ROADMAP2

Good practices of communication in disaster risk management

FLASH REPORT 3

Good practices of communication
in disaster risk management

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Project Details

Start date:
1st January 2023

End date:
31th December 2024

Duration:
24 Months

Reference:
101101690 – ROADMAP2 – UCPM-2022-KN

Website:
https://roadmap2.ci3r.it/

Table of Contents

1. Introduction

Disaster risk management can be thought of as consisting of four phases: mitigation, preparedness, response, and recovery. Communication – exchanging of messages and interpersonal meaning making – plays an essential role in each phase. Communication concerning the first two phases is called **risk communication** and it involves messaging aimed at shaping people's understanding of the causes and possible consequences of hazards – their risk awareness – as well as decisions and actions taken to mitigate or prepare for the future impact of hazards. Communication concerning the latter two phases is called emergency or **crisis communication** and the aim of it is to minimise casualties and loss during a particular crisis event and support swift recovery after the event. Understanding what risk, emergency and crisis communication practices best serve these aims is particularly relevant at a time when the plurality of technological means and channels of communication has skyrocketed, yet reaching various audiences remains a challenge and people are often exposed to harmful false information.

European Union Disaster Resilience Goal 2 stipulates that 'Member States should further develop risk awareness raising strategies and step-up risk awareness-raising actions to ensure that the level of risk awareness of regional and key national risks increases amongst the population' (European Commission, 2023). In this flash report, which aims to further develop the analysis started in ROADMAP project (Tagliacozzo et al., 2022), we explore and exemplify how the civil protection authorities at national level have improved their practices to increase accessibility to risk and crisis information, understandability of the provided information, and overcome the barriers to acting adequately upon information about hazards, thereby mitigating people's communication-related vulnerability to disasters (Hansson et al., 2020). The report is guided by the following questions:

- What are the new or reviewed practices in risk or crisis communication following the lessons learned from various crises?
- Are there any new practices that improve the accessibility of risk and crisis information to individuals with various needs and preferences?
- Which novel practices help to improve the understandability of risk or crisis information and mitigate the harm caused by people's exposure to misinformation or disinformation?
- Which practices help to overcome the barriers to reacting adequately to risk or crisis information, such as distrust towards official information sources?

The report follows the methodology for identifying and assessing good practices in disaster risk management set forth in the ROADMAP2 deliverable D3.1. In this context, good practices are defined as activities that substantially reduce disaster risk and losses in lives, livelihoods, health, and assets. Practices that help to minimise the detrimental effects

of various barriers to risk and crisis communication were considered as the key areas of relevance. Firstly, the search for good practices was conducted across academic databases Web of Science and Google Scholar using search terms such as "risk communication", "crisis communication", "emergency communication", "crisis information" and "preparedness communication". Secondly, examples of communication practices were collected via a survey among the ROADMAP2 partners representing different countries and organisations. Seven hour-long expert interviews were carried out with crisis managers at national and local levels in Estonia, and official websites were consulted for additional information on risk and crisis communication initiatives. Additionally, a webinar was organised that featured presentations on good practices in risk and crisis communication by academics and practitioners (see the recording on ROADMAP2 website). Practices for the report were selected if these

- covered the disaster risk management cycle (e.g., had been realised in prevention, preparedness, response and/or recovery phases),
- adhered to priorities and targets of the Sendai Framework for disaster risk reduction,
- adhered to the European Union Disaster Resilience Goals,
- considered a multi-risk perspective,
- through research and/or practice, had been applied and worked in a real context in achieving outcomes and results (evidence), and
- involved different types of stakeholders (international, national, local, but also different professions).

2. Principles of risk and crisis communication

Academic literature on disaster risk management and communication provides several lists of recommendations for authorities with regard to good practices of risk and crisis communication. Some of the principles of good communication accepted by many experts and institutions include the following (Seeger, 2006):

- communication should be regarded as integral part of every stage in disaster risk management, including pre-crisis planning and educating the public about preparation;
- the public should be seen as a legitimate and equal partner to professional disaster managers; the latter should listen to the public's concerns and understand the audiences (see also ROADMAP2 flash report 2 'Practices of engaging people in vulnerable situations in disaster risk management', https://roadmap2.ci3r.it/2nd-flash-report/);
- public risk and crisis communication should be characterised by honesty, candor, and openness: the authorities should avoid lying and hiding

risks, remain accessible to journalists and social media users, and accept uncertainty and ambiguity that is inherent in crisis situations.

Much of crisis and risk information is *instructional*, that is, meant to advise people to behave in certain ways in preparation or response to hazardous events. The following basic recommendations have been devised concerning message design for effective instructional risk and crisis communication (Sellnow et al., 2017; Johansson et al., 2021):

- make messages personally relevant to specific audiences;
- distribute messages via channels that the audience uses and trusts;
- explain the risk or crisis situation accurately and clearly;
- provide actionable instructions: who should do what and how.

Recent literature on disaster vulnerability suggests that it is useful to think about risk and crisis communication not only as the actions disaster managers take to send messages to people at risk, but to understand more broadly how various barriers to communication may make people more vulnerable and, accordingly, devise policies to lower or remove these barriers (Hansson et al., 2020). This approach emphasises the importance of making sure different groups have **access** to risk and crisis information, that the information is presented in languages and formats that people with varying skills can **understand**, and that people have the means necessary to **react** adequately to messages about hazards. It is also essential to take steps to mitigate risks arising from people's exposure to false and harmful information, such as misguided advice or inaccurate risk assessment (Hansson et al., 2021; Torpan et al., 2021).

3. Practices of risk and crisis communication

The practices described below demonstrate the multiplicity of ways in which communication could be used as an instrument of disaster risk management. These practices cover different phases (mitigation, preparedness, and response) and represent specific tools (apps, information and warning systems) as well as long-running campaigns and collaboration programs that aim to improve either individual preparedness for self-protection or institutional preparedness to respond to disasters.

3.1 Crisis preparedness app 'Be prepared!'

The smartphone application 'Be prepared!' ('Ole valmis!' in Estonian) was created by Estonian volunteers from the Women's Voluntary Defence Organisation, a unit of the Estonian Defence League. Its purpose is to enhance the crisis preparedness of residents in various emergency situations, such as disruption of vital services (communication, water,

electricity service, etc.), natural disasters, fire, cyber threats, and security threats (Kivinuk, 2020, Interview G, 2024; Naiskodukaitse, 2023).

The mobile application offers:

- general codes of conduct, such as where to get crisis information, how to evacuate, sheltering information, public places of refuge, and so on;
- information on crisis preparedness, such as stockpiling and interruption of cash circulation and payment services;
- information on security threats, including explosions, armed conflicts, information warfare and non-violent combat;
- instructions on how to act in the event of disruption of vital services such as electricity, communications, heat supply and water supply;
- guidelines on providing first aid including assessing the victim, ABC of resuscitation and stopping bleeding, and security topics such as self-defence, mental health, home and property security;
- an interactive test of the level of home stocking, initial cyber hygiene training module (including study chapters and knowledge test);
- direct access to important phone numbers such as emergency services, family doctor's advice line, and poisoning information.

The users can subscribe to receive threat notifications for multiple locations, specifying the city or municipality, including when abroad. The crisis management authority decides when to send threat notifications using the Situational Awareness Information System EE-alarm (Interview G, 2024; see subsection 3.3 below).

The application allows users to search for most of the information offline, with internet access only required for downloading the app, watching videos, and receiving hazard warnings. Information is available in Estonian, Russian, and English. To improve the effectiveness of the search function, it is important to use appropriate keywords in the instructions (e.g., 'snake bite' or 'viper bite'). The information provided in the app includes references to its primary sources to add credibility (Interview G, 2024).

The mobile application was developed in 2018 and has since been downloaded onto 113,000 devices. It has been noted that app downloads increase during crisis situations, such as the COVID-19 pandemic. The information and instructions on the mobile application will be continuously updated, considering the particular crisis situation. For instance, in 2022, information was added for the Ukrainian war refugees, including a brief introduction to the country's functioning and security-related information. The guidance materials were prepared by female volunteer home guards who collaborate with experts in fields such as rescue, medicine, law enforcement, and electricity provision.

The mobile application is used, among other things, as a teaching material in national defence lessons in schools. The strength of the mobile application is

the informativeness and abundance of information, but at the same time it can make it difficult to find information quickly. To do this, it is recommended to download the app outside of a crisis (not during a crisis situation), which allows users to familiarise themselves with the code of conduct proactively before an emergency (Interview G, 2024).

Mobile crisis preparation applications exist in other countries, such as Germany and the USA. The Estonian app stands out due to the extensive information it provides.

3.2 Situational awareness information system 'SITREP'

SITREP is an online platform created by the Estonian Ministry of the Interior to enhance communication and coordination among state and local crisis management agencies during major crises (Interview A, 2024).

During a crisis, the system functions as a channel for the systematic and rapid exchange of information between the authorities involved. The system is used to:

- share a detailed description of the emergency, which will be updated as the situation develops;
- under the leadership of the crisis manager, agree on working arrangements, responsibilities, and tasks for the institutions involved in crisis resolution;
- send location-based warning messages to mobile phones (EE-alarm) or activating sirens;
- share general instructions (codes of conduct) with the authorities to be communicated to people at risk, including through the official crisis hotline 1247 of the country;
- specify the danger area in the map application, which provides users with a visual overview of the danger zone.

The information system has more than 1200 users from national crisis management agencies – police, border guard, rescue, cyber and health protection, food safety (Interview D, 2024) – and on an ad hoc basis, the crisis manager can also add users from other parties who play an important role in responding to a particular emergency, such as crisis managers in local governments or vital service providers.

Since 2020, the information system has been used to exchange information and create a common situational awareness, both in the case of major national crises (such as the COVID-19 pandemic) and in local and regional crises (e.g., environmental pollution, events caused by storms, large-scale power outages). The information system has also been used in various crisis exercises so that officials have gotten used to transmitting and receiving information in the system. The use of the information system improves the accessibility of information about the crisis and its management for institutions involved in crisis response and thus also makes the provision of warnings and instructions faster and more coherent (Interview B, 2024).

The use of an information system can reduce the risk of spreading disinformation and increase the responsiveness of authorities. For instance, in the event of water pollution in a settlement in 2023, a health protection expert provided all crisis managers with a science-based overview of the potential threats to human health and life through the information system. Based on this information, it was jointly decided to send out a warning message (EE-alarm) to people in the affected area, along with codes of conduct (Interview C, 2023).

Effective internal communication is crucial for crisis managers to respond promptly in emergency situations, reducing the risk to human life and health (Interview D, 2024). The information system relies on functioning electricity and communication services. As a backup solution, many local governments use satellite communications, which remain operational even when data or power lines are destroyed (Interview E, 2023).

3.3 Location-based SMS threat alert systems

Following the EU Directive establishing the European Electronic Communications Code (EU 2018/1972), all EU Member States have to set up a public warning system addressed to citizens. This system uses cell broadcast technology to send alerts to all mobile phones in a specific area in the event of a natural disaster, terrorist attack, or other major emergency in their area. The aim of the public warning systems adopted in several European countries is to

- reach a high percentage of people in the targeted area, not just residents but roaming visitors using their native language;
- send messages quickly and with a high degree of reliability;
- send message without the need for the public to have to opt-in.

Two examples of national warning systems are given below.

EE-alarm in Estonia

The Estonian Ministry of the Interior introduced the location-based short message notification system EE-alarm in 2023. Its purpose is to warn people in the event of life-threatening situations, health hazards, or threats to national security. These situations may include wildfires, industrial fires that involve the emission of toxic smoke, ammonia or chlorine leakage, mass disturbances, large-scale natural disasters, and contaminated food and drinking water (Interview D, 2024; Emergency Response Centre, 2024; Luht-Kallas, 2024).

The system

- enables the rapid dissemination of SMS warnings to vulnerable mobile phone users, including tourists, if their life or health is at risk;
- provides people in danger zones with instructions, references to additional information sources, and updates on the hazard situation;
- is used to notify all those who previously received a warning about the end of the emergency situation (Interview D, 2024; Luht-Kallas et al., 2023; Luht-Kallas, 2024).

The crisis management authority prepares a warn-

ing message that provides essential information about the crisis: the name of the leading authority, the event, the time it occurred, the danger zone, the primary codes of conduct, and the source for requesting additional information. For instance: "Estonian Rescue Board: Toxic smoke spreading from the Suur-Sõjamäe waste station on May 24 at 03:30. Please close windows and doors and turn off forced ventilation. Avoid moving outdoors. Additional information: 1247" (Luht-Kallas, 2024).

The authority responsible for resolving the crisis determines whether the message will be communicated solely in Estonian, the official state language, or if translations into other languages, such as English or Russian, will be provided. The language used is dependent on the size of the danger zone, the region, and the population demographics (Interview D, 2024). For instance, in 2023, when E. coli bacterium contaminated the drinking water in a particular region, a warning was issued in three languages: Estonian, English, and Ukrainian (Interview C, 2023).

When a message is disseminated via SMS, information about the event is also published via other channels transmitting crisis information, such as the National Public Broadcasting, the national crisis information website Kriis.ee and the State Information Telephone number 1247. These are the main channels from which residents can receive information when they receive a threat notification message (Interview D, 2024).

As of the end of 2023, the EE-alarm has been activated on six occasions where there was a risk to human health and life. For instance, in 2023, a major fire broke out at a hazardous waste collection centre, and rescuers were uncertain about the quantity and nature of the burning materials and the potential toxicity of the smoke. Accordingly, a threat notification message was sent to 334,000 mobile phones in the vicinity (Lomp, 2023).

The Ministry of the Interior conducted a survey to evaluate the visibility and comprehensibility of the SMS warnings. The results showed that 97% of respondents are willing to follow the instructions (Luht-Kallas & Põld, 2023). Additionally, 70% of participants saw the message within the first five minutes, and 96% of people found the message to be completely understandable (91% of Estonian- and 73% of Russian-speaking respondents). However, it is possible that the warning message may not be noticed for up to 15 minutes by individuals who are engaged in other activities at the same time, such as driving a car, attending a meeting, school or training, or having their phone in silent mode (Luht-Kallas & Põld, 2023; Luht-Kallas et al., 2023).

IT-alert in Italy
In Italy, the public warning system was first introduced by Decree Law No. 32 of April 18, 2019, with the aim of ensuring the protection of human life through mobile communication services aimed at users affected by serious emergencies, imminent or ongoing disasters. The IT-alert service entered an ex-perimental phase on October 1, 2020. The following national-level risk scenarios have been identified for which an IT-alert message is expected to be sent to inform the public to encourage the implementation of self-protection measures:
- earthquake-generated tsunami;
- collapse of a large dam;
- volcanic activity;
- nuclear accidents or radiological emergency;
- major industrial accidents in plants subject to Legislative Decree 105/2015 (so called Seveso events);
- heavy rainfall.

Thanks to cell-broadcast technology, the alert messages can be delivered within a group of geographically close phone cells, bounding an area that corresponds to that affected by the emergency as closely as possible. Users in the affected area will receive a text message with an identifiable sound to indicate the sender (IT-alert), which differs from typical ring tones. The system is unidirectional (from the telephone operator to the device) and does not allow any kind of return data or feedback from the reached mobile phones. This means that no personal data of the person receiving the message is processed in any way by the Civil Protection Department and the phone operator of choice. The message contains the following data: day, time, type of event, location, the primary codes of conduct, and the source for requesting additional information.

The system became operational in February 2024 in case of imminent or ongoing major emergencies or disasters relating to the collapse of a major dam, major incidents in industrial plants, nuclear incidents or radiological emergencies, and volcanic activity in the areas of Campi Flegrei, Vesuvius and the island of Vulcano. At the time of writing, it is still in an experimental phase with regards of earthquake-induced tsunamis, heavy rainfalls and volcanic activity in the island of Stromboli, as well for further improvements on the other risks.

3.4 'Safe Village' and 'Safe People' wildfire safety programs
Wildfires are a major environmental hazard in Portugal. 'Safe Village' and 'Safe People' are key programs in Portugal that focus on establishing safety protocols and educational measures to ensure communities are ready to respond effectively to wildfire threats. These programs underscore collaboration between local authorities and residents, promoting a community-centric approach to enhancing resilience against wildfires and improving overall safety and preparedness in vulnerable regions.

The programs are part of a set of measures established by the government in 2017 aimed at introducing "a systemic reform in the prevention and combat of forest fires, extending to other areas of protection and relief" (Safe Village Safe People, 2024). The 'Safe Village' program is intended to establish "structural measures to protect people and goods, and buildings in the urban-forest interface, with the imple-

mentation and management of protection zones for settlements and strategic infrastructure, identifying critical points and places of refuge". The 'Safe People' program aims to promote "awareness-raising actions for the prevention of risky behaviors, self-protection measures and carrying out simulation evacuation plans, in conjunction with local authorities" (Safe Village Safe People, 2024).

The execution of the programs takes place under a Protocol between the National Emergency and Civil Protection Authority (ANEPC), the National Association of Portuguese Municipalities (ANMP) and the National Association of Parishes (ANAFRE). The National Authority for Emergency and Civil Protection (ANEPC) in Portugal is a key agency responsible for coordinating and implementing civil protection measures across the country. Tasked with planning, organizing, and executing the civil protection policy, ANEPC plays a vital role in preparing for and responding to various emergencies and disasters. This includes developing strategies for prevention, preparedness, and response to major accidents and catastrophes, ensuring the protection and relief of populations, and overseeing the operational activities of various civil protection agents.

The actions within the programs include:

- settlement protection (actions aimed at managing settlement protection zones located at the urban-forest interface to reduce the possibility of buildings being destroyed by rural fires);
- evacuation of settlements (actions aimed at preparing and executing a spontaneous or deliberate evacuation of a settlement in the face of the approach of a rural fire);
- places of shelter and refuge (actions aimed at selecting and preparing spaces or buildings in a given settlement to serve as shelter or refuge during the passage of a rural fire, in cases where this is the most viable or the only possible option);
- prevention of risky behaviors (awareness actions aimed at reducing the number of ignitions caused by risky behaviors associated with the use of fire); and
- awareness raising and warning to the population (actions aimed at raising awareness and informing the population about the current risk of rural fire and the self-protection measures to be adopted in the event of the possibility of a rural fire approaching).

Awareness raising programs involve the production of brochures, posters, radio spots, and videos that provide instructions on self-protection measures, such as what to do if you are near a fire, if a fire approaches your home, if you are surrounded by a fire, in case of home confinement, and in case of evacuation (Safe Village Safe People, 2024). Some instructional brochures are available in multiple languages, including Portuguese, Spanish, English, and German, to cater for different language communities and tourists.

3.5 'You are part of the Norwegian preparedness' campaign

This campaign was launched by the Norwegian government via the Directorate for Societal Security and Preparedness (DSB) to promote a higher risk awareness in the population. It has been running since October 2018. The main objective of the campaign is to increase awareness about how the Norwegian population can be prepared for a sudden breakdown of critical infrastructures like electricity, water, and communication.

The main means of communication has been a brochure that explains how to manage without help for 72 hours by recommending having a certain number of items stored at home, such as water, wood, and blankets. In addition, the campaign website https://forberedt.sikkerhverdag.no/en depicts some scenarios that the population can test to verify which kind of supplies lack in the household in case of a crisis.

The campaign concerns mainly how to behave during a crisis, but improves understanding of risk in all the phases of the disaster risk management cycle. The scenarios proposed on the website concern risks related to extreme weather events and cyber-attacks against infrastructure and mobile systems which have cascading effects.

The Norwegian population is the target group. While the campaign is directed by DSB, a preparedness week has been organized since 2018 in October to promote the content of the brochure and to make the population aware of the importance to be prepared.

The analysis of the impact of the first campaign in 2018 showed that the 12-pages-long brochure was sent to 2.4 million households and there was information spread from the official accounts of DSB (Facebook, X, websites) to the population. However, the campaign did not spark much engagement with social media users and the overall content of the comments that were made were ironic or sarcastic.

This campaign has been repeated every year with almost the same content, but both the website and the brochure have been improved every year with new information. The latest improvement consists of a simple check list, which allows to verify what is missing in the household.

3.6 'I don't take risk' campaign

'I don't take risk' (Io non rischio) is an Italian public communication campaign on good civil protection practices based on the synergy between science, volunteers and institutions for everyone with clear and identifiable messages to translate awareness into everyday action. The campaign is promoted and implemented by the Civil Protection Department in collaboration with National Association of Public Assistance, National Institute of Geophysics and Volcanology, Inter-University Consortium of Earthquake Engineering Laboratories and CIMA Foundation, in agreement with the Conference of Regions and Au-

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Project co-funded by the European Union

9

tonomous Provinces and the National Association of Italian Municipalities.

The campaign started in 2011 and aims to raise awareness on risks, either natural or caused by human activity, to which the community is exposed, and to promote activities and behaviours to prevent or reduce their consequences. The campaign promotes initiatives, tools and languages accessible to everyone without distinction of age, education, physical and social condition. There are 8 risks analysed (flood, earthquake, forest fire, volcanoes, tsunami, industrial, nuclear and large dams) and for each of them there is a part dedicated to knowledge of the risk and a part dedicated to good practices that can be put in place to prevent and reduce the impact.

Since 2017, the campaign has also involved schools promoting projects and tools for the diffusion of civil protection culture for the new generations. The 'I don't take risks school' (Io non rischio scuola) was developed in collaboration between psychologists, scientists, educators and civil protection experts as an experiential program dedicated to elementary school students. In 2023, the comic strip 'L'attimo decisivo' ('The crucial moment') was launched, dedicated to the secondary schools. The stories told in the comics are the basis for building an entire cross-media narrative universe in which the campaign's communication can be developed and evolved in an engaging, interactive, exciting and effective way.

Since 2011, the campaign has grown and now involves thousands of volunteers. Two national days have been established, and 753 events have been organised in 2023.

Finally, in 2022, an institutional textbook was published titled 'Basic Training in Civil Protection' (Dolce et al., 2022; https://www.protezionecivile.gov.it/en/pubblicazione/civil-protection-italy-basic-training-civil-protection-0/). This book is the English version of an Italian text entitled 'La protezione civile in Italia. Testo istituzionale di riferimento per i docenti scolastici', published online on 14 August 2020. It was conceived as a tool for all school teachers who, following the Law 92/2019 and beginning from the 2020-21 School Year, are required to include in the national education program the subject of Civil Protection to be taught as part of the compulsory course of Civil Education.

The text was designed to provide teachers, who work with students from 6 to 19 years old, with a wide range of detailed subjects, including historical, technical, scientific, operational and policymaking topics. The scope and depth of this work make this textbook a very rich and useful source of information that could definitely be appreciated and shared with a wider audience, besides Italian teachers. It represents, in fact, an organized and in-depth description of the National Civil Protection Service that operates on Disaster Risk Reduction (DRR) in Italy and of the risks it deals with.

4. Conclusions

The practices outlined above are examples to illustrate the various roles of communication in different phases of risk and crisis management. Practices that help to save lives may focus on raising public awareness about risks, provide practical guidelines to individuals and households how to prepare for the impact of particular hazards, but may also involve broader programs that support community collaboration and engagement, and the introduction of information systems that improve intra-organisational communication and coordination between authorities.

The described practices are diverse, and they also take into account cultural and geographical diversities, yet they complement each other and possibly a combination could be used for optimal reach and impact in different phases of disaster management. The presented examples offer snapshots of practices in particular countries, so it deserves further research how these might fit in other social, cultural, and political systems. These case studies also point at the need for more detailed studies to identify the effects and outcomes of these practices in terms of how these improve the reach of risk, emergency and crisis information, its understandability (both for general people and population in vulnerable situations, and for the authorities responsible for disaster risk management), and the impact of particular campaigns and tools on shaping public attitudes and actual behavior.

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11

Interviews

Interview A. (2024). Interview, crisis management authority (Rescue Board 1), 2024
Interview B. (2024). Interview, crisis management authority (Rescue Board 2), 2024
Interview C. (2024). Interview, crisis management authority (Health Board), 2023
Interview D. (2024). Interview, crisis Management Authority (Ministry of the Interior), 2024
Interview E. (2024). Interview, crisis management authority (Rescue Board 3), 2023
Interview F. (2024). Interview, local crisis management authority (Rescue Board 1), 2023
Interview G. (2024). Interview with women's organisation of the Estonian Defence League (Women's Home Defence)

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