them not deeming it necessary, or them not having enough money. In addition, the fourth most frequently mentioned reason for not implementing preparational measures was respondents not knowing which preparational measures could be useful in times of disasters and how they should be implemented.

According to the respondents, 64.4% of them have already participated in an educational event on how they can deal with disasters. In a subsequent open question the participants were asked in which educational event they have participated. The most common response was that they have taken a first aid course, followed by a multitude of trainings provided by disaster aid organizations for their own members. The German Red Cross was particularly often mentioned in this regard. 43.2% of them also stated that they previously have received informational material regarding the appropriate response and behavior during disasters. Consequently, over 50% of the respondents also perceive themselves to be well informed about disaster risks and the appropriate behavior in such cases at their place of living.

When it comes to the ability of understanding disaster warning, 11% of the respondents stated, that they previously experienced problems with understanding disaster warnings that were not caused by technical problems on the part of disaster relief agencies. Out of these 11%, two persons stated that the language in the warning was difficult to understand, one stated that they did not speak German well enough to understand it, one person stated that they did not understand the context of the warning, and eight persons reported that they did not understand which consequences followed from this warning for themselves.

Regarding their social connections only 5.9% of the respondents stated that they could not rely on their family and also a relatively low number of respondents (22%) said so with regard to their neighbors. Most respondents also live relatively close to their next social contact they believe they could rely on during times of disaster, with a median of five kilometers and a mode of 18.1% stating, that they live at the same place as they do.

When it comes to the reported income levels, the valid responses of the survey participants imply that that most participants earn a lower mid-level income, with the median reported household net income being 2750€ per month[33]. The distribution is slightly right skewed, with the income mode being around 2000€ per month. A secondary income peak exists around a household income of 4000€ per month. This implied relatively beneficial income situation of most survey participants is further supported by

[31] 58 mentions
[32] 55 mentions
[33] The average household net income in the new states and Berlin has been 2,989€ in 2019 DESTATIS (2020)

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their self-reported own financial situation, when compared to their neighborhood. Most people see themselves as middle to well financially positioned, which manifests itself in a slightly left skewed distribution. This makes the median correspond exactly with the middle value of the used scale and the average value is slightly higher than this middle value. Of the participants who have been experiencing a non-pandemic disaster, 25 stated that they were able to spend 1000€ on an unexpected necessary expenditure, while 27 stated that they were unable to do so. When asked whether they would be able to cover an unexpected expenditure of 1000€ right now, 31 of the participants who have not been exposed to a non-pandemic disaster stated that they would be able to do so, while only 17 stated that they could not do so. This difference is most likely caused by the differing context of the two variables.

When it comes to the reported social status of the participants, a similar picture emerges. The collected valid responses imply that most participants see themselves as having a middle to high social status, both within general society and their local neighborhood. In both cases the median of the reported relative social status is a value of six out of ten. The only relevant difference is that mode of the reported social status relative to their neighborhood has a value of seven and is therefore slightly higher than the reported social status relative to general society, which has shared mode of five and six. It is conceivable that either due to the self-selection process our sample is biased towards people who have a higher social status, or that people systematically overestimate their status

Being elected into an honorary office in the past has been reported as having occurred to them by 40.7% of the survey participants. In addition, 65.8% of the valid respondents also reported that they normally do not allocate any time to voluntary activities during their average day.
Survey participants were also asked if they work voluntarily or regularly for a disaster response actor. 27.1% of the respondents reported that this is the case, while 72.9% denied such an activity. Therefore it can be concluded, that the share of survey participants active in disaster prevention is higher compared to the general population. A possible cause for this is the self-selection into the sample and the specific communication channels used for promoting the survey, which has been outlined in the method section. A disproportionally high share of Red Cross members had to be anticipated among the survey participants, particularly because the Saxonian Red Cross also spread our call for participation.

5.2.1.4. Self-assessment of ability to deal with disasters and perceived importance of personal characteristics

Within previous sections, the descriptive analysis so far has focused on variables describing past and current experiences of the survey participants with disasters, as well as indicators for relevant personal characteristics of the respondents. This final section, in contrast, will focus on questions assessing different opinions and perceptions of the survey participants.

The first variable of interest measures the perceived ability of the respondent to deal with impacts of disasters in general. When rating their ability to deal with the impacts of disasters, they could choose from a five-point scale, ranging from “Not well at all” (1) to “Very well” (5). Most survey participants appear to be highly confident in their abilities to deal with the impacts of disasters. The most frequent given response was them perceiving themselves to be able to deal well with disaster impacts, choosing a four among the five-point index 44.8% of the times. Overall, 64.6% of all valid respondents believe that they would be able to deal well or very well with disaster impacts, with only 6% believing

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they could only deal badly or very badly with the impacts. 29.3% believe they could deal partly well with it. On average, respondents gave a rating of 3.77.

In further questions, respondents were asked to rate the importance of six personal characteristics for their importance in dealing successfully with a disaster on scale ranging from one for "Not important at all" to five for "Very important". Overall, most respondents perceived, to different degrees, all six characteristics to be important for dealing successfully with disasters, with all their distributions being left-skewed. But based on its average rating, most participants perceived the psychological constitution to be the most important characteristic[34]. It is followed by the physiological constitution[35], the individual social network[36], the income level[37], language skills[38] and, as perceived relatively *least* important factor, the social status of a person[39]. Still, even social status is perceived by most respondents to be quite important for successfully dealing with a disaster.

5.2.2. Factor Analysis

The next step of the quantitative study was the construction of indices measuring the different latent vulnerability dimensions of interest.

Overall the three factors identified by the explorative factor analysis (based on the preliminary graphical analysis used to identify the statistically optimal number of factors) were able to explain 39% of the variance of the dataset. While this share first appears to be relatively small, given the multitude of diverse latent constructs influencing the realized values of the indicators and the measurement error inherent to a survey data it is still a highly relevant portion of the variance inherent in the data. Therefore explaining 39% of the overall variance of the measured results with three factors supports the assumption that *social vulnerability* strongly influences the realized values of the indicators. Particularly if the good fit of the factors and their attributed indicators with the underlying theoretical framework is considered. A breakdown of the overall explained variance reveals that the first identified factor explains 16%, the second factor 15% and the third factor still 7% of the overall variance. Given the assignments of the vulnerability dimensions to the factors, the *Social support networks* dimensions can explain the largest share of the variance of the sample data, the *Individual capacities & needs* dimension the second largest share and the *Public support structures* dimension the smallest one of all the operationalized social vulnerability dimensions.

Figure 6 serves as an illustration of how the relevant indicators measured by the survey questionnaire with absolute loadings[40] higher than 0.3 were attributed to the three identified factors[41]. These factors were named after the social vulnerability dimension they serve as indices for. In the following part, the indicator attribution to the different factors will be described, while the factor loadings of the

[34] Avg: 4.602
[35] Avg: 4.372
[36] Avg: 4.354
[37] Avg.: 3.661
[38] Avg.: 3.477
[39] Avg.: 3.342
[40] The factor loadings can be understood as the correlation between an indicator and a factor. It shows the variance explained by the indicator on that particular factor (cf.Kim and Mueller (2004). A negative loading implies a negative correlation between an index and the factor. This means if the value of the index increases, the value of the factor on average decreases.
[41] Social support networks, Individual Capacities & needs and Public support structures

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different items are reported through figure 1. It should also be noted that a few potential indicators that were included in the survey, like the ability to deal with unexpected expenditures of 1000€, did not have an absolute factor loading score of 0.3 or more for any of the factors and were therefore excluded from further analysis

Factor 1 is representing the *Social support networks*-dimensions of vulnerability. Overall, the factor analysis identified seven variables as suitable indicators for the operationalization of this latent construct. These are, in order of the absolute value of their factor loading: (a) relative social status a respondents has within their neighbourhood (Factor loading: 0.8), (b) self-reported absolute social status they have among the general society (0.8), (c) reported relative financial situation when compared to their area of living is also taken into account (0.7), (d) absolute monthly net household income (0.5), (e) distance to the next social contact to which they would turn to in case of a disaster (-0.5), (f) believe in support by the family (-0.4) and (g) believe in support by the neighbours (-0.3).

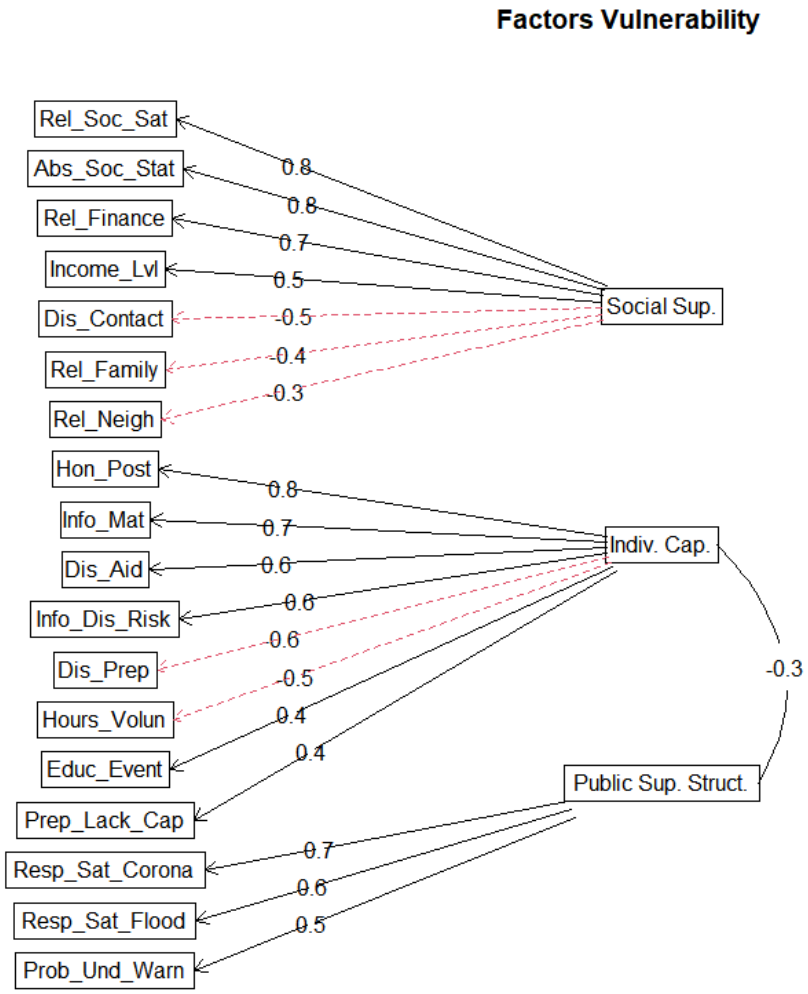

Figure 6: Illustration Factor Loading, Source: Own graphic

Factor 2 serves to measure the *Individual capacities & needs* dimension of vulnerability. It consists out of eight indicators. These are a) whether the respondent currently holds or has ever had an honorary post (0.8), b) if they already had access to information material about disasters (0.7) and

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c) if they work, both voluntary or professionally, in an organization active in disaster aid (0.6). Further indicators included in the index construct for this factor are d) whether they feel well informed about disaster risks at their living area (0.6), e) how many preparational measures for disasters they have undertaken (-0.6), f) how much time they invest in volunteering on average during a day (-0.5) and g) whether or not they have ever participated in crisis related educational events (0.4). Finally, the last included indicator was h) a dichotomous variable which indicates if a person did not implement more preparatory measures against disasters because they lacked the special, financial, or temporal capacity to do so (0.4).

Factor 3 represents the *Public support structures* dimension and is formed by three indicators for respondents who experienced a flood and two indicators for survey subjects who stated that they have never experienced a flood disaster before. The first two indicators measure the a) satisfaction of a respondent with the official response during the COVID-19 pandemic (0.7) and b) the floods (0.6). The final indicator measures c) whether or not a respondent experienced problem with understanding a disaster warning before, which were not caused by technical difficulties which the warning party is responsible for (0.5)[42].

Inspecting the correlation between the different indices and the indicators used in their construction reveals that while indicators are generally highly correlated with the index, they were used to a degree that roughly corresponds with its factor loading, but are much less correlated with the other indices. In addition, indicators that were excluded from the index construction are also relatively weakly correlated with each of the indicators, with a maximum correlation of 0.31 existing between the ability to deal with unexpected expenditures and the strength of one's own social support network. The indicators therefore behave as expected, as a low correlation with the other dimensions they do not serve as indicators for can be expected. This is due to all of them being sub-dimensions of the overarching latent construct of *social vulnerability*. Differences in the direction of the correlation between indicators and indices can be attributed to the standardization of the indices' orientation.

Table 3: Correlation between indicators and constructed indices (n = 117), Source: Own table

	Dis_Prep	Educ_Event	Info_Mat	Rel_Family	Dis_Contact	Rel_Finance	Abs_Soc_Stat	Rel_Soc_Sat
Vuln_Soc_Sup	-0.152343533	0.098195195	0.17256087	0.36093585	0.5675617	-0.7650995	-0.8586373	-0.8530640
Vuln_Ind_Cap	-0.655580004	0.500759491	0.69565195	0.17767597	0.1364466	-0.3156043	-0.1749564	-0.1336936
Vuln_Pub_Sup	-0.006000268	0.004958493	-0.02755971	-0.09793944	0.1192140	-0.3134209	-0.1310475	-0.1109632

	Hon_Post	Dis_Aid	Hours_Volun	Resp_Sat_Flood	Resp_Sat_Corona	Info_Dis_Risk	Rel_Neigh
Vuln_Soc_Sup	0.3808789	0.1234409	0.20102589	-0.06529614	-0.2840884	0.3288880	0.44101079
Vuln_Ind_Cap	0.7625321	0.7320544	-0.54254387	-0.06336712	-0.2580284	0.6406449	0.19084750
Vuln_Pub_Sup	0.2325103	0.1964700	-0.06204801	-0.79792076	-0.8072343	0.2053543	0.05383401

	Prep_Lack_Cap	Dep_Sup	Soc_Info	Prob_Und_Warn	Unexp_Exp	Income_Lvl
Vuln_Soc_Sup	0.29431137	-0.09135400	-0.04674318	-0.04814126	0.31290082	-0.6228436
Vuln_Ind_Cap	0.40108194	0.12375095	0.02096033	-0.12470088	0.02574989	-0.1513750
Vuln_Pub_Sup	0.09979372	0.06012763	-0.06686031	-0.61384259	0.23911100	-0.2184445

In addition, the correlation between the three indices was also examined. The results of this were also consistent with the association between the indicators and the indices. While some association, as should be expected, exists[43], it remains on a moderately low level. It is thereby implied that the three indices are correlated since they measure the same latent construct, *social vulnerability*. But they are

[42] Frequencies of multiple loudspeakers cancelled each other out and in some instances the quality of the loudspeakers was so bad, that it was near impossible to understand the announcements

[43] Between 0.2 and 0.28

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also different in their individual realization because they represent different subdimensions of the construct and therefore are only correlated to a degree. This means that while *Social support networks, Individual capacities & needs* and *Public support structures* are all part of and contribute to the overall construct of *social vulnerability*, they are different aspects of it that are only incompletely associated with one another and therefore measure different characteristics of a person. Additionally, all correlations between the different indices are positive, thereby confirming that the unification of the orientation of the indices has been successful. The value increase in each of these dimensions is associated with a higher level of vulnerability.

Table 4: Correlation of the three vulnerability dimensions of interest (n = 115), Source: Own table

	Vuln_Soc_Sup	Vuln_Ind_Cap	Vuln_Pub_Sup
Vuln_Soc_Sup	1.0000000	0.2777289	0.2326176
Vuln_Ind_Cap	0.2777289	1.0000000	0.1964065
Vuln_Pub_Sup	0.2326176	0.1964065	1.0000000

5.2.3. Correlation Analysis

After constructing the required indices for operationalizing the three dimensions of social vulnerability of interest in the previous subsection, the following and final step of the quantitative analysis section of the German case study focuses on identifying associations present within the survey sample. In the following report, only relevant strong correlations with an absolute score of 0.2 or higher are reported in order to keep the report concise. As a starting point it investigates the correlation between higher levels of vulnerability and the ability to deal with floods and the COVID-19 pandemic as well as the degree by which people are negatively affected by their impacts.

5.2.3.1. Association of social vulnerability with the capability to successfully deal with disasters

Inspecting the association between the three different dimensions of vulnerability and reported ability of the respondents to deal with the two disaster types of interest reveals that the correlation between the operationalized vulnerability dimensions and the self-reported capability to deal with disasters is nearly, with two exceptions, completely negative. A higher level of vulnerability is therefore within all the operationalized dimensions of social vulnerability associated with a reduced capability of dealing with the different types of challenges posed by the evaluated disasters. Additionally, the correlation between the three vulnerability dimensions and the number of challenges faced during flood disasters is also positive for all three instances, thereby implying that participants with a higher level of vulnerability face more challenges during disasters. These associations are therefore consistent with the expectation that people who are more vulnerable also struggle more during disasters. Not all of these associations are strong cant though. This section focuses on reporting only the strong, and therefore statistically relevant, correlations. The vulnerability dimension with the highest number of positive correlations within the different assessed types of capabilities for dealing with floods is the *social support network*-dimension. It is both strongly correlated with the general ability to deal with floods (with a correlation score of -0.263) and the respective financial ability (score: -0.289). The *public support structures*-dimension, on the other hand, is only strongly correlated with the financial ability to deal with floods with a score of -0.335. The *individual capacities & needs*-dimension is not strongly correlated with one of the measured indicators for dealing with floods. None of the vulnerability dimensions is strongly correlated with the number of challenges faced during floods, too. Overall, these analytical results imply that the vulnerability dimension which had the largest association with

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the respondents' ability to successfully deal with negative effects of flooding disasters was the *social support network*-dimension. While the *public support structures*-dimension of vulnerability also had some association with a person's capability to deal with the financial effects of a flood, *individual capacities & needs*-dimension of vulnerability did not have any relevant association at all. It therefore seems like the social network of a respondent was the most important factor for successfully overcoming the negative effects of floods for the participants of the survey.

Table 5: Correlations Vulnerability Dimensions and Disaster Capabilities (n = 117), Source: Own table

	term	Deal_Flood_Gen	Deal_Flood_Fin	Deal_Flood_Health	Deal_Flood_Psych	Imp_Flood_Gen
	<chr>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
1	Vuln_Soc_Sup	-0.263	-0.289	-0.207	-0.127	-0.337
2	Vuln_Ind_Cap	-0.114	0.0179	0.00515	-0.0595	-0.178
3	Vuln_Pub_Sup	-0.176	-0.335	-0.196	-0.150	-0.246

	Imp_Flood_Fin	Imp_Flood_Health	Imp_Flood_Psych	Num_Chal_Flood	Deal_Cor_Gen	Deal_Cor_Fin
	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
1	-0.116	-0.240	-0.298	0.0599	-0.262	-0.449
2	-0.0767	-0.203	-0.123	0.171	-0.267	-0.266
3	-0.109	-0.0143	-0.114	0.108	-0.395	-0.435

	Deal_Cor_Health	Deal_Cor_Psych	Imp_Cor_Gen	Imp_Cor_Fin	Imp_Cor_Health	Imp_Cor_Psych	Num_Chal_Cor
	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
1	-0.316	-0.385	-0.442	-0.422	-0.437	-0.416	0.395
2	-0.184	-0.254	-0.283	-0.305	-0.217	-0.271	0.110
3	-0.407	-0.486	-0.516	-0.374	-0.407	-0.505	0.293

Regarding variables assessing the perceived impacts of the floods only three relevant correlations with vulnerability dimensions were identified. The general impact of floods was correlated with the *social support network* of a person by -0.337. The psychological impact was in a correlation of -0.298 with the same dimension. In addition, the availability of a functioning public support structure to a person was correlated with the general impact of a flood -0.246. While all these correlations were not too strong, they still imply a relevant association between the vulnerability level of a respondent and their susceptibility to flooding disasters, at least regarding the *social support network* and the *public support structures*-dimension.

The association between vulnerability and the ability to deal successfully with the COVID-19 pandemic is on the other hand much clearer outlined. All three dimensions are, with one exception, strongly correlated with the four indicators detailing the difficulties experienced by respondents when dealing with the COVID-19 pandemic in general, financially, physiologically and psychologically. The three dimensions were all strongly correlated with the four indicators assessing the severity of the impacts of the COVID-19 pandemic upon the respondents. The only weak correlation exists between the physiological dimension of the level of difficulty experienced when dealing with the COVID-19 pandemic and the individual capacities & needs-dimension of vulnerability. The other relevant correlations of this dimension in regard to the COVID-19 pandemic range from -0.305 for the correlation with the financial impact of the pandemic as the strongest correlation to -0.217 for the relatively weakest correlation with the physiological impact of the COVID-19 pandemic. The strongest correlation of the social support network dimension exists with the financial difficulties experienced during the COVID-19 pandemic and has a value of -0.449, while the weakest, but still relevant correlation is -0.262 with the general difficulties experienced during the pandemic. All the other correlations have values between these two extremes and approximate (except for the correlation with the ability to deal with physiological difficulties caused by COVID-19, which has a correlation of -0.316) a relatively high correlation score of -0.4. Finally, the public support structures-dimension correlates most strongly with the impact of the COVID-19 pandemic. Its strongest correlations exist

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with the difficulties experienced when dealing with the psychological effects of COVID-19 in regard to general impacts of the COVID-19 pandemic. When it comes to the psychological impacts of the pandemic, with all the variables being correlated with the dimension by approximately -0.5, all other correlations approximate to -0.4. Furthermore, the *social support network*-dimension and the *public support structure*-dimension are also positively correlated with the number of challenges experienced during the COVID-19 pandemic, while the *individual capacities*-dimension's correlation is much weaker. This implies that people who score higher on these vulnerability dimensions also struggle with a higher number of challenges during COVID-19. Overall, the results in this section demonstrate, that all three evaluated vulnerability dimensions had a clear association with the ability of an individual to deal with the current COVID-19 pandemic. A person who was more vulnerable on the *social support network*-, *individual capacities & needs*- as well as the *public support structure*-dimension therefore was much more likely to struggle with the pandemic than somebody who scored lower values on these dimensions. This association was also much more highlighted for the COVID-19 pandemic in comparison to the flood disasters.

5.2.3.2. Associations of socio-demographic characteristics with the capability to successfully deal with disasters

The next step of the analysis tried to look for associations between socio-demographic variables and the capability of individuals to deal with the two disaster types. Interestingly, the gender of a respondent was negatively correlated with multiple indicators for the severity of the flood events for an individual, but not correlated for any of the indicators for the COVID-19 pandemic. More precisely, women and people with a diverse gender had a higher risk of being negatively affected by floods. In particular, the correlation with the ability to deal with the general, physiological and psychological difficulties posed by floods was strong. Interestingly, only the correlation with the ability to deal with financial difficulties posed by floods was close to zero. In regard to the impacts caused by floods, only correlations with the general and the psychological impacts were strong. It therefore seems like female respondents and respondents with a diverse gender struggle more with multiple negative effects of floods compared to men.

When it comes to whether a person has a debilitating health problem, measured associations can be identified both for floods, as well as the current COVID-19 pandemic. Strong effects exist for difficulties regarding the flood in general and regarding finances. For the COVID-19 pandemic, the general difficulties as well as the physiological and psychological ones were strongly associated with this variable. Interestingly, the correlation with financial difficulties caused by the pandemic was close to zero. Regarding the impacts of the flood, the general and psychological impacts were strongly correlated, as well as the number of challenges faced during the flood. For the pandemic, the general, physiological and psychological impacts were strongly associated with deliberating health problems.

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Table 6: Correlations Social-Demographic Characteristics and Disaster Capapbilities (n = 118), Source: Own table

	term	Deal_Flood_Gen	Deal_Flood_Fin	Deal_Flood_Health	Deal_Flood_Psych	Imp_Flood_Gen	Imp_Flood_Fin
	<chr>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
1	Gender	-0.261	-0.0634	-0.240	-0.313	-0.433	-0.204
2	Disab	0.220	0.261	0.158	0.208	0.226	0.231
3	Disab_Card	0.344	0.355	0.323	0.288	0.402	0.360
4	Religion	-0.0767	-0.0770	-0.0547	-0.0569	-0.202	-0.0490
5	age	-0.0832	-0.0514	-0.103	0.00380	-0.00926	-0.145
6	l_city	-0.0206	0.00194	0.0933	0.0326	-0.0285	0.00244

	Imp_Flood_Health	Imp_Flood_Psych	Num_Chal_Flood	Deal_Cor_Gen	Deal_Cor_Fin	Deal_Cor_Health	Deal_Cor_Psych
	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
1	-0.231	-0.348	0.161	-0.161	-0.0470	-0.135	-0.109
2	0.198	0.256	-0.190	0.253	0.0710	0.456	0.375
3	0.330	0.347	-0.112	0.0883	0.127	0.188	0.200
4	-0.0466	0.0150	-0.0202	0.0326	-0.121	-0.0341	-0.0869
5	-0.101	-0.0551	0.00927	0.200	0.228	0.0994	0.191
6	0.00429	0.0672	0.0400	-0.0997	-0.0928	-0.0524	-0.138

	Imp_Cor_Gen	Imp_Cor_Fin	Imp_Cor_Health	Imp_Cor_Psych	Num_Chal_Cor
	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
1	-0.0666	-0.115	-0.135	-0.0905	-0.0144
2	0.344	0.118	0.459	0.423	-0.106
3	0.125	0.186	0.247	0.207	-0.0912
4	0.0268	-0.209	-0.0694	-0.123	0.00506
5	0.121	0.245	0.0788	0.124	-0.0994
6	-0.141	-0.0699	-0.119	-0.138	0.0210

An even clearer picture forms for respondents who had an official disability card. For this respondent group only five variables measuring the difficulties and severity of the impacts of the floods and the pandemic were not strongly correlated. These were the number of challenges faced during floods, and for the pandemic the general and financial difficulties as well as the number of challenges faced meanwhile. Overall, the data strongly implies that people with disabilities or serious medical restrictions are much more susceptible to the negative effects of flood disasters and pandemics.

In contrast to this observation, respondents being members of religious organization was only strongly correlated with the financial impacts they faced during the pandemic. It appears that religious people were less susceptible to sever negative financial impacts caused by the COVID-19 pandemic than non-religious people.

The age of a participant was, interestingly, not strongly associated with any of the indicators measuring the severity of the effects and impacts of floods. For the pandemic, a strong correlation existed for the general, financial and psychological difficulties experienced during the pandemic, as well as its financial impacts. An additional graphical analysis also confirmed that for these variables a linear positive association exists between them and the age of the respondents. Therefore, older people appear to be more negatively affected in these regards.

Inspecting whether people in large cities with 100,000 inhabitants or more are differently affected by the two disaster types than people in smaller settlements revealed, in contrast to the previously assessed socio-demographic variables, no relevant differences.

A final interesting observation can be made for the relationship between the educational level of a participant and the felt effects of the two disaster types. Most calculated associations were not relevant, but for the perceived physiological and psychological impacts of floods, as well as the perceived difficulty in dealing with financial effects and impacts of the pandemic, a strong positive

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correlation existed. Furthermore, the number of challenges faced during COVID-19 was also negatively associated with the educational level of a respondent. These associations imply that people with a higher educational background faced less problems regarding these dimensions of the evaluated disasters.

To sum up the results of this section: While socio-demographic variables were associated with the impacts of floods and the current COVID-19 pandemic, as well as its impacts and the challenges faced during these two disaster types, their association appeared to be stronger and more versatile for the pandemic. Overall, it seems like the experience of the pandemic differs more between social groups compared to the flood disasters. A possible reason for this could of course be that most respondents in general perceived, or at least remembered, the floods as less severe than their experience of the currently ongoing pandemic. Of all socio-demographic groups, respondents with debilitating health issues and respondents who have an official disability card appear to be the hardest hit group by both floods and COVID-19.

5.2.3.3. Association between social vulnerability and socio-demographic key characteristics

As the next step, the association between the three operationalized dimensions of social vulnerability (the *social support network*-, *individual capacities & needs*-, as well as the *public support structure*-dimension) and the assessed socio-demographic variables was inspected. This inspection reveals that not too many relevant associations exist between these two variable groups. Gender was the first inspected socio-demographic variable and it appears to be only one strongly correlated with the individual capacity & needs vulnerability dimension by a score of 0.227. It is therefore implied that women and gender-diverse people are more vulnerable regarding this dimension than men. People suffering from restrictive health problems appear to be vulnerable in the *public support structures* dimension and therefore seem to be more susceptible to experience a lack of public support. People owning an official disability card are, on the other hand, much more vulnerable in the *social support network* dimension. The inspection of the membership in a religious organization did not reveal any relevant association with any of the vulnerability dimensions, as it was the case with the age of a respondent. Interestingly, respondents who live in major cities appeared to be less vulnerable regarding the individual capacities & needs-dimension compared to people living in smaller settlements. A respondent's level of education also appears to be strongly negatively associated with their vulnerability level on the social support network dimension, thereby implying that higher educated persons are less vulnerable on this dimension.

Regarding the income level of respondents a few associations with other variables of interest were also specifically analysed. The first examination was carried out to check whether respondents who have stated that they did not implement more disaster preparations because of their financial situation really had less money available than the survey average (see section 4.2.1.2, Social Vulnerability indicators). The results of a comparison of the mean and the median confirms that this is indeed the case. While respondents who stated that they did not implement (more) disaster preparation measures due to their lack of financial capabilities on average had a net household income of 1957.67€, respondents who did not implement more measures for other reasons had an average income of 2970.95€ (median: 1875€ and 2875€). Interestingly, respondents who were not asked why they have not implemented more preparations (because they have reported that they already had implemented a comparatively high number of four or more preparations) had an even higher average

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income of 3358.04€ and median income of 3125€ in comparison to both groups of respondents which have only implemented a small number of preparations.

Table 7: Correlations Social-Demographic Characteristics and Vulnerability Dimensions (n = 117), Source: Own table

	term	Vuln_Soc_Sup	Vuln_Ind_Cap	Vuln_Pub_Sup
	<chr>	<dbl>	<dbl>	<dbl>
1	Gender	0.199	0.227	-0.0177
2	Disab	-0.189	-0.0591	-0.295
3	Disab_Card	-0.268	0.0552	-0.0832
4	Religion	0.0703	0.158	-0.0531
5	age	-0.0185	-0.0718	-0.0862
6	l_city	0.119	0.495	0.118

The second variable that was specifically analysed in depth was the self-reported capability of respondents to cover an unexpected expenditure of 1000€. This construct of interest was covered, as has already been described in section 4.2.1.2, by two variables. One of them assessed whether people who were exposed to a disaster were able to cover an unexpected expenditure of 1000€ right after the disaster, while the other variable assessed if people who were not exposed to a disaster could cover such an expenditure at the time of the survey. It has been found that the rate of people who reported that they struggle with covering such an expenditure is higher for people who were asked whether they would be able to do so in the context of the aftermath of a disaster. Comparing the average income of people who reported that they were able to cover an unexpected expenditure of 1000€ with the average income of people who were not able to cover such an expenditure reveals that in the aftermath of a disaster and under normal conditions the income of people who were able to cover such an expenditure was clearly higher. For the respondents asked for their ability to do so in the aftermath of a disaster, the average income of people who stated they were able to cover an unexpected expenditure of 1000€ was 3857€ (median: 3125€) and the average income of people who were not able to do so was 2403€ (median: 2250€). Regarding the variable that asked this question for the time the survey was implemented, the average income of people able to cover the 1000€ was 3733€ (median: 4250€) and for respondents who were unable to do so it was 1909€ (median: 1875€). Interestingly, the average income barely did not differ for people who have experienced a disaster and people who did not. People who were asked questions regarding the disaster context had an average monthly household income of 3048€, while people who were asked the alternative question had an average income of 3010€. Finally, it was checked if people who were unable to cover the 1000€ expenditure in the aftermath of a disaster were hit harder by a flood regarding their financial capabilities. Calculating the correlation between their answer to this question and the financial difficulties caused by floods as well as their financial impact revealed that no strong correlation existed. Overall, it seems like the prime determining factor for the ability of respondents to cover an unexpected 1000€ expenditure was their income situation, unrelated from their disaster experiences. Therefore, the higher rate of people struggling to cover an unexpected expenditure of 1000€ in the aftermath of a disaster was most likely due to the particular context for which the question was asked.

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5.2.3.4. Self-Assessment items

As the next and final step of the analysis of the association between different variables and the relationship between the self-assessments made by respondents and the other variable groups of interest is inspected. Regarding the self-assessed capability to deal with different types of disasters, the correlation analysis reveals a strong association with most indicators for the difficulties experienced during disasters. This implies that people who assess their ability to deal with disasters as better indeed were less affected by disasters. The only indicators for which no relevant association existed were the difficulties experienced during floods concerning their psychological effects, financial impacts and the number of challenges faced during floods. All indicators for the COVID-19 pandemic were strongly correlated and implied that respondents who perceived they were better able to deal with disasters were in fact better able to deal with COVID-19.

Following up on the analysis of the correlation between the self-assessment of one's capability and the actual analysis of respondents to deal with disasters, the correlation between the self-assessments and the operationalized vulnerability dimensions was inspected. A first interesting association exists between the self-assessed capability of respondents to deal with disasters and the three vulnerability dimensions (*social support network*, *individual capacities & needs*, and *public support structure*). All three are strongly negatively associated with the self-assessed capability, thereby implying that people who are less vulnerable are aware of this on some conscious or unconscious level and report their capabilities accordingly.

On the other hand, the variables measuring the perceived importance of certain individual characteristics for dealing successfully with disasters were almost completely weakly correlated with the vulnerability of a respondent. The only exception to this rule was the variable measuring the perceived importance of income for dealing successfully with disasters. It was strongly positively associated with the *individual capacities & needs*, as well as the *public support structures*-dimension, thereby implying that respondents who perceive income as particularly important for being able to deal successfully with disasters are also more vulnerable in these two dimensions.

Finally, the association between socio-demographic groups and the assessment variables was inspected. Most socio-demographic variables do not seem to be associated with the variables measuring self-assessment. The self-assessed capability of dealing with disasters successfully only seems to be strongly correlated with the socio-demographic indicators. The first one is gender with -0.199, implying that women and respondents with a diverse gender evaluate their capability off dealing with disasters as being worse than men. The second one is whether the respondent owns an official disability card with a correlation score of 0.234, implying that respondents who have a disability card evaluate their capabilities as being worse than people without such a card. The final variable is the education level of a respondent with a score of 0.194, implying that respondents with a higher education level evaluate their capability, on average, as being better.

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Table 8: Correlations Self-Assessement Items (n = 118), Source: Own table

	term	Deal_Flood_Gen	Deal_Flood_Fin	Deal_Flood_Health	Deal_Flood_Psych	Imp_Flood_Gen	Imp_Flood_Fin
	<chr>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
1	Num_Chal_Cor	-0.270	-0.234	-0.270	-0.167	-0.0981	0.0181
2	Vuln_Soc_Sup	-0.263	-0.289	-0.207	-0.127	-0.337	-0.116
3	Vuln_Ind_Cap	-0.114	0.0179	0.00515	-0.0595	-0.178	-0.0767
4	Vuln_Pub_Sup	-0.176	-0.335	-0.196	-0.150	-0.246	-0.109
5	Gender	-0.261	-0.0634	-0.240	-0.313	-0.433	-0.204
6	Disab	0.220	0.261	0.158	0.208	0.226	0.231
7	Disab_Card	0.344	0.355	0.323	0.288	0.402	0.360
8	Religion	-0.0767	-0.0770	-0.0547	-0.0569	-0.202	-0.0490
9	age	-0.0832	-0.0514	-0.103	0.00380	-0.00926	-0.145
10	l_city	-0.0206	0.00194	0.0933	0.0326	-0.0285	0.00244
11	Ass_Dealing_Dis	0.326	0.220	0.234	0.164	0.360	0.159
12	Ass_Health	0.0881	0.0325	0.0448	0.0553	-0.128	-0.174
13	Ass_Psych	0.0529	0.0584	0.119	-0.0137	-0.0837	-0.145
14	Ass_Soc_Net	-0.197	-0.186	-0.186	-0.166	-0.190	-0.159
15	Ass_Soc_Stat	-0.313	-0.241	-0.335	-0.312	-0.142	-0.141
16	Ass_Inc	-0.192	-0.102	-0.156	-0.138	-0.168	-0.0237
17	Ass_Lang	-0.0979	-0.0901	-0.0412	-0.0265	-0.150	-0.154

	Imp_Flood_Health	Imp_Flood_Psych	Num_Chal_Flood	Deal_Cor_Gen	Deal_Cor_Fin	Deal_Cor_Health	Deal_Cor_Psych
	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
1	0.149	-0.0954	0.151	-0.339	-0.518	-0.335	-0.475
2	-0.240	-0.298	0.0599	-0.262	-0.449	-0.316	-0.385
3	-0.203	-0.123	0.171	-0.267	-0.266	-0.184	-0.254
4	-0.0143	-0.114	0.108	-0.395	-0.435	-0.407	-0.486
5	-0.231	-0.348	0.161	-0.161	-0.0470	-0.135	-0.109
6	0.198	0.256	-0.190	0.253	0.0710	0.456	0.375
7	0.330	0.347	-0.112	0.0883	0.127	0.188	0.200
8	-0.0466	0.0150	-0.0202	0.0326	-0.121	-0.0341	-0.0869
9	-0.101	-0.0551	0.00927	0.200	0.228	0.0994	0.191
10	0.00429	0.0672	0.0400	-0.0997	-0.0928	-0.0524	-0.138
11	0.291	0.310	-0.0440	0.387	0.332	0.340	0.385
12	-0.226	-0.255	-0.107	0.0395	0.0762	-0.0156	-0.0303
13	-0.0776	-0.137	-0.0788	-0.111	-0.00587	0.0650	-0.128
14	0.0456	-0.0515	0.0583	-0.152	-0.0600	-0.0370	-0.196
15	-0.0749	-0.0718	0.0145	-0.273	-0.152	-0.130	-0.135
16	-0.0595	-0.123	0.0968	-0.217	-0.236	-0.0249	-0.161
17	-0.0282	-0.0219	-0.106	-0.0793	0.0673	-0.0334	0.00985

	Imp_Cor_Gen	Imp_Cor_Fin	Imp_Cor_Health	Imp_Cor_Psych
	<dbl>	<dbl>	<dbl>	<dbl>
1	-0.529	-0.544	-0.478	-0.511
2	-0.442	-0.422	-0.437	-0.416
3	-0.283	-0.305	-0.217	-0.271
4	-0.516	-0.374	-0.407	-0.505
5	-0.0666	-0.115	-0.135	-0.0905
6	0.344	0.118	0.459	0.423
7	0.125	0.186	0.247	0.207
8	0.0268	-0.209	-0.0694	-0.123
9	0.121	0.245	0.0788	0.124
10	-0.141	-0.0699	-0.119	-0.138
11	0.410	0.315	0.370	0.292
12	-0.0478	-0.0202	-0.100	-0.0916
13	-0.131	-0.0443	0.0308	-0.158
14	-0.177	-0.0778	-0.138	-0.185
15	-0.247	-0.114	-0.136	-0.169
16	-0.251	-0.231	-0.0254	-0.133
17	-0.110	0.0205	-0.171	-0.0122

Only in two instances are the variables assessing the perceived importance of individual characteristics strongly correlated with socio-demographic variables. The self-assessed importance of the physiological constitution of a person is perceived as being much less important by people with a higher educational background compared to people with a lower educational background. In addition, people living in a major city see a high-income level as more important for dealing successfully with disasters in comparison to people in smaller settlements. Overall, it can be deduced that the socio-demographic background of a person does not strongly influence their perception of the importance of individual characteristics for successfully dealing with disasters.

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6. Main Aspects and Points to Consider

Based on these results of the German case study in the following seven aspects should be discussed in more detail and serve as a foundation for recommendations, which should be discussed and further developed in WP5 of the BuildERS project.

6.1. Taking up responsibilities requires awareness, ability and the possibility to adjust

A crucial feature of every functioning (disaster) management system is, that every actor knows his/her tasks and areas of responsibility and is able to live up to them. This encompasses three steps: First, individuals have to be aware of responsibilities they have to fulfil. Those who have to take certain responsibilities should not only know about them. Second, every "should" requires a "can" and therefore the ability to do so. Therefore, those who are responsible have to be able, trained and equipped to fulfil them. Third, individuals need to be able to raise concerns if they struggle to fulfil them due to conflicts with other responsibilities or a lack of capacities. This requires an open communicational atmosphere and the possibility to raise and discuss issues. The interviews unveiled issues in this regard and outlined in how far shortcomings can lead to a lack of official support. These issues concerned multiple dimensions: a clear understanding of how disaster management (German: Katastrophenschutz) is able to support, the role of citizens and the interplay between crisis management and social politics.

The first issue that was outlined by the interviewees was that people often do not have a clear idea on the tasks and capacities of disaster management structures. Thereby it is not only to be found that citizens do not have a clear on how disaster management works but also that disaster managements responsibilities towards certain living situations are not necessarily clear. Disaster management aims to support existing everyday live structures in order to uphold their structures or bounce back as soon as possible (Karutz et al., 2017, DM3). In this way emergency personnel might provide medical support and rescue those in need as well as fill short-term gaps in the provision of material goods and of care. What they are not able to do is to substitute everyday structures in times of crisis. This is not only due the very structure of disaster management in Germany, which for the most part builds on affiliated volunteers (German: Ehrenamt) (Wendekamm & Matzke, 2015a, 2015b) which are part of these organisations in addition to their (often non-related) employment. Moreover, and without regard to the level of training, disaster management personnel in many fields won't be able to substitute the expertise of those whom they support (e.g., care or social service providers). Even more, citizens themselves are experts of their individual living situations and therefore are an important stakeholder.

At the same time, the lack of knowledge about official support options is not limited to citizens but also includes disaster management or social service providers who only know their own services and not know about the others support offers. If these do not exist existing vulnerabilities can become even more pressing for those who are supposed to prepare and have no one to turn to for support.

Therefore, secondly interviewees of disaster management argue for a major role and responsibility of citizen in coping with extreme events. A core aspect here is the self-provision. For years individual preparedness is a broadly discussed topic. Especially in terms of the BBK guideline for self-provision (BBK, 2017), which started a social and medial discussion ranging from questioning its overall necessity to scrutinizing the ability of citizens to fulfil this attributed responsibility, especially those in precarious living conditions (Krüger & Max, 2019b). Especially the latter point was also found in the survey where limitation in the financial and special spatial situation were named as the most prominent

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reasons why people are not able to take care of provisions for a possible disaster event. For multiple respondents the key reason was that they didn't perceive such measures necessary or were unaware that they could take such measures, respectively how they should have implemented them. Studies suggesting that the general implementation of self-provisions is problematic and did not lead to citizens being able to overcome a 14 days period on their own (Menski, 2016, DM5, DM1). Stockpiling and other forms of self-provision must not only be demanded but require an active support. Furthermore, these studies indicate that citizens might have misconceptions about their abilities to cope as they overestimate their provisions and neglect other factors such as the need for power or heat to prepare food (ibid).

This thesis is likely to be supported by the overall lack of disaster related education in Germany. As the survey suggests only a very small portion of the population have had more than a first aid training course and no further contact to broader preparedness activities. In addition, many of the respondents who received further training did so in the context of their voluntary or professional activity within organisations active in disaster assistance. This means that very few members of the general public participate in such educational events. This conclusion is also supported by 50% of our survey's respondents stating that they don't feel well informed about disaster risks at their place of living. Beyond first aid training courses, little to no training exists regarding topics like behaviour in emergency situations, fire-fighting basics, self-provision or self-protection with regard to different hazards (Hitzges, 2018). In contrast, to enable individuals to activate these capacities such trainings are essential. Addressing these situations might not only encompass to include such training at various point in life and maybe especially in school. Further, courses such as first aid should become obligatory and refreshed in a fixed period. Both is to some extent attempted by a new format which the German BBK presented in 2019 first aid with self-protection components (BBK, 2019). Nevertheless, guidelines and manuals to prevent, prepare, react or recover from crisis and disasters are as well as associated digital tools (such as warning apps) are by no means widely spread, known or used. the survey also implied its usage among the population is still not very widespread. Of the 118 valid respondents in the survey, only 21 have stated that they would learn about a disaster through a crisis warning app. While this was still the most often given response to the question on how somebody would learn about a disaster, it was still a relatively low percentage of the respondents (17.8%) which stated, that this is their primarily source of information about the occurrence of disasters. To enable individuals to take preventive measures, this needs to be changed. Guidelines, manuals and digital tools need to provide information that is accessible to everyone and need to be widely spread.

Finally, the results of the interviews and the survey suggest, that little exchange is to be found regarding existing responsibilities and difficulties but rather a push and shove between disaster management and the population; a tendency mentioned and discussed for some time now in Germany (Wolf R. Dombrowsky & Siedschlag, 2014; Menski, 2016; Pohlmann, 2015; Schulze et al., 2015; Schweer et al., 2014; Sticher & Ohder, 2013).

Against this backdrop, in order to reduce vulnerability and improve the overall resilience, first a common understanding of the limits, tasks and abilities of disaster management has to be supported. Second, individuals but also decision makers and other stakeholders have to be trained and empowered to be able to take up responsibilities that are ascribed to them as well as they have to be aware of the limitations of the disaster management structure (Begg et al., 2015; Begg, 2018). Third, in order to empower individuals, the existing social structures and social policy regulations have to be scrutinized as a core condition that has to be adjusted. For all of this to be implementable, finally, responsibilities and responsibilisation have to be understood as contingent and the results of political

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decision making (Pohlmann, 2015; Krüger & Gabel, forthcoming), which can be adjusted and has to be societally negotiated. This refers to a broader exchange and discussion between disaster management and the population, which the first is – especially in Germany – considered to be part of.

6.1.1. Improving crisis management requires both short-term adjustments and long-term changes of social structures

Disasters are special and extraordinary situations which need experts to deal with the impacts that hazards have on the affected societies. Although crisis prevention, preparedness, response and recovery often take a technical, short- to midterm and rescue-related perspective, for an overall resilience it should not be overlooked, that many issues the come up during crisis are rooted in everyday structures (Cannon, 1994; Geale, 2012; C. Hartman & Squires, 2006; IFRC, 2007; Kelman & Stough, 2015).

Against this backdrop, our findings but also other authors suggest a disconnect between crisis and social politics, which shows up a detachment of short-term disaster management activities and long-term strategies to reduce vulnerability (Dombrowsky und Brauner 1996; Krüger 2019; Gabel 2019; UN-DHA 1994; UN-ISDR 2015, para. 28f).For instance, disaster management often tends to associate more structural issues and especially the consideration of “vulnerable groups” with social service providers rather than being understood as a topic for disaster management (W. R. Dombrowsky & Brauner, 1996; Gabel, 2019; Krüger, 2019; Parthasarathy, 2018; Sparf, 2016; DM1). In contrast, social service providers didn’t make such a clear distinction, emphasising that structures do not only have to be available in everyday live but especially in crisis (SoSe3).

A specific topic this outlines this gap are communication related issues in crisis. Two[44] key components of this are the abilities to access and understand given information (Demeritt et al. 2013, S. 147). As accessible communication (both referring to the literal access and the understandability of information) is a topic not only in everyday life, referring to the overall possibility of social participation, but also and especially in crisis situations. In practice this prominently concerns the reduction of communicational barriers, in order to allow all affected individuals to access, understand and act upon given information. In general, the studies showed that although crisis communication is not yet understood to be fully accessible an improvement can be found since the 2002 flooding. Not only are sign language interpreters very common during the COVID-19 pandemic, also the use of different languages is much more to be found (Adm2; SoSe6; SoSe7; see also the webpages of German authorities[45]). Nevertheless, the interviewees as well as study participants indicated problems, for instance, in the quantitative study it became clear that some people have difficulties to understand the information provided by the NINA app (the official crisis warning app of Germany). This was for instance reasoned with a lack of knowledge to understand information; for instance, what does a specific wind speed mean for my personal context. Often the consequences of this warning

[44] The third aspect of communication related information is “acting upon” information. It is discussed in the next section on individual autonomy.

[45] See for instance https://www.coronavirus.sachsen.de/amtliche-bekanntmachungen-uebersetzungen-5359.html or https://www.baden-wuerttemberg.de/de/service/aktuelle-infos-zu-corona/aktuelle-corona-verordnung-des-landes-baden-wuerttemberg/

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stays unclear thereby implying that the warning should have given more precise recommendations how to respond to the disaster at hand. Furthermore, this app though available in many different languages (including simple language), the information provided through the app is not always translated, rendering the language setup of the app itself a bit cynical (https://www.bbk.bund.de/DE/NINA/Warn-App_NINA_node.html). In addition, the limitations in the over-all level of accessibility in everyday live, such as the lack of an accessible emergency call or low spread of sign language still pose many challenges the diverse population in Germany (Committee on the Rights of Person with Disabilities, 2015). Against the backdrop of this specific example, it becomes visible in how far shortcomings with regard to accessibility not only link to shortcomings in disasters but also how a lack of exchange and interaction between crisis management and social politics tends to amplify these shortcomings rather than addressing them as long-term strategies the could benefit both.

This gap is to be considered a major issue against the backdrop of disaster risk reduction strategies pushed by the UN (UN-ISDR, 2015) and the social construction and therefore influenceability of disasters. It can be argued, that crisis management, especially with regard to prevention and preparedness – and in the whole meaning of disaster risk reduction – should not be limited to these often technical, short- to midterm rescue-related activities. Rather a broader perspective is needed that considers social politics and everyday life as part of crisis management in the sense of crisis risk reduction. Following this argument, crisis management and social politics have to be much more interlinked.

This does not mean that those responsible for the operative and rescue related parts of disaster management (in the German context specifically the “Katastrophenschutz”) should also be responsible to support just structures of equal social participations for instance by reducing homelessness. Rather this needs a much more nuanced approach on how to use existing capacities in the best ways to bring together this commonly separated fields. From an emergency organisations point of view this for instance means to create, support and continue cooperation between disaster management structures and care providers, migrant workers or social workers in order to improve the understanding for individual living situations and develop plans on how to activate existing expertise in times of crisis. Organisations which combine both social service and emergency support under one organisational roof (in Germany the Deutsche Rote Kreuz e.V, Arbeiter-Samariter Bund e.V., Malteser Hilfsdienst e.V. and Johanniter Unfallhilfe e.V.), play a key role as pioneers in this regard. This requires an openness to discuss responsibilities and scrutinize existing conceptualizations of what crisis management means. This does not only mean to be open for participation but to actively get in contact to different actors in order for them to scrutinize existing measures based on their expertise. This active approach is in the interest of disaster management itself as it strengthens their structures and makes them more appropriate to the needs of a diverse society before an event happens.

On the other hand, with regard to for instance social service providers, it refers to the need to create accessible, empowering and just social structures that allow individuals to activate their own capacities and act as independently as possible to thereby reduce the workload for disaster management structures. This for instance encompasses the introduction of support structures and contact points for those who do not consider themselves feasible to cope (before and in an extreme event). Also, social services, which are very often project based, need to get a more continuous financial funding in order to allow them uphold cooperation to emergency organisations, implement preparedness activities and therefore be able to offer their services even in crisis situations. This will then lighten the work load for crisis management.

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A closer collaboration between disaster management and social services can help to achieve accessible risk communication strategies. In line with the Sendai Framework (Reference, para.19) this would also help to develop a disaster management system which considers social diversity and the multiplicity of living situations in the European Union. To make disaster management overall more inclusive and consider the contextuality of different life situations the aim should be to include social service providers (governmental and private) in disaster management structures. Further, for an ongoing exchange and stable cooperation this approach has to be both supported by national authorities and performed in a local context, which knows best about the existing social structures and needs.

With regard to the specific example of communication: To make information about disasters and preventive measures accessible to everyone means to provide warnings in illustrations, sign language or for those without reception device. Furthermore, it encompasses to train citizens on how to interpret warnings (e.g. what does a wind speed of 10m/s mean), or to provide simple language information. With regard to being able to act, it refers for instance to an increase of accessibility, the option to get assistance, the provision of shelters not only for acute victims and non-injured but for the chronically ill, care recipients or persons with disabilities.

The whole process should thereby be understood as ever persistent and ongoing. As needs and living realities change, all perspectives are limited and it is those who are most vulnerable who are not seen in the first place, an ongoing process should ensure a continuous reflection and scrutiny of strategies, plans and measures. In addition, this discussion also and especially requires to scrutinise social understandings of (bodily, mental, cultural, religious, gender-related) normality. Adjustments should thereby be seen as improvements rather than mistakes.

6.1.2. Individual autonomy should be promoted by crisis management activities, while acknowledging its potential to put people in vulnerable situations

Besides the above mentioned access and ability to understand information, thirdly the ability to act on them, in terms of interpreting given information on potential hazards as well as on how to behave and make conscious and well-informed decisions, is a core aspect of both individual vulnerability as well as resilience. This encompasses three things: the training of skills, access to information and the freedom to act upon what was identified as appropriate action. Especially the latter point is contested in crisis and disaster management, as on the one hand individuals are longed to be more self-sufficient and able to care for themselves. On the other hand, crisis management often builds on a command-and-control system, where the population is merely a receiver or has a passive role.

For instance, during the floods, refused to evacuate in order to protect their homes and willingly choose to stay in a risky situation although they could have been rescued (Fischer, 2017). Secondly, statements on especially older people that could be found both in the German case study and the Estonia case study, refer to them as refusing to ask for help (cf. DM2, similar findings are also made in D4.4). They reasoned this in their will to be independent and a potential fear of stigmatisation. A similar case was also found with a woman using a wheelchair, who refused to be marked as member of a risk group but longed to make this decision on herself by herself (Adm4). Thirdly, for instance individuals with a migration background might avoid interaction with disaster management due to a perceived the risk to be deported due to lacking a residence permit (SoSe6). This renders their situation even more vulnerable. Finally, a fourth dimension, which did not come up during this study

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but can be found for instance during Hurricane Katrina is that individuals due to previous neglect or negative experiences in other events lack trust in support structures (C. Hartman & Squires, 2006).

Taking these examples together they do not only illustrate how some characteristics (such as residential status) have the potential to reduce the possibility to benefit from support mechanisms. Also, what all these examples emphasise is that there might be "good" reasons for taking actions and decisions, which are not in line with official disaster management recommendations. Against this backdrop, in order to reduce the risk of becoming vulnerable, crisis management has to reflect on and scrutinize its own structures with regard to an individual who wants to protect her material existence, who fears to lose her status as an independent individual, who distrusts established structures because of previous experiences or avoid support due to a fear of being deported. With regard to the normative and ethical dimension of autonomy, these situations do also refer to a broader justice related issue presented in the capability approach (Nussbaum, 2014; Sen & Krüger, 2013). Although all individuals have the principal possibility to get support, some living situations make it impossible to really access these support structure, as for instance not using them is considered to have the better outcomes.

At the same time, all these decisions, though they should be recognized and respected as often rational decisions, put disaster management personnel in a difficult position. Although they warned individuals about potential risks, they would have to come back at a later point to support or rescue them if their situation got worse (Fischer, 2017). Furthermore, due to the organisation of (German) crisis management it is often not possible to actively search for persons who could need support, but those persons are needed to raise their need for support (Adm4). In terms of further complicating it, it might be assumed that empowering people by training them and activating their abilities to deal with extreme events raises their will to make individual decisions, which tends to be in contrast to a usual self-understanding of crisis management following a command-and-control narrative structure (Sticher und Ohder 2013).

Against this backdrop, two somewhat ambivalently linked aspects seem to be most important in this regard. On the one hand, the relationship of individual decisions and becoming vulnerable has to be discussed. This means that there can be "good" reasons not to comply, which at the same time should not be mistaken as a lack of risk awareness but as taking decisions that will increase vulnerability due to a (perceived) lack of alternatives. On the other hand, crisis management has to find ways to scrutinize these reasons without talking people over or ignoring the living situations these individuals are in. Within this field of tension, crisis management has to openly discuss how to navigate between these two poles. It needs to scrutinize how to respect those who do not follow official calls by understanding the (good) reasons individuals might have not to trust (because they were forgotten, ignored or stigmatised in previous events), not to follow procedures (because they want to protect their property) or raise concerns about measures to be taken (because they are the [medical] experts of their individual living situation).

These conflicts cannot be solved easily – if it all – but need for open discourse, understanding and respect for individual autonomy. At the same time, there is a thin line between respect of well-informed and autonomous decisions and the legitimate demand to intervene. Dealing with thereby is not only for disaster management to decide but refers to the need of a broader social discourse. As empowerment aims to improve individual chances to make well-informed decisions crisis management has to also scrutinize its own role, expertise and especially responsibilities. This does

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also encompass training crisis management personnel to be both non-paternalistic experts and non-ignorant supporters of autonomous decisions.

6.1.3. Crisis management activities should be considered as a potential factor of vulnerability

In addition to the common finding that extreme events amplify existing inequalities (Cannon, 1994; Geale, 2012; C. Hartman & Squires, 2006; IFRC, 2007; Kelman & Stough, 2015), the results, especially on the pandemic, pointed towards the potential risk of an amplification of vulnerable situations, by measures that are taken in order to overcome disasters. While such issues can also be found with the Dresden flooding and the conscious destruction of dams and therefore flooding of villages for the greater good (Issing et al., 2013), this vulnerability factor has become even more prominent during the pandemic.

For instance, the case study shows that (also in other countries a challenge emerged for communication of and with speech- and hearing-impaired persons due to the impossibility of for instance read lips when wearing an FFP2 mask (Eskytė et al., 2020; gehörlosenverband münchen und umland e.V., 2020). Although considering masks a valuable and important strategy of dealing with the pandemic the unavailability of transparent masks made speech- and hearing-impaired persons have to decide between COVID-protection[46] and social participation.

Even more prominent are the impacts of the lockdowns which aimed to “flatten the curve” by reducing the spread rate of the virus. As public life was reduced to a minimum, schools were closed and individual freedom was restricted, many of those who are commonly not considered specifically vulnerable were pushed into much more vulnerable situations. For instance, families became burdened in a threefold way of having to deal with family care, home-schooling and work at the same time and often in the same room (SoSe3). Furthermore, the physical distancing as part of the general anti-COVID strategy led to an increased isolation of citizens, which posed a risk for the psychological stability and wellbeing of citizens; the interviews thereby emphasized the stress for children and elderly people (Skoda et al., 2021, Adm1).

New vulnerabilities arose not only for the users of social services but the social support structures themselves as well. Due to the lockdowns the number of unemployment rose, and more citizens needed social welfare services such as soup kitchens, leading to an increased strain on their food supply and personnel (DM2).

The findings support what other scholars also discussed in events such as hurricane Katrina in the US, where not only the extreme event but crisis managements measures of all levels (prevention, preparedness, response and recovery) themselves can create or amplify vulnerabilities and injustices (C. Hartman & Squires, 2006). Furthermore, this emphasises that it is not only extreme events, or inappropriate crisis management structures that can put persons in vulnerable situations, but that measures themselves redistribute risks and harms.

[46] Based on the discussion between the Munich deaf-people community and the Servicestelle im Bayerischen Staatsministerium für Gesundheit und Pflege deaf people are allowed to take off their mask if it hinders their communication (gehörlosenverband münchen und umland e.V., 2020)

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A short remark can finally be made regarding the extent to which individuals could benefit from disasters or at least could activate abilities which are usually not seen in everyday life. Especially the results from the survey indicate that a large portion of society – considering retrospective biases – described the coping with the flooding as profitable. Nearly 15% of the respondents have stated, that they were in general able to profit from their experiences during the floods. This was particularly often the case in regard to the psychological impacts of the floods, for which 11.7% of the respondents stated, that they were better off after the floods than before. Presumably, many people perceived the challenges posed by the floods in retrospect as a chance for personal, posttraumatic growth. But 7% of all valid responders also stated, that they were able to financially profit from the floods, potentially because it gave them an opportunity to implement long planned investments, or because the compensation for their losses was beneficial for them. Others especially emphasise the ability for the city to learn from the events and be built back better (SoSe4).

In order to reduce vulnerability crisis management measures themselves (of all stages of the disaster management cycle) should be scrutinized as potential sources of vulnerability. Following security research, it is advised to not treat crisis management measures as any different from other security measures; they also have (negative) side-effects and influence, sometimes even restrict, individual freedoms.

These (negative) side-effects have to be reflected already in the development and decision-making processes. This does not exclude the potential for negative effects and even decisions to disadvantage specific groups but refers to the need of a reflection process and arguments to legitimize these disadvantages. This is especially important to prevent increasing existing inequalities and maybe even stigmatisation or discrimination. Therefore, as well as in addition, disaster prevention, preparedness, response and recovery measures have to be critically reflected if they are still appropriate on a regular basis.

Examples for the importance of this reflection can be found in all phases. Prevention measures such as the investment in flood protection (floodplain distinction) might amplify existing precarious living situations. With regard to preparedness expectation of self-provisions, insurance of protection measures might not be feasible to implement for all members of society, evacuation planning might overlook certain living situations. In the context of response besides the already mentioned lockdowns this for instance concerns the issue of police duties in crisis management, which reduce the chance for those without residential permit to reach out for help, who therefore have an increased chance to be overlooked. Finally, with regard to recovery measures might not consider that persons do not have an address or bank account to receive money.

Against this backdrop and in order to reflect on the potential vulnerability factor of crisis management measures it is necessary to include individuals with experience or knowledge on diverse living situations in disaster management structures.

6.1.4. Recognition of psychosocial wellbeing as a factor for resilience and vulnerability

The German case study shows the great significance of mental health and psychological/psychosocial support during crises. Consistent with other studies (see Hahad et al., 2020; Skoda et al., 2021), the collected material shows the increased stress of the population in Germany during the COVID-19 pandemic. While the floods were handled relatively well by most people, the pandemic causes a lot of stress, tension, and anxiety. Many people feel lonely and have no one to talk to. Within the survey,

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the psychological difficulties posed by the COVID-19 pandemic, as well as the psychological impacts accompanying it, were also generally deemed to be the most severe effect of the pandemic.

It also became clear that disaster management deals with psychological factors only within narrow limits. Those who visibly display psychological problems and stress and are severely affected during a crisis are cared for by psychosocial care units of disaster management. However, there is no corresponding care for all those who wish to receive help. Poor mental health, which can be caused by stress or trauma during a crisis, has a negative impact on how people are able to handle it. Studies also suggest that adaptive behaviours that emerge from increased psychological distress can negatively impact actions taken during a pandemic and contribute to its spread (seeHahad et al., 2020). Already existing psychosocial services, such as the psychosocial crisis service, experienced an increased number of requests. Overall, the pandemic and the measures taken to contain it have had a negative impact on people's mental health. At the beginning of the pandemic, there was a high level of COVID-19-related anxiety, which decreased as the pandemic progressed. Elevated levels of psychological distress were observed during all phases of the pandemic (Skoda et al., 2021). People who had previously suffered from mental illness observed a worsening of their condition due to the state of emergency (Frank et al., 2020). However, the interviews and the survey show that even people who deem psychologically healthy experienced the pandemic and the corresponding measures as a great burden. For many people, it was difficult to cope with the decreased structure of working at home and home-schooling (SoSe8). Many recreational and compensatory activities were not possible, while at the same time stress levels increased for many people (SoSe8). Existing support services were often closed, therapies could no longer be carried out in person but had to be digitized. As a result, people felt left alone to deal with stress. Psychosocial support has a decisive influence on the ability to help oneself during crises, and a poor psychosocial situation increases vulnerability.

Not only since the ongoing pandemic is the psychosocial condition of those affected by extreme events an important aspect for crisis management; psychosocial wellbeing is one of the very first contexts in which resilience was discussed in relation to disasters (Werner, 1995). Although psychosocial support structures have evolved and an infrastructure is slowly building up to support personnel working in emergency organisations and crisis management (Helmerichs, 2010), so far little has been done with regard to psychosocial support structures for those citizens affected by extreme events.

Against the backdrop of the ongoing pandemic and the increasing number of those suffering from isolation and stress a broader discussion of formats and infrastructure to support those in need should be established. Although it is clear that this cannot be the sole responsibility of crisis management, which is neither trained nor staffed in an appropriate way, a societal discussion is needed on what the role and responsibilities of crisis management structures can be and how they link to everyday life structures; especially with regard to major events with a large number of (non-)injured victims, first responders and bystanders (of for instance terror attacks). This for instance encompasses to increase assets for short term psychosocial support within the disaster management structures, establish cooperation with support hotlines and networks and involve social workers and psychiatrics for long-term recovery.

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6.1.5. Social capital and social cohesion are powerful resources that should be recognized as situation-depended

Social cohesion describes a process and outcome of social solidarity, while social capital refers to resources derived from social relations. They are connected and influence each other.

6.1.5.1. Social Cohesion

The German case study reveals a strong sense of cohesion among the population during the floods. This observation is consistent with other research on the floods (see 3. State of the Art). The flood was perceived as a collective experience. The high visibility of the crisis, as well as the opportunity to take active action against it, led mostly to the experience of "collective efficacy" (Siegrist et al., 2009, p. 171), which in turn strengthened social capital. The flood shaped collective experiences and thus fostered social cohesion as a form of social capital that finally functioned as a resource for a collective disaster management

During the still ongoing COVID-19 pandemic, a different picture has emerged. Although there are no indicators for panicking interviewees commonly refer to feeling of loneliness. This time, the threat itself tends to be invisible. Rather it is the countermeasures, the masks, precautionary activities and closed public live, that for some was perceived as the threat.[47] Especially, the physical distancing and the lockdowns made an active engagement much more difficult but amplified a feeling of inactivity, since sitting at home and doing nothing is recommended as the best one can do (see https://www.zusammengegencorona.de/)48. This does not to say that there was no engagement. Especially in the beginning many citizens supported social services or subscribed to neighbourhood support services (Die Bundesregierung, 2020). Nevertheless, in line with the restrictions, there is no fostering of a feeling of cohesion and it seems that the constant political imperatives on the necessity of solidarity are very much needed to create this shared feeling of a productive collaboration.

This suggests at least two perspectives here: First, social cohesion in crises depends on the ability to work together and cooperate. Considering this point seems to be important, as the pandemic shows that this form of collaboration is not possible in every extreme event. Instead, thinking of alternative ways to bring people together in order to develop a positive narrative and thereby increase active involvement is required. This leads to the second thesis: The ability to actively taking part in overcoming a crisis is an important part of psychological resilience. Based on the argumentation of approaches such as the Six C Model (Farchi et al., 2018) it is likely that at least parts of the psychological stressors and consequences of the pandemic (Skoda et al., 2021) stem from this inactivity.

Taking both aspects together it is likely that the visibility and the possibility of active engagement in order to overcome an extreme event influence the ability to cope. Both seem to have an effect on the mental image of a crisis and the psychosocial condition of those affected. In this regard, a community

[47] While for the floods the most prominent situation is the water which threatens the infrastructure and inhabitants of the city, for the pandemic the direct consequences of the disease are often only seen via medial representation or limited to those working in the medical sector.
[48] Furthermore, it is likely that the duration of the pandemic plays an important role here. In contrast to the flooding which were mainly about one month, the pandemic is now approaching the 1,5 year mark.

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might behave cohesive and supportive in one event, but might become defensive and psychologically vulnerable in another, based on the possibility to address its consequences.

6.1.5.2. Social capital

Social capital influences vulnerability and resilience in crises not only depending on its specific design (What resources can be acquired by specific individuals?) but also depending on its (in-)just distribution and level of accessibility (Can resources be acquired and why not?). There are three dimensions of social capital that can influence the outcome of social actions and this distribution of resources: *bonding*, *bridging* and *linking* social capital (Aldrich & Meyer, 2015). *Bonding* social capital refers to emotional relationships with friends and family while *bridging* social capital describes connections between people of different social groups. The connection to people in positions of power is conceptualised as *linking* social capital. *Bonding* and *bridging* social capital refer to horizontal networks while *linking* social capital encompasses vertical network connections. In the context of the floods and the COVID-19 pandemic, two types of social capital can be described as influencing people's vulnerability: social contacts and networks as well as the consideration of social diversity in crisis management and the consideration of their needs.

Bonding and *bridging* social capital have shown to be an important factor in the German case study as social contacts have a great influence on the psychological condition. They can also contribute to people's use of certain resources. *Bonding* and *bridging* social capital were quite easily activated during the floods (as described above) but could only be activated to a limited extent during the pandemic. Containment measures led to social contacts being reduced and moved to digital formats which has made the activation of *bonding* and *bridging* social capital more difficult. Both the interviews and the survey show, that many people feel lonely and struggle to cope with the decrease of connection to their social networks. Some factors that make contact even more difficult during the pandemic are not having sufficient infrastructure (internet), not being able to use devices or not having time due to the triple burden of work, home schooling and childcare. Accordingly, social inequalities (for example financial or time resources) have an impact on the opportunity to activate linking and bridging social capital. Social capital's great importance is also illustrated by the results of the quantitative part of the German case study. Its analysis showed that the *Social support networks*-dimension of vulnerability is strongly correlated with the difficulties and negative impacts experienced during both the floods and the pandemic. They are both strongly correlated with this dimension, thereby implying that respondents who have weaker social ties and overall less social as well as economic capital often struggle in dealing with disasters. Further, they also have to overcome more disaster related challenges than the average of the sample.

Having strong *bonding* and *bridging* social capital is helpful to cope with crises in multiple ways (e.g., support network that you can talk to or that helps you with certain activities). Social networks can be a source of information that can fill gaps in the official communication of information. This is what happens, for example, when warnings are disseminated only auditorily and deaf people learn their contents through their neighbours, as happened in the floods (Bachmann, 2013). The official communication of information has hardly considered the needs of deaf people in the floods. However, this created major problems for those who do not have an appropriate social network. Therefore, connections to those who are in positions of authority and power, who influence what factors are considered by disaster management and how resources are distributed are also an important factor in coping with crises. With such *linking* social capital, the needs of individuals can be recognised by institutions and people in power. Representatives and advocates in administrations can try to influence disaster management processes to include the needs of people who often have less *linking*

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social capital (e.g., deaf people). The uneven distribution of (*linking*) social capital means that people have unequal chances of being 'seen' during a crisis and in the context of crisis management. Moreover, this distributes the chances of successfully managing crises unequally. As crises are often characterised by a shortage of resources, social capital that leads to some people gaining privileged access to resources, can further increase inequalities. This is also referred to as the dark side of social capital (Portes & Landolt, 1996). Accordingly, representatives and advocacy groups can help to counterbalance the unequal distribution of linking social capital and make sure that disaster management measures are inclusive and consider the needs of disadvantaged people.

However, having social capital does not necessarily mean this social capital is available. In this regard and as a framing to all three forms of social capital it has to be considered, that all three depend on the availability and activatability in crisis. This for instance was discussed in the quantitative survey, asking how far those considered to support in crisis living away from the affected. For instance, having grown up children hundreds of kilometres away that can only help via telephone is to be different, than having grown up children in the near area; not to forget that especially the latter might also be affected by the event. To scrutinize this availability is important in order find out the differences to seemingly equal individuals, who describe themselves as having a strong social context.

Despite all the links between the availability of social capital and societal resilience sketched out above, expanding social capital is no panacea for tackling disasters. This I due to at least three reasons. First, the effectiveness of social capital as a resilience-building resource depends on the kind of event and on the kind of available social capital. While in some instances bonding social capital is helpful, in other cases, linking or bridging social capital is more beneficial. Moreover, the impacts of extreme events might render available resources inaccessible (e.g. family and friends in a different city or state).

Second, the possibility to activate social capital depends on the type of social capital and on the affectedness of the very social networks on which it rests. Especially in large scale events such as the pandemic, which affects people on a global scale in many different ways, activating social capital can become very problematic.

Third, social contexts define themselves by both inclusion and exclusion. Although exclusion is not per se problematic, especially structures aiming at supporting every individual, such as structures of crisis management or social support structures, should be continuously scrutinized with regard to their potential to exclude and even discriminate. Disaster management needs to foster social capital in a way that increases the social embeddedness of isolated people while diminishing the excluding and discriminating effects of those forms of social capital that create and exacerbate societal injustices.

6.1.6. Preparedness planning has to consider the embeddedness of disaster management personnel in social context

Disaster management in Germany builds to a large degree on affiliated volunteers whose capacities and work force can be activated if necessary. In order to make the best from this resource these persons do not only have to be trained and equipped appropriately to fulfil the tasks that they are meant for. Also, they have to have the possibility to go into action. This means to recognize that affiliated volunteers are embedded in sometimes fragile social contexts. They might have children or relatives to care for and an employment from which they have to be exempted. These potential

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conflicting roles of the private and the professional sphere have to be considered in preparedness planning.

This means, for instance, to provide alternatives for childcare or for getting support, assistance for relatives people care for (Meinhardt, 2018). Especially in long-term crisis such as the pandemic emergency personnel are often bound for long periods of time. If this is predictable, support structures should be implemented. This very much concerns the confrontation (with the risk(s) of extreme events) and training of the population to assist official disaster management activities in easy tasks. A final aspect emerges around the psychological sphere and the ability of personnel to get support after dramatic operations. This can also be considered as an example to bridge the upper mentioned gap between disaster and social politics. With regard to the implementation it might be sensible to offer courses on reflecting on the individual perspective and biases.

In addition, disaster management personnel itself, might become vulnerable. As was outlined before, people who are deployed in disaster management or work in social services during a crisis may be affected in two ways: On the one hand they might have to work much more – sometimes even without appropriate breaks – in times of crisis, such as the pandemic. On the other hand, they may also be affected themselves by the respective crisis. Both could be found in case of the flooding as well as during the pandemic (SoSe8). As the German disaster management system is based on affiliated volunteers, the issue of considering support structures for disaster personnel is essential to be raised as a general topic with regard to improve the overall resilience of societies. Although in recent years especially the availability of psychosocial support structures became improved in all organizations (police, firefighters and emergency organisations (Helmerichs, 2010)) the care infrastructure for children but especially cared for family members is still highly based on improvisation. There is a gap of planning with regard to providing childcare and support for care work for disaster management which against the backdrop of increasing numbers of for instance privately care for relatives (Krüger & Max, 2019a), is likely to cause issues especially in smaller scale events.

6.2. General innovative potential and validation of the theoretical framework

The German case study aimed to find out more on how vulnerability can be understood as dynamic, not limited to certain groups and depends on intersections between different vulnerability factors by speaking to experts from disaster management, authorities, social service providers as well as citizens. Against the backdrop of sections 3, 4 and 5 and in line with D1.2 the following findings regarding the understanding of vulnerability can be outlined:

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Who is **vulnerable is not due to one specific condition but the result of many factors on different levels**. It is the individual condition, within a structural context which interacts with technological developments and environmental influences that creates situations in which individuals lack the capacities to deal with external threats. Even more, **the way societies prevent, prepare, react and recover from disasters and the accompanied measures *themselves* influence vulnerability**. For instance, the neglect of certain needs in preparedness planning or a national lockdown can create or transform living situations, which partially or fully influence the capacities of individuals to deal with events. The entry point of an event or its duration might have similar effects, leading to a diabetic person who is fine with his or her medication in the first days of an event to be in great need for assistance as the crisis proceeds. Consequentially the model by Orru et al (2021) could be extended in the following way:

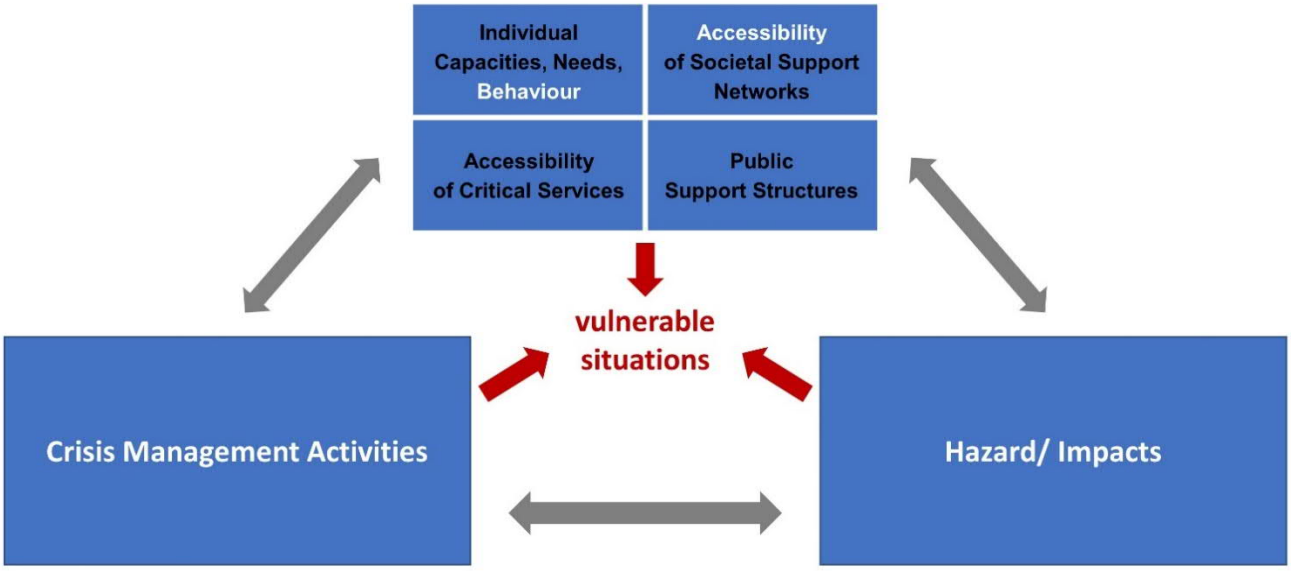

Table 9: Adaptation of the "conceptual dimensions of social vulnerability model" by Orru et al. (2021)

The different factors that influence vulnerability thereby not only have a certain impact but they also influence each other allowing both for compensation of shortcomings in one regard or the aggravation of others. **Vulnerability is influenced by intersecting factors.** Having financial capital might open up the opportunity to buy assistance, insurance or security and therefore compensates living in a highly threatened living area. Being a woman with a disability might worsen the chance for equal social participation and therefore runs a high risk of lower education or income. Therefore, it is not enough to only be aware of the multiplicity of factors which influence vulnerability but to consider that these factors influence each other.

This has at least two implications. First, vulnerability is a characteristic that every individual has but the degree to which one is vulnerable differs due to the living situation and the hazard the threatens it. **To present vulnerability as a characteristic of a few social groups falls short of this complex interplay** and might lead to wrong assumptions. Elderly might more often have medical conditions and be alone, but they might have made experiences or stored tools, to help them deal with conditions such as power cuts. Even more, this shows that **vulnerability is heterogenic within social groups.** Not all elderly might need the same amount of support or support at all. Some might even thrive in these particularly threatening situations.

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Second, due to the intersectional characteristic, those **living situations that render individuals most vulnerable in a certain event might not always be foreseen**. Furthermore, as mostly those involved in decision making lack contact with these living situations and – as everyone else – are limited in their perspective and expertise those living in **the most vulnerable situations tend to be overlooked by disaster management**.

In this regard, **vulnerability is also to be considered dynamic**. Finally, the ways in which individuals behave does influence their capacities. Thereby the decisions individuals have taken do not necessarily have to be wrong but should be looked at from different angles. A lack of trust can stem from former experiences of neglect in other events, the will to protect one's belongings or livestock might be due to them being the basis of ones very existence, or not asking for help might be due to the fear of being stigmatized as needy or because of fear to be deported. Therefore, **becoming or staying vulnerable might be a choice due to a lack of alternatives**.

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7. Conclusion

The BuildERS project aims to help actors from different levels of the European disaster management system to improve the resilience of European populations, with a focus those most vulnerable. WP4 aims for (social) innovation, to inform policy, strategy and other recommendations and to develop tools and guidelines. This report on T4.5 explored social diversity and disaster management using the example of the Elbe floods and the COVID-19 pandemic. It aimed to scrutinize the concept of vulnerable groups and highlight the contextuality and intersectionality of vulnerability.

The results showed to what extent social diversity was considered in the measures of crises management. The contextuality of vulnerability and its influencing factors were analysed. The study revealed how crisis management measures themselves can create vulnerability. People can be affected by crises in multiple ways: Disaster management and social service personnel can also become vulnerable during crisis while some citizens evolve and even thrive in the crisis situation. The analysis of the survey demonstrates that participants of the survey who scored higher on social vulnerability-indices, which were constructed based on indicators measured as part of the survey, were also affected worse by both floods and the ongoing COVID-19 pandemic. In addition, except for the health status of participants and whether or not they had an officially recognized disability, their socio-demographic characteristics were only to a very limited degree correlated with how severely they were affected by the inspected disaster. The same holds true for the association of socio-demographic characteristics with social vulnerability among the respondents. As a last analytical step it was also inspected how the self-assessment of the participants ability to deal with different types of disasters and the assessed importance of different individual characteristics is associated with other variables of interest. Overall this analysis revealed that participants were consistent in the assessment of their ability to deal with disasters and the reported actual impact of disasters upon their lives. But except for this association the responses to the assessment questions did not differ greatly depending on the other variables of interest. The results of the expert interviews and the survey were discussed and points to consider for a disaster management that considers social diversity were elaborated. This included the discussion of responsibilities in disaster and social policies and the consideration of social diversity. The need to consider individual autonomy and the importance of psychosocial wellbeing for resilience was discussed. The influencing factor of social cohesion and social capital was shown. It was discussed how disaster management needs to consider the embeddedness of its personnel. Then the innovation potential of the results of T4.5 were discussed and linked to the theoretical framework. Finally, the implication of the results for existing technologies and the development of new technologies were explored.

The German case study revealed some aspects that are important to consider when developing guidelines and policy recommendations that consider the social diversity of the population in order to reduce vulnerability and increase resilience. It explored the link between disaster and social policy. The study has shown that there are multiple issues that need to be addressed in order to reduce vulnerability and increase resilience. A simple 'technofix' in the form of technologies alone is not sufficient. Rather, technologies must be linked back to social strategies, or in other words: social technologies and innovations. T4.5 identifies points to consider when deploying technologies that can help to design technologies that are beneficial to a diverse population. Furthermore, it started a discussion on the role of individual autonomy and crisis management measures as potential factors to increase or decrease individual vulnerability, especially with regard to living situations that are commonly overlooked. In this vein, the results of T4.5 will inform co-creation and develop policy

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recommendations in D4.8, WP5 and WP6 of the BuildERS project and improve the understanding of vulnerability as dynamic and intersectional.

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Annexes

Questionnaire/Interviewguideline for the qualitative study of T4.5

Warm up:

- Which organization do you work for? In which position?
- What experience do you have with disasters?

Flooding:

- Please think back to the Elbe floods, tell us what it was like.
- What problems did people come to you with?
  (if applicable, in what distress were the people you helped?)
- Which people were particularly dependent on support/help?
- What would you say were the circumstances that led to these people being particularly hard hit?
- How did you react to these circumstances of particular hardship with your offers of help?
  (if applicable: how did you in your organization deal with these people who were particularly affected?)
- What went well in dealing with particularly severely affected/vulnerable people during the floods?
- How would you describe the cooperation with other actors, such as ... (Youth welfare department, City administration..) in coping with situations/disasters?
- To what extent has disaster preparedness changed in your organization in the wake of the floods?

Covid-19

- When you think about the current situation of the Corona Pandemic ...
  What problems do people now come to you with?
  (In what hardships are the people you help?)
- Which people are particularly dependent on support/help?
- What would you say, which circumstances currently cause these people to be particularly hard hit?
- How do you react with your offers of help to these circumstances of particular hardship?
- What is currently going well in dealing with particularly severely affected/vulnerable people?
- What is currently not going well when addressing people who are particularly hard hit/vulnerable?
- How would you describe the cooperation with other actors, such as ... (Youth welfare department, City administration..) in coping with situations/disasters?
- Do you think that in the aftermath of the pandemic, something will change in your organization with regard to disaster preparedness?

Comparison

- In research, these groups you mentioned are called vulnerable, what is your position on this?
- Are there people or groups that you experience as vulnerable, but that have hardly ever appeared in the public debate?

Closing

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- We are now almost at the end of this interview
  When you think about how society deals with catastrophes, what do you wish for the future?
- Is there anything else that has not been addressed that is important to you? Is there still something that is important to you?

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Informationen über das EU-Projekt BUILDERS

Dieses Dokument informiert Sie über ein von der Europäischen Union gefördertes Forschungsprojekt mit dem Titel BuildERS - BUILDING EUROPEAN COMMUNITIES' RESILIENCE AND SOCIAL CAPITAL (Fördernummer 833496).

Ziel von BuildERS

Das Ziel des Projektes ist es, die Fähigkeit zu erhöhen, sich nach Krisen, wie beispielsweise Naturkatastrophen oder Unglücke, regenerieren zu können (Resilienz). Dies ist insbesondere für Menschen wichtig, die nicht über ausreichend Ressourcen hierfür verfügen. Das gewonnene Wissen wird zur Entwicklung von inklusiven und effektiven Praktiken sowie Strategien zur Gefahrenabwehr genutzt. Die erwarteten Ergebnisse dieses Forschungsprojekts sind Handlungsempfehlungen, Berichte, technische Mittel und wissenschaftliche Artikel. Das Hauptziel von BuildERS ist es, die Widerstandsfähigkeit der Europäischen Gemeinschaften sowohl gegen Naturkatastrophen als auch gegen vom Menschen verursachte Krisen zu verbessern. Dies soll durch die Stärkung des Sozialkapitals und des Risikobewusstseins ihrer Bürger*innen angesichts der gestiegenen Nutzung von neuen Technologien und Medien erfolgen. Dieses neue Wissen wird Zivil- und Sicherheitsorganisationen sowie Behörden zur Verfügung gestellt, um ihre Zuverlässigkeit und Funktionsfähigkeit während Katastrophen, bei der Gefahrenerkennung und bei Wiederaufbauprozessen zu erhöhen. Dadurch soll die Widerstandsfähigkeit der gesamten Gesellschaften verbessert werden.

Interview zur Erhebung der Fallstudie zu den Elbhochwassern

Dieses Interview ist Teil des Arbeitspakts 4 des Forschungsprojekts BuildERS. Im Rahmen der Task 4.5 liegt der Fokus auf den Elbehochwassern von 2002, 2006 und 2013 sowie der aktuellen Covid-19-Pandemie. Hier soll untersucht werden, in welchen (Lebens-)Situationen Menschen vulnerabel werden und inwiefern diese Situationen vom Notfallmanagement berücksichtigt werden. Ziel ist es, das die Erfahrungen zur Entwicklung eines inklusiven Katastrophenschutzes beitragen.

Das Interview trägt zur Erhebung von Erfahrungen bei, die durch die Ableitung von lessons learned zur Entwicklung von Politikempfehlungen im weiteren Projektverlauf genutzt werden können.

Ihre Beteiligung ist zu jeder Zeit rein freiwillig und ist mit keiner Gegenleistung verbunden. Sie haben das Recht, jederzeit die über Sie gesammelten Informationen einzusehen. Sie können zu jeder Zeit ihre Zusage zur Teilnahme am Forschungsprojekt oder zur Verarbeitung Ihrer Daten zurückziehen. In diesem Fall werden alle Ihre Daten aus dem Forschungskontext gelöscht.

Am Forschungsprojekt BuildERS sind beteiligt: VTT Technical Research Centre of Finland Ltd. (Koordination), Universität Stavanger, Stockholm Environment Institute, Universität Stockholm, Institute for Transport Economics, Universität Tartu, Universität Trient, Polizeifachhochschule Finnland, National Rescue Board of Estonia, Positium Ltd., Geonardo Ltd., Stadtverwaltung

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Stavanger, Heilsarmee, Universität Tübingen, Deutsches Rotes Kreuz, Autonome Provinz Trient, Universität Indonesia und George Mason Research Foundation.

Weitere Informationen über das Projekt finden Sie unter: www.//buildersproject.eu

Ihre Meinung ist uns sehr wichtig. Sollten Sie sich unwohl fühlen oder physischen oder psychischen Stress empfinden, können Fragen jederzeit übersprungen oder das Interview beendet werden.

Sollten Sie weitere Fragen haben, kontaktieren Sie bitte:

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Einverständniserklärung für die Beteiligung an Interviews

Ich stimme hiermit zu, an dem von der Europäischen Kommission geförderten Projekt BuildERS (HORIZON 2020, Fördernummer 833496) teilzunehmen. Das Teilprojekt der Universität Tübingen wird von Prof. Dr. Regina Ammicht Quinn geleitet (verantwortliche Wissenschaftlerin). Ich wurde über die Ziele Projekts und die Beteiligten durch ein Begleitschreiben informiert. Ich verstehe die Zielsetzungen des Teilprojekts und wie es zu dem gesamten Ziel des Projekts BuildERS beiträgt.

- Meine Teilnahme an diesem Interview ist freiwillig. Ich verstehe, dass ich für meine Teilnahme nicht bezahlt werde. Ich kann jederzeit und ohne negative Auswirkungen meine Zusage zurückziehen oder meine Beteiligung beenden.
- Die Teilnahme an der Studie beinhaltet ein Interview mit einem Forscher/einer Forscherin der Universität Tübingen. Das Interview wird in etwa 45-90 Minuten dauern. Es wird eine Audioaufnahme und eine anschließende Transkription des Interviews erstellt.
- Ich verstehe, dass ich in keinen Berichten, die Informationen aus diesem Interview enthalten, namentlich identifiziert werden kann und, dass meine Teilnahme an dieser Studie vertraulich behandelt wird.
- Alle persönlichen Daten werden gemäß der Datenschutz Grundverordnung (DSGVO) verarbeitet werden. Mit der Unterzeichnung dieser Einverständniserklärung stimme ich zu, dass meine Angaben pseudonymisiert im Rahmen dieses Projekts verwendet werden können. Forschungspartner außerhalb der Europäischen Union (Heilsarmee | Vereinigtes Königreich im Falle eines BREXIT) können Zugang zu diesen Daten erhalten.
- Alle erhaltenen Informationen werden ausschließlich im Forschungskontext verwendet. In anonymisierter Form können Teile des Interviews in wissenschaftlichen Publikationen verwendet werden.
- Ausschließlich Wissenschaftler*innen des Projekts BuildERS an der Universität Tübingen haben Zugriff auf die Audiodatei. Die Audiodatei wird in einem verschlüsselten und passwortgeschützten Ordner gespeichert und nach Ende der Projektlaufzeit gelöscht.
- Eine anonymisierte Zusammenfassung des Interviews kann dem Projektkonsortium zugänglich gemacht werden.
- Ich verstehe, dass ich das komplette Interview, Teile davon oder einzelne Informationen zu jeder Zeit – auch nach Beendigung des Interviews – ohne nachteilige Konsequenzen zurückziehen kann.
- Ich habe die Erklärung gelesen und verstanden. Alle meine Fragen wurden zufriedenstellend beantwortet und ich erkläre mich bereit, freiwillig an dieser Studie teilzunehmen.
- Ich habe eine Kopie dieser Einverständniserklärung erhalten.

_____	_____
Datum	Name Interviewpartner*in
_____	_____
Unterschrift Forscher*in	Unterschrift Interviewpartner*in

Für weitere Informationen kontaktieren Sie bitte:
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Interview partner

N0	DM=Disaster Management SoSe=Social Service Organisation Adm=Administration	Working field
1	DM1	Administration, disaster management
2	SoSe1	Social service (homelessness)
3	Adm1	Administration, health department
4	SoSe2	Social service (women's counselling)
5	SoSe3	Social service (children, teenager and families)
6	DM2	Disaster management organisation
7	SoSe4	Social service (single parents)
8	SoSe5	Social service (addiction)
9	Adm2	Administration (seniors, disabilities)
10	Adm3	Administration (migration)
11	Adm4	Administration (disabilities)
12	SoSe6	Social service (deaf people)
13	SoSe7	Social service (homelessness)
14	DM3	Disaster management organisation
15	SoSe8	Social service (children, teenager and families)
16	DM4	Disaster management organisation
17	DM5	Administration, disaster management
18	SoSe9	Social service (women)
19	DM6	Disaster management
20	DM7	Disaster management organisation

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Questionnaire for the quantitative study of T4.5

No	Question in English	Answers
1	Apart from the Corona pandemic, have you ever been affected by a disaster? Which one?	Multiple Choice: Elbe Flooding 2002, Elbe Flooding 2006, Elbe flooding 2013, other flooding, storm/tornado, Winter storm, forest fire, major fire, industrial accident, terrorist attack, widespread/long-term power blackout lasting more than 12 h, other event, No I have not yet been affected by any disaster.
2	How well were you able to deal with the flood?	Likert scale (1 not good, 5 very good)
3	How much do you still suffer from the effects of the flood today?	Likert scale (1 My existence is still destroyed today, 5 I can still profit from it today)
4	What challenges did you face during the flood?	Multiple Choice: Challenges with... Protection of the home/apartment, energy supply, nutrition/supply of food and drink, Medical care, Care of dependent relatives, general care of the family, job maintenance, Contact restrictions and isolation, Tight financial situation, evacuation, Finding adequate emergency accommodation, Reconstruction, Psychological processing of the experience, Other, I did not face any problems/challenges
5	What challenges did you face during the flood? For this question, please also indicate in the right-hand field whether you had greater, consistent or fewer problems during previous floods with regard to the respective challenges.	Multiple Choice: Challenges with... Protection of the home/apartment, energy supply, nutrition/supply of food and drink,

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		Medical care, Care of dependent relatives, general care of the family, job maintenance, Contact restrictions and isolation, Tight financial situation, evacuation, Finding adequate emergency accommodation, Reconstruction, Psychological processing of the experience, Other, I did not face any problems/challenges
6	In overcoming which challenges would you like to see more support from the government/public side (e.g. authorities, police, official emergency services, recognized aid services, religious communities)?	Multiple Choice: Challenges with... Protection of the home/apartment, energy supply, nutrition/supply of food and drink, Medical care, Care of dependent relatives, general care of the family, job maintenance, Contact restrictions and isolation, Tight financial situation, evacuation, Finding adequate emergency accommodation, Reconstruction, Psychological processing of the experience, Other, I did not face any problems/challenges
7	Who did you receive support from in overcoming the challenges of the flood?	Family, Friends, neighbours, Police, fire brigade and/or THW (Technisches Hilfswerk), Federal Armed Forces, authorities & offices, disaster management relief organisations, religious community, social organisations and counselling centres, spontaneous helpers, Other,

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		From no one, although I would have needed support, I did not need support
8	How satisfied were you with the help provided by government/public agencies in dealing with the flood?	Likert scale (1 not satisfied, 5 very satisfied)
9	In the past, the area around Dresden and the surrounding regions were repeatedly affected by floods. If you imagine yourself being affected by a flood, what activities would you need help with from outside or third parties?	I'd need help with… Protection of the home/apartment, energy supply, nutrition/supply of food and drink, Medical care, Care of dependent relatives, general care of the family, job maintenance, Contact restrictions and isolation, Tight financial situation, evacuation, Finding adequate emergency accommodation, Reconstruction, Psychological processing of the experience, Other, I'd not face any problems/challenges
10-57	The following questions are asked regarding the disasters experienced ticked in question 1:	
	How well were you able to deal with disaster X?	Dimensions: general, financial, physical, mental Likert scale (1 could not handle it, 5 could handle it very well)
	How much do you still suffer from the effects of disaster X today?	Dimensions: In general, in financial terms, in physical terms, in psychological terms Likert scale (1 could not handle it, 5 could handle it very well)
	What challenges did you face during disaster X?	Multiple Choice: Challenges with... Protection of the home/apartment, energy supply, nutrition/supply of food and drink, Medical care, Care of dependent relatives,

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		general care of the family, job maintenance, Contact restrictions and isolation, Tight financial situation, evacuation, Finding adequate emergency accommodation, Reconstruction, Psychological processing of the experience, Other, I did not face any problems/challenges
	In overcoming which challenges would you like to see more support from the government/public side (e.g. authorities, police, official emergency services, recognized aid services, religious communities)?	Multiple Choice: Challenges with... Protection of the home/apartment, energy supply, nutrition/supply of food and drink, Medical care, Care of dependent relatives, general care of the family, job maintenance, Contact restrictions and isolation, Tight financial situation, evacuation, Finding adequate emergency accommodation, Reconstruction, Psychological processing of the experience, Other, I do not want any further support from the state/public side
	Who did you receive support from in overcoming the challenges of disaster X?	Multiple Choice: Family, Friends, neighbours, Police, fire brigade and/or THW (Technisches Hilfswerk), Federal Armed Forces, authorities & offices, disaster management relief organisations, religious community, social organisations and counselling centres, spontaneous helpers, Other,

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		From no one, although I would have needed support, I did not need support
	How satisfied were you with the help provided by government/public agencies in dealing with disaster X?	Likert scale (1 not satisfied, 5 very satisfied)
58	How well can you handle the current Corona crisis?	Dimensions: general, financial, physical, mental Likert scale (1 could not handle it, 5 could handle it very well)
59	How much do you suffer today from the effects of the current Corona pandemic?	Dimensions: general, financial, physical, mental Likert scale (1 could not handle it, 5 could handle it very well)
60	What challenges do you face during the current Corona crisis?	Challenges with... Protection of the home/apartment, energy supply, nutrition/supply of food and drink, Medical care, Care of dependent relatives, general care of the family, job maintenance, Contact restrictions and isolation, Tight financial situation, evacuation, Finding adequate emergency accommodation, Reconstruction, Psychological processing of the experience, Other, I did not face any problems/challenges
61	For which challenges would you like to see more assistance from the government/public sector (e.g. public authorities, police, official emergency services, etc.)?	Multiple Choice: Challenges with... Protection of the home/apartment, energy supply, nutrition/supply of food and drink, Medical care, Care of dependent relatives, general care of the family, job maintenance,

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		Contact restrictions and isolation, Tight financial situation, evacuation, Finding adequate emergency accommodation, Reconstruction, Psychological processing of the experience, Other, I do not want any further support from the state/public side
62	Who supports you in meeting the challenges of the current Corona crisis?	Multiple Choice: Family, Friends, neighbours, Police, fire brigade and/or THW (Technisches Hilfswerk), Federal Armed Forces, authorities & offices, disaster management relief organisations, religious community, social organisations and counselling centres, spontaneous helpers, Other, From no one, although I would need support, I don't need support
63	How satisfied are you with the help provided by government/public agencies in dealing with the current Corona crisis?	Likert scale (1 not satisfied, 5 very satisfied)
64	Have you taken any of the following disaster precautions/preparedness activities? If yes, which ones?	Multiple choice: Stockpiling, Insurance, Checklist for behaviour in the event of a disaster, Creating a cash reserve, well-stocked medicine cabinet, Emergency generator, Stock of hygiene articles, Stock of candles and torches, Battery-powered/crank-operated radio, Ready emergency luggage, Structural measures (e.g. flood protection), Stockpiling of materials to protect the home, Patient's living will Installation of a warning app,

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		Document folder with all important documents, None of the above, Other
65	For what reason did you not take further precautionary measures?	Multiple choice: I don't have enough space in my flat. I do not have sufficient financial means. I do not have the time. I did not know that it makes sense to take precautionary measures for disasters. I did not know what kind of precautionary measures I should have taken and what steps they require. I do not need this. I don't think I will be affected by disasters. I do not think precautionary measures are useful. I am not responsible for precautionary measures. I already take other precautionary measures, namely:
66	Have you ever participated in an (educational) event on dealing with disasters (e.g. first aid course, event for fire safety officers)?	Yes/No
67	In which (educational) event did you participate?	Open
68	Have you used informational materials to learn about what to do during disasters?	Yes/No
69	From whom did you receive these information materials?	Open
70	Do you feel well educated about disaster risk in you living area?	Yes/No
71	Who educated you about the disaster risk in you living area?	Open
72	How concerned are you that you might be affected by a disaster?	Likert scale (1 very worried, 5 not worried)
73	What disaster are you worried about?	Multiple choice: Floods, Big storm/tornadoes, Forest fire, Industrial accident, Terrorist attack, Earthquake, War, pandemic or epidemic, other event:
74	If a disaster were to occur, how would you be informed about it?	Multiple choice: Television, Radio, online news sites, social media,

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		instant messaging, alert app, Sirens, Family, Neighbours, friends, Other source of information:
75	Have you ever had difficulty understanding an official disaster warning?	Yes/No/ I have not yet received a disaster warning.
76	What were the difficulties you had to deal with?	Multiple choice: The message was written in difficult language or technical language. I don't understand enough German. I did not understand the context. I did not understand if and what it means for me. Other:
77	In the event of a disaster, who would you turn to as your first point of contact for help?	Single choice: Family, Police, Friends, Fire brigade, Ambulance service, Religious community, Other:
78	Do you have family members or friends you can rely on in disasters?	Yes/No
79	Do you think your neighbors would help you in a disaster?	Yes/No
80	How far away does the closest contact or support person lives from the place where you are?	Number of kilometers
81	Imagine a ladder that maps the financial situation in your neighborhood. At the top of the ladder ladder are the people who have the most money available and at the bottom are the people who have the least money available. Where would you place yourself on the ladder?	Ladder to put status on
82	Before the disasters you experienced, were you able to handle an unexpected expense of about 1000 euros without any major problems?	Yes/No/I can’t or don’t want to answer.
83	Taking a look on your current situation. Could you handle an unexpected expense of about 1000 euros without major problems?	Yes/No/I can’t or don’t want to answer.
84	Imagine a ladder that represents the social status of people from the overall societal view. At the top of the ladder are the people with the highest social status. social status. At the bottom of the ladder are the people with the lowest status. Where would you you place yourself on this ladder?	Ladder to put status on
85	Now imagine a ladder that represents the social status of people within your local community. Where would you place yourself on this ladder?	Ladder to put status on
86	Have you ever been elected to public or volunteer office (e.g., local council, club chair)?	Yes/No

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87	Are you involved in disaster response on a full-time or volunteer basis?	Yes/No
88	How many people live in your household?	number
89	If you add up all the income: What is your household's monthly net household income? If you do not know your exact monthly household income, please estimate the monthly please estimate the monthly amount.	Single choice
90	What does your normal everyday life currently look like? On an average workday, how many hours per day do you spend on the following activities?	Number of hours for specific purposes
91	For what reason do they not engage in paid employment?	Single choice: I am currently looking for work. I am on parental leave. I mainly work unpaid in the household. I am still at school/studying/apprenticing. I am unable to work. I am retired. I am not dependent on paid work. Other reason:
92	In which year were you born?	Year of birth
93	Whats your gender?	Male/female/divers
94	Would you consider yourself to have a migrational background?	Yes/No
95	In which generation?	First generation, second generation, third generation, fourth generation or further back
96	Are you limited in your everyday life by health problems despite using assistive devices?	Yes/No
97	In how far?	Open
98	Do you have an officially determined disability (in the form of a determination notice or a severely disabled person's card)?	Yes/No
99	What is currently your highest level of education?	Single choice: Different school qualifications can be chosen (from leaving school without qualification to high school diploma), University degrees (BA to Phd and Habilitation) Completed apprenticeship, Master craftsman's diploma
100	What is the population of the municipality/city where your primary residence is located?	Single choice: 500 000 and more inhabitants, 100 000 to less than 500 000 inhabitants, 50 000 to under 100 000 inhabitants, 20 000 to under 50 000 inhabitants

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		5 000 to under 20 000 inhabitants, 2 000 to under 5 000 inhabitants, under 2 000 inhabitants
101	Are you part of a religious community?	Yes/No
102	How well do you rate your ability to deal with the aftermath of disasters?	Likert Scale (1 Not good, 5 very good)
103	How would you assess the ability of these groups to deal with the aftermath of disasters?	People with little money, People with a lot of money, people with a strong social network, people with a weak social network, people with mental impairment, people with physical impairment, people with chronic diseases, People with mental illness, people with good health, Babies & toddlers (up to 3 years), Children (4 to 13 years), Adolescents & young adults (14-20 years), Pregnant women, People older than 65 years, People with a migration background, people with refugee experience, Homeless people, people with addictions, Other Likert Scale (1 Not good, 5 very good)
104	How important do you consider the following factors to be with regard to successful disaster management?	Dimensions: physical constitution, mental constitution, social network, social status, income, Language skills Likert Scale (1 Not important, 5 very important)
105	Do you consider any other factors to be central to successfully dealing with disasters? If so, which ones?	Single choice, open No/Yes and that is:
106	To conclude our survey: Do you have any feedback or anything else you would like to share with us?	open

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