

*Designing citizen-centred and effective information on disaster preparedness*

# *Strengthening citizens' capacity to respond to crises and disasters*

Division of Behavioural Science and Citizen-Centred Governance at the Federal Chancellery in cooperation with the Federal Ministry of the Interior (BMI) and the Federal Office of Civil Protection and Disaster Assistance (BBK)



Bundeskanzleramt

Bundesministerium  
des Innern

**wirksam  
regieren**

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# Summary

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In a disaster, emergency services cannot reach all citizens at the same time. Therefore, effective civil protection relies on citizens being able to protect themselves and help others in crises and disasters. The state has a duty to support citizens in their disaster preparedness by, among other things, providing information and supporting skill development. In Germany, the Federal Office of Civil Protection and Disaster Assistance (BBK), a specialist agency under the auspices of the Federal Ministry of the Interior (BMI), is responsible for delivering this support.

So far, only a minority of Germany's population has prepared for a disaster; the majority has not actively prepared to cope without assistance for a limited period of time if infrastructure (e.g. electricity, water, payment systems and communications) were to be disrupted. The information provided by the BBK on disaster preparedness has received little attention and is not widely distributed among the population.

The BBK's disaster preparedness guide is intended to serve as a key source of information to help citizens prepare for disasters. A citizen-centred approach was taken to review and revise the disaster preparedness guide, incorporating citizens' perspectives throughout to design and test the new guide. As part of a *wirksam regieren*<sup>1</sup> project, the Division of Behavioural Science and Citizen-Centred Governance at the Federal Chancellery

supported the BMI and BBK, advising on conceptual and methodological aspects of the project, including involving citizens, identifying relevant areas for study, selecting and designing research methods, as well as data analysis and translating insights into criteria for the guide's revision.

More than 1500 citizens were involved in the process of developing evidence-based criteria for designing clear, citizen-centred information in order to strengthen the ability of citizens to prepare for and be resilient in disasters. These criteria guided the revision of the disaster preparedness guide. The revised guide focuses particularly on specific, tangible benefits of disaster preparedness in order to empower citizens. To this end, the guide demonstrates the concrete value of disaster preparedness measures for coping with the impacts of disasters. To ensure that crucial information reaches citizens, the guide was focused on the most important information and significantly reduced in length. Additionally, it was revised with a view to ensuring that all text is easy to understand.

Citizens were actively involved throughout the development process. Feedback was recorded iteratively over the course of three user tests. The final user test highlighted overall positive feedback for the revised disaster preparedness guide. After reviewing the revised guide, more than two thirds of participants reported unprompted that the revised guide had helped them understand

<sup>1</sup> *wirksam regieren* translates to 'governing well' and refers to projects run by the Division of Behavioural Science and Citizen-Centred Governance at the Federal Chancellery together with Federal Ministries.

how disaster preparedness is useful and sensible. This suggests that the project achieved one of its central goals.

In addition to reviewing the disaster preparedness guide, key criteria for the design of information on disaster preparedness that strengthens citizens' ability to act in crises and disasters were developed based on the project's findings. These criteria supplement existing recommendations on risk communication.<sup>2</sup> They include:

### *Using best practice to provide information about risks*

Risk perception refers to the knowledge of which disasters can occur and how these can impact one's daily life specifically, as well as an assessment of how likely one is to be affected by them. Risk perception is a cognitive process in which information about potential hazards is collected, processed and evaluated.

Risk perception is a prerequisite for taking precautionary action (e.g. disaster preparedness), but it is not sufficient on its own. Information about risks must be objective and easy to understand, so that citizens can arrive at an accurate risk assessment based on the information provided. Factual and easy to understand risk communication helps strengthen citizens' ability to deal with risks. Fear, by contrast, can make people feel helpless and can hinder action. Risks are often not intuitive. There-

fore, helping citizens understand risks well is an important skill, particularly in a disaster.

Easy-to-understand risk communication uses comparisons and identifies specific consequences provides reference classes, uses natural incidence rates, explains conditional probabilities and base rates, uses graphical representations (e.g. to give a sense of proportions), presents risks in relation to alternative risks and includes and explains ranges (see e.g. Gigerenzer, 2022; Wegwarth, 2021).

### *Helping citizens understand the specific benefits of disaster preparedness is crucial*

The purpose of risk communication and information about disaster preparedness is to explain the specific impacts that disasters could have on day-to-day life and the particular ways in which preparedness could help people to cope with those impacts in the event of any such disaster.

### *Disasters are highly exceptional situations*

Civil protection agencies routinely communicate about disasters to the public. For citizens, disasters are exceptional situations and information about them can be disconcerting. When authorities share information about what sensible disaster preparedness looks like, people may take this to mean that a disaster is imminent. This can be countered by communicating clearly and in a coordinated manner and, where possible and necessary,

<sup>2</sup> This report uses the following definition of risk communication: "Exchange of information and opinions about risks for the purpose of avoiding, reducing and ensuring acceptance of risks." This includes, among other things, risk assessment (e.g. the nature and severity of possible adverse effects and their likelihood).

Bundesamt für Bevölkerungsschutz und Katastrophenhilfe und Bundesamt für Risikobewertung (2022). Risikokommunikation: Ein Handbuch für die Praxis. Retrieved on 11 July 2025 from: [https://www.bbk.bund.de/SharedDocs/Downloads/DE/Mediathek/Publikationen/Risikomanagement/handbuch-risikokommunikation.pdf?\\_\\_blob=publicationFile](https://www.bbk.bund.de/SharedDocs/Downloads/DE/Mediathek/Publikationen/Risikomanagement/handbuch-risikokommunikation.pdf?__blob=publicationFile)

Risk communication should be open, transparent, credible, consistent and dialogue-orientated.

Bundesministerium des Innern (2015). Leitfaden Krisenkommunikation. Retrieved on 17 July 2025: <https://www.bmi.bund.de/SharedDocs/downloads/DE/publikationen/themen/bevoelkerungsschutz/BMI08313-leitfaden-krisenkommunikation.html>

contextualising new information and the timing for sharing new information.

In addition, all official communication must consider that when trying to offer comprehensive information, the central pieces of information are often lost or overlooked ('full disclosure paradox') and do not reach citizens. Focusing on and prioritising recommendations and communicating in clear and simple language (e.g. avoiding technical terms or jargon) helps ensure that the most important messages reach citizens.

Effectively supporting citizens in disaster preparedness in this manner may also require changes in the processes and structures of relevant state authorities.

- **Placing citizen-centeredness at the core:** Ensure expertise and resources for citizen-centred work are placed at the core of work on risk communication and disaster preparedness information so that evidence-based approaches are integrated in this work throughout. This is particularly relevant to areas focusing on education and preparedness, such as civil protection, health, and climate.

- **Deliver information and risk communication centrally:** Prepare and provide information to the public on one issue in one place. Ensure that information is prepared and coordinated across institutional boundaries. Additionally, coordinate risk communication and preparedness information and communicate them in a coordinated manner. This requires, in principle, organising government information by topic rather than along institutional lines.
- **Prepare citizen-centred communication for the event of a disaster:** Ensure that citizen-centred information and communication is prepared before a disaster occurs. Ensure that such information and communications explain how what citizens can do to deal with the effects of the situation in a concretely and practical way. Ensure that, once an event occurs, resources are available to provide targeted, practical information that is easy to understand..

# 1. Background and research question

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In the event of large-scale disasters, such as widespread power outages, heavy rainfall, or floods, emergency responders cannot assist everyone affected all at once. For civil protection to be effective, it is therefore essential for citizens to be able to protect themselves and manage the situation for a period of time. Effective self-protection requires appropriate preparation by citizens. Civil protection is regulated at the federal level in the Civil Defence and Disaster Relief Act (ZSKG) and as at the state level by the states respective disaster protection laws. There is no legal obligation for citizens to prepare for disasters.

Preparing adequately for disasters is demanding and requires extensive knowledge. One particular challenge arises from the fact that the individual risk of severe consequences from events requiring disaster preparedness is low, while the impacts can be far-reaching. Only a minority of citizens in Germany currently prepare for disasters (Eberhardt, Schwärzel, Rosenberg, & Schultmann, 2025; Lacher, Rohs, Großmann, & Fliegner, 2025; Sterl, Stelzmann, Teigler, & Gerhold, 2024). These findings are consistent with those from other Western countries (Kohn et al., 2012; Levac, Toal-Sullivan & O'Sullivan, 2012).

The state is tasked with supporting citizens in their disaster preparedness by providing information and supporting the development of skills in staying safe in dangerous situations, acting safely in chemical, biological, radiological or nuclear (CBRN) events, providing for themselves, administering first aid and fighting fires (see section 1 paragraph 2 no. 1, section 4

paragraph 1 no. 4 and section 5 paragraph 1 ZSKG; Federal Ministry of the Interior, 2016). In Germany, the Federal Office of Civil Protection and Disaster Assistance (BBK) is the government agency responsible for this task, under the auspices of the Federal Ministry of the Interior (BMI).

International studies suggest that knowledge and engagement with information about disaster preparedness are associated with a higher likelihood of having already prepared for emergencies (Maduz, Prior, Roth & Käser, 2019; Kohn et al., 2012). However, the BBK's information on disaster preparedness is currently not well known amongst the population (Menski & Gardemann 2008; Goersch & Werner 2011; Sterl, Stelzmann, Teigler, & Gerhold, 2023).

In recent years, there has been a shift in thinking about official risk communication. Authorities are no longer just providing information about hazards and behaviour in disasters, but government risk communication is now intended to support citizens in making good individual decisions; for example, by presenting specific measures that contribute to reducing individual risks (OECD, 2016). To achieve these goals, citizens need to be involved in the design of risk communication. This enables state authorities to better align communications and information with citizens' information needs, capabilities, experience and values (Federal Office of Civil Protection and Disaster Assistance and Federal Institute for Risk Assessment, 2022; Roth, 2018). Since 2015, the Division of Behavioural Science and Citizen-Centred

Governance has developed an approach to citizen-centred policy design, including consulting and training across the German Federal government.

Faced with the current limits on disaster preparedness information, this *wirksam regieren* project was set up to demonstrate how citizen-centred design can be integrated into the BBK's work to revise its key information and communications offerings – particularly the agency's disaster preparedness guide, which last underwent a comprehensive review 2013 – in a way that considers citizens' needs and is evidence-based. To this end, citizens' perceptions, current level of knowledge, motives, and possible barriers to action, as well as any group-specific differences in the population, were investigated in a qualitative field study and subsequently verified in a survey. Based on these findings, the project developed criteria for clear and citizen-centred communication with a focus on strengthening citizens' capacity to respond to crises and disasters. Based on this, the BBK reviewed and revised its disaster preparedness guide, which is the agency's central citizen-facing information product. Over the course of three user tests, citizens gave feedback on the concept and visual language, cover, and overall guide,

involving citizens continuously and iteratively in the design of the final product. A total of 1585 citizens were involved in the project. Its findings should also be taken into account in communication guidelines aimed at strengthening the population's capacity to respond to crises and disasters.

The Division of Behavioural Science and Citizen-Centred Governance at the Federal Chancellery provided conceptual and methodological support. It advised on how project goals and research interests of the BMI and BBK could be explored methodologically and provided behavioural science expertise to choose an appropriate theoretical framework. It advised on involving citizens, research design, tendering, data collection, and data evaluation. It also provided support with analysing the data, translating findings from the data to inform criteria for risk communication and revising the disaster preparedness guide.

The study was conducted on behalf of the BMI and BBK and was funded federally. An appendix is available for this report, providing additional insights into the project.

## 2. *What factors shape disaster preparedness behaviour?*

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In preparation for the qualitative field study, social science and behavioural science models of disaster preparedness were reviewed. The literature discusses numerous factors that influence individual disaster preparedness for various types of (natural) hazards (e.g. earthquakes, floods, power outages, storms, and pandemics), including knowledge and understanding of hazards and disaster preparedness, assumptions about one's own abilities to engage in disaster preparedness, motivation, awareness, risk perception, the relevance of these hazards to the individual, assessment of one's own resources and availability of resources, expectations regarding the effects and benefits of disaster preparedness, self-efficacy, perceived behavioural control, social norms, attitudes, living situation, access to and use of media and news about disasters, as well as denial or avoidance (see Ejeta, Ardalan, & Paton, 2015; Kohn et al., 2012; Paek, Hilyard, Freimuth, Barge & Mindlin, 2010; Paton, 2019). Individual factors' influence on disaster preparedness differs across various types of hazards that people prepare for.

This project aimed to generate an empirical basis for designing risk communication on meaningful disaster preparedness that is relevant across the spectrum of potential disasters (all-hazards approach). It was therefore particularly important to consider factors that are not specific to a particular hazard and that

can be addressed with appropriate risk communication. Therefore, the Health Action Process Approach (HAPA model) by Schwarzer (2008) was chosen as a theoretical framework. The model was originally developed for health-related preventative behaviour and distinguishes between the formation of intention (motivational phase) and action (volitional phase). In order for an intention for a specific behaviour to emerge, three prerequisites must be present: the individual must assume that a particular hazard could occur (risk perception); that the action will lead to a desired outcome (outcome expectancy); and that they are able to carry out the action (self-efficacy). For an intention to translate into action, individuals must plan the action in a specific way and feel able to maintain the action as well as deal with obstacles and difficulties. A simplified representation of the HAPA model is shown in [Image 1](#).

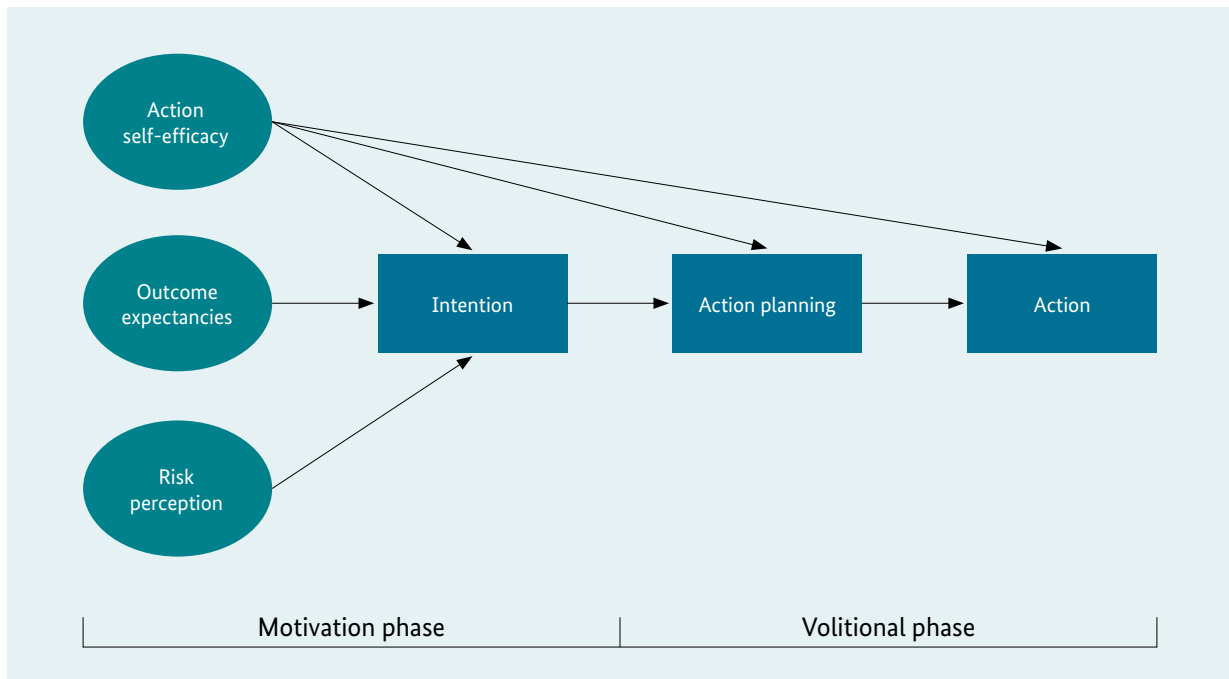


Image 1: The HAPA model (simplified, based on Schwarzer, 2008, p.6)

Based on the model, it can be assumed that citizens develop the intention to prepare for the consequences of disasters – such as by stockpiling food or water – when all three factors of the HAPA model are present.

**a) Risk perception** In this context, risk perception refers to an understanding of which disasters can occur and what specific impacts these can have for one's daily life, as well as the assessment of how likely it is to be affected.

**b) Outcome expectancies** In this context, outcome expectancies refer to the expectation that one's own actions (i.e. planning and implementing disaster preparedness) will help in coping with the impacts of a disaster. If, on the other hand, an individual assumes that disaster preparedness will have no effect on their own situation in a disaster, this central prerequisite for intention formation is not met.

**c) Action self-efficacy** In this context, this refers to the conviction that one has the necessary skills and confidence in one's ability to implement disaster preparedness in the required form.

Therefore, recognising the risk of disasters (e.g. a multi-day widespread power outage) is not enough on its own to prompt disaster preparedness behaviour. In order to form an intention to implement a specific disaster preparedness measure (e.g. stockpiling drinking water), people need to understand how specific disaster preparedness measures can help them cope with the impacts of a disaster (e.g. having water to drink and maintain hygiene even if the water supply fails) and be convinced that they can implement the required measure (e.g. buying and storing water supplies).

### 3. *Understand: Insight study on individual disaster preparedness*

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This project used a mixed-methods approach. First, a qualitative study was conducted to better understand citizens' perceptions and experiences. In the next step, a survey was conducted to test for generalisability (findings about the perceptions and needs of citizens).

Security situations are dynamic, and citizens' experiences and perceptions of them also change dynamically. Therefore, the results presented are snapshots and the generalisability of the study's results is limited to the underlying dynamics described here.

#### 3.1 *Qualitative fieldwork*

In order to redesign information products in a citizen-centred manner, it is necessary to understand how citizens perceive risks and disaster preparedness, what motives and potential barriers to action they experience regarding disaster preparedness, and how they perceive existing information products. To better understand these points, a qualitative fieldwork study was conducted from July to September 2024.

##### 3.1.1 *Design, method and sample*

The qualitative study explored key aspects of the HAPA model (risk perception, outcome expectancies, and action self-efficacy). In addition, it addressed further aspects that were central to the participants. Twenty participants were interviewed in three regions (Berlin/Brandenburg; Düsseldorf/Cologne/Bonn area;

Munich area) using semi-structured in-home interviews of five hours each and exploring their lived experience in their own context. Semi-structured interviews are suitable for an in-depth exploration of personal experience. On-site visits allow for a deep understanding of participants' living environment and behaviour. The in-home interviews were further supplemented using exercises, including a timeline of experienced emergencies or disasters and how participants managed them; a card sorting exercise to learn about participants' thoughts on dealing with disasters and the perceived threat levels of various potential disasters; word association exercises to learn about participants' understanding of technical terms relating to disasters and disaster preparedness ([Image 2](#)); as well as exercises to gauge knowledge and expectations about actors in the field of civil protection and disaster response. Additionally, a home tour was conducted, during which participants showed rooms and places they associate with disaster preparedness ([Image 3](#)). Participants were also asked to show digital applications they use in the context of disaster preparedness. Finally, several exercises involved existing information products on disaster preparedness. Participants filled in the existing BBK checklist ([Image 4](#)) and shared their experiences and thoughts using the thinking aloud method. Finally, they read and evaluated the existing BBK disaster preparedness guide as well as translated excerpts from three emergency guides from two EU member states and an Asian city. (See [Appendix A](#) or field research guide.)

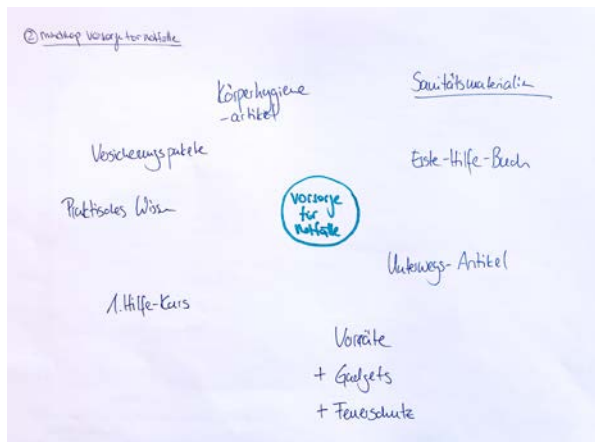


Image 2: Excerpt from fieldwork: exercise materials; shown here: a worksheet for a mind map exercise on the topic of disaster preparedness



Image 4: Excerpt from fieldwork: exercise materials; shown here: a disaster preparedness checklist that participants filled out as part of fieldwork



Image 3: Excerpt from fieldwork: home tour of rooms and places relating to participants' disaster preparedness

The qualitative fieldwork's sample included a cross-section of the German population. The participants were recruited to represent key demographic characteristics of the population (e.g. age, gender, household size, urban and rural population, level of education, former West and East German federal states) as well as additional relevant characteristics (e.g. individuals engaged in professional or voluntary work relating to disaster preparedness or security; individuals affected by a crisis or disaster in the last ten years; individuals who have implemented disaster preparedness measures). The qualitative fieldwork was carried out by the research firm Point Blank.

### 3.1.2 Key findings

The qualitative fieldwork study showed that participants distinguished between “concrete” and “abstract” risks. “Concrete risks” are risks that participants can generally conceive of, such as a flooded cellar or a fire. They acknowledged that these risks are generally relevant in Germany but often felt that the risk of being affected by crises or disasters were comparatively lower for their specific location than risks for Germany as a whole (risk perception). They mostly expected to be able to manage these events or cope using their

existing resources until the damage was repaired. Most participants did not feel that it was necessary to prepare for the consequences of such events (outcome expectancies) to be able to manage their consequences:

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*Man, 81, Berlin: “If there is a power cut, I’ll just eat out for a little while.”<sup>1</sup>*

*Woman, 25, Munich: “I can spend a few nights at my boyfriend’s place, if necessary.”<sup>2</sup>*

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“Abstract risks” are risks that seem highly unlikely to participants, but would have devastating consequences (e.g. nuclear accident, war). Given the potentially devastating impacts, preparing for these scenarios did not seem worthwhile to participants (outcome expectancies). Most participants assumed that disaster preparedness would not mitigate the consequences significantly if such a devastating event were to occur. They were mostly unaware of the specific impacts these events could have.

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*Man, 35, Munich: “If there’s a war, you have completely different problems. A few bottles of water won’t help in that case.”<sup>3</sup>*

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During fieldwork in the summer of 2024, almost all participants reported that the war in Ukraine was on their minds, but that this concern had decreased since the beginning of the war. Only a minority had implemented disaster preparedness measures as a result. This data represents a snapshot in time. Given a dynamic security situation, changes in perceptions, knowledge, and informa-

tion needs vis-à-vis military conflicts, disasters, and the necessity of disaster preparedness are to be expected.

For the majority of participants, the idea of a war is the quintessential disaster. They associate the term with an attack on German territory, significant material destruction in their surroundings, and danger to their lives. This scenario is linked with strong emotions of fear and helplessness. Participants felt completely defenceless in this scenario and unable to act.

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*Woman, 58, Berlin: “If a war breaks out, we’re done for anyway.”<sup>4</sup>*

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Most participants had implemented very few disaster preparedness measures. Moreover, the majority overestimated the extent of their preparedness. For example, participants mentioned dietary supplements as relevant food supplies. Participants also said they would rely on food supplies that require preparation using an alternative power source or cooking method (e.g. pasta, flour) as provisions for the event of a power outage.

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*Man, 33, Berlin: “I have protein powder and ready meals – that’s enough for two weeks easily.”<sup>5</sup>*

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Fieldwork also explored what events prompted participants to engage with disaster preparedness. These included personal experiences (e.g. flooded cellar, coronavirus pandemic), media reports (e.g. reports from Ukraine), or life events (e.g. building a house or the birth of a child). Additionally, the on-site visits revealed instances of “incidental

1 Loosely quoted from fieldwork

2 Ibid.

3 Ibid.

4 Ibid.

5 Ibid.

preparedness". Some participants had implemented measures for other purposes (e.g. purchasing camping stoves or gas grills for recreational activities) and not with a view to disaster preparedness, but would benefit from these in the event of a disaster.

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*Man, 81, Berlin: "These are scented candles. I always have them in the house. They smell good and look good."*<sup>6</sup>

*Man, 33, Düsseldorf: "My gas barbecue even has a hot plate – that would be practical, but it wasn't the reason for the purchase."*<sup>7</sup>

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The participants were largely unaware of the specific impacts that disasters could have on the day-to-day lives of those affected. They were also not aware that the impacts of "concrete" and "abstract" risks largely overlap. This is particularly true of risks whose impacts are unknown to the participants, such as cyberattacks. Most participants considered cyberattacks to be unlikely and the impacts were largely unclear to them. Most participants underestimated the impact of sabotage on IT infrastructure, which can disrupt healthcare, water supply, and telecommunications infrastructure.

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*Woman, 40, Munich: "Cyberattack... It has happened before that data was stolen. But it's not really worrisome."*<sup>8</sup>

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If people are unaware of the specific impacts of disasters, it does not become clear to them how disaster preparedness measures will enable them to deal with the consequences of said disasters.

For example, most participants were not aware that in the event of a prolonged, widespread power outage, running water is also likely to be cut, because pumping stations can no longer function. As a result, most participants underestimated the benefit of disaster preparedness.

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*Man, 33, Berlin: "In the worst case, you can eat food cold, and with my water filter, I always have clean water."*<sup>9</sup>

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Participants experienced a range of obstacles to disaster preparedness, with no clear hierarchy of challenges. Some participants perceived disaster preparedness as too time-consuming and expensive (in some cases, even participants with above-average access to resources) or stated that they lacked space for the necessary equipment. Others found creative solutions or integrated (incidental) preparedness into their daily lives.

A 35-year-old man from Munich did not mention his camping equipment (sleeping bag, kerosene lamp, gas stove) until the home tour. He had not previously thought of these items as being associated with disaster preparedness. Previously, he had pointed out that he had no space for disaster preparedness in his two-bedroom flat.

The majority of participants were not familiar with the BBK disaster preparedness guide and its recommendations. Its extensive information on disaster preparedness was perceived by many participants as overwhelming and in parts even exaggerated ("unrealistic"). The design of the guide seemed too dense and confusing to participants. They also struggled to connect the recommended measures to the specific impacts of potential disasters. Moreover, participants were largely unaware

6 Ibid.

7 Ibid.

8 Ibid.

9 Ibid.

of where to obtain information. They had little or no knowledge of the BBK and its activities. In principle, they expressed interest in information about disaster preparedness and considered check-lists and summaries to be particularly helpful.

During the interviews, it also became clear that participants did not use technical terms and did not understand them. For example, participants did not know or understand the differences between civil protection, disaster management and civil defence. They did not use terms such as emergency, crisis or disaster unprompted, had no common understanding of the terms, and did not distinguish between them consistently.

## 3.2 Survey

The survey aimed to verify key findings of the qualitative study in a large, approximately representative sample, better understand the relationship between factors, and identify group-specific differences within the population. Key analyses are presented here. For a complete overview of the collected data, [see Appendix D](#).<sup>10</sup>

### 3.2.1 Design, method and sample

A telephone survey (Computer-Assisted Telephone Interviewing, CATI) was conducted based on a standardised questionnaire. The questionnaire comprised a total of 223 items ([see Appendix B](#)). Using forced-choice questions (yes/no questions or five-point scales) and two open-ended questions, participants were asked to give responses about:

- Demographic information
- Professional or voluntary work related to disaster preparedness or security
- Experience of being affected by a disaster
- Subjective risk assessment – abstract as well as concrete risks
- The consequences of a widespread, prolonged power outage and a cyberattack
- Dealing with and implementing disaster preparedness – deliberate preparedness in general and incidental preparedness in relation to specific measures
- Expectations regarding help and self-help in disasters – in general as well as in relation to a widespread, prolonged power outage and a war
- Attitudes towards disaster preparedness
- Discussing disaster preparedness with family and friends
- Expectations vis-à-vis various actors in disasters
- Information needs regarding disaster preparedness
- Awareness of selected disaster response organisations
- Current living situation

The sample was recruited from the German-speaking population in private households aged 18 and over throughout Germany, based on the ADM landline and ADM mobile phone master

<sup>10</sup> Appendix D is only available in German.

samples. The interviews averaged about 25 minutes each and were conducted by the research firm Info GmbH from November 2024 to January 2025.

A total of 1,500 adults (n = 663 female, n = 835 male, n = 2 non-binary) participated in the telephone survey. The average age of the participants was 56 (SD = 17). Almost one fifth (17 %) lived in Brandenburg, Mecklenburg-Western Pomerania, Saxony, Saxony-Anhalt, or Thuringia.

Twenty-four per cent of participants indicated that they were parents or legal guardians of one or more children, 14 per cent confirmed that they were carers for relatives, and 64 per cent of participants indicated that they were neither responsible for children nor carers to other relatives. More than half of participants (58 %) reported living in owner-occupied housing.

Almost two thirds of participants (61 %) had at least a school-leaving certificate (*Abitur*) or vocational equivalent (*Fachabitur*). Half of the participants (48 %) were or had been actively involved in at least one state authority or non-state organisation with tasks relating to public safety at the time of the survey (including military service and alternative civilian service).

A total of 84 per cent of participants had been affected by one or more event in the past (power outage: 58 %; central heating failure: 39 %; storm damage: 33 %; flooded cellar: 27 %; damage due to heavy rain: 26 %; flood damage: 13 %; fire in the home: 8 %; situation in which participant had to leave/evacuate the house quickly: 7 %; food shortage: 6 %; shortage of drinking water: 4 %).

To approximate results that are representative of the German population, a dual-frame design weighting of the total sample was performed based on the following characteristics: age, gender, high-

est level of education, and federal state of residence. For the results of the analyses performed with the reported unweighted data, [see Appendix C](#).

### 3.2.2 Key findings

#### Level of (deliberate) disaster preparedness

Twenty-two per cent of participants felt very well or well prepared for emergencies and disasters in general, while 38 per cent did not feel well prepared or not well prepared at all. Almost half of participants (47 %) had implemented disaster preparedness measures. Participants who had not yet taken any measures felt they were not well or not at all well prepared for emergencies and disasters significantly more often than participants who had already prepared for emergencies and disasters ([Image 5](#)). More than half of participants who had not implemented preparedness measures indicated that they had previously thought about with disaster preparedness (55 %). Across the entire sample, 24 per cent had neither implemented nor thought about disaster preparedness to date.

To better assess the degree of individual disaster preparedness, participants were asked to select the items and measures they had already acquired or implemented in their households from a list – even if they had not acquired or implemented them with view to preparing for emergencies and disasters. The proportion of participants who had already acquired individual items or implemented measures was sometimes significantly higher than the proportion of participants who stated that they had deliberately prepared for emergencies and disasters ([Image 6](#)). Regarding individual disaster preparedness measures or items that are already present in or implemented by many households, participants sometimes underestimated their level of disaster preparedness. At the same time, for example, the proportion of participants who stated that they had already stockpiled water was lower than the proportion of participants who

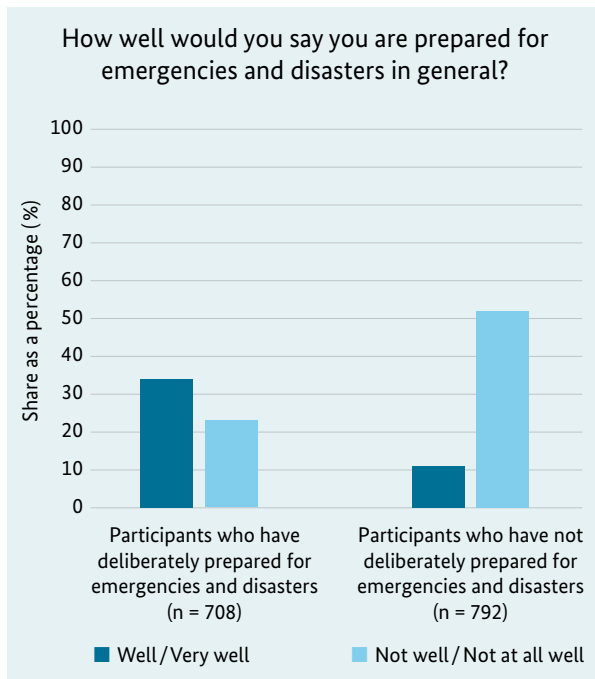


Image 5: Participants' self-assessment of how well prepared they are for emergencies and disasters in general, shown here in relation to previous deliberate implementation of disaster preparedness measures

stated that they had already specifically prepared for disasters. Overall, it can be concluded that only a small number of participants had prepared for disasters comprehensively.

### Who does not prepare for disasters?

In order to better understand challenges to disaster preparedness, a subset of participants who had not previously implemented disaster preparedness measures (53%) was examined more closely. Only a minority found disaster preparedness uninteresting (19%) or too expensive (15%) or could not implement it in daily life (15%). Lack of money (20%), lack of time (23%), or lack of space at home (27%) were challenges for a minority of participants and less than half of participants said they had too many other things to deal with first (36%) or

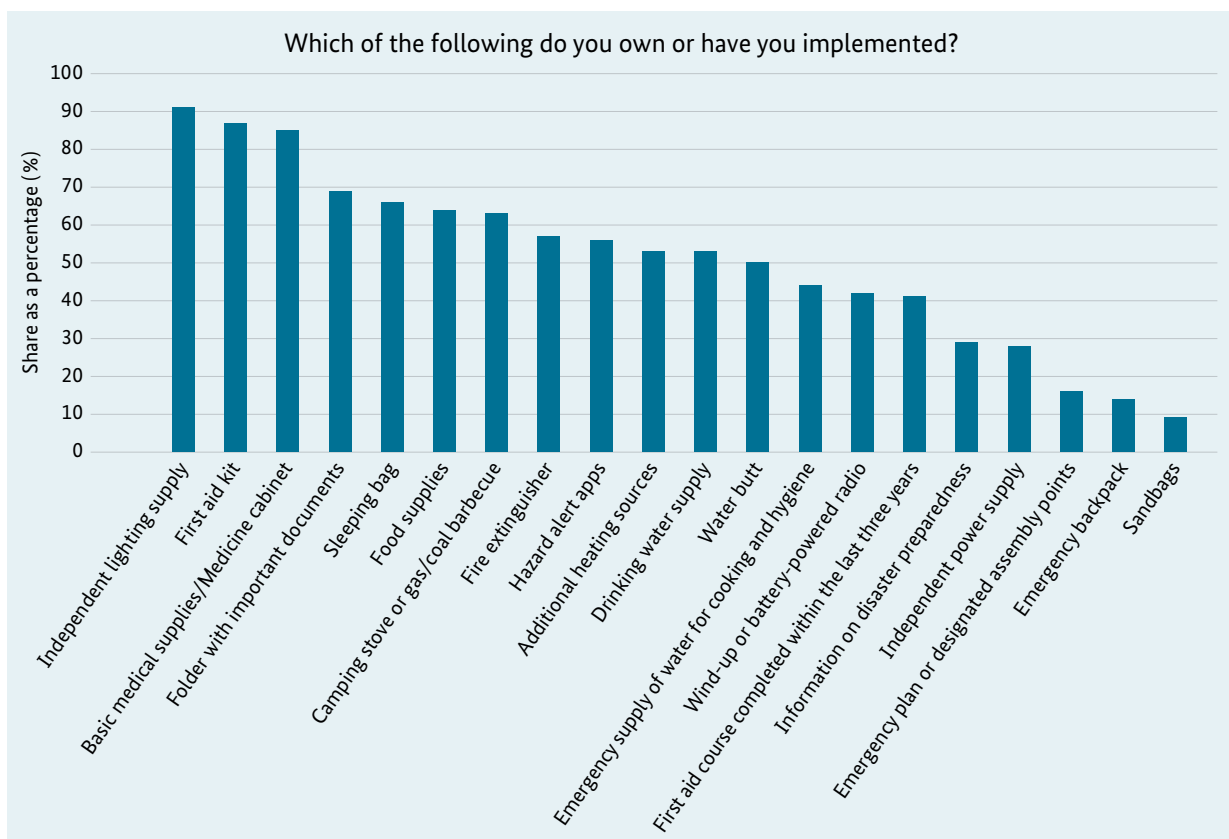


Image 6: Share of participants who own or have implemented things that are relevant to disaster preparedness

wanted to invest the money required for disaster preparedness in things that brought them joy (25 %). Almost a third found engaging with disaster preparedness unsettling (32 %). Significantly more participants indicated that they would rely on the support of family (61 %) or friends (40 %) in an emergency or wait until an emergency or disaster occurred before taking action (64 %).

### **How does experience with emergencies and disasters affect disaster preparedness?**

Participants who had already experienced emergencies or disasters were more likely to have deliberately implemented disaster preparedness measures (50 %) than participants who had not yet experienced such adverse events (34 %). Among participants who had not yet taken any disaster preparedness measures but had previously experienced emergencies or disasters, 58 per cent had already engaged with disaster preparedness. Among the participants who had neither deliberately implemented disaster preparedness measures nor personally experienced emergencies or disasters, only 42 per cent had previously engaged with disaster preparedness. Perhaps experiencing an emergency or disaster prompted participants to implement disaster preparedness. An alternative explanation for the relationship between these behaviours could be that participants' context (e.g. living in an area that is at risk of flooding) both makes the need for disaster preparedness more salient and is also associated with more frequent emergencies and disasters.

### **What do participants know about the effects of cyberattacks and power outages?**

In order to better understand what knowledge participants have about the consequences of disasters, they were asked to name the impacts that a cyberattack and a multi-day power outage would have on their daily lives. As in the qualitative survey, this study showed that participants

did not have a complete picture of how a cyberattack and a multi-day power outage would specifically affect their daily lives. With a view to assumed consequences of a cyberattack on their own daily lives, participants most frequently (21 %) mentioned restrictions in payment transactions (no access to accounts, ATMs, online banking, card payments at the supermarket etc.). Only 11 per cent of participants mentioned a power outage as a potential result of a cyberattack. The breakdown of administrative services due to a cyberattack on an authority was not mentioned among the ten most frequent responses. This is in contrast with the reality that in the past year, 726 cyberattacks on critical infrastructure were reported, and the federal government was also frequently the target of such attacks (Federal Office for Information Security, 2024). Participants assumed that in the case of a multi-day power outage, heating (36 %), cooking facilities (stove, microwave; 31 %), and cooling appliances (air conditioning, refrigerator, freezer; 29 %) would be primarily affected. In a multi-day power outage, all of the above consequences would occur. In addition, running water would also be very likely to cut. However, this was not among participants' ten most frequently mentioned consequences.

### **What do participants know about the benefits of disaster preparedness in the event of a multi-day power outage and a war?**

Participants' assessment of the benefits of disaster preparedness was recorded based on two specific scenarios. In addition, the study aimed to test the finding from the qualitative field study that participants associate war with particularly devastating consequences. In order to test this finding, participants' perception of the benefits of disaster preparedness for a multi-day power outage and a war were contrasted. Significantly more participants indicated that they would be unable to prepare adequately for the consequences of war than

said the same for a multi-day power outage (45 % vs 30 %). In the case of war, more participants felt that even the best preparation would be of no use in such an event (43 % vs 25 %). It is therefore not surprising that 78 per cent of participants stated that preparing for a war was something entirely different from preparing for a power outage or flooding. In both scenarios, most participants felt that the state would need to step in (war: 88 %; power outage: 78 %). Additionally, 27 per cent of participants indicated that they would leave the country in the event of a war.

### Who is responsible for managing emergencies and disasters?

The majority of participants (54 %) stated that they would also be able to count on the support of their neighbours in an emergency. Participants who had already specifically prepared for disasters stated more frequently that they could rely on their neighbours than participants who had not yet taken specific disaster preparedness measures (61 % vs 48 %).

Almost half of participants (46 %) felt responsible for dealing the impacts of disasters on their daily lives. There was barely any difference in this response between participants who had and participants who had prepared specifically for disasters and participants who had not ([Image 7](#)). About half of participants (46 %) felt that they would be able to rely on their own abilities in disasters. This proportion was significantly higher among participants who had already implemented specific disaster preparedness measures. Only about a third of participants felt generally able to deal with emergencies and disasters (33 %). The proportion was slightly higher among participants who had deliberately implemented disaster preparedness measures. About a third felt that they would be able to manage in emergencies and disasters (35 %). In this respect, there were hardly any differences in relation to previous disaster preparedness. Only about a quarter of participants (28 %) were convinced that they could handle emergen-

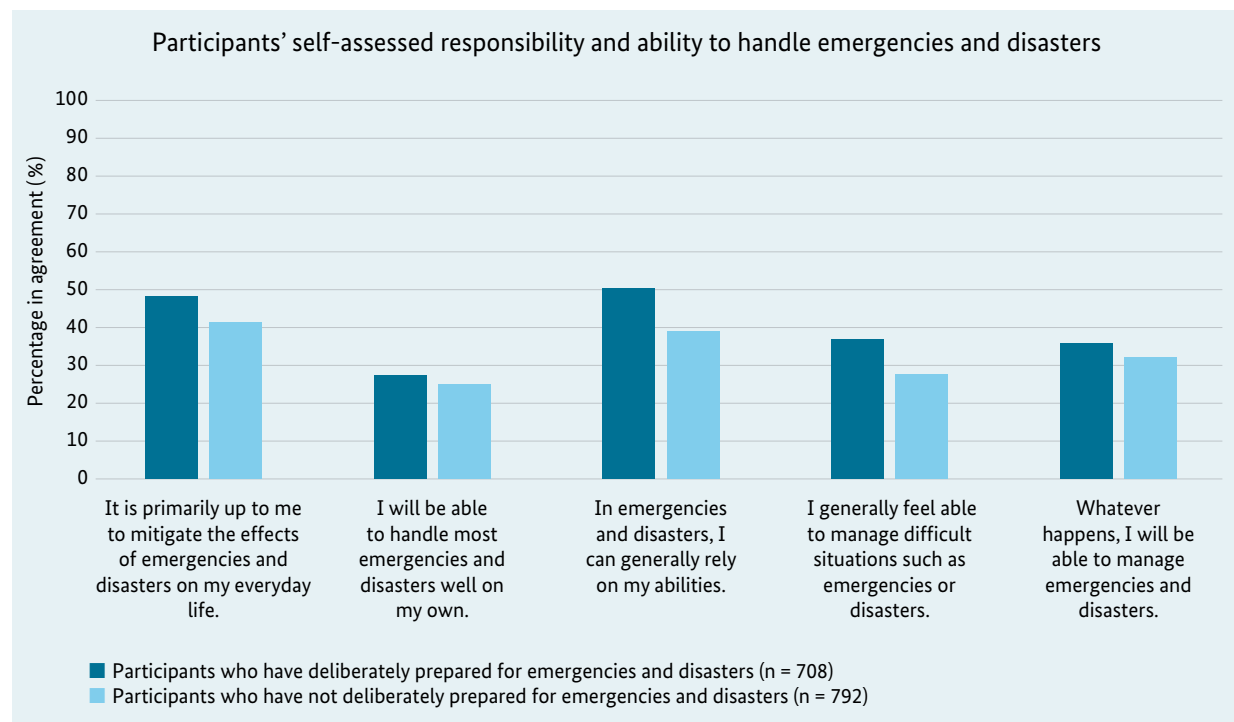


Image 7: Participants' self-assessed responsibility and ability to handle emergencies and disasters

cies and disasters well on their own. Again, it seemed irrelevant whether participants had already implemented specific disaster preparedness measures.

On the one hand, the majority of participants (61 %) saw the management of emergencies and disasters as the state's responsibility. On the other hand, only slightly more than a third (39 %) trusted that the state would help them in a disaster and only a quarter considered Germany's disaster management authorities to be well prepared (26 %). Among participants who had deliberately prepared for emergencies already, fewer trusted in state support than among participants who had not deliberately implemented disaster preparedness ([Image 8](#)).

#### How do individual risk perception, outcome expectancy, and self-efficacy influence deliberate disaster preparedness?

Two thirds of participants (64 %) expected that there would be more and worse emergencies and disasters in Germany in the future. Significantly fewer participants expected that their home region (26 %) or they themselves (21 %) would be more affected in the future. Participants who perceived a high risk of Germany, their region or themselves being more affected by emergencies and disasters in the future had more often taken deliberate precautions and engaged with disaster preparedness ([Chart 1](#)).

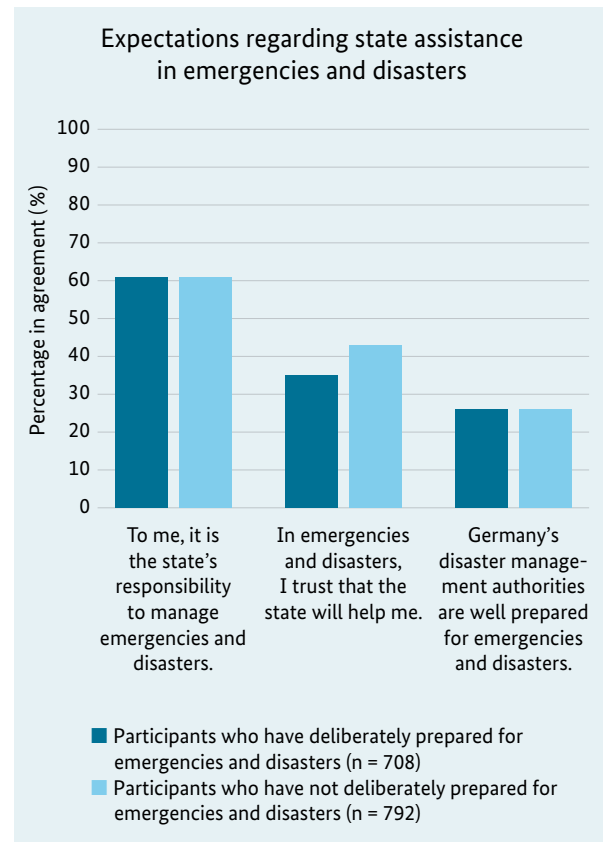


Image 8: Participants' expectations regarding assistance from government agencies in emergencies and disasters, shown here in relation to previous deliberate implementation of disaster preparedness

|                                                                                                                       | I think there will be more and worse emergencies and disasters in Germany in the future. |                   |                          | I think that the region where I live will be more affected by emergencies and disasters in the future. |                   |                          | I think that I myself will be more affected by emergencies and disasters in the future. |                   |                          |
|-----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-------------------|--------------------------|--------------------------------------------------------------------------------------------------------|-------------------|--------------------------|-----------------------------------------------------------------------------------------|-------------------|--------------------------|
|                                                                                                                       | Do not agree (at all) (n=183)                                                            | Undecided (n=358) | (Strongly) agree (n=957) | Do not agree (at all) (n=599)                                                                          | Undecided (n=506) | (Strongly) agree (n=395) | Do not agree (at all) (n=724)                                                           | Undecided (n=462) | (Strongly) agree (n=313) |
| Respondents who have implemented deliberate emergency preparedness measures                                           | 36 % (n=66)                                                                              | 45 % (n=160)      | 50 % (n=481)             | 43 % (n=260)                                                                                           | 48 % (n=244)      | 52 % (n=204)             | 47 % (n=341)                                                                            | 45 % (n=209)      | 50 % (n=157)             |
| Respondents who have not implemented emergency preparedness measures, but have thought about emergency preparedness   | 26 % (n=47)                                                                              | 26 % (n=94)       | 31 % (n=292)             | 27 % (n=160)                                                                                           | 28 % (n=143)      | 33 % (n=131)             | 27 % (n=194)                                                                            | 29 % (n=134)      | 34 % (n=105)             |
| Respondents who have not implemented emergency preparedness measures and have not engaged with emergency preparedness | 38 % (n=70)                                                                              | 29 % (n=104)      | 19 % (n=184)             | 30 % (n=179)                                                                                           | 24 % (n=119)      | 15 % (n=60)              | 26 % (n=189)                                                                            | 26 % (n=119)      | 16 % (n=51)              |

Chart 1: Risk perception among respondents (Germany, regional, individual), broken down by those who had previously implemented emergency preparedness measures and those who had not<sup>1</sup>

The majority of participants expected that they would be affected by the consequences of emergencies or disasters in the next three years, particularly consequences of a cyberattack (57%), heavy rain (56%), severe storm (49%), the outbreak of infectious disease (33%), or a terrorist attack (28%). A quarter of participants (25 %) considered it (very) likely that they would be directly affected by the consequences of a war in the next three years.

In order to assess outcome expectancy, participants indicated their agreement with the statement “One can generally prepare well for the consequences of emergencies and disasters” on a scale from 1 (do not agree at all) to 5 (strongly agree). Less than a third agreed with the statement (strongly agree) (29 %,

n = 432). Participants who had already implemented deliberate disaster preparedness had higher outcome expectancy (33 % vs 25 %).

Participants’ expectation that they would be able to implement disaster preparedness measures (self-efficacy) was assessed through binary agreement (yes/no) with the item “I find it difficult to prepare for emergencies and disasters because I don’t know enough about the subject.” Rejection of the statement was interpreted as an indicator of higher self-efficacy. About half of participants rejected the statement (52 %. The proportion was significantly higher among participants who had already deliberately implemented disaster preparedness (61 %) than among those who had not (44 %).

1 Note: This table contains minor rounding errors because weighted numbers were used for the analysis.

**How do citizens access information about disaster preparedness?**

Although many participants said that they could rely on family and friends for help in emergencies and disasters, less than half of those surveyed had discussed disaster preparedness with family (44 %) or friends (35 %). Only very few participants (12 %) reported making joint emergency arrangements with their neighbours.

Less than a third of participants (28 %) said they were familiar with the BBK disaster preparedness guide. The proportion of those who were already familiar with the guide was significantly higher among those who had already implemented disaster preparedness measures than among those who had not (39 % vs 19 %). More than a third of participants (39 %) stated that they could not rely on information from authorities about emergencies and disasters. Overall, there was high interest in information about disaster preparedness: 70 per cent would like more information about emergency and disaster risks that could affect them and how to prepare for emergencies, and 66 per cent would like more information on how to prepare for the effects of a war in Germany. Half of participants (50 %) also stated that they have previously actively sought information about disaster preparedness.

## 4. Design and test: Revision of the disaster preparedness guide

The following criteria were developed based on the findings of the qualitative field study and survey to ensure that the revised BBK disaster preparedness guide would be citizen-centred and easy to understand:

- **Explain the impact on one's own daily life in a relevant and understandable way:** Disaster preparedness can be perceived as meaningful only if it is clear what concrete impact emergencies and disasters could have on one's own daily life. Those who understand how their own life could be affected recognise the value of disaster preparedness, such as supplies or an emergency plan.
- **Empower citizens to implement preparedness through specific actions:** Citizens also need information that shows which impacts of crises and disasters they can specifically mitigate with the recommended measures. Practical examples and options can help demonstrate the concrete benefits of disaster preparedness for one's own daily life.
- **Ensure that text is short and concise:** Long text or a high level of detail quickly overwhelm and even discourage readers. Extensive text can be perceived as an indication of recommendations' complexity and impracticality. For the BBK's disaster preparedness guide, this meant significantly reducing the volume of 67 pages with mostly continuous text and great attention to detail in the recommendations. The revised guide focuses on essential information and assists readers through graphic design (e.g. using checklists or bullet points). This supports readers' ability to take in information.
- **No technical terms; ensure that illustrations are relevant:** In order to implement disaster preparedness measures, people need to be able to understand them. Therefore, technical terms should be avoided in information materials and understandable, everyday language should be used. Illustrations and photos in risk communication run the risk of being perceived as inappropriate, either as too negative/frightening or as too positive/trivialising for the subject at hand. Therefore, illustrations and photos should be used thoughtfully and only where helpful to support information visually. Ideally, this should be user-tested before launch.

Based on these criteria, the BBK's central information product – the disaster preparedness guide – was revised as an example of how to apply the above criteria. A total of 65 citizens were continuously and iteratively involved in the design of the guide over the course of three separate user tests focusing on concept and visual language (4.1), title and cover (4.2), and the overall disaster preparedness guide (4.3). The user tests were conducted by research provider Info GmbH.

## 4.1 User test: Concept and visual language

### 4.1.1 Goal and research question

The first user test aimed to identify a suitable illustration style and to check whether the above criteria to ensure that the revised disaster preparedness guide is citizen-centred and easy to understand were well implemented after an initial stage of revisions. The user test aimed to give feedback early on in the revision process to allow for fundamental adjustments if necessary.

### 4.1.2 Method and sample

Twenty participants were interviewed for 60 minutes each. They were shown and asked about mock-ups (drafts of pages with text and illustrations) of the revised disaster preparedness guide. Participants evaluated drafts of double-page spreads on six pages of the guide in three different illustration styles from various providers.

Interviews for the first user test were conducted from 26 February 2025 to 6 March 2025. Six interviews took place in person at a test studio in Berlin and twelve interviews were conducted online.

The participants represented key demographic characteristics of the German adult population, such as gender, age, urban/rural, education, region, employment, and income. Additionally, the participants represented various levels of experience with emergencies and disasters: seven participants had been directly affected by an emergency or disaster in the past ten years, such as flooding, earthquake, flash flood or, power outage; the other thirteen had not. (See [Appendix E](#) for the interview guidelines for User Test 1.)

### 4.1.3 Key findings

The participants rated the mock-ups highly in terms of their ability to present information well. They predominantly reported that the content was informative, clear, and presented in a manner that made its practical relevance easy to understand. The majority of participants also reported that the text's focus (factual presentation; focus on what specific steps citizens can take to prepare) did not cause fear but rather sparked interest in the topic. Additionally, they found the design appealing thanks to short text, easy-to-understand language, and visualisations.

The illustration style chosen for the redesigned guide was the one that seemed most appropriate to participants in terms of atmosphere and contributed to the reader's understanding of the text by supporting key points visually. The participants pointed out that the other illustration styles had a childish and comic-like or cold and overly factual feel, which they did not find appropriate. Based on this, the disaster preparedness guide was developed according to the criteria outlined above and implemented with the illustration style selected based on the first user test.

## 4.2 User test: Title and cover

### 4.2.1 Goal and research question

The qualitative fieldwork at the beginning of the project pointed to several challenges that the title of the new guide would need to address. In particular, it needed to avoid poorly understood technical terms (e.g. the difference between civil defence and disaster management). In German, disaster preparedness as addressed by this guide overlaps linguistically with other topics relating to preparing for emergencies (e.g. pre-

paring a living will as a way to prepare for medical emergencies). Additionally, the BBK itself and its responsibilities are not well known.

An effective title must therefore meet the criteria of “linguistic clarity” (concise and easy to understand), “content is clear” (makes clear what the topic is), and “tone” (serious, but in a measured way; not fear-inducing). The guide’s illustrations must meet the criteria of “content is clear” (the topic is clear at first glance) and “tone” (importance of the topic, but not fear-inducing; presenting disaster preparedness as normal and sensible). At the same time, the cover must be able to attract the attention of citizens and pique interest in the topic.

#### 4.2.2 Method and sample

Fifteen participants were interviewed individually for 60 minutes each about different cover options with different titles and illustrations. Participants first evaluated three possible titles and subtitles as well as the title and subtitle of the existing guide individually and comparatively. In the next step, they evaluated three potential covers (with corresponding titles and illustrations) as well as the cover of the existing guide individually and comparatively.

The interviews for the second user test were conducted online from 19 May to 23 May 2025. The thinking aloud technique was used to capture participants’ spontaneous, unprompted reactions. In addition to assessing the presented titles and illustrations, participants were also asked whether they believed any changes were necessary for the covers to meet the criteria of linguistic and content clarity as well as appropriate tone and, if so, what those changes should be. ([See Appendix F](#) for the interview guidelines for User Test 2.)

#### 4.2.3 Key results

All three draft covers (each containing a draft title and title illustration) largely met the specified criteria. None of the covers stood out significantly from the others in participants’ feedback. Ultimately, the cover that received the clearest and most consistent feedback on possible improvements was selected. Adjustments were made to the illustration based on the user test to further optimise the cover’s fit with the above criteria.

### 4.3 User test: Overall feedback on the revised disaster preparedness guide

#### 4.3.1 Goal and research question

The revised guide, including the new cover and title, was evaluated in a final user test by participants to determine how effectively the evidence-based design criteria were implemented. Since disaster preparedness affects all citizens, the question also arose as to how to disseminate the guide most widely. In order to inform future strategic decisions regarding the guide’s dissemination, participants were asked hypothetically how they might feel about the BBK sending the disaster preparedness guide unsolicited through the post. The external validity of this approach is low due to self-reporting of a hypothetical future scenario. However, the question is suitable for gaining insights into the thoughts of participants regarding this hypothetical scenario and, based on this, could inform further insight studies or tests.

#### 4.3.2 Method and sample

During a three-day online research community, 30 participants answered questions about the revised disaster preparedness guide for approximately 30 minutes each day. On the first day, all participants recorded

their first impressions of the cover and content, gave an overall rating, and recorded how interested they felt in further engaging with the topic based on their initial impressions. On the second and third days, participants evaluated all content pages of the emergency guide and recorded where the product seemed successful and where there was room for improvement from their perspective. Due to the amount of information, some content was presented to subgroups (8–24 participants). The majority of the content was evaluated by most participants (25–30 participants). The online research community was conducted from 3 June to 6 June 2025. (See [Appendix G](#) for the online research community guidelines for User Test 3.)

#### 4.3.3 Key findings

The final user test resulted in an overall positive evaluation of the disaster preparedness guide, its cover, and the individual pages. After reviewing the entire disaster preparedness guide, more than two thirds of participants spontaneously reported that after engaging with the revised guide, it seemed sensible to them to prepare for potential emergencies and disasters. This suggests that this central objective of the project was achieved.

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*For example, at the end of the user test, participants shared which message from the guide resonated most with them:*

*“There are many critical situations that can happen, but there are also many ways to prepare for the worst-case scenario. Human solidarity is very important.”*

*“An emergency or disaster is not predictable. It’s best to be prepared so that you can handle the situation well.”*

*“For me, the message is that some preparation is always sensible, even if, especially in Germany, one generally assumes that there is not much to worry about. But with little effort, you can still prepare for extreme situations.”*

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More than two thirds of participants stated in the final section of the survey that they had started to engage at least theoretically one or more of the recommendations during the three-day online research community and had developed specific intentions to act in some cases. Thus, there are initial indications that the information in the revised disaster preparedness guide was presented in an understandable and relevant manner and is suited to helping citizens engage with their individual disaster preparedness. A future impact assessment in the field is recommended.

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*“Definitely! I am considering buying a power bank, updating my medicine cabinet at home, learning more about non-perishable, and creating a list of important phone numbers and addresses.”*

*“Since the day before yesterday, I haven’t implemented any specific recommendation, but my awareness on this topic has grown. On Pentecost [upcoming holiday at the time], I will check my supplies in the pantry again – which is actually part of my routine) to see if I have enough of everything. I will order a good power bank today. Additionally, I can imagine signing up for a first aid course soon. Furthermore, I will inform myself about which off-grid heating device is suitable for my apartment and possibly buy one soon.”*

*“Yes, I want to stock up on food and prepare and keep a backpack ready for emergencies.”*

*“I would buy some bottles of water; I only drink tap water.”*

*“I need to buy more cat food.”*

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A minority of participants reported that certain points needed optimising (fewer than five participants in each case). This concerned individual word-

ings or aspects of illustrations that seemed misleading or caused concerns. Additionally, there were isolated comments that some illustrations appeared cluttered, the text was slightly too long, and specific content was missing on individual pages. This feedback was reviewed and incorporated during the final revision of the disaster preparedness guide (Images 9 to 11 illustrate how the above criteria were applied during the guide's revision). Compared with the previous guide, the length of the revised guide was significantly reduced, from 67 to 37 pages. The user tests did not reveal any need to shorten the guide further.

This page illustrates the practical consequences for citizens' daily lives when a range of systems fail.

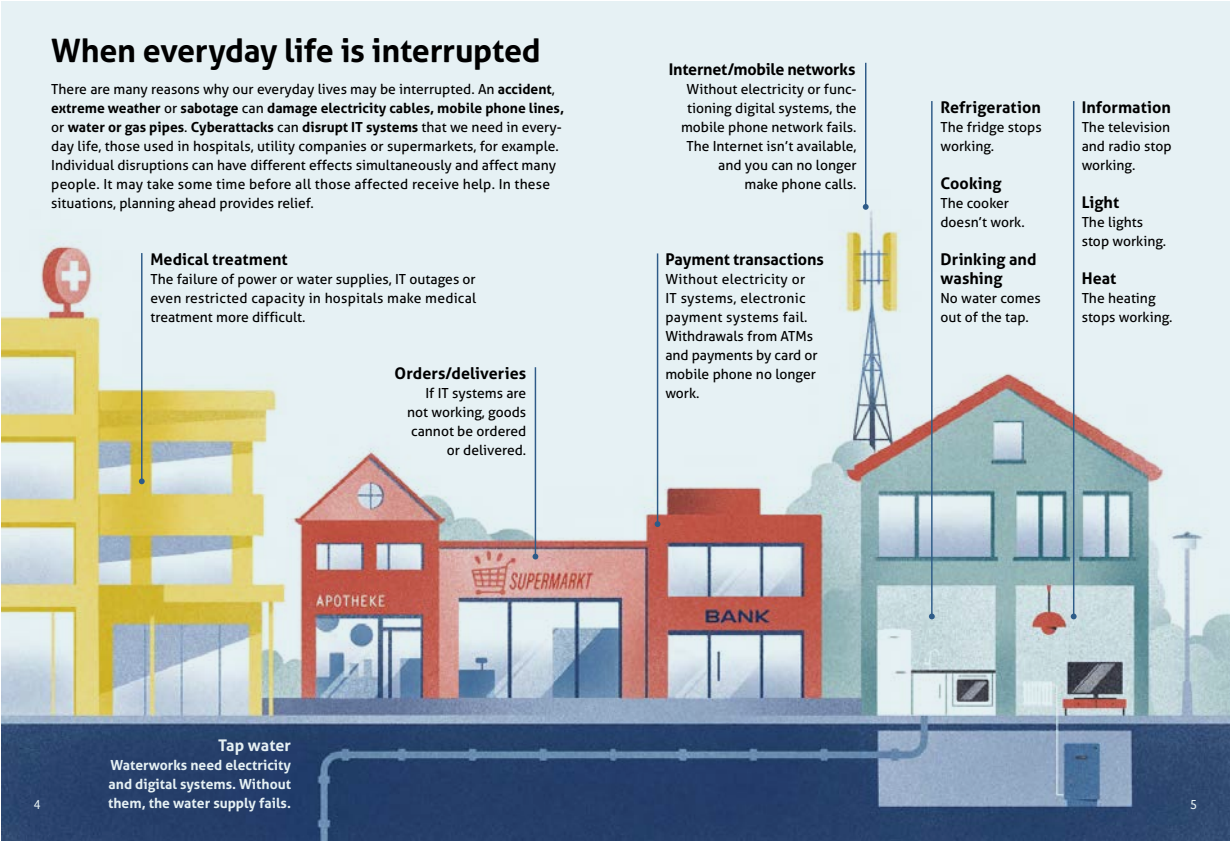


Image 9: Example of how the revised guide incorporated the criterion “Explain the impact on one’s own daily life in a relevant and understandable way”

This page uses practical examples to show how an emergency pack as recommended by the BKK can be helpful for managing the situation. Illustrations highlight the concrete benefits of preparing an emergency pack. The visual language also focuses on the benefits of preparation.



Image 10: Example of how the revised guide incorporated the criterion “Empower citizens to implement preparedness through specific actions”

This page is an example of how the revised guide uses clear and easily accessible language (e.g. short sentences, specific and practical examples) as well as suitable illustrations (e.g. not inducing fear through the illustration style).

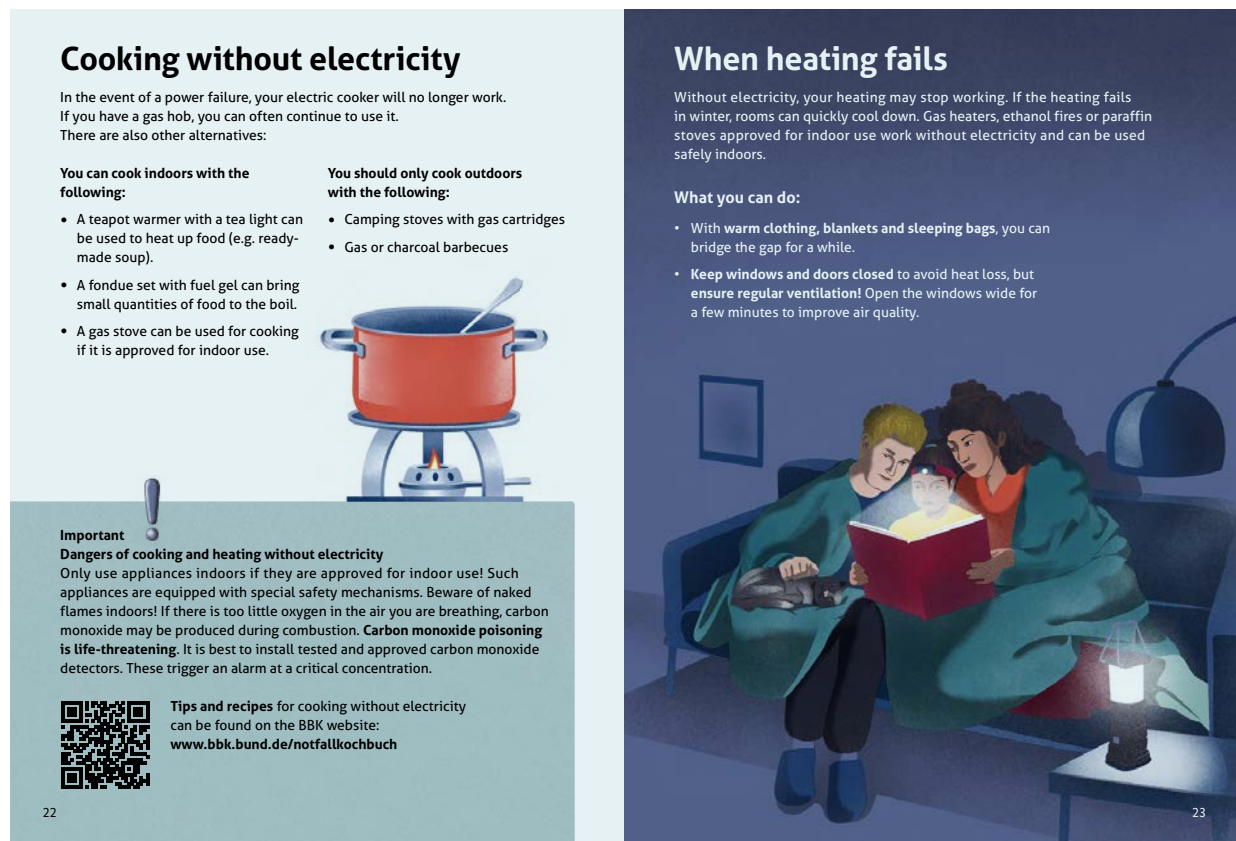


Image 11: Example of how the revised guide incorporated the criterion “No technical terms; ensure that illustrations are relevant”

Regarding the hypothetical scenario of receiving the new disaster preparedness guide being sent unsolicited through the post, participants' reactions were mixed. Out of 30 responses to this question, 18 participants expressed positive sentiments. Nine participants expressed ambivalent views, weighing the value of the information against the potential that sending out the guide proactively could signal a heightened threat and could be unsettling to them or others in society. Three participants reported that they would find it annoying.

The results underscore several challenges that arise when government agencies proactively distribute information about disaster preparedness. This includes the risk of inadvertently implying to

the population that there is a higher level of threat than was intended or is actually the case. Additional challenges arise as a result of the population being very heterogeneous, among other things, [in terms of risk perception as evidenced by key findings of the survey \(3.2.2\)](#), which likely influences how recipients would interpret any accompanying communication. Therefore, the communication accompanying any unsolicited distribution of disaster preparedness information to households – if logistically feasible in the first place – would be critical. Therefore, it would seem crucial to test the design of information and any accompanying communication thoroughly before considering unsolicited distribution of information on disaster preparedness to households.

## 5. Key implications for designing information

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This project aimed to develop criteria for evidence-based and citizen-centred information and risk communication, which contribute to strengthening the population's ability to respond in crises and disasters.

To do this, the project developed a deep understanding of citizens' perceptions, experience, capabilities, knowledge levels, and information needs in the context of disaster preparedness.

Based on insights from the qualitative field study, questionnaire-based survey, and three user tests, criteria were developed for designing effective information and risk communication, particularly in the area of disaster preparedness.

Applying the following criteria can help strengthen citizens' ability to respond in crises and disasters. They should be considered in the development of information and communication in preparation for crises and disasters. They complement existing recommendations on risk communication.

### *Using best practice to provide information about risks*

Risk perception refers to the knowledge of which disasters can occur and how these can impact one's daily life specifically, as well as an assessment of how likely one is to be affected by them. Risk perception is a cognitive process in which information about potential hazards is collected, processed, and evaluated.

Risk perception is a prerequisite for taking precautionary action (e.g. disaster preparedness), but it is not sufficient on its own. Information about risks must be objective and easy to understand, so that citizens can arrive at an accurate risk assessment based on the information provided. Factual and easy-to-understand risk communication helps strengthen citizens' ability to deal with risks.

Fear, however, can make people feel helpless and can hinder action. Risks are often not intuitive. Therefore, helping citizens understand risks well is an important skill, particularly in a disaster.

Easy-to-understand risk communication uses comparisons and identifies specific consequences, provides reference classes, uses natural incidence rates, explains conditional probabilities and base rates, uses graphical representations (e.g. to give a sense of proportions), presents risks in relation to alternative risks, and includes and explains ranges (see e.g. Gigerenzer, 2022; Wegwarth, 2021).

### *Helping citizens understand the specific benefits of disaster preparedness is crucial*

The purpose of risk communication and information about disaster preparedness is to explain the specific impacts that disasters could have on day-to-day life and the particular ways in which preparedness could help people to cope with those impacts in the event of any such disaster.

### *Disasters are highly exceptional situations*

Civil protection agencies routinely communicate about disasters to the public. For citizens, disasters are exceptional situations and information about them can be disconcerting. When authorities share information about what sensible disaster preparedness looks like, people may take this to mean that a disaster is imminent. This can be mitigated by communicating clearly and in a coordinated manner and, where possible and necessary, contextualising new information and the timing for sharing new information.

In addition, all official communication must consider that when trying to offer comprehensive information, the central pieces of information are often lost or overlooked ('full disclosure paradox') and do not reach citizens. Focusing on and prioritising recommendations and communicating in

clear and simple language (e.g. avoiding technical terms or jargon) helps ensure that the most important messages reach citizens.

Effectively supporting citizens in disaster preparedness in this manner may also require changes in the processes and structures of relevant state authorities.

- **Placing citizen-centeredness at the core:**

Ensure expertise and resources for citizen-centred work are placed at the core of work on risk communication and disaster preparedness information so that evidence-based approaches are integrated in this work throughout. This is particularly relevant to areas focusing on education and preparedness, such as civil protection, health, and climate.

- **Deliver information and risk communication centrally:** Prepare and provide information to the public on one issue in one place. Ensure that information is prepared and coordinated across institutional boundaries. Additionally, coordinate risk communication and preparedness information and communicate them in a coordinated manner. This requires, in principle, organising government information by topic rather than along institutional lines.

- **Prepare citizen-centred communication for the event of a disaster:** Ensure that citizen-centred information and communication is prepared before a disaster occurs. Ensure that such information and communications provide detailed and practical explanations of what citizens can do to deal with the effects of the situation. Ensure that, once an event occurs, resources are available to inform subsequently in a specific, understandable, and practical manner.

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**Authors**

Dr Sabrina Artinger, Dr Perke Jacobs, Valerie Giesen,  
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Bundeskanzleramt  
Referat 612 – Verhaltenswissenschaften und  
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Abteilung 6 – Politische Planung,  
Grundsatzfragen, Gesellschaftlicher Dialog  
wirksam.regieren@bk.bund.de  
Willy-Brandt-Straße 1  
10557 Berlin

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