The
Federal Government

German Strategy for Strengthening Resilience to Disasters

Implementing the Sendai Framework for Disaster Risk Reduction (2015–2030) – Germany's contribution 2022–2030

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Foreword

Humankind has always had to deal with crises and disasters. Our more recent past, our present and a glimpse into the future show, however, that crises and disasters are presenting us with new and changing challenges. Over the past two years alone, the Covid-19 pandemic has tested the coping strategies of every single human being and the global community and constantly imposed restrictions on our social lives. At the same time, the flood disaster in July 2021 emphatically demonstrated that unrelenting climate change is also leading to extreme weather events on an unprecedented scale in Germany, for which we need to be better prepared. Following Russia's war of aggression waged against the Ukraine, in contravention of international law, it has once again become fundamentally clear that peace and security in Europe should not be taken for granted. Simultaneously emerging acute threats are increasing our vulnerability to such hazards. We must bolster our resilience to a broad range of crises; resilience to disasters also strengthens our resilience to military and hybrid threats.

Risk and crisis management in Germany is the task of the government and an integral part of our security architecture. Security is a fundamental human need, for which the state bears particular responsibility. Accordingly, we need to focus on people in our initiatives aimed at strengthening resilience to disasters. At the same time, social change must also be considered. Demographic change, social cohesion and democratic cooperation, changing lifestyles and mobility patterns as well as digitalisation and the global networking of societies equally have an impact on our prevention and coping strategies.

With the Federal Government's Strategy for Strengthening Resilience to Disasters (or 'Resilience Strategy' for short), we will make Germany more able to withstand crises on a lasting basis!

The Federal Government is pursuing an integral strategic approach in order to invest in prevention and be able to better manage disasters and crises and help us to recover from them. The Resilience Strategy highlights the efforts that are already being made in this regard and points out where there is a need for comprehensive action in five specific action areas:

- Understanding disaster risk.
- Strengthening disaster risk governance to manage disaster risk.
- Investing in disaster risk reduction for resilience.
- Enhancing disaster preparedness for effective response and to 'Build Back Better' in recovery, rehabilitation and reconstruction.
- International cooperation.

In order to understand the complex relationships between the causes and consequences of disasters and crises and implement integral solutions, joint action is needed by all stakeholders at all levels – locally, regionally, nationally and internationally and across all sectors.

For joint action of this kind, the United Nations has formulated targets, guidelines and priorities for action in the Sendai Framework for Disaster Risk Reduction (2015–2030). We are using these as a basis to enable us to play our part in creating a more resilient future both in Germany and in terms of our international commitment. With regard to sustainability, climate change mitigation and adaptation, urban development, humanitarian assistance and security policy, we are also promoting measures to prevent new risks, mitigate existing risks and avert crises in line with other global and European agendas. In doing so, Germany stands firmly by its international partners as part of the global community.

The integrated system of assistance provided by municipalities, the Federal Government and the Länder, which characterises civil protection in Germany, already constitutes a very good basis for enhancing resilience. A number of stakeholders – authorities, fire services, aid organisations and the Federal Agency for Technical Relief – work together in an efficient hazard prevention chain. With an action force of 1.7 million people, most of whom are volunteers, civil protection is firmly anchored in our society. I would like to thank the professional and voluntary personnel for their commitment!

In order to adequately address existing and prospective risks in the future, risk and crisis management at federal and state level must be even better intertwined and treated as a permanent cross-functional task in all policy areas.

That is why, for the first time, the Resilience Strategy creates a common strategic framework for increasing resilience to disasters. We are thus promoting an integrated and inclusive approach to disaster risk management and setting the course to tackle new challenges by joining forces. Important here is the cooperation of the Federal Government, the Länder and municipalities as well as stakeholders from civil society, the scientific community, the private sector and the media!

The Resilience Strategy is designed to initiate a public discussion on how Germany can become more resilient. Accordingly, I invite all interested parties to get involved in the implementation process and play their part in further developing the strategy. After all, the Resilience Strategy is a milestone on the way to a more secure future. Let's take this path together!

Nancy Faeser

Federal Minister of the Interior and Community

German Strategy for Strengthening Resilience to Disasters

On 13 July 2022, the Federal Government enacted the **German Strategy for Strengthening Resilience to Disasters** (or 'Resilience Strategy' for short)**.** This **summary** provides an overview of key elements of the strategy.

Where we are at present

In recent years, various hazardous situations, occurring naturally and/or human-induced, have led to complex crises and disasters. Particularly in high-tech societies intertwined in global trade, the consequences for all areas of life and our community have become much more complex: loss of human life and livelihoods, significant economic, social and environmental damage as well as the threat to critical infrastructure. The Covid-19 pandemic that has been raging since 2020, the flood disasters in July 2021 as an effect of climate change, and more evident migration movements – also due to climate change and armed conflicts – are the most serious disasters of recent years. They have had a significant impact on our society and politics and continue to change them. These and other damaging events have also clearly shown where both our preparedness and coping capacities and skills are well organised and where we must significantly improve in order to be fit for the future. This applies to civil protection in general and our risk and crisis management measures in all other policy areas.

Where we want to be

New challenges in dealing with hazards, risks, disasters and crises call for new strategies. An integral approach to resilience must take all hazards into account and be viewed as a permanent political task that is constantly being readjusted and embedded in the overall state security architecture.

Disaster risk reduction instruments will thus also be used to counter risks with a security policy dimension as well as military hazards. At the same time, disaster resilience forms the basis for reliable civil defence. All state and non-state stakeholders must be involved and play their part here, i.e. the state itself, civil society, the private sector, the scientific community and the media from all disciplines or sectors across all administrative levels.

International concepts

- Multi-hazard approach
- Stronger focus on prevention
- Disaster risk management as a task for all sectors and levels
- Coherence across all policy areas

The Federal Government recognises this need in the Resilience Strategy. We are using it to create the strategic framework in order to promote forward-looking action informed by risk and foster a resilient society as important elements of sustainable development. The driving forces behind it are the Sendai Framework for Disaster Risk Reduction (2015–2030) published by the United Nations and other global and European agendas that are mutually committed to the importance of integrated disaster risk management for sustainability, climate change mitigation and adaptation, international cooperation and urban development.

Our strategic goals for 2030 are:

▶ Integration:

Existing structures and systems are supplemented or linked by new or improved disaster risk management measures.

▶ Cooperation:

State and non-state stakeholders work more closely together in the area of disaster risk management.

▶ Coordination:

Information, insights and findings in the area of disaster risk management are increasingly disseminated and interlinked.

What we will do to achieve it

The aim of the Resilience Strategy is to protect people and their livelihoods and to strengthen the resilience and adaptability of the community to disasters. The Resilience Strategy also shows how Germany can use development cooperation and humanitarian assistance to contribute to the global implementation of the Sendai Framework for Disaster Risk Reduction and thus increase resilience to disasters.

The implementation of the Resilience Strategy is based on the following overarching guidelines:

- A focus on protecting people and their livelihoods
- A perspective that embraces society as a whole
- The responsibility of all stakeholders in line with their skills and capacities
- A multi-hazard approach
- Building on existing processes, capacities and principles
- Generating synergies and coherence between existing efforts
- Continuous learning during and from the implementation of the Resilience Strategy

The Federal Government formulates measures across five action areas to resist the impact of a wide range of hazards in a timely and efficient manner, to absorb them, to adapt to them and to recover from them. This is accompanied by the responsibility to maintain and restore critical services for society as well as a transformation process to reduce existing risks and prevent the emergence of new risks.

Action area 1 – **Understanding disaster risk** – includes measures for enhancing knowledge of risks and how they interact, i.e. becoming more aware of existing and potential risks and being able to assess them better and identify them earlier. These include areas such as strategic foresight, risk analysis, data availability and processing, awareness-raising initiatives among the population and education and training.

Action area 2 – **Strengthening disaster risk governance to manage disaster risk** – focuses on establishing which stakeholders must work even more closely together, how they can do so and which planning-related and regulatory principles should form the basis of such collaboration. This means anchoring disaster risk management as a cross-functional task and significantly improving coherence across all policy areas as well as risk management skills and interdisciplinary and cross-level coordination. This requires closer cooperation with non-state stakeholders and international organisations (United Nations, European Union).

Action area 3 – **Investing in disaster risk reduction for resilience** – identifies measures within 17 subject areas that help to reduce disaster risks as an integral and systematic element embedded within structural investment, financing and support measures. These measures not only help to build resilience to disasters through sectoral development, but also address underlying risk drivers that can arise from social, economic or environmental processes.

Action area 4 – **Enhancing disaster preparedness for effective response and to 'Build Back Better' in recovery, rehabilitation and reconstruction** – focuses on crisis management tasks such as early warning systems, emergency planning and exercises, training of leaders and emergency services, voluntary work, networking of stakeholders and the question of how we can learn from crises.
At the same time, it highlights how crisis management can draw on the knowledge, capacities and structures of risk management.

Action area 5 – **International cooperation** – consolidates the subject areas from Action areas 1–4 for Germany's bilateral and multilateral cooperation in the field of disaster management, humanitarian assistance and development cooperation.

What happens next

The implementation of the Resilience Strategy at Federal Government level in line with its constitutional responsibility can only succeed through joint action by the various departments. Here, a targeted approach should be taken to using the synergies and interfaces with related strategy processes. At Federal Government level, the Interministerial Working Group tasked with implementing the Sendai Framework for Disaster Risk Reduction (IMAG Sendai) acts as a steering and coordinating committee, which will be supported by an inter-agency working group in the future. The National Focal Point for the Sendai Framework (NKS) at the Federal Office of Civil Protection and Disaster Assistance (BBK) is on hand to provide expert advice and public relations and networking services to the Federal Government and all stakeholders who would like to get involved in the process as well as other implementation partners. The NKS is also the point of contact for the United Nations Office for Disaster Risk Reduction. Initiatives and measures taken to improve disaster risk management and increase resilience to disasters should be qualitatively recorded in the form of a progress report at three-year intervals and form the basis for the continuous development of the Resilience Strategy.

The strategy also provides a guidance framework for various stakeholders, institutions, sectors and levels with the overriding aim of helping to create a society that is more resilient to disasters. In order to implement and develop the Resilience Strategy, the Federal Government will start a dialogue and participation process with the Länder, representatives from the municipalities as well as stakeholders from civil society, the scientific community, the private sector and the media. This process is set to be made permanent within the framework of a National Platform.

German Strategy for Strengthening Resilience to Disasters

Overarching goal

German society is more resilient to disasters and Germany's international cooperation contributes to the global implementation of the Sendai Framework.

Strategic goals

Integration
Existing structures and systems are supplemented or linked by new or improved disaster risk management measures.

Cooperation
State and non-state stakeholders work more closely together in the area of disaster risk management.

Coordination
Information, insights and findings in the area of disaster risk management are increasingly disseminated and interlinked.

Stakeholders

All disciplines/sectors – All levels – State – Non-state

Action areas

1. Understanding disaster risk

1.1. Enhancing and using risk analyses
1.2. Identifying newly emerging risks at an early stage
1.3. Improving the data situation
1.4. Raising awareness of self-provision among the population
1.5. Including disaster risk management issues in education and training

2. Strengthening disaster risk governance to manage disaster risk

2.1. Anchoring disaster risk management as a cross-functional task
2.2. Bolstering risk management skills and coordination mechanisms
2.3. Expanding and leveraging coherence with other cross-sectoral policy areas
2.4. Stepping up cooperation between state and non-state stakeholders
2.5. Increasing cooperation in the area of disaster risk management in and with the EU and NATO

3. Investing in disaster risk reduction for resilience

3.1. Finance
3.2. Healthcare
3.3. Economic affairs and energy
3.4. Digital infrastructure
3.5. Construction, urban, rural and regional development and land-use planning
3.6. Transport
3.7. Food, agriculture and forestry
3.8. Environment
3.9. Labour and social affairs
3.10. Education and science
3.11. Civil and military defence
3.12. Justice and consumer protection
3.13. Vulnerable groups
3.14. Innovative technologies
3.15. Protection of cultural assets
3.16. Critical infrastructure
3.17. Disseminating proven resilience practices

4. Enhancing disaster preparedness for effective response and to 'Build Back Better' in recovery, rehabilitation and reconstruction

4.1. Improving early crisis detection and early warning systems for timely and targeted action
4.2. Better forecasting the potential developments of a disaster
4.3. Conducting regular incident exercises
4.4. Enhancing emergency planning
4.5. Improving the training of leaders and emergency services
4.6. Offering better incentives for voluntary work
4.7. Networking stakeholders, interests and expertise before the crisis
4.8. Learning from the crisis

5. International cooperation

5.1. Supporting the use of comprehensive risk analyses

5.2. Strengthening cooperation with civil society
5.3. Enhancing governance
5.4. Promoting risk-informed planning and development
5.5. Linking international, regional and national approaches
5.6. Promoting multilateral cooperation

5.7. Strengthening participative and community-based prevention measures
5.8. Supporting social security systems
5.9. Strengthening healthcare systems
5.10. Encouraging risk finance and risk transfer
5.11. Developing resilient infrastructure

5.12. Strengthening preparation and coping capacities
5.13. Supporting resilient reconstruction with a developmental focus (Build Back Better)
5.14. Linking humanitarian assistance and development cooperation

Contents

List of abbreviations

AA	German Federal Foreign Office
AK V	Working Group V 'Fire Service Affairs, Rescue Services, Civil Protection and Civil Defence' of the Standing Conference of the Ministers and Senators of the Interior of the German federal States (the "Länder")
AMIS	Agricultural Market Information System
BABZ	Federal Academy for Civil Protection and Civil Defence – formerly Academy for Crisis Management, Emergency Planning and Civil Defence (AKNZ)
BBK	Federal Office of Civil Protection and Disaster Assistance
BBSR	Federal Institute for Research on Building, Urban Affairs and Spatial Development
BKG	Federal Agency for Cartography and Geodesy
BMDV	Federal Ministry for Digital and Transport
BMEL	Federal Ministry of Food and Agriculture
BMI	Federal Ministry for the Interior and Community
BMUV	Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection
BMVg	Federal Ministry of Defence
BMWSB	Federal Ministry for Housing, Urban Development and Building
BMZ	Federal Ministry for Economic Cooperation and Development
BSI	Federal Office for Information Security
BSIG	BSI Act
Bw	Bundeswehr (German Armed Forces)
CBRN	Chemical, biological, radiological and nuclear
DAS	German Strategy for Adaptation to Climate Change
DRK	German Red Cross
DWD	German Weather Service
EADRCC	Euro-Atlantic Disaster Response Coordination Centre
EAFRD	European Agricultural Fund for Rural Development
ERCC	Emergency Response Coordination Centre
EU	European Union

FONA	Research for Sustainable Development
GAK	Joint Task for the Improvement of Agricultural Structures and Coastal Protection
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
IFRC	International Federation of Red Cross and Red Crescent Societies
IMAG	Interministerial Working Group
JEE	Joint External Evaluation
KdB	Conception of the Bundeswehr
KfW	German Development Bank
KZV	Civil Defence Concept
LÜKEX	Interministerial and cross-national crisis management exercises
MoWaS	Modular Warning System
NATO	North Atlantic Treaty Organization
NCRSM	NATO Crisis Response System Manual
NGO	Non-governmental organisation
NINA	Emergency Information and News App
NKS	National Focal Point for the Sendai Framework, Germany
RKI	Robert Koch Institute
SDGs	Sustainable Development Goals
SMEs	Small and medium-sized enterprises
TCC	Telecommunications company
THW	Federal Agency for Technical Relief
UN	United Nations
UNDRR	United Nations Office for Disaster Risk Reduction
UP KRITIS	Public–private partnership for the protection of critical infrastructures; named after the 'KRITIS Implementation Plan' (2007)
WHO	World Health Organization
WMO	World Meteorological Organization
ZAPRL	Civil Alert Planning Guideline
ZSKG	Federal Civil Defence and Disaster Assistance Act

Part A: Context, opportunities and challenges

I. Hazards and increasing risks

Between 2000 and 2019, an estimated 1.23 million people worldwide died due to hydrological, meteorological and geophysical disasters. More than four billion people were affected, meaning that they were injured, made homeless, displaced, separated from family members or in need of emergency aid. While geophysical events – mainly earthquakes and tsunamis – accounted for the majority of fatalities, meteorological events such as storms and other extreme weather events caused most of the economic losses (Centre for Research on the Epidemiology of Disasters and United Nations Office for Disaster Risk Reduction 2020).

Germany, too, is threatened by hazards that could have serious consequences for the population, its livelihoods and public safety and order (Fig. 1).

Natural hazards in this country primarily include **hydrometeorological hazards,** including floods, severe storms such as windstorms or heavy precipitation, temperature drops, heatwaves and droughts environmental hazards such as wildfires. Furthermore, **geological hazards**, e.g. landslides, earthquakes and volcanic eruptions, and **extraterrestrial hazards**, such as meteorite impacts, must be taken into account.

The area of **chemical, biological, radiological and nuclear (CBRN) hazards** includes not only the release of pollutants, e.g. in the event of incidents in industrial plants and power generation facilities, but also other aspects, such as those involved in food safety. Biological hazards are primarily infectious diseases that adversely affect the health of humans, animals and plants.

These diseases can spread across national or continental borders and have serious consequences. This aspect includes the *novel severe acute respiratory syndrome coronavirus type 2* (SARS-CoV-2), which triggered the global Covid-19 pandemic in early 2020.

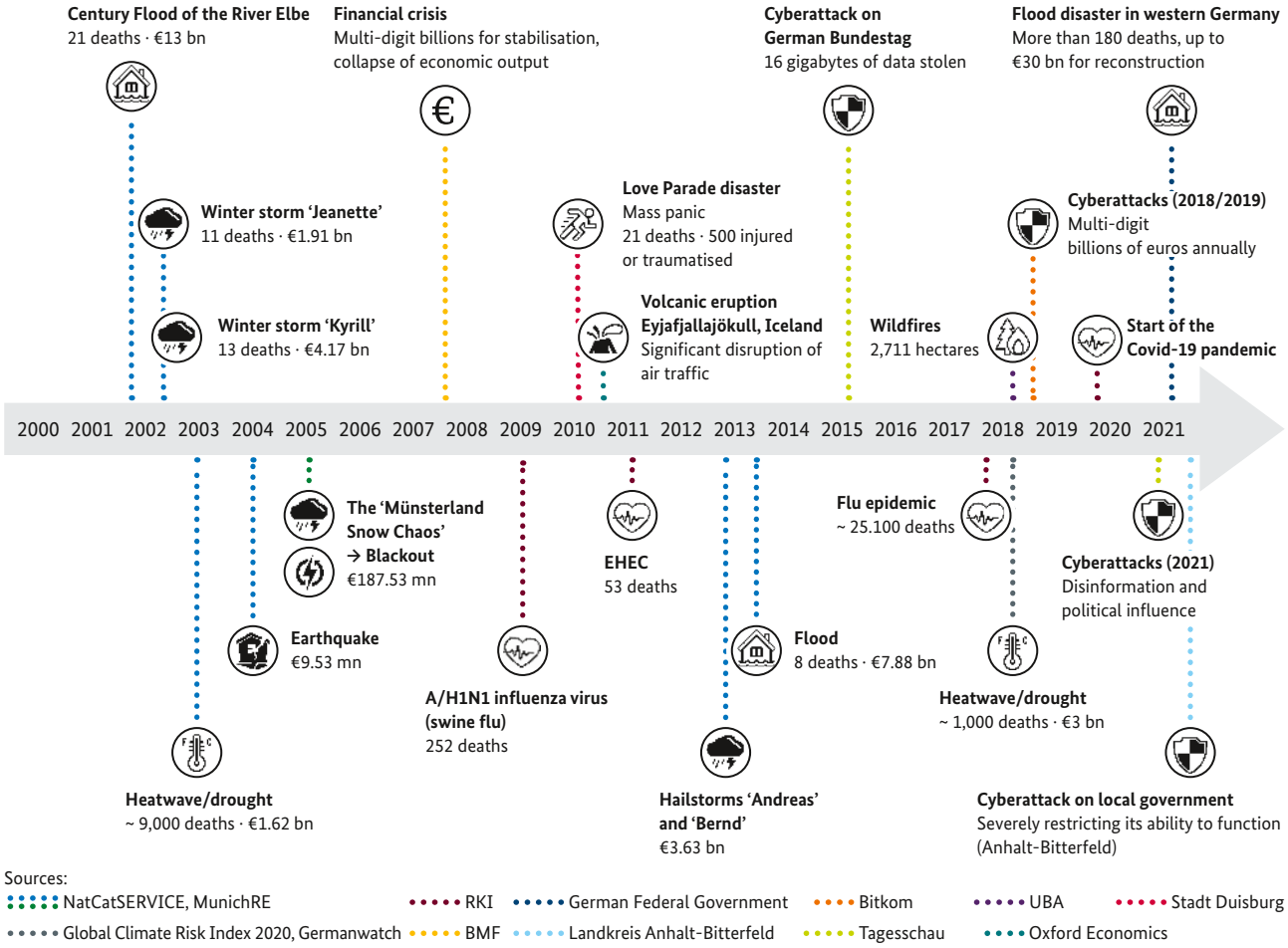

Figure 1: Selected incidents and disasters in Germany between 2000 and 2021 (source icons: Getty Images/various artists).

Many **Changes in the climate system** are increasing in direct relation to advancing human-induced global warming. These changes include increases in the frequency, duration and intensity of heatwaves and precipitation and drought events (Intergovernmental Panel on Climate Change 2022). In Germany, the effects of frequent dry spells are already visible and measurable.

For some regions in Germany, the nationwide radar data of the German Weather Service (DWD) indicates an increase in the frequency of heavy precipitation events (DWD 2021). Extreme climate risks affect vital natural resources, such as soil, forests and bodies of water, as well as economic systems, such as fisheries, agriculture and forestry, which rely on these resources. The latter are particularly sensitive to drought.

The systems affected by climate change influence each other, while requiring the same resources (e.g. water and land) to adapt (Umweltbundesamt 2021a). In addition, global warming is enabling pathogens that are transmitted via arthropods (e.g. ticks or mosquitoes) and reservoir animals (e.g. rodents and birds), and that have so far occurred predominantly in, warmer southern regions, to increasingly penetrate into temperate zones such as Germany. This can lead to the spread of infectious diseases (Umweltbundesamt 2021b).

However, hazards can also occur due to **human or technical failure.** These include severe nuclear, biological and chemical accidents or large-scale failures of highly interconnected, vital infrastructures such as those that ensure availability of our energy supply or telecommunications systems. This includes threats from space such as uncontrolled re-entry of inactive space systems or large-scale failures of space systems such as navigation, positioning and timing systems (e.g. Global Positioning System or GALILEO).

Criminal, terrorist or belligerent acts also pose complex hazard for people, especially in view of the further development and spread of CBRN weapons of mass destruction.
(Bundesamt für Bevölkerungsschutz und Katastrophenhilfe 2009, 2010, 2015, Bundesministerium der Verteidigung 2016, European Union 2016).

Hybrid stakeholders are increasingly creating and using complex hazardous situations to advance their own interests. Hybrid threats can include various forms of illegitimate influence by foreign states, which can be specifically directed against the security interests or sovereign political decision-making of the Federal Republic of Germany. **Threats in cyberspace** can be used as a means of hybrid threats. In addition, hacker attacks aimed at sabotage in particular, but also hacker attacks pursuing other goals, have increased in recent years. Cyberattacks are increasingly targeting critical infrastructures and thus endangering critical utilities (e.g water and electricity supply for the population).

In all these different hazard situations, acute political, social or economic crises play a significant role as a cause, amplifier or consequence. Not every hazard ends in disaster. However, the nature, frequency and intensity of hazards are changing. Their causes have become more complex, as have the interactions between the various hazards and their potential direct and cascading effects across national borders.

The spread of Covid-19 demonstrates that threats can affect all sectors of society and the population, as well as institutions at all levels of government, albeit in very different ways.

Awareness of risks and the need to prevent them is therefore becoming increasingly important. At the same time, it is important to build the capacity of the state, the economy and the population to prepare for hazardous situations and to deal with the consequences. Crises and disasters can only be prevented by the interaction of governmental and non-governmental stakeholders from different disciplines and at different levels of action and managed by pooling all available resources. The Federal Government is therefore pursuing a comprehensive, connected approach.

This Resilience Strategy defines goals and measures for this joint approach. It is intended to contribute at a national and international level to strengthening resilience to disasters.

II. Resilience to disasters at international level

1. The Sendai Framework for Disaster Risk Reduction

The policy goal of disaster risk reduction has become increasingly important at international level in recent decades. In many cases, it has been linked to the task of strengthening the resilience of societies to disasters.

Leading the way for a cross-hazard, cross-policyfield and cross-stakeholder approach is the **Sendai Framework for Disaster Risk Reduction 2015–2030**, which was adopted at the third United Nations (UN) World Conference on Disaster Risk Reduction in Sendai, Japan, in March 2015. At the request of the UN General Assembly, the hosting of the World Conference and the creation of the Sendai Framework is supported by the United Nations Office for Disaster Risk Reduction (UNDRR).

What is the meaning of resilience?

Resilience describes the ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner. An important prerequisite for this is the preservation and restoration of its essential basic structures and functions through risk management (United Nations 2016).

A total of 187 countries, including Germany, have adopted the Sendai Framework. Through the implementation of the framework, they all pursue the goal of significantly reducing disaster risk as well as losses from disasters in the future. Above all, it is necessary to protect human lives, livelihoods and people's health, as well as the economic, physical, social, cultural and environmental assets of people, companies, communities and countries.

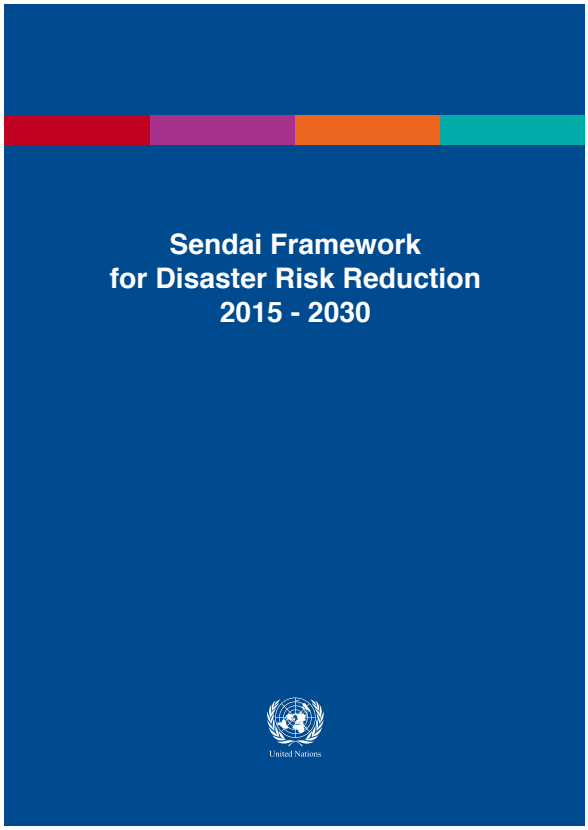

Figure 2: Cover of the Sendai Framework for Disaster Risk Reduction 2015–2030 (source: UNDRR 2015).

In order to be able to reduce existing disaster risks and prevent new ones, integrated and inclusive measures for dealing with risks in diverse areas are to be implemented. Joint efforts in economic, construction, legal, social, health, cultural, educational, environmental, technological, political and institutional areas aim to strengthen the resilience of the population, the state and the economy to natural or human-induced hazards. To achieve this outcome, the Sendai Framework specifies seven global targets (A–G):

- Reducing the number of (A) fatalities, (B) people affected, (C) economic losses and (D) damage to and failures of critical infrastructure caused by disasters;
- Improving (E) national and local strategies by 2020, (F) international cooperation (G) and the availability of early warning systems and disaster risk assessments.

These objectives are based on the following four priorities for action, which formulate recommendations for action at the local, national, regional (in this case, European) and international levels:

1. Understanding disaster risk;
2. Strengthening disaster risk governance to manage disaster risk;
3. Investing in disaster risk reduction for resilience;
4. Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction.

2. The global agendas for more coherence

The implementation of the Sendai Framework is closely connected to other global agendas to which the international community has committed since 2015. These include, in particular, the **2030 Agenda for Sustainable Development** (New York, September 2015), the **Paris Agreement** under the UN Framework Convention on Climate Change (Paris, December 2015), the **Agenda for Humanity** (Istanbul, May 2016) and the **New Urban Agenda** (Quito, October 2016).

The objectives of these global agreements have significant intersections, which are also reflected in the respective reporting requirements. An integrative approach is therefore required for their implementation.

Some of the requirements from the aforementioned agendas are already addressed at the federal level in national strategies and underpinned by concrete measures, such as in the German Strategy for Adaptation to Climate Change (*Deutsche Anpassungsstrategie an den Klimawandel;* DAS) of the German Sustainability Strategy (*Deutsche Nachhaltigkeitsstrategie*; DNS). These strategies relate and complement each other.

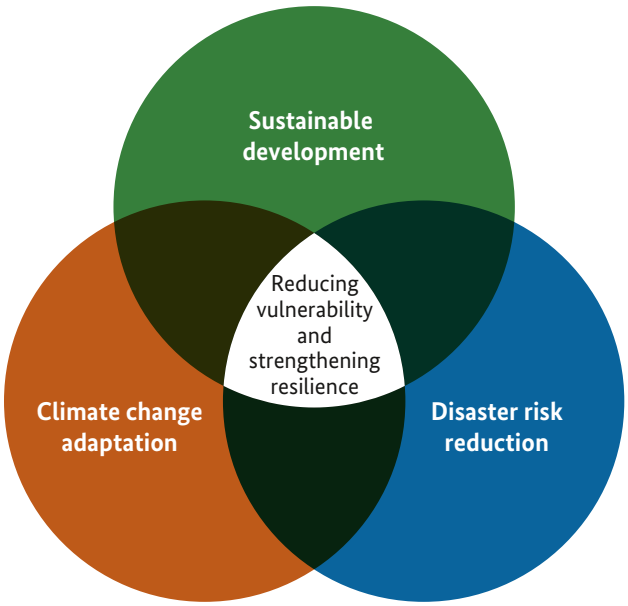

Figure 3: Coherence through common and complementary goals and actions (adapted from United Nations Climate Change Secretariat 2017).

3. Systemic perspective and cross-sectoral mandate as structural commonalities

At the core of all the post-2015 agendas is a systemic view. These agendas point to the need to reduce the impacts of hazards of all kinds – including those of climate change – on people, ecosystems and infrastructure and to contribute to the stability of the human–earth system. A prerequisite for the long-term success of individual agendas is that the risk spectrum is addressed as comprehensively and coherently as possible. The importance of disaster risk management is, therefore, also recognised by all the global post-2015 agendas mentioned above. They call for concrete measures to reduce or adapt to risks.

In order to meet these demands in an effective way, stakeholders from different thematic and policy fields need to be involved. Disaster risk management – like sustainability and climate protection – is a cross-functional task. It touches on a wide range of policy areas where it also needs to be implemented. Consequently, the stakeholders involved must seek dialogue in order to identify and exploit synergy effects and thus avoid duplicating efforts. **A common challenge will be to coordinate the many individual measures. The implementation of the Resilience Strategy is intended to initiate new dialogue formats and coordination mechanisms for this purpose.**

4. Synergies for sustainability

Disaster risk management aims at measures to sustainably prevent, reduce and manage events with high damage potential. Sustainability means counteracting long-term crisis trends and the underlying risk factors.

Figure 4: The 17 global Sustainable Development Goals of the 2030 Agenda (source: UN).

These close links between disaster risk management, climate, biodiversity and sustainability policies are reflected in the common goals of reducing vulnerability and building resilience.

These common goals lead to synergies in the implementation of strategies designed for disaster risk management and sustainability. Implementing the 2030 Agenda Sustainable Development Goals will counteract crises such as climate change, species extinction, rising resource consumption and growing inequality, thereby reducing disaster risk. Improved disaster risk management, in turn, avoids or reduces setbacks in achieving goals related to the social, environmental and economic dimensions of sustainability.

Therefore, it is only logical that the international reporting on the Sendai Framework identifies more than 25 indicators that simultaneously serve to measure the progress of the 2030 Agenda (Sustainable Development Goals, SDGs).

The following sustainability goals are particularly relevant to the topic of disaster risk management:

SDG 1 – End poverty in all its forms everywhere.

SDG 3 – Ensure healthy lives and promote well-being for all at all ages.

SDG 9 – Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation.

SDG 11 – Make cities and human settlements inclusive, safe, resilient and sustainable.

SDG 13 – Take urgent action to combat climate change and its impacts.

SDG 15 – Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

International concepts for strengthening resilience – opportunities for Germany

A **multi-hazard approach** allows interactions and possible cascading effects or overlaps of different hazards to be better identified and addressed in a more targeted manner. This also allows resources to be used more efficiently for dealing with risks and managing crises.

A stronger focus on risk reduction saves lives and pays off economically. This not only reduces the risk of disasters and increases resilience, but also protects wealth built up over years from losses due to single extreme events.

More than ever, the complexity of dealing with risks and hazard situations requires that **disaster risk management be** perceived **as a task for all sectors and levels**. This can also help to ensure that disaster risk reduction, disaster response and reconstruction are better integrated.

Coherence between all policy areas not only avoids duplication of efforts but also allows for better interaction with other cross-sectoral efforts in areas such as sustainable development, climate protection and adaptation or digitalisation.

III. Starting point in Germany

Germany has a robust system in place that has evolved over decades to protect the population in the face of emergencies, crises, major incidents, and disasters. In civil protection, a legal distinction is made between civil defence, i.e. the protection of the population against war-related hazards, which is the responsibility of the Federal Government, and disaster management, which is the responsibility of the Länder. Despite the differences in responsibilities between the federal and Länder governments, Germany does not maintain duplicate structures for civil defence and disaster management. Instead, the focus is on dual use: in the integrated relief system, federal civil defence also builds on civil protection structures. Objectives and structures for civil protection therefore also influence the design of disaster management.

The implementation of the Sendai Framework here is, therefore, fundamentally understood against the background that the measures to protect the population have long been established and the responsible institutions are well positioned.

By intertwining civil protection and disaster response, the implementation of the Sendai Framework is also related to enhancing resilience to risks with a security dimension, for which a comprehensive conceptual framework has been established in the European Union (EU) and the North Atlantic Treaty Organization (NATO) with the EU Strategic Compass (2022), the NATO Strategic Concept (2022) and the NATO Heads of State and Government Commitments on Resilience Enhancement of 2016 and 2021.

At national level, international disaster risk management terms do not always translate one to-one. In Germany, the relevant laws of the Länder define what exactly constitutes a **disaster**. Common to almost all definitions:

- A disaster is a major incident that endangers or impairs the life or health of many people, their natural resources or significant material assets to an unusual extent, and

- the effective combating and elimination of this incident requires the cooperation of all authorities, departments and organisations involved, as well as the forces deployed under the uniform management of a civil protection authority.

In practice, the terms "emergency", "crisis", "major incident," and "disaster" are used to describe different phenomena and also as synonyms.

This Resilience Strategy uses "disaster" as a generic term (see Glossary).

The same applies to the terms disaster risk management and disaster risk reduction. Disaster risk reduction should be understood as a component of comprehensive disaster risk management, which primarily focuses on preventive and preparatory measures. While these terms have become established internationally, the terms risk and crisis management are more commonly used in Germany (see Glossary).
In this Resilience Strategy, "disaster risk management" is used as a central term in its broadest sense.

1. Roles and responsibilities

For Germany, implementation of the Sendai Framework based on this Resilience Strategy includes both the national level and cooperation with other countries. **For the national implementation of the Sendai Framework, roles and responsibilities for disaster risk management tasks are defined by law and organised in a federal system.** The implementation of the Sendai Framework is also linked to many policy areas. In Germany, these areas are based in different departments.

At the international level, Germany contributes to the implementation of the Sendai Framework through the federal ministries responsible for areas such as development cooperation, humanitarian assistance, the European/International Climate Initiatives, the EU Civil Protection Mechanism (Union Mechanism) and NATO. In addition, Germany is working internationally to strengthen integrated disaster risk management. For example, it supports international **stakeholders from public administration, politics, civil society, academia and the private sector** that cooperate with the **EU** and the **UN.**

2. Strategic links

In Germany, there are already numerous topic-specific and cross-topic strategies at various levels that address aspects of a resilience approach or disaster risk management. These strategies are coordinated under the auspices of different ministries according to sectoral or hazard-specific responsibilities. An overarching framework will be provided by the planned National Security Strategy as the German government's basic security policy document, which will be based on a comprehensive security concept.

Strategies focusing on civil protection and security preparedness, such as the National Strategy for Critical Infrastructure Protection of 2009 under the lead responsibility of the Federal Ministry of the Interior and Community (BMI) or the Cyber Security Strategy (BMI 2021), address risk and crisis management as both a cross-sectoral and a sectoral task.

In addition, established bodies in specific sectors also deal with aspects and strategies of risk and crisis management. In agriculture, for example, this is the case within the framework of the Conference of Chief Officers and Ministers of Agriculture, as a part of the Agenda for Adaptation of Agriculture, Forestry, Fisheries and Aquaculture (Bundesministerium für Ernährung und Landwirtschaft 2018, 2019). In the area of research and innovation, the topic of civil security is addressed in the German government's High-Tech Strategy 2025 and implemented with the German government's "Research for Civil Security 2018–2023" strategy.

Moreover, the issue of resilience is centrally addressed in cross-sectoral strategies. In the German Sustainable Development Strategy – Update 2021, resilience is ranked as an important element of the guiding principle of sustainable development. Another example is the 2008 DAS.

Example of strengthening resilience in the German Strategy for Adaptation to Climate Change

The German government presented the DAS in 2008 under the leadership of the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV) and has continuously developed it since then. It provides the Federal Government's strategic framework for climate adaptation policy. The aim is to reduce the vulnerability of Germany's society, economy and environment and to increase the country's adaptability to climate change. In 15 central fields of action, the essential requirements for action are specified, and (within the responsibilities of individual ministries) the concrete steps and measures of the Federal Government are described.

The DAS is established as a permanent task. It relies on an interagency network of 28 federal agencies and has a continuous reporting system. For example, to increase resilience to extreme weather events, the Federal Office of Civil Protection and Disaster Assistance (BBK), the Federal Agency for Technical Relief (THW), the DWD, the Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR) and the Federal Environment Agency have been working together since 2007 in the Strategic Governmental Agencies Alliance on Adaptation to Climate Change. Research questions in the DAS are addressed in many ways by the Federal Ministry of Education and Research (BMBF), e.g. in the funding priority for Urban Climate in Transition and Climate Resilience through Action in Cities and Regions.

The resilience approach is also reflected in international cooperation strategies, such as the German government's guidelines on "Preventing Crises, Resolving Conflicts, Building Peace" (German Federal Government 2017), the New Leipzig Charter as a policy document on integrated, resilient urban development in the EU (Bundesministerium für Wohnen, Stadtentwicklung und Bauwesen 2020a) and the Partnership on Cultural Heritage in the Urban Agenda for the EU, which is developing recommendations for action on integrating risk management and heritage management, among other things (Bundesministerium für Wohnen, Stadtentwicklung und Bauwesen 2020b).

The Resilience Strategy presented here is intended to be a unifying, connecting and complementary element for these existing strategies and plans. The goal is to promote the coherent implementation of existing measures in the sense of a multi-hazard approach (Fig. 5).

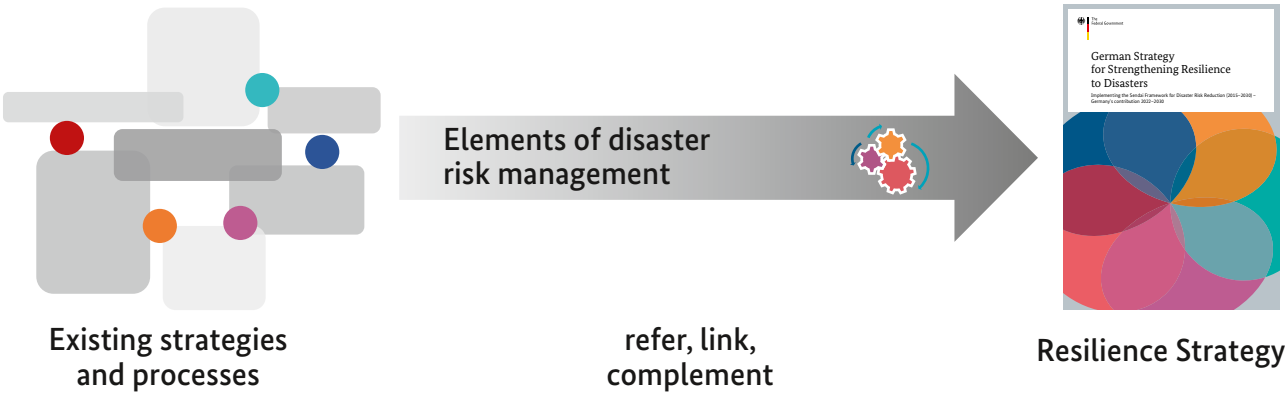

Figure 5: Connection points of the Resilience Strategy.

3. Structural connecting factors

A large number of institutions, committees, networks and working groups already exist that deal with disaster risk management and increasing resilience. While they all have different focuses, there are nevertheless overlaps and common interests regarding selected topics. The implementation of the Sendai Framework is therefore intended to build on these existing institutional structures and complement them with regard to necessary aspects of disaster risk management. To this end, an **interministerial working group** (IMAG Sendai) was established at the federal level in 2016, with the participation of various ministries and their subordinate authorities and organisations.

In November 2017, **the National Focal Point for the Sendai Framework** (NKS) was also established at the BBK to coordinate and provide technical support for the implementation of the Sendai Framework. It is the primary contact in Germany for matters relating to the Sendai Framework.

In Germany, the ***Fachtagung Katastrophenvorsorge*, a disaster risk reduction conference,** is held every year. It is funded by the German Foreign Office (AA) and organised and coordinated by the German Red Cross (DRK). This event has established itself as a platform for dialogue about practical needs and experiences between disaster risk management stakeholders from different sectors.

The IMAG Sendai, NKS and *Fachtagung Katastrophenvorsorge* form the core of the National Platform for the Sendai Framework in Germany. This platform must be successively expanded.

4. Development of the Resilience Strategy

The Resilience Strategy was developed through a multi-year consultation process with all departments and agencies at the federal level, led by the IMAG Sendai and supported by the NKS. Contributions from the professional public were gathered during the *Fachtagung Katastrophenvorsorge*. Other exchange formats were used to inform other stakeholders about the process and discuss Resilience Strategy topics. In addition, the Resilience Strategy is based on research on existing strategies and structures that was compiled in 2018 as part of a report prepared by the Federal Republic of Germany. This report assesses Germany's risk management capabilities in accordance with the Union Mechanism.

Part B: German Strategy for Strengthening Resilience to Disasters

The Sendai Framework provides both a strategic vision and a practical guide for implementing comprehensive disaster risk management. The Resilience Strategy is intended to flesh out the meaning of the Sendai Framework for the national context and identify synergies with other national strategies. Given the opportunities and challenges of today, as well as the institutional baseline, the Resilience Strategy lists specific recommendations for action, subject to available budgetary resources, as well as possible implementation mechanisms. In this context, Action areas 1, 2 and 4 deal primarily with disaster risk management measures that have a cross-sectoral character, while Action area 3 formulates sector or hazard-specific measures to increase resilience or, in many cases, refers to measures that have already been identified.

I. Goals, target groups and guidelines

Disaster risks have become more complex due to ever-increasing interactions and interdependencies – on the one hand, between hazards, on the other hand, between sectors and stakeholders, and between local and global levels. With improved sharing of information and knowledge across stakeholders and sectors, potential conflicts between protection goals can be prevented, and cascading effects between different sectors can be better addressed. **A systemic basis for action is required to identify such disaster risks and initiate appropriate precautionary measures.** It would also provide the foundation for effective disaster response and recovery.

This strategy is intended to help strengthen the resilience of society in Germany vis-à-vis disasters. The focus is on protecting people and their livelihoods and strengthening the community's resilience and adaptability to disasters. It also shows how Germany can contribute to the global implementation of the Sendai Framework through development cooperation and humanitarian assistance.

Our goals by 2030

1. **Integration:** Existing structures and systems are supplemented or linked by new or improved disaster risk management measures. The resilience and reliability of these structures and systems are thus significantly improved.

2. **Cooperation:** State and non-state stakeholders work more closely together in the area of disaster risk management.

3. **Coordination:** Information, insights and findings in the area of disaster risk management are increasingly disseminated and interlinked.

These goals can only be achieved through the joint efforts of a wide range of institutions and stakeholders. The Resilience Strategy therefore addresses all state and non-state stakeholders that are involved in the management of disaster risks or crises and are responsible for, e.g. utilities and the protection of people, their livelihoods and the environment (Fig. 6). These stakeholders come from politics, public administration and departments of the Federal Government as well as the Länder and municipalities, civil society (e.g. aid organisations), academia, the private sector and the media. Thus, the Resilience Strategy addresses different sectors and disciplines (health, economy, science, education, environment, water and sanitation, agriculture, food industry, transport, telecommunications, security, etc.) as well as all operating levels (local, regional, national and international).

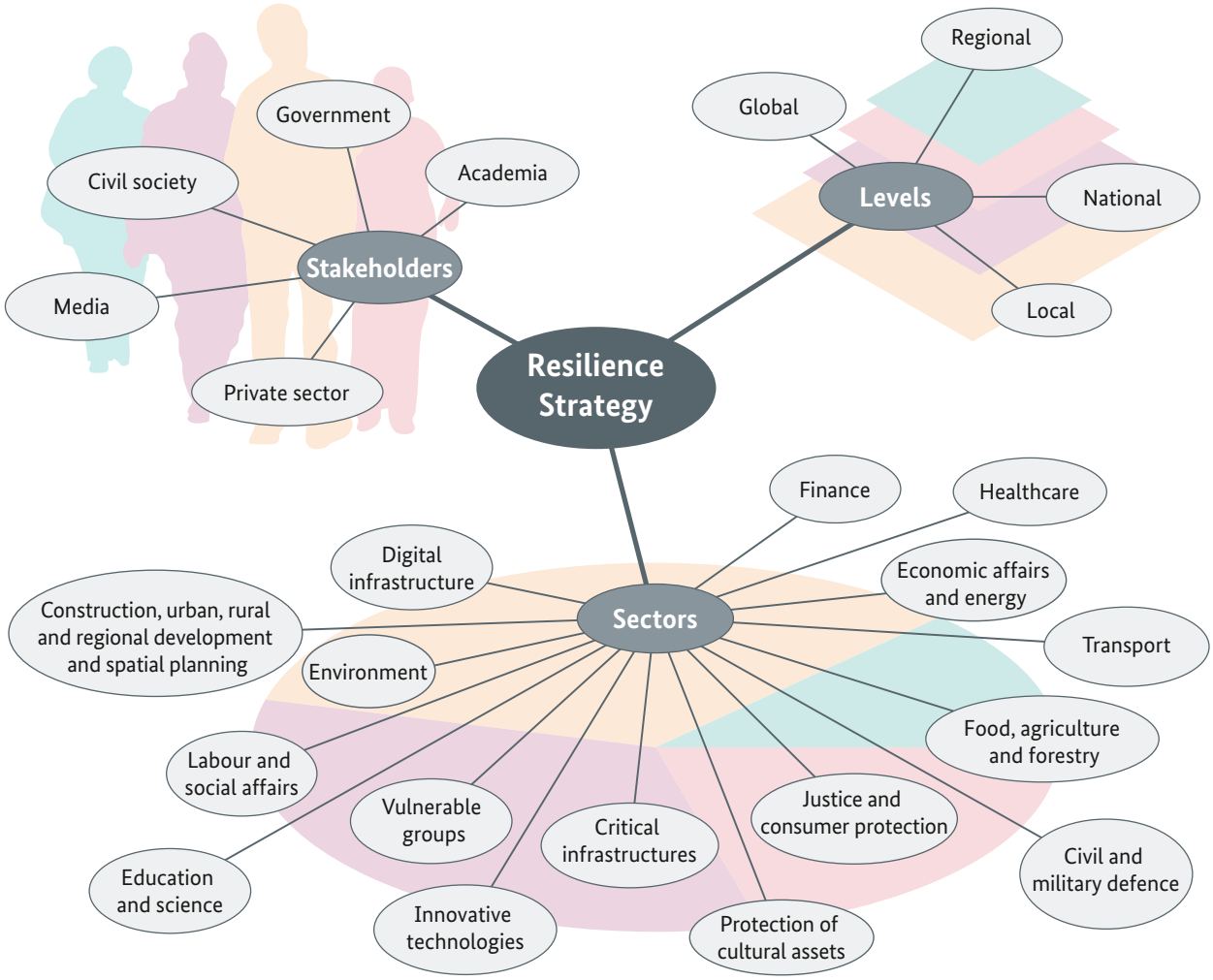

Figure 6: Resilience Strategy target groups: stakeholders, levels and examples of sectors.

The Resilience Strategy comprises a set of overarching **guidelines** that provide the basic framework for implementing measures in the respective Action areas.

Guidelines

1. The focus is on protecting people and their livelihoods.

2. In line with the "leave no one behind" principle of the 2030 Agenda for Sustainable Development, the Resilience Strategy takes a society-as-a-whole and inclusive perspective. It enables the needs of all population groups to be taken into account, including the elderly, children and young people, people regardless of their gender or sexual orientation, people living in poverty, people with disabilities, refugees and people with migration histories. The same applies in spatial terms, especially for people living in small towns or in sparsely populated regions. In this context, respect for human rights and gender equality (SDG 5) and the reduction of inequalities (SDG 10) are key concerns.

3. All stakeholders are responsible for implementation within the scope of their competencies and capacities. Everyone can contribute to strengthening disaster risk management.

4. A multi-hazard approach is taken, i.e. small-scale and large-scale, frequent and infrequent, sudden and gradual disasters, and their associated environmental, technological and health risks, are considered. Disasters triggered by both natural and human-induced hazards are addressed.

5. Existing processes, capacities and principles are used as a basis and expanded.

6. Synergies are created between ongoing efforts and coherent processes are ensured. Particular care must be taken to ensure that measures are sustainable.

7. The implementation of the Resilience Strategy is accompanied by a continuous learning process.

Underlying the Resilience Strategy approach is the concept of comprehensive disaster risk management. This includes maintaining the continuity of important state and government functions. It considers all phases of risk and crisis management, including the interrelationships of prevention, preparedness, response and recovery. Consequently, in the future findings from individual phases will increasingly be incorporated into other phases.
In order to be able to identify risks in good time, it is necessary, in the context of the multi-hazard approach, to think about the outcome – i.e. all possible effects of disasters – when planning and implementing measures. To achieve this, it is essential to further interconnect the different areas of practice Figure. 7 depicts such a holistic approach to disaster risk management. The graphic overview shows the Action areas, processes and overarching goal of the Resilience Strategy (from external to internal).

Figure 7: Action areas, processes and goal (from external to internal).

II. Action areas and recommendations for measures

The following four Action areas are aligned with the Sendai Framework's priorities for action. The international contribution to the implementation of the Sendai Framework is clarified in an additional Action area. Within the Action areas, measures are identified that are of particular relevance for the implementation of the framework in Germany by 2030. The arrow bullet points list recommendations that flesh out the implementation of these measures. They can be continuously adapted over the years to meet requirements for action.

Since strengthening resilience to disasters is a challenge for society as a whole, many measures can only achieve their full effectiveness through cooperation with many other stakeholders. The Resilience Strategy therefore includes recommendations for areas that are also relevant to other stakeholders and levels but cannot have a binding character within the framework of this federal strategy.

1. Understanding disaster risk

In order to be able to assess disaster risks, it is essential to ensure knowledge and understanding of possible effects and interactions of hazards among all stakeholders. This also requires the development and use of methods that can be used to collect, visualise, and analyse information and data. At the same time, risk communication must raise awareness of risks among the general public and among all those responsible, e.g. in supply facilities and in public administration.

1.1. Enhancing and using risk analyses

Risk analyses are a key component of disaster risk management. They provide the necessary information to make appropriate decisions on how to deal with risks. Since 2009, risk analysis has been enshrined in law in the Civil Defence and Disaster Assistance Act (ZSKG). At the federal level, risk analyses in civil protection have been carried out for various hazards since 2012. In order to be able to record and analyse risks in Germany even more systematically and to promote these risk analyses as a basis for sustainable development, the following measures are recommended:

- Establishing **regular polling** of the most current hazard analyses related to natural hazards (e.g. storms, hail, heavy rain, flash floods, floods) for risk analyses based on the most current knowledge;
- Promoting the **implementation of risk analyses** and risk assessments at all levels and across all sectors, and establishing the preparation of risk maps as a **permanent task**;
- Building **mechanisms** to link findings of sector-specific risk analyses and **evaluate results**;
- Providing concrete recommendations for action based on risk analyses for **risk-informed planning and political decision-making processes** (see sector-specific areas of application in Action area 3);
- Compiling results from risk analyses into **practical information** for different user needs;
- Developing more **damage categories and hazard definitions** across levels;
- Promoting the formulation and establishment of **conservation goals**;
- Taking better account of the interdependencies between sectors and possible **cascading effects** in the context of risk analyses and using strategic foresight methods as a basis;

- Paying more attention to the **cross-border effects** of hazards in risk analyses, especially regarding supply disruptions and interdependencies between sectors;

- Considering the **needs of different stakeholders** and socio-political structures in the risk analysis and mapping them in order to be able to respond in an emergency in a needs-oriented and group-specific manner;

- Presenting the dynamics and interactions of different disaster risks as well as climate change as a **risk amplifier** in risk analyses qualitatively, in particular by applying methods of strategic foresight, and – where possible – quantitatively, if necessary with the help of model calculations based on national accounts and structural data, and also considering non-monetarily ascertainable losses;

- Using **methods, results and (technology) impact assessment of strategic foresight** (including *horizon scanning, scenario analysis, road mapping, wild cards*) to analyse risks, including in a medium to long-term perspective, and to better capture systemic interactions;

- Creating opportunities to **use software-based adaptations of existing methods,** for example, to evaluate existing reporting or to carry out individual evaluations on a quantitative and empirical basis;

- Creating **technical solutions** to communicate the results of risk analysis in a timely manner, both to stakeholders and to the public.

1.2. Identifying newly emerging risks at an early stage

The causes for the emergence of risks sometimes develop over long periods of time, or the severity of their consequences only becomes apparent when their interactions are considered. The earlier preventive measures can be taken, the more effective they will be. In terms of improving disaster risk management, this means recognising potentially dangerous developments and trends as early as possible in order to be able to identify potential damage and initiate appropriate adjustments to precautionary measures (considering measures starting at the end). To be able to ensure this, the following measures are recommended:

- Conducting regular **strategic foresight and trend analysis processes** that holistically capture and assess potential catastrophic risk developments;

- Conducting **stakeholder analyses** to capture and engage individuals with decision-making responsibility from different sectors and levels and incorporate their expertise into trend studies;

- Incorporating **findings** from strategic foresight processes and trend analyses into disaster risk management **approaches** at all levels at an early stage;

- Conducting an **analysis of international best practices** in *emerging risks forecasting* in order to learn from other countries (including the US, UK and Finland).

1.3. Improving the data situation

Better data on exposure and vulnerability to hazards and on the impact of extreme incidents and disasters, including extreme weather events, is the basis for targeted planning. Improved data use plays a critical role in both crisis management and preparedness.

Data is often collected automatically or accumulates gradually in IT systems. The use of *data mining* techniques makes it possible to extract the information content from large, complex data sets in an exploratory manner. *Business intelligence software* is used to identify patterns or statistical dependencies and make them useful for disaster risk management.

The Federal Government's data strategy aims to significantly increase innovative and responsible data provision and use.

Large amounts of data can be analysed in a targeted manner to make the information contained in the data useful for risk analysis (see Measure 1.1.) Valid damage and loss data, such as data on economic damage or critical service outages, can also assist local and national stakeholders in many ways. It helps to identify and prioritise prevention measures to reduce harm and track their effectiveness. In addition, it can be used to provide information on the possible effects of hazards in early warning (see Measure 4.1). It is suitable, for example, as a basis for justifying demand planning – both in terms of personnel and infrastructural equipment.

In Germany, for example, official agencies currently collect and analyse damage data and event data in an only partially standardised manner. Projects such as the DWD's KRONER database help to ensure that information on extreme weather events and their damage in Europe is documented using internationally standardised identifiers, known as universally unique identifiers. Other examples of connecting points for systematically collecting damage and loss data across agencies include data from the Federal Statistical Office, the Federal Office for Building and Regional Planning, the Federal Network Agency for Electricity, Gas, Telecommunications, Post and Railway, the Robert Koch Institute (RKI), the Federal Agency for Cartography and Geodesy (BKG) and DAS monitoring, to name a few. The BKG plays a central role in the federal administration for the provision of geo-information. It procures commercial, very high-resolution data for the Federal Government, operates data centres for satellite navigation and is responsible in an international network for the derivation of Earth rotation parameters and the determination of the Earth's gravitational field.

The development and exchange of uniform data sets between the federal and Länder-level governments as well as with and among non-governmental stakeholders, especially academia, should be further pursued. It is also important to effectively involve municipalities in the decision-making and implementation processes. In order to be able to create a comprehensive information basis for future disaster risk management, the following measures are recommended:

- Capturing the **need for damage information** across sectors and at all administrative levels and harmonising such data collection on this basis;
- Developing a national, officially validated **damage information database** based on a consistent method of collecting and collating data that makes it possible to plan on the basis of empirical information and to use the database for national reporting;
- Increasing **data collection** across different measurement networks (e.g. through the use of remote sensing technologies such as those of the Copernicus Earth observation programme or the GALILEO satellite navigation system), which provide the basis for positioning on Earth to evaluate damage and identify best practices with the goal of incorporating new data sources into government disaster risk management processes and supporting the development of government disaster loss databases;
- Promoting **new, systematic data collection** to better assess the status of risk situations resulting from dynamically evolving **disaster events of longer duration** (e.g. pandemic situations);

- Improving the **level of knowledge** regarding the Description of selected conservation targets (e.g. sites and land uses), hazard intensities, probabilities of occurrence and sensitivity thresholds of individual hazard types (e.g. heat, water shortages, low tide and geogenic hazards);

- Promoting further **research and development activities** in order to be able to create better evaluation options for larger data volumes (e.g. based on artificial intelligence) and integrate them into risk research (see sector-specific application areas in Action area 3);

- Processing the **results of science and research** in a more targeted manner **for practical application** and making them available so that they can be directly incorporated into the risk and crisis management of stakeholders (e.g. in disaster management, urban, regional and spatial planning and development, as well as rural development or humanitarian assistance) (see sector-specific areas of application in Action areas 3 and 5);

- Promoting opportunities to make already-collected data from different stakeholders **publicly available**, e.g. through digital sharing platforms for damage and loss data, severe weather events, etc.;

- **Preparing** relevant **data** such as weather data or population data from the census in a small-scale, geo-referenced manner (e.g. using visualisations) in such a way that a wide range of stakeholders from the private sector and society can use it more easily for disaster risk management;

- Promoting the **involvement of and exchange with international institutions** (e.g. European Health Emergency Preparedness and Response Authority, the Risk Data Hub of the EU Disaster Risk Management Knowledge Centre, the Global Hub for Pandemic and Epidemic Intelligence of the World Health Organization (WHO).

1.4. Raising awareness of self-provision among the population

A key factor in the resilience of a society is the ability of the population to take self-protective measures. Lack of knowledge and inadequate information about risks reduce people's motivation and sense of responsibility for their own precautions and self-protection. Ministries, authorities, (aid) organisations and other institutions therefore provide a wide range of information services for the population.

However, in view of the constantly changing risk landscape and the increasingly complex interrelationships and interactions, these information services and communication resources must be regularly updated. The following measures are recommended:

- Preparing and updating existing and new **information materials** on disaster risks, self-protection and prevention measures regularly for the population in a practical, contemporary and, where applicable, fun way;

- Taking even better account of the different **needs and situations of various population groups** (e.g. children, young people, older people, people with disabilities, marginalised groups), the multiculturalism and multilingualism of society and the specific circumstances of densely and sparsely populated areas (see Measure 3.13), i.e. pay attention to the accessibility of information (German Sign Language, two-senses principle, Easy read language) so that, for example, people with disabilities or with little knowledge of German are not excluded;

- Publicising **information and contact points** to ensure consistent risk communication and raise awareness of known and emerging risks;

- Developing approaches for **hazard-specific risk communication with** the involvement of media institutions;

- Using **digital media** and innovative IT systems (e.g. *augmented reality platforms*) increasingly for risk communication with the population (especially for target group-specific risk communication with younger population groups);

- Improving the **information offered** to citizens **regarding natural hazards**, e.g. using a suitable online platform;

- Engaging with increasing issues of disaster risk management and resilience within the **public discourse.**

1.5. Including disaster risk management issues in education and training

The German higher education landscape offers a wide range of courses related to disaster risk management and thus makes a valuable contribution to a better understanding of how to deal with disaster risks. However, there is an increased need to embed disaster risk management and self-protection content in all areas of education – from daycare centres to adult education and continuing education for professionals (see sector-specific areas of application in Action area 3). The following measures are recommended for this purpose:

- Integrating preparedness and self-protection measures into existing **programmes and exercises** regarding proper behaviour in emergency situations for different age groups and adapt to the local context.

- Developing approaches for **population protection education** for teachers of different types of schools and professionals in early childhood education;

- Expanding **professional development offerings**, particularly to include topics related to cross-sector disaster risk management.

2. Strengthening disaster risk governance to manage disaster risk

The effects of disasters affect a wide variety of (policy) areas such as health, internal and external security, infrastructure, environment, finance, mobility, agriculture, (early childhood) education and culture. In order to effectively manage disaster risks in the sense of risk governance, disaster risk management instruments must be anchored in different sectors. To this end, risk-informed planning, e.g. in financial budgeting, urban and regional planning, land use, health, conservation and management of natural resources and transportation and infrastructure (including communications and IT), should be further pursued.

The following recommendations can strengthen existing institutional mechanisms and promote coherent disaster risk management across different policy and thematic areas.

2.1. Anchoring disaster risk management as a cross-functional task

The clear division of responsibilities between the Federal Government and the Länder, as stipulated in the German Basic Law (Constitution), and the departmental principle form the basis for the establishment or expansion of robust disaster risk management systems that are specifically geared to local conditions. This creates a meaningful diversity, but also increases the effort of coordination in terms of effective control. This is because the interfaces between the administrative levels and the different sectors or task and policy areas must be worked out and addressed. To create the institutional conditions for this, the following measures are recommended:

- Examining in all relevant sectors (such as the economy, education, the environment, security and defence, agriculture, energy, telecommunications, transport and water/wastewater) and at all levels (such as cities, municipalities, counties, states and the Federal Government) which elements of disaster risk management are available in **legal and planning instruments** and developing them further, e.g. within the framework of existing and more recent precautionary and safeguarding legislation (see sector-specific recommendations in Action area 3);

- Promoting **risk-informed planning and action** in all sectors to make measures more resilient (see sector-specific areas of application in Action area 3);

- Further strengthening **interconnections and synergies of** sectoral approaches to risk management by implementing integrated approaches and involving different stakeholders;

- Providing sufficient **material, financial and human resources** to drive forward aspects of risk and crisis management as a cross-cutting task and securing them in the long term (see sector-specific recommendations in Action area 3);

- Promoting **cross-national measures** for prevention in the context of disaster risk reduction or (crisis) resilience plans.

2.2. Bolstering risk management skills and coordination mechanisms

In order to be able to interconnect stakeholders, knowledge and experience for improved integrated risk and crisis management and to improve the interaction of different sectors and administrative levels, the following measures are recommended:

- Anchoring risk management as a **management task**;
- Capturing **existing institutional** risk management **structures** and initiatives at all levels and in all sectors;
- Strengthening **competencies** of individuals with decision-making responsibility in key institutional functions;
- Enhancing **capabilities for strategic foresight** and early crisis detection across departments;
- Investing in an **improved digital infrastructure within the participating civil protection authorities and organisations** to support cooperation between participating authorities and organisations in risk and crisis management;
- Establishing **coordinating roles** within institutions or departments;
- Designating or establishing an **overarching coordinating body** to manage cross-sector processes;
- Intensifying **cooperation between different departments** at the federal and Länder levels in view of security of supply and the availability of critical services (see Measure 3.16);
- Promoting the **networking of expert contacts** for risk and crisis management in all ministries and subordinate business area authorities as well as in existing committees and working groups in order to identify common needs and coordinate cross-sectoral actions (see Measure 4.7);
- Thinking about the **indirect impact on public administration** from the loss of personnel who may themselves be affected by a disaster.

2.3. Expending and leveraging coherence with other cross-sectoral policy areas

Aspects of disaster risk management are already embedded in other policy areas that require cross-stakeholder, cross-sector and cross-level collaboration. Examples include the DAS and the accompanying cross-sectoral implementation process, the German Sustainability Strategy and the National Strategy on Biological Diversity. In Germany, however, interconnections in strategic planning and coordination for the implementation of global agendas (e.g. the Sendai Framework, the 2030 Agenda, the Paris Agreement, the Convention on Biological Diversity and the New Urban Agenda) have only been explicitly addressed and established in isolated instances.

To better interconnect disaster risk management with other federal approaches in the future, the following actions are recommended:

- Identifying cross-sectoral policy areas and topics related to disaster risk management, assessing the **need for** information and intelligence **sharing** and promoting such sharing;
- Promoting resilience more strongly as a **building block for sustainable development**, for example, in the context of updating the German Sustainability Strategy;
- Considering the resilience concept in the further development of the National Strategy on **Biological Diversity**;
- Exploiting **synergies between national and international programmes**, e.g. by harmonising and duplicating progress measurements and reporting requirements (see also Part C. III);

- Utilising findings and progress from the implementation of the Sendai Framework and DAS in their respective processes, both through **regular exchanges** in the IMAG Sendai and the Interministerial Working Group on Climate Change Adaptation and within the institutions involved.

2.4. Stepping up cooperation between state and non-state stakeholders

The goals of the Resilience Strategy can only be achieved and provide real added value for the protection of the population in Germany if non-state stakeholders are also involved in the implementation process.

To achieve this, it is necessary to bring together interdisciplinary approaches and knowledge from all sectors and to consider the interests and needs of all stakeholders (government, civil society, academia, media and the private sector).

The starting point and institutional core for the implementation of the Sendai Framework in Germany is the IMAG Sendai. Its goal is, among other things, to promote the interagency implementation of the Sendai Framework. The National Platform is an expanded cooperation platform that will also serve non-state stakeholders for exchange in the future. Established networks of the German government, such as the UP KRITIS or the expert network of the Federal Ministry for Digital and Transport (BMDV) and their research results represent initial starting points for this. In this way, the National Platform can help promote disaster risk management as a society-wide task, share more knowledge, initiate further activities, advise relevant institutions, raise awareness of the need for cooperation and document national progress and best practices. To be able to achieve this, the following measures are recommended:

- Establishing a **National Platform** that promotes cooperation and exchange among a wide variety of disaster risk management networks and institutions, especially with aid organisations and critical infrastructure operators (e.g. health, energy, telecommunications, water, transportation);
- Establishing the *Fachtagung Katastrophenvorsorge* as an annual meeting place of the National Platform, where stakeholders can network and share expertise;
- Promoting **local and interdisciplinary networking forums**, such as roundtable meetings, for institutionalised exchange on various disaster risk management issues at all levels of government and involving non-state stakeholders;
- Developing **binding standards** for systematised and cross-sectoral **cooperation** between different stakeholders in disaster risk management with the help of regulations issued by standard-setting bodies and professional associations (see sector-specific areas of application in Action area 3).

2.5. Increasing cooperation in the area of disaster risk management in and with the EU and NATO

The cooperation of the Federal Government with the EU member states and other participating states in the field of civil protection takes place mainly through the Union Mechanism and is coordinated by the Emergency Response Coordination Centre (ERCC) (Decision No. 1313/2013/EU). In accordance with the applicable principle of subsidiarity in this policy area, the EU's competencies are limited to promoting, supplementing and coordinating the assistance provided by the member states under the mechanism (Article 196(1) of the Treaty on the Functioning of the EU).

Active participation in the Union process, both in implementation and in the work of the bodies involved in the implementation and further development of the decision, is an important concern for Germany and a strong sign of international solidarity. Germany's commitment should therefore be further expanded in the future. This includes the deployment **of German experts, resources and, above all, coping capacities, as well as their further expansion**, e.g. within the framework of the European Civil Protection Pool and the rescEU deployment reserve. German involvement in the Union mechanism also includes **participation in joint prevention and preparedness activities.** Particular attention should be paid to the **development and expansion of the EU knowledge network** as a central building block for the sustainable collection, processing and provision of knowledge gained.

Germany should also work with the European Commission to create **synergies with other international processes**, such as the Sendai Framework for Disaster Risk Reduction, e.g. in the context of the Union's disaster resilience goals to be developed under the Union Mechanism.

However, the EU is also becoming increasingly competent and important in regulating other aspects of resilience. The work and processes of European institutions and coordination among EU member states represent a separate level of policymaking in this regard, including in the areas of **climate change adaptation, cybersecurity, research, critical infrastructure resilience and resilience in the context of security policy.**

It is, therefore, extremely important for Germany to actively support and help shape the developments initiated at the European level (see sector-specific areas of application in Action area 3). This also includes the exchange of information on progress and new findings on the relevant topics. Through the Euro-Atlantic Disaster Response Coordination Centre (EADRCC), NATO also provides a coordination platform for assistance in disaster situations.

3. Investing in disaster risk reduction for resilience

Investment is essential to strengthen disaster risk management. To achieve this, it is necessary to increasingly include risk aspects in investment decisions for structural and non-structural measures as well as other financial and investment measures. In this way, damage resulting from disasters can be substantially reduced and financial expenditures can be made sustainable. Various programmes and approaches exist at the EU, federal, state and municipal levels that directly and indirectly promote disaster risk management measures.

The basis for the support measures comprises special ordinances and guidelines. They create the necessary legal frameworks both for the prevention and reduction of risks and for the rapid and effective management of disasters.

However, disaster risk reduction is not systematically integrated as an integral part of structural investment and financing measures and the promotion of sustainable development.

3.1. Finance

The financial sector is central to a society's resilience in several ways. It provides critical services needed to ensure the basic needs of the population, even in the event of a crisis. The circulars issued by the German Federal Financial Supervisory Authority define the minimum requirements for the credit and financial services industry and cover both financial and operational risks, i.e. the risks of losses caused by the inadequacy or failure of internal procedures, people, systems or external events, including legal risks. The financial sector itself can, therefore, also be a cause of crises. In addition, the consequences of disasters put a strain on financial markets and liquidity, as well as on the financial budgets of the federal, state and local governments. However, the instruments of fiscal policy and financial markets can also create important incentives to reduce risk and are essential for the rapid resolution of crises. The following measures take up instruments already established in Germany and are to be understood as recommendations for a sharper focus with regard to promoting resilience to disasters and crises:

- Assessing disaster risks by the responsible ministries and ensuring adequate funding through appropriate prioritisation or reallocation of available **budget resources** – both for civil protection and for sector-specific risk and crisis management in the relevant individual plans (see Measure 2.1);
- Incentivising public and private investment in disaster risk reduction and resilience, including post-crisis recovery, with federally funded **financing instruments;**
- Examining new **risk transfer** options, for example, by further monitoring and evaluating the potential and risks of alternative risk transfer instruments for the German market;
- Providing **assistance to affected workers** to prevent job and income losses (e.g. short-time allowance, sick pay and income tax deferrals) (see Measure 3.9);
- **Reducing the risks of a financial crisis** by regulating capital flows more closely with the pure aim of short-term speculative gains and without hedging risks and by systematically and independently reviewing lessons learned from past financial crises in order to derive recommendations for action;
- Giving greater consideration to recommendations from the **Organisation for Economic Co-operation and Development** on disaster risk financing strategies where appropriate.

3.2. Healthcare

Healthcare risk management, including healthcare population protection, encompasses the prevention, protection, control and response of the healthcare system with respect to diverse hazard situations. These include mass-casualty or illness incidents, war-related health hazards, hazardous CBRN material releases, epidemics or pandemics triggered by dangerous pathogens, food safety disruptions, environmental and natural hazards, including extreme weather events, and critical infrastructure failures.

Germany has one of the world's most efficient healthcare systems, which is also ranked in the top group in an international comparison with regard to preparation for major emergencies. The aim is to maintain the resilience of the German healthcare system, bring about targeted improvements and adapt the system to future challenges. To achieve this, disaster risk management issues must be more fully integrated into public health planning, medical education and health education. To ensure this, the following measures are recommended:

- Identifying and addressing any need for action on resilience regarding disasters once the Joint External Evaluation (JEE) results are available, as Germany has transposed the **International Health Regulations** (WHO 2015) into national law and undergone an evaluation by WHO in November 2019;
- **Evaluating** foreseeable **challenges for the healthcare system** from an economic and quality-improvement point of view, such as demographic change, the consequences of climate change for the morbidity of vulnerable groups of people and the increasing proportion of people with low German language skills and their integration into the German health care system;
- Expanding environment-based scientific **expert networks** on health hazards;
- Strengthening **research on pandemic risks** and preparing existing research and development structures for rapid response to new pathogens or establishing adequate new structures to support the development of vaccines, therapeutics and diagnostics, as well as epidemiology and outbreak modelling;
- Developing **pandemic plans** more practically at all levels, tailoring them more specifically to the tasks and requirements of different stakeholders and paying particular attention to ensuring power supply and the mobility of helpers;
- Examining the **health impacts of climate change** and **biodiversity loss** from other environmental factors more closely;
- Continuing to expand the **One Health approach** to further promote interdisciplinary collaboration (especially between human medicine, veterinary medicine and environmental sciences);
- In line with the One Health approach, further developing measures to **prevent the development of antimicrobial resistance** and to contain neglected and poverty-associated **tropical diseases;**
- Deepening multidisciplinary collaboration in **food safety** in line with the One Health approach;
- Strengthening and expanding **hospital alarm and emergency planning**, which is the responsibility of the Länder, in preparation for major emergencies in Germany and, if possible, making it more uniform, integrating it into the certification process for hospitals and evaluating it through exercises;
- Implementing **heat action plans** in municipalities, hospitals, nursing facilities and rehabilitation facilities;

- Preventing the **spread of emerging diseases** by investing in resources for adequate laboratory capacity and drug stockpiles, as well as decentralised stockpiling of medical supplies, protective materials and equipment;
- Establishing and funding the **National Health Protection Reserve** to be able to act more quickly in the face of future pandemics;
- Including people with life-threatening and chronic conditions in the design of policies and plans to address risks resulting from their **special needs;**
- Further developing **risk management** holistically across all parts or sectors of the healthcare system (including outpatient/inpatient dovetailing), and also extending it to the **(geriatric) care sector and rehabilitation** and integrating it into existing structures, since there is a high risk potential for vulnerable groups of people here but not yet any disaster risk reduction plans;
- Taking crisis and disaster prevention measures into account in the calculation of **staffing ratios** in the healthcare and social care sector, in particular as part of the development processes for the staffing assessment tools pursuant to Section 113 (c) of the German Social Code XI;
- Strengthening the crisis resilience of the **medical and nursing infrastructure** through an interdepartmental "crisis-resilient care" working group at the federal level, involving the relevant federal ministries and nursing organisations;
- Giving greater consideration to **blood donation services** such as those of the German Red Cross in crisis preparation and management in order to be able to guarantee a secure and safe supply of blood products to the population even in times of crisis;
- Establishing a **crisis-resistant** healthcare **infrastructure** at the organisational, logistical and construction levels (e.g. contingency plans, supplies, protective equipment, emergency power, flood and heat protection);
- Continuing to advance the **digitalisation** of the healthcare system for crisis management, especially in the case of infectious diseases;
- Promoting a much **more diverse structure** of public health services, including the establishment of environmental medicine consultation centres (e.g. for cases of environmental contamination of water or soil, and air or mould contamination after flood damage);
- Mandating **specially trained personnel** in the nursing profession for practical and coordinating use in crisis and disaster situations and promoting mandatory anchoring of these nursing roles in crisis and disaster plans;
- Strengthening **lay help** through additional competence acquisition in special sub-areas of self-help and neighbourhood help in the sense of resilient basic skills in a social space-oriented approach in order to be able to relieve the healthcare system, which is under great strain in a pandemic situation;
- Using and strengthening the structures of **public welfare** for disaster risk reduction and civil protection;
- Interconnecting **social welfare service** structures with civil protection in the event of a disaster, as voluntary welfare work can contribute to the health and social care of the population in foreseeable crisis weather situations;
- Expanding the **regulation governing the acquisition of the licence to practise medicine** for physicians in the area of emergency and disaster medicine in the relevant curricula;

- Providing regular **training opportunities for emergency** personnel and medical and nursing staff to simulate procedures and approaches to hazardous health situations, including the mandatory implementation of special competencies and authorities for crisis and disaster management in the curricula of vocational and university nursing training and medical studies;

- Increasingly using **virtual training offerings** and computer simulations;

- Providing increased **training opportunities for professionals** on a variety of topics, such as the health impacts of climate change, vaccination prevention and the One Health approach;

- Implementing **training and education in local social space** to prepare the population for the onset of disasters during non-crisis periods (e.g. in kindergartens, schools, workplaces or community colleges and through a course for care support workers);

- Promoting the **training of the (older) population in new technologies** so that digital media can be used to compensate for activities/services relevant to quality of life that are lost due to crises for which health promotion and prevention concepts for all health dimensions (physical, mental and cognitive functions) are needed;

- Improving regular public **health education** on correct infection prevention behaviours through various communication channels and for all age groups;

- Developing a comprehensive catalogue of practical **recommendations for action and best practices** in the healthcare sector for different hazard situations in order to be able to support consistent crisis communication among different stakeholders (see Measure 3.17).

3.3. Economic affairs and energy

A resilient economy is a central component of a resilient society. Disaster risk management in business is important not only to ensure business continuity and livelihoods but also to maintain critical services such as electricity and gas supply or telecommunications. The macroeconomic impact of disasters often follows a complex chain of effects, in many cases with a time lag across countries, and is sometimes reflected in the gross domestic product, inflation rates and trade balances for several years to come. In terms of comprehensive disaster risk management, the following measures are recommended for the business and energy sectors:

- Promoting models of **public–private partnerships** to increasingly pursue shared public good interests and objectives in the public and private sectors in the governance and management of disaster risks, including cross-border partnerships for disaster risk management services, such as under the Smart Connectivity Initiative;

- Leveraging the **skills and expertise** of the **private sector** to be able to develop new technologies, for example, in aerospace;

- Improving the **framework** for risk management (including risk analysis) and corporate security as existing laws and European standards and guidelines are revised and new ones developed;

- Advancing measures to increase the resilience of **supply and production chains** of companies operating in global value systems under the criteria of redundancy, diversity, adaptability and modularity;

- Promoting the **use of digital technologies** to increase the transparency of production processes and supply chains in order to be able to react flexibly to disruptions in value creation networks;

- Developing trusted **information-sharing** networks and facilitating public access to commercially collected data with societal relevance more intensively, for example, through the Geological Data Act;
- Focusing more strongly on the measures within the framework of the **Cyber Security Strategy** for Germany (BMI 2021) and approaching them holistically in order to be able to identify cybersecurity incidents at an early stage, assess them quickly and comprehensively and develop coordinated recommendations for action;
- Continuing the expansion of support services for **more complex threat mitigation**, such as cyberattack defence, especially for small and medium-sized businesses;
- Expanding disaster risk management strategies in the **tourism sector**, especially in regions where there is a strong dependence on tourism as an economic driver;
- Intensifying cooperation between the state and the private sector from the point of view of **security of supply** or critical services while respecting responsibilities in order to be able to support the supply to the population and the smooth functioning of the national and European economy (see Measure 3.16);
- Playing a greater role at the **European level** in order to be able to promote common, harmonised solutions for **electricity and gas supply security**, including with regard to capacity mechanisms and the expansion of transmission capacities;
- Reviewing **strategic reserves** and **strategic production capacities** regularly in order to determine whether they can meet needs (energy, health, food, etc.) in a targeted manner in the event of supply disruptions;
- Developing **model emergency preparedness plans** with respect to power and gas outages or telecommunications service outages;
- Designing support programmes for economic recovery during and after crises, especially to enable the **business continuity of small and medium-sized enterprises (SMEs)**, with an increased focus on sustainable economic growth and social progress according to the principle of "Build Back Better";
- Taking the opportunity to modernise **supply infrastructures** (e.g. in the area of digital infrastructures) in terms of **better recovery** in the event of a loss, and improving them for future resilience.

3.4. Digital infrastructure

Digital infrastructures are the basis for functioning telecommunication services as well as for other digital services. They are thus of crucial importance for the functioning and resilience of who rely on digital infrastructures.

Extreme weather events such as floods, storms or extreme precipitation (heavy rain, extremely heavy snowfall) or space weather events (e.g. solar storms) can lead to outages and the destruction of digital infrastructures. This mainly affects mobile communications and the landline network, but broadcasting may also be affected. Causes can be the failure or destruction of the digital infrastructures themselves (e.g. technical malfunction at or destruction of base stations, radio towers or landline infrastructure) or damage to or destruction of supporting infrastructures (e.g. house roofs, roads) caused by extreme weather events. In extreme cases, particularly longlasting disruptions occur when infrastructure is completely destroyed and has to be dismantled and completely renewed. In such cases, interim solutions are needed to restore at least basic service in the affected areas as quickly as possible, to support the coordination of assistance and to provide continuous information to helpers and those affected.

Longer-term disruptions of telecommunication services in the event of a disaster are often due to the fact that the power supply is affected at the same time and must also be restored. This dependency must be considered accordingly when measures to increase the resilience of digital infrastructures are taken.

In terms of comprehensive disaster risk management, the following measures are recommended for digital infrastructure:

- Focusing more strongly on the measures within the framework of the **Cyber Security Strategy** for Germany (BMI 2021) and approaching them holistically in order to be able to identify cybersecurity incidents at an early stage, assess them quickly and comprehensively and develop coordinated recommendations for action;
- Analysing the **security plans of infrastructure operators**, including updated risk or vulnerability analyses regarding major incidents, in order to be able to increase the resilience those infrastructures, with a particular focus on preventive risk management and measures to protect against natural hazards, which includes discussing the power supply to telecommunications networks and the question of redundant infrastructures;
- Developing **model plans for emergency preparedness** with regard to the failure or destruction of digital infrastructures or disruptions of telecommunication services caused by power outages;
- Developing **contingency plans with possible measures to create transitional solutions** for the rapid restoration of nationwide basic coverage in the event of the complete destruction of digital infrastructures (reconstruction may also be made more difficult by complete destruction of carrier infrastructures);
- Increasing **intensive cooperation, coordination and information sharing** between the various stakeholders, in particular between public authorities and telecommunications companies (TCCs) and between the TCCs themselves, in order to be able to strengthen the resilience of digital infrastructures and the ability to deal with emergency situations quickly and efficiently;
- Promoting good communication and close **interaction between TCCs and power supply operators** to enable better prioritisation of technical interventions in resolving outages, e.g. by providing TCCs with information from distribution network operators about the power supply situation in specific areas in the event of a disaster so that they can identify more quickly where telecommunication services have been disrupted due to power outages;
- Designating **specific contacts** in the local crisis teams for digital infrastructure operators to facilitate cooperation on the ground;

- **Involving telecommunication network operators** closely in the restoration of destroyed traffic routes in order to be able to ensure that the reconstruction of infrastructures and thus their use is as efficient as possible;

- Supporting the possibility of **modernising digital infrastructures** to improve future resilience (e.g. by not replacing copper lines with copper, but by laying fibre-optic cables during reconstruction whenever possible) and allow better reconstruction (especially in the case of completely destroyed infrastructures);

- Expanding highly **secure satellite navigation in the civil sector**, e.g. the publicly regulated GALILEO *Public Regulated Service* (PRS), which provides a highly protected, encrypted navigation system and time signal for government-authorized civil users (e.g. authorities and organisations with security tasks).

3.5. Construction, urban, rural and regional development and land-use planning

The effects of crises and disasters – such as the Covid-19 pandemic or the July 2021 floods in Germany – are most evident at the local level, i.e. in cities and communities, and with regard to social coexistence and public infrastructures. They must also be managed largely by local stakeholders – in cooperation with the Länder and the Federal Government. The resilience of a city or region is characterised by robustness against negative external influences. That includes sufficient safety reserves for crisis situations and the ability of public administration, the public and other relevant groups of stakeholders to deal with extraordinary situations (BBSR 2013). The goal is, therefore, to create resilient and sustainable structures on the ground that can better address challenges across levels and sectors.

The "Memorandum on Urban Resilience – Pathways to a Robust, Adaptive and Sustainable City", adopted in May 2021 as part of the National Urban Development Policy (Federal Ministry for Housing, Urban Development and Building 2020c), goes beyond this, following the UN-Habitat definition of "urban resilience": it is "not only about resilience but also about actively adapting and changing to meet the future challenges" of sustainable urban development – and thus about transformation. The fields of construction, cultural heritage, urban development, rural or regional development, rural development and spatial planning make a significant contribution to strengthening resilience. Germany's federal structures and planning system provide a particularly conducive institutional framework for this. The Federal Government, together with the Länder, is already supporting municipalities in their urban development adaptation needs with urban development funding programmes. One goal is to limit the negative effects of extreme events such as pandemics, natural hazards or heat and drought periods through climate-adapted open space development and adapted structures, thus making a significant contribution to the creation of resilient structures in cities and communities.

Furthermore, the future-oriented precautionary approach to sustainable land use is already firmly anchored in the construction industry and in urban and regional planning. This includes, for example, limiting new land use (target below 30 hectares per day by 2030), among other things to preserve areas close to nature that can buffer geogenic risks, such as heavy rainfall. In addition, the "Resistance to Natural Hazards" fact sheet in the Sustainable Construction Rating System of the Federal Ministry for Housing, Urban Development and Building (BMWSB) must be observed for federal buildings. Damage caused by disasters or crises to private and public buildings or infrastructures, as well as related restrictions on services, can be reduced or avoided by a high standard of planning and execution or implementation of construction methods and by preventive spatial planning. A risk-based approach is proposed for land-use planning: The essential components are the hazard and the exposure and sensitivity of the relevant protected sites.

Risk analysis thus requires a differentiated evaluation of both the hazards and the protected goods sites. Spatially significant hazard maps and risk maps play an important role in this process, as demonstrated by the July 2021 floods. Multi-hazard and multi-risk maps will also become more important in the future when it comes to identifying spatial focus areas of hazard and risk locations (BBSR 2020).

The area of structural civil protection includes structural, technical and organisational measures to mitigate the consequences of natural hazards and human-induced hazards such as sabotage or weapons effects. In the spirit of the multi-hazard approach and civil defence suitability, structural civil protection should be interconnected with appropriate architectural or structural protection measures in construction, as well as with risk-informed spatial and urban planning and village or regional planning. In the sense of social resilience, the potential of civil society must also be increasingly utilised in order to develop preventive knowledge and skills for good strategies and appropriate behaviour in crises and the subsequent transformation processes. The following recommendations in the areas of construction, urban, rural and regional development and spatial planning include construction and planning measures as well as process-oriented measures to prevent or at least reduce exposure to hazards and vulnerability to disasters, increase disaster preparedness in terms of relief and recovery and in this way strengthen resilience:

- Implementing **balanced and common good-oriented urban development** in line with the New Leipzig Charter to increase the resilience of cities and communities as a whole, considering common good orientation, an integrated approach, participation and co-creation, multi-level cooperation and the local context;
- Implementing the **recommendations of the EU Commission** in its communication "A long-term vision for rural areas" with regard to resilience in coordination with the Länder and representatives of municipalities;
- Connecting **risk prevention** for the strengthening of the resilience of urban and rural structures to external crisis events more closely with **integrated** urban development and rural or regional development processes;
- Giving greater consideration to preventive strategies and measures in the **structural and spatial development** of cities and municipalities, such as open and green spaces that are close to residential areas and as close to nature as possible in order to create green and blue infrastructure using nature-based solutions, climate adaptation concepts, multifunctional open space network systems, municipal unsealing strategies, socially inclusive and high-quality public spaces, equal access to social infrastructures, sustainable mobility – especially bicycle and pedestrian traffic – and, mixed-use and vibrant city centres;
- Anchoring the **guiding principle of environmental justice** in the sense of avoiding and reducing the socio-spatial concentration of health-relevant environmental stressors more prominently in planning and interconnecting it to risk prevention approaches;
- Supporting municipalities in the future development of their cities and communities not only with necessary investments but also through (international) **exchange, learning networks, research activities and professional expertise**;
- Continuing to support municipalities in active and strategic use of **digitalisation** in the context of integrated spatial development to strengthen risk management and to work towards interlinking information and coordinating findings and the measures derived from them;
- Consolidating the discourse on urban resilience within the framework of the **National Urban Development Policy** and inter-connecting it to political initiatives at the federal level (e.g. to further develop the funding instruments) in order to strengthen cities and municipalities and better integrate risk management into planning practice;

- **Educating** regional and municipal stakeholders and decision-makers in the context of planning cooperation at all levels **about instruments of risk and crisis management** and testing the development and implementation of corresponding strategic approaches in model projects in order to be able to create new cooperation spaces for risk management;
- Identifying and regularly evaluating **spatially relevant risks** in the interaction of security authorities, politics, specialised planning and spatial planning;
- Working towards resilient spatial structures by adopting a **risk-based approach to spatial planning** that takes greater account of the sensitivity of protected assets by assessing the vulnerabilities of spatial uses and functions;
- Promoting the **development of spatial planning instruments** for precautionary risk management, e.g. through general and over-arching risk-related specifications, i.e. covering the entirety of spatial hazards as far as possible, as well as specifications for the protection of critical infrastructures in spatial planning, such as the targeted safeguarding of flood relief and retention areas;
- Developing, further expanding, promoting and strengthening flood protection measures and measures to strengthen basic supply and services for **rural areas and coastal protection measures** in a suitable instrument, e.g. within the framework of the Joint Task Improvement of Agricultural Structure and Coastal Protection (GAK);
- Developing further measures to **strengthen basic supply** and services in rural areas (e.g. within the framework of the GAK), considering centrally located supply structures and their accessibility in the event of crisis-related loss of function;
- Strengthening **protection against flooding** due to heavy rainfall by strengthening water retention in the area, for example, through nature-based solutions such as the renaturation of floodplains and peatlands and flood-adapted construction methods;
- Designing cities and municipalities to be water-sensitive for the purpose of **flood and heat prevention** in accordance with the "sponge city" principle and selectively expanding structural protection measures such as flood protection measures (polders or flood retention basins or dike relocations);
- Reducing further the **use of new land** for building and transport, designing used areas in such a way that their natural buffer function is used and extended, reducing the new sealing of soil, and unsealing sealed soil wherever possible;
- Weighing up **competition for space** in a needs-oriented and forward-looking manner in order to prevent risks in city centres and carefully developing dense and green development (City Centre Strategy 2021 of the BMWSB City Centre Advisory Council);
- Providing **public green and open spaces** close to residential areas for exercise and health prevention and as a contribution to climate protection and climate adaptation, as such spaces can, inter alia, mitigate the consequences of lockdowns during pandemics and can also function as water retention facilities depending on their location, can serve as climate oases in increasingly built-up areas, and are also important building blocks for unsealing;
- Implementing the climate protection/climate adaptation funding requirement consistently as part of **urban development funding**;
- Encouraging the evaluation and revision of existing, or the development of new, **building codes and practices**, particularly for rehabilitation and reconstruction;

- Establishing a **basic protection capability for private and public structures** gradually by means of harmonised protection regulations, DIN standards and laws as far as possible (e.g. in the areas of fire, flood and surge protection);

- Developing **guidelines, laws and regulations for the reconstruction** of residential, public and private-sector buildings after disaster events such as storms or floods to take advantage of opportunities to "Build Back Better" during the recovery phase

- Redesigning the **framework conditions** for resilient, flood-sensitive **reconstruction planning** of building developments, taking into account, inter alia, the flood hazard level and the vulnerability of protected assets for urban development and spatial planning;

- Examining and evaluating necessary **adaptations to long-term, climatically induced changes** and considering the increase in extreme events (especially heavy rain, heat, drought) accordingly in residential development and renewal of existing buildings, protection of cultural heritage, residential water management, building planning and technical equipment in structural civil protection, and taking into account the dangers and opportunities of climate change;

- Disseminating **information on structural precautions in the private sphere** in order to enable the population to **protect itself** and **help itself** in the event of an incident (see Measure 1.4);

- Reviewing the changing potential threat situations on a rotating basis when implementing adequate **structural civil protection to** protect against weapons effects.

3.6. Transport

Transport infrastructure and mobility services are central to the development of a state and the functioning of a society. Proactively planned, built and maintained transport infrastructure is less susceptible to damage from disruptive events, which can also reduce losses to other sectors and the cost of reconstruction. During almost all incidents, transport infrastructures and services are directly or indirectly affected. A functioning transport system is essential to ensure the protection, safety and supply of people: as rescue routes, for the transport of relief supplies, to maintain access to critical services such as healthcare or to restore key sectors such as water and energy supply or waste disposal. Transport systems thus assume a central role in reducing risk and in the overall management of emergencies. To be able to promote proactive risk management for transport infrastructure and mobility services, the following measures are recommended:

- Giving greater consideration to **risk analyses and assessments** in transport infrastructure planning (see Measure 1.1);

- Conducting a **resilience study** for the transport sector (researching relevant risks and existing protective strategies in the transport sector) and developing and implementing appropriate measures;

- Making the transport network and transport infrastructure more robust across all modes of transport with regard to extreme wea-ther events and the **consequences of climate change** in order to be able to reduce damage or breakdowns, among other things by implementing the solutions and recommendations for action put forward by the BMDV expert network;

- Checking during network planning and, in the case of capacity-restricting construction measures, whether **alternative traffic routes** can be taken into account in order to be able to maintain important links in the event of disruptions or disasters;

- Planning **redevelopment measures and redesigning** traffic space and infrastructure in a way that incorporates **precautionary measures** for extreme events such as heavy rain, flash floods, and floods e.g. measures to absorb or retain precipitation water and to create rescue sites including helipads;

- Identifying measures to **reduce casualties,** particularly road accident fatalities, associated with extreme events, such as special warning signs, options for temporary road closures, improved road surfaces or improved lighting;

- Relocating transport infrastructure to locations **away from risk areas**, if possible, or integrating appropriate **protective equipment**;

- Regularly reviewing and, if necessary, adapting **safety requirements** and **their implementation** for transport infrastructures;

- Expanding **education** on what to do in extreme events and how to help in traffic emergencies;

- Preparing multi-level traffic management and closure plans for potential **evacuation routes** (roads, railways, waterways, air corridors) based on uniform maps and identifying competences and backup personnel for traffic management in the event of evacuation;

- Participating in resilient transport strategies at **European level** e.g. the pandemic and crisis contingency plan for the European freight transport sector;

- Taking the opportunity to remedy structural deficiencies in transport infrastructure, modernising it on the basis of the latest scientific findings and improving its future resilience in the sense of **sustainable reconstruction** in the event of an incident;

- Adapting construction and **routing** when **reconstructing** transport infrastructure after flooding so that renewed damage from floods and heavy rain events can be largely prevented or at least mitigated;

- Creating sufficient **information and evaluation bases** to be able to prioritise individual transport infrastructure elements in terms of their function and importance for freight transport, as these have very different degrees of relevance for the smooth flow of freight transport depending on their function and location;

- **Developing an information system** which evaluates the available traffic databases in a simple, fast and targeted manner in the event of time-critical political decision-making situations involving highly complex tasks, such as a transport flow visualisation model;

- Taking **preventive measures** (e.g. creation of redundancies, precautionary stockpiling, erection of protective structures or emergency planning) whenever and wherever a particularly high potential for damage is combined with **high criticality**;

- Ensuring high-quality, varied and area-wide coverage of infrastructure links, **flexible supply logistics** (at least bi- if not trimodal supply options via road/rail/waterway) and flexible **storage capacities** in order to be able to guarantee a stable and regular supply.

3.7. Food, agriculture and forestry

The agricultural and food sector plays a special role in government security provision and is classified as critical infrastructure. At the same time, agriculture, in particular, is increasingly affected by production and weather risks as well as market and price risks. These include increasing price volatility in agricultural markets in the wake of agricultural trade policy liberalisation and globalisation, production losses due to climate change and other crises, animal and plant diseases and disaster-related interruptions/collapses in logistics value chains. To meet these challenges, disaster risk management in agriculture relies primarily on private-sector approaches – in addition to the necessary adaptation of management. Companies have various instruments and action strategies at their disposal for this purpose, such as taking out insurance against the consequences of extreme weather events or hedging on commodity future exchanges. Government measures can create conducive conditions for these initiatives and provide additional support in special situations and crises. The objective is both to safeguard the existence of the farms and to ensure food security for the population. Thus, on the basis of the national framework guidelines for the granting of state allowances to cope with damage in agriculture and forestry caused by natural disasters or adverse weather conditions, the Länder can, if necessary, grant allowances to compensate for damage on their own authority. In addition, various Länder are planning to provide financial support for crop insurance for specific crops in the new EU funding period. The reduced insurance tax rate on insurance against damage that may be caused to agricultural production by natural hazards or the system of animal disease funds is also intended to support the risk management of agricultural enterprises. Direct payments also aim to contribute to risk protection for farms and can support the development of more resilience-oriented structures. In the long term, however, securing the food supply will only be possible if agricultural production methods are adapted to changing climate conditions . The methods must, as far as possible, be brought in line with these conditions.

Available resources must be used sustainably and biodiversity and the climate must be protected to a greater extent. To this end, it is necessary to further develop adaptation and resilience approaches for agriculture and forestry that provide a high level of protection for humans, animals and the environment and are based on research findings. In addition, it is crucial for a resilient agricultural and food economy to focus on the functionality of the entire value chain.

The following actions are recommended to further strengthen the resilience of **agriculture and food:**

- Supporting farms in developing and implementing **management practices that are adapted to climate change and beneficial to climate and biodiversity,** such as **nature-based solutions**, as this is the basis for farm resilience as a precautionary tool;
- Supporting farms in **diversification**, as it is one of the most effective tools to increase farm resilience and encompasses different levels such as crop diversity, farm diversification and farm-related (e.g. agritourism, renewable energy) and off-farm income sources;
- Paying attention to risk assessment and diversification when **procuring inputs** (feed and fertiliser);
- Ensuring **precautions for the health of animals** (veterinary medicines including vaccines) **and plants** (plant protection products);
- Evaluating dependencies in the area of **energy supply** (in greenhouse cultivation, animal husbandry, food processing) and, if necessary, strengthening supply security;
- Developing approaches for dealing with restrictions on the free **movement of people in the EU** and resulting labour shortages;

- Paying attention to the diversity of **markets** in order to be able to spread risks and avoid extreme dependence on individual markets in the event of a crisis;
- Creating awareness in existing **trade structures** of the potential consequences that can result from excessively high **price pressure** (low business income, difficulty recruiting of new talent, low regional food supply);
- Building **resilient value chains** from producer to food retailer, paying particular attention to functioning logistics that also incorporate digital approaches for better early detection of disruptions and interruptions in supply chains;
- Developing a **comprehensive approach for supplying retailers** in the event of supply difficulties – especially for urgently needed merchandise – and for supporting retailers in rebuilding their businesses quickly and without red tape;
- Maintaining and further improving the high **standards of drinking water, food and animal feed safety** through regular audits and, if necessary, adjustments, e.g. through further improvements to regulatory systems, early detection of food-related disease outbreaks using state-of-the-art analytical methods or even closer networking of national and European regulatory authorities;
- Continuing the **Civil Contingency Reserve** and the **Federal regulatory Grain Reserve**, and regularly reviewing them with regard to potential needs and adjusting them if necessary;
- Discussing possible risk situations in terms of supply, contamination, etc., **together with the stakeholders involved in the food supply** and discussing appropriate responses;
- Developing a **catalogue of possible crop management measures** for areas such as crop rotation design, land cover,and crop and variety selection, and investing in the breeding of crops and varieties that are better adapted to climate change (see Measure 3.17);
- Taking advantage of **opportunities for zootechnical improvement** in the **livestock** sector through the selection of robust animals and considering increasing risks in the design and construction of housing systems;
- Considering innovative methods for new **biosecurity, management and sanitation measures**, such as implementing targeted vaccination programmmes and education campaigns, or developing community prevention strategies against specific animal pathogens;
- Effectively warding off or preventing potential threats from **new pests**, ultimately safeguarding the supply of plant-based food and animal feed;
- Focusing on the increasingly **limited availability of active ingredients** and the threat of invasive pests caused by climate change;
- Developing **innovative measures** to prevent catastrophic damage in agriculture and test them in practice (e.g. the novel tools of satellite-based remote sensing, which can be the basis for insurance against extreme weather events such as droughts), especially since the development of practical innovations for preventive risk management can be supported by the “European Innovation Partnership for Agricultural Productivity and Sustainability”;
- Developing recommendations for **meal preparation** in situations where individual ingredients for familiar meals are missing – including and especially in the event of longer gaps in supply in order to prevent malnutrition/deficiency.

Forestry is particularly affected by the consequences of large-scale damaging events such as storms, droughts or prolonged heatwaves. These are often exacerbated by subsequent calamities such as the mass proliferation of insect pests (especially bark beetles) or fires. Since high and unplanned quantities of wood usually accumulate in connection with these events, there is often a temporary oversupply and price decline as a result. For forestry operations, preventive forest management measures and supra-regional risk and crisis management approaches are particularly in demand. Therefore, the following measures are recommended for forestry:

- Conducting fire drills, maintaining trail networks and firefighting water taps and continuing to expand forest fire protection and related silvicultural measures to mitigate **forest fire risks**;
- Strengthening forest resilience to extreme weather and consequential damage as part of **climate change adaptation**;
- Limiting soil compaction, increasing water percolation and retention capacity and strengthening erosion control through sustainable **forest conversion** and **management** and adapted agricultural use;
- Considering **biodiversity and species selection** in forest management, especially in light of current damage trends;
- Optimising **species selection** in forests by considering specific **protective functions** (e.g. protection from avalanches and floods).

The following measures are recommended **across sectors** for food, agriculture and forestry:

- Examining all projects with regard to their **long-term effects**, particularly with regard to sustainable and competitive agricultural and forestry operations, consumer health protection, the environment and the climate;
- Preparing and exchanging **damage data** from the Federal Government, the Länder and the scientific community in a uniform manner (see Measure 1.3);
- Processing **experiences from coping with incidents** (evaluation of drought aid approaches in 2018) in order to be able to continuously develop the national framework for granting state aid to cope with damage in agriculture and forestry caused by natural disasters or adverse weather conditions and to strengthen effectiveness and efficiency as well as ex-ante precautions (see Measure 4.8).

3.8. Environment

The environmental sector plays an important role in dealing with a wide variety of risks in flood protection, climate adaptation measures for extreme weather events as a result of human-induced climate change and in radiological emergencies. In other words, topics that are also central to disaster risk management. National measures related to these risks also stem from EU direct-ives such as the Seveso III Directive (Directive 2012/18/EU) or the Flood Risk Management Directive (Directive 2007/60/EC). The aim of the Seveso III Directive is to prevent serious accidents involving hazardous substances and to limit the impact of accidents on human health and the environment. The Flood Risk Management Directive supports the assessment and management of flood risks.

In addition, there are policy areas in the environmental field that indirectly play a major role in disaster risk management. For example, biodiversity or the sustainable management of natural resources help to maintain or build robust systems such as natural and semi-natural ecosystems, which are also more resilient to weather extremes such as storms, heavy rainfall or drought and provide a basis for health and disease prevention. In addition, intact ecosystems can contribute to climate protection and thus to minimising the risks of climate change. Natural hazards not only cause direct and immediately visible damage, but they can also endanger entire ecosystems in the long term.

The following recommendations therefore aim to exploit synergies with existing risk management measures and to establish interconnections with other relevant areas of the environmental sector:

- Strengthening the cross-cutting task of **adaptation to climate change** in order to consistently align society, infrastructure and ecosystems with future climate developments and their expected consequences (in particular more frequent and intense extreme events such as heatwaves, prolonged drought and heavy rainfall events) and take into account that this transformation and adaptation process requires early planning, long-term collaborative action and strategic coordination;

- Developing **nature-based solutions** in disaster risk management for the German context (including through the use of geospatial information) and incorporating them into relevant policy areas such as coastal and flood protection;

- Developing **nature conservation** with regard to increasing risks in order to be able to mitigate the vulnerability of ecosystems and areas (e.g. terrestrial ecosystems and aquatic ecosystems) and strengthening their contributions to resilience;

- Strengthening **soil protection** to maintain or restore natural soil functions (e.g. water storage and absorption functions);

- Limiting ongoing **land degradation** as well as promoting restoration of degraded land to achieve land degradation neutrality by 2030;

- Examining environmental areas with regard to their **systemic relevance** and strengthening them accordingly;

- Making greater use of opportunities to interconnect in terms of **better reconstruction** and advancing **environmentally relevant issues** such as sustainability, climate protection, the protection of biodiversity, soil conservation,and flood protection;

- Improving the **protection of built development** and soil compaction in flood relief areas (Section 78 (d) of the Federal Water Act) and implementing water retention measures;

- Working towards ensuring that priority areas for **flood protection measures**, floodplains, oxbow lakes and retention areas to be protected are defined in the planning of the Länder and regions on a river basin basis;

- Maintaining and strengthening the expertise and human resources in **radiation protection** and, in particular, taking into account the recommendations and statements of the Reactor Safety Commission and the Radiation Protection Commission on radiological emergencies and also the recommendations for action from the risk analysis "Release of radioactive substances from a nuclear power plant" from 2015;

- Preparing, in cooperation between the Federal Government and the governments of the Länder, **emergency plans** and conducting **emergency exercises** for the event of a release of hazardous CBRN substances, taking into account their transnational effects, so that the competent authorities can respond to reference scenarios with optimised protection strategies (see Measures 4.3 and 4.4);

- Developing a comprehensive strategy for **aftercare following a release of radioactive substances;**

- Continuing to advocate at **EU level** that the highest possible **nuclear safety standards** apply and that a common understanding of safety is established and continuously developed;

- Giving greater consideration to disaster risk management in the future when dealing with global **chemical management** challenges;

- Strengthening the importance of the Convention on the **Transboundary Effects of Industrial Accidents** as a legal instrument in the implementation of the Sendai Framework in Germany and the SDGs.

3.9. Labour and social affairs

Crises and disasters can pose enormous challenges to the labour market. At the same time, employment and social protection systems play a significant role in how well communities are prepared for extreme events. Socially disadvantaged groups and groups in precarious employment tend to be more affected by crises. In Germany, various temporary measures – including comprehensive social protection packages and employment protection measures – have been taken to deal with crises and disasters and help the population to recover more quickly afterwards. The following recommendations are intended to reinforce and complement existing labour market and social policy measures:

- Making the **occupational health and safety standards** relevant to hazardous situations uniform nationwide and reviewing them regularly;

- **Improving occupational health and safety goals sustainably** in the context of the topic of resilience to disasters as well as working conditions in special **hazard situations**, e.g. within the framework of the Joint German Occupational Health and Safety Strategy;

- Developing **labour market policies and programmes** for preparedness and post-crisis recovery in the context of consultation with employers' and employees' organisations regarding the promotion of their active participation, e.g. with training and employment programmes;

- Ensuring and protecting **labour rights** and safe environments for workers, paying special attention to employees in precarious employment;

- Evaluating crisis-related **social protection and employment security** scientifically in order to learn for future crises;

- **Strengthening local capacity** for employment agencies, job centres and economic offices to respond more quickly in crisis situations;

- Including in regular business the **initial socio-economic and reintegration** of individuals who, due to disasters, cannot be integrated into the general training and labour market or have lost their jobs, or supporting them with special programe if necessary;

- Strengthening or expanding **social services** for socially disadvantaged groups and those affected by job losses, e.g. non-profit debt and insolvency counselling or the statutory right to debt counselling as an instrument for early prevention of over-indebtedness risks;

- Issuing a regulation a allowing temporary access to the **short-time allowance** as a flexible instrument in times of crisis and pandemics to cushion severe labour market consequences;

- Taking greater account of **financial crisis effects** on the socially disadvantaged, the unemployed and families under particular strain, e.g. by introducing temporary moratoria for consumers and small businesses;

- Providing for exceptions to **reporting and co-operation obligations** in the context of claims for unemployment benefits I and II in disaster situations, as communication channels with authorities can be disrupted in times of crisis;

- Developing innovative measures to increase **organisational resilience**, e.g. through operational best practices in relation to the interplay between agility and work process stability, and transferring projects or platforms to disseminate lessons learned;

- Updating and further developing industry-specific recommendations for **operational protective measures**, if necessary, on the basis of disaster scenarios;

- Developing approaches to support the **ability of companies and organisations to change**, including through autonomy, (re)structuring capability, agility and flexible decision-making hierarchies, and making them widely accessible to companies and especially SMEs through transfer projects or platforms (e.g. the New Quality of Work Initiative or Future Centres).

3.10. Education and science

Disaster risk management in education and research is particularly important to foster a kind of "resilience culture". Through the education system (including early childhood education) and through research, knowledge can be communicated and generated that strengthens the capacity of the population and institutions to deal with risks. In addition, disaster risk management in the education sector can help ensure safe and equitable educational opportunities and learning outcomes in times of crisis.

Germany already has a number of research programmes and educational opportunities on disaster risk management topics. Particular mention should be made here of the programme "Research for Civil Security", which includes, for example, topics from the areas of vulnerable groups (3.13) and critical infrastructure (3.16).

The EU also funds resilience research. An example of this is the "Adaptation to Climate Change" mission of the EU's Horizon Europe research framework programme, which supports at least 150 European regions and communities in their efforts to become climate-resilient by 2030. At the same time, this effort also contributes to the EU's "Climate Neutral and Smart Cities" mission.

To further promote scientific knowledge and education on disaster risk, disaster risk management and resilience, the following actions are recommended:

- Continuing to promote **research programmes** on all Action areas of this Resilience Strategy;

- Providing impetus for the dissemination of innovative approaches to disaster risk management through **applied research**, for example through the use of simulations in exercises (see Measure 4.3) or the "SME-Innovative" funding initiative;

- Giving greater consideration to **resilience as part of related research fields** such as sustainability or social justice, e.g. in the Research for Sustainable Development (FONA) framework programme or in health research;

- Continuing to expand **international research collaborations** in security and resilience research, which at the EU level means continuing to participate in cross-border research programmes and promoting the involvement of stakeholders in scientific exchange, e.g. the Horizon Europe research framework programme, the European Science and Technology Group network or the Disaster Risk Management Knowledge Center;

- Incorporating disaster risk management topics into **school and out-of-school education** (see Measures 1.5 and 4.5);

- Strengthening **educational institutions** from early childhood onwards and ensuring their continued operation even in the event of a crisis, e.g. by expanding digital infrastructures in educational institutions or by further developing security approaches and recommendations for daycare facilities, schools and universities with regard to extreme events;

- Promoting **coordinated multilateral cooperation** and **exchange** to disseminate best practices, experiences and lessons learned to support education and learning continuity and resilience in times of crisis.

3.11. Civil and military defence

Recognising that defence of the federal territory against external attacks and protection of the population are essential functions of the state, the Federal Republic of Germany has given constitutional status to defence tasks. A responsible state preparedness policy cannot dispense with defence capabilities. This includes both military and civil defence as components of overall defence that are committed to the same goal and of equal rank, but separated from each other in organisational terms.

Civil defence is tasked with planning, preparing and executing all civilian actions necessary to establish and maintain defence capabilities, including protecting the population and providing the population with supplies. These actions include:

- Maintaining state and government functions;

- Civil protection;

- Providing supplies to the population, state and government bodies, agencies responsible for civil protection and state emergency preparedness and the armed forces;

- Providing (other) support to the armed forces.

The basic conceptual document for the design of civil defence in Germany is the Civil Defence Concept (KZV), which was adopted by the Cabinet in 2016 and already takes into account key NATO requirements for the resilience of member states (Baseline Requirements for National Resilience). The implementation of the KZV's measures is also always oriented towards the goal of strengthening society's resilience to incidents.

The Federal Government maintains its own civil protection units in the form of the Federal Agency for Technical Relief (THW) on the basis of the first sentence of Article 73 (1) of the German Basic Law (Constitution). The THW was founded to protect the population in the event of a state of defence and has since become an important partner for civil protection in the Federal Republic of Germany. The units and capacities of the THW are generally available free of charge within the framework of administrative assistance to the relevant levels of state and municipal bodies for managing disasters, public emergencies and accidents. Services include technical assistance in the areas of rescue, command/communication, logistics, locating, evacuation, providing electricity supplies and infrastructure and blasting, and in the event of water hazards and damage. In recent years, the THW has consistently worked to increase resilience to critical infrastructure failure through its framework (expanding emergency repair and supply capabilities). In the future, the provision of emergency infrastructures to provide supplies to the population and maintain state and government functions will continue to play a central role for the THW (e.g. emergency power supplies, drinking water treatment and emergency communications).

The umbrella document for Germany's overall military defence concept is the Bundeswehr Concept (KdB) of 20 July 2018. It is the counterpart to the KZV. The KdB describes the tasks of the Bundeswehr in a whole-of-government approach and, in particular, in national and collective defence within the framework of NATO, as well as in international crisis management. In particular, defence aspects of whole-of-government cyber-security, contributions to the whole-of-government situation picture in cyber- and information space within the framework of national and multi-national security preparedness and ensuring cybersecurity in the Bundeswehr's own networks are additional tasks to be performed on an ongoing basis.

As a provider of military defence, the Bundeswehr is characterised by its ability to maintain its operational readiness even under conditions of external emergency and to be available for missions within the framework of international crisis management and national risk and crisis management. In this context, the Bundeswehr is highly responsive and flexible. The Bundeswehr therefore has the capabilities to provide rapid support with forces and resources on a subsidiary basis within the framework of administrative and disaster assistance under Article 35 of the German Basic Law and to contribute to resilience as a whole-of-government task. At the same time, the Bundeswehr must remain capable of command and control, action and reaction, both in the armed forces and in the federal defence administration itself, and must retain its full range of capabilities for its primary tasks throughout. In terms of planning, it must always be ensured that the Bundeswehr forces and assets deployed on a subsidiary basis can be withdrawn again as quickly as possible and/or replaced by civil defence forces and assets as soon as this becomes necessary. The Bundeswehr Medical Service is supported in the area of defence by the German Red Cross (DRK) in accordance with Section 2 (1) No. 1 of the German Red Cross Act and by the German St John Accident Assistance and Order of Malta Volunteers assistance organisations in accordance with the first sentence of Section 5 of the German Red Cross Act. These volunteer aid organisations thus not only participate in civilian public health protection but also support military defence when requested.

Improved resilience through enhanced civil and military preparedness across all NATO and EU member states is essential. In order to respond to crises, NATO has developed the NATO Crisis Response System Manual (NCRSM), which aims to ensure readiness and support for crisis and conflict prevention and management. The NCRSM contains predetermined alert measures. Germany has codified the alert measures from the NCRSM as well as supplementary national alert measures in the Bundeswehr Crisis Response and Alert Plan

(*Krisenreaktions- und Alarmplan der Bundeswehr*, KAPlBw) and the Civil Alert Planning Guideline (*Richtlinie für die zivile Alarmplanung*, ZAPRL) as the basis for coordinated military and civil contingency planning. The ZAPRL summarises the tasks to be implemented in the event of specific approval by the Bundestag, a state of tension or defence, invoking the NATO mutual defence clause, and other foreign policy/military crises by initiating alert actions, which must be carried out to protect and provide for the population, maintain state and government functions and support the armed forces. This response capability is essential to credible deterrence and defence – even in advance of a possible state of tension or defence.

Holistically understood, resilience combines aspects of non-military protection from a civilian perspective with societal and military aspects that build on and complement them. Consequently, it can only be achieved in a whole-of-government/society approach. The EU has a prominent role to play here in view of its comprehensive set of instruments and integrated approach. Key areas of resilience action are the interconnected and mutually reinforcing areas of civil preparedness and military enablement.

Enablement – in its importance for both collective defence and the national defence capability – is a whole-of-government task that cannot be performed by the Bundeswehr alone. However, coordinating all the necessary stakeholders poses many challenges due to the division of responsibilities between different agencies at the federal and state levels and Germany's federal structure. In order to counter these challenges, it is essential to plan proactive measures and – wherever possible – make preparations even in peacetime. The aim of *enablement* is to make a substantial and effective contribution to the security of state leadership and action in any crisis up to and including armed conflict.

On the one hand, this means embedding and coordinating national measures in and with NATO and the EU, as well as with any neighbouring states, with as few disruptions and interfaces as possible. On the other hand, in a domestic context, it is important to build up and shape the capabilities expected by NATO and the EU to support collective defence. Linking military enablement to civil preparedness reflects this whole-of-government or whole-of-society approach. Based on these points, the following measures are recommended:

- Continuously promoting **national and international networks of** civil-military cooperation and cooperation between state and civilian aid organisations at all levels and adapting them to new risks;

- Advancing resilience as a **task for society as a whole,** e.g. by **institutionalising a whole-of-society dialogue** on the requirements of future security preparedness (see also the Federal Academy for Security Policy, seminars on national preventive security measures, primarily for members of civilian and military crisis management teams);

- Promoting resilience as part of the **"connected security"** approach and, to this end, intensifying security partnerships between the state, businesses and academia, in particular through regular dialogue;

- Focusing more on the measures within the framework of the **Cyber Security Strategy** for Germany (BMI 2021) and taking a holistic approach to them in order to be able to identify cybersecurity incidents at an early stage, assess them quickly and comprehensively and develop coordinated recommendations for action;

- Consolidating **space security** as a multinational, interministerial field of action and a task for the whole of government, and working to raise awareness of hazards to space systems and risks associated with the unavailability of space-based data, services and products;

- Intensifying **cooperation with NATO** in the context of Article 3 of the North Atlantic Treaty based on NATO's "Baseline Requirements for National Resilience" and in line with the NATO Heads of State and Government's "Strengthened Resilience Commitment", renewed in 2021;

- Strengthening the **resilience of NATO member states** with a focus on deterrence and defence capabilities in line with the above-mentioned NATO resilience goals as an essential basis for fulfilling core missions;

- **Promoting and deepening cooperation between NATO and the EU** in order to make the best possible use of the instruments of both organisations and, for example, to enhance military defence capability through capabilities at the European level;

- Creating a **law on health preparedness and security** for whole-of-government healthcare in the event of a crisis or a state of defence, and in doing so also securing and developing the supportive involvement of the Workers' Samaritan Foundation Germany (ASB), the German Life Saving Association (DLRG), the German Red Cross (DRK), St John Accident Assistance and the Order of Malta Volunteers as assistance organisations to the necessary extent even before a disaster, both in Bundeswehr healthcare in the context of national and collective defence and in light of hybrid influences and increasingly international healthcare;

- Preparing and upgrading military and civilian infrastructure to **support redeployments**, along with the organisational measures associated with redeployment for all modes of transport, such that they can support redeployment with appropriate numbers and equipment in a timely manner, enabling Germany's role as a "hub" and thus ensuring freedom of movement and action within the framework of collective and national defence;

- Creating the **conditions** for suitable infrastructure to be available for **strategic transfer by rail** through or out of Germany, both in the form of routes for out-of-gauge transport and in the form of suitable railway loading facilities and freight transport stations, including mobile end-loading ramps.

3.12. Justice and consumer protection

The judiciary must remain functional in times of crisis. This requires legal foundations that enable courts to react flexibly to crisis situations and, at the same time, maintain the judiciary's ability to function to the necessary extent.

In terms of content, German civil law already offers the possibility of finding solutions that are in line with the interests of the individual case (e.g. contract adjustments) in the event of serious changes to the basis of the contract due to the jurisdiction of the elimination of the basis of the contract (Section 313 of the German Civil Code).

Consumer protection also plays an important role in protecting the livelihoods of people in crisis. It can make an important contribution to risk communication and self-protection of citizens, e.g. by informing them about specific risks (e.g. fraud or disinformation), consumer rights and services (e.g. insurance) in crises. Germany already has comprehensive and proven offerings in this regard.

The following recommendations can be used to continue and supplement the existing measures in the areas mentioned here:

- The consequences of crises should be mitigated with the help of situation-related adjustments to statutory regulations in **insolvency law and criminal procedure law**, e.g. by promoting the preservation of the ability of companies and associations to act and the flexibility of criminal courts, taking greater account of empirical values from past crises;

- Awareness of catastrophic risks should be increased through **consumer information**, e.g. by providing more information to consumers about their rights or options for insurance coverage against natural hazards.

Other cross-sector topics

3.13. Vulnerable groups

Not all population groups are equally affected by hazardous situations and some come under particular stress in hazardous situations. Vulnerable groups may have poor health, often have less access to material resources and to healthcare systems and at the same time encounter more barriers to participation in information, knowledge and networks. In particular, the effect of intersectional impairments must be considered. Affected population groups are often exposed to particular risks, while at the same time they are insufficiently able to cushion the consequences of disasters. Individual population groups (for example, young and old people, women, men and non-binary people, LGBTQI+ people, people living in poverty, people with disabilities or other health impairments, refugees, people with a history of flight or migration or families separated as a result of displacement, single-parent households, people in other particularly vulnerable life situations) may be affected in very different ways. They all have special needs and bring different capacities and individual knowledge to holistic disaster risk management. Vulnerable individuals and groups should, therefore, not be viewed as passive beneficiaries of protection but as active stakeholders who can help shape disaster risk management in all sectors and at all levels (federal, state and local). In order to improve the protection of vulnerable groups and support their co-creation in disaster risk management, the following recommendations should be considered in the implementation of actions in all participating sectors of this Resilience Strategy:

- Considering the **needs and capacities as well as barriers** and participation limitations of vulnerable groups in disaster and vulnerability research;
- Making greater use of simple language, multilingualism and **accessible forms** of communication in the communication of risks, early warnings, and other information services (see Measures 1.4 and 4.1) and pushing for the digital empowerment of all population groups;
- Involving vulnerable groups and their organisations in the **design, procurement, implementation** and communication of disaster risk management measures at all levels (federal, state, local) as experts in their own right and promoting them accordingly;
- Improving **self-protection by helping** people to help themselves, e.g. strengthening the independence of people with impairments based on gender, age, origin or disability (see Measure 1.4);
- Regularly reviewing the recommendations of the Office of the UN High Commissioner for **Human Rights** regarding disaster response in the German context with the participation of vulnerable groups and – where necessary – further integrating and improving these recommendations;
- Regularly reviewing the **gender dimensions of** disaster risk reduction in the context of climate change in Germany and – where necessary – further integrating and improving these dimensions (see Recommendation No. 37 of the UN Women's Rights Convention);
- Improving the **protection of people with disabilities** in the event of disasters and emergencies, in fulfilment of Article 11 of the UN Convention on the Rights of Persons with Disabilities;
- Considering the needs of people with disabilities as a **cross-cutting issue** in terms of disability mainstreaming, especially in risk and crisis management;

- Improving the **accessibility** of the warning app NINA and other warning and emergency call apps based on the two-senses principle (see Measure 4.1);

- Ensuring **continuous sign language interpreting** for disaster warnings on all public channels (not only digital) and providing information in plain language (see Measure 4.1);

- **Providing targeted education** to **people with disabilities** on how to behave and be empowered to take action in the event of a disaster (through accessible campaigns, educational brochures, etc., and with the participation of associations of people with disabilities);

- **Raising awareness** among **aid organisations, fire departments, the THW, etc.**, of the needs of people with disabilities in the event of a disaster – for example, through training courses.

3.14. Innovative technologies

In its implementation strategy for digitalisation (Federal Government 2020a), the German government has identified measures that can help to make better use of the opportunities offered by digitalisation. These extend into all disciplines, such as research into digital technologies for internal and external security. In this context, potential risks from digitalisation itself are also taken into account.

The strategic foundations for this were already presented in 2016 with the white paper on the Federal Government's security policy and the further development of the Federal Government's Cybersecurity Strategy 2021 (BMI 2021). Furthermore, the implementation strategy for digitalisation (Federal Government 2020a) sheds light on new opportunities for national risk and crisis management. These include, in particular, the focus areas "Digital innovations in foreign, security and defence policy", "Security in the area of critical infrastructures" and "(International) security policy and digitalisation of public administration". Examples include projects such as the establishment of the Agency for Innovation in Cybersecurity, the Federal Crisis Preparedness Information System and the promotion of investments in IT security at hospitals, e.g. via the Hospital Structure Fund and the Hospital Future Fund.

The digital structural change affects municipalities in particular. Here, technologies are opening up new digital models for action in local hazard prevention and disaster management, enabling better prevention or rapid rescue. Satellite navigation systems form the basis for determining positions and navigation on earth and in the air and are therefore also usefully applied in disaster management. The civil GALILEO system provides navigation signals with very high accuracy. The EU's GALILEO satellites, in whose systematic development, operation and financing Germany (BMDV) plays a major role, can be used, for example, to coordinate relief forces with one another in the event of a disaster by providing accurate positional data. For example, rescue dog teams are used in the search for missing persons and dog handlers and dogs are equipped with satellite navigation receivers. This not only helps the missing

persons, who can be located more quickly, but also the incident command. Furthermore, aerial images of the disaster area are geo-referenced by means of satellite technologies so that rescue forces can act in a targeted manner.

Increased use can also be made of social media in civil protection. At the same time, systems must become more resilient, for example, they must be able to function autonomously in the event of power supply failure and there must be redundancies for key functions. In order to identify and exploit further potential of digital connectivity and technology for disaster risk management, the following measures are recommended:

- Regularly reviewing and making greater use of **already-deployed technologies**, such as rescue and warning apps, telemedical assistance systems and data glasses, e.g. by setting up initiatives for joint use/cost sharing by different players, and specifically promoting the **digital skills** of end users and rescue forces through broader information offerings and training programmes;

- Investigating the **potential of technologies** for situational awareness, response, damage assessment, transportation of equipment, logistics, etc., in sectoral risk management, preparing cost-benefit analyses and deploying the technologies as appropriate;

- Ensuring resilience in the context of **securing command and control capability**, and providing tested crisis (command and control) staff, robust and available communications, practised command and control and crisis procedures and tested crisis and **information management** at all levels – federal, state, county and local – for successful crisis management, since the ability of official crisis staff and taskforces to act is critically dependent on the availability of their communications, especially if commercial communications networks and the Internet fail over large areas;

- Maintaining **stable and self-sufficient government-operated mobile communications networks** for emergency and rescue forces from the federal, state and local governments, into which other civilian rescue forces can also be easily integrated, as they are of paramount importance for successful crisis management;

- **Testing in practice** which technologies are best suited to reduce damage in the first place or make the best use of hours of helpers' time, which should include examining the use of smart drones, digital outfitting of emergency responders, social media, robotics, big data, the Internet of Things, artificial intelligence, blockchain technology and satellite remote sensing (e.g. the European Copernicus programme);

- Creating the **necessary framework conditions** for the use of new technologies in risk and crisis management, e.g. through digitalisation in rural areas, information security, data protection, specifications for standardised data formats and interfaces, the ordinance regulating the use of new technologies in public spaces, liability law and insurance protection, the promotion of inter-municipal and cross-state cooperation or the revision of processes in situation management;

- Making greater use of **social media** to identify situations at an early stage, possibly with the help of artificial intelligence, collect information relevant to the situation, support crisis communication, disseminate information on accessibility and responsibilities in civil protection and disaster management and facilitate the involvement of spontaneous and unattached helpers.

3.15. Protection of cultural assets

Cultural assets are unique testimonies to the past and present. They represent values and traditions, convey knowledge and create identity. The goal of cultural assets protection is to protect significant tangible and intangible cultural assets and preserve them for future generations. This includes the protection of cultural heritage preservation facilities and other sites of cultural heritage interest. An integrated and multi-stakeholder approach to disaster risk management must also be implemented in cultural assets protection. The following measures are recommended for this purpose:

- Anchoring **disaster risk management** more firmly as a topic **in cultural assets preservation institutions** and interlinking it across levels;
- Recording the **impacts of extreme events** on cultural assets, taking into account already-observable impacts and future expected **risks of climate change**, and implementing appropriate adaptation measures to build resilience;
- Describing, conceptualising, establishing, strengthening and facilitating the **cooperation** of cultural assets preservation institutions and stakeholders such as emergency response services in disaster risk management;
- Expanding the **number of emergency response alliances** in which cultural assets preservation institutions can join together, collaborate on emergency preparedness and support each other;
- Promoting the activities of existing **competence centres and projects** such as *Sicherheits-Leitfaden Kulturgut (SiLK) or KulturGutRetter;*
- Promoting disaster response **support components** in the area of cultural assets protection (e.g. special emergency containers with equipment and materials for cultural assets protection);
- Updating and continuing the **identification and marking** of immovable cultural assets under the Hague Convention for the Protection of Cultural Assets in the Event of Armed Conflict (1954);
- Continuing to expand **federal preservation filming** of nationally valuable archival and library materials and adapting it to the latest technologies;
- Developing or elaborating approaches for the **protection of movable cultural assets** as well as approaches for removal and salvage measures;
- Exploring approaches for **interagency strategies and exchange platforms for** the protection of immovable and movable cultural assets involving all relevant stakeholders, in particular the cultural authorities of the Länder, the Federal Government Commissioner for Culture and the Media (BKM), the Federal Ministry of the Interior and Community (BMI), the AA, the United Nations Educational, Scientific and Cultural Organization, Blue Shield International/Blue Shield Germany, the Federal Criminal Police Office (BKA), the BBK and the THW as well as within the framework of the EU.

3.16. Critical infrastructure

Critical infrastructures are "organisations and facilities of vital importance to the state community, the failure or impairment of which would result in lasting supply bottlenecks, significant disruptions to public safety or other dramatic consequences" (BMI 2009, p. 3). Critical infrastructure includes facilities, plants and systems in (waste) water, energy, transport, information and telecommunications infrastructure as well as in the areas of healthcare, food, finance and insurance, media and culture, and government and public administration. Many of these sectors are closely interlinked and dependent on products and services from other areas, even beyond the sectoral classification (e.g. space), which at the same time also play an important role in Germany's internal and external security. More specific comments on some of these sectors have already been made (see Measures 3.1 – [kompress] 3.15), so the focus below is on the cross-sectoral aspects of critical infrastructure protection in particular.

The goal of critical infrastructure protection is to ensure the supply of important services and goods to the population as part of the provision of public services. It thus plays a significant role in disaster risk reduction. The strategic framework for critical infrastructure protection is provided by the National Strategy for Critical Infrastructure Protection adopted by the German government in 2009.

Critical infrastructure protection measures include both basic cross-sector approaches and sector-specific requirements. For example, risk and crisis management methods that support critical infrastructure operators in identifying risks in a structured manner, implementing preventive measures and dealing effectively and efficiently with crises are considered crosssectoral. Sector-specific measures are used, for example, to ensure secure network operation in the power supply or wastewater disposal, to ensure continuous hospital operations and drinking water and firefighting water supplies or to guarantee the functioning of state institutions at all times. By interconnecting the sectoral perspective with the overarching perspective, critical infrastructure protection contributes to reducing disaster risks and ensuring the provision of critical services to the population in Germany. Political, social and technological developments continuously pose new challenges to the protection of critical infrastructures. These include climate change, demographic developments, the increasing use of information technology such as artificial intelligence and the associated new dependency between infrastructure systems, as well as the increased number of attacks by cybercriminals on critical infrastructures and thus on the supply of the population. Protection of network and IT systems and their environment requires consideration of all harmful events that may affect the integrity, authenticity, confidentiality and availability of stored, transmitted or processed data or services of critical infrastructure network and IT systems. The corresponding risk management should therefore take particular account of the protection of the physical environment of network and IT systems of critical infrastructures based on recognised standards such as the ISO 2700X series and the IT-Grundschutz (IT baseline protection) of the German Federal Office for Information Security (BSI). Particularly when it comes to securing critical infrastructures as defined by the BSI Act (BSIG), physical protection is a necessary component of the IT security approach because only by securing in the sense of the multi-hazard approach can the provision of the critical service be guaranteed. For this reason, operators of critical infrastructures are already being supported by the BSI in the context of Section 8 (a) BSIG, both with regard to preventive implementation and the provision of evidence.

These new challenges highlight the importance of an all-hazard approach and the need to constantly adapt and improve cooperation between state and non-state stakeholders and approaches to critical infrastructure protection. The following measures are recommended for this purpose:

- Driving **collaboration** among institutions that have coordinating roles at the **federal, state and local levels** to address the cross-sector requirements of critical infrastructure resilience;

- Strengthening the trust-based **cooperation** between **operators and authorities** as central players in the protection of critical infrastructures in the state and the economy;
- Promoting closer cooperation and exchange of information between **civil protection stakeholders and critical infrastructure operators**;
- Formalising collaborations through **roundtable meetings** and supporting the collaboration of different stakeholders through recommendations and/or standards;
- Addressing **cross-border aspects** of critical infrastructure protection (e.g. cross-border services) and strengthening cooperation at the **European and international** levels, including in the context of EU directives on the resilience of critical facilities and on measures for a high common level of cybersecurity across the Union;
- **Researching and developing the approaches** and measures for protecting critical infrastructures, taking advantage of opportunities presented by technical developments in the infrastructure sector and recognising and observing associated risks;
- Promoting the use of critical infrastructure **identification** and **prioritisation** methodologies at all levels, considering the criticality of infrastructure on a sector and industry-specific basis;
- **Continuously developing** and **coordinating** the **risk and crisis management of** operators and authorities;
- Strengthening the **capabilities for situation presentations and forecasts** regarding short and long-term developments affecting the security of supply and complementing the methodological basis (see Measure 4.2);
- Examining in detail the need to **expand redundancies and fallback levels** (such as securing critical infrastructures with emergency power generators) and gradually supplementing missing technical equipment and incompletely planned processes;
- Increasing the **resilience of civil protection facilities** to the failure of critical infrastructures in order to strengthen the ability of emergency forces to act in the event of an incident;
- Anchoring national and European risk and crisis management requirements more firmly in **planning processes and approvals** for critical infrastructure;
- Thinking more closely about the resilience of critical infrastructures and **services of general interest** since they overlap considerably in terms of the services they provide and the infrastructures involved in providing them, for which processes of spatial planning, e.g. in the course of urban development and rural or regional development, are appropriate (see Measure 3.5.);
- Promoting **research** on the resilience of critical infrastructures in order to take future challenges into account and, for example, to be able to research new technologies that increase the security of supply or enable rapid recovery in the event of failure (see Measure 3.10);
- Making **adjustments to long-term, climate-related changes** in the planning and operation of critical infrastructures, taking into account the increase in extreme events and considering the risks and opportunities of climate change.

3.17. Disseminating proven resilience practices

There are already many good examples of establishing or expanding effective disaster risk management at the federal, Länder and local levels, as well as in the non-governmental sector. They are based on legal requirements, committee resolutions or recommendations. In many cases, however, examples of best practices and lessons learned are not widely known. In order to provide a user-friendly overview of such examples and available tools, the following actions are recommended:

- Developing **documentation** regarding examples of best practices in disaster risk management and building resilience to disasters;
- **Publicising** examples of best practice and **value commitment**, for example, by increasing the number of promotional awards and prizes for prevention-related projects;
- Promoting the exchange of stakeholders and sectors through **improved knowledge management**, for example, through the web portal on disaster risk management for Germany (KatRiMa.de);
- Developing **practical guidelines and tools** for resilience promotion and making them available to municipal users, e.g. urban and regional planners, as a toolbox of methods.

4. Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction

Not all incidents can be prevented through prevention. Disaster preparedness measures and coping capacities need to be continuously reviewed and strengthened. This is evident in many ways. Disaster risks are changing in the wake of climate change, urbanisation, globalisation and ecosystem degradation. For example, the flood disaster in July 2021 required the deployment of civil protection forces from all over Germany for months. In particular, widespread destruction or damage caused by extreme events to transportation and utility infrastructure poses new challenges to the entire civil protection system. At the same time, there are growing challenges in terms of capacity to protect the population, such as demographic change and declining participation in volunteerism. Lessons learned from past disasters also indicate that disaster risk preparedness cannot be a completed process. When damage cannot be prevented, it is important to learn from incidents for the future and to take advantage of opportunities to "Build Back Better", which, by increasing resilience, helps to reduce the risk of renewed damaging events.

The following recommendations include measures to supplement preparedness for severe damaging events and to improve loss management when they occur.

4.1. Improving early crisis detection and early warning systems in order to initiate targeted measures in time

Early warning is necessary so that each and every individual can prepare specifically for a possible hazardous situation. The longer the lead times until possible impacts occur, the more comprehensive measures that can be initiated. The European Commission provides several services to EU member states through the GALILEO satellite system. This includes services for the mobile-independent output of alerts to end devices. One of these services is the GALILEO Emergency Warning Service, which is an additional transmission channel based on existing early warning systems and is intended to enable options for combination with other warning devices or telecommunications channels in future. In Germany, the Länder are responsible for warning the population in the event of a disaster. In order to be able to warn the population and all stakeholders involved in hazard prevention in Germany effectively and comprehensively, the Federal Government operates the satellite-based Modular Warning System (MoWaS). The MoWaS can signal to different warning channels. These include warning apps (e.g. NINA, BIWAPP), radio, sirens, Deutsche Bahn train station display boards and digital billboards. To ensure that early warning also leads to early action by users, the following measures are recommended:

- Continuing to support early detection of hazards through **research**, particularly regarding the occurrence, frequency and intensity of extreme events in the course of climate change;
- Analysing and evaluating the current **information situation** on early hazard detection in order to explicitly shed light on potential uses and to strengthen existing institutions (such as the BSI, BBK, DWD, RKI, BKG, Federal Institute for Risk Assessment and Friedrich-Loeffler-Institut) in this area;
- Identifying **multiple hazards and specific, local, small-scale consequences** at an early stage and, if possible, drawing on experience and data on the effects of past hazardous situations (see Measures 1.1–1.3);

- Improving **impact-related warning services**, i.e. combining early warning with more user-friendly recommendations for action (e.g. for emergency services, municipalities, companies, public institutions);
- **Establishing *cell broadcast*** as a supplementary warning channel as soon as possible;
- Evaluating existing **soil moisture and drought monitoring systems** for their suitability as early detection and early warning systems;
- Identifying and using opportunities for continuous **accessibility** improvements for alerts (see Measure 3.13);
- Identifying and using opportunities for further expansion of **multilingual** warning messages for different warning channels (see Measure 3.13);
- Adapting **crisis communication** continuously to new technical possibilities and new forms of media, especially social media platforms, and establishing capabilities for managing disinformation;
- Promoting **initiatives** to inform the population about the warning systems in Germany and thereby strengthening the population's ability to protect itself (see Measure 1.4).

4.2. Better forecasting the potential developments of a disaster

In addition to the early assessment of possible or developing consequences for society, it is important to be able to make forecasts regarding the potential effects of risks and developments of an incident for emergency planning and crisis management. The comprehensive assessment of cascading effects and interactions in the context of complex and interdependent systems such as critical infrastructures poses a particular challenge. This applies both to simple qualitative estimates and to possible quantitative solutions. To be able to improve both in future, the following measures are recommended:

- Expanding the use of rough **qualitative forecasts** regarding potential impacts of hazards and possible incidents, for example, by establishing a federal communications and information network;
- Examining the use of **quantitative models** for impact analysis and - as far as possible – implementing them in different areas, e.g. through a forecasting and expert advisory service that, inter alia, makes numerical models from research easier to use in practice.

4.3. Conducting regular incident exercises

Regular drills serve to prepare for a possible emergency and strengthen the smooth cooperation of all players involved. Therefore, the disaster management authorities regularly conduct exercises with the participation of fire departments, aid organisations, the THW, etc. At the federal level, an Interministerial and cross-national crisis management exercises (LÜKEX) has been held every two years since 2004 under the auspices of the BMI. LÜKEX is a strategic exercise in which crisis teams practise procedures based on a scenario and a script. In addition, topic-specific exercises are held regularly, which also rehearse the interaction between local authorities, state and federal authorities, neighbouring EU countries and/or international organisations, and are often coordinated by the latter. To further improve these exercises in the future, the following actions are recommended:

- Promoting the development of effective **knowledge management** of lessons learned from exercises by thoroughly debriefing and evaluating crisis management exercises and documenting best practices;
- Promoting the **development of LÜKEX** into an exercise platform for national crisis management;
- Offering exercises and simulations more often **across stakeholders and sectors**, i.e. actively involving organisations beyond the traditional civil protection system;
- Promoting **dialogue** on disaster response exercises, e.g. with businesses and other states;
- Identifying particularly **exposed personnel and key workplaces** in critical infrastructure facilities and conducting regular crisis management exercises that address the permanent loss of personnel;
- Conducting exercises assuming **communication failure.**

4.4. Enhancing emergency planning

Contingency planning comprises the totality of concrete preparations to be made by institutions in the event of a crisis or disaster in order to cope with it effectively. Federal, Länder and local governments are working to further develop multi-level planning, protection and supply approaches for the protection of the population and institutions. In order to ensure and regularly update emergency planning, the following measures are recommended:

- Increasing efforts to ensure that **operational crisis management plans** are drawn up and implemented (see sector-specific recommendations in Action area 3);
- Developing **scenario-specific emergency plans** (see sector-specific recommendations in Action area 3);
- **Teaching** emergency plan writing and **practising and evaluating** emergency plans on a regular basis;
- Establishing continuous, viable and resilient **workforce planning arrangements**, particularly for key sectors of the economy and in critical functions;
- (Further) developing separate emergency plans to **maintain the operation** of relevant industrial facilities, other enterprises of corresponding importance and critical infrastructures;
- Addressing the challenges that disasters pose to **health, drinking water and sanitation** more fully in emergency plans;
- Considering the **needs of separated families** with regard to restoring family contact and clarifying the whereabouts of missing loved ones in emergency planning;
- Considering **psychological issues** in emergency planning with regard to the care of emergency victims and their relatives as well as the aftercare of emergency personnel, developing psychosocial emergency care into an effective integral component of non-police emergency response in the long term and also taking into account appropriate quality assurance, research, regional and supra-regional networking and training opportunities.

4.5. Improving the training of leaders and emergency services

The training systems of the various organisations involved in civil protection are just as diverse as the structures and processes of German civil protection and the people involved. The training and equipment of emergency forces must be continuously adapted to new challenges and local conditions.

The Länder offer a wide variety of training courses, especially on local hazard prevention and disaster management. The Federal Academy for Civil Protection and Civil Defence (BABZ) of the BBK is the central (advanced) training institution of the Federal Government in civil protection. With its educational offering, it primarily addresses managers and disseminators at all administrative levels who are concerned with issues of civil security preparedness. In addition, the BABZ offers opportunities for information exchange, mutual networking and further development in relevant civil protection topics related to civil defence. The (advanced) training institutions of aid organisations, fire departments and the THW, with their often regionally specific needs coverage, are an important and complementary building block for maintaining resilience in the regional context. The following measures are recommended in order to improve the conditions in the area of education and training and to be able to exploit new opportunities through digitalisation:

- Integrating disaster risk management and resilience enhancement into **curricula** for civil protection **training programmes** (see Measures 1.5, 3.2 and 3.10);
- Establishing mandatory **crisis team training** for managers;
- Promoting and establishing **tools** such as coaching and job shadowing among **crisis management** leadership and operations staff;
- Expanding **professional cooperation** among civil protection education providers and other education stakeholders such as universities;
- **Bundling** similar **stakeholder interests** to effectively utilise resources and offerings, e.g. through collaborations in the development of online learning platforms.

4.6. Offering better incentives for voluntary work

Volunteerism is a key resilience factor in protecting the population. The integrated civil protection system in Germany is largely supported by volunteers – in aid organisations, fire departments and the THW. For example, some 1.7 million civil defence and disaster response personnel volunteer their time, receive training and are regularly deployed.

The high efficiency of this mostly volunteer-based emergency organisation has been proven by the operations of the past 70 years. In the THW, more than 80,000 volunteers (97 percent) perform their service in civil protection.

In the long term, however, a decline in the number of available volunteer forces is to be expected, due in part to demographic change, increasing mobility and changing lifestyles and social structures. At the same time, the professional requirements for the tasks are increasing. Opportunities to recruit volunteers from all age groups for voluntary work and to develop initiatives and innovative volunteering projects are important for strengthening civil protection in Germany in the long term. In order to promote, honour and raise the profile of volunteering as a whole, the *Deutscher Engagementpreis* has successfully established itself as an umbrella prize for volunteering. Civil protection projects are regularly nominated and awarded. The BMI's "Helping Hand" sponsorship award is another successful example that honours the efforts of volunteer helpers and publicises new initiatives to strengthen volunteer involvement in civil protection.

However, such measures of recognition cannot guarantee the availability of volunteers for disaster management in the long term, especially in rural areas. The appreciation, promotion and

support of volunteerism are, therefore, central concerns of government agencies at all administrative levels of civil protection in Germany. In addition to the already-established measures, the following measures are recommended:

- Conducting a thorough **inventory** of the general conditions for volunteer involvement in civil protection in Germany;
- **Examining innovative approaches** that could help increase volunteering, taking greater account of activities by other stakeholders such as the German Foundation for Commitment and Volunteering, for example with regard to better compatibility with family and work, and demonstrating the tangible benefits of volunteering in civil protection and disaster management;
- Promoting **diversity** in volunteering and, for example, attracting social groups to participate that are currently still underrepresented in the structures of volunteering;
- Promoting **initiatives and programmes** that advertise volunteerism in a targetgroup-specific manner, systematically considering the needs of people in different life phases in order to enable participation – e.g. by offering childcare during assignments;
- Improving **acceptance** of volunteerism on the part of employers;
- Enhancing the professional, social and operational competencies of operational, managerial, and technical staff through **training opportunities**;
- Better integrating **non-classically trained volunteers** and, for example, training of groups of "unskilled volunteers" via social media;
- Identifying opportunities for the use of **unaffiliated spontaneous helpers** and organisations outside of traditional disaster management (e.g. citizens' groups or sports clubs).

4.7. Networking stakeholders, interests and expertise before the crisis

The more complex potential damage situations become, the more importance is attached to the systematic networking of stakeholders for the prevention of, preparedness for, response to, and recovery from serious damaging events. Stakeholders with different expertise should take advantage of opportunities for mutual exchange through committees, round-table meetings and working groups to coordinate the preparation of risk analyses and measures to manage incidents. This involves a systematic exchange of knowledge and results in all phases of disaster risk management in order to be able to ensure a coherent overall process. Early and close cooperation in risk management also lays the foundation for effective and trusting cooperation in crisis management. To promote coordination and cooperation, the following actions are recommended:

- Expanding and strengthening the **Joint Competence Center for Civil Protection** at the Federal Office of Civil Protection (BBK) in order to be able to ensure coordination and a continuous and institutionalised cross-level and cross-organisational exchange of information in crisis management or for analyses and forecasts of national incidents and their effects;
- **Relying on existing steering groups and working groups**, as well as widening access to existing round-table meetings in risk management and crisis situations in order to provide advice and support in the event of a disaster;
- Promoting the **interconnection of prevention of, preparedness for, response and recovery from** serious incidents in existing structures and, if necessary, initiating and promoting new structures for cooperation between different stakeholders (see Measures 2.2 and 2.4);
- Promoting the development of **knowledge management** with regard to preparatory actions;
- Including, formally involving and voluntarily training appropriate **businesses** in disaster response.

4.8. Learning from the crisis

Continuous learning during crises, evaluation of crisis and disaster response and integration of lessons learned into all stages of disaster risk management provide opportunities to improve prevention, preparedness, response and post-disaster recovery based on real-world stress tests. For example, the Covid-19 pandemic highlighted the need to maintain a stock of personal protective equipment and medical supplies in addition to a stock of medical supplies.

Crises or disasters are, therefore, also a special opportunity for transformative change and can help to make existing systems more efficient and sustainable. Depending on the nature of the disaster, reconstruction also affects economic and social structures. After the financial crisis, the financial system had to be restructured; during and after the Covid-19 pandemic, volunteer structures, etc. had to be rebuilt and, in some cases, re-established.

For a systematic learning process to move from the management of a crisis or disaster situation to the reconstruction and rehabilitation phase, the following measures are recommended:

- Establishing post-disaster analysis **dialogue forums** in which all affected policy areas, levels and stakeholders can participate and incorporate their findings into recovery strategies and plans;
- Developing processes for the **documentation and dissemination of *"lessons learned"*** and making results available, especially for politics and public administration;
- Giving greater consideration to lessons for resilience and crisis response at the **European level** in national "lessons learned" and planning processes;
- Identifying topics and subject areas and conducting **scientific studies** on opportunities for sustainable and improved reconstruction in order to drive social or economic **transformation processes**, e.g. regarding topics such as digitalisation or climate protection (see also sector-specific recommendations from Action area 3);
- **Regularly reviewing and evaluating** government funded **projects and emergency measures** in civil protection (see sector-specific measures in Action area 3);
- Investing in civil protection **equipment**, especially in order to be adequately equipped to **deal with future climate-related events.**

5. International cooperation

Disasters regularly confront people with immeasurable suffering and great need, especially in crisis and conflict regions and developing countries. They lose their livelihoods, slide into poverty and find themselves forced to leave their homes. These disasters pose enormous challenges, increase humanitarian needs worldwide and can set back the sustainable development efforts of affected countries by decades. The main triggers are extreme weather events, earthquakes, health crises, environmental damage and other human-induced disasters. The consequences of climate change, population growth or, for example, the expansion of settlement, and industrial and agricultural areas in risk areas can exacerbate the effects in the course of cascading effects.

Particularly in states and regions affected by crisis, conflict, fragility and violence, vulnerable populations face multiple disadvantages, as their resilience is already weakened, and state structures often have insufficient capacity to adequately protect their populations from disasters.

The consequences of climate change are particularly devastating for developing countries and small island states, which have contributed comparatively little to global climate change and often lack appropriate adaptation, preparedness and coping capacities. In crisis and conflict regions, disasters can not only additionally worsen the humanitarian situation of the people but also act as crisis and conflict amplifiers, e.g. as a result of distribution conflicts due to the scarcity of (natural) resources such as water.

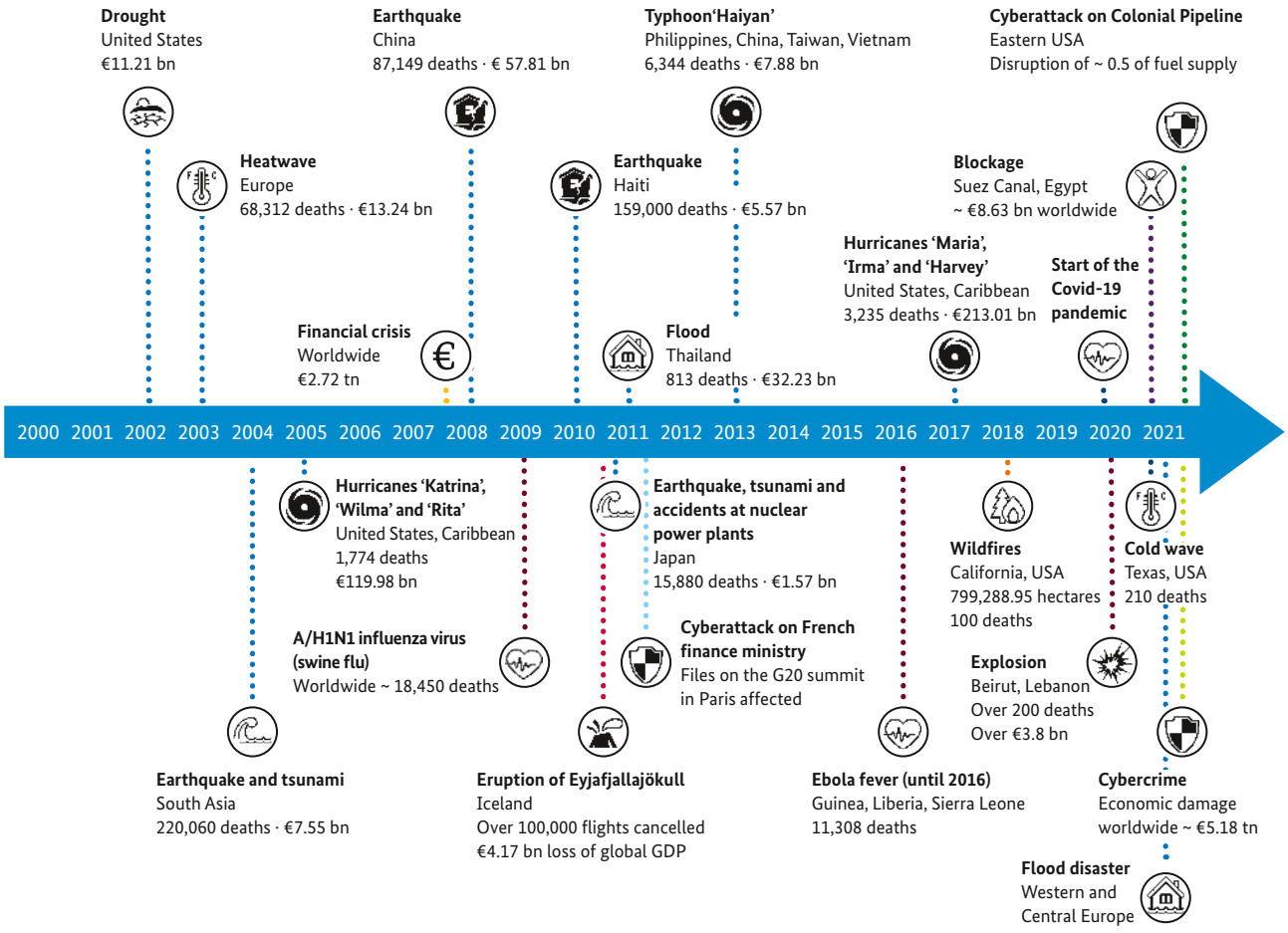

Figure 8: Selected incidents and disasters worldwide between 2000 and 2021 (Source icons: Getty Images/various artists).

Through a comprehensive understanding of disaster risks and appropriate management of these risks, Germany and its partners can help to prevent extreme events from causing disasters in the first place, reduce the human cost of unavoidable disasters, strengthen local structures and support sustainable development. To address these complex challenges, the Federal Government is committed to a comprehensive, forward-looking approach to disaster risk management. Disaster risk management and disaster preparedness, for example, are considered as cross-cutting issues in projects that the German government supports internationally. In this context, humanitarian assistance and development cooperation play a crucial role as central, interlinked components of the German government's international co-operation. Dealing with climate-related crises and disasters in a risk-informed manner is an integral part of modern crisis prevention and is also addressed in the relevant guidelines of the German government, such as the guidelines "Preventing Crises, Managing Conflicts, Promoting Peace". Close coordination of actions can succeed in reducing vulnerabilities in the world's most affected states. It can strengthen capacities so that communities, civil society, the private sector and governments can incorporate different risks into their decision-making and take proactive action accordingly. This strengthens the resilience of affected states and can save lives, reduce suffering and stem economic losses.

5.1. Supporting the use of comprehensive risk analyses

Risk analyses form the basis for disaster risk management and preparedness measures, enabling forward planning adapted to local needs. Those affected, the public and private sectors, including civil-society stakeholders, are involved in the analysis while being supported in making risk-informed decisions. Together with its partners, Germany supports participatory and comprehensive risk analyses, as these raise risk awareness, expand access to emergency preparedness information among the local population and enable various stakeholders to take an active role in disaster prevention and preparedness. Disaster risk management and preparedness should thereby – where possible and appropriate – follow the multi-hazard approach described above and analyse risks systemically. This is especially true in relation to advancing climate change and rising pandemic risks, but also in the context of urban and fragile settings. Particular attention must be paid to vulnerable groups (e.g. people affected by extreme poverty, refugees, families separated when escaping, internally displaced persons and people displaced as a result of disasters and climate change; see Measure 3.13). This includes, in particular, vulnerable people who do not have the opportunity to migrate ("trapped populations").

Risk analyses capture both the probability of occurrence and the expected extent of disasters. Maps for heavy rainfall and flood risks are one example. Relevant information is collected, modelled and analysed, and capacities for adaptation and disaster response are identified. The subsequent risk assessment highlights strengths and weaknesses of risk management and disaster risk reduction. Based on this, various options are outlined for preventing or minimising risks as well as reducing vulnerabilities and strengthening response capacities – especially at the local level. Climate change is increasing the frequency and intensity of extreme weather events. These effects must, therefore, also be given greater consideration in risk analyses and the measures derived from them.

5.2. Strengthening cooperation with civil society

The Sendai Framework for Disaster Risk Reduction 2015–2030 does not only target action at state level. Rather, different expertise and perspectives should be taken into account by involving stakeholders from different sectors and levels (government, civil society, academia, private sector). Only in cooperation with the local population can the existing potential for identifying risks and strengthening resilience be fully exploited. Risk-informed action also involves the community level and supports the interaction of relevant stakeholders at all levels. For example, mechanisms for civil-society participation and support can be strengthened at the national level. The German government therefore promotes the active and early involvement and participation of civil-society stakeholders in national and local decision-making processes.

To reduce the level of suffering and impoverishment caused by disasters, the needs of vulnerable and marginalised populations should be given special consideration in national and local crisis response plans. In line with the principle of "leaving no one behind", the German government therefore supports local civil-society organisations as well as national and international partners working to promote community-based and inclusive disaster risk management and disaster preparedness.

Vulnerable and marginalised populations may be particularly at risk due to their physical and/or mental state (e.g. people with disabilities, the elderly) and/or due to their particular social situation (e.g. people who are refugees or have a migrant background), as they are often particularly hard hit by sudden-onset disasters.

5.3. Enhancing governance

Professionals and individuals with decision-making responsibilities in institutions and organisations are empowered to improve and implement the various tools of disaster risk management and disaster preparedness in government, private sector- and civil-society settings. By building and strengthening capacities, the government, private-sector and civil-society processes and frameworks for dealing with risks are improved and, where possible or available, integrated into existing structures. Promoting inclusive and participatory crisis management processes and institutions can also make an important contribution to strengthening the transparency and capacity of state stakeholders. The skills to be imparted range from technical expertise and methodological competencies to process knowledge, such as the systematic and cross-sectoral consideration of risks in urban and spatial planning, the handling of health risks, the development of meteorological early warning systems or the interdependencies of climate, security and migration.

Germany, in cooperation with its partners, ensures that capacity building is always adapted to the needs of the target group. To this end, participatory methods are being expanded at the local level and cooperation between state and non-state stakeholders is being improved. It is essential to develop national legislation that defines how responsibilities should be allocated before, during and after impending disasters and how cooperation among relevant stakeholders is shaped in these phases. Only holistic legislation on a national level can ensure that preparedness for and response to potential disasters are effective and efficient from the national level to the community level. Since disaster situations often take on regional dimensions, cross-border exchanges between neighbouring states and the anchoring of disaster prevention principles in the internationally applicable legal framework also play an important role and are promoted accordingly. It is also important to involve citizens as early as possible so that social values and needs can be taken into account at an early stage in a two-way exchange between civil society and politics.

5.4. Promoting risk-informed planning and development

Sustainable development takes into account multiple, interdependent, dynamic, trans-boundary, broadly systemic risks, sometimes occurring simultaneously. Progress achieved to date, such as poverty and disease reduction or improved health and education, can be jeopardised by a wide range of risks, especially in fragile contexts. These include negative impacts of climate change (e.g. intensified resource conflicts), economic and financial instability, pathogens, transnational criminal networks and cyberthreats. Often, different events or risk dimensions reinforce each other. These cascading effects additionally increase the complexity of the risk situation and make a holistic approach even more necessary.

Risk-informed planning and development help fill gaps where governments focus exclusively on post-disaster response and neglect structural prevention and disaster risk reduction or where agencies focus only on the risks of their own sector and do not coordinate sufficiently with other sectors. Specifically, this approach aims to strengthen the competencies and capacities of institutions and individuals with decision-making responsibilities, e.g. with regard to participatory planning and decision-making processes for projects and investments. This means that the above-mentioned risks can be systematically analysed and evaluated. The data used as a basis (evidence base) regarding possible impairments to sustainable development is also being prepared and improved. Another aim is to stimulate processes that help stakeholders deploy their resources effectively and early in terms of comprehensive risk management strategies.

Disaster risk management, for example, allows risks to be systematically incorporated into national land-use and development planning, contributing to long-term, risk-informed development. Adaptive planning and development approaches can thus provide robust and flexible solutions even in the face of unexpected events. The corresponding planning precautions and protective measures are to be coordinated across borders and, if necessary, implemented cooperatively.

5.5. Linking international, regional and national approaches

In common global frameworks, the international community is addressing a growing number of disaster risks. Mutual exchanges have already resulted in a common understanding of disaster risk management approaches. Germany is committed to international dialogue with the scientific community as well as regionalisation of knowledge sharing in high-risk regions worldwide. In addition, Germany promotes the coherent implementation of the post-2015 agendas and supports many initiatives and programmes, such as the International Agricultural Market Information System (AMIS), through financial contributions and collaboration. In this way, the Federal Republic helps to increase the effectiveness of the projects, work and international partnerships it supports. It also relies on comprehensive risk management, which includes sustainability and climate protection as elements of risk management, as well as the integration of humanitarian assistance and development cooperation.

One example of interconnecting international and national approaches in the field of climate risk management is the Climate Watch System, which the DWD coordinates as part of its management function as the Regional Climate Centre for Europe of the World Meteorological Organization (WMO). In this context, climate watch advisories (early warnings) for upcoming weather events in the next two to four weeks (heat and cold waves, periods of heavy rain and drought) are issued for larger areas within Europe and sent to the national weather services. Sophisticated warnings can then be created at the national level for areas within each country.

Another example is Earth observation or the measurement and mapping of the Earth's surface, e.g. to describe changes in sea level or the movements of the Earth's crust. For this purpose, positions must be determined very precisely and uniformly in all states. International cooperation to harmonise these methods and data is an important basis for ensuring that states and aid organisations can act efficiently and effectively in the event of a disaster.

5.6. Promoting multilateral cooperation

The German government is committed to effective disaster risk management and disaster preparedness, promotes intensive international exchange and provides important financial resources for this purpose. Numerous conferences and platforms at global and regional level offer versatile opportunities for exchange and cooperation. These include, for example, the Global Platform for Disaster Risk Reduction, the InsuResilience Global Partnership, the Platform on Disaster Displacement, the Global Dialogue Platform for Anticipatory Humanitarian Assistance, AMIS and web services such as the Platform for Exchange on Environment, Conflict and Cooperation, the Fiji Clearing House for Risk Transfer and PreventionWeb: The Knowledge Platform for Disaster Risk Reduction. Beyond traditional bilateral cooperation, Germany represents its interests in international and multilateral bodies and organizations. Close cooperation with, for example, the UN (FAO, WHO, WMO, etc.), the Red Cross and Red Crescent Movement, the World Bank, regional development banks and non-governmental organisations (NGOs) can efficiently harness cross-state and cross-sector expertise for the global community. In the field of meteorology, these are in particular the WMO's Disaster Risk Reduction initiatives. In the event of a disaster, the AMIS Rapid Response Forum helps stabilise international food markets.

The EU Civil Protection Mechanism, through the Emergency Response Coordination Centre (ERCC), the EU Civil Protection Pool and the emergency response reserve rescEU, ensures a concerted and coordinated response by EU member states in the event of disasters originating in natural hazards and human-induced disasters. Close coordination between the ERCC and NATO's Euro-Atlantic Disaster Response Coordination Centre (EADRCC) will also enable the alliance's disaster response capabilities to be harnessed, particularly in large-scale cross-border emergencies. The German government is committed to strengthening cooperation through EU and NATO instruments, as well as closer EU-NATO cooperation in the field of civil protection.

NATO and the EU also provide an important framework for increasing resilience to security and military threats. The German government is committed to ensuring that strategy development in this regard within the EU and NATO is based on a holistic understanding of resilience that aims to exploit synergies between disaster management and civil protection.

5.7. Strengthening participatory and community-based prevention measures

The focus of the German government's international cooperation is on the communities, institutions and countries that are most affected. Germany supports local and national stakeholders in managing existing crises by themselves and reducing the risk of new crises. In this way, an important contribution is made to preventing and reducing the impact of disasters and strengthening resilience. Building on existing structures and capacities in the sense of the do-no-harm approach, disaster management committees, etc. are established or supported together with particularly affected communities, and emergency and evacuation plans are developed or improved. Particular emphasis is placed on a holistic and participatory approach to community-based measures so that precautionary measures can actually be planned and implemented in the affected communities. This ensures that vulnerable groups are made as aware as possible of the measures and that mechanisms can operate effectively in an emergency.

5.8. Supporting social security systems

It is important to design different instruments of government action in a risk-informed way. Social security systems systematically minimise risks and guarantee support through:

- Basic security by means of cash or non-cash benefits, vouchers or other support for drinking water, food, health or subsistence;
- A social insurance system financed by contributions;
- Labour market policies or interventions (preventive as well as active measures such as public employment programmes).

Social protection stabilises people's livelihoods and helps secure sources of income, making them more resilient to shocks such as extreme weather events. In addition to demographic change, the consequences of climate change pose considerable challenges for social security systems. The German government is therefore committed to establishing and expanding adaptive social security systems that provide sustainable protection for everyone and can be used in the event of shocks. Adaptive social protection systems provide a financial and institutional platform to undertake early disaster preparedness measures and implement contingency plans, such as social registries to identify affected individuals and existing channels for transfer payments. It is, therefore, essential to strengthen national institutions and capacities in partner countries and to improve coordination between international stakeholders and different sectors and ministries. Adaptive social protection systems are an efficient and effective way to directly support people affected by disasters.

5.9. Strengthening healthcare systems

Health forms an important basis for sustainable development in our partner countries. Universal health coverage contributes significantly to a more resilient society. Expanding and improving systems that can prevent or detect disease outbreaks early is essential for rapid response, containment and effective management of disease. The holistic and interdisciplinary One Health approach is followed, considering the connections between human, animal and environmental health and focusing on stable supply in the WASH sector (water, sanitation and hygiene). The German government therefore supports multilateral and local stakeholders and governments so that partner countries can build and sustain their core capacities to meet the International Health Regulations and thus contribute to national and global health security. Especially in fragile contexts, status-independent primary healthcare is necessary to enable access to medical treatment for all people. In addition, the German government is working with partner countries to sustainably strengthen and expand state healthcare systems, including improved health risk identification, early warning and response capacity for outbreaks of infectious and highly contagious diseases.

5.10. Encouraging risk finance and risk transfer

The Federal Government has set itself the goal of protecting those affected by disaster risks more effectively. Part of this is that imminent disasters can often be anticipated. With the help of risk models and short or medium-term extreme weather forecasts, as well as measures based on these forecasts, affected people and communities are encouraged to prepare themselves in order to avoid human suffering and reduce damage. In doing so, the German government relies on a strong network of NGOs, the International Federation of the Red Cross and Red Crescent Movement (IFRC) and the UN to further develop this approach and firmly anchor it in international cooperation. The aim here is to close the gap that has existed to date between disaster risk reduction and immediate relief following a disaster. To this end, early warning protocols are being developed, among other things, as part of approaches to forecast-based humanitarian assistance (forecast-based financing) in particularly affected communities. The early warning protocols serve to identify impending disasters at an early stage so that anticipatory actions can be taken in advance and thus reduce the risk of significant loss of livelihoods. The Federal Government also supports the development of instruments that spread the risk from individuals or individual states and shift it to a solidarity community. For example, innovative financial and insurance instruments such as climate risk insurance for smallholder farmers or micro-enterprises and risk pools for states provide rapid financial support before or after the occurrence of an extreme event. In this way, people's livelihoods can be secured or quickly restored. These solutions should be embedded in comprehensive disaster risk management strategies so that they can help relieve the pressure on government finances by transferring risk to the private sector. Also crucial is the necessary financing for reconstruction, which can be ensured, for example, through climate risk insurance payouts or the accumulation of contingency reserves in the national budget. It enables governments to access funds promptly after disasters without having to shift government budgets or depend on international aid money. In this context, Germany launched the InsuResilience Global Partnership for Climate and Disaster Risk Finance Insurance Solutions back in 2017, together with the then Ethiopian presidency of the Vulnerable 20 (V20). The partnership's Vision 2025 aims to insure 500 million of the poorest and most vulnerable people by 2025. This six-year work plan aims to further integrate climate risk insurance and finance into resilience and climate adaptation strategies.

5.11. Developing resilient infrastructure

Disasters and cross-border crises, such as the Covid-19 pandemic, underscore the central importance of critical infrastructure because they highlight potential vulnerabilities that can quickly lead to supply shortages and supply chain difficulties. For this reason, the Federal Government is also committed to forward-looking risk analyses in this area in order to be able to determine what impact the consequences of a disaster could have on the infrastructure. Risk analysis and early warning thus strengthen infrastructure, as do concrete investments by development banks in the expansion of resilient infrastructure. The goal must be to increasingly adapt infrastructures to multiple local risks and to build and expand them resiliently from the outset. Infrastructure investments for integrated water resource management (green and grey infrastructure, wastewater systems), for healthcare (e.g. hospitals, stockpiling of medicines) or for transportation and communications (e.g. rail and road networks and telecommunications lines) are suitable for this purpose.

5.12. Strengthening preparation and coping capacities

The expansion of effective civil protection structures serves to improve disaster preparedness. The Federal Government provides targeted support to the most affected municipalities, regions and countries to plan their institutional procedures and responsibilities in advance of a disaster and to establish processes to enable them to act more effectively in the event of a disaster. For example, evacuation plans are drawn up, the logistics of emergency relief measures are planned, e.g. delivery via social security systems, and communication and decision-making are improved. The important thing here is to tailor disaster response planning to the risks at hand and the capacities on the ground, and to test it regularly. The Federal Government also focuses on the needs of particularly vulnerable groups (e.g. people with disabilities, the elderly, separated families).

Early warning systems are an important tool to better prepare for disasters and include three main components: forecast, warning and response. The Federal Government supports its partners with regard to cooperation between the various authorities and organisations at the global, national, regional and local levels, as well as together with the population, e.g. in simulation exercises. For the development of early warning systems, it is important to have clear government structures that can independently ensure the protection of their population in the event of a disaster. Reliable data is also essential. The German government supports its partners with proven as well as new technologies, e.g. in the fields of remote sensing or mobile communications, to ensure that early warning systems are also available to particularly vulnerable and remote communities and are adapted to their specific needs.

5.13. Supporting resilient reconstruction with a developmental focus (Build Back Better)

Disaster-preventive reconstruction (Build Back Better) aims to restore the livelihoods of affected people in the region after a disaster while minimising future risks. Great importance is attached to analysing precisely which current and future hazards and risks the respective structures must withstand in order to make them more resilient and secure when they are rebuilt. Previously gained experiences, the extent of the disaster and the available knowledge about future risks are taken into account together with the respective affected states and the partners on the ground and integrated into the reconstruction process through disaster risk management and disaster risk reduction measures. Among other things, results of risk analyses are incorporated into land-use and development planning so that, e.g. hospitals or schools are not rebuilt in high-risk zones. One example of this is preventive flood protection.

In addition, the result is to show safe alternative locations for other settlement areas affected by disasters. Existing infrastructures can be structurally reinforced, new investments can be protected through the introduction of construction standards and the resilience of infrastructures can thus be strengthened.

5.14. Linking humanitarian assistance and development cooperation

The Federal Government has an extensive toolbox that can be applied in international cooperation to improve disaster preparedness, respond more effectively and assist in reconstruction. The German government's humanitarian assistance and development cooperation also play a crucial role in implementing the Sendai Framework through their close interconnection. The Federal Government's goal is to reduce vulnerabilities in the world's most affected states and strengthen capacities so that communities, the private sector and civil society, as well as governments, can incorporate different risks into their decision-making. This enables them to take proactive measures that can improve the protection of the population and help alleviate hardship in the event of an emergency. What matters is a coherent approach that is context-appropriate and responsive to local needs and that sustainably promotes resilience and saves lives.

Part C: Implementation mechanisms

I. Stakeholders, responsibilities and coordination

1. Interdepartmental federal cooperation

The implementation of the Resilience Strategy at the federal level within the framework of constitutional responsibility can only succeed through joint action by the ministries. The IMAG Sendai will act as a steering and coordinating body in the implementation of the Resilience Strategy and will be supported in the future by an interdisciplinary working group. The NKS at the BBK will provide organisational support and neutral technical assistance for the process and is the primary contact for the UNDRR. The NKS will also be available to Länder and municipalities as well as other partners for implementation concerns and will provide expert advice, public relations and networking opportunities.

2. Cooperation between the Federal Government and the Länder

Successful implementation of the Resilience Strategy for Germany or the Sendai Framework "in and with" Germany will require cooperation between the federal and Länder governments, in part because some of the addressed areas also come under the responsibility of the Länder. During the April 2018 meeting of Working Group V (AK V) "Fire Service Affairs, Rescue Service, Civil Protection and Civil Defence" of the Standing Conference of the Ministers and Senators of the Interior of the German federal States, both the work of the NKS for the Sendai Framework as well as the need for and added value of a common strategic vision for its implementation in Germany were presented. In this context, AK V sees the need for the federal and Länder governments, together with the relevant departments, to play a role in fulfilling their reporting obligations to the UN. Planned relevant actions and possible contributions to the implementation of the Resilience Strategy at Länder level are coordinated through existing structures such as those of the chancelleries of the Länder, conferences of specialised ministers and working groups.

3. Cooperation at municipal level

Local governments play a critical role in risk and crisis management. Municipal stakeholders are the first on the scene in the event of a disaster and must also be the first to respond. As lower civil protection authorities, the municipalities are

responsible for protection in the event of major accidents or disasters. Every citizen in every city and municipality can request help at any time via the (rescue) control centres. With their fire protection, technical assistance and CBRN emergency response duties, the municipal fire departments also perform the tasks that are already assigned to the municipalities as mandatory duties under the fire protection laws of the Länder. Urban planning and rural or regional planning, as well as voluntary self-government tasks (e.g. in the health sector), are also central components in the implementation of locallyspecific approaches to prevention and preparedness at the municipal or district level.

The further development of small-scale data (e.g. new digital data) and information systems required for risk prevention will proceed better and faster if the various levels, from the Federal Government to the municipalities, work together. The Federal Government should determine which small-scale data is appropriate for this purpose, and the municipalities should grant access to that data in an unbureaucratic manner.

Insofar as small-scale data categories that are useful for the overarching goal of risk prevention have not been collected to date, the Federal Government should collect that data in the execution of its responsibility for crisis prevention and offer it to the respective municipalities for further use.

4. The importance and involvement of non-state stakeholders

In addition to governmental responsibilities in civil protection, effective implementation of disaster risk management is, including at the local, national, regional and global levels, a task for society as a whole that requires the will, knowledge, experience and resources of different stakeholders i.e., the joint commitment of governments and non-governmental stakeholders. These include:

- Civil society, volunteers, voluntary services, organised voluntary associations and non-profit organisations;
- Universities, as well as institutions and networks in the field of science and research;
- Corporations, professional and trade associations and private-sector financial institutions, including financial regulatory and auditing bodies, critical infrastructure operators and charitable foundations;
- Media outlets.
- Different formats for the further involvement of societal stakeholders in the implementation of the Resilience Strategy are to be established within the framework of a National Platform and the *Fachtagung Katastrophenvorsorge*.

5. Cooperation with international stakeholders and other states

The federal ministries implement disaster risk management measures in the international environment within their respective areas of responsibility. Through humanitarian disaster risk reduction, the AA helps to anticipate and proactively prevent or reduce impending humanitarian needs and strengthen the response capacity of humanitarian stakeholders in the face of future disasters. Where humanitarian needs nevertheless arise, it helps to address them as quickly as possible to enable survival in dignity and safety and to alleviate the suffering of those who cannot overcome their acute emergency on their own.

The German Federal Ministry for Economic Cooperation and Development (BMZ) promotes comprehensive risk management in the context of development cooperation. Through this approach , the BMZ supports the implementation of the international agendas for sustainable and urban development, climate change mitigation and adaptation and disaster risk management, and helps to increase the effectiveness and resilience of funded projects and international partnerships.

Disaster risk management is anchored as a cross-cutting task in development programmes, for example, ones that seek to promote health, infrastructure, water access, food security, urban rural or regional development, adaptation to climate change and climate protection.

The BMI is committed to civil protection internationally and maintains intensive cooperation with European states, particularly in civil protection, with regard to the resilience of critical infrastructures and cybersecurity. Other topics of international cooperation in the BMI's portfolio include geo-information, satellite-based remote sensing and SDG reporting.

As part of its international urban development policy, the BMWSB is committed to strengthening urban resilience by, inter alia, improving municipal capacity to act in the face of global challenges.

The BMDV and the DWD, are committed to the areas of early warning for weather events, risk analyses and climate forecasts, among other things.

The BMUV deals internationally with issues of climate adaptation and climate change mitigation, especially natural climate protection and nature-based solutions, but also with sustainable energy policy, biodiversity conservation, protection of forests, oceans and soil, and protection against hazardous substances. Furthermore, protection against the dangers posed by radiological emergencies is on the BMUV's agenda, to which it contributes through cooperation at the International Atomic Energy Agency and by means of cross-border cooperation in radiological emergency protection with neighbouring states.

The BMBF promotes international cooperation in science, inter alia, through bilateral cooperation in the field of civil security research and sustainability research. The BMBF's climate and climate adaptation research also relies on international cooperation in order to take adequate account of the global aspects of climate change and to assume international responsibility, e.g. with the West African Science Service Centre on Climate Change and Adapted Land Use and the Southern African Science Service Centre for Climate Change and Adaptive Land Management, as well as in research on the sustainable development of urban regions.

The Federal Ministry of Food and Agriculture (BMEL) supports AMIS with financial contributions as well as through cooperation, thus contributing to an improved data situation and ultimately to greater market transparency. This helps to better prevent hunger crises and avoid extreme price fluctuations. In addition, the BMEL has been promoting cross-border and, above all, regional cooperation in forest fire prevention for many years, especially in cooperation with the Global Fire Monitoring Center in Freiburg.

In addition, the secretariat led by Germany/ the BMEL is currently developing a "Forest Risk Knowledge Mechanism" as part of the German chairmanship of the pan-European forest ministerial process "Forest Europe". The mechanism is intended to combine and strengthen transboundary cooperation, exchange and coordination regarding current and future risks of forest degradation and the corresponding adaptation of forests to climate change, thus supporting policy decision-making in the event of risk through timely and targeted information.

Furthermore, the BMEL supports the worldwide establishment of bioenergy through personnel in the Global Bioenergy Partnership (GBEP) and thus strengthens the energy policy resilience of developing countries in particular.

II. Financing

Financing the implementation of the measures in line with the Resilience Strategy is the responsibility of the stakeholders involved and the respective specialist departments within the scope of their respective responsibilities and subject to available budgets.

In principle, it is possible that financial burdens or additional personnel requirements may arise for the measures listed as part of the Resilience Strategy or future measures linked to them, which have not yet been taken into account in the current financial planning of the Federal Government. Even if the Federal Government has the necessary powers, these measures can only be implemented if they can be directly, completely and permanently counter-financed or compensated within the affected individual plans or in the political area.

The federal funding database offers stakeholders who need support in planning and implementing measures for prevention, preparedness response and recovery in Germany an initial overview of existing federal, state and EU funding programmes. **Selected examples are given below.**

There are relevant BMBF funding programmes for research in the field of civil protection. The "Research for Civil Security" framework programme addresses the entire resilience cycle, from disaster and risk prevention to overcoming and maintaining the functioning of critical infrastructures. In addition, new processes, concepts and strategies for transdisciplinary management of extreme water events are being developed in the federal programme "Water: N – Research and Innovation for Sustainability" with the funding measure "Extreme Water Events – WaX".

In the field of climate research and climate change adaptation, e.g. in the funding measures ClimXtreme – Climate Change and Extreme Events, Urban Climate in Transition and Climate Resilience through Action in the City and Region, transdisciplinary and needs-oriented research is carried out to overcome the regional challenges of climate change and to increase climate resilience.

As part of the Federal Government's health research framework programme, the BMBF also offers funding opportunities for pandemic prevention and management. The other departments also promote elements of disaster risk management in their respective areas of responsibility. Ones worth mentioning here are the funding of measures to adapt to climate change by the BMUV and GAK, one of the BMEL's national funding instruments, with the two special framework plans "Preventive flood protection" and "Coastal protection measures as a result of climate change", which are technically supervised by the BMUV.

With the federal programme for the "Adaptation of urban areas to climate change", the BMWSB supports conceptual and investment projects with high effectiveness for climate change mitigation (CO_2 reduction) and climate adaptation, with high technical quality, with above-average investment volume or with high innovation potential. In addition, the BMWSB supports innovative ideas and approaches for the creation of resilient structures in cities and communities with the project call "Post-Corona-City" within the joint initiative National Urban Development Policy.

The BMEL and the BMUV also jointly fund projects through the "Forest Climate Fund" that are intended to increase the resilience of forest ecosystems to the consequences of climate change and preventive measures to avoid and deal with large-scale damage events such as forest fires.

The AA conducts humanitarian disaster risk reduction activities before, during and after crises and disasters as part of humanitarian assistance only when there are humanitarian needs and a specific vulnerability of the population to disasters. In these cases, AA supports its humanitarian partners on the ground (NGOs, UN and IFRC organisations) to respond appropriately to imminent and acute crises, to better prepare for disaster risks and to mitigate or even avoid human suffering and loss of livelihoods through targeted disaster risk reduction and anticipatory action. The AA is also committed to systematically embedding forward-looking funding mechanisms across the whole humanitarian system. Therefore, it provided, for example, significant resources for the establishment and functionality of the specific

funding window for forward-looking humanitarian assistance, including in the IFRC's Forecast-based Action by the Disaster Relief Emergency Fund, administered by the UN Office for the Coordination of Humanitarian Affairs (UNOCHA), and the Start Fund, administered by an NGO network.

Bilateral government development cooperation promotes state capacity building in disaster risk management. The funds are used by the governmental implementing agencies for development cooperation (Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), German Development Bank (KfW), Federal Institute for Geosciences and Natural Resources). The Engagement Global Service Agency promotes innovative projects by NGOs, municipalities and the private sector. Disaster risk management is also one of four areas of action for structure-building transition assistance. It is therefore also supported with development cooperation funds within resilience and reconstruction programmes of international organisations, e.g. through the World Bank (Global Facility for Disaster Reduction and Recovery), UN, IFRC, GIZ, KfW and German NGOs. In addition to reducing risk, these funds are used to bring about further improvements, e.g. in terms of income and access to basic services and infrastructure. Substantial funding from multilateral development policy flows into international climate and disaster risk management initiatives (e.g. the InsuResilience Global Partnership on climate risk financing). As part of the German government's commitment to international health policy, the BMZ also contributes funds that support crisis response approaches, such as pandemic response. Ad hoc increased core contributions, which go to international organisations such as the United Nations Development Programme (UNDP) and the International Bank for Reconstruction and Development (IBRD), also support disaster-resilient reconstruction in response to crises (e.g. Covid-19).

In addition, the German government supports mandated UN organisations, the IFRC and various NGOs as part of international cooperation in disaster risk reduction and management.

In the area of health, the Hospital Structural Fund can be used to support projects of the Länder that contribute to improving structures in hospital care (e.g. the project to improve the information technology security of hospitals). In addition, the Hospital Future Fund offers the Länder the opportunity to take advantage of funding for hospitals to implement a wide range of measures in the area of digitalisation. The prerequisite for this is that a minimum share of the funding for the respective project benefits the improvement of IT security so that the resilience of hospitals against corresponding attacks increases.

As part of their research activities, the BMWSB and BBSR support the implementation of precautionary risk management in regional planning and development through model regional planning projects and as part of the Shaping Regions Programme (funded by the Federal Rural Development Programme). Likewise, resilience and risk prevention, as well as risk management in the context of building cultural heritage, are the subject of various research and model projects in the innovation programme Zukunft Bau and in the research programme Experimental Housing and Urban Development (ExWoSt).

The individual **Länder** also **offer a wide variety of funding programmes.** One example is the promotion of training courses for fire departments and aid organisations involved in disaster management.

At the European level, a number of additional funding opportunities are available from the **European Structural and Investment Funds** for measures in the areas of disaster prevention and management and adaptation to climate change. The **European Regional Development Fund** supports regions with development deficits and structural problems, as well as measures of European territorial cooperation. Within this framework, funds can also be used for climate change adaptation and disaster prevention and response.

The **European Agricultural Fund for Rural Development (EAFRD)** supports investments in sustainable and crisis-resistant agriculture. The new Common Agricultural Policy (CAP) Strategic Plan Regulation continues the possibility of promoting risk instruments (e.g. insurance against production and revenue losses) already provided for in the previously applicable EAFRD Regulation, which has the objective of crisis resilience to improve food security. Also eligible for EAFRD funding are:

- Measures aimed at climate protection and adaptation, such as water retention in the landscape;
- Flood and coastal protection measures;
- Consulting services covering a wide range of topics, including aspects such as combating antimicrobial resistance (One Health), and risk instruments;
- Forestry investments, including for forest fire prevention, reforestation and climate adaptation;
- Construction measures, measures taken by associations (e.g. the fire department) and broadband expansion in the area of rural development.

Mention should also be made of the EU Solidarity Fund, which provides financial support for relief and reconstruction measures following severe disasters caused by natural hazards. Specifically, for the research sector, the EU's Horizon Europe research framework programme provides research funding for collaborative research projects in the thematic areas of risk management and resilience enhancement, particularly through the "Civil Security for Society" cluster. Thematic links can also be found in other areas of Horizon Europe.

In addition, there are a variety of civil-society and private funding opportunities from foundations and other institutions, as well as funding through international qualification programmes in the context of exchange and continuing education programmes.

All investments and other additional requirements resulting from the Resilience Strategy are to be counter-financed in the respective individual budgets.

III. Progress monitoring

In order to measure the progress made in implementing the Resilience Strategy, qualitative reporting will be carried out. The synergies that have emerged from the Sendai Framework process in Germany and the assessment of risk management capabilities through the Union process form the basis for the 2018 Federal Risk Management Capability Assessment Report. The representations in the report are qualitative in nature, refer to the national and subnational levels, take a multi-hazard approach and do not claim to be exhaustive. This report represents the starting point for an update. The triennial progress reports are intended to present initiatives and actions taken that have contributed to improving risk management and increasing resilience to disasters.

The information and structure of the progress reports should – where possible – provide a double benefit for other relevant national and international reporting requirements. Internationally, the reporting system of the Sendai Framework for Disaster Risk Reduction, on the basis of which all states report, is also to be fulfilled. As part of the mid-term review of the implementation of the Sendai Framework in 2022, member states submit a voluntary national report. Within the seven global goals (A–G, see Fig. 9), 38 indicators have also been developed for annual reporting. More than 25 of these indicators have a dual function and simultaneously contribute to measuring progress on the global SDGs (1 – No Poverty, 11 – Sustainable Cities and Communities and 13 – Climate Action).

The Federal Statistical Office (DESTATIS) is responsible for reporting on the sustainability goals in general.

These global indicators are mainly quantitative in nature. They are intended to measure the impact of measures taken. The recommendations listed in Action area 1 “Understanding disaster risk” aim to optimise collection options for quantitative and qualitative data and thus make it possible to show the effects of measures taken in and by Germany.

Coordination of national monitoring of this Resilience Strategy and international reporting on the implementation of the Sendai Framework is part of the range of tasks of the NKS, based at the BBK.

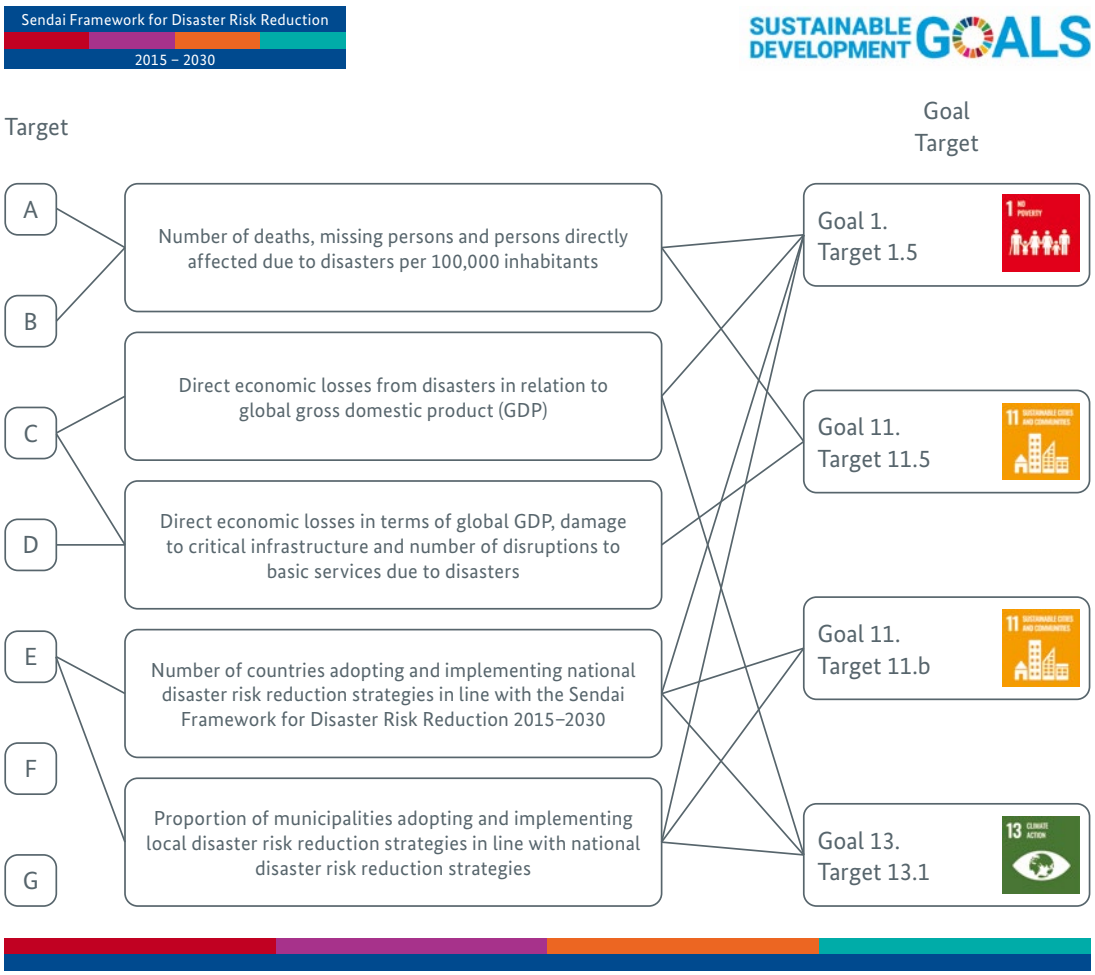

Figure 9: Overlap between the goals of the Sendai Framework and the SDGs (modified according to UNDRR).

IV. Outlook

Disasters can only be effectively and sustainably prevented, reduced and managed through the joint efforts of a wide range of institutions and stakeholders.

With three goals, five Action areas and recommendations for measures in the national context as well as for international cooperation, this strategy provides a guiding framework for diverse stakeholders, institutions, sectors and levels. The overall goal is to help to strengthen a resilient society in the face of disasters.

The following next steps are planned as **milestones in the strategy process:**

- Expanding interagency collaboration in the Sendai IMAG in the second half of 2022;
- Initiating a dialogue and participation process in 2022 and 2023 to trigger cross-departmental, cross-level and cross-stakeholder implementation mechanisms for the Resilience Strategy;
- Preparing the first progress report regarding the implementation of the Resilience Strategy in Q2 2025.

In addition, the Resilience Strategy does not formulate any fixed targets for implementation. The addressed stakeholders, sectors and institutions of all levels of action are called upon to translate relevant aspects into concrete action measures or topic-specific implementation plans according to their competencies and capacities. The synergies and intersections of individual and joint efforts are supported by the aforementioned structures and recommendations of the Resilience Strategy.

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Glossary

The terminology used in this Resilience Strategy is not used consistently by all stakeholders at the different levels of action. For example, terms that have become established internationally are sometimes translated differently in Germany. For linguistic simplicity, the Resilience Strategy uses mostly standard terms. In order to distinguish different meanings, both the national and the international definitions are given in this glossary.

Aid Organisation
Organisation with the task of helping people or animals in need or protecting material assets such as specially protected cultural assets. Aid organisations that have committed themselves to participate in civil defence and disaster control and have been generally recognised for this purpose include:

- Workers' Samaritan Foundation Germany;
- German Life Saving Association;
- German Red Cross;
- St John Accident Assistance;
- Order of Malta Volunteers;

The aid organisations mentioned are associations of persons organised under private law and, in the case of the Bavarian Red Cross, a corporation under public law (BBK 2019).

Build Back Better
The use of the recovery, rehabilitation and reconstruction phases after a disaster to increase the resilience of nations and communities by integrating disaster risk reduction measures into the restoration of physical infrastructure and societal systems, and into the revitalisation of livelihoods, economies and the environment (UN 2016).

Cascade Effect
A self-reinforcing chain of events that gradually "cascades" towards a certain outcome.

Civil Defence
Non-military measures within the framework of overall defence, which relate to Article 73(1) of the German Basic Law (Constitution). They are subdivided into maintaining state and government functions, providing goods and services to the population and armed forces, supporting the armed forces and civil defence (BBK 2019).

Civil Protection
Civil protection is the generic term used to describe all tasks and measures of the municipalities and the Länder in disaster management and of the Federal Government in civil defence. Civil protection thus encompasses all non-police and non-military measures to protect the population and its livelihoods from disasters and other serious emergencies, as well as from the effects of war and armed conflict. Civil protection also includes measures to prevent, mitigate and manage the aforementioned impacts (BBK 2019).

Climate Change Adaptation
All measures that contribute to adaptation to the consequences of climate change, which are already unavoidable today. Adaptation to climate change helps people and governments to better cope with its consequences, reduce damage and take advantage of existing opportunities.

Coherence
Policy coherence is extremely important for the balanced implementation of sustainable development. It means developing mutually reinforcing strategies to achieve national goals while avoiding or minimising negative impacts in other policy areas. Policy coherence requires the ability to analyse policy synergies and trade-offs between different policy options in order to develop coherent strategies (United Nations Department of Economic and Social Affairs Capacity Building n.d.).

Crisis
Unstable condition in which an abrupt or significant change is imminent, requiring urgent attention and action to protect life, asset, property or the environment (DIN EN ISO 22300:2020-04).

Crisis Management
All measures to prepare for detection, management, avoidance of further escalation and follow-up of crises.
Crisis management involves the creation of conceptual, organisational and procedural preconditions by governmental and non-governmental stakeholders in order to be able to support the fastest possible return from the exceptional situation that has occurred to a normal state or to avoid an escalation. Crisis management is ideally combined with risk management (BBK 2019).

International definition (Disaster Management):
The organisation, planning and application of measures preparing for, responding to and recovering from disasters (UN 2016).

Critical Infrastructures
Organisations and facilities of major importance to the national community, the failure or impairment of which would result in lasting supply bottlenecks, significant disruptions to public safety or other dramatic consequences (BMI 2009).

International definition (Critical Infrastructure)
The physical structures, facilities, networks and other assets which provide services that are essential to the social and economic functioning of a community or society (UN 2016).

Critical Service
Service provided by operators of critical infrastructures to supply the general public, the failure or impairment of which would lead to significant supply bottlenecks, threats to public safety or comparable consequences (BBK 2019).

Development Cooperation
Development cooperation aims to give people the freedom to shape their lives in a self-determined and self-reliant manner without material hardship and to enable their children to have a good future. It contributes to the sustainable improvement of global economic, social, environmental and political conditions. It fights poverty and promotes human rights, the rule of law and democracy. Development cooperation can contribute to the prevention of crises and violent conflicts and promote a socially just, ecologically viable, and thus sustainable form of globalisation.
As a collective term, development cooperation summarises the services of technical, financial and personnel cooperation. Development cooperation is a task for society as a whole, performed by private and public institutions. Development cooperation services can be provided in tangible form (as loans or grants) or in intangible form (e.g. by providing know-how or training and education) (BMZ 2020).

Disaster
An event in which the life or health of a large number of people or their natural resources or significant material assets are endangered or damaged to such an unusual extent that the hazard can only be averted or the disruption prevented and eliminated if the authorities, organisations and institutions involved in civil protection work together under the unified leadership and direction of the civil protection authority.
The legal definitions of the various Länder differ slightly in some cases (see DIN 13050:2015-04, Terms in rescue services) (BBK 2019).

International definition (Disaster): A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts (UN 2016).

Disaster Risks
Risks related to catastrophes, emergencies and major incidents.

International definition (Disaster Risk):
The potential loss of life, injury or destruction of or damag to assets which could occur to a system, society or community in a specific period of time, determined probabilistically as a function of hazard, exposure, vulnerability and capacity (UN 2016).

Disaster Risk Management
Includes measures in risk and crisis management by different stakeholders in different sectors or thematic and policy areas at different levels against the background of potential disasters, emergencies and major incidents. The objective is to prevent and reduce disaster risks for the population and society and to improve the management of residual risks. For this purpose, all phases of the risk and crisis management cycle are included, namely prevention, preparedness, response and recovery. Disaster risk management consequently contributes to strengthening the resistance and flexibility, or resilience, of society.

International definition (Disaster Risk Management): Disaster risk management is the application of disaster risk reduction policies and strategies to prevent new disaster risk, reduce existing disaster risk and manage residual risk, contributing to the strengthening of resilience and reduction of disaster losses (UN 2016).

Disaster Risk Reduction
Disaster risk reduction includes all actions taken by the government, aid organisations, society and each individual with the goal of reducing disaster risk and mitigating disaster consequences. Disaster risk reduction aims to avoid new risks, reduce existing disaster risk and manage residual risks. All of this contributes to strengthening resilience and flexibility, and thus to achieving sustainable development. In addition, disaster risk reduction encompasses the knowledge and capacity developed by governments, aid organisations, communities and individuals to better anticipate, respond to and recover from the impacts of likely, impending or current disasters (BBK 2019).

International definition (Disaster Risk Reduction): Disaster risk reduction is aimed at preventing new and reducing existing disaster risks and managing residual risk, all of which contribute to strengthening resilience and therefore to the achievement of sustainable development (UN 2016).

European Union Civil Protection Mechanism (Union Mechanism)
Through the Union Mechanism, the EU coordinates, supports and complements the actions and mutual assistance of the participating states of the mechanism in the areas of disaster preparedness and response with regard to disaster risks from natural and human-induced hazards, both inside and outside the Union. Third countries may request support from the EU or the six other participating states. The procedure, which has been in place since 2001, is governed by Decision 1313/2013/EU.

Global Agendas
Global agendas are internationally valid frameworks to which the majority of United Nations member states subscribe. These include the 2030 Agenda for Sustainable Development (New York, September 2015), the Paris Agreement under the United Nations Framework Convention on Climate Change (Paris, December 2015), the Agenda for Humanity (Istanbul, May 2016), the New Urban Agenda (Quito, October 2016) and the Sendai Framework for Disaster Risk Reduction 2015–2030, (Sendai, March 2015).

Hazard
Condition, circumstance or process that can cause damage to a protected good. The multi-hazard approach considers all hazard types (natural hazards, technological hazards, etc.) as part of risk and crisis management (BBK 2019).

International definition (Hazard):
A process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation (UN 2016).

Humanitarian Assistance
Humanitarian assistance supports people abroad who are threatened by or already in acute need due to disasters caused by natural hazards, epidemics, human-induced crises and conflicts or other disasters.

Five different fields of action can be distinguished:

1. Immediate assistance aims to save lives and relieve acute distress immediately after sudden disasters. One example is helping to search for and recover victims after major earthquakes.

2. Emergency aid is provided in prolonged crisis situations when there is no short-term prospect of improvement. Emergency aid measures include, the supply of drinking water or the provision of emergency shelters.

3. Transitional humanitarian assistance provides the link between immediate emergency measures and long-term development cooperation and includes rehabilitation measures that prevent those in need from falling back into life-threatening hardship.

4. Humanitarian disaster risk reduction serves to mitigate the consequences of future crises in advance. These include, work on early warning mechanisms, measures to improve the preparedness of humanitarian stakeholders and affected populations and mechanisms for anticipatory humanitarian assistance.

5. Humanitarian mine and ordnance clearance aims to protect the lives and livelihoods of people in countries and regions where mines and ordnance residues are present, thereby mitigating human suffering and the negative social and economic impacts of such contamination (AA 2020).

Integrated Assistance System
The result of interconnecting the resources of the Federal Government, the Länder and private aid organisations to form the overall system of civil protection. The term also includes the planned interaction of the various governmental areas of responsibility at one level (e.g. civil protection and rescue services). It is often used interchangeably with the term "national assistance system" (BBK 2019).

Major Incident
Incident in which a large number of people are injured, made unwell or otherwise adversely affected and/or considerable material damage is caused (see DIN 13050:2015-04, Terms in rescue services).

One Health
One Health is an integrated, unifying approach that aims to sustainably balance and optimise the health of people, animals and ecosystems. It recognises that the health of humans, domestic and wild animals plants, and the broader environment (including ecosystems) are closely interrelated and interdependent.
The approach mobilises diverse sectors, disciplines and communities at different levels of society to work together to promote well-being and address threats to health and ecosystems while meeting collective needs for clean water, energy and air, as well as safe and nutritious food; taking action on climate change; and contributing to sustainable development (One Health High-Level Expert Panel).

Prevention
Measures to prevent and reduce incidents, including health hazards (BBK 2019).

International definition (Prevention):
Activities and measures to avoid existing and new disaster risks (UN 2016).

Protection Objective
Desired state of a protected good, i.e. any good that is to be protected from damage in the event of an incident due to its non-material or material value (BBK 2019).

Remote Sensing
Remote sensing refers, in particular, to airborne and satellite-based procedures and methods with which information (mostly in pictorial form) about objects, areas and phenomena can be obtained and analysed. Often, remote sensing data refers to aerial and satellite images of the Earth's surface, but it can also be used to explore the Earth's atmosphere or the surface of other planets (BMI 2020).

Resilience
The ability of a society (or system) to withstand or adapt to events while maintaining or regaining its ability to function as quickly as possible (BBK 2019).

International definition (Resilience):
The ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management (UN 2016).

Risk
Combination of the probability of occurrence of an event and its negative consequences (BBK 2019).

Risk Analysis
Systematic procedure for determining risk (BBK 2019).

International definition (Risk Assessment): A qualitative or quantitative approach to determine the nature and extent of disaster risk by analysing potential hazards and evaluating existing conditions of exposure and vulnerability that together could harm people, property, services, livelihoods and the environment on which they depend. Disaster risk assessment includes:

- The identification of hazards;
- A review of the technical characteristics of hazards such as their location, intensity, frequency and probability;
- The analysis of exposure and vulnerability, including the physical, social, health, environmental and economic dimensions;
- The evaluation of the effectiveness of prevailing and alternative coping capacities with respect to likely risk scenarios (UN 2016).

(Disaster) Risk Governance
The system of institutions, mechanisms, policies, legal frameworks and other arrangements to guide, coordinate and oversee disaster risk reduction and related areas of policy (UN 2016).

Risk Management
A continuous, systematic procedure for the targeted handling of risks, which includes the analysis and assessment of risks as well as the planning and implementation of measures, in particular for risk avoidance/minimisation and acceptance (BBK 2019).

Risk Management, Comprehensive
The comprehensive risk management approach supports the implementation of international agendas for sustainable and urban development, climate change mitigation and adaptation and disaster risk management, and enhances the effectiveness and resilience of funded projects and international partnerships. In order to ensure risk-informed development, it combines instruments from climate change mitigation and adaptation, disaster risk management and social protection into an overall approach (BMZ 2019).

Risk Management, Integrated
Procedures for structured and permanent exchange at relevant interfaces in the risk management of relevant stakeholders in civil protection in order to be able to interconnect methods, findings and results in a targeted manner and actively use the associated synergy effects (BBK 2019).

Risk Transfer
Transferring the (financial) risk from individual affected persons to a community or organisations (e.g. insurance companies).

International definition (Risk Transfer):
The process of formally or informally shifting the financial consequences of particular risks from one party to another, whereby a household, community, enterprise or state authority will obtain resources from the other party after a disaster occurs, in exchange for ongoing or compensatory social or financial benefits provided to that other party (UN 2016).

Risk Transfer, Alternative
Alternative risk transfer (ART) is when insurers transfer underwriting risks to the capital markets using special financial instruments. Such instruments represent a further risk policy tool for insurance companies, in addition to classic risk transfer through reinsurance. Insurers and reinsurers can both supplement and replace classic risk transfer through reinsurance or retrocession with the help of ART instruments (BaFin 2013).

Safety Precautions
All actions taken by the government and private parties to protect the public and prevent or manage events before they occur (BBK 2019).

Sector
In this Resilience Strategy, sectors are understood to be thematic and policy areas in which risk and crisis management measures related to emergencies, major incidents or disasters are undertaken.

Social Security
Social security means standing by individuals in emergency situations that can no longer be overcome by their own efforts – whether in the event of illness, accident, need for care, unemployment or old age – and also preventing these emergencies through long-term measures (BMAS 2020).

Social security is a human right and includes all measures that directly support and assist individuals and households to (1) reduce existing poverty and vulnerability (protection), (2) protect them selves from the risks of impoverishment and social decline (prevention) and (3) help them overcome poverty and vulnerability permanently (promotion or "activating social policy"). Risks against which social security provides protection can be individual (illness, unemployment, etc.) or collective (catastrophes, pandemics, etc.) in nature.

Spatial Planning
The different spatial planning levels range from the municipality and the region to the state and federal levels, as well as the European and international levels.

Warning the Public
Informing the public about imminent dangers and/or acute incidents and recommending appropriate action. Thus, warning the public is an area of crisis communication.
Warning the population of "special hazards in case of defence" (civil defence) is the responsibility of the Federal Government, relying on the warning infrastructures of the Länder. These issue the civil defence warnings on its behalf (see Section 1 (2) No. 2 of the Federal Civil Defence and Disaster Assistance Act (ZSKG)).
The Länder are responsible for warnings in the event of a disaster (civil protection), while the municipalities issue warnings in everyday situations relevant to the population (fire protection, technical assistance and public safety). The MoWaS serves as a uniform technical platform at all federal levels (BBK 2019).

International definition (Early Warning System)
An integrated system for hazard monitoring, forecasting and prediction, disaster risk assessment, communication and preparedness activities, systems and processes that enable individuals, communities, governments, businesses and others to take timely action to reduce disaster risks in advance of hazardous events (UNDRR 2017).

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