

# LINKS

Strengthening links between technologies and society  
for European disaster resilience

## D6.2 SECOND WORK PLAN FOR THE FIVE CASES

Research Report

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## EXECUTIVE SUMMARY

### About the project

LINKS “Strengthening links between technologies and society for European disaster resilience” is a comprehensive study on disaster governance in Europe. In recent years, social media and crowdsourcing (SMCS) have been integrated into crisis management for improved information gathering and collaboration across European communities. The effectiveness of SMCS on European disaster resilience, however, remains unclear, the use of SMCS in disasters in different ways and under diverse conditions. In this context, the overall objective of LINKS is to strengthen links between technologies and society for improved European disaster resilience, by producing sustainable advanced learning on the use of SMCS in disasters. This is done across three complementary knowledge domains:

- Disaster Risk Perception and Vulnerability (DRPV)
- Disaster Management Processes (DMP)
- Disaster Community Technologies (DCT)

Bringing together 15 partners and 2 associated partners across Europe (Belgium, Denmark, Germany, Italy, Luxembourg, the Netherlands) and beyond (Bosnia & Herzegovina, Japan), the project will develop a framework to understand, measure and govern SMCS for disasters. The LINKS Framework consists of learning materials, such as scientific methods, practical tools, and guidelines, addressing different groups of stakeholders (e.g. researchers, practitioners, and policy makers). It will be developed and evaluated through five practitioner-driven European cases, representing different disaster scenarios (earthquakes, flooding, industrial hazards, terrorism, drought), cutting across disaster management phases and diverse socioeconomic and cultural settings in four countries (Denmark, Germany, Italy, the Netherlands). Furthermore, LINKS sets out to create the LINKS Community, which brings together a wide variety of stakeholders, including first-responders, public authorities, civil society organisations, business communities, citizens, and researchers across Europe, dedicated to improving European disaster resilience through the use of SMCS.

### About this deliverable

This deliverable (D6.2) focuses on the second work plan to execute the case-based assessment of the LINKS Framework. It will be developed and evaluated through five practitioner-driven European cases, in the frame of the following hazard scenarios:

- Flooding in Denmark;
- Drought and terrorism in Germany;
- Earthquakes in Italy;
- Industrial hazard in The Netherlands.

The research in the local cases, based on the decisions taken in the preparation phase (June-September 2021), will be carried out by the Case Assessment Teams (CATs) using the assessment guidelines included in this document.

D6.2 is designed around the LINKS cases by providing a detailed overview of the context (broad and specific) in which each case takes place and by describing the stakeholders who will be involved in the research activities. The research in each case is explained with a specific focus on the objectives, the methods and the on-going and upcoming research activities. This Deliverable also provides the building blocks for the LINKS Community, which will eventually bring together a wide variety of stakeholders, including first-responders, public authorities, civil society organisations, business communities, citizens, and researchers across Europe, dedicated to improving European disaster resilience through the use of SMCS.

The Annexes in this document consist of specific information for the CATs, namely the assessment guidelines that have been developed to ensure systematic data collection in the cases, and overview of the Covid-19 risks and impacts per case.

This document is mainly conceived as a work plan for internal (LINKS consortium) use. Yet, it is a public document as it is also of interest to external stakeholders (e.g. researchers, practitioners) who are engaged in research activities similar to those carried out in LINKS and are looking for guidance on e.g. planning and/or for practical tools (such as guidelines) that can support the research.

## TABLE OF CONTENTS

1. Introduction .....	1
1.1 Reading guide.....	1
1.1.1 The main concepts .....	1
1.1.2 How to read this document .....	5
2. The LINKS Cases .....	6
2.1 Case 1: Earthquakes in Italy.....	6
2.2 Case 2: Industrial hazards in the Netherlands .....	9
2.3 Case 3: Drought in Germany .....	12
2.4 Case 4: Flooding in Denmark .....	15
2.5 Case 5: Terrorism in Germany.....	18
3. Work plan for the five cases.....	23
3.1 Cross-case assessments .....	23
3.1.1 Timeline .....	26
3.2 Deep dive assessments .....	28
3.2.1 Activities and timelines per case .....	29
4. Conclusive remarks and next steps .....	40
5. Bibliography.....	41
6. Annex.....	44
6.1 Annex I: Covid 19 Risks and Impacts per Case.....	44
6.2 Annex II: Assessments Guidelines for the cross-case assessments.....	47
6.3 Interview Protocol for the cross-case assessment .....	47
6.4 Guidelines on how to sort data .....	60
6.5 Online Survey Protocol .....	67

## LIST OF TABLES

Table 1: Case 1 - Earthquakes in Italy .....	8
Table 2: Case 2 - Industrial Disaster in the Netherlands.....	11
Table 3: Case 3 - Drought in Germany .....	14
Table 4: Case 4 - Flooding in Denmark .....	16
Table 5: Case 5 - Terrorism in Germany.....	20
Table 6: Timeline for the Cross-case Assessments.....	27
Table 7: Case 1 - Overview of activities .....	30
Table 8: Case 2 - Overview of activities .....	33
Table 9: Case 3 - Overview of activities .....	35
Table 10: Case 4 - Overview of activities .....	37
Table 11: Case 5 - Overview of activities .....	39
Table 12: Tasks - risks, impacts, and mitigation measures.....	44
Table 13: Overview of the components of the interview study .....	49
Table 14: Next steps.....	59
Table 15: How to sort data.....	63
Table 16: Next steps for the online survey .....	68

## LIST OF FIGURES

Figure 1: Workflow for assessing the Framework.....	2
Figure 2: The LINKS case countries .....	3
Figure 3: Research design for the case-based assessments .....	23
Figure 4: The Inter Linking Questions .....	24
Figure 5: Structure for sorting the data .....	25
Figure 6: From the semi-structured interviews to the case reports .....	26
Figure 7: Four main levels .....	61

## LIST OF ACRONYMS

Abbreviation / Acronym	Description
CATs	Case Assessment Teams
DCT	Disaster Community Technologies
DMO	Disaster Management Organisation(s)
DMP	Disaster Management Processes
DRM	Disaster Risk Management
DRPV	Disaster Risk Perception and Vulnerability
KPIs	Key Performance Indicators
LAC	LINKS Advisory Committee
LCC	LINKS Community Center
LCW	LINKS Community Workshop
SMCS	Social Media and Crowdsourcing
WP	Work Package

## DEFINITION OF KEY TERMS<sup>1</sup>

Term	Definition
Best practices	This encompasses the preferred actions in a specific type of situation to efficiently and effectively achieve a certain objective. Best Practices may be formalized in internal policy documents such as handbooks and standard operation procedures and could be based on one or several lessons learned approved by decision-makers (definition builds on DRIVER+ terminology, LINKS Glossary).
Case	Context-based study, realised through fieldwork, to assess the LINKS Framework. A case implies an empirical inquiry that investigates a real-life hazard scenario (LINKS Glossary).
Case-case assessments	The cross-case assessments are joint efforts between WP2-4 and investigate the specific knowledge domains across different contexts while exploring interacting themes. The cross-case assessments are thus both an attempt to explore domain-specific questions through a comparative lens and an attempt to explore the interdependent questions cutting across knowledge domains (LINKS Glossary).
Crowdsourcing	Describes a distributed problem-solving model where the task of solving a challenge or developing an idea get “outsourced” to a crowd. It implies tapping into “the wisdom of the crowd” (definition builds on Howe, 2006; see also LINKS Glossary).
Disaster risk management	Disaster risk management is the application of disaster risk reduction policies and strategies to prevent new disaster risk, reduce existing disaster risk and manage residual risk, contributing to the strengthening of resilience and reduction of disaster losses (UNDRR, 2016).
LINKS Framework	A set of learning materials, such as methods, tools and guidelines for enhancing the governance of diversity among the understanding of SMCS in disasters for relevant stakeholders. Methods in LINKS refer to approaches that will enable researchers and practitioners to assess the effects of SMCS for disaster resilience under diverse conditions. Tools are practical instruments supporting first-responders, public authorities and citizens with the implementation of SMCS in disaster and security contexts. Guidelines are recommendations for improving national and regional governance strategies on SMCS as well as introductions and explanations of

<sup>1</sup> Definitions are retrieved from the LINKS Glossary (forthcoming).

	how to apply the methods and tools under diverse conditions (LINKS Glossary).
LINKS Knowledge Bases	The outputs and knowledge obtained from the assessment of three knowledge domains. This knowledge is used to develop the LINKS Framework (LINKS Glossary).
LINKS Knowledge Domains	The three crucial domains of analysis for studying European disaster resilience and SMCS. These include: Disaster Risk Perception and Vulnerability (DRPV), for assessing changes in the citizens' perception of disaster risks induced by SMCS, as well as assessing the changes in the vulnerability of practitioners and citizens. Disaster Management Processes (DMP) for analysis of how SMCS changes the procedures and processes within the crisis and disaster management. Disaster Community Technologies (DCT), for assessing SMCS related technologies used by practitioners (and citizens) in disasters (LINKS Glossary).
Resilience	The ability of individuals, institutions, and systems to recover from disturbance and to develop and adopt alternative strategies in response to changing conditions (definition builds on Tyler & Moench, 2012; see also LINKS Glossary).
Risk communication	The process of exchanging or sharing risk-related data, information and knowledge between and among different groups such as scientists, regulators, industry, consumers or the general public (IRGC, 2017:27).
Scenarios	In LINKS the scenarios are the hazards, contextualized in each case (case 1, earthquake, Italy; case 2, industrial, the Netherlands, case 3, drought, Germany, case 4, flooding, Denmark, case 5, terrorism, Germany). They are informed by methodological choices and are instrumental for the case-based assessments of the Framework as they are the real-life scenarios through which the LINKS Framework is assessed (LINKS Glossary)
Social media	A group of Internet-based applications that build on the ideological and technological foundations of the Web 2.0 and that allow the creation and exchange of user-generated content (UGC). Forms of media that allow people to communicate and share information using the internet or mobile phones (definition builds on Kaplan & Haenlein, 2010; see also LINKS Glossary).

## 1. INTRODUCTION

In order to meet the overall objective of LINKS, to strengthen links between technologies and society for improved European disaster resilience, by producing sustainable advanced learning on the use of social media and crowdsourcing (SMCS) in disasters, we selected five different cases through which we investigate real-life hazard scenarios: flooding, draught, earthquakes, industrial incidents and terrorist attacks. This document is the second of three strategic planning deliverables that make the assessments which take place in the LINKS cases possible (D6.1: September 2021, **D6.2: November 2021**, and D6.3: November 2022).

In the first deliverable, D6.1 (Fonio, C. & Clark, N. 2021), we outlined the crucial steps to prepare for the case-based assessments by providing a step-by-step approach to ensure proper planning. This deliverable, D6.2, provides the detailed framing of the individual LINKS cases, and the work plan and the timelines for both cross-case and the deep dive assessments. The work plan in this document is mainly focused on the first round of case-based assessment and the activities running from June 2021 – May 2022. Minor updates have been made to the timelines for activities defined in D6.1 and the methodological deliverables D2.3 (Bonati, S. & Pazzi, V. 2021), D3.2 (Bach Nielsen, A., Raju, E., Nicolai J. E., Blom Andersen N. 2021), and D4.2 (Gehlhar S., Habig, T., Luke, R., Marterer, R. 2021) have been made since June 2021, but overall, the case-based assessments are on track as planned. The current overview of the timelines for both cross-case and deep dives assessments is provided in Section 3 of this document.

This document and the work described within is done in close coordination with the case assessment teams (CATs), which encompass local partners from each of the LINKS cases. Their knowledge, expertise and efforts have been crucial for understanding the contexts of the different cases, and for the organization and execution of the activities across and within the different cases.

Before outlining the LINKS cases and work plan, we first clarify some key concepts and the overall structure of the document through a short reading guide.

### 1.1 Reading guide

#### 1.1.1 The main concepts

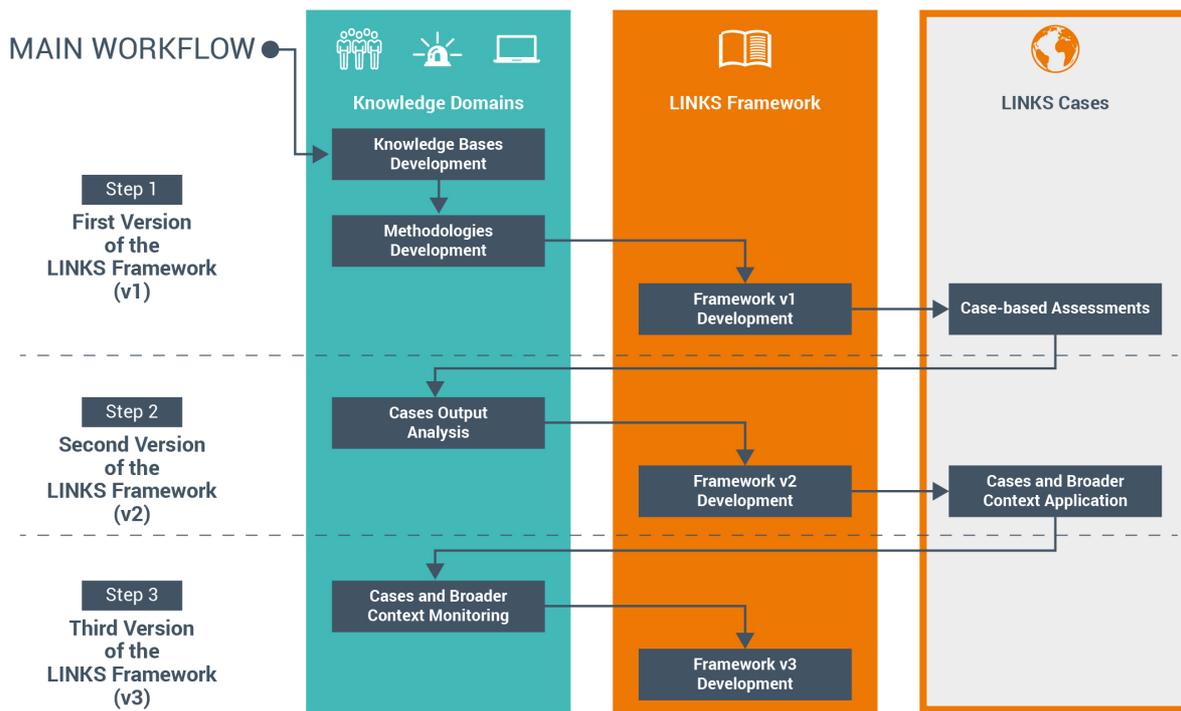
##### ***The LINKS Framework defined***

The LINKS Framework is one of the primary outputs of the project. The Framework is a set of contextualised and structured knowledge, in the format of learning materials, to support the governance of diverse uses of social media and crowdsourcing (SMCS) for different types of stakeholders such as: disaster management organisations (DMOs), policy makers and the scientific community. The main purpose of the Framework is not only to provide such knowledge, but also to facilitate knowledge sharing among different stakeholders and to support cooperation and the

exchange of good practices, especially through the LINKS Community Center (LCC)<sup>2</sup>, an online platform where stakeholders can engage with the project outputs and each other (D7.3, Kiel, M., Habig, T., Marterer, R., 2021).

The Framework is assessed and developed in three stages during the project (Figure 1). This current work plan and activities described in this deliverable fall under step 1 in the figure below.

**Figure 1: Workflow for assessing the Framework**



Source: LINKS

The cases place a key role in the assessment of the Framework, as the results emerging from each round of the assessments will feed into the knowledge that will ultimately be part of the Framework. All five cases have their own processes, actors, institutions, dynamics, and challenges with regards to the uses of SMCS in all phases of disasters. The Framework provides a space to capture the diversity of that knowledge and to learn from it.

<sup>2</sup> <https://links.communitycenter.eu/index.php/Welcome!>

### ***The LINKS cases defined***

In LINKS, the terms “cases” and “case-based assessment” refer to the assessment of the LINKS Framework, realized through fieldwork in five cases and in the frame of the following hazard scenarios:

- Case 1: Earthquakes in Italy
- Case 2: Industrial hazards in the Netherlands
- Case 3: Drought in Germany
- Case 4: Flooding in Denmark
- Case 5: Terrorism in Germany

**Figure 2: The LINKS case countries**



Source: LINKS

In the five LINKS cases, the focus is on the use of social media and crowdsourcing (SMCS), which are operationalised in relation to three key knowledge domains: disaster risk perception and vulnerabilities (DRPV), disaster management processes (DMP), and disaster community technologies (DCT), and in different hazard scenarios.

### ***The scenarios defined***

Scenarios in LINKS are points of departure, informed by the DRPV, DMP, and DCT knowledge bases and methodological choices developed under WP2-4, to explore gaps, needs, challenges and experience relating to the uses of SMCS in different context.

The use of the term “scenario” in LINKS specifically refers to:

- The hazard contextualised in each case: case 1, **earthquake**, Italy; case 2, **industrial**, the Netherlands; case 3, **drought**, Germany; case 4, **flooding**, Denmark; case 5, **terrorism**, Germany;
- The context: e.g. geographical, socio-cultural, risk exposure;
- The stakeholders who are both involved in dealing with the hazard and in the research activities carried out in the cases.

### ***The characteristics of the cross-case and deep dives case assessments***

In LINKS we apply three methodologies helpful to shed light on the operationalisation of the uses of SMCS in relation to DRPV, DMP and DCT across and within the different cases. To do this, the research design is based on two levels: cross-case and deep dives case assessments:

- The cross-case assessments are joint efforts to investigate the individual knowledge domains (DRPV, DMP, DCT) across different contexts while exploring interacting themes. They will generate both independent domain-specific results, and comparative results across domains. They involve the use of the mandatory methods (semi-structured interviews and on-line survey), and related instruments (specific assessment guidelines) in all cases. The assessment guidelines are included in Annexes 6.3, 6.4 and 6.5 of this document;
- Deep dives are additional assessments which allow the teams more freedom to explore the knowledge domains, scenarios and topics which are of specific relevance to the local case.

The findings from both the cross-case assessments and the deep dives will feed into:

- The three knowledge bases and the second versions of the methodologies (D2.4; D3.3 and D4.3);
- The LINKS Framework, specifically the second version in which initial learning materials will be provided (D5.4).

### 1.1.2 How to read this document

This document is structured as follows:

- Section 2 presents the five LINKS cases with a specific focus on the hazard, the context, and the stakeholders;
- Section 3 outlines the work plan, meaning all the activities currently ongoing and planned for the cross-case assessments and for the deep dives;
- Section 4 provides conclusive remarks and an overview of the next steps.

In addition to these sections, Annex 6.2 describes Covid-19 risks and impacts per case, and the Annexes provide the following assessment guidelines:

- Protocol for conducting the semi-structured interviews (Annex II: 6.3);
- Guidelines on how to sort data collected in the semi-structured interviews (Annex II: 6.4);
- On-line survey protocol (Annex II: 6.5).

## 2. THE LINKS CASES

In this Section we provide a description of the five LINKS cases by focusing on:

- The broader context per case country: e.g. past events, socio-cultural and geographic aspects that should be taken into account;
- The specific context per case country, meaning a short outline of the area in which a case takes place, the main focus of the case and the initial stakeholders who will be involved in the research activities. More stakeholders will be involved, as needed, based on the findings and on the needs per case country.

### 2.1 Case 1: Earthquakes in Italy



Case 1 is focused on earthquakes in Italy. A recent National Risk Assessment released by the Italian Civil Protection Department (DPC) notes that earthquakes caused 160,000 fatalities in the last two centuries (DPC, 2018). Italy is one of the countries with the greatest seismic risk in the Mediterranean due to the frequency of earthquakes that have historically affected its territory.

Since 1908, 30 earthquakes with magnitude over 5.8 hit the country<sup>3</sup>. The economic impact of earthquakes in Italy in the last 50 years has been estimated around 150-160 billion euros<sup>4</sup>.

Those events usually hit more than one region (e.g. Central Italy earthquakes in 2016-2017). This calls for an effective collaboration among several and different governance levels that usually include three geographical scales: local, regional, and national.

Compared to other countries, Italy has a very high vulnerability, due to the considerable fragility of its building heritage, infrastructure, service networks, high population density and the presence of a historical, artistic and monumental heritage that is unique in the world. According to Masi et al. (2021): “These dramatic effects mainly depend on the high vulnerability of the existing building stock, as it was designed and realized either for gravity loads only or using inadequate seismic criteria”.

The Italian Government uses seismic hazard maps to prevent and estimate potential damages, and to plan the measures of disaster risk prevention and reduction. However, an in-depth analysis of social vulnerability is still lacking today. New inputs on how to address and include social vulnerability in the different disaster risk management phases are required.

In the following table, the specific context in which the Italian case takes place, the main focus, and the types of stakeholders who will be involved are provided.

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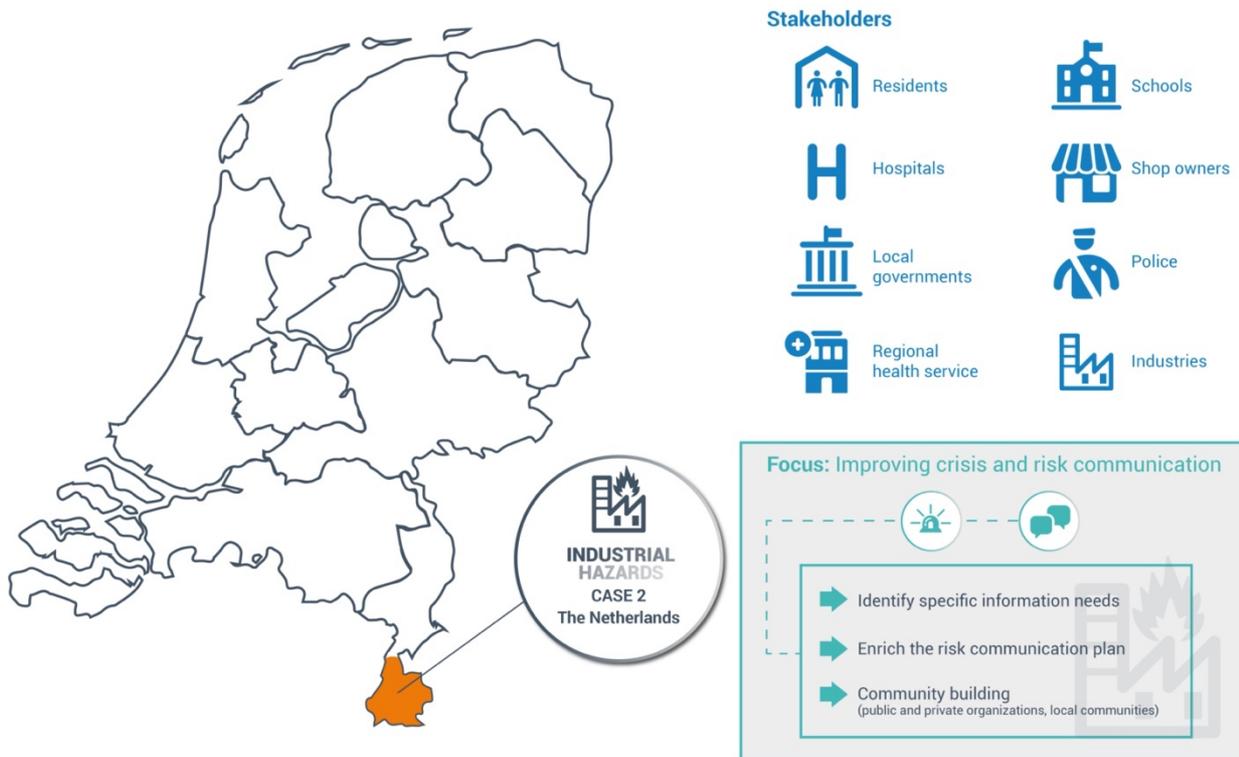
<sup>3</sup> <https://emidius.mi.ingv.it/CPTI15-DBMI15/>

<sup>4</sup> <https://blog.ilgiornaledellaprotezionecivile.it/italiapaesesismico/2018/02/19/costo-dei-terremoti-italia>

**Table 1: Case 1 - Earthquakes in Italy**

Specific context	Main focus (deep dive)	Stakeholders involved in the research activities
<p>Valnerina: The area has been hit by devastating earthquakes in the last century (e.g. in 1979, 2009, 2016-2017). In 2016-2017 a series of earthquakes devastated 131 municipalities in four different regions (Marche, Abruzzo, Umbria, Lazio), impacting the life of approximately 600,000 citizens, killing 333 people and displacing 4,807 residents.</p> <p>It is a mountain area, with small villages, large presence of elderly people and few and narrow roads connecting the villages to one another and to the main infrastructures.</p> <p>Unique characteristics:</p> <ul style="list-style-type: none"> <li>a) risk exposure and high familiarity with earthquakes (vivid memories of past events);</li> <li>b) high number of volunteer associations engaged in risk and crisis communication.</li> </ul>	<p>These disastrous seismic events highlighted the weaknesses of traditional disaster communication mechanisms, especially for vulnerable people.</p> <p>The main focus revolves around:</p> <ul style="list-style-type: none"> <li>a) assessing and improving communication strategies through a multiage approach to improve community resilience;</li> <li>b) promoting intergenerational dialogue as a way to assess risks and potential of SMCS, especially for children and elderly people;</li> <li>c) promoting inclusive communication strategies.</li> </ul> <p>The purpose is to bring adults and young people together to share knowledge, experiences and to use SMCS in creative ways.</p>	<p>Institutional (mayors and other authorities at local level).</p> <p>Four municipalities in the areas of Valnerina will be involved: Arrone, Ferentillo, Montefranco, Polino;</p> <p>At a provincial level, the Civil Protection office of the Province of Terni as well as the Regional Civil Protection (Umbria Region) will be involved;</p> <p>Schools involved in the research activities: Education Secondary school (IC Fanciulli of Ferentillo and Arrone located in Umbria)</p> <p>Associations: Save the Children Italy, EDI Onlus</p>

## 2.2 Case 2: Industrial hazards in the Netherlands



Case 2 revolves around industrial hazards in the Netherlands. The Dutch chemical industry is one of the biggest of Europe and worldwide since the Netherlands are one of the leading countries with respect to chemical production. In the Netherlands, there are a few places where chemical factories are located close to each other. Those so-called 'chemical clusters' can, for example, be found near Rotterdam, Amsterdam and Sittard-Geleen (Chemelot). Incidents with chemical substances are rare, but have occurred nonetheless. For example, on January 5th 2011, when a fire was caused at the chemical plant of Chemie-Pack, in the municipality of Moerdijk. On August 21 2017, there was a fire in the ExxonMobil Refinery in Rotterdam, in furnace F1001 of the Powerformer factory. At the end of the morning on Saturday 3 August 2019, there was a leak at one of the nitric acid factories at Chemelot. Even when incidents are not frequent, the effects for the surrounding environment could be major (e.g., possible health-effects after inhaling a chemical substance). This is one of the reasons why chemical plants would like to engage more actively with people living next to their plant.

An important research was carried out already by the RIVM (National Institute for Public Health and the Environment). The research was focused on information needs and safety perception of citizens surrounding Chemelot (Rijksinstituut voor Volksgezondheid en Milieu, 2021). The results fed in the

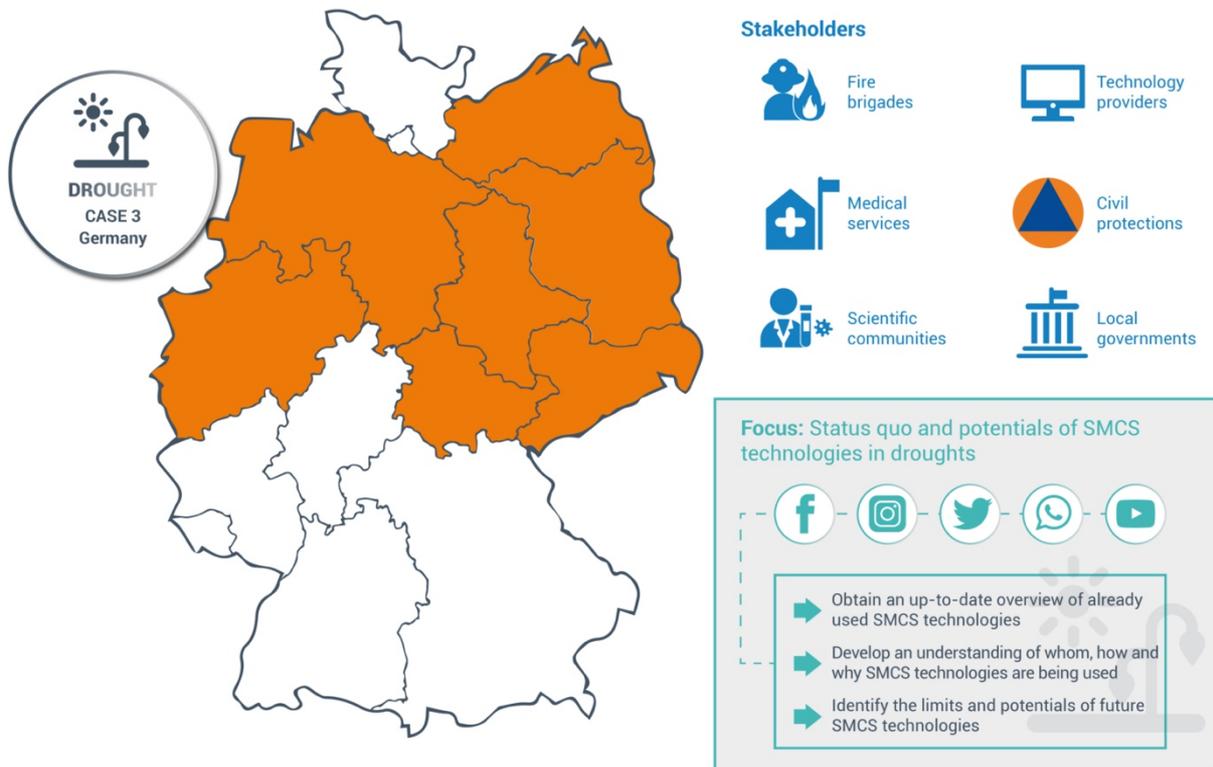
Communication Plan which specifically deals with citizens/residents from the three municipalities surrounding the chemical plant. However, it does not target specific stakeholder groups, such as students or people involved in business (e.g. shop owners). In order to further improve the communication plan, those stakeholder groups will be engaged in the activities planned for case 2.

In the following table, the specific context in which the Dutch case takes place, the main focus, and the types of stakeholders who will be involved are provided.

**Table 2: Case 2 - Industrial Disaster in the Netherlands**

Specific context	Main focus (deep dive)	Stakeholders involved in the research activities
<p>Chemelot: located in South-Limburg. It's one of the top five chemical cluster in the NL. Several incidents occurred in the last decade. Those incidents had a massive impact on the local communities living nearby, despite health effects were not registered.</p> <p>Unique characteristics:</p> <ul style="list-style-type: none"> <li>a) Chemelot is situated next to A2, one of busiest highways in the NL and very close to the urban area;</li> <li>b) public and private entities involved in managing safety and security;</li> <li>c) high information needs from the citizens who would like to know what they should do when an incident occurs, where they should go for information, and what the government and Chemelot do to ensure the safety off-site.</li> </ul>	<p>The main focus revolves around improving crisis and risk communication in case of an industrial incident (e.g. chemical spill).</p> <p>The overall purpose is to develop and maintain a long-lasting cooperation between private and public organisations and the citizens living in the surroundings.</p>	<p>Institutional: the three local authorities (municipalities) adjacent to the Chemelot site: Sittard-Geleen; Stein and Beek.;</p> <p>Two municipalities which are farther from the site but can still be affected: Echt-Susteren and Beekdaelen;</p> <p>The national police and the regional health service;</p> <p>Industries (Chemelot)</p> <p>Residents living in the area;</p> <p>Students;</p> <p>Shop owners;</p> <p>People working in hospitals;</p>

## 2.3 Case 3: Drought in Germany



Case 3 revolves around drought in Germany. The complex phenomenon of drought is primarily characterised by little to no rainfall over an extended period of time. This is often accompanied by higher temperatures and high solar radiation. Overall, this leads to the situation that the water needs of the organisms concerned cannot be adequately met and the ecosystem is thus permanently disrupted (Wolchover, 2019; Samaniego et al., 2018). Unlike other extreme events such as floods and storms, droughts have large spatial dimensions and can easily stay for a longer period of time (even over years). The numerous secondary consequences therefore can affect many citizens in Europe (Samaniego et al., 2018). This includes water shortages, forest fires, health problems (especially for the most vulnerable citizens such as the elderly and children) and impact animals, the agricultural sector and industry as a whole (European Environment Agency, 2017). If climate change continues unchecked, the risks from drought and heat throughout Germany will increase sharply in the future. (Federal Environment Agency Germany, 2021). Prolonged droughts in Central Europe and Germany occur regularly and are statistically recorded by e.g. the European

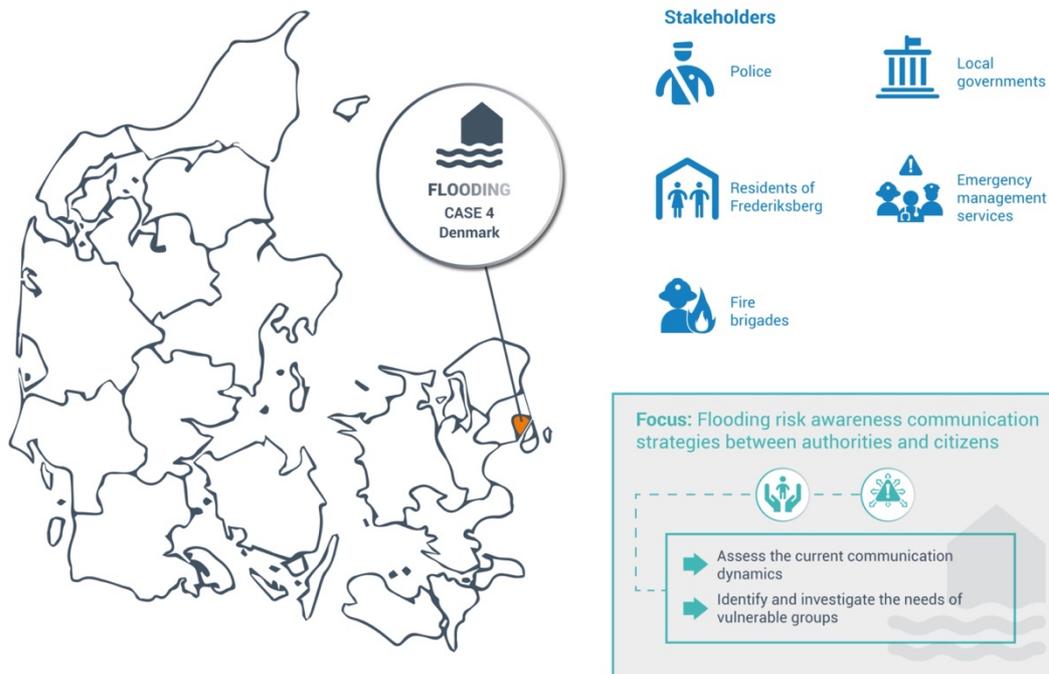
Drought Observatory (Europe, the Middle East and North Africa) or the Environmental Research Center Helmholtz (Germany).

Germany experienced three years of severe drought and heat in 2018, 2019 and 2020 (Marinho et al., 2021). Especially the year 2018, in which 25% less precipitation caused far-reaching consequences (Federal Environment Agency Germany, 2021). Particularly, as captured in the figure above, the federal states of North Rhine-Westphalia, Lower Saxony, Thuringia, Brandenburg, Saxony Anhalt, Saxony, and Mecklenburg-Western Pomerania were affected by above-average temperatures and below-average rainfall (Meinert et al., 2019). Scientific data, disaster response actions and how the overall society responded in the recent past, will play an essential role in Case 3. In the following table, the specific context in which the German drought case takes place, the main focus, and the types of stakeholders who will be involved are provided.

**Table 3: Case 3 - Drought in Germany**

Specific context	Main focus (deep dive)	Stakeholders involved in the research activities
<p>Due to the spatial dimensions of drought, this type of disaster cannot be limited locally. For this reason, in order to gain the most meaningful insights possible, the study is not limited to a specific area, but looks at Germany as a whole. However, the above-mentioned federal states can be highlighted as a starting point for the case research.</p> <p>For example, given the strong connection between the responsible partner safety innovation center (SIC) and the local practitioners, the city and the district of Paderborn is of particular interest for the case.</p> <p>Unique characteristics for Paderborn are the large forest areas but also equally large industrial areas, several highways, railroad tunnels as well as a campus with about 20,000 students.</p>	<p>The relative novelty of the drought phenomenon in Germany makes it an interesting field of study, especially with regard to the implementation of new and innovative mitigation strategies, such as the application of SMCS.</p> <p>The main focus revolves around the status quo and potentials of SMCS technologies in droughts. Specifically, case 3 aims to:</p> <ul style="list-style-type: none"> <li>a) obtain an up-to-date overview of currently used SMCS technologies;</li> <li>b) develop an understanding of whom, how, and why SMCS technologies are being used and</li> <li>c) identify the limits and potentials of future SMCS technologies.</li> </ul>	<p>Fire brigades (leading fire brigades in the field of SMCS, e.g. fire brigade Paderborn);</p> <p>Technology providers (developers of SMCS technologies and DCT, e.g. Ubermetrics Technologies);</p> <p>Civil protections and disaster management organisations (e.g. different virtual operations support teams (VOST));</p> <p>Medical services (e.g. Red Cross associations);</p> <p>Scientific communities in the field of SMCS (e.g. University of Paderborn, ISCRAM-Community);</p> <p>Authorities of the countries and districts, local governments (e.g. federal state of civil protection, city and district of Paderborn);</p>

## 2.4 Case 4: Flooding in Denmark



Case 4 deals with flooding in Denmark. Cloudburst is a weather condition that relates to precipitation, and concerns incidents where heavy rain falls within a short period of time and might consequently lead to flooding. In Denmark, and in Europe, cloud bursts reoccur, and it is expected that the frequency and severity will increase in the future due to climate change (IPCC, 2021). Climate change is expected to impact differently depending on areas around the globe, in Denmark cloudburst and flooding from the sea are some of the main risks anticipated. Geographical conditions secure, that fatal outcome from cloud bursts is seldom, they do however have comprehensive consequences for citizens and society alike since they cover a large geographical area which expands beyond districts and municipal borders. Additionally, long-term incidents, such as flooding, demand use of internal and external resources which are often limited vis-à-vis the extent of the damages. Overall, there is a critical need to coordinate the efforts among the involved municipalities, especially in relation to technical administration and management (great managerial resources are in fact needed). Despite the fact that weather-related incidents often set off a warning in advance, there is a strong need for information and communication prior to, during and after an event. This is also the reason why the case is specifically focused on risk assessment communication strategies adopted by the authorities and information flows between the authorities and the citizens. In the following table, the specific context in which the Danish case takes place, the main focus, and the types of stakeholders who will be involved are provided.

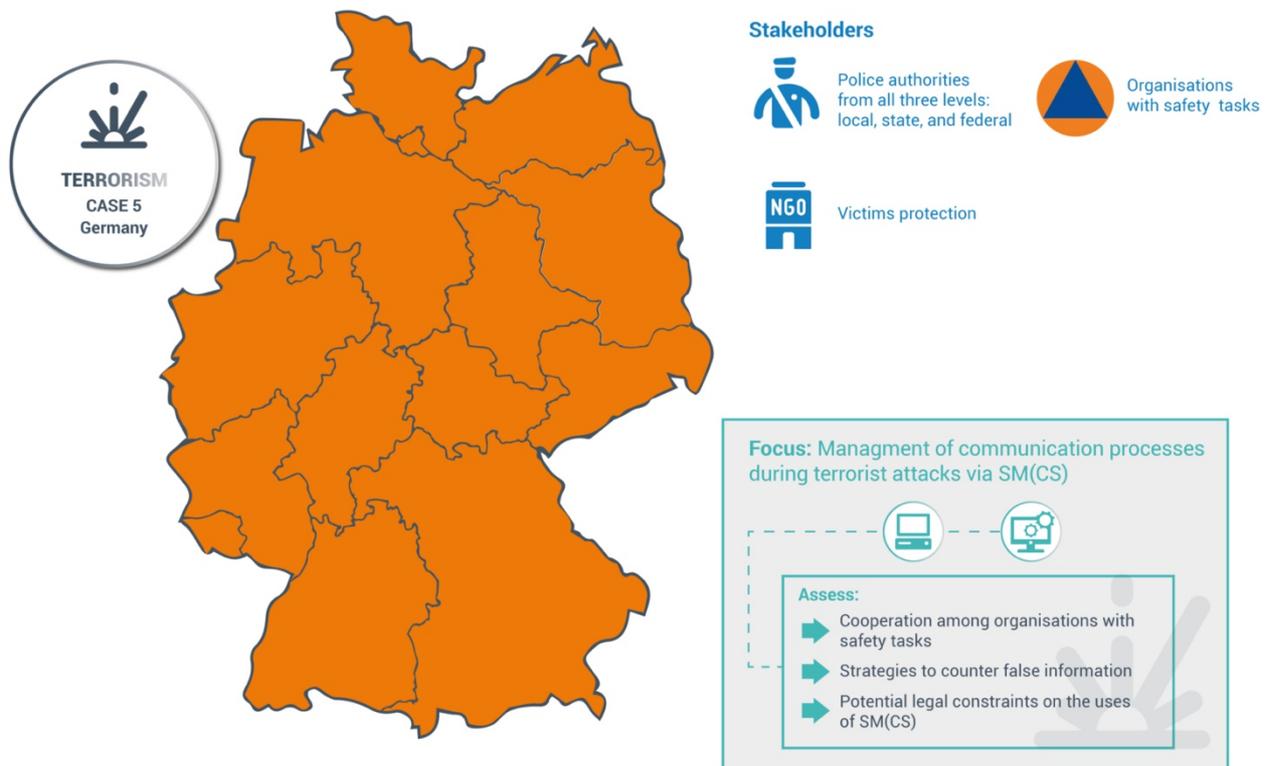
**Table 4: Case 4 - Flooding in Denmark**

Specific context	Main focus (deep dive)	Stakeholders involved in the research activities
<p>Frederiksberg municipality which is situated in the middle of Copenhagen. The city has a population of approximately 100,000 citizens. Numerous shops, restaurants, leisure activities are located in the area, that, besides a high density of residents, attracts many tourists. The population ranges from inhabitants who are rather wealthy to groups that are low on financial resources as well as a broad variation of nationalities is found among the residents.</p> <p>A severe cloud burst occurred in 2011. Within 24 hours, 30-90 millimeter of rain fell in Frederiksberg and the surrounding municipalities. 100,000 damages were registered in the area around the Danish capital, that covers several municipalities, and the expenses were around 1.2 billion Euro.</p> <p>Unique characteristics:</p>	<p>The core idea of the initiatives implemented after 2011 is that sharing data among public authorities, first responders, citizens, and other relevant entities, will serve to improve: warnings, public awareness, engagement and preparedness, and, in general, it will help to better understand community risk patterns. Based on this, the main focus revolves around:</p> <p>a) the assessment of flooding risk awareness communication strategies between authorities and citizens in Frederiksberg and</p> <p>b) improving activities regarding targeted vulnerable groups</p>	<p>Local government; Copenhagen Police; Residents of Frederiksberg.</p>



<p>a)) the municipality of Frederiksberg assigns a great deal of resources to prevention and risk awareness campaigns, compared to other Danish municipalities;</p> <p>b) there is a growing awareness among the Danish emergency management services that disasters caused by climate change will increase and that incidents like cloud bursts need to be managed more often and more intensively in the future.</p>		
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## 2.5 Case 5: Terrorism in Germany



Case 5 is focused on terrorism in Germany. Around the years 2015 and 2016 Europe experienced a new peak in terrorist attacks. And even though the number of recorded incidents is slightly declining again, authorities agree that the threat level remains high all across Europe (European Parliament, 2021). Before the onset of the global pandemic Europe registered 119 executed or thwarted terrorist plots for the year 2019 alone<sup>5</sup>. And whereas some countries might have quite specific threat scenarios (such as e.g., Ireland with predominantly separatistically motivated attacks), Islamic and targeted right-wing/ethno-nationalist plots remain the greatest threats across the EU. Despite Germany accounting for only three of the 119 incidents (Europol, 2020) and suffering fewer fatalities than other EU countries in the past decade (as e.g., France or Norway), authorities (Bundesministerium des Innern, für Bau und Heimat[BMI], 2021) as well as the public (YouGov, 2021) still see a high potential for Germany to become the target of future plots.

German law enforcement authorities continuously seek to develop strategies to be as best prepared as possible. Those strategies also include aspects of the management of communication processes

<sup>5</sup> Attacks that occurred in the UK are still included in this figure because the country had not left the EU at this date.

during terrorist attacks – internally as well as with other organizations with safety tasks (BOS; ger.: Behörden mit Sicherheitsaufgaben) and civic stakeholders. Social media in general are already considered particularly useful tools for a fast and efficient communication in crisis situations by the police and are not only implemented in those strategies, but also in the training of police officers at management level. German law enforcement has only recently started to explore the potentials of extended social media features, such as crowdsourcing functionalities.

Case 5 assessment is strongly centred around a specific incident (which cannot be disclosed because its investigation is not concluded), but will also assess more the broader landscape of terrorist attacks in the case as these attacks almost always trigger that local actors (first responders), state-level actors (such as the central psychological services) and federal actors (such as the special forces) will be simultaneously involved in the police operation. In the following table, the specific context in which the German terrorism case takes place, the main focus, and the types of stakeholders who will be involved are provided.

**Table 5: Case 5 – Terrorism in Germany**

Specific context	Main focus (deep dive)	Stakeholders involved in the research activities
<p>Case 5 is mainly focused on a specific incident that cannot be disclosed at this stage since the investigation is still on-going. However, in order to tailor the case assessment questions targeting experiences, obstacles, and needs regarding SMCS more specifically to the uses during terrorist attacks, a preliminary investigation has already been carried out on four of the most prominent attacks that occurred in Germany in recent years</p> <ul style="list-style-type: none"> <li>the attack in <b>Munich</b> 22 July 2016, when an 18-year-old Iranian-German opened fire at a McDonald's restaurant in the Moosach district and killed nine people and left thirty-six injured; the attack in <b>Munich</b> on the evening of 22 July 2016, when an 18-year-old Iranian-German opened fire at a McDonald's restaurant near the Olympia shopping mall in the Moosach district and killed nine people and left thirty-six injured;</li> </ul>	<p>Overall, the case revolves around the management of the internal flow of information (within the police crisis staff, between operational units, between states and between states and federal police organizations). The following aspects will be assessed:</p> <ol style="list-style-type: none"> <li>cooperation with other organizations with safety tasks;</li> <li>the assessment of the quality of information spread via social media as well as, strategies to counter rumours and false information;</li> <li>legal restrictions hindering or at least compounding the application of SMCS in 'amok/TE' police operations.</li> </ol>	<p>Police authorities from all three levels:</p> <ul style="list-style-type: none"> <li>the local (social media team from the police department that sent first responders to the scene of the incident governing the case);</li> <li>-state (a spokesperson from the Ministry of the Interior from of the state in which the case-governing attack occurred, from their central psychological services, from the State Ministry of the Interior, Social media coordinators from other states for comparison) and</li> <li>- federal level (coordinators of the special forces, and interviewee from the Federal Office of Investigation)</li> </ul> <p>Other organisations with safety tasks (particularly the fire brigades from one large city that actively cooperates with the police in joint headquarters, the Federal Agency for Technical Relief (THW; ger.: Technisches Hilfswerk, the person responsible for coordinating volunteers,</p>

<ul style="list-style-type: none"> <li>• the attack in <b>Berlin</b> on 19 December 2016, where a truck was deliberately driven into the Christmas market next to the Kaiser Wilhelm Memorial Church at <i>Breitscheidplatz</i> which left 12 people dead and 56 injured;</li> <li>• the attack in <b>Halle</b> on 9 October 2019, in which a German neo-Nazi unsuccessfully tried to attack the synagogue during the Jewish holiday of Yom Kippur and later fatally shot two people and wounded two more;</li> <li>• the attack in <b>Hanau</b> on 19 February 2020, when ten people were killed, and five others wounded in a terrorist shooting spree by a far-right extremist.</li> </ul> <p>Those events were chosen because they were covered exhaustively by the news media, and thus provided a large amount of information to dive into the different issues discussed in the context of these incidents and eventually identify thematic areas that are relevant in the frame of LINKS.</p>		<p>and a representative of the Federal Office for Civil Protection and Disaster Assistance[BBK]);</p> <p>victim protection NGOs that can speak on behalf of vulnerable groups (e.g., the Weißer Ring')</p>
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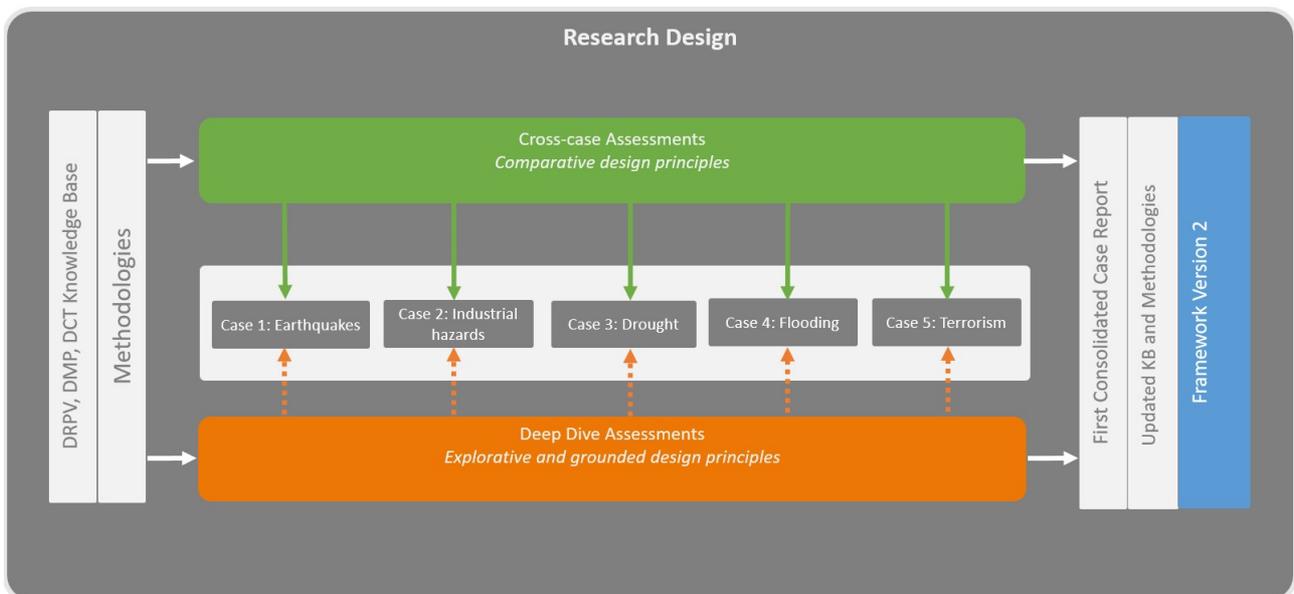
<p>Unique characteristics: Some of those thematic areas are: the miscommunication between the police, the public the media and the municipalities (Halle and Berlin), challenges in the collaboration of different organisations both at a national and at an international level (Hanau and Berlin), and countering fake news, containing mass panic and/or fostering collaboration with the public (Munich).</p>		
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### 3. WORK PLAN FOR THE FIVE CASES

This Section elaborates on the work plan for the first round of case-based assessments in the five cases. In the introduction of this document, we explained that the cross-case and deep dive assessments are applied in all five cases, albeit through different methods and activities. In this section, we provide an overview of the main activities and timelines for both levels of assessments in the cases.

Figure 3 below provides an overview of the overall research design for the first round of case-based assessments. The results from the assessments feed into a consolidated case report (D6.4), the updated knowledge bases and methodologies (D2.4, D3.3, D4.3), and the second version of the LINKS Framework (D5.4).

**Figure 3: Research design for case-based assessments**



**Source:** WP2-4 contribution and adapted by WP6

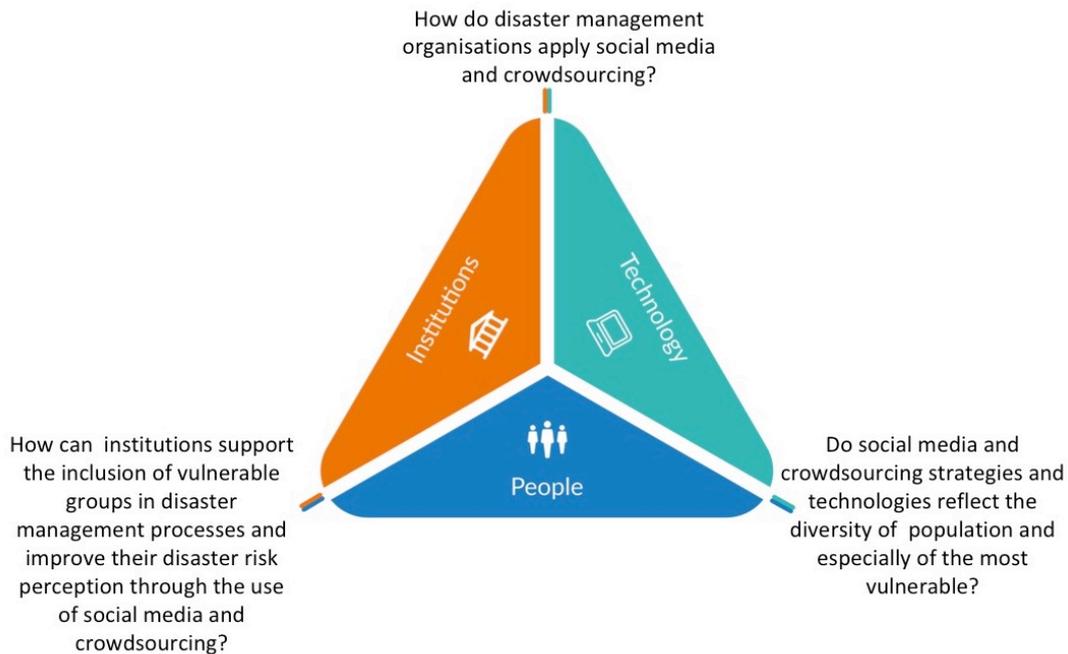
#### 3.1 Cross-case assessments

As is clear from Section 2, the LINKS cases are rich with diversity in terms of the hazards and contexts being addressed. Nevertheless, common themes emerge across the cases in relation to social (DRPV), institutional (DMP) and technical (DCT), experiences, knowledge and needs.

The cross-case assessments are designed with a set of methods which allow us to explore those overlapping themes across the three knowledge domains. The research design for the cross-case assessments was defined in the methodological deliverables D2.3, D3.2, and D4.2, which provided

an overview of the domain specific and transversal research questions and methods that would be applied within and across the cases.

**Figure 4: The Inter Linking Questions**



**Source:** WP3 authors' contribution in collaboration with WP2 and WP4

In this round of cross-case assessments, the case assessment teams (CATs) are using semi-structure interviews and a survey across all cases. Additionally, assessment guidelines have been developed for the interviews and survey to guide the CATs in further developing the inter linking questions identified by the knowledge domains. These include:

- Protocol for conducting the semi-structured interviews (Annex II: 6.3): used for identifying relevant participants and interview questions/guides.
- On-line survey protocol (Annex II: 6.5): used for identifying relevant participants.

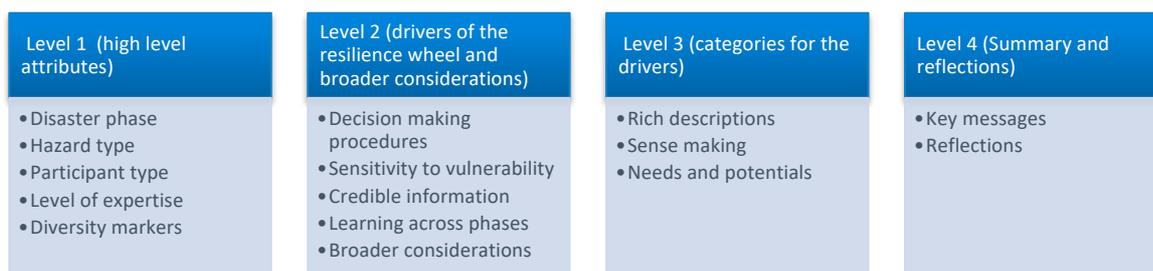
The assessment guidelines were designed in a manner to assist the CATs in selecting research participants who would provide valuable and meaningful inputs in their respective local cases. However, the CATs followed a number of strategic considerations to ensure alignment of participants across the cases (the detailed procedures for this are described in the Annexes 6.3 and 6.5). In general, CATs were asked to identify a combination of participants working at an operational and/or strategic level who can reflect and provide examples, challenges and opportunities of the disaster management organisation's application of SMCS in various processes.

Moreover, for the interviews CATs worked closely with WP2-4 to align their case specific research questions across the knowledge domains. The questions were guided by thematic drivers of the DMP Resilience Wheel, in connection to thematic considerations from the DCT and DRPV methodologies, and tailored to the local contexts of the cases. The overall thematic drivers included:

- Decision-making procedures;
- Institutional sensitivity to vulnerability;
- Learning across places and phases of the disaster management cycle;
- Credible information.

Finally, the CATs were provided with guidelines on how to sort data collected in the semi-structured interviews (Annex II: 6.4), with instructions on how to sort the data from the interviews. The data sorting and analysis is directly linked to the thematic drivers in the protocol. An overview of the levels can be seen in Figure 5.

**Figure 5: Structure for sorting the data**



**Source:** Author's contribution

Details on the levels of data sorting are provided in the guidelines (see Annex II: 6.4). In general, data from the case-based assessments will be sorted into four levels, and different parts of the results will feed into upcoming deliverables.

In the first consolidated case report D6.4, we will present level 1 (high attributes) and level 4 (reflections) identified in the figure above, as well as some high level attributes from the on-line survey. The data analysis will continue to be carried out across all levels by WP2-4 based on their respective knowledge domains. This will influence the next round of methodologies (D2.4, D3.3, D4.3) and the second version of the LINKS Framework (D5.4).

### 3.1.1 Timeline

The cross-case assessments began in October 2021 and are on-going. In the context of WP6, the next steps include the finalization of data collection by CATs through the semi-structured interviews and the survey, and the drafting of case reports based on the collected data.

Figure 6 shows the process which CATs are following for the semi-structured interviews, leading to the submission of the case reports to WP6 (VU) in March (month 22).

**Figure 6: From the semi-structured interviews to the case reports**



Source: Author's contribution

The process above consists of five steps:

1. **Familiarisation and Finalisation:** this step involves getting CATs familiar with relevant documents and information before reaching out to potential interviewees. Relevant documents are included under a specified folder on the LINKS SharePoint and include the protocols, data sorting guidelines, participant invitation materials, and ethics-related documents (e.g. pocket-guidelines, informed consent sheets, data management plan).

WP3 with the support of WP2, WP4 and WP6, organised two meetings with CATs in September 2021 to discuss participant mapping and the operationalisation of the research questions in each case. In October 2021 all CATs finalised the participant mapping and operationalisation of the research questions. A separate session was also held with CATs by in October 2021 to explain the ethics materials and requirements for conducting the interviews.

2. **Reaching out to potential interviewees.** CATs are responsible for reaching out to potential interviewees. WP6 provided an invitation letter to ensure consistency across all cases.
3. **Carrying out the interviews.** The interviews in all cases are carried out from October to December 2021. A certain degree of flexibility is expected here since some CATs may finish earlier while others may need additional time due to e.g. challenges in recruiting research

participants, internal staff schedules, etc. The interviews can be done face-to-face or on-line, based also on Covid-19 country-specific restrictions.

4. **Data sorting based on the guidelines.** The data must be sorted according to the *Guidelines on how to sort data* (Annex II). All interviews should be: recorded, transcribed, anonymised, and translated into English in due time so that the case reports can be sent to VU in March 2022. To facilitate both this process all teams our using the same software (NVIVO) and steps for transcribing and sorting/coding data. Instructions and a workshop on these processes have been organized for relevant CAT members by WP6 in January 2022.

5. **Submitting Case reports.** The reports must be sent to VU by March 1<sup>st</sup> 2022.

A consolidated version of the case reports, including the results from the survey, and a status update of the deep dive activities at case level will also be included in D6.4 in May 2022.

The timeline and summary of activities for the cross-case assessments is provided in Table 6:

**Table 6: Timeline for the Cross-case Assessments**

Date	Activities	WPs
<b>June-August 2021</b>	Detailed planning at case level (mid -June)	WP2-6
	Design of the online survey	WP4 in collaboration with WP2-3
	Design of the semi-structured interviews	WP2-3 in collaboration with WP4
	Identification of the online platform for the survey (ethics/data management)	WP4
	Protocol for conducting the semi-structured interviews	WP3 in collaboration with WP2-6
	Operationalisation of the semi-structured interview in local cases (stakeholder mapping)	WP2-6
	Refinement	WP2-4
<b>September 2021</b>	Stakeholder mapping discussed and finalised by the CATs (semi-structured interviews)	WP3 in collaboration with WP2-6
	Operationalisation of the questions for the semi-structured interviews in local cases	WP6 in collaboration with WP3
	Development of the guidelines on how to sort the data collected during the semi-structured interviews	WP3 in collaboration with WP2-6

Date	Activities	WPs
<b>October 2021</b>	Step-by-step explanation of the process CATs have to follow to carry out the semi-structured in a proper manner including ethics requirements and data management.	WP6
	Protocol for the distribution of the online survey in the countries of the CATs	WP4 in collaboration with WP2-6
<b>October-December 2021</b>	Semi-structured interviews carried out in all cases	WP6
<b>November 2021</b>	Delivery of the first version of the LINKS Framework (D5.3) and of the second work plan for the five cases (guidelines and templates: D6.2)	WP5-6
	Finalisation of the online survey	WP4 in collaboration with WP2-6
	Translation of the online survey in the respective CAT-languages	all CATs
	Pilot tests of the online survey	WP4
<b>December 2021</b>	Start of the publication and distribution of the online survey	all LINKS partners
<b>January- February 2022</b>	Transcriptions, translations, data sorting by CATs. Workshop on data coding and analysis.	WP6
<b>March 2022</b>	Case reports ready and sent to WP6 leader	WP6
<b>March – July 2022</b>	Data analysis	WP2-4
	Consolidation of results from case reports into final report	WP6
<b>May 2022</b>	Submission of first LINKS case report (D6.4)	WP6

Source: WP2-4 and adapted by WP6

### 3.2 Deep dive assessments

As described in the Introduction, the deep dives are additional assessments which are carried out alongside the cross-case assessments. Those assessments allow for more freedom for the CATs to focus on what is relevant in a given context (e.g. challenges experienced by the practitioners in their daily job and/or follow-up investigations or “zooms-in” specific issues that are already tackled by local authorities). An overview of the **main focus** for deep dives in each case was provided in the tables in Section 2. In this section we elaborate on the main focus for each case by highlighting:

- The objectives;
- The methods to achieve the objectives;
- The research activities and timelines per case.

There is a wide variety of activities carried out at case level the for deep dives. The variety emerges both content and time-wise since some activities have started already, while others are on-going or not yet started. A certain degree of variation offers the opportunity to implement a more practitioner-oriented approach to the research, while still keeping as key points of departure the three knowledge domains. All deep dives are primarily designed and driven by a single knowledge domain (e.g. DCT in the German Drought case) but not limited by it. The outcomes from the deep dives will also inform other domains and, ultimately, the rich experiences and findings of the in-depth investigations will inform the LINKS Framework by providing key inputs to develop the learning materials, together with the findings from the cross-case assessments.

### 3.2.1 Activities and timelines per case

#### 3.2.1.1 Case 1: Earthquakes in Italy

As outlined in Section 2, the disastrous earthquakes that hit the country highlighted the weaknesses of traditional disaster communication processes, especially for the most vulnerable. The point of departure of case 1 is the assumption that minors and elderly people are often among the most vulnerable groups when disasters strike. Additionally, they are often at the margins of key decision-making processes. In this frame, SMCS platforms can be helpful to implement more inclusive practices. The main focus revolves around three key aspects: communication strategies, intergenerational dialogue as a way to assess risks and the potential for SMCS, community resilience.

Case 1 is primarily designed around and driven by the DRPV knowledge base.

#### Objectives:

- Raise awareness on the use of technologies and social media to improve communication during the different phases of disaster risk management, especially in case of earthquakes;
- Promote inclusive communication dynamics for those who are socially more vulnerable;
- Reinforce community resilience through an active engagement with minors and senior citizens;
- Promote active citizenship / civic engagement through an appropriate and safe use of technologies.

#### Methods:

Different research methods will be applied, specifically focus group discussions, interviews, participatory action research (e.g. action research game) and workshops. Furthermore, a multi-age

criterion has been adopted in selecting research participants (details about methods and research approaches are in D2.3). Short descriptions of the methods are provided below:

- **Workshops.** They will be carried out mainly minors (12-13 years old). The aims are varied and range from increasing the level of awareness in relation to risks and disasters, specifically on earthquakes, to increasing the familiarity with local emergency plans;
- **Action-research game.** The aim is to improve minors' participation to community life. Moreover, gaming can help to reduce the risk of hierarchical relationships among minors and adults. Experts and other members of the community could also be involved in the activities. Thus, the action research game will be used to raise awareness on the topic of technologies in relation to the prevention of disaster risks and disaster risk management adopting a child-friendly perspective;
- **Focus groups** will also be used to identify the limits and the potentials of SMCS in disaster risk management according to a multi-age perspective. Focus groups will be organized on the basis of DRPV model, revolving around accessibility, connectivity and mobility capacity such as on trust in SM-CS platforms in the different phases of disaster risk management.

The activities are summarized in the table below and consists of two core research phases:

1. From October 2021 to May 2022
2. From October 2022 to April 2023

The activities with adults started in October 2021 (duration until March 2022) and include:

- focus groups
- Interviews with experts (in the cross-case interviews, some specific questions focusing on deep dive have been introduced)

Interviews and focus groups have not been included in the table, having been planned throughout all the research phase. Further actions will be planned in the second phase, based on the outcomes from the first phase.

**Table 7: Case 1 - Overview of activities**

Activity	Date	Activity focus	Participants
<b>Phase 1</b>			
<b>Workshop with children on "Accessibility"</b>	In October 2021 (19, 21, 25 October) February 2022	Identification of the risks affecting 'our' community. Debate on how children usually access information, places and resources	Students from 3 different classes (School: Istituto Fanciulli <sup>6</sup> )

<sup>6</sup> It should be noted that the main school is located in a mountain village (Arrone), while a smaller one is located in another village but they both have the same name.

<b>Action Research game with children on "Accessibility"</b>	November 2021	Introducing to CS technologies and applying crowd mapping to accessibility analysis	Same as above
<b>Workshop with adults (LINKS Community Workshop, LCW)</b>	9 November 2021	Introduction of the project and debate on the potential of SMCS in disaster management and prevention. Focus groups with civil protection volunteers	Local authorities and experts
<b>Workshop with children on "Connectivity"</b>	February 2022	Group work on vulnerability and social media. Debate on connectivity according to the DRPV model	Students from 3 different classes (School: Istituto Fanciulli)
<b>Action Research game with children on "Connectivity"</b>	April 2022	Exploring connectivity through technologies and SMCS use	Same as above
<b>Workshop with children as closing and restitution of the 1<sup>st</sup> phase</b>	May 2022	Feedback on the research 1 <sup>st</sup> phase. Reflecting on the progresses and designing the next steps	Same as above
<b>Phase 2</b>			
<b>Focus Group Discussion with children</b>	October 2022	Exploring the use of SMCS among children and designing the multimedia tool for the awareness campaign	Students from 3 different classes (School: Istituto Fanciulli)
<b>Action Research Game with children on "Mobility"</b>	October 2022	Exploring mobility through technologies and SM use	Same as above
<b>Testing of the multimedia product</b>	November 2022	First test of the multimedia product with local authorities and stakeholders	Same as above
<b>Simulation (role-play) with the use of a multimedia product</b>	April 2023	Strengthening child participation to DM	Students from 3 different classes (School: Istituto Fanciulli)
<b>Inter-generational dialogue workshop</b>	April 2023	Children meet local authorities and civil society	<i>TBD</i>

<b>Final Dissemination event</b>	May 2023	Final event on project's results and launch of the awareness campaign	<i>TBD</i>
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### 3.2.1.2 Case 2: Industrial Hazards in the Netherlands

As described in Section 2, case 2 is mainly focused on risk and crisis communication due to both the proximity of several local communities to Chemelot and their needs for information, in case an incident occurs. The point of departure is the assumption that building a long-lasting relationship between private and public organisation which collaborate to maintain the security and safety of the citizens around Chemelot and the citizens themselves is key to enhance resilience.

The majority of the deep dive activities in case 2 will not take place before 2022. Some crucial risk communication activities, unrelated to LINKS but nonetheless deemed important in the frame of the project, will be launched in early 2022<sup>7</sup>. One activity/campaign is, for instance, the “Samen veilig rondom Chemelot” (“Together safe around Chemelot”) and is focused on the residents surrounding Chemelot. The strategy of the campaign is largely based upon the research done by the Dutch National Institute for Public Health and the Environment which gauged the perception of safety and information needs of people living near the chemical cluster of Chemelot through a survey (N=913). Based upon the findings, the goal of the campaign is threefold, leading to preserving and increasing (1) trust (in Chemelot and the government), (2) the feeling of safety, and (3) the ability to take necessary act during crisis. The campaign will be published via social media and offline channels, such as leaflets. The deep dive is considered (and designed) as a follow-up of those activities.

Case 2 is primarily designed around and driven both by the DMP and by the DRPV knowledge bases.

#### Objectives:

- Identify if and how the informational needs in all phases of a crisis and focused on industrial hazards differ among stakeholders groups;
- Enrich the existing Risk Communication Plan (see Section 2) by including different target groups, such as vulnerable groups, hospitals, schools and shop owners;
- Community building among different organizations (public and private) and local communities. This entails, *inter alia*, the development of more inclusive communication strategies and community building practices through, *inter alia*, SMCS;

#### Methods:

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<sup>7</sup> This is the reason why, at the time of writing (October 2021), a detailed overview of the activities cannot be provided. More activities will be planned in 2022.

In order to achieve the objectives, both **workshops** and **focus groups** with citizens will be carried out. Local mayors (from the municipalities of Sittard-Geleen, Beek and Stein), representatives of important stakeholders groups (e.g., directors of schools, representatives from hospitals, nursing homes, mental health organizations and other health care organizations) and representatives of the general public will be invited to the first workshop. This workshop will be organized to launch the LINKS project officially, by presenting the activities that will be carried out in 2022. Specific information needs from different stakeholders will be already explored. A preliminary outline of the activities is captured in the table below:

**Table 8: Case 2 - Overview of activities**

Activity	Date	Activity focus	Participants
<b>LINKS Community Workshop (schools, hospitals and other healthcare organisations, shop owners)</b>	February 2022	Launching the LINKS project within the community and investigating additional information needs within local communities	Local communities from the municipalities of Sittard-Geleen, Stein en Beek
<b>Focus group with schools</b>	End Of March 2022	Investigating the information needs of school directors and students in case of an emergency at Chemelot, or long before such an emergency occurs.	Students and schools within the municipalities of Beek, Stein and Sittard-Geleen
<b>Focus group with hospitals and other healthcare organizations</b>	End of April 2022	Investigating the information needs of hospital representatives, and other healthcare workers, in case of an emergency at Chemelot, or long before such an emergency occurs	Representatives from hospitals and other healthcare organizations within the municipalities of Beek, Stein and Sittard-Geleen
<b>Focus group with shop owners</b>	May 2022	Investigating the information needs of shop owners in case of an emergency at Chemelot, or long before such an emergency occurs.	Shop owners within the municipalities of Beek, Stein and Sittard-Geleen )

### 3.2.1.3 Case 3: Drought in Germany

As explained in Section 2, Germany experienced severe drought in the past three years. These recent events have shown huge potential for improvement in the prevention of an occurring drought and the response and recovery while and after a drought (Marinho et al. 2021). The point of departure of case 3 is that, despite drought being a recent phenomenon in Germany, understanding the current status and the potential uses of SMCS in dealing with it is nonetheless important to increase the positive impact of social media in managing drought-related impacts and effects.

Case 3 is primarily designed around and driven by the DCT knowledge base.

#### Objectives:

- Understanding the current uses of SMCS technologies. This would allow to get an up-to-date, comprehensive overview of the status;
- Understanding the actors, the dynamics and the strategies underlying the uses of SMCS technologies in the case of drought;
- Identify the limits and potentials of future SMCS technologies.

#### Methods:

Together with the relevant stakeholders, the methods described below will be used to explore insights and potentials on how the use of SMCS and, more concrete, DCT can be applied in a prolonged drought. For example, transparency and education the public ensures an increased acceptance among the population for e.g. unpopular measures (e.g. limited water use) and communicating instructions for action to avoid hazards (e.g. wildfire due to carelessness) are considered important. Furthermore, the sentiment analysis function (mood of the public) seems quite promising in a long-lasting disaster event.

Both **qualitative interviews** and **workshops** will be used as the main research methods. The interviews will shed light mainly on technical aspects, which are of particular interest to the case leader (SIC). Workshops are well suited to generate rich information with a high density. To reflect the diversity of the LINKS Community and also to actively involve it, some of the workshops are planned within the context of the LINKS Community Workshops (LCW). The LCWs are an important resource for the case drought to engage with the LINKS Community. They provide an opportunity to gain valuable experiences and assessments on the use of SMCS and especially DCT in disaster situations, particularly in drought scenarios.

In the following table, ongoing and planned case activities are presented:

**Table 9: Case 3 - Overview of activities**

Research activities	Date	Activity focus	Participants
<b>Observation and analysis of SMCS usage in recent droughts</b>	ongoing	Investigation of SMCS-related activities in drought scenarios	Various Disaster Management Organisations – DMO - (e.g. authorities of cities and districts, fire brigades, police, relevant NGOs (e.g. Red Cross))
<b>Deep dive - Interviews</b>	November 2021-March 2022	Current usage, potentials and limitations of SMCS and DCT in general and in the context of droughts	Practitioners (e.g. strategical leadership positions of fire departments) Policy makers, Researchers, Software Provider of DCT
<b>LCW with practitioners of the police (together with DHPol)</b>	Winter 2021/22	Experiences in the uses of SMCS and DCT (which DCT features have proven valuable to facilitate police work?)	Practitioners (law enforcement only but across all three levels – local, state and federal)
<b>LCW at the Federal Academy for Civil Protection and Civil Defence (together with DHPol)</b>	February 2022	Evaluating different DCT features for the communication and coordination between DMO in disaster situations	Practitioners (various DMO)
<b>LCW on Social Media</b>	March 2022	Discussion about the current state of the art of SMCS and DCT usage in Germany and identifying of future potentials, limitations, implementations and chances of the SCMS usage in droughts	Practitioners, policy/decision makers Researchers

#### Case 4: Flooding in Denmark

As highlighted in Section 2, the sharp rising of cloud bursts due to climate change is apparent in Denmark, especially after the eye-opening event which occurred in 2011. Taking this event as a point of departure together with the initiatives that have been implemented since then, case 4 revolves around the assessment and potential improvement of flooding risk awareness communication strategies between authorities and citizens in Frederiksberg. Moreover, this case put an emphasis on the most vulnerable groups so that communication strategies and activities can be improved.

Case 4 is primarily designed around and driven by the DMP knowledge base.

#### Objectives:

- Mapping and understanding the current communication dynamics and interactions between the stakeholders through qualitative methods from social science to obtain insights in relation to the DMP knowledge base: Is the flow of communication primarily a one-way process, where DMO inform citizens, or are there multiple processes, where citizens also inform DMOs, citizens inform citizens etc?
- Identifying and investigating the needs of vulnerable groups through qualitative interviews and social media analyses that will also inform the DRPV and DCT knowledge bases. The concept of vulnerability is to be understood as dynamic, situated and not static;
- Analysing the interplay between digital online communication processes, including SMCS, and non-mediated communication in the preparedness and response phases to figure out how to improve social media and crowdsourcing. This will create insights across both the DRPV, DMP and DCT knowledge bases.

### Methods:

To achieve the objectives, a wide variety of methods will be used:

- **Focus groups** will be carried out with citizens in Frederiksberg involving citizens with specific characteristics (e.g. people who own their home, people who rent their home, people living in housing cooperatives);
- Frederiksberg municipality carries out a campaign to create awareness of the risk of cloud burst among the citizens at the end of November 2021. Part of the campaign activities will take place in open Facebook groups: an **exploratory monitoring and analysis of on-line interactions** in these groups will be done. This will be followed up by an analysis of “closed” (not accessible) groups later, the sample of these groups will depend on the sampling of participants for the focus groups;
- **Participant observations** of crisis management teams in DMO will also be carried out in order to understand the potential for social media and crowdsourcing.

An overview of the activities is outlined in the table below. It should be considered that part of the data collection took place already in Spring 2021 (pilot interviews, as described in D3.2), with both DMOs from FRB and HBR who deal with emergency management and/or communication with the citizens (7 interviews), and with representatives from the French diaspora in Copenhagen. This specific group was selected as it is considered more vulnerable than others: they do not understand Danish and depend on help from others during crises to understand the messages from the DMOs (5 interviews).

**Table 10: Case 4 - Overview of activities**

Activity	Date	Activity focus	Participants
<b>Pilot interviews, qualitative</b>	Spring 2021	Insight into risk perception and community communication	Citizens from French diaspora
<b>Pilot interviews, qualitative</b>	March, April 2021	Insight into disaster management processes and stakeholder communication	Stakeholders from HBR and FRB
<b>Focus group interviews</b>	January-April 2022	In-depth insight in the risk perception and the communication practices (online and non-mediated communication) among citizens with a variety of vulnerability profiles (e.g. citizens who cannot secure their home; citizens who have not the skills to understand and follow the instructions provided by the authorities; citizens who don't know how to ask for help and assistance).	Citizens from Frederiksberg who are vulnerable in different ways
<b>Social Media analysis</b>	November 2021 – April 2022	Insight in communication dynamics on selected Facebook groups in Frederiksberg, where citizens and professionals exchange views.	Facebook groups (two open groups, two closed groups)
<b>Participant observation</b>	November 2021, November 2022	Analysis of practices in crisis management teams work (exercises and/or planned events) to investigate potentials and obstacles for integration of new practices, e.g. following the upcoming LINKS' framework	Emergency managers

### 3.2.1.4 Case 5: Terrorism in Germany

As explained in Section 2, the terrorism case revolves around the management of internal communication flows across several organisations. The point of departure is a recent terrorist attack (as explained in Section 2, it cannot be disclosed as the investigation is currently on-going) that occurred in a moderately-sized community in central Germany. The event, together with others mentioned in Section 2, highlighted some issues which are worth exploring in the frame of LINKS, especially the recent implementation of new crisis communication and cooperation technologies in this state, the management of potentially unreliable information and some cooperation challenges between organisations.

Case 5 will be carried out in strong collaboration with SIC and is thus primarily designed around and driven by the DCT knowledge base, but it covers also important aspects of the DRPV and DMP domains. The results will be particularly interesting for law enforcement, but also for developers of

future DCTs that shall be tailored to meet the needs for law enforcement and are also important for decision makers. There will also be a focus on the population and its perception of the use of SMCS, e.g., whether they trust the information shared via SM. This will directly feed into the knowledge base of DMP and DRPV.

### Objectives:

Several concerns regarding the use of SMCS by BOS (Organisations responsible for security tasks) during terrorist attacks arose, such as the lack of information about the use of SM and SMCS by emergency responders or the underdeveloped skills for analyzing data. In order to address these concerns, a preliminary overview on the uses of SMCS across all cases in Germany needs to be carried out (objective 1). The second objective is to gain a deeper insight into the current use of SMCS, including advantages and barriers, which can be reached by interviewing responsible stakeholder. This will pave the ground to explore and assess:

- the dynamics and the cooperation with other organisations with safety tasks;
- the quality of information spread via social media and strategies to counter rumours and false information
- the legal landscape, specifically potential restrictions hindering the uses of SMCS

### Methods:

The first assessment will feed into the knowledge base of DMP, DCT, and DRPV, as it sheds light on the current use of SMCS within the German Police, which DCTs are already used and how it is handled, in particular in relation to the objectives listed above. To do this Case 5 conducts:

- A short **exploratory survey** across all states and also at the federal level in order to assess which states already employ SMCS during terrorist incidents, clarify jurisdictions and research potential contact persons;
- qualitative **interviews** and **focus group discussions** with people in charge of police operations during the selected terrorist attacks or that were affected by them.

The mentioned survey has already been carried out throughout spring and summer of 2021 and revealed that the experience with and understanding of crowdsourcing indeed varies a lot across states. Moreover, answers of the participants raised the important issue that many police officials would at least be hesitant to engage in further information exchange on their use of SMCS in the context of workshops or with the LCC because this topic touches upon police tactics and is thus regarded as classified information.

By conducting interviews and focus group discussions, a closer look will be given to the case of terrorism, and especially which DCTs have been valuable in this case. This will involve different levels and types of participants in the research. Police authorities from all three levels – the **local, state,**

and **federal** level – will be involved in the research and complement (or contrast) their experiences on the use of SMCS with experiences. Relevant first responders that may be involved are: other BOS such as the fire fighters and the Federal Agency for Technical Relief.

The interviews and focus group discussions are still to be carried out and will each – for the matter of synergy effects – be linked to LCWs or BOS training sessions at the Bundesakademie für Bevölkerungsschutz und Zivile Verteidigung (BABZ) – the German Federal Academy for Civil Protection. The BABZ training sessions are held once a year, where different emergencies are simulated and first responders (Police, Fire department, Red Cross) are trained for secure decision-making under stress (Stabsrahmen-Übungen).

An overview of the research activities for the deep dive is provided in the table below.

**Table 11: Case 5 - Overview of activities**

Activity	Date	Activity focus	Participants
<b>Survey</b>	02/2021– 6/2021	Assessing which polices across Germany already employ SMCS during major incidents	practitioners (law enforcement only)
<b>LCW followed by interviews and focus groups discussions (with SIC)</b>	Winter 2021/22	Get an overview of the features of those DCTs which have proven valuable to facilitate police work during terrorist incidents (with respect to R&CC with the public and for operational tasks)	practitioners (law enforcement only but across all three levels – local, state and federal)
<b>participation at an BABZ training session</b>	03/2022	Get overview of the features of those DCTs have proven valuable to facilitate BOS coordination during major terrorist attacks Understand which features hindered them.	practitioners (law enforcement and other BOS)
<b>LCW followed by interviews and focus groups discussions</b>	Summer 2022	Assess how the police and the media communicate during terrorist incidents. Understand if the public turns to the media, instead of the police. Understand how to protect and engage potentially vulnerable groups using SMCS. Assess how the public evaluates the credibility of information shared in SMCS. Reflect upon how to prevent rumors and the spread of false information in social media.	practitioners & citizens (law enforcement, prevention council members, media)
<b>LCW followed by interviews and focus groups discussions</b>	Spring 2023	Understand how the guidelines for SMCS use during major terrorist incidents are developed	practitioners & decision makers (law enforcement, ministries, DAs)

## 4. CONCLUSIVE REMARKS AND NEXT STEPS

This deliverable is designed around the LINKS cases and provides:

- an in-depth overview of the context in which the cases are carried out as well as the stakeholders who will be involved in the research activities (Section 2);
- the work plan for the both the cross-case and deep dives assessments by focusing respectively on the rationale, key methodological steps and process and the updated timeline for the cross-case assessments; and the objectives, methods and research activities for the deep dives in each case (Section 3).

Key assessment guidelines for the CATs to ensure systematic data collection are provided in the Annexes.

Both the cross case and the deep dives assessments are crucial in the frame of the project and for the development of the LINKS Framework. The findings will inform the three LINKS knowledge bases (DRPV, DMP and DCT) and the new version of the methodologies. Additionally, the results will be key to develop the learning materials that will be included in the second version of the Framework (D5.4). The latter will be delivered in November 2022 together with the third work plan for the cases (D6.3). D6.3 will provide an update of the work plan for the five cases and will also include additional guidelines to assess the learning materials.

As mentioned in the Introduction, the Framework is a set of contextualised and structured knowledge, in the format of learning materials, to support the governance of diverse uses of social media and crowdsourcing (SMCS) for different types of stakeholders. The knowledge that will be provided in the Framework is closely interrelated both with the knowledge bases and with the cases. It is from and across the cases that specific knowledge, experience and needs will emerge, thanks to the rich on-going and future research activities.

The wide range of stakeholders in the cases will be actively engaged in, *inter alia*, workshops and creative research activities (Case 1), focus groups (Case 2), interviews and ad-hoc assessments (Case 3), participant observations (Case 4) and observation in training sessions (Case 5) should be considered as co-creators of the LINKS Framework. The cases, together with of the knowledge bases, are the entry points to develop a set of learning materials that can must be useful for the main stakeholders involved. Yet, the ambition goes beyond the development of a structured set of knowledge and encompass also knowledge sharing and knowledge transfer so that e.g. good practices in the uses of SMCS, guidelines and specific tools can be also applied by the wider crisis management community. To achieve this goal, the first two assessments rounds of the Framework, will be followed by a validation phase in which the transferability of the results will be assessed by experts independent from the project in 2023.

## 5. BIBLIOGRAPHY

- Bonati, S., Pazzi, V. & Graziani, F. (2021). First DRPV-methodology for the links framework and the case assessments. Deliverable 2.3 of *LINKS: Strengthening links between technologies and society for European disaster resilience*, funded by the European Union's Horizon 2020 Research and Innovation Programme (No. 883490).
- Bundesministerium des Innern, für Bau und Heimat (BMI) (Eds). (2021). *Verfassungsschutzbericht 2020*. Berlin.
- DPC (2018). *Emergenze*. Emergenze Protezione civile. Retrieved from <https://emergenze.protezionecivile.gov.it/it/>
- Environmental Research Center Helmholtz (2021). *Drought Monitor Germany*. Retrieved from <https://www.ufz.de/index.php?de=37937>
- European Environment Agency (EEA) (2017). *Climate change, impacts and vulnerability in Europe 2016*. doi:10.2800/534806
- European Parliament (2021). *Terrorismus in der EU: Anschläge, Todesopfer und Festnahmen Im Jahr 2019*, p. 214. Retrieved from [https://www.europarl.europa.eu/pdfs/news/expert/2018/7/story/20180703STO07125/20180703STO07125\\_de.pdf](https://www.europarl.europa.eu/pdfs/news/expert/2018/7/story/20180703STO07125/20180703STO07125_de.pdf)
- Europol (2020). *European Union Terrorism Situation and Trend Report*. European Union Agency for Law Enforcement Cooperation. Retrieved from: <https://www.europol.europa.eu/publications-events/main-reports/eu-terrorism-situation-and-trend-report>
- Federal Environment Agency Germany (2021). *Klimawirkungs- und Risikoanalyse für Deutschland*. Dessau-Roßlau: Umweltbundesamt. Retrieved from <https://www.umweltbundesamt.de/publikationen/KWRA-Teil-1-Grundlagen>
- Fonio, C. (2021). Work plan for the five cases Deliverable D6.2 of *LINKS: Strengthening links between technologies and society for European disaster resilience*, funded by the European Union's Horizon 2020 Research and Innovation Programme (No. 883490).
- Fonio, C. & Clark N. (2021). Work Plan for LINKS Framework. Deliverable 5.1 of *LINKS: Strengthening links between technologies and society for European disaster resilience*, funded by the European Union's Horizon 2020 Research and Innovation Programme (No. 883490).
- Fonio, C. & Clark, N. (2021). First Work Plan for the Five Cases. Deliverable 6.1 of *LINKS: Strengthening links between technologies and society for European disaster resilience*, funded by the European Union's Horizon 2020 Research and Innovation Programme (No. 883490).
- Gehlhar, S., Habig, T., Lüke, R. & Marterer, R. (2021). First DCT-methodology for the LINKS

- Framework and case assessments. Deliverable 4.2 of *LINKS: Strengthening links between technologies and society for European disaster resilience*, funded by the European Union's Horizon 2020 Research and Innovation Programme (No. 883490).
- Howe, J. (2006). The rise of crowdsourcing. *Wired magazine*, 14(6), 1-4.
- IPCC (2021). *Climate Change 2021*. The Physical Science Basis. IPCC.
- Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of Social Media. *Business horizons*, 53(1), 59-68.
- Marinho Ferreira Barbosa, P., Masante, D., Arias-Muñoz, C., Cammalleri, C., De Jager, A., Magni, D., Mazzeschi, M., McCormick, N., Naumann, G., Spinoni, J. and Vogt, J. (2021). Droughts in Europe and Worldwide 2019-2020, EUR 30719 EN, Publications Office of the European Union, Luxembourg, 2021, ISBN 978-92-76-38040-5, doi:10.2760/415204, JRC125320.
- Masi, A., Lagomarsino, S., Dolce, M., Manfredi, V., & Ottonelli, D. (2021). Towards the updated Italian seismic risk assessment: exposure and vulnerability modelling. *Bulletin of Earthquake Engineering*, 1-34.
- Meinert, T., Becker, A., Bissolli, P., Daßler, J., Breidenbach, J., Ziese, M. (2019). Causes and consequences of drought in Germany and Europe as of June 2019, German Weather Services
- Münch, H. (2018). Rückkehrer und "Homegrown Terrorists": Umgang mit dem Sicherheitsrisiko. *Bundeszentrale für politische Bildung*. Retrieved from: <https://www.bpb.de/politik/extremismus/radikalisierungspraevention/266840/rueckkehrer-und-homegrown-terrorists-umgang-mit-dem-sicherheitsrisiko>
- Nielsen, A.B., Raju, E., Nicolai, J.E., & Andersen, N.B. (2021). First DMP- Methodology for the LINKS Framework and the Case Assessments. Deliverable 3.2 of *LINKS: Strengthening links between technologies and society for European disaster resilience*, funded by the European Union's Horizon 2020 Research and Innovation Programme (No. 883490)
- Rijksinstituut voor Volksgezondheid en Milieu (2021). Het peilen van veiligheidsbeleving en informatiebehoefte van omwonenden rond chemieclusters.
- Samaniego, L., Thober, S., Kumar, R., Wanders, N., Rakovec, O., Pan, M., ... & Marx, A. (2018). *Anthropogenic warming exacerbates European soil moisture droughts*. *Nature Climate Change*, 8(5), 421-426.
- Tyler, S., & Moench, M. (2012). A framework for urban climate resilience. *Climate and development*, 4(4), 311-326.
- United Nations Office for Disaster Risk Reduction (UNDRR) (2021). *Global Assessment Report on Disaster Risk Reduction – Special Report on Drought 2021*, Geneva
- Weber, K. & Hamachers, A. (2020). Aus dem radikalen Netzwerk in den Jihad. Radikale Prediger als Schlüsselakteure im Umfeld deutscher Syrienreisender. In A. Hamachers, Weber, K. & S. Jarolimek (Eds.), *Extremistische Dynamiken im Social Web. Befunde zu den digitalen*

*Katalysatoren politisch und religiös motivierter Gewalt* (p. 225–270). Frankfurt am Main: Verlag für Polizeiwissenschaft.

Wolchover, N. (2018). *What Is a Drought?* Livescience.com. Retrieved from

<https://www.livescience.com/21469-drought-definition.html>

YouGov (2021). YouGov Eurotrack November 2021 Topline Results. Retrieved from:

[https://docs.cdn.yougov.com/p5atgl5h8v/Eurotrack\\_Nov21\\_Topline\\_W.pdf](https://docs.cdn.yougov.com/p5atgl5h8v/Eurotrack_Nov21_Topline_W.pdf)

## 6. ANNEX

### 6.1 Annex I: Covid 19 Risks and Impacts per Case

In the table below, we identify risks, impacts, and mitigation measures for the upcoming work in LINKS at case level. We identify the severity of impacts for each risk as High (H) Medium (M) or Low (L). We further identify any expected delays at the current time, and the owners of each risk.

The risk owners, together with the WP6 leader, will continue to monitor the risks identified in the table and update it before the submission of the Third Work Plan for the five cases (D. Major impacts and delays will be communicated to the REA.

**Table 12: Tasks - risks, impacts, and mitigation measures**

Task	COVID-19 Risks	Impacts and Severity: High (H) Medium (M) Low (L)	Mitigation Actions	Current Anticipated Delays	Risk Owner
T6.2 LINKS Framework evaluation in local cases	<b>Case 1, Earthquakes in Italy</b> The Covid emergency has been seriously taken into account when planning the research activities in Italy. The persistence of the emergency and its severity (increasing of cases), could impact on some activities due to potential restrictions.	Impact on the time planned and available to carry out the research activities (periods and timeline), and the activities themselves (M/H)	On line interviews and focus groups can be a mitigation action. Also workshops and action research games with students can be developed online. At the moment, hybrid solutions have been adopted, giving participants the possibility to choose if they prefer participating virtually or in presence. Another mitigation strategy is to postpone some	Some participants to interviews decided to participate virtually. Some delays were registered to activate local actions in the first phase of the project. No further obstacles were met until now.	SCIT

			activities to the summer time (better weather conditions: outdoor activities can be carried out)		
	<p><b>Case 2, Industrial Hazards in The Netherlands</b></p> <p>The future course of the COVID pandemic is not a risk for the semi-structured interviews, since the interviews are already carried out on-line. But it is a risk for the LCWs.</p>	Challenges to organise LCWs in person (M)	Postponing the activities that require face to face interactions. Find a way to communicate online/digitally in the meantime with LINKS 'ambassadors' so that people involved are informed that the Dutch CAT is active.	None	ST, VRZL
	<p><b>Case 3, Drought in Germany</b></p> <p>The Covid-19 situation could threaten the conduction of the planned workshops on site</p>	Challenges to gain in-depth knowledge from experts (M)	Innovative and interactive organisation of online meetings and virtual workshops; Conduction of several smaller, bi-lateral in person meetings.	None	SIC
	<p><b>Case 4, Flooding in Denmark</b></p> <p>The future course of the COVID pandemic is a risk for the thorough qualitative field work and current research design. In case of new restrictions in Denmark (who is free of COVID</p>	Lack of thorough insights due to online activities, participant observations will be postponed (M)	Postponing the activities that require face to face interactions	Potential delays in participant observations	UCC



	restrictions at the moment), online activities will replace the face-to -face interviews, and participant observations will be postponed				
	<p><b>Case 5, Terrorism in Germany</b> The evaluation of the Framework in the terrorism case might be endangered due to covid-19 e.g. BABZ training sessions 2022 might be cancelled due to the current Covid-19 laws. As a consequence, the workshop and the focus groups won't be carried out.</p>	Lack of insight into the use of SMCS from important stakeholder (Police, Fire department) (M)	Postponing the activities and/or organising on-line virtual workshops, as necessary and if possible	None	DhPol

## 6.2 Annex II: Assessments Guidelines for the cross-case assessments

Annex II consists of key guidelines for the CATs related to the cross-case assessments:

1. The Interview Protocol for the cross-case assessment
2. The Guidelines on how to sort data
3. The Online Survey Protocol

As mentioned in Section 3, all guidelines have been shared and explained to CATs in dedicated meetings.

## 6.3 Interview Protocol for the cross-case assessment<sup>8</sup>

**Authors:** Anne Bach Nielsen (UCPH), Nina Blom Andersen (UCC)

### 6.3.1 General Information

The cross-case assessments are joint efforts between WP2-4 and investigate the specific knowledge domains across different contexts while exploring interacting themes. The cross-case assessments are thus both an attempt to explore domain-specific questions through a comparative lens and an attempt to explore the interdependent questions cutting across knowledge domains. Three different instruments support the cross-case assessments:

- Surveys;
- Interviews;
- Focus groups.

This specific protocol only concerns the interviews.

### 6.3.2 Purpose of the interview study

This protocol provides the information needed for the case assessment teams (CATs) to carry out the interviews. The interview study has the purpose of informing the explorative research questions deducted from the DRPV, DMP and DCT knowledge bases and on a broad and general level to explore the experienced potentials and benefits of using SMCS in disaster management processes from the point of view of disaster risk management organisations. The LINKS definition of disaster management organisations is organisations that operate or can operate to support disaster risk management activities at different levels and across different phases of the disaster management cycle. Consequently, relevant participants go beyond those formally included in the management of the case scenarios.

As explained in detail in deliverables D2.3, D3.2 and D.4.2 the interviews will inform the following overarching research questions:

- How can the use of social media and crowdsourcing in disaster management shape vulnerability and risk perception (WP2);
- What are the limits and potentials of applying social media and crowdsourcing in disaster management processes associated with institutional resilience (WP3);
- How are disaster community technologies applied by DMOs and how can the application of DCT be further facilitated?

Carrying out the interview study across the five LINKS cases allows us to compare similarities and differences between institutional structures and practices in using SMCS in various disaster management processes.

#### *6.3.2.1 Language and format*

The interviews are conducted in the respective national language - Danish, Dutch, German and Italian.

The interviews will have a semi-structured format where all local case assessment teams are tasked with formulating the open-ended questions to be asked in each of the interviews. This ensures a locally grounded and targeted interview that takes contextual understanding and language into consideration. The questions must be based on the four overall themes of the Resilience Wheel, which are presented and explained in detail in Section 3 of this protocol.

Consequently, the interviews will be designed as semi-structured conversational interviews with people representing various actors important for understanding SMCS use in disaster management processes.

All important details for the CATs are following in the next four sections and summarised in the table below:

- Identifying research participants;
- Designing the interview questions;
- Carrying out the interview;
- Ethical considerations;
- Timeline for the interview process.

**Table 13: Overview of the components of the interview study**

<b>Qualitative Research Interviews</b>	
A method based on qualitative questions and responses facilitated by a semi-structured guide. Applied across all LINKS cases to generate in-depth knowledge on people's opinions, thoughts, experiences, and feelings towards SMCS use in DMP.	
<b>Targeted Number of Participants</b>	<b>Research Participants</b>
10-20 per case scenario	Identified by each CAT in collaboration with WP2-4 – see the section on selection of research participants (section 2.2)
<b>Case Relevance</b>	<b>Language</b>
All case-based assessments	Danish, Dutch, German, Italian
<b>Lead</b>	<b>Timeline</b>
WP3	September 2021 to January 2022
<b>Level of Information</b>	<b>Participants Engagement</b>
Deep	High
<b>Type of interview</b>	<b>Time</b>
Semi-structured	45-60 minutes
<b>Benefits</b>	
Generation of rich and contextual knowledge Flexibility to explore emerging topics Low financial cost	
<b>Risk</b>	<b>Mitigation</b>
<ul style="list-style-type: none"> <li>• Confirmation bias</li> <li>• Time demanding in terms of preparing and organising;</li> <li>• Requires experience and knowledge to go beyond the popular narrative;</li> <li>• Access to experts can be difficult.</li> </ul>	<ul style="list-style-type: none"> <li>• Open and narrative approach;</li> <li>• Timely and structured planning;</li> <li>• Pilot interviews;</li> <li>• Focus questions on local knowledge of circumstances and events.</li> </ul>

### 6.3.3 Identifying participants for the interview study

#### 6.3.3.1 The overall approach for selecting interviewees

The strategy for selecting interviewees is based on a strategic selection of actors that have a position where they can reflect and give examples of the disaster management organisation's application of SMCS in disaster management processes. These interviewees can represent different organisations or interests in the local context where the case-based assessments take place and a strategic and meaningful selection will vary across the different case-assessment localities. The identification of research participants (interviewees) for the interview study needs to follow several considerations. Each CAT is asked to map a list of relevant research participants based on the following dimensions:

The scenario is the starting point. We are thus interested in organisations involved in managing the specific scenario or addressing risk and vulnerabilities associated with the hazard of the case in question (i.e. earthquakes in Italy, terrorism and drought in Germany, industrial hazards in The Netherlands). In the Danish context, this includes organisations who are involved in, or can be associated with, disaster risk management processes related to flooding in Frederiksberg Municipality;

Organisations who work across all the four phases of the disaster management cycle (response, recovery, prevention and preparedness). In the Danish context, this for example includes the police and the Greater Copenhagen Fire Department (both involved in the response to flooding), the climate adaptation team from the Frederiksberg Municipality (involved in preparedness) and a representative from a social housing association (working with vulnerable groups and indirectly with risk prevention for elderly and migrant populations);

Participants representing the selected organisations can be experts and professionals who work both on the strategic and operational levels. In the Danish context, this could for example imply talking to the Head of Communication of the Greater Copenhagen Fire Department as well as a person monitoring flooding events when a flood happens.

Please note, the LINKS definition of disaster management organisations is organisations that operate or can operate to support disaster risk management activities at different levels and across different phases of the disaster management cycle. Consequently, relevant participants go beyond those formally included in the management of the case scenarios (e.g the police). Examples could be organisations that work and represent vulnerable groups that are deemed relevant to include

#### SUPPORT

All CATs should make the first attempt to map out the participants they find to be relevant for the interview study in accordance with the criteria highlighted in this section.

The participant mapping will be discussed and elaborated in a workshop together with WP2, WP3 and WP4 and the other CATs. See Section 6 for details on the timeline.

based on the local definition of vulnerability. This means that these organisations have not necessarily collaborated directly in the risk management of the scenario but would provide the point of view of those usually left at the margins or that are most exposed.

### 6.3.3.2 Mapping interviewees

A good approach to strategically identifying research participants is to map all relevant organisations in the contexts of the particular case. When you do this exercise, remember to have the above criteria in mind:

- The case scenario in question (flood, drought, terrorist attack, earthquake, industrial hazard);
- All phases of the disaster management cycle (response, recovery, prevention, preparedness);
- Different types of expertise in the selected organisations (e.g. communication specialists, people involved in operation procedures, management).
- To provide an example, the Danish CAT did the mapping exercise and found relevant participants in the following type of organisations:
  - Public authorities and agencies;
  - NGOs and citizen organisations;
  - Industry;
  - Media;
  - Providers of critical infrastructure (e.g. utility companies);
  - Insurance providers;
  - Consultants or advisors;
  - Hospitals;
  - Religious organisations;
  - Interest organisations;
  - Foundations and philanthropies.

Not all of these actors will be equally important in each context as it depends on the hazard, geography and socio-political context. The list is thus not a “checklist” for CAT to go through, but a source of inspiration for the organisations that could be strategically important to interview.

Following the identification of relevant organisations, CATs need to contact specific representatives. As emphasised in Section 2.1, you should target research participants that work on both strategic and operational levels with the management of the particular hazard, and with a preference towards professionals that have experiences or insights on the use (or non-use) of social media and crowdsourcing technologies and processes.

To provide an example of the type of participants, the Danish case can again serve as an example. Here we identified a range of positions within the selected organisations to contact. This includes:

- A climate change adaptation specialist at Rambøll (consultancy);
- Head of communication at the Greater Copenhagen Fire Department;
- Newseditor at the local newspaper on Frederiksberg (Frederiksbergbladet);
- Project manager at Frederiksberg Municipality;
- Head of a local homeowner's association working on flood prevention measures.

#### 6.3.4 Designing the interview questions

Each CAT is in charge of formulating and preparing the specific questions for the interviews. This supports a grounded interview where local events, examples and experiences are central to the conversation.

We recognise that available and accessible information differs from country to country and that researchers may have important stories to tell that are not directly linked to the key questions. However, to streamline the cross-case interviews similar themes and content will guide the interviews to ensure that we can draw similarities and differences between the organisations' views on the use of SMCS in disaster management. Priority must be given to cover the themes presented below, however, through a local "translation" process that takes context-specific practices, understandings and experiences into account.

The interviews are:

Guided by the four themes of the Resilience Wheel (see D3.1 and 3.2) but questions are formulated by the local CATs;

Tailored for the particular contexts as well as for the research participant the guide will address. The contextual knowledge held by the CAT will help the interviewer engage in-depth with the unfolding of past events and existing policies and practices and yield nuances to the themes. This includes knowledge of local regulations, well-known examples of crowdsourcing or social media platforms, previous disasters and so on;

Semi-structured in nature meaning that they are guided by a set of questions with the flexibility to explore emerging topics along the way;

Based on qualitative open-ended questions that invite for exploration of stories, experiences and reflections on the themes. It is also important to allow for surprises and new directions in the interview and to create a space for participants to voice strong opinions, tell anecdotes and reveal insights into the inner workings of the organisations they represent.

### SUPPORT

As with the research participants, the number of the interviews as well as the interview questions are discussed with WP2, WP3 and WP4 before the interviews are carried out.

A plan for this consultation process is provided in Section 6.

In terms of the number of interviews, no firm rules can be appropriately applied, however, we expect a minimum of 10-20 interviews, which are often enough to provide a degree of saturation where similar accounts start to appear in the interviews. That said, the volume of interviews also depends on the time and resources available for the CATs, which need to be balanced with other research activities associated with the survey and the deep-dives.

#### 6.3.4.1 Interview themes

The semi-structured interviews are designed around the themes provided by the DMP Resilience Wheel:

- Decision-making procedures;
- Institutional sensitivity to vulnerability;
- Learning across places and phases of the disaster management cycle;
- Credible information.

For each of these themes, the overall goal is to explore:

- How organisations describe and explain developments and current state of affairs of applying SMCS in disaster governance (descriptions);
- What organisations associate with making decisions, ensuring credible information, considering vulnerable groups and learning across phases of the disaster management cycle (meaning/sense-making);
- Their visions and suggestions for improved disaster resilience in DMP (imaginaries).
- A description of each theme is provided below accompanied by a set of suggested questions that may inspire the CATs when they formulate the case-specific interview guide.

Please note that you are not expected to cover all themes in each interview if they are not relevant to the organisation or interviewee. For example, if you talk to a person responsible for fact-checking crowdsourced information for a newspaper, questions related to credible information may be more relevant than some of the other themes. The suggested questions are meant as inspiration for the design of the case-specific interview guide. You are very unlikely to be able to cover 12-20 questions during a 45-60 minutes interview. Consequently, you will need to prepare in advance and select the most relevant themes and questions to maximise the information from each interview.

Also, you will need to translate both the themes and examples into questions that make sense and are relevant to the local case context. You can re-visit the contextualised resilience wheels (Annex to D3.2 or attached to the email you received with the protocol) that can support this process.

#### 6.3.4.2 Decision making procedures

Decision-making procedures are essential to understanding resilience-building efforts. Decision-making processes that build resilience for all groups are likely to be *participatory and inclusive*, allowing those most affected by hazards to play an active role in determining how best to avoid

them. Furthermore, they are efficient and allow for quick procedures. Attempts to build disaster resilience require coordinated actions by many different actors, thereby suggesting the need for new mechanisms for collaboration between various actors and sectors.

We know from the DMP knowledge base presented in D3.1 that all of these qualities of good decision-making procedures may be supported by social media and crowdsourcing. We do not know, however, the extent to which procedures supporting the use of SMCS for greater inclusion, effect and coordination are present in European management organisations.

Consequently, the interviews should explore:

- The formal and informal policies, processes and practices that are in place to include and coordinate disaster management efforts through the use of social media and crowdsourcing (*descriptions*);
- Reflections on benefits and challenges in using social media and crowdsourcing for management purposes during, after and before a disaster with making decisions, ensure credible information, considering vulnerable groups and learning across phases of the disaster management cycle (*meaning/sense-making*);
- Their visions and suggestions for future application of SMCS to enhance inclusive, efficient and accountable decision-making processes (*imaginaries*).

### **Suggested questions/examples:**

The following questions are examples that could support the development of the specific interview guide. Some of the concepts continue to be generic (e.g. your organisation, disaster management) and need to be tailored to the concrete organisation, hazard, context and to discussions around either social media or crowdsourcing.

Q1: Are you aware of processes and policies guiding the implementation of SMCS that are relevant to your organisation?

*These can be technical guidelines, hazard-specific guidelines, organisation-specific, European or so on.*

Q2: Can you provide me with an example of how SMCS are used to mobilise citizens in your management processes?

*This can be followed up with questions concerning the challenges or benefits encountered. This can be specifically contextualized in questions of mobilising volunteers if relevant.*

*Understandings of volunteerism are also relevant to explore if relevant to the local case scenario and organization in question.*

Q3: How do you bridge procedures of using SMCS from planning to action?

Q4: Five years from now, how do you want your organisation to apply SMCS in your management processes?

#### *6.3.4.3 Institutional sensitivity to vulnerability*

In the social science literature on disaster resilience, the question of vulnerability is profound. Institutions that differentially constrain or promote rights and entitlements can limit the access to services and resources for particular groups in a society. Being entitled to make use of local ecosystems, to use critical infrastructure and to receive welfare, care, and help are paramount for understanding core vulnerabilities and for designing disaster management measures. In LINKS, we distinguish between different types of institutional sensitivities related to questions of vulnerability. The four main 'vulnerability variables' identified in D2.1 – diversity, accessibility, connectivity and mobility – are guiding our analysis of vulnerability from a governance perspective.

For the interviews, we are particularly interested in understanding questions of accessibility connectivity and the extent to which management organisations reach and target vulnerable groups and how they are connected. Our goal here is to consider how vulnerability is understood and whether vulnerability is considered in policy, practice and processes. These questions allow us to find out how organisations define vulnerable groups, and whether or not such groups are considered in disaster risk management efforts concerning social media and crowdsourcing.

Furthermore, it would be useful to understand if, during the different phases of disaster, they activate/have activated 'alternative' or parallel systems of communication out of the official ones. The final purpose is to understand if these organizations/associations can in future work as bridges between citizens, the most marginalized/forgotten, and institutions.

#### **Suggested questions/examples:**

The following questions are examples that could support the development of the specific interview guide. Some of the concepts continue to be generic (e.g., vulnerability, risk perception) and need to be tailored to the concrete context, language and local discussions on the theme.

Q1: How do you define vulnerability in your organisation?

When defined, this can be followed up with a question that describes the vulnerable groups, which are important to “access” in the context of the specific hazard.

Q2: Are there any formal policy/processes/tools in place to reach vulnerable groups?

*This could be followed up with further questioning on whether they have experience with targeted communication to these groups if they are aware of any tools that help them define vulnerable groups.*

Q3: Thinking back on the last disaster effort your organisation was involved in, how did you reach vulnerable groups?

*Here you should tailor the question to the type of communication you want to understand and you should ask about specific groups relevant to the context (elderly, immigrants, minors, disabled). This could be followed up with questions asking about the specific challenges encountered (or success stories of reaching these groups).*

Q4: In your perspective, how can social media and crowdsourcing help address vulnerability and risk perceptions?

#### 6.3.4.4 Learning across phases, time and places

LINKS understands resilience as not only the capacity to respond and recover but also to learn and adapt. In that sense, we recognise the need for renewal, re-organisation, and development. In the nexus between social media, crowdsourcing and institutions, this aspect looks at the policies and practices put in place in disaster management institutions to learn from:

Training and education policies and structures for using SMCS in disaster governance. This includes technical expertise necessary for fully and successfully exploiting the potential of crowdsourcing;

Previous experience from using SMCS in disaster management and evaluative policies and procedures;

Knowledge sharing across different disaster management phases related to the use of SMCS in disaster management;

Sharing of best, good or worst practices across disaster management organisations related to the use of SMCS in disaster management.

#### **Suggested questions/examples:**

The following questions are examples that could support the development of the specific interview guide. As always, the questions will need to be tailored to the specific interview and the case context. It will, for example, not be all interviewees who would know the organisation's use of technical training. Moreover, you would rarely ask about "disaster management effort" but on the concrete work, programmes, efforts and activities done in the organisation.

Q1: Can you describe how you evaluate disaster management efforts in your organisation?

*This can be followed by a retrospective line of questioning. When you think back on the last disaster, activity, programme, campaign (depending on the organisation or context), what did you learn about the use of SMCS? And how does this influence present work/activities/policies, procedures?*

Q2: How do you seek knowledge about the potentials of using SMCS?

*This can be followed with concrete questions on their experiences using networks, training programmes, knowledge hubs and other training outlets for learning depending on answer and organisation.*

Q3: Are there any good practices that your organisation has been inspired by?

*Be concrete here if possible. This could be by referring to an example that has come up earlier, it could be by referring to SMCS that are known in the local context or something similar.*

Q4: In your opinion, what type of knowledge is needed for you to fully benefit more from SMCS?

*Again, this can be narrowed down to something more concrete.*

#### 6.3.4.5 Credibility of information

Public and accurate information is an important component of a positive institutional environment. Authorities, as well as private and civil society actors, should have access to credible and meaningful information that enable decisions about risk and vulnerabilities. Furthermore, information should be meaningful and trustworthy to benefit disaster management processes.

This line of questioning aims to understand the procedures put in place to ensure credible information, but also to understand concerns and challenges related to this aspect. We know from the existing literature that questions of mis/disinformation, hate speech and respect for privacy are potential barriers to organisations who actively want to use SMCS to receive and communicate information.

#### **Suggested questions/examples**

The following questions are examples that could support the development of the specific interview guide. As always, the questions will need to be tailored to the specific interview and the case context.

Q1: What procedures do you have to ensure the credibility of information?

*Follow up by asking for policies, examples, concrete experiences, concrete technical software/tools and so on that allows to “check” the validity of the information they receive.*

Q2: How do you measure the reach and impact of your SMCS efforts?

Q3: Do you experience misinformation/disinformation in your disaster management efforts?

*This could be followed up with examples and a question of how this has been handled in concrete situations.*

Q3: Do you have any knowledge on the extent to which the information you share is trusted by its recipients?

Q4: In your planning, what needs to be improved for your organisation to rely on SMCS?

*Here, you can refer directly to challenges you have discussed, it can be EU law, national regulation or organizational training.*

### 6.3.5 Carrying out the interview

#### 6.3.5.1 Interview setting

Interviews can be carried out physically if conditions at the time of interviewing allow it, or virtually if necessary. CATs are responsible for deciding on a time and a place for the physical interviews.

The LINKS Teams environment can be used as the interview platform when carried out virtually.

#### 6.3.5.2 Recording

The interviews should be recorded for later transcriptions/analysis. Please make sure to follow all ethical guidelines for using a recording device (see Section 5).

#### 6.3.5.3 Probing

Because the qualitative interview study aims at generating in-depth and contextual insights into the use of SMCS in disaster management, it is important to be flexible and follow new directions during the interviews. Moreover, we encourage the interviewers to ask for concrete examples, experiences and practices whenever relevant to support the reflections brought forward. The extensive contextual knowledge held by the CAT will help them engage in-depth with the unfolding of past events and existing policies and practices and yield nuances during the interviews.

To reach such a level of depth, you should use probing questions to explore details and elaborations of what is put forward by the interviewee. Examples are:

- Can you tell me more about...
- Can you provide me with an example of how you...
- When you think back on this...
- How would you approach this...
- Moving forward, what will you do about...

#### 6.3.5.4 Insights from pilot interviews

To test the approach of using the DMP Resilience Wheel as an overall approach to guide interviews undertaken by CAT, we assigned the Danish CAT to do a pilot test where the Danish CAT used the DMP resilience wheel to design questions relevant for the Danish context. The initial experience of conducting these pilot interviews may provide some useful insights for the CATs in designing and conducting the interviews:

- Surprisingly, the number of relevant participants is few. When the first participants were identified, they quickly pointed to one another;

- The themes provided by the Resilience Wheel resonated well with the Danish practitioners and provided good insights into both potentials and challenges experienced by the organisations;
- The interviews were all scheduled to last for an hour and they all took an hour. Both interviewee and interviewer expressed that the themes could have been explored in more detail and that there is much to discuss around these topics;
- Most interviewees had most to say about one or two out of the four themes and the interviews needed to be adjusted accordingly while being carried out.

#### 6.3.5.5 Ethical considerations

All essential ethical considerations can be found in the LINKS Ethics Strategy and the Data Management Plan (D10.1 and D1.5). An elaborate pocket guide has been developed specifically for the interviews and focus groups (link). Please view these documents before you continue with the interviews.

#### 6.3.5.6 Next steps/Roadmap

Most of the coordination and methodological support will take place through the case coordinators meetings and ad-hoc additional meetings and workshops, as necessary. In addition, WP2,3 and 4 will call for meetings with the individual CATs to support the process if deemed necessary. These are planned ad-hoc throughout the interview process.

An initial overview of the interview process plan is provided below:

**Table 14: Next steps**

Task	Deadline	Involved partners
The finished version of the interview protocol is circulated to all CAT members	August 5 <sup>th</sup> , 2021	WP2,3,4,6
Research participants are identified by CATs and circulated to WP3 on (mail to: <a href="mailto:anne.bach.nielsen@sund.ku.dk">anne.bach.nielsen@sund.ku.dk</a> ) or uploaded to the Teams environment under WP3 => interviews. Please do not include any personal contact details (e.g. name and email address).	September 6 <sup>rd</sup> , 2021	WP6
Map of research participants presented to WP2,3 and 4	Meeting in early September – please answer the doodle	WP2,3,4,6

CATs develop the first version of their interview guides and circulate them to WP3 on <a href="mailto:anne.bach.nielsen@sund.ku.dk">anne.bach.nielsen@sund.ku.dk</a> or upload them to Teams environment under WP3 => interviews	September 20 <sup>th</sup> , 2021.	WP2,3,4,6
Interview guides presented to WP2,3 and 4	Case coordinators meeting in late September	WP2,3,4,6
Interviews are carried out in all cases	September 2021 to January 2022	WP6 with support from WP2,3 and 4

## 6.4 Guidelines on how to sort data<sup>9</sup>

**Authors:** Anne Bach Nielsen (UCPH), Nathan Clark (VU) Chiara Fonio (VU), Emmanuel Raju (UCPH),

As specified in the Interview protocol, the interviews have the purpose of informing the explorative research questions deducted from the DRPV, DMP and DCT knowledge bases and – on a more general level – of exploring the experienced potentials and benefits of using SMCS in disaster management processes from the point of view of disaster risk management organisations. Hence, we are interested in collecting **stories, descriptions and experiences** that can shed light on those aspects.

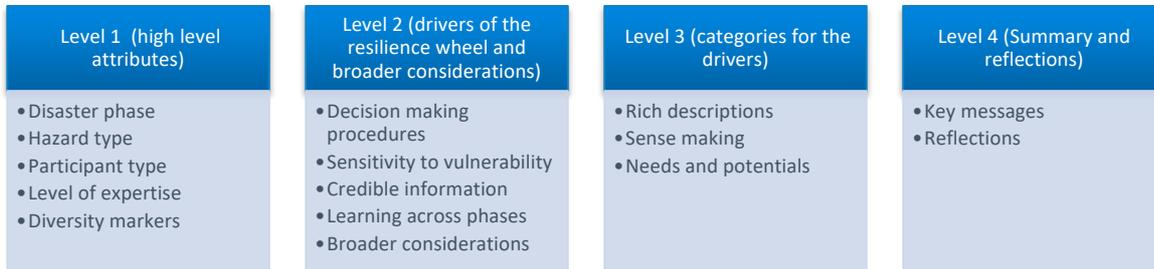
The **quality** of the content is more important than the quantity of information you can collect during an interview.

Data collection and data sorting are key to ensure that:

- we collect “what we need” in each case, meaning that the data will inform the knowledge bases, the respective methodologies and the Framework;
- we learn from each case and across them about procedures, processes, and needs which are crucial to develop useful learning materials that will be included in the Framework.
- The type of structure for sorting the data collected through the qualitative interviews consists of four main levels depicted in the figure below:

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Figure 7: Four main levels



Case coordinators are responsible for sorting the data according to the instructions provided below.

For each interview, the obtained information will be sorted as follows:

### Level 1 – High Level Attributes

We would like to categorise each interview through a number of high-level attributes. Categories are provided by WP2-6 and used to easily navigate the overall content across the interviews. Consequently, each interview should be categorised according to:

- Disaster management phases (one or more)
- Type of hazards (the case scenario or an option for multi-hazard)
- Type of participants (same category as in the excel spreadsheet on research participants – e.g. civil society, policy-maker)
- Level of expertise (strategic, operational or technical)
- Diversity markers (e.g. age, gender etc.)

### Level 2- Drivers of the Resilience Wheel and Broader Considerations

You can select one or more driver to focus on during an interview depending on the type of participant and the scope.

The key themes for each driver are:

**Decision-making procedures (Driver 1):** *Key themes: active/passive use of SMCS, efficiency in DMP processes, integration and coordination across agencies, sectors and stakeholders, the inclusion of citizens and volunteers;*

**Sensitivity to vulnerability (Driver 2):** *Key themes: an overview of local vulnerabilities, targeting of (official) information, tailored information, sensitivity to diverse groups;*

**Credible information (Driver 3):** *Key themes: strategic use of SMCS, consistent and reliable information (processes and concerns), mis/disinformation, hate speech and respect for privacy;*

**Learning across phases (Driver 4):** *Key themes: training and education structures for using SMCS in disaster governance, technical expertise, evaluation processes, learning processes;*

**Broader considerations on technical aspects (Driver 5):** *Key themes: general and specific information on SMCS uses and functions, names of providers, technical implementations;*

### **Level 3 – Categories for each driver**

For each of the drivers, we would like to receive **raw chunks of translated and transcribed interviews** corresponding to the three categories (rich descriptions, meaning/sense-making, and needs and potentials). There is no need to transcribe whole interviews: instead, we ask you to focus on and transcribe only relevant parts (see below).

- Rich descriptions: Referring to examples of existing guidelines, policies, programmes, experiences and practices.
- Meaning / sense-making: Reflections<sup>10</sup> on the benefits and challenges of SMCS in disaster management processes
- Needs and potentials: Referring to needs, gaps, and suggestions for improvements identified by participants.

The drivers and categories will overlap and arguments may be presented several times in some interviews. In this case, we ask you to select the chunks that you believe represent the best understanding of the argument or viewpoint put forward by the interviewee for the data processing.

***The table below can be used as a “compass” to prepare for interviews, and to navigate through the transcribed interviews and sort useful information.***

Please note that **it's not mandatory to cover all drivers in each interview!**

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<sup>10</sup> These reflections are different from the level 4 “Summary and Reflections”. See explanations below.

**Table 15: How to sort data**

<p><b>Decision-making procedures (Driver 1)</b></p> <p><i>Key themes: active/passive use of SMCS, efficiency in DMP processes, integration and coordination across agencies, sectors and stakeholders, the inclusion of citizens and volunteers</i></p> <p>Sorting categories:</p> <ul style="list-style-type: none"> <li>• The formal and informal policies, processes and practices that are in place to <i>enhance</i> processes, <i>include and coordinate</i> disaster management efforts through the use of social media and crowdsourcing (<b>descriptions</b> of policies, experiences, examples and of existing programmes and practices);</li> <li>• Reflections on benefits and challenges in using social media and crowdsourcing to enhance governance processes, include citizens and coordinate between entities (<b>meaning/sense-making</b>);</li> <li>• Their visions and suggestions for future application of SMCS to enhance inclusive, efficient and accountable decision-making processes (<b>needs and potentials</b>).</li> </ul>	<p><b>Sensitivity to vulnerability (Driver 2)</b></p> <p><i>Key themes: an overview of local vulnerabilities, targeting of (official) information, tailored information, sensitivity to diverse groups</i></p> <p>Sorting categories:</p> <ul style="list-style-type: none"> <li>• The formal and informal policies, processes and practices attempting to reach and target vulnerable people in disaster management processes (<b>descriptions</b> of policies, experiences, examples and existing programmes and practices; examples of guidelines on how to support and communicate with e.g. minors, elderly, people with disabilities; examples of definitions of vulnerable people; examples of guidelines on how to identify and define vulnerable people using SMCS);</li> <li>• Platforms mainly used both by DMOs to communicate with vulnerable people and by vulnerable people to communicate with DMOs; conditions that facilitate or limit access to those platforms (<b>descriptions</b> of existing platforms and specific functions; examples of conditions and functions that facilitate or limit access to those platforms)</li> <li>• Platforms used for crowdsourcing /crowd mapping by or for vulnerable people (<b>descriptions</b> of existing platforms for crowdsourcing and crowd mapping; examples of spontaneous volunteers who use those platforms)</li> </ul>
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	<ul style="list-style-type: none"> <li>• Reflections on benefits and challenges in using social media and crowdsourcing to target vulnerable groups include diverse citizens and coordinate efforts to address vulnerability to disaster risk, reflections on positive and negative experiences in using platforms by representative of vulnerable groups (e.g. how their use could have increased vulnerabilities) and their level of trust (<b>meaning/sense-making</b>);</li> <li>• Their visions and suggestions for future application of SMCS to enhance sensitivity to vulnerability in the particular case contexts (<b>needs and potentials</b>).</li> </ul>
<p><b>Credible information (Driver 3)</b></p> <p><i>Key themes: strategic use of SMCS, consistent and reliable information (processes and concerns), mis/disinformation, hate speech and respect for privacy</i></p> <p>Sorting categories:</p> <ul style="list-style-type: none"> <li>• The formal and informal policies, processes and practices that are in place to ensure credible and accurate information flows and high ethical standards in disaster risk management efforts (<b>descriptions</b> of policies, examples, existing programmes, practices and SMCS platforms for dealing with credible information);</li> </ul>	<p><b>Learning across phases (Driver 4)</b></p> <p><i>Key themes: training and education structures for using SMCS in disaster governance, technical expertise, evaluation processes, learning processes</i></p> <p>Sorting categories:</p> <ul style="list-style-type: none"> <li>• The formal and informal policies, processes, practices and platforms that are in place to learn from and evaluate previous use of SMCS use in disaster risk management as well as from other organisations experience with SMCS use (<b>descriptions</b> of policies, experiences, examples and existing programmes, practices and platforms);</li> </ul>

- Reflections on benefits and challenges in securing credible information and high ethical standards when using social media and crowdsourcing (**meaning/sense-making**);
- Their visions and suggestions for future application of SMCS in relation to questions of credible information (**needs and potentials**).

- Specific learning processes and/or paths within and across DMOs (**descriptions** of trainings, workshops or learning materials and how learning is put into practice)<sup>11</sup>
- Reflections on benefits and challenges in evaluating or importing “good practices” from elsewhere (**meaning/sense-making**);
- Their visions and suggestions for future evaluation and learning structures for enhancing SMCS use in disaster risk management processes (**needs and potentials**).

### Broader considerations on technical aspects (Driver 5)

*Key themes: general and specific information on SMCS uses and functions, names of providers, technical implementations*

Sorting categories:

- **General:**
  - Since when working with SMCS;
  - Satisfaction of the current SMCS use within their organisation;
  - main risks/challenges they see when implementing SMCS (**meaning/sense making**; reflections on benefits and on challenges when using SMCS and/or implement specific social media strategies)
- **Specific:**
  - Names and providers of SMCS-technologies (DCT);
  - Functions/types of tasks SMCS-technologies are used for (**descriptions** of functions and/or tasks carried out using one or more function);
  - Potential functions for future SMCS-technologies they would like to have (**needs and potentials**, their visions and suggestions for the future)

<sup>11</sup> Please note that this is not reflected in the Interview Protocol. Nevertheless, it's an important aspect we would like to capture.



- Guidelines
  - Guidelines for the technical implementation and also for the processes SMCS can be used for (**descriptions** of technical documents/policies);
  - Guidelines they are missing (**needs and potentials**, documents and policies which are currently missing as well as their visions and suggestions for the future )
- Good practices
  - Examples of real usage experiences of the application of SMCS-technologies (**descriptions** of applications, experiences and examples);
  - Usage experiences they are interested in (**needs and potentials**, their visions and suggestions for the future)

#### **Assorted**

Here we would like chunks of transcribed data that fall outside the established categories but that the CATs find interesting and important for the use of SMCS in disaster management processes

## Level 4 – Summary and reflections

Please provide:

- A condensed summary of the overall content / Key messages of the interview sorted in accordance with the drivers (1-2 bullet points for each interview);
- One or two sentences where CATs reflect on the content of the interview from their position (e.g. it surprised us that... we need to further our understanding of...) and in the frame of their context (e.g. this is of particular relevance as it comes from the head of an organisation etc.). In other words, the reflections should shed light on contextual factors which are difficult to grasp for those who are outside the local/nation socio-cultural context.

## 6.5 Online Survey Protocol

**Authors:** Richard Luke (SIC), Therese Habig (SIC)

### Introduction of the Online Survey

This document serves as the basis for identifying research participants for the upcoming LINKS online survey conducted via EUSurvey12 in the first case-based assessment phase.

### Aim of the online survey:

The survey is intentionally broad and intends to reach as many practitioners from disaster management organisations as possible. The aim of the survey is to obtain a comprehensive picture of the usage and potentials of SMCS in disasters (the case countries serve as representative examples of European disaster management). The results from the survey will provide important impulses for the future course of the project and further concretise the need for research. Also the possibility of identifying further relevant contacts as well as potentials that have not yet been taken into account by SMCS will be of huge interest.

### Minor relation to the scenario of the case:

The survey has no closer connection to the scenario of the case. The survey does not attempt to capture the use and potential of SMCS in any particular scenario (e.g. drought in Germany). Rather, the survey tries to cover SMCS in disaster management in general from the view of practitioners. For this purpose, the priority must be to enable a wide range of practitioners in the responsible countries and if possible above.

### Example Questions:

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<sup>12</sup> <https://ec.europa.eu/eusurvey/home/welcome>

The following questions give a brief impression of the content of the survey. All questions will be made available to CATs in the upcoming days.

- On what social network do your organisation have an official account?
- Does your organisation have a dedicated social media position/staff?
- What feature you would like to have in future?

**Next steps to prepare the online survey:**

The following table shows the process already discussed for preparing the survey and is briefly summarized below (to be found on sharepoint under this link). All relevant information for the CATs regarding the survey is stored in the following folder (LINKS\_shared – WP6 Cross-case assessments Online survey).

**Table 16: Next steps for the online survey**

7.10.2021

	Estimated date	What you receive	Actions from CATs	Related WP4-Action
a.)	cw 40-43 4.10.-29.10.	Online Survey Protocol	Identification of research participants and contact options	Bilateral meetings with CATs
b.)	cw 41-42 11.10.-22.10.	Questions of the survey	Optional Feedback	
c.)	cw 42 18.10.-22.10.	Information sheet	Translate before the distribution	
d.)	cw 42-43 18.10.-29.10.	Pre automated translated survey (case language)	Review	
e.)	cw 44 1.11.-5.11.		Distribution of the survey	<b>Set the survey online</b>
f.)	cw 47 22.11.-26.11.	Template for reminder		
g.)	cw tbd		Translation of free text answers	
	cw tbd			Set the survey offline

**Additional information:**

- The description of the research participants (this document) is distributed to the CATs. Additionally, we will contact you for a bilateral meeting to clarify open questions and give suggestions.
- The questions coordinated between WP2-5 is distributed to CATs for optional feedback.
- An information sheet about the survey is distributed to CATs in English and has to be translated by the CATs before the distribution of the survey. This text will help to address the organisations, networks and contacts in a common way.

- d.) The questions are automatically translated by EUSurvey into the respective case-language and require attentive correction of the CATs due to typical translation errors. We will send you an Excel file with the translations.<sup>13</sup>
- e.) The survey will be distributed by the CATs to the identified research participants and mailing lists.
- f.) A pre-written reminder to increase the motivation to participate in the survey will be distributed to CATs. The date is variable and depends on the number of responses already received (we will distribute those numbers regularly).
- g.) All results are stored via the account of safety innovation center on EUSurvey. The free text answers in the respective case language will be automatically translated into English and sent to the CATs for correction.<sup>13</sup>

### Required research participants:

With the survey we want to reach people who are working with SMCS (or even specific technologies<sup>14</sup>) in disaster management and are familiar with it on an operational level (e.g. social media manager). Furthermore, we are interested in strategic leadership positions who decide on the implementation of SMCS (or even specific technologies) in their organisation.

Given the similarity in purpose and content of the semi-structured interviews and the survey, it is possible that similar research participants will be of interest. However, due to the characteristics of the research instruments, the survey should include a much larger number of participants. Therefore, it is necessary to distribute the survey beyond the potential participants of the interviewees. Special consideration should be given to distributing the survey through associations and networks active in the country.

Relevant participants for the survey can come from the following areas:

- associations and networks (e.g. German fire protection association<sup>15</sup> in Germany): Many practitioners are members of associations or networks to represent common interests. The selection of relevant associations and networks is country specific.
- fire brigades (incl. their rescue services)
- police
- other civil protection and disaster management organisations (e.g. THW in Germany)
- private aid organisations in the field of welfare (e.g. Red Cross)

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<sup>13</sup> The CATs are not responsible for the data analysis of the responses. The responsibility of the CATs lies in the distribution of the survey and correction of the automatic translations.

<sup>14</sup> In LINKS we introduced the term Disaster Community Technologies (DCT): *A DCT is a software(-function) for interaction with, within or among groups of people who have similar interests or have common attributes (communities) in case of a disaster as well as performing analysis of these interactions.*

<sup>15</sup> <https://www.vfdb.de/>



- public authorities of the countries and districts, local governments