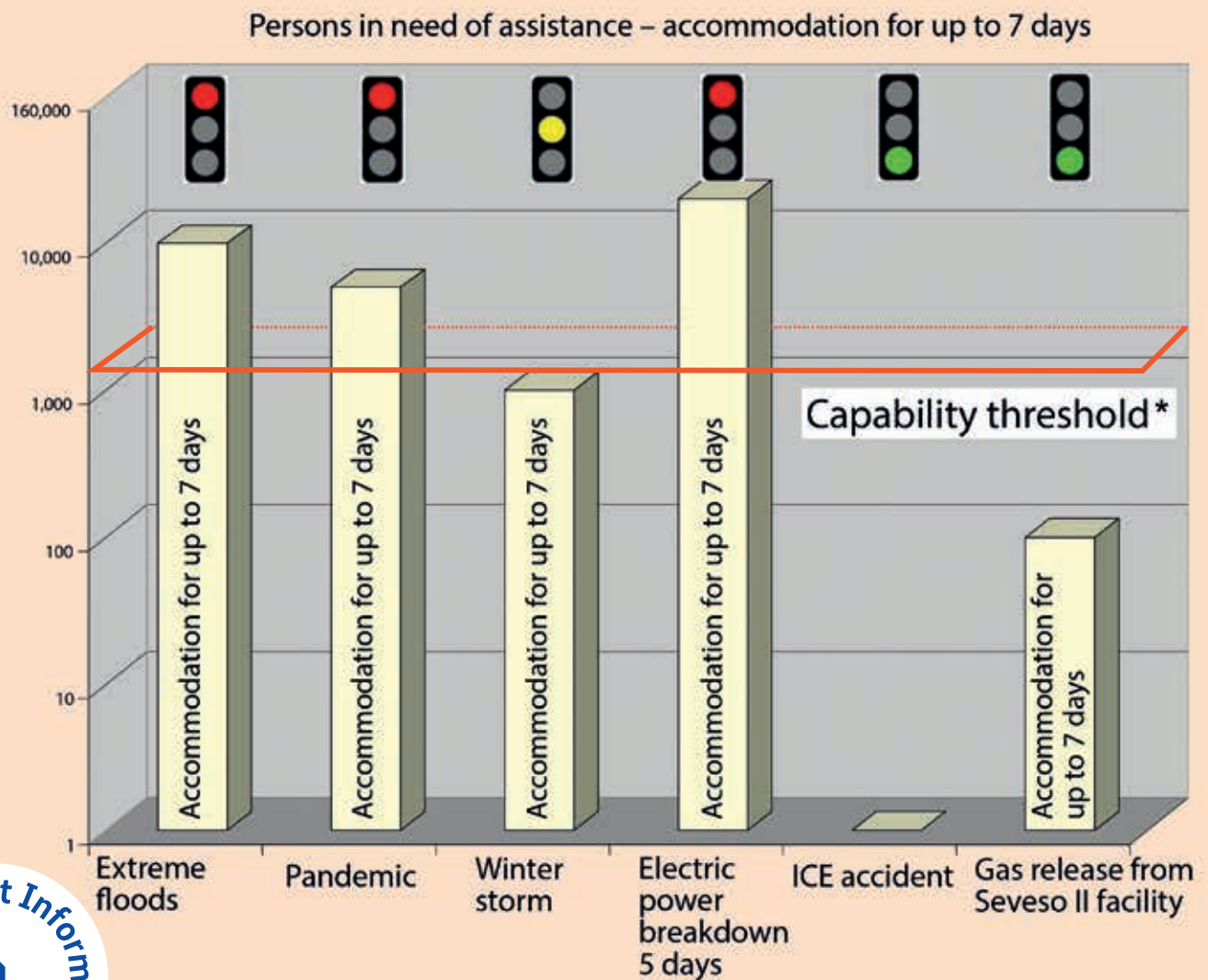




Risk Analysis for Civil Protection

A stress test for general hazard prevention and disaster management



Civil Protection
Practice

Volume 16



Civil Protection
Practice

Volume 16

Manual for Risk Analysis for Civil Protection

A stress test for general hazard prevention and
disaster management

Volume 16 · Civil Protection Practice



Federal Office of Civil Protection and Disaster Assistance



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Foreword



Christoph Unger
President of the Federal Office of Civil Protection and Disaster Assistance

Dear readers,

This manual regarding the method for the risk analysis is primarily aimed at experts in counties and towns that are independent of a Kreis who have been assigned the task of analysing hazard scenarios. The manual describes the general conditions and the precise procedure for the appraisal and assessment of hazards. It also serves as a stress test for the coping capacities of general hazard prevention and disaster management.

The following information aims to help you to analyse hazards systematically and comparatively. A key objective is to make the achieved results easy to understand – i.e. to document them verifiably and comprehensibly. In this way, it can be shown that the competent authorities have actively and comprehensively tackled the issue of preventive civil protection.

The “Method of Risk Analysis for Civil Protection” (BBK 2010) serves as a basis for the procedure presented here. This has been refined by means of pilot projects; to this end, procedures and approaches have been tested, tried out and then applied in practice for the first time in 2013/2014, at a county level in a number of federal states.

This manual provides a suitable basis for your own analyses in the context of risk and crisis management at the level of local disaster management authorities and aims to contribute towards

making it possible for the players in the area of civil protection to be appropriately and effectively prepared for larger-scale emergencies.

We would like to thank the dedicated staff members in the pilot locations, whether they are working full-time or in an honorary capacity, as well as the accompanying and supporting officials from the respective ministries of the interior / senate departments of the interior of a Land and the subordinate supervisory authorities, and everyone else involved. We would be delighted for this manual to make a contribution to the consolidation of a coordinated risk and crisis management system in your jurisdiction.

Bonn, December 2015

A handwritten signature in blue ink, appearing to read 'Christoph Unger', written over a light grey rectangular background.

Christoph Unger
President of the Federal Office of
Civil Protection and Disaster Assistance

Risk analyses have been performed for a long time in the context of general hazard protection and disaster management – even if they may not have been given this name. Even the concept of the stress test – i.e. a situation in which a system is reviewed with regard to its stability through an accepted increase in the stress and pressure – can be referred to as a tried-and-tested method in connection with exercises in hazard prevention. The question of whether a municipality, a town belonging to or independent of a Kreis, or a county is well-prepared for potential risks is therefore nothing new. Due to the increasing awareness of possible dangers and risks, the performance of general risk analyses for whole reference areas is, however, becoming increasingly urgent; the local territorial authorities can no longer avoid performing them professionally and documenting their results comprehensibly.

To this end, this manual aims to provide the appropriate people with the necessary information and tools, and to give them assistance. It is divided into two main sections: one general section and one methods section. The general section explains what the purpose of the risk analysis and crisis management is and why it is essential to implement these.

The responsible people will be provided with arguments to help them to obtain backing and support for such a procedure from competent authorities and amongst the population. In the methods section, the procedure for the risk analysis and crisis management will be presented in detail. In the process, fundamental questions will be addressed, the contents that are necessary for the implementation of the risk analysis and crisis management will be conveyed, and assistance with such an implementation offered with examples and additional links. In-depth information can be taken from the appendices and links.

To make things easier for the people designated to implement the risk analysis and crisis management, a PowerPoint presentation is available in addition to this manual. This presentation summarises the main contents and reproduces them as an overview. It is intended as an aid for the provision of information and training to those involved and to the population and concludes with an interactive question section, in which the knowledge gained can be reviewed.

The resources presented in this manual, e.g. tables and lists, are also available to be downloaded on the website of the BBK: www.bbk.bund.de/risiko-analyse.

Chapter

2

Risiko

Sicherheit

Part I: Why the risk analysis can help to protect people

What not every responsible person may realise is that the performance of risk analyses or “stress tests” is not a new invention, even if the terms were not previously universally used in connection with general hazard prevention and disaster management. For, with or without a legal obligation, “risk analyses” were performed in all the federal states in various different ways in the past too. The preparation of fire protection or hazard prevention requirement plans, the setting up of fire brigades or the procurement of disaster management materials and support for disaster management units, for example, are based – more or less – on the consideration of the reference area and the individual hazard potential and thus on an analysis of the potential risk. However, what has been missing in Germany so far is a uniform methodology for the performance of risk analyses for disaster management and for general hazard prevention, as well as for reviewing what has been planned so far in the form of a real stress test – i.e. the examination of the question

“Am I / are we really well-positioned?”

Note:

Civil protection, therefore, includes all non-police and non-military measures for the protection of the population and the resources which are the basis for their existence from disasters and other serious emergencies, as well as from the effects of wars and armed conflicts. Civil protection also includes measures for avoiding, limiting and coping with the aforementioned events.

Yes, it’s true: performing a risk analysis takes time. It is necessary to research, summarise and visually prepare data. Decisions must be made and documented. But: this effort is worth it!

In Germany, civil protection¹ is essentially based on a system of complementarity and mutual support of everyone involved. This includes both interaction in the specific place of operation (crisis management) and preparedness and adaptation, as well as preparation for a specific event (risk management). In this context, risk management is understood to mean a continuous, systematic process for the targeted handling of risks. In this procedure, which is designed here for the jurisdiction level of counties and towns that are independent of a Kreis – and thus for the local disaster management authorities, the analysis and evaluation of risks with regard to the planning and realisation of disaster management measures (especially for the avoidance, minimisation and acceptance of risk) are taken into consideration. Equally, the process can also apply to the responsibility for general hazard prevention at the level of towns belonging to a Kreis and municipalities.

Risk analysis
for civil protection

General preparatory work

Risk analysis method

Evaluation

1 Civil protection is a general term to describe all the tasks and measures undertaken by the local authorities and the Laender for disaster management, as well as those undertaken by the Federation for civil protection.

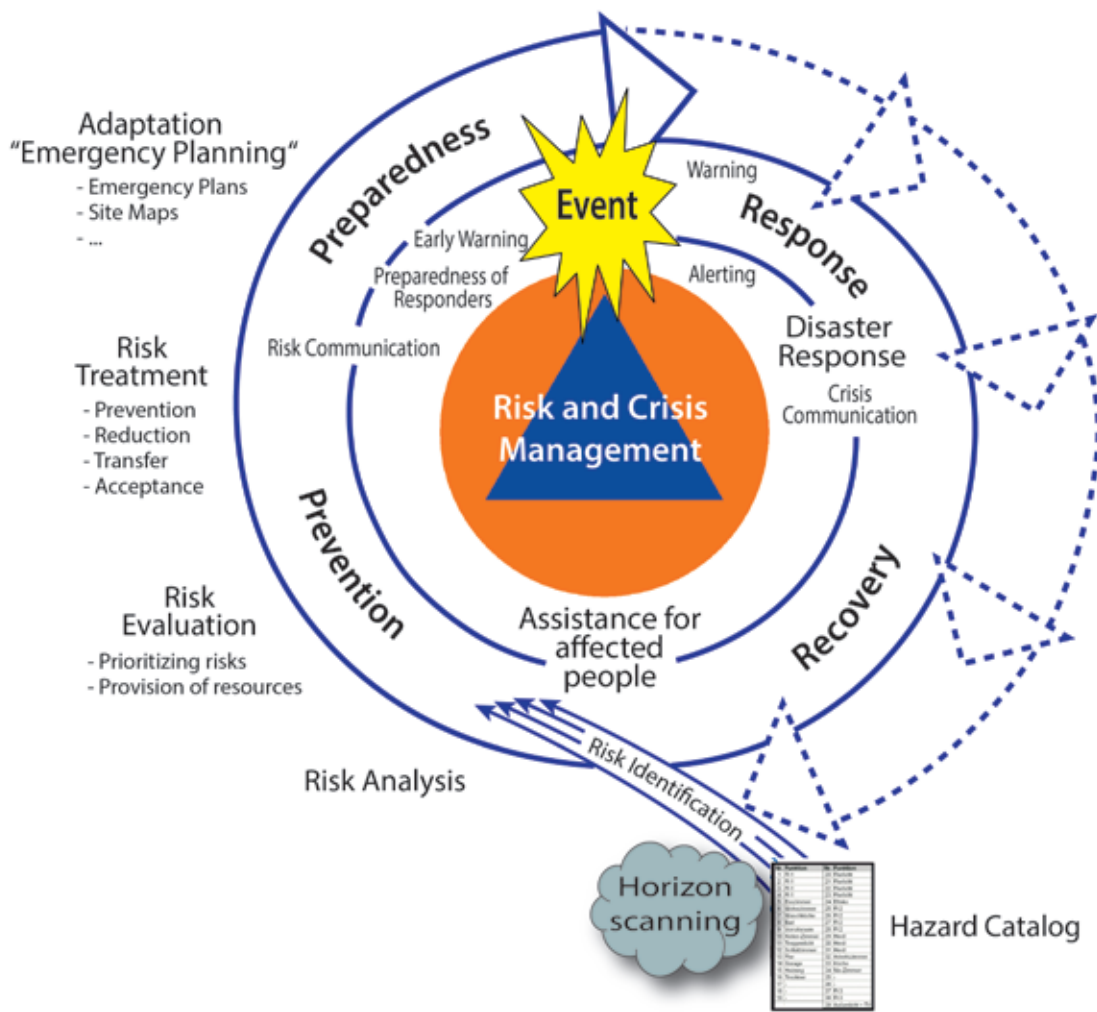


Fig. 1: The cycle of risk and crisis management

Fig. 1 shows an integrated approach to risk and crisis management. An event triggers the response by the disaster defence personnel. The effects which the event has on the protected assets are dealt with, and the reconstruction starts. In addition to the dangers that have already been considered (e.g. from an existing hazard catalogue), further dangers may also constitute a risk

potential for a selected reference area. These are included in the further investigation in the areas of preparedness and adaptation, and preparation. The systematic identification of previously unknown or unprecedented risks, which could nevertheless occur, is referred to as “horizon scanning” (instrument for strategic early recognition of developments).

Risk analysis for civil protection
 General preparatory work
 Risk analysis method
 Evaluation

“Risk management” specifically looks at the following steps:

- **Risk identification:** Here, the relevant dangers for the jurisdiction are identified and documented in a hazard catalogue – *what must we expect?*
- **Risk analysis:** With the participation of a variety of offices/experts, an overall picture of all the conceivable effects of the hazardous situation can be created, so that a coordinated approach can be guaranteed if an event occurs. Courses of action and, on the basis of these, the risk communication are then derived from the results. Structure and approach:
 - Scenario development
 - Assessment of the likelihood
 - Determination of the level of damage
 - Visualisation of the results – *What can happen/what effects does it have?*
- **Risk evaluation:** At this point, the skills and capabilities (coping capacities) that are available in the context of hazard prevention are reviewed with regard to their effectiveness – *How prepared are we for this?*
- **Risk treatment:** Experts in hazard prevention derive the plans for an improvement in civil protection from the risk evaluation. For this, a prioritisation of recognised deficits and supply gaps is created. The different fields of action are reviewed with respect to their possible need for optimisation. – *What has to be done/ how can we position ourselves better?*

A coordinated risk and crisis management system is necessary, so that all the bodies affected by the respective danger can work together as effectively as possible and the measures can be seamlessly

integrated. The analysis of existing risks before an event occurs is an important complement to the occupation purely with coping with emergencies, i.e. crisis management. By looking at possible adverse effects on citizens, as well as on critical infrastructures or other protected assets, the appropriate preventive measures can be initiated and, ideally, damages can be prevented.

1. Risk analysis as a strategic planning task

In the course of the flood disaster in 2013, damage amounting to approx. 8.2 billion euros occurred in Germany. In eight federal states or 56 territorial authorities, an emergency alert was triggered. 80,000 people had to be evacuated. Honorary helpers worked 871,000 man-days in aid operations over the course of the flood disaster.

This “100-year” flood was the result of prolonged rainfall – in a wide band from southern Schleswig-Holstein to northern Bavaria, 300 per cent of the regional target rainfall for the month was achieved in May 2013. A comparable weather situation may lead to a similar, possibly even more destructive, scenario again at any time. It is, therefore, in the interest of all citizens to prepare civil protection for long-term and complex danger situations. This not only applies to flood events, but also, for example, to chemical accidents.

The Bundestag is aware of the importance of strategic risk management and, therefore, passed a law in 2009, the Civil Protection and Disaster Relief Act, which obliges the Federation to prepare nationwide risk analyses for civil protection. To this end, the BBK is supporting a possible implementation of risk analyses at a local authority level with this manual.

Risk analysis is a key element of a comprehensive risk management system and the central basis for all civil protection plans and measures. Its goal is the improvement of the protection level and the preparation of all state and non-governmental players, as well as the population, for disaster situations. This applies both to the federal territory as a whole and to the federal states and the counties, towns independent of a Kreis and municipalities. In this context, different expert perspectives on a potential event are to lead to an overall picture of all the conceivable effects. This will make a coordinated approach easier if an event occurs. Thus, the risk analysis constitutes a central basis for all the plans and measures on all levels of civil protection. The risk analysis on a county or local authority level provides the most detailed and informative information, as it depicts the circumstances right on the spot. Therefore, a special role is accorded to the counties, towns independent of a Kreis and municipalities in the risk analysis process. Its results can form the basis for all further analyses at a Laender or Federation level.

2. The objectives of risk analysis for civil protection

The basis of any successful risk management is information. It is only possible to make sustainable decisions in the event of a disaster if you are aware of the imminent dangers and the available resources. It is only possible to assess which measures must be taken at which point if you have reliable information about damage potential.

Risk analysis for civil protection is a stocktaking exercise: it gives an overview of the possible risks – from a forest fire to a terrorist attack to a virus epidemic – as well as of the available capabilities or coping capacities. At the same time, the risk analysis also functions as a stress test for general hazard prevention and disaster management. During the procedure, the effect of the event described in the scenario on the protected assets is examined.

Protected assets are assets which human beings must protect – such as health or property. Further protected assets include cultural assets and other material assets.

Within the framework of risk analysis for civil protection, the protected asset „**man**“ must be regarded as the key protected asset, as the primary task of non-police hazard prevention or disaster management mainly relates to the protection of people. For this reason, during the procedure, the main focus with respect to the possible effects (“injuries”) is placed on the protected asset „**man**“. The stress test for the capabilities of the hazard prevention and disaster management personnel similarly reflects the importance of this protected asset through a significant increase in the level of detail.

Furthermore, it has become internationally accepted, with regard to the pursuit of an approach covering society as a whole, to examine the protected assets „**environment**“ and „**national economy**“. With respect to coping with the extent of the damage using the capacities of general hazard prevention and disaster management, these protected assets will, however, only play a limited role. However, negative impacts in these areas always have an effect on the people. In addition, disaster management personnel also have the task of protecting the assets themselves – e.g. by undertaking containment action when harmful substances are released (e.g. spill containment, sealing cushions etc.), in order to minimise long-term damages. In addition, many large-scale emergencies have considerable financial repercussions. It makes particular sense to include these in the evaluation because these can be used to justify assessments regarding any risk management measures (see Part V) to be taken (key word “economic efficiency calculation” in the event of fiscal measures e.g. for the procurement of equipment).

More in-depth analyses of these areas are outside the scope of hazard prevention, but fall within the respective jurisdiction or discipline. From the findings of the risk analysis for civil protection, important tips for other jurisdictions or disciplines can be obtained, which may then trigger follow-up analyses.

The protected asset “cultural assets”, the protected asset “public safety and order” and damage parameters such as “political and psychological effects” (brought together in the protected asset category „**non-material**“) should continue to be considered. The focus here is on the State’s ability to act in the case of specific issues outside the traditional fields of operation such as “welfare and treatment” and “technical assistance”.

The stress on and, if applicable, the overloading of the available hazard prevention capacity can then be derived directly from the consideration of the above factors. This means that the scenario exerts stress on the hazard prevention system and, as a result, limits to the efficiency of the system are made clear. The comparison of the required resources (TARGET) with those that are actually available (ACTUAL) may reveal a shortfall.

Target-actual comparison for coping capacities → find need for action and shortfalls!

The target-actual comparison is, however, also a forward-looking instrument: scenarios are examined with respect to the necessary requirements or possible shortfalls in the hazard prevention capacities. Overall, risk analysis helps with answering a question that is decisive for the welfare of the population:

Are we sufficiently prepared for an emergency?

3. An overview of the results of the risk analysis

It is the task of the responsible person – Director of the “Office of Disaster Management” (or similar title, depending on localisation of the responsibilities) or the Chief Executive Officer (CEO) – to put together the relevant risks for his/her area (county/town independent of a Kreis) and to name the possible extent of the damage. On the basis of these inquiries, it is then possible to compare the available capacities in terms of emergency personnel or materials (e.g. sandbags, rubber dinghies, camp beds) with the actually required capacities, in other words to perform a target-actual comparison, in order to find need for action and shortfalls.

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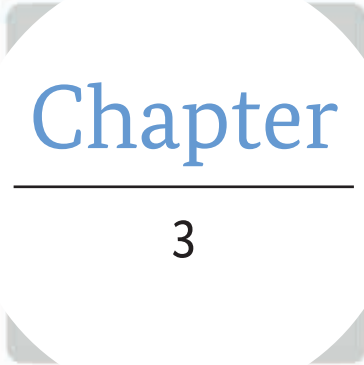
Evaluation

Results:

Risk analyses are a valuable resource for effectively protecting the population.

- They form bases for decision-making for the risk management process.
Objective: to identify gaps and weaknesses, to assess risks. Ideally, courses of action for risk treatment are obtained.
- They serve as a planning basis for crisis management.
Objective: to identify potential for improvement.
- They provide the basis for efficient emergency planning and resource management.
Objective: targeted use of funds for capacity and resource building
- They set up links between experts in the sphere of their respective responsibilities.
Objective: to know people in a crisis. Only well-rehearsed cooperation with trusted and familiar colleagues guarantees smooth cooperation in an emergency
- They document the whole process of state emergency preparedness comprehensibly and comparatively.
Objectives: basis for a targeted risk communication, which must be underpinned with recommendations for action; evidence of the appropriate treatment of the topic in the planning and preparation for large-scale emergencies.

On the basis of these technical considerations, a political evaluation must ultimately be made for an effective risk treatment.



Part II: General preparatory work

Before you embark on a risk analysis, some preparatory work is necessary first. You will generally only do this work once in the initial phase and then refer to its results in subsequent stages of the procedure (and in subsequent analyses). The preparatory work includes the planning and organisation of the administrative implementation, the establishment of a steering committee, the creation of a project schedule, and the selection of the dangers and events to be examined. How you should proceed will be explained in the sections below.

1. Administrative implementation

Preliminary remark:

The performance of a risk analysis for civil protection at a local authority level is not the work of an individual, but a joint responsibility of administration, politics, (private) operators of critical infrastructure, fire brigades, private relief organisations, the healthcare sector, the police, the Federal Armed Forces (county liaison detachment) and others. Thus, all the players who actively or indirectly participate in hazard prevention and disaster management, both preventively and actively during an event, are involved in the process. The players also include the population to be protected, which provides decisive support for the successful management of the event through its own abilities to protect and help itself.

The risk analysis for civil protection has the objective of analysing individual dangers and events in the form of “scenarios” by means of so-called “stress tests” for these parties, in order to reveal possible weaknesses and needs for action for the protection and support of the population. Therefore, it is unavoidable that all the aforementioned players will be involved in the process right from the start.

1.1 Initiative

A universally valid localisation of the responsibility for the initiative to perform risk analyses for civil protection may not be possible, due to the different legal and organisational bases of the 16 federal states and their more than 400 counties and towns independent of a Kreis in Germany.

There are federal states in which the performance of risk analyses is established by the respective Land Disaster Management Act at the level of the local disaster management authorities; other federal states do not have this statutory obligation.

If there are no statutory regulations, a stress test for the capabilities and coping capacities can be conducted in the form of one or more risk analyses, on the initiative of politics, the administrative leadership or the experts (e.g. fire brigade, Public Health Department).

The important thing is that (if they are not proactively responsible for the process themselves), the political leadership or leadership of the administration (County District Commissioner, Lord Mayor) is involved in the process at an early stage, as the subsequent risk evaluation and risk treatment (e.g. with respect to the use of funds or registration of fund requirements) are not feasible without this decision-making level. Furthermore, the procedure can also secure widespread support in other offices through the constructive supervision of the Chief Executive Officer.

As already mentioned at the start of the chapter, the performance of a stress test is a joint responsibility of all the players. In the first instance, this sounds like a lot of work, a need for coordination and a protracted process. This does not have to be the case, however – and if it is,

the effort is worth it!

The following accounts have come from the experiences gained in pilot projects. They should be understood as aids for action and as support for the start of your own project. Ultimately, your individual general conditions will determine the actual course of the work.

How can you proceed?

If the consent of the political leadership (or leadership of the administration) is obtained by the initiator, the other players must be brought on board. How you proceed in this phase is of decisive significance for the overall success of the project.

At a time of limited resources (financial and human), and in order to create the greatest possible degree of acceptance and participation in the process, the most important initial tasks are the “raising of awareness” and the “dispelling of reservations”.

As mentioned above, people are quick to make comments such as “But we have all that” – with reference to the fire protection requirement plans, for example – or “We have no staff for that!”, “Where is the added value?” and so forth. Dispelling these reservations is the biggest obstacle facing the procedure.

If you proceed as described here, i.e. set up a corresponding organisational structure and take all the players with you in the procedure, you will be able to dispel these objections quickly.

1.2 Distribution of responsibilities, organisation

An initial important factor for the distribution of responsibilities is the question of a decision-making body. Using a so-called “steering committee” as a decision-making and steering body

has proved to be a good solution. This “steering committee” can, for example, contain the Director of the Office for Fire Protection and Disaster Management (or similar title), the county or city *Brandmeister* (or *Brandrat* or *Brandinspektor*), a representative of the leadership of the administration or the political leadership of the local authority and the official in charge of disaster management. Involvement in the staff work (administrative staff or administrative-organisational staff) with the associated understanding of multidisciplinary cooperation for the achievement of objectives is helpful here.

1.3 Documentation

All decisions regarding the risk analysis (determination of the likelihood, specification of the amount the damage, etc.) must be documented in the form that is standard for administration (protocols, references etc.) and archived for possible later processes, such as the implementation of measures or the review of analyses. In addition, a transparent methodology increases the acceptance of the results. Finally, a continuous documentation makes the creation of a final report easier.

2. The steering committee

The tasks of the steering committee are:

- Project management (see e.g. scheduling, time frame)
- Specification of the general conditions in terms of the content (project schedule, specification of scenarios; specification of the damage parameters to be analysed (see Subsection 2.2) and the associated coping capacities)
- Specification of the experts who need to be involved

The following processing sequence has proved its worth as a project schedule:

- Start of project: project initiative (e.g. by the law, a competent authority, an order by the CEO etc.)
- Formation of the steering committee
- Specification and invitation of all the participants
- Implementation of the kick-off event
- Creation of the description of the reference area: compilation of the relevant data on the coping capacities
- Development of the first scenario
- Request from other players: necessary data/expertises on the specified scenario
- Joint analysis workshop for all players on the specified scenario
- Evaluation of the results with subsequent collection of missing data and information (if necessary)
- Final report on the first scenario
- Progression through the individual work steps (from data collection to the final report) for all further scenarios
- End of project: final report for all scenarios

The corresponding risk treatment measures follow the final evaluation.

2.1 Selection of dangers and events

The selection of the dangers and events to be dealt with also takes place at the start of the risk analysis. Territorial authorities can be affected by a large number of dangers, including:

- Extreme weather conditions (e.g. storm, heavy rain, snow drifts)
- Earthquakes
- Floods
- Release of hazardous materials from nuclear power plants/from facilities which are subject to the Contingency Ordinance
- Epidemics (e.g. pandemics)
- Serious disruption and damages to facilities for supply and food (e.g. water, food, long-distance heating system, electricity)

You can find a list of the dangers in the download area at www.bbk.bund.de/risikoanalyse.

As an economical approach (with regard to time and use of funds) can be regarded as a prerequi-

site for a successful procedure, a narrowing down and prioritisation of the dangers and events to be considered is indispensable.

Experience shows that it is not necessary to consider all the dangers and risks that are conceivable in the reference area. The steering committee should ensure, in the specification and prioritisation, that the scenarios developed from the dangers and events bring the whole spectrum of general hazard prevention and disaster management (incl. the other people directly or indirectly involved) to the limits of their capabilities or beyond in at least one scenario. Only then can we talk of a real “stress test”.

This manual cannot offer a universally valid proposal for the selection of dangers and events and their prioritisation. In many local authorities, floods have to be considered, in others earthquakes or the release of substances from a SEVE-SO facility. The different conditions (geographical, meteorological or infrastructural) in Germany prohibit such a proposal here.

The following hints can, however, serve as an aid to orientation with respect to the selection of dangers:

- The fire brigade, the relief organisations and all other players and their organisations (health service, critical infrastructure operators, administration, etc.) are to be brought at least to the limits of their capabilities -> see “stress test”
- A protracted electric power breakdown should be included in the list of priorities because it covers a very wide range of burdens
- A release scenario (CBRN) from a stationary facility or from a transportation accident should also appear in the list of priorities
- A scenario with mass casualties is used for the assessment of the efficiency of the medical elements of hazard prevention

We believe that, with the skilful selection of 4 – 5 dangers and events, it is possible to subject the entire spectrum of general hazard prevention and disaster management to an analytical “stress test”.

In some federal states with corresponding legal provisions, a centralised selection of the dangers to be analysed by the local disaster management authorities can be made. This approach is supported by a comparability of the information and thus makes a high-level resource optimisation possible.

Specific questions can also be examined in subsequent analyses, as specific dangers in county X (e.g. in the danger zone of a nuclear power plant) require corresponding planning.

The analysis of an extreme event is recommended to begin with, as, in case of doubt, this also has the worst consequences. For the sake of comprehensive preparedness, it may then be sensible to clarify the effects of different levels of intensity for individual dangers. In these cases, it is advisable always to run through three scenarios for a danger:

- one from category 5 (see Part III, Section 2), which occurs relatively frequently
- one from category 3 with a medium likelihood (100-year event)
- one from category 1 with an extreme course → Advantage: this approach offers more details and provides more precise information for operational crisis management (general hazard prevention, disaster management personnel)

Alternatively, an event with a return period of more than one hundred years (category 3 or lower) can be analysed for any selected danger. → Advantages:

- Time savings (several risk analyses can be performed in a shorter period of time)

- The lessons learned from the extreme event can also be applied to all events with a lower intensity within the framework of the target-actual comparison of the coping capacities.

The requirement to subject more than just one intensity of a specific danger to an analysis, if applicable, may arise in the course of the risk analysis. During an analysis, it is important that the limits of the capabilities of the available capacities are recognised.

For some scenarios, you will be able to obtain data on the affected protected assets relatively quickly, e.g. for flood events:

- The water level determines the flooded area
- The flooded area determines the location and number of households and critical infrastructures affected
- Households provide information about the number of buildings, people etc. affected.

In the case of scenarios such as the spreading of a cloud of hazardous substances as a result of an accident involving hazardous goods, or casualties after a terrorist attack, there is often hardly any empirical data. Nevertheless, it is worth running through these scenarios, as you are possibly least prepared for them.

2.2 Impact on the protected assets – introduction of damage parameters

As already described at the start, the primary objective of the risk analysis is the “stress test” for the personnel and capabilities of general hazard prevention and disaster management. In order to make the impact of an event on the protected assets which are available in the reference area (e.g. man, animals, environment) measurable and comparable, key indicators have to be established which will represent these protected assets. These key indicators will be referred to a „**damage parameters**“ in the risk analysis procedure.

a) List of damage parameters

In the download area at www.bbk.bund.de/risiko-analyse, you will find a list of possible “damage parameters”. These are the areas that are to undergo a scenario-specific analysis in the main phase with regard to the possible “impact” or “the extent of the damage”.

As you can see, this list is very extensive, as, for example, an enormous level of detail in the analysis is possible for what is for us the key protected asset category “man”. This mainly applies to the damage parameter “persons in need of assistance”, as a variety of manifestations of the “need for assistance” – with differentiations from “logistics/transport” to “accommodation”, to questions of “medical and nursing care in public accommodation (in the event that evacuations are necessary)” – have to be taken into account in the event of a large-scale emergency. A limitation is provided primarily by the coping capacities or capabilities of the players involved in disaster management that are to be reviewed. The individual capabilities will be directly linked to the damage parameters.

b) Selection of the damage parameters

In order to keep the effort as low as possible for everyone involved, a full analysis of all the possible “damage parameters” for several scenarios seems hardly affordable or, from a certain level of detail, hardly economically (with regard to the use of time and personnel) feasible. Experiences from joint events with a variety of pilot locations have shown that prioritisation is necessary here. This means that, **from the list of possible damage parameters, the parameters that the steering committee considers to be relevant must be selected.** Specific questions (e.g. in the context of the planning of a special operation in the case of CBRN events) must then be clarified in detail subsequently. In the first instance, the stress test is to consider the “primary capabilities” – such as

“care”, “treatment”, “accommodation” or “emergency power supply”. The details of the “care” can, for example, be examined by the responsible players in scenario-specific follow-up analyses.

Examples: : in order to be able to assess the **ability to transport sick or injured** people, the **number of patient transport ambulances** that are available in your jurisdiction is required as an input variable.

Damage parameters: “Accommodation – short-term – medium-term – longer-term”, “Centralised catering”, “Centralised nursing care”. For the assessment of the **ability to accommodate people**, I require knowledge of the **type and extent of accommodation and care facilities** (including bed, supply and other infrastructures).

How much detail you go into when analysing the data is based on the capabilities that are to be reviewed on an individual basis, and is at the discretion of the decision-making body (steering committee).

It may also be a matter of a Land-wide procedure (e.g. in a federal state with a corresponding legal basis), where uniform guidelines are established through the Ministry of the Interior/Senate Department for the Interior of the Land or a Land authority authorised to do this. This centralised procedure may also be useful, as it allows for a comparability of risk analyses, for example, as a basis for a risk evaluation across the entire Land.

Each local authority is, of course, free to perform more detailed analyses (i.e. further than the specified damage parameters) for its own purposes.

Remember, however: the more precise the analysis, the more specific the target-actual comparison can be!

A selection of damage parameters to be analysed could look as follows:

Damage parameters for the protected asset “man”			
Fatalities	Injured persons <ul style="list-style-type: none"> • Very seriously injured T1² • Seriously injured T2 • Slightly injured T3 • Without a chance of survival T4 • Special types of injury 	Sick persons <ul style="list-style-type: none"> • Out-patient treatment • Inpatient treatment • Intensive medical care • Special illnesses 	Persons in need of assistance <ul style="list-style-type: none"> a) <u>Interruption of energy supply</u> <ul style="list-style-type: none"> • Electric power (< 8 h) • Electric power (8 h – 3 days) • Electric power (> 3 days) b) <u>Accommodation of people</u> <ul style="list-style-type: none"> • Requirements for the transportation of persons • Accommodation (short-term – 1 night) • Accommodation (medium-term – 2-7 days) • Accommodation (long-term (> 1 week) c) <u>Interruption of the water supply</u> <ul style="list-style-type: none"> • Water (< 8 h) • Water (8 h – 3 days) • Water (> 3 days)

Damage parameters for protected asset “environment”		
Protected areas (NATURA 2000, FFH, and similar)	Agricultural land	Livestock

2 T1-T4 = triage categories in the event of mass casualties or illness.



Damage parameters for the protected asset “economy”	
Impact on the private sector	Impact on the public sector

Damage parameters for the protected asset “non-material”		
Political impact	Impact on public security and order	Cultural assets affected <ul style="list-style-type: none"> • UNESCO World Heritage Site • Cultural asset of national significance (Hague Convention) • Cultural asset of regional significance

Example tables 1-4

After the appointment of a steering committee and the specification of the scenarios and damage parameters to be analysed, the steering committee should start the subsequent stages of the project planning.

The next step should be the specification of further participants for the procedure.

2.3 Specification of further participants – „Round Table“

The “Round Table” serves to bring together the different expert perspectives from the respective reference area for the analysis of a danger. This also means that the composition of the Round Table arises from the danger under consideration. In Figure 1, for example, a variety of representatives who deal with a specific analysis are presented. The procedure will help you to obtain important information:

- What **plans** already exist in which organisation; how do these complement one another, if applicable; where are there gaps in the planning?
- How do the **communications channels** run; what interfaces exist; what deficits are there?
- What concrete **capabilities** can the individual participants contribute when an event occurs; what is their endurance like; what general conditions exist?
- Finally, an important insight: “**knowing people in crisis situations**”: in an actual operation situation, the players know one another – they are aware of the capabilities of the participants – coordination is thus significantly easier.

In the group, it is first necessary to clarify the question of expectations and responsibilities. Then the information on the coping capacities that you need for the target-actual comparisons must be defined within the team.



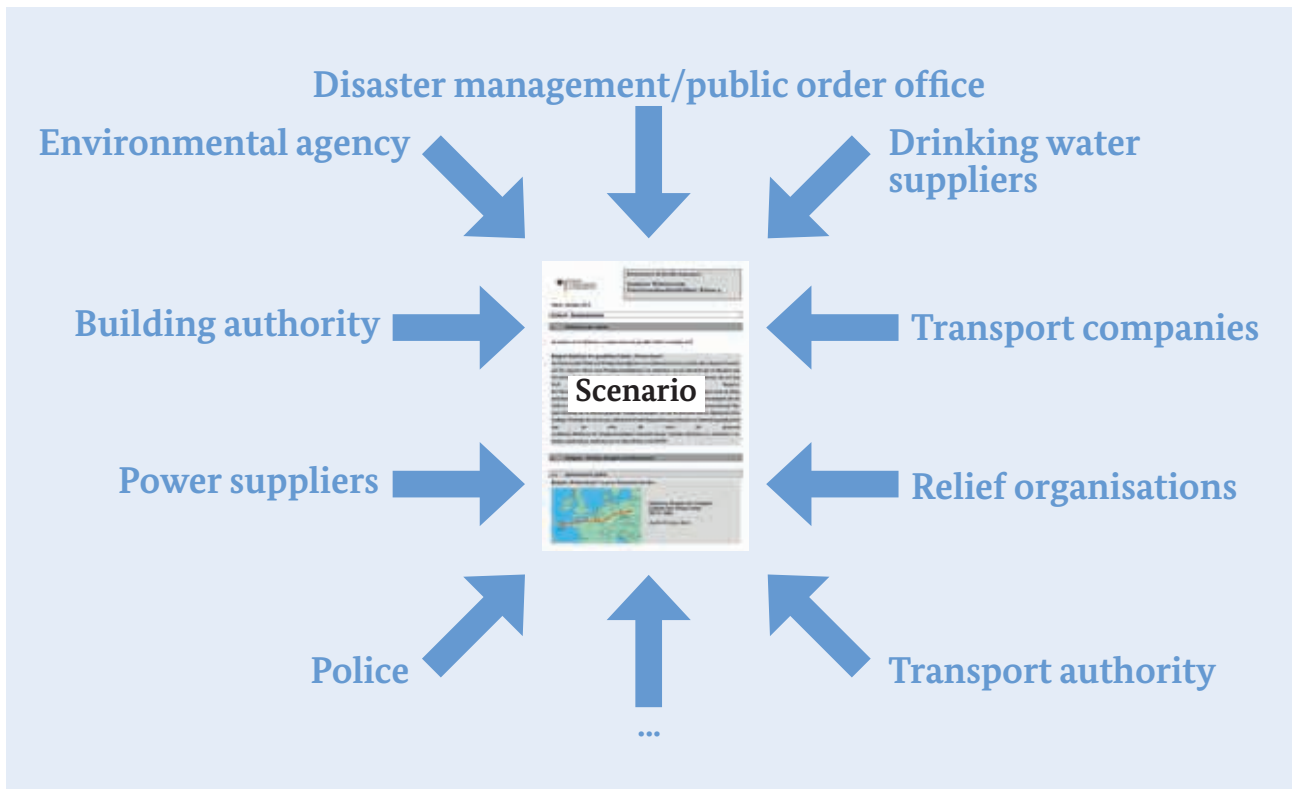


Fig. 1 Different expert perspectives on a potential event – The Round Table

2.4 The coordinator

A coordinator will be appointed by the steering committee to ensure the proper organisation of the procedure. This person will lead the process, bring all the strands together, take care of the creation and maintenance of the list of dangers and events, establish contact with the Round Table experts, incorporate the collected data, and finally prepare these data for a report. An administrator from the department responsible for disaster management is particularly suitable for this role.

2.5 Raising the awareness of everyone involved

The raising of the awareness of everyone involved is important for the success of the project. The following schema can serve as an aid for this:

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Who? – Coordinator / Coordinator

- For example Office of Fire-fighting and Disaster Management

How? – Kick-off event

- Invitation of everyone involved to a “kick-off event”: provide information about the project, coordinate a joint approach, specify objectives and procedure

Whom? – Main players

- **Representatives of the political leadership** (Chief Executive Officer, delegated if applicable)
- **Representatives of the emergency personnel:**
 - Professional and/or voluntary fire brigades; county *Brandmeister/Brandrat/Brandinspektor*
 - City *Brandinspektor/Brandmeister*/Director of the Fire Brigade,
 - Relief organisations (German Red Cross, Worker’s Samaritans, Knights of Malta, St. John’s Ambulance Association, German Life-Saving Association)
 - Private organisations involved in disaster management, if applicable
 - Federal Agency for Technical Relief
 - Police
 - Federal Armed Forces (county liaison detachment)
- **Representatives of the authorities:**
 - Health service
 - Public supply and disposal
 - Infrastructure (local public transport, transport, networks – gas and power supply, telecommunications, drinking water, long-distance heating system, if applicable)
 - Environmental protection and nature conservation
 - Agriculture and forestry
 - County veterinarian
 - Others depending on the structure of the administration and the specific question of the event under consideration
- **Representatives of the business community:**
 - Private operators of critical infrastructures (network operators – gas and power supply, drinking water etc.)
 - Representatives of particular industrial companies (SEVESO etc.), if applicable

Why? – Project presentation and dispelling of reservations

- Agenda
- Presentation of the BBK manual

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The actual appraisal of the main players required for the Round Table, within the framework of the kick-off event, must take place locally. It is, for example, conceivable that representatives of the business community may only be involved later (in relation to the scenario) and that you are initially limited to the representatives of authorities and the emergency personnel.

Objectives of the kick-off event:

- Communication of the project objective: stress test for the players involved in crisis management in the area of general hazard prevention and disaster management. This takes place through an analysis of three to five primary hazards which examine the entire service spectrum (general hazard prevention, disaster management), including endurance.
- Specification of responsibilities: who provides which data and assessments?
- Clarification that additional burdens arise for everyone involved to an acceptable extent – for a lot of the necessary data is already available.
- Presentation of the danger(s) (scenarios) specified for analysis by the steering committee.
- Specification of the time frame: by when are the analyses to be ready?
- Statement of the scheduling: project scheduling.
- Specification of the next joint event.

Experience has shown that a period of three to six months must be estimated for the collection and structuring of the data, from the kick-off event to the target-actual comparison.

So that the extent of the damage and the impact can be determined and responsibilities allocated at all, it is first necessary to specify and describe a reference area.

3. Description of the reference area

Each risk analysis is based on a regionally restricted reference area; the coordinator will generally collate the data for a county or the area of a city, town or municipality.

Examples of a reference area:

- The county of Munich
- The town of Rosenheim
- The municipality of Unterhaching

For each reference area, the extent of the damage that is associated with the occurrence of a particular danger can be determined. Here, not only material damages to protected assets (man, environment, economy), but also non-material damages are taken into consideration. The latter can, for example, be cultural assets, such as library collections with a historic value.

The best way to describe the reference area is by collecting the information which is required in the subsequent analysis of the extent to which the individual damage parameters are affected.

3.1 Collection of data on damage parameters

Protected asset	Damage parameter	Required information e.g	Possible sources of information (authorities at a local authority, Land and Federation level) e.g.
Man	<ul style="list-style-type: none"> Fatalities Injured persons Persons in need of assistance 	<ul style="list-style-type: none"> Number of inhabitants Population density Number of households Commuters Tourists Transport routes (road, rail) Supply networks (electric power, gas, water) 	<ul style="list-style-type: none"> Statistical offices Residents' registration offices Tourist information Planning and transport authorities Federal Institution for Research on Building, Urban Affairs and Spatial Development Public utilities, regional suppliers, network operators, water boards
Environment	<ul style="list-style-type: none"> Protected areas Agricultural land Woodlands Livestock 	<ul style="list-style-type: none"> Areas Animal population (LUs or number) 	<ul style="list-style-type: none"> Statistical offices Environmental agencies Office of Agriculture and Forestry Federal Office for Nature Conservation Chambers of agriculture
Economy	<ul style="list-style-type: none"> Consequences for public security and order Psychological impact on the population Impact on politics Damages to cultural assets 	<ul style="list-style-type: none"> Number of operations of emergency personnel Assessment of the consequences by experts Assessment of pressure from the public/the media Number/locations of moveable and immovable cultural assets 	<ul style="list-style-type: none"> Control centre(s) Management of fire brigade, police, press and information offices Monument protection authorities



Possible additional information:

- The Federal Agency for Cartography and Geodesy (BKG) provides basic data on the spatial distribution of protected assets.
www.geodatenzentrum.de
- Geodata from the Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR) at the Federal Office for Building and Regional Planning (BBR) are also helpful. This includes, for example, the “indicators and maps on spatial and urban development” (INKAR). The maps include data on the population structure which may be important for the description of the reference area. Thus, in the event of a crisis, the proportion of the population consisting of elderly people who are dependent on help during an evacuation is of interest.
- The Federal Institute for Research on Building, Urban Affairs and Spatial Development also operates a website, which provides information on the location and living conditions in Germany and Europe. Up-to-date analyses, interactive maps and graphics illustrate the regional developments.
www.raumbeobachtung.de
- The Regional Database Germany – a joint project of the Federal Statistical Office and the statistical offices of the Länder – provides statistical and socio-demographical geodata. There, you can find, for example, information on the water supply and the housing stock.
www.regionalstatistik.de
- The regional statistics are supplemented by an atlas, in which maps on different indicators can be retrieved.
www.destatis.de/onlineatlas/
- In a joint project of the German Meteorological Service (DWD) and the BBK, weather data on the risk of storms has been compiled.

Thus, in conjunction with other information, maps were created which show areas in which extreme wind speeds can be expected. DWD climate atlas:

www.dwd.de/klimaatlas

3.2 Data collection on capabilities and coping capacities

As one of the key objectives of the risk analysis is the stress test for the capabilities and coping capacities of hazard prevention, the amount of data on “capabilities and coping capacities” that is required with respect to a target-actual comparison will be explained at this point

As a rule, no laborious data collections should be conducted, and data collections should only take place at all in exceptional cases. It may, however, be necessary to perform data updates. Experience has shown that the total effort for everyone involved remains within reasonable limits, as the necessary data have generally already been collected during their everyday work and must thus only be passed on to the coordinating body for the analysis project.

On the following pages, examples of the capabilities or coping capacities which should be brought together for the target-actual comparison will be listed.

The coping capacities listed here are not exhaustive. Land-specific types/names and special purpose vehicles or capabilities must be adapted accordingly and/or supplemented or deleted.

In the download area at www.bbk.bund.de/risiko-analyse, you will find editable Excel tables for recording your capabilities and coping capacities.

1. Fire brigade (non-exhaustive list – here: selection of DIN vehicles)

From: FNFW³ – Fire-fighting vehicle type list (DIN) As at: April 2014

Vehicle type	Short name	Area of operation	Crew	Number	Location
Small fire engine	KLF	Fire fighting	Squadron (0/1/5/6)		
Crew cab fire engine for disaster management	LF 20 KatS	Fire fighting / technical assistance	Unit (0/1/8/9)		
Water tender 3000	TLF 3000	Fire fighting	Team (0/1/2/3)		
Turntable ladder 18	DLK 18	Rescue technology	Team (0/1/2/3)		
Heavy rescue vehicle	RW	Technical assistance	Team (0/1/2/3)		
Tool and equipment wagon – hazardous materials	GW-G	Hazardous materials operations	Team (0/1/2/3)		
Tool and equipment wagon – logistics 1	GW-L1	Logistics	Team (0/1/2/3) oder Staffel (0/1/5/6)		
Command vehicle	KdoW	Incident command	Platoon leader and section group (1/1/2/4)		
Operational command vehicle 1	ELW 1	Incident command	Platoon leader and section group (1/1/2/4)		
Addition by the county the town independent of a Kreis					

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2. Other vehicles and technical equipment (non-exhaustive list and description)

Vehicle type	Short name	Area of operation	Crew	Number	Location
CBRN (NBC) reconnaissance vehicle	(CBRN ErkW)	CBRN-reconnaissance	4		
Tool and equipment wagon – altitude rescue	(GW H 1)	Altitude rescue	Team (0/1/2/3) or squadron (0/1/5/6)		
Crew cab fire engine for disaster management	(LF-KatS)	Fire fighting / technical assistance	Unit (0/1/8/9)		
Hose cart for disaster management	(SW-KatS)	Supplying extinguishing water	Team (0/1/2/3)		
Heavy rescue vehicle/tool and equipment wagon/ immediate response vehicle with power generator and lighting towers	(GW, RW, VRW)	Technical assistance			
Power generator 9 kVA		Technical assistance			
Power generator 8 kVA		Technical assistance			
Power generator 5 kVA		Technical assistance			
Addition by the county the town independent of a Kreis					

A list of the technical equipment of the fire brigades is not provided here because of the size of this list.

3. Units of disaster management (non-exhaustive list and description)

Unit name	Area of operation	Capabilities	Manpower	Location
Section group / Rapid Intervention Unit for Platoon Leadership	Medical and welfare service	Incident command		
Medical squad / Rapid Intervention Unit for Medical Service	Medical service	Medical care / treatment		
Welfare squad / Rapid Intervention Unit for Welfare	Welfare service	Accommodation and social support		
Technology and security team/ Rapid Intervention Unit for Logistics and Technology	Medical service	Technical and logistical support		
Casualties clearing station (BHP): BHP 25, BHP	Sanitätsdienst	Medical care / treatment of 25, 50 .. affected people		
Rapid Intervention Unit for Water Rescue	Water rescue	Rescue and recovery		
Rapid Intervention Unit for Hazardous Substances and Materials	Rescue and supply	Decontamination		
Addition by the county the town independent of a Kreis				

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4. Vehicles of the relief organisations (non-exhaustive list and description)

Vehicle type	Short name	Area of operation	Crew	Number	Location
Command vehicle	KdoW	Incident command			
Tool and equipment wagon – treatment	GW Beh	Medical and welfare service			
Tool and equipment wagon - decontamination	GW Dekon V	Decontamination			
Tool and equipment wagon - medical	GW San	Medical and welfare service			
Crew car – treatment	MTW Beh	Medical and welfare service			
Tool and equipment wagon – logistics	GW Log	Medical and welfare service			
Crew car – decontamination of injured persons	MTW Dekon V	Logistics			
Patient transport ambulance type B	KTW typ B	Medical and welfare service			
Ambulance	RTW	Rescue service			
Mobile intensive care unit	NAW	Rescue service			
Emergency doctor ambulance	NEF	Rescue service			
Crew cars	MTF	Logistics			
Addition by the county the town independent of a Kreis					

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5. Units of the Federal Agency for Technical Relief (www.thw.de): see download area at www.bbk.bund.de/risikoanalyse

Due to its size, the list has not been provided here in the manual.

6. Other coping capacities (non-exhaustive list):

As well as the coping capacities listed above by way of example, the following should also be considered:

- the bed capacity of hospitals (incl. intensive care beds and special beds), incl. a survey of the scope of the emergency power supply,
- places in emergency accommodation (public and, if applicable, private e.g. hotels) for evacuation measures (incl. available emergency beds and blankets),
- transport capacity for people (e.g. evacuation),
- transport and distribution capacity for supplies and consumables,
- police officers and capabilities of the police,
- number of pharmacies,
- number of practising doctors (different specialist fields),
- capacities of the canteen kitchens, other possibilities for supplying food (to persons in need of assistance and emergency personnel),
- number and locations of the emergency wells (drinking water supply),
- drinking water storage tanks for the public supply of drinking water,
- transport capacity of tankers (substitute water supply),
- mobile drinking water purification (substitute water supply),
- stockpiling of medical supplies and drugs,
- in the event of a risk of flooding: mobile sheet piling, sandbags, high-performance pumps etc.,
- in the event of other particular location-specific hazards, corresponding special equipment and provisions,
- capabilities of the private sector (e.g. construction companies located in the county, cranes and diggers),
- fuel supply (emergency power supply),
- animal transport capacity,
- and the possibilities of support by the Federal Armed Forces (county liaison detachment), as well as the collation of the defence plans (such as alarm and response regulations, fire protection requirement plans, disaster management plans etc.)

Please note: you only do this data acquisition once; only a regular updating of the data is necessary. Incidentally, this comprehensive data collection regarding the capabilities of general hazard prevention, disaster management and the other relevant players not only helps you with the risk analysis, but also provides a useful basis for decision-makers in the context of crisis management.

For the creation of scenarios **data on the geography in the reference area** may also be helpful: climate (precipitation rate, mean temperature, lightning frequency), bodies of water (courses of rivers, lakes, water levels), groundwater level, probability of earthquakes.

Data should only be collected if it is actually needed. This means that you should only compile the required data when you are creating a scenario “natural danger”.

The important thing is that you take the protected assets recorded in the table and the listed coping capacities into consideration, as you will otherwise have problems, in the subsequent stages of the analysis, with determining the extent of the damage and performing the target-actual comparison. The description of the reference area should be as clear as possible. This can best be achieved through the inclusion of maps.



Chapter

4



Part III: The risk analysis method

1. Description of the scenario

The stress test will be performed by means of a scenario-based analysis of the possible impact of an event in the reference area on the protected assets, as well as the deduction of the necessary need for action to cope with this event.

The analysis will be performed on the basis of a devised (fictitious) event description (=scenario), which is completely plausible for the reference area.

The steering committee (see Part II, Section 2) has selected the “dangers and events” and has specified a processing sequence.

In order to comprehensively capture the event, it is helpful to use the following W-questions as guidance:

- **Where** is the event happening/**What** area is affected by the event?
- **When** is the event happening?
- **Who** is affected by the event?
- **What** course does the event take and for how long does it last? **How** serious is the event?
- **Why** is the event happening? **What** leads to this event? **What** triggers the event?

The structure for the development of such a scenario will be explained in the following section.

Structure of scenarios

The table below brings together parameters which may help you with the creation of a scenario:

Step	Parameter	Key questions
A	1	Danger/event What event is under consideration? e.g. 3-day electric power breakdown
	2	Place of occurrence and geographical spread Where is the event happening? – What area is affected by the event? e.g. entire area of the town or city or the south-western part of the county
	3	Intensity How serious is the event? e.g. height of the high water mark; strength of the storm etc.
	4	Time and duration When is the event happening (time of year/time of day, if applicable)? How long does the event and/or its direct effects last? The electric power fails on 23rd January 2016 at 11:30 a.m. It is not until 6:00 p.m. on 26th January that all parts of the town/city are supplied with electric power again. The storm blows over the county for 7 hours.
	5	Course What leads to the event? What course does the event take? Due to a technical fault in a substation, the electric power fails in the whole area of the town/city. The peak of the flood develops as follows...
	6	Advance warning Is the event anticipated? Can the population prepare for the event? Can the authorities prepare for the event? The comprehensive electric power breakdown catches both the authorities and the population unprepared.
B	1	Reference events What comparable events have there already been? Electric power breakdown, Münsterland 2005
	2	Further information What is important for the scenario, but has not yet been recorded? The electric power breakdown affects not only the area of the town/city, but also all the surrounding counties



The key parameters for the description of the scenario are specified in more detail below.

A

1. Definition of the type of danger/event

The definition of the type of danger or event to be examined introduces the scenario. The appendix “Dangers and events” (see download area at www.bbk.bund.de/risikoanalyse) names a whole series of different dangers and provides information on definitions. These include:

- Extreme weather conditions (e.g. storm, heavy rain, snow drifts)
- Earthquakes
- Floods
- Release of hazardous materials from nuclear power plants
- Epidemics (e.g. pandemics)
- Serious disruptions and damages to facilities for supply and food (e.g. water, food, long-distance heating system, electricity)

2. Place of occurrence and geographical spread

Here, it is necessary to mark out the geographical boundaries of the event within the reference area. Is the whole county affected or only a specific part? Is it primarily the properties that are near to the course of a river that are affected (e.g. up to 500 m from the mouth of the river) or does the event affect all the agricultural land?

3. Intensity

This is about the intensity of the event. Provided that the events are measurable, the information on the intensity should be provided in the appropriate units, e.g.:

- Flood: 100-year flood
- Earthquake: Richter scale magnitude 6
- Release of hazardous substances: release of 100 kg chlorine

It is also possible to make a distinction from events that have occurred in the past and to demonstrate the extent to which the scenario differs from the reference event.

4. Time and duration

Here, it is necessary to briefly outline when the event is occurring, provided that this is of relevance or is prescribed by the type of danger (e.g. for the type of danger “winter storm”). The indication of a day of the week or a time of day is sensible if there are tangible and justifiable arguments in favour of this. For example, the time at which the event itself has no more direct effects (e.g. the time at which the river returns to its bed and no more areas are flooded). It may also be sensible to indicate the period that is required before the “normal situation” can be restored. This period covers clearing measures and measures for coping with the event, for example. In addition, the indication of anticipated long-term consequences, where applicable, may help you to be able to comprehensively evaluate the damage potential of the event.

5. Course

Here, the emergence and course of the event must be explained comprehensibly and in chronological order. The necessary conditions in general must be addressed, as well as factors which have a favourable or amplifying effect on the occurrence of the event, and the causes and reasons which ultimately lead to the event.

6. Advance warning

Depending on how early measures are taken to cope with an event or which decisions are taken by authorities and rescue workers, events can take different courses. You should, therefore, also include the factor “man” in the description of the scenario. If necessary, you can also refer to the possibility of greatly differing courses of the event (e.g. if a measure is started too late).

→ Is the event anticipated?

Here, you should examine whether the signs of the imminent event can be recognised, reliable predictions made and corresponding warnings communicated. The system of measurement and detection instruments, modelling capabilities, reporting channels and warning systems/devices can, where available, be explained concisely on the basis of a concrete scenario. In the process, you should also go into common scales (e.g. INES⁴, pandemic alert levels), where available. The timing and the type, manner and target group of the warning must also be described (e.g. early warning, advance warning, official warning, internal warning systems, propagation of the warning via radio). If applicable, you may also briefly discuss whether the State, society and science generally expect an event like that described in the scenario.

→ To what extent can the authorities prepare for the event?

Here, you should explain the extent to which the authorities can prepare for the event, on the basis of the reports and warnings described above. Plans which are kept for corresponding events and are now put into action, should be mentioned here, for example, as well as internal preparations, such as the particularly careful observation of a potential danger or the establishment of on call duties.

→ Can the population prepare for the event?

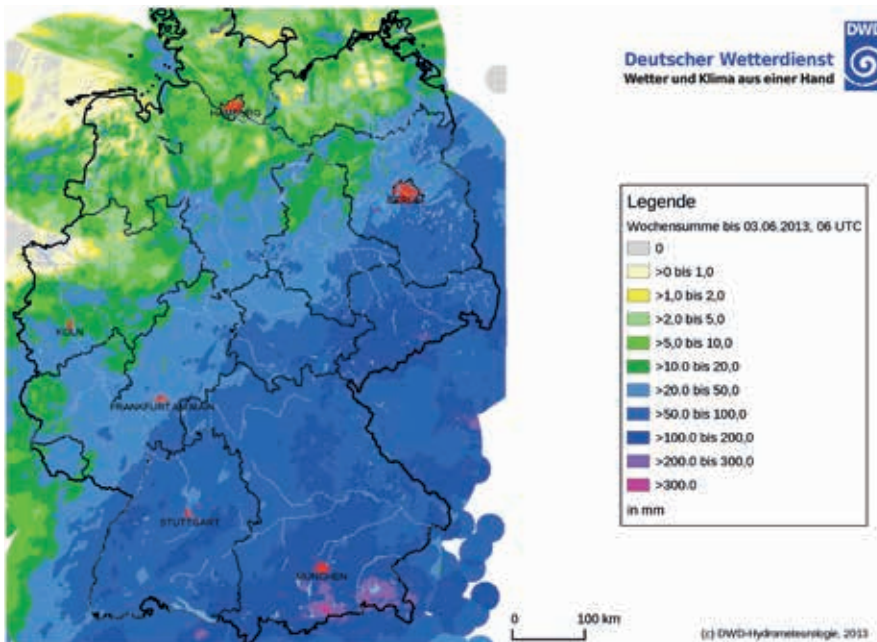
Here, it is necessary to discuss whether and, if applicable, how the population can prepare for the event, on the basis of the reports and warnings. Possible problems with receiving and processing the warnings should be addressed (access to the relevant media, language barriers, lack of awareness of dangers/raising of awareness – including with regard to risk communication which has (not) taken place in advance, etc.). Then you should demonstrate which self-protection measures the population can take and whether it will take these. You should refer to information relating to the conduct of the population in large-scale emergencies and disaster situations.

B

1. Reference events

In the description, you should refer to real reference events, where available. This makes your presentation comprehensible and increases the clarity of the risk analysis. An example of a reference event (flood disaster 2002):

“The meteorological cause of the disastrous floods at the river systems of the Danube and – in particular – the Elbe in August 2002 was extraordinary weather conditions, whereby various meteorological factors together led to such extreme levels of precipitation as had never before been recorded in Germany. In the Ore Mountains, more than 300 mm of rain fell in a single day in some areas. On 12th August, the record level of precipitation of 352.7 mm was measured at the Zinnwald-Georgenfeld DWD station between 5:00 a.m. CET and the same time the following day. Also in the region to the north of this low mountain range, more than 150 mm of rain fell in 24 hours; and even in the Berlin area, a level of around 100 mm was recorded. The above data are record values, which – assessed statistically on the basis of previous observations – would be expected less frequently than once in 100 years.”



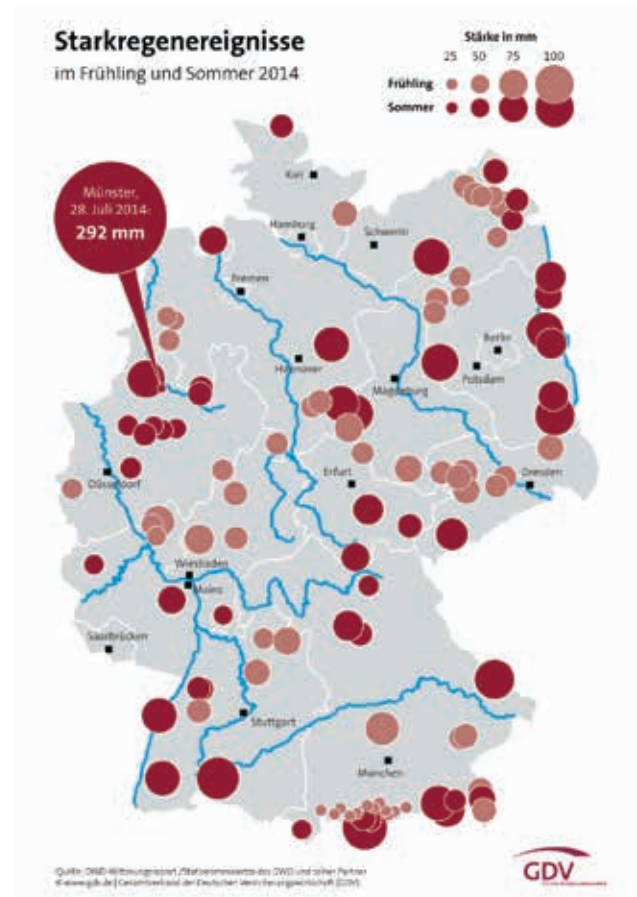
Possible data sources:

- Documentation from the control centre
- Chronicles
- Archives
- Contemporary witnesses
- Further sources: e.g. warning criteria of the German Meteorological Service (DWD): www.dwd.de

Further information:

Here, if sensible, you can include further scenario-related information which will enable the analysts/people involved to draw the correct conclusions, e.g. within the framework of the target-actual comparison of the coping capacities. For example, information (assumptions) relating to the impact outside your own reference area must be briefly addressed here (are, for example, the neighbouring counties, the whole federal state etc. also affected), so that the possibilities for support can be better assessed in the context of supralocal assistance.

Here, you could also include restrictions (consideration of cascade effects in the event of the failure of critical infrastructures) or prioritisations (for a depth of analysis) in the scenario.



You will find an editable word document for the creation of a scenario in the download area at www.bbk.bund.de/risikoanalyse

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2. The determination of the likelihood

Now it is necessary to determine the likelihood or the **plausibility** of the scenario. How great is the likelihood – how plausible is it that a particular event will actually occur in your own jurisdiction.

Use the classification shown below. This covers classes 1 (“very unlikely”) to 5 (“very likely”), to which statistical likelihoods are assigned.

No clear likelihoods can be assigned to events that are brought about deliberately (e.g. crime, terror-

ism, armed conflicts) and events caused by negligence (triggered by human error). The reason for this is the rapidly changing threat situations and the lack of experience in connection with such scenarios in Germany. For these events, therefore – in addition to the statistical likelihood – a possible “plausibility” was included in the table, which should also be assessed for the next 5-10 years for the reference area in question.

Value	Classification	Expected occurrence: 1x in ... years
5	very likely/very plausible: an event which occurs in Germany several times in a lifetime, on average (occurrence in the next 5-10 years very plausible)	≤ 10
4	likely/plausible: an event which occurs in Germany only once/a few times in a life time, on average (occurrence in the next 5-10 years plausible)	11 – 100
3	likely to a limited extent/plausible to some extent: an event that has already occurred in Germany, but several generations ago (occurrence in the next 5-10 years plausible to some extent)	101 – 1.000
2	unlikely/still conceivable: an event which has happened several times in the world and would be possible in Germany (occurrence in the next 5-10 years still conceivable)	1.001 – 10.000
1	very unlikely/hardly conceivable: an event which is rare on a global level, but cannot be completely ruled out in Germany (occurrence in the next 5-10 years hardly conceivable)	> 10.000

Table 1: Classification of likelihood

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In line with the international view of the plausibility of such events (see e.g. UK and Switzerland), we also regard this period as a sensible interval for the assessment.

Important: These are statistical recurrence values, on the basis of which likelihoods can be assigned to specific events. A 100-year flood, for example, is an event which occurs every 100 years on a statistical average. However, this does not mean that it is not possible for two or more such events to occur within 100 years, possibly even in quick succession (e.g. 100-year flood in Bavaria in 2005 and 2013, on the Elbe in 2002 and 2013, on the Rhine in 1993 and 1995). The same applies to “plausibilities”.

The data situation for the specification of the likelihood of some natural dangers is generally relatively good. The data research for other dangers is more time-consuming – or in some cases even impossible. So that not too much time is invested in this, a pragmatic approach is recommended for the local authority level: instead of a determination of “fixed statistical values,” you are restricted during the classification to statements within the framework of the five-level scale from 1 (event occurrence very unlikely/hardly conceivable) to 5 (event occurrence very likely/very plausible), in accordance with the explanations in the “Classification” column in Table 1.

Example for determination of likelihood:

- A possible winter storm (reference event Hurricane Kyrill 2007) belongs to Class 4. (Classified as a 100-year storm by the German Meteorological Service)
- If you select an event for which no statistical likelihood is available – such as a protracted electric power breakdown – the classification can take place as follows: the scenario is declared to be “unlikely/still conceivable” by the experts, as corresponding events have already taken place a few times in previous decades – assignment to Class 2.

2. Determination of the extent of the damage – holding an “analysis workshop”

If the likelihood is defined, the next step of the risk analysis will be for you to determine the extent of the damage that is to be expected when the event occurs. Here, the impact on different protected assets, such as man, the environment, the economy and non-material protected assets, must be taken into consideration.

In order to be able to determine the extent of the damage, the following points must be satisfied:

- suitable damage parameters are selected (see Part II Section 2.2 b),
- a scenario has been created,
- data on the damage parameters are available and experts have been appointed for determining the extent of the damage for the analysis.

After the preparatory work has been completed (specifications by the steering committee, implementation of the kick-off event, data collection, appointment of contacts and experts, creation of the scenario), the analysis of the extent of the damage can take place within the framework of a one or two-day event.

To this end, the necessary representatives and experts from the authorities, the fire brigade, relief organisations, operators of critical infrastructures etc. (Round Table) should be invited to an analysis workshop in good time. It has been proven in practice that a joint event with a “workshop character” is, for example, preferable to a purely written process. In a workshop, the appraisals and cascade effects of an event can be discussed more quickly, misunderstandings cleared up and joint decisions regarding the possible extent of the damage taken more easily.



The agenda of the workshop could look as follows:

1. Presentation of the work steps that have been completed so far – repetition of the common objective
2. Presentation of the scenario, in order to put all the participants in the “situation”
3. Presentation of the damage parameters
4. Specification of the damage values for the damage parameters
5. Specification of the necessary coping capacities (“TARGET”)
6. Comparison of the coping capacities (“ACTUAL”)
7. The “TARGET-ACTUAL comparison”
8. Specification of the way forward

In the following subsections 2.1 to 2.7, the course of the workshop will be explained to you on the basis of an example.

2.1 Item 1 of the agenda “Presentation of the work steps that have been completed so far – repetition of the common objective”

Presentation of the project structure, i.e. of the participants and their roles, of the administrative implementation of the procedure and of the specifications laid down by the steering committee. These may, for example, include the dangers selected and prioritised for the analyses. In each case, the selection of the damage parameters which are to be taken into consideration within the analysis should be presented to the panel of experts. A comprehensive description of the capabilities or coping capacities to be examined in the stress test should also be given – on the basis of this, the foundations for the risk evaluation and the risk treatment (“target-actual comparison”) will be laid in the subsequent stages of the workshop.

2.2 Item 2 of the agenda “Presentation of the scenario, in order to put all the participants in the “situation””

Example for a county of 450 km² (see county report in the appendix)

Scenario: comprehensive electric power breakdown throughout the county for a period of 36 hours.

- Cause: technical failure
- Time: winter – average outside temperature 5°C during the day, 0°C at night
- Time period: Tuesday morning to Wednesday evening
- Course: power supply restored in the first areas after approx. 12 hours, full supply after 36 hours

For an effective risk analysis, a consultation with the regional power supplier and network operator should take place for this scenario. Ask what causes could lead to such an event, what measures would be necessary for the restoration of the power supply and how much time this would take. – has taken place here (in the run-up to the workshop).

2.3 Item 3 of the agenda “Presentation of the damage parameters”

It is, for example, assumed that the steering committee has specified that the damage parameters shown in Table 2 must be analysed for the performance of the stress test.

Table 2: Example selection of damage parameters to be analysed

Protected asset	Damage parameter	Anticipated damage as a result of the event (scenario)?
Man	Fatalities	Number of affected persons?
	Injured persons: <ul style="list-style-type: none"> • slightly injured – T3 • seriously injured – T2 • very seriously injured – T1 • without a chance of survival – T4 • special types of injury 	Type and number of affected persons?
	Sick persons: <ul style="list-style-type: none"> • out-patient treatment • inpatient treatment • intensive medical treatment • special illnesses 	Type and number of affected persons?
	Interruption of power supply: <ul style="list-style-type: none"> • short-term (< 8 hours) • medium-term (8 h - 3 days) • longer term (> 3 days) 	Number of affected persons or households?
	Interruption of heating energy: <ul style="list-style-type: none"> • short-term (< 8 hours) • medium-term (8 h - 3 days) • longer term (> 3 days) 	
	Interruption of drinking water supply: <ul style="list-style-type: none"> • short-term (< 8 hours) • medium-term (8 h - 3 days) • longer term (> 3 days) 	
	Interruption of sewage	





Protected asset	Damage parameter	Anticipated damage as a result of the event (scenario)?
Man	Requirements for the transportation of persons: Removal	Number? and route? Transport for stretchers? (Note: avoid duplication with recorded damages for injured/sick persons)
	Accommodation: <ul style="list-style-type: none"> • short-term (1 night) • medium-term (2 - 7 days) • longer term (> 1 week) 	Number of affected persons?
	Catering: <ul style="list-style-type: none"> • decentralised • centralised (e.g. in emergency accommodation) 	
	Medical / nursing care: <ul style="list-style-type: none"> • decentralised • centralised 	
	Other logistics	Type, number and, if applicable, duration

Protected asset	Damage parameter	Anticipated damage as a result of the event (scenario)?
Environment	Protected areas	Affected (damaged) area in km ² or ha. + information on the duration of the damage (short-term, medium-term, long-term)
	Surface water	
	Groundwater	
	Woodlands	
	Agricultural land	
		Animals

Protected asset	Damage parameter	Anticipated damage as a result of the event (scenario)?
Economy	Impact on the public sector	Scale (assistance from the Land or Federation necessary?) special costs (restoration of infrastructure, deployment costs etc.) Assessment: - very low to very high
	Impact on the private sector	Scale (significance of the affected enterprise(s) for the reference area; there is a threat of tax deficits, closure(s)? Assessment: - very low to very high
	Impact on private households	Scale (damages covered by insurance? Is state assistance necessary?) Assessment: - very low to very high

Protected asset	Damage parameter	Anticipated damage as a result of the event (scenario)?
Non-material	Impact on public security and order	Multiple shift operation, personnel deployed – necessary reinforcement from other territorial authorities, other problems Assessment: - very low to very high
	Political impact	Scale of the pressure (from the media or the population) on political decision-makers Assessment: - very low to very high
	Psychological impact	Scale of the behaviour of the population (“panic buying”; flight from the reference area; hotlines overburdened) Assessment: - very low to very high
	Damage to cultural assets	Number and significance of the cultural assets affected (regional, national, Cultural World Heritage Site) + level of damage (short-term, medium-term, total loss) Assessment: - very low to very high



2.4 Item 4 of the agenda “Specification of the damage values for the damage parameters”

First of all, possible damage values will be specified for the selected damage parameters of the respective scenario by the experts attending the workshop:

- The specification of the anticipated damages may require research; in some cases, you will only be able to make rough assumptions or estimate scopes; in the case of differing estimates by different experts, all the results should be documented, together with the grounds and the derivation.

- If no information is available at all for some areas, such gaps of knowledge should be closed, as far as possible, to improve the State’s security policies. To this end, corresponding research should be commissioned after the event.
- As the risk analysis is not able to/does not desire to depict a real event (events take a different course, depending on the location, time and weather conditions), estimates and smaller gaps are generally unproblematical.

Example:

Table 3: Anticipated damages for the protected asset “man” Part 1

Schutzgut	Schadensparameter	Erwarteter Schaden auf Grund des Ereignisses (Szenario)?
Man	Fatalities	fewer than 5 Reason: accidents caused by the failure of traffic lights. The public bodies are not aware of persons who, for example, are connected to ventilators at home
	Injured persons: <ul style="list-style-type: none"> • slightly injured T3 • seriously injured T2 	<ul style="list-style-type: none"> • not anticipated • T1 and T2 combined fewer than 20. <u>Reason:</u> accidents caused by the failure of traffic lights • not anticipated • not anticipated
	<ul style="list-style-type: none"> • very seriously injured T1 • without a chance of survival T4 • special types of injury 	<ul style="list-style-type: none"> • not specified • not specified • not specified • approx. 100-200. Reason: due to the failure of home ventilation, home dialysis etc., relocation of a larger number of affected patients to the hospitals



In the example table, you can see that information cannot be provided for all the damage parameters. This is not absolutely necessary. If the scenario

provides no direct indications of possible damages, or if no specific focus can be identified, this is also a permissible result.

Table 4: Anticipated damages for the protected asset “man” Part 2

Protected asset	Damage parameter	Anticipated damage as a result of the event (scenario)?
Man	Interruption of power supply <ul style="list-style-type: none"> short-term (< 8 hours) medium-term (8 h - 3 days) longer term (> 3 days) 	<ul style="list-style-type: none"> 150,000 persons 150,000 persons none
	Interruption of heating energy: <ul style="list-style-type: none"> short-term (< 8 hours) medium-term (8 h - 3 days) longer term (> 3 days) 	<ul style="list-style-type: none"> 150,000 persons 150,000 persons none
	Interruption of drinking water supply: <ul style="list-style-type: none"> short-term (< 8 hours) medium-term (8 h - 3 days) longer term (> 3 days) 	<ul style="list-style-type: none"> none none none
	Interruption of sewage	<ul style="list-style-type: none"> none
	Requirements for the transportation of persons: <ul style="list-style-type: none"> emoval 	<ul style="list-style-type: none"> 7,500 persons 30 km – neighbouring counties
	Accommodation: <ul style="list-style-type: none"> short-term (1 night) medium-term (2 - 7 days) longer term (> 1 week) 	<ul style="list-style-type: none"> 7,500 persons none none



Protected asset	Damage parameter	Anticipated damage as a result of the event (scenario)?
Man	Catering: <ul style="list-style-type: none"> decentralised centralised (e.g. in emergency accommodation) 	<ul style="list-style-type: none"> none 7,500 persons for 1.5 days
	Medical / nursing care: <ul style="list-style-type: none"> decentralised centralised 	<ul style="list-style-type: none"> 100-200 persons 200-400 persons
	Other logistics	<ul style="list-style-type: none"> not specified

Table 5: Anticipated damages for the protected asset “environment”

Protected asset	Damage parameter	Anticipated damage as a result of the event (scenario)?
Environment	Protected areas	None
	Surface water	None
	Groundwater	None
	Woodlands	None
	Agricultural land	None
	Animals	<p>In the county, there are 55 farms engaged in livestock farming (dairy farming, pig farming, poultry farming). The farms are between 150 LUs and 1000 LUs in size. According to a survey, 10 of these farms are without an emergency power supply or a feed-in facility, with the result that several thousand animals have to be slaughtered as a result of the failure of the heating/air conditioning system/milking system.</p> <p>→ <u>Assessment of the extent of the damage: high</u></p>

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In order to obtain data that are as realistic as possible in the damage assessment, it would be useful if you were to talk through the scenario with experts, e.g. with the Chamber of Agriculture, the

Farmers' Association, the county vet or the largest farms in your area. In this way, you will get the best possible estimate of the extent of the damage for your jurisdiction.

Table 6: Anticipated damage for the protected asset "economy"

Protected asset	Damage parameter	Anticipated damage as a result of the event (scenario)?
Economy	Impact on the public sector	<ul style="list-style-type: none"> Costs for the deployment of honorary helpers Costs for the accommodation and feeding of the evacuated persons Budgets of the municipalities and the county manage without funds from the Land or Federation <p>→<u>Assessment of extent of the damage: low</u></p>
	Impact on the private sector	<ul style="list-style-type: none"> In the county, there are two automotive suppliers with 2,500 jobs each; a two-day loss of production is manageable (according to information from the companies) For the other industries (retail, crafts and trades etc.), bankruptcies are not expected as a result of the event <p>→<u>Assessment of the extent of the damage: low</u></p>
	Impact on private households	<ul style="list-style-type: none"> Larger – uninsured – damages are not expected as a result of the event <p>→<u>Assessment of the extent of the damage: low</u></p>

For the determination of the damage parameters indicated here, you can contact the Chamber of Commerce and Industry, in order to achieve an estimate of the extent of the damage that is as accurate as possible.



Table 7: Anticipated damages for the protected asset non-material:

Protected asset	Damage parameter	Anticipated damage as a result of the event (scenario)?
Non-material	Impact on public security and order	<ul style="list-style-type: none"> Multiple shift operation for personnel deployed – necessary reinforcement from other territorial authorities Other problems: failure of communication from the control centre to the emergency personnel, failure of radio system for authorities and organisations responsible for security, failure of mobile networks → <u>Assessment of the extent of the damage: high</u>
	Political impact	<ul style="list-style-type: none"> Media report on the event nationwide Due to the communication problems with the emergency personal, pressure is exerted on the County District Commissioner and the Incident Command Centre by the population and the media → <u>Assessment of the extent of the damage: high</u>
	Psychological impact	<ul style="list-style-type: none"> Scale of the behaviour of the population: the population behaves calmly and sensibly overall. Most stay at home or find accommodation with relatives and acquaintances outside the area. The accommodation / evacuation of old people's homes and other persons is generally orderly → <u>Assessment of the extent of the damage: medium</u>
	Damage to cultural assets	<ul style="list-style-type: none"> As a result of the electric power breakdown, the required air conditioning in the Museum XYZ, in which paintings and writings of national significance are kept, no longer works. The works which are seriously at risk (200 pictures and 1500 writings) will be taken away and distributed to other museums in the Land. This will be done by the employees of the museum, supported by volunteers, in half a day. → <u>Assessment of the extent of the damage: medium</u>

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For the protected assets “economy” and “non-material”, you can see an „**assessment**“ in the column “Anticipated damage as a result of the event (scenario)?” This is one possible approach if you are not able to or do not want to work with absolute values (e.g. € values).

For guidance, we have enclosed tables on the protected assets “environment”, “economy” and “non-material” in the appendices, which you can use to get closer to such an assessment.

2.5 Item 5 of the agenda “Specification of the necessary coping capacities (“TARGET”)

After you have jointly estimated the damages which can be anticipated for all the damage parameters, the appraisal of the required coping capacities (state and non-governmental) in crisis management will take place. Here, you have to assess what capacities are required

- to **quickly get to grips with the respective danger situation,**

- to **avoid further damages** to man and the environment,
- to **avoid further damages** to infrastructures and to cultural assets,
- to **protect the political decision-makers/the State from a loss of confidence.**

In particular, it is a matter of setting the necessary personnel and material capabilities with regard to general hazard prevention and disaster management against the corresponding damages or the extent to which the individual damage parameters are affected. If available, private capacities should be included at this point.

Example: for the damage parameter “seriously injured persons” in the protected asset category “man”, you are dealing with the coping capacity of logistics. For this, you require information on the number of emergency doctors that you have at your disposal, or on the vehicles (ambulances or mobile intensive care units), which are available for care and transportation.

Please note:

When defining the necessary coping capacities, there can be **no** question of defining the **normal situation as the TARGET**. In the event of an emergency situation/a disaster, various curtailments must be accepted in the provision of supplies, i.e. it may not be possible to rely upon accommodation, food provisions or means of communication (Internet, cellular radio) to the customary extent. The response times and the level of supplies provided by the standard rescue service and preventive fire protection, as well as the technical relief operations, cannot be assumed. Nevertheless, the state players are obliged to guarantee the basic needs of the population, to ensure the integrity of these and the fastest possible assistance for injured persons. The **TARGET** coping capacities must be defined against this background. In this context, the specification of subjects of protection is helpful. Subjects of protection describe desired protection statuses and thus form the basis for the planning of measures in the context of the prevention of damages to the population and the preparation for dealing with such damage. Subjects of protection create transparency with respect to the status which is to be achieved and thus allow for a comparison with the level of protection which has already been attained.

Example:

Table 8: TARGET capacities for the protected asset “man”:

Protected asset	Damage parameter	Anticipated damage as a result of the event (scenario)?	Required coping capacities (TARGET)
Man	Fatalities	fewer than 5 persons <u>Reason:</u> accidents caused by the failure of traffic lights. The public bodies are not aware of persons who, for example, are connected to ventilators at home	Psychosocial crisis management – 5 persons Corpses handled by local undertakers
	Injured persons:	T1 and T2 combined fewer than 20 persons. <u>Reason:</u> accidents caused by the failure of traffic lights	2 ambulances and 2 emergency doctors
	Special illnesses	Approx. 100-200 persons <u>Reason:</u> due to the failure of home ventilation, home dialysis etc., relocation of a larger number of affected patients to the hospitals	The hospitals available in the county all have an emergency power supply and can admit the appropriate number of affected persons as a result of early discharges
	Interruption of power supply: short-term (< 8 hours)	150,000 persons	Provision of information to the population via loudspeaker announcements Need for at least 50 vehicles equipped accordingly
	Interruption of power supply: medium-term (8 h - 3 days)	150,000 persons	No coping capacities, as houses generally do not have feed-in facilities. Must be implemented through self-help or (see “accommodation”) only for part of the population.



Protected asset	Damage parameter	Anticipated damage as a result of the event (scenario)?	Required coping capacities (TARGET)
Man	Interruption of power supply: medium-term (8 h - 3 days))	150,000 persons	No coping capacities, as houses generally do not have feed-in facilities. Must be implemented through self-help or (see “accommodation”) only for part of the population.
	Interruption of heating energy: medium-term (8 h - 3 days)	150,000 persons	No coping capacities, must be implemented through self-help or (see “accommodation”) only for part of the population
	Requirements for the transportation of persons: Removal	7,500 persons (30 km – neighbouring counties)	150 bus journeys
	Accommodation: short-term (1 night)	7,500 persons	7,500 places in emergency accommodation 25 Rapid Intervention Units for Welfare
	Catering: centralised (e.g. in emergency accommodation)	7,500 persons (1.5 days; 3 meals/day)	25 kitchen units (Rapid Intervention Units for Catering) in emergency accommodation
	Medical / nursing care: decentralised	100-200 persons	via private nursing services
	Medical / nursing care: centralised	200-400 persons	2 Rapid Intervention Units for Treatment, supported by private nursing services



Table 9: TARGET capacities for the protected asset “environment”:

Protected asset	Damage parameter	Anticipated damage as a result of the event (scenario)?	Required coping capacities (TARGET)
Environment	Animals	<p>In the county, there are 55 farms engaged in livestock farming (dairy farming, pig farming, poultry farming). The farms are between 150 LUs and 1000 LUs in size. According to a survey, 10 of these farms are without an emergency power supply or a feed-in facility, with the result that several thousand animals have to be slaughtered as a result of the failure of the heating/air conditioning system/milking system.</p> <p>→<u>Assessment of the extent of the damage: high</u></p>	<ul style="list-style-type: none"> • Support through feed-in, where possible • No coping capacities for animal slaughter or disposal • Culling – capacity for the removal of the carcasses of 10,000 animals • Transport capacities for 10,000 animals • Execution by the agricultural holdings on their own

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Table 10: TARGET capacities for the protected asset “economy”:

Protected asset	Damage parameter	Anticipated damage as a result of the event (scenario)?	Required coping capacities (TARGET)
Economy	Impact on the public sector	<ul style="list-style-type: none"> Costs for the deployment of honorary helpers Costs for the accommodation and feeding of the evacuated persons Budgets of the municipalities and the county manage without funds from the Land or Federation →<u>Assessment of extent of the damage</u>: low 	Sufficient budgetary resources
	Auswirkungen auf die private Wirtschaft	<ul style="list-style-type: none"> In the county, there are two automotive suppliers with 2,500 jobs each; a 2-day loss of production is manageable (according to information from the companies) For the other industries (retail, crafts and trades etc.), bankruptcies are not expected as a result of the event →<u>Assessment of the extent of the damage</u>: low 	No direct coping capacities in the area of disaster management/public sector
	Auswirkungen auf die privaten Haushalte	<ul style="list-style-type: none"> Larger (uninsured) damages are not expected as a result of the event →<u>Assessment of the extent of the damage</u>: low 	No direct coping capacities in the area of disaster management/ public sector

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Table 11: TARGET capacities for the protected asset “non-material”:

Protected asset	Damage parameter	Anticipated damage as a result of the event (scenario)?	Required coping capacities (TARGET)
Non-material	Impact on public security and order	<ul style="list-style-type: none"> • Multiple shift operation for personnel deployed • Necessary reinforcement from other territorial authorities • Other problems: failure of communication from the control centre to the emergency personnel, failure of radio system for authorities and organisations responsible for security, failure of mobile networks →<u>Assessment of the extent of the damage: high</u> 	<ul style="list-style-type: none"> • Administrative assistance • Alternative channels of communication
	Political impact	<ul style="list-style-type: none"> • Media report on the event nationwide • Due to the communication problems with the emergency personnel, pressure is exerted on the County District Commissioner and the Incident Command Centre by the population and the media →<u>Assessment of the extent of the damage: high</u> 	<ul style="list-style-type: none"> • Crisis communication • One-voice policy • Regular press statements



Protected asset	Damage parameter	Anticipated damage as a result of the event (scenario)?	Required coping capacities (TARGET)
Non-material	Psychological impact	<ul style="list-style-type: none"> • Scale of the behaviour of the population: the population behaves calmly and sensibly overall. • Most stay at home or find accommodation with relatives and acquaintances outside the area. • The accommodation / evacuation of old people's homes and other persons is generally orderly → <u>Assessment of the extent of the damage:</u> medium 	<ul style="list-style-type: none"> • Krisenkommunikation • One-voice-policy • Hotlines
	Damage to cultural assets	<ul style="list-style-type: none"> • As a result of the electric power breakdown, the required air conditioning in the Museum XYZ, in which paintings and writings of national significance are kept, no longer works. • The works which are seriously at risk (200 pictures and 1500 writings) will be taken away and distributed to other museums in the state. This will be done by the employees of the museum, supported by volunteers, in half a day. → <u>Assessment of the extent of the damage:</u> medium 	<ul style="list-style-type: none"> • Operational plans and logistics for the evacuation of the endangered/affected cultural assets • here: 30 helpers incl. staff of the museum



2.6 Item 6 of the agenda “Comparison of the coping capacities “ACTUAL”

After you have now specified the necessary “TARGET” resources, the comparison with the “ACTUAL” values for the county will take place. The data required for this have largely already been collected by the coordinator in the context of the de-

scription of the reference area (Part II Subsection 3.2). If individual pieces of data are missing, you can discuss these with the experts or collect them subsequently from the competent bodies during the follow-up to the workshop.

Example:

Table 12: ACTUAL coping capacities for the protected asset “man”:

Protected asset	Damage parameter	Required coping capacities (TARGET)	Coping capacities (ACTUAL)
Man	Fatalities	Psychosocial crisis management – 5 persons Corpses handled by local undertakers	Psychosocial crisis management – 10 persons 15 undertakers in the county
	Injured persons <ul style="list-style-type: none"> seriously injured – T2 very seriously injured – T1 	2 ambulances + 2 emergency doctors	12 ambulances + 6 emergency doctors
	Special illnesses	200 places in hospitals	The hospitals available in the county all have an emergency power supply and can admit up to 400 affected persons as a result of early discharges
	Interruption of power supply: short-term (< 8 hours)	<ul style="list-style-type: none"> Provision of information to the population via loudspeaker announcements Need for at least 50 vehicles equipped accordingly 	16 vehicles are equipped with loudspeakers

Protected asset	Damage parameter	Required coping capacities (TARGET)	Coping capacities (ACTUAL)
Man	Interruption of power supply: medium-term (8 h - 3 days)	<ul style="list-style-type: none"> No coping capacities, as houses generally do not have feed-in facilities. Must be implemented through self-help or (see “accommodation”) only for part of the population. 	None
	Interruption of heating energy: medium-term (8 h - 3 days)	<ul style="list-style-type: none"> No coping capacities, Must be implemented through self-help or (see “accommodation”) only for part of the population 	None
	Requirements for the transportation of persons: removal	150 buses	184 public transport buses
	Accommodation: short-term (1 night)	7,500 places in emergency accommodation 25 Rapid Intervention Units for Welfare	10 Rapid Intervention Units for Welfare
	Catering: centralised (e.g. in emergency accommodation)	25 kitchen units (Rapid Intervention Units for Catering) in emergency accommodation	5.000 Plätze ausgewiesen 10 Rapid Intervention Units for Catering
	Medical / nursing care: decentralised	via private nursing services	Private Pflegedienste
	Medical / nursing care: centralised	2 Rapid Intervention Units for Treatment, supported by private nursing services	5 Rapid Intervention Units for Treatment



Table 13: TARGET coping capacities for the protected asset “environment”:

Protected asset	Damage parameter	Required coping capacities (TARGET)	Coping capacities (ACTUAL)
Environment	Animals	<ul style="list-style-type: none"> • Support through feed-in, where possible • No coping capacities for animal slaughter or disposal • Culling – capacity for removal of the carcasses of 10,000 animals • Transport capacities for 10,000 animals • Execution by the agricultural holdings on their own 	None <ul style="list-style-type: none"> • Self-help on the part of the farmers • Capacities for animal carcass removal available in the Land (up to 50,000 LUs/week)

Table 14: ACTUAL coping capacities for the protected asset “economy”:

Protected asset	Damage parameter	Required coping capacities (TARGET)	Coping capacities (TARGET)
Economy	Impact on the public sector	Sufficient budgetary resources Requirement approx. € 1 million	Costs of max. € 1 million affordable through budgets
	Impact on the private sector	No direct coping capacities in the area of disaster management/public sector	None Assistance from Land/Bund if applicable
	Impact on private households	No direct coping capacities in the area of disaster management/ public sector	None Assistance from Land/Bund if applicable

Table 15: ACTUAL coping capacities for the protected asset “non-tangible”:

Protected asset	Damage parameter	Required coping capacities (TARGET)	Coping capacities (ACTUAL)
Non-material	Impact on public security and order	Number of personnel (incl. changes of shift):: <ul style="list-style-type: none"> • Fire brigade: 2000 • Police: 500 • Relief organisations: 2700 →Administrative assistance →Alternative channels of communication 	Number of personnel (incl. changes of shift): <ul style="list-style-type: none"> • Fire brigade: 1000 • Police: 220 • Relief organisations: 1600 • Administrative assistance • No alternative channels of communication available comprehensively in the area
	Political impact	<ul style="list-style-type: none"> • Crisis communication • One-voice policy • Regular press statements 	No coordinated concept available
	Psychological impact	<ul style="list-style-type: none"> • Crisis communication • One-voice policy • Hotlines 	Citizen hotline – trained personnel for crisis and disaster situations for hotline: 5
	Damage to cultural assets	<ul style="list-style-type: none"> • Operational plans and logistics for the evacuation of the endangered/affected cultural assets • here: 30 helpers incl. staff of the museum 	Museum has a corresponding preparedness plan Staff of the museum: 45 persons



2.7 Item 7 of the agenda “The target-actual comparison”

At this point, you will compare the ACTUAL condition of the coping capacities available in your

county with the required TARGET values. Then you will derive your need for action from the deficits established here.

Example:

Table 16: TARGET-ACTUAL comparison for the protected asset “man”:

Damage parameter	Required coping capacities (TARGET)	Coping capacities (ACTUAL)	TARGET-ACTUAL comparison
Fatalities	Psychosocial crisis management – 5 persons Corpses handled by local undertakers	Psychosocial crisis management – 10 persons 15 undertakers in the county	No deficit
Injured persons • seriously injured – T2 • very seriously injured – T1	2 ambulances + 2 emergency doctors	12 ambulances + 6 emergency doctors	No deficit
Special illnesses	200 places in hospitals	The hospitals available in the county all have an emergency power supply and can admit up to 400 affected persons as a result of early discharges	No deficit Operations planning for hospitals must be available!
Interruption of power supply: short-term (< 8 hours)	<ul style="list-style-type: none"> Provision of information to the population via loudspeaker announcements Need for at least 50 vehicles equipped accordingly 	16 vehicles are equipped with loudspeakers	Deficit: at least 34 vehicles with loudspeakers

Damage parameter	Required coping capacities (TARGET)	Coping capacities (ACTUAL)	TARGET-ACTUAL comparison
Interruption of power supply: medium-term (8 h - 3 days)	<ul style="list-style-type: none"> No coping capacities, as houses generally do not have feed-in facilities. Must be implemented through self-help or (see “accommodation”) only for part of the population. 	None	Strengthening of the population’s ability to help itself, if applicable →Risk communication
Interruption of heating energy: medium-term (8 h - 3 days)	<ul style="list-style-type: none"> No coping capacities, Must be implemented through self-help or (see “accommodation”) only for part of the population 	None	Strengthening of the population’s ability to help itself, if applicable →Risk communication
Requirements for the transportation of persons: Removal	150 buses	184 public transport buses	No deficit Consultation/planning with public transport operators for specific situations
Accommodation: short-term (1 night)	<ul style="list-style-type: none"> 7,500 places in emergency accommodation 25 Rapid Intervention Units for Welfare 	5000 places in emergency accommodation accounted for 10 Rapid Intervention Units for Welfare	<ul style="list-style-type: none"> Review of the available public buildings for potentially topping up the available accommodation Supralocal disaster management assistance: a further 15 Rapid Intervention Units
Catering: centralised (e.g. in emergency accommodation)	25 kitchen units (Rapid Intervention Units for Catering) in emergency accommodation	10 Rapid Intervention Units for Catering	Supralocal disaster management assistance: a further 15 Rapid Intervention Units



Damage parameter	Required coping capacities (TARGET)	Coping capacities (ACTUAL)	TARGET-ACTUAL comparison
Medical / nursing care: decentralised	via private nursing services	Private nursing services	Consultation/planning with the nursing services
Medical / nursing care: centralised	2 Rapid Intervention Units for Treatment, supported by private nursing services	5 Rapid Intervention Units for Treatment	No deficit

Table 17: TARGET-ACTUAL comparison for the protected asset “environment”:

Damage parameter	Required coping capacities (TARGET)	Coping capacities (ACTUAL)	TARGET-ACTUAL comparison
Animals	<ul style="list-style-type: none"> Support through feed-in, where possible No coping capacities for animal slaughter or disposal Culling – capacity for the removal of the carcasses of 10,000 animals Transport capacities for 10,000 animals Execution by the agricultural holdings on their own 	<ul style="list-style-type: none"> None Self-help on the part of the farmers Capacities for animal carcass removal available in the Land (up to 50,000 LUs/week) 	<ul style="list-style-type: none"> Strengthening of the population’s ability to help itself, if applicable →Risk communication

Table 18: TARGET-ACTUAL comparison for the protected asset “economy”:

Damage parameter	Required coping capacities (TARGET)	Coping capacities (TARGET)	TARGET-ACTUAL comparison
Impact on the public sector	Sufficient budgetary resources Requirement approx. € 1 million	Costs of max. € 1 million affordable through budgets	No deficit
Impact on the private sector	No direct coping capacities in the area of disaster management/public sector	None Assistance from Land/Bund if applicable	Strengthening of the population’s ability to help itself, if applicable →Risk communication
Impact on private households	No direct coping capacities in the area of disaster management/ public sector	None Assistance from Land/Bund if applicable	Strengthening of the population’s ability to help itself, if applicable →Risk communication



Table 19: TARGET-ACTUAL comparison for the protected asset “non-material”

Damage parameter	Required coping capacities (TARGET)	Coping capacities (ACTUAL)	TARGET-ACTUAL comparison
Impact on public security and order	Number of personnel (incl. changes of shift): <ul style="list-style-type: none"> • Fire brigade: 2000 • Police: 500 • Relief organisations: 2700 • Administrative assistance • Alternative channels of communication 	Number of personnel (incl. changes of shift): <ul style="list-style-type: none"> • Fire brigade: 1000 • Police: 220 • Relief organisations: 1600 • Administrative assistance • No alternative channels of communication available comprehensively in the area 	Deficits in the number of personnel <ul style="list-style-type: none"> • Fire brigade: 1000 • Police: 280 • Relief organisations: 1100 • Supralocal assistance: development of alternative channels of communication which are not dependent on electric power, or longer endurance
Political impact	<ul style="list-style-type: none"> • Crisis communication • One-voice policy • Regular press statements 	No coordinated concept available	Coordinated crisis communication concept of all the responsible parties
Psychological impact	<ul style="list-style-type: none"> • Crisis communication • One-voice policy • Hotline(s) – with a total of at least 30 persons working in shifts 	Citizen hotline – trained personnel for crisis and disaster situations for hotline: 5	Training required for additional personal for citizen hotlines, so that they can grow if an event occurs
Damage to cultural assets	<ul style="list-style-type: none"> • Operational plans and logistics for the evacuation of the endangered/affected cultural assets • here: 30 helpers incl. staff of the museum 	<ul style="list-style-type: none"> • Museum has a corresponding preparedness plan • Staff of the museum: 45 persons 	No deficit

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2.8 Item 8 of the agenda “Specification of the way forward”

To conclude the analysis workshop, the specification of the way forward, for example with regard to

- The clarification of outstanding questions
- The consultation of further experts for a particular question (follow-up analyses),
- The production and, if applicable, the type and scope of the report to the political decision-makers,
- Any initial adjustments – e.g. of an organisational nature – to the operational crisis management,
- The fixing of a possible final event,
- (...)

must be provided for as the final point of the agenda.



Chapter

5

Part IV: Evaluation

The results of your risk analysis for civil protection as a stress test for general hazard prevention and disaster management must be communicated – irrespective of whether this is enshrined in law or initiated politically or by experts. This manual may not make a universally valid specification of the nature and scope of this communication here, for the decision regarding the manner in which the publication is to take place shall be the responsibility of the administration or the political leadership of the local territorial authority.

1. Reporting

It is advisable that at least everyone involved in the procedure is sent a final report containing the relevant information and results (scenario, analysis of the extent of the damage, target-actual comparison).

In the context of risk communication, it is also recommended that the population, as well as other parties who are identified in the analysis as possible affected persons (e.g. farmers) be informed about the results of the risk analyses, in an appropriate way. For this, it is necessary to specify whether you would like to publish an “abstract” containing the results relevant for the population after every analysis of a scenario, or only after the completion of all the planned analyses in the form of a target group-specific summary.

It is recommended that the nature and scope of the report, as well as its publication, be decided upon in the steering committee.

In the appendices to this manual, you will find an example of a report which was created in a pilot county. This form of the report is suitable for passing on to the people involved in the procedure, but the right form for a report regarding the achievement of the objective is ultimately your decision.

Communication of the limits of the capabilities of disaster management/hazard prevention, combined with technically justified approaches for the different target groups:

- Political decision-makers
- Technical experts in the jurisdiction
- The public
- Other affected parties

2. Visualisation of the risk

The graphic preparation of the results from the risk analyses is a useful tool for illustrating the complex relationships to laymen. The aim is to put decision-makers in politics and administration and other possible affected persons, as well as the citizens in general, in a position to be able to intuitively understand the circumstances and to form an opinion. The requirements for the presentation may differ, according to the target group addressed.

The figures below can, for example, support your statements for the results of the risk analyses (corresponding files for the visualisation of your own results are available to you in the download area at www.bbk.bund.de/risiko-analyse):

Figure 1: Summary of the analysis of a scenario:

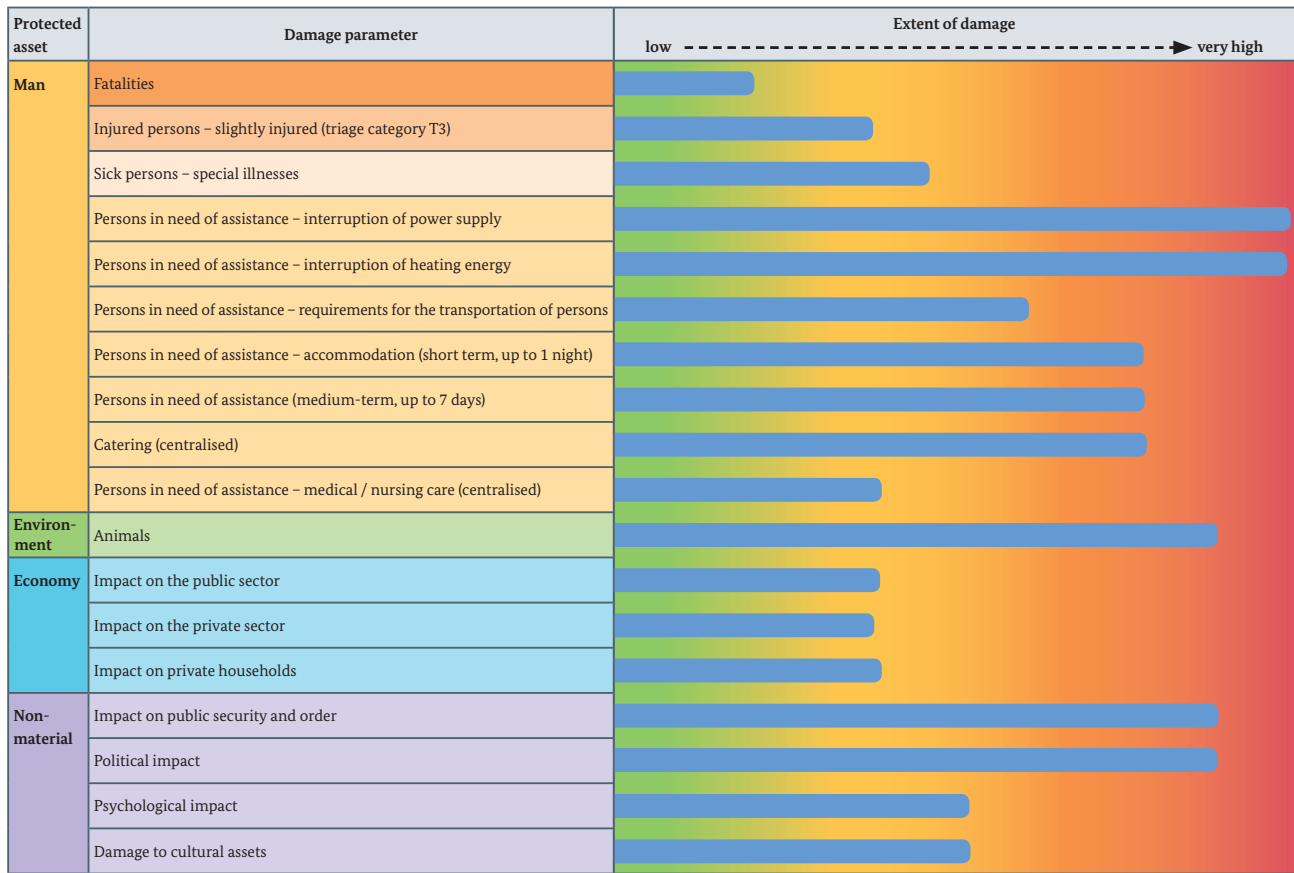


Fig. 1 visualises the results of an individual analysis (a scenario) in a so-called “scan representation”. Here, the impact of the event on the different damage parameters is compared. This gives you a quick overview of the areas in which the event

exhibits the greatest damage potential. The scan representation is aimed primarily at technical experts and decision-makers. It allows more detailed information to be obtained from the consideration of individual scenarios.

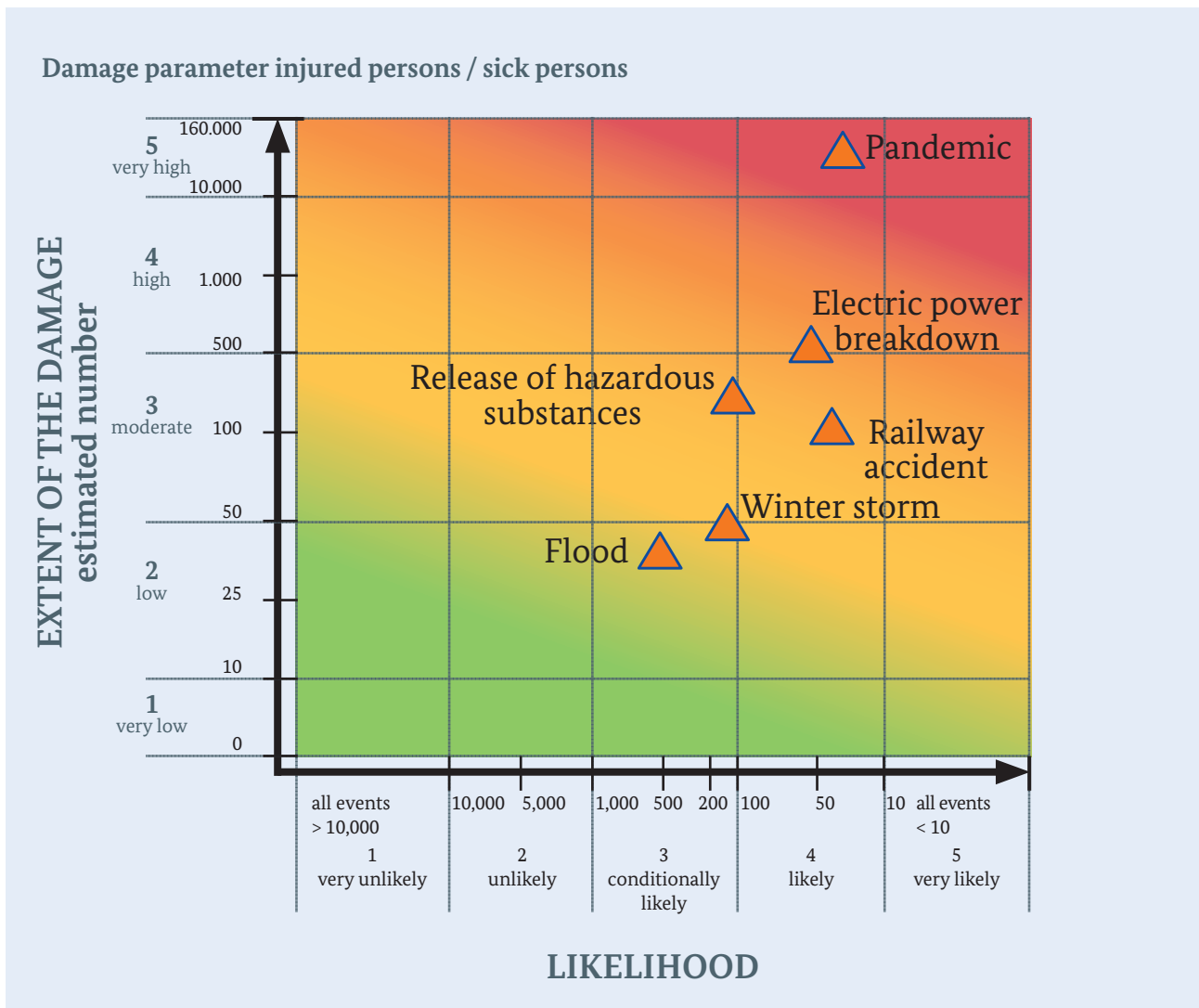
Risk analysis for civil protection

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Figure 2: Comparative representation of several analyses for one damage parameter (here: injured persons/sick persons):

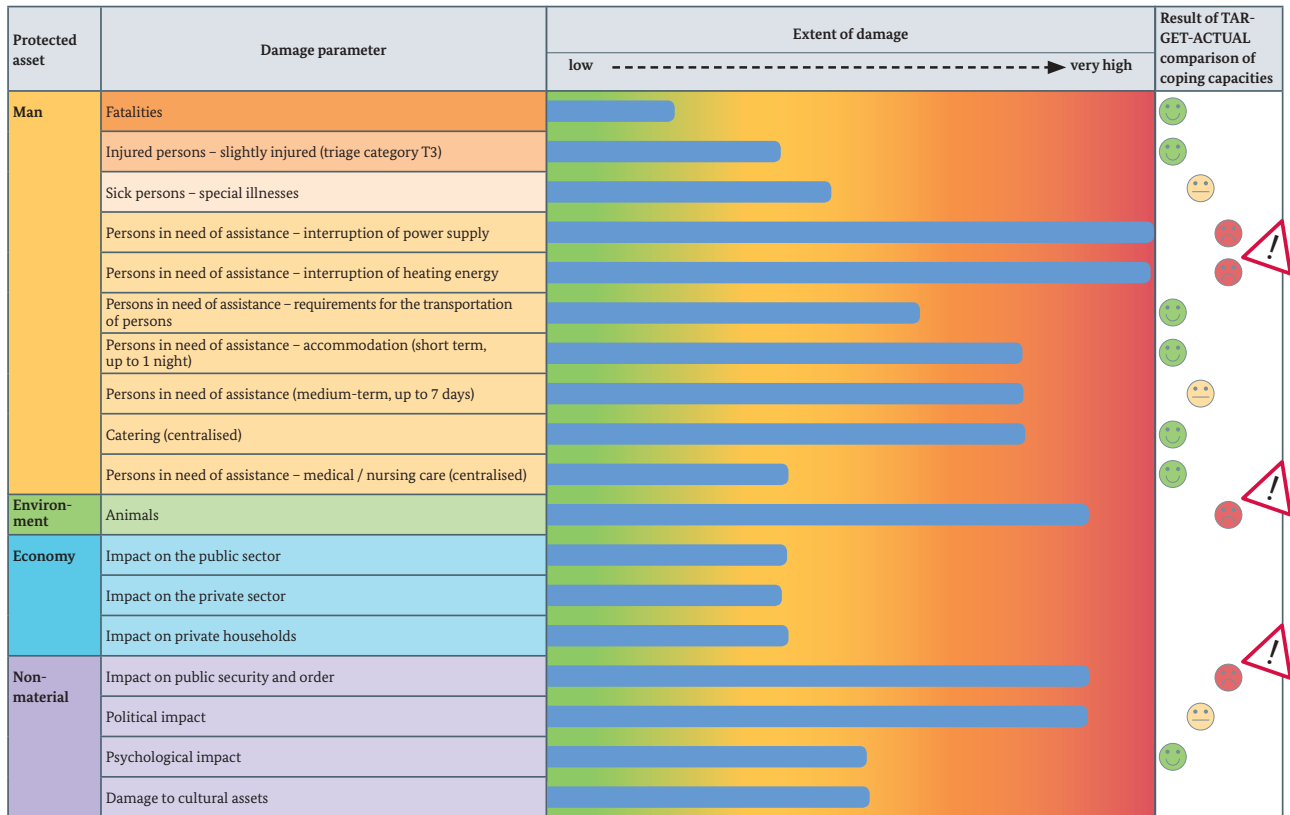


In Fig. 2, a so-called “matrix representation”, the results of a number of analysed scenarios are compared. The important thing here is that only the results of individual damage parameters may be compared with one another. By way of an example, the results for the damage parameter “injured persons/sick persons” are presented for a number of scenarios in the figure.

This representation can help you to bring the issue of “raising awareness” and “preparation and self-protection/self-help” to particular interest groups (e.g. farmers) or to the general public. The upper limit of the “Y” axis will be defined by the population (population in residence, if applicable) of the territorial authority (a fictitious county with 160,000 inhabitants is used as an example here).



Fig 3: Summary representation of the “TARGET-ACTUAL comparison of the coping capacities of a scenario (in simplified form, relating only to the damage parameters, not the individual capabilities/capacities):



Key:



= your own coping capacities are not sufficient to satisfy the requirements of the event. The resource planning must be revised.



= your own coping capacities are just sufficient to cope with the event. If there are greater needs in a real event, your own resources are not sufficient. The resource planning should be adjusted.



= your own coping capacities are sufficient to cope with the event. There is generally no need for adjustment in the resource planning.

Fig. 3 extends the “scan representation” from Fig. 1 by the representation of results of the TARGET-ACTUAL comparison of the coping capacities that are available or required for the event in a qualitative overview. This overview representa-

tion is a simplified representation of the results of the entire procedure. It can be used to clearly illustrate the relationships between a scenario that is under consideration and the capacities of hazard prevention and disaster management.

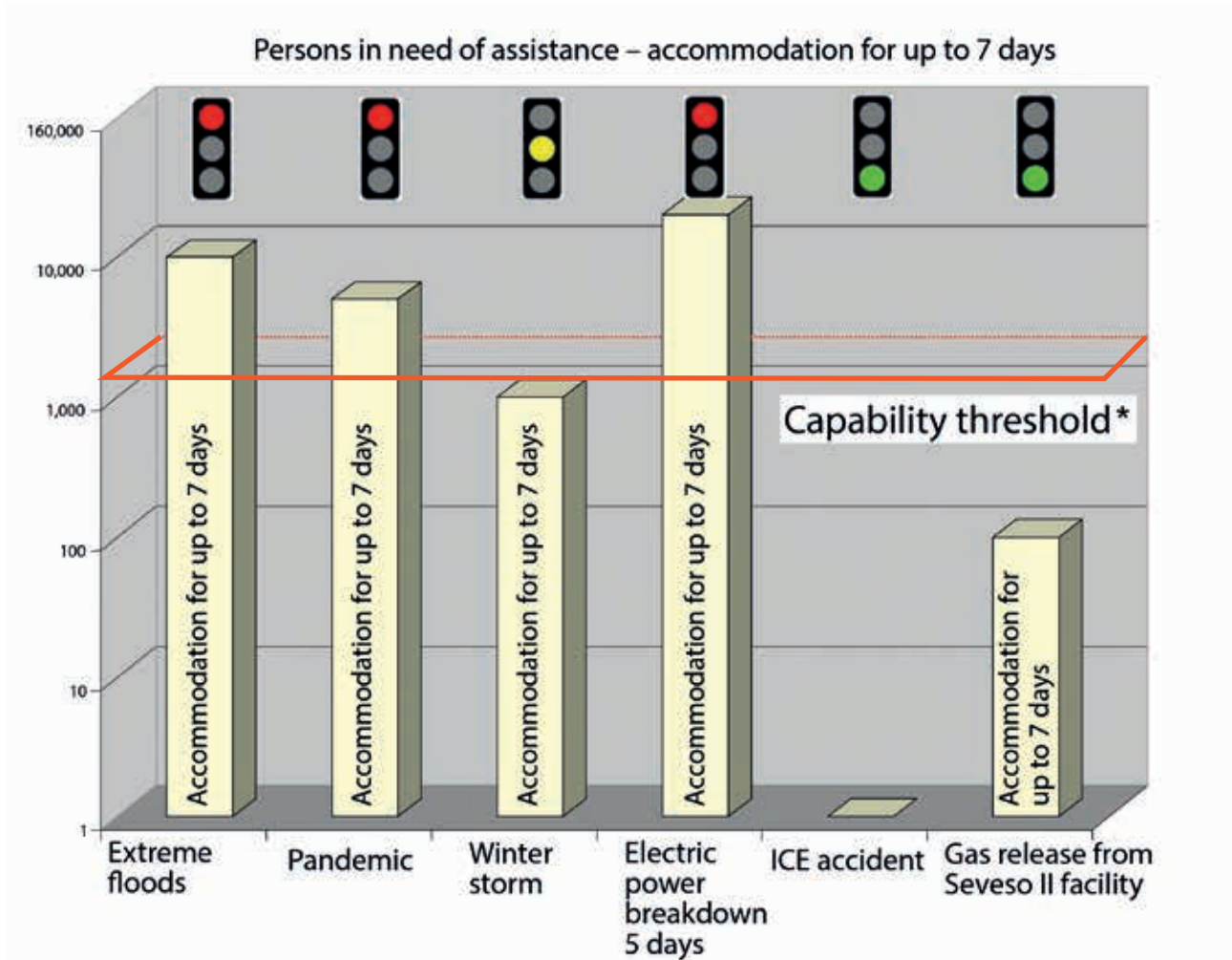
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Fig 4: Comparative representation of the “TARGET-ACTUAL comparison of the coping capacities” of several analyses for one damage parameter (here: persons in need of assistance – accommodation for up to 7 days):



* **The capability threshold** is the value that summarises the maximum capacity of the general hazard prevention and disaster management personnel in the county or the town independent of a Kreis for coping with a situation requirement, as things currently stand (ACTUAL situation).

By means of a bar chart, Fig. 4 presents the TARGET-ACTUAL comparison with respect to the ability to accommodate persons in need of assistance for a period of up to 7 days in a reference area. The “capability threshold” is an important aspect here. In the overview, it is possible to quickly identify which events would overburden the capabilities of the hazard prevention authorities. For example, the maximum capacity for the

accommodation of persons in need of assistance is 2,000 people. In the context of the fictitious analysis results shown above, this would mean a deficit for the fictitious reference area that is taken as a basis for the analysis in the case of the events “extreme floods”, “pandemic” and “five-day comprehensive electric power breakdown”, as 5,000 – 20,000 persons requiring accommodation are expected in the case of these events.

In the first instance, the theoretical procedure of the stress test for the general hazard prevention and disaster management personnel would be completed with such a representation.

However, as has already been seen from the agenda of the “analysis workshop”, the whole project does not end with this. For it is now necessary to specify the way forward and to answer the question:

How will we deal with the results of the analysis?



Chapter

6

ERFOLG

Umsetzung

Planung

Analyse

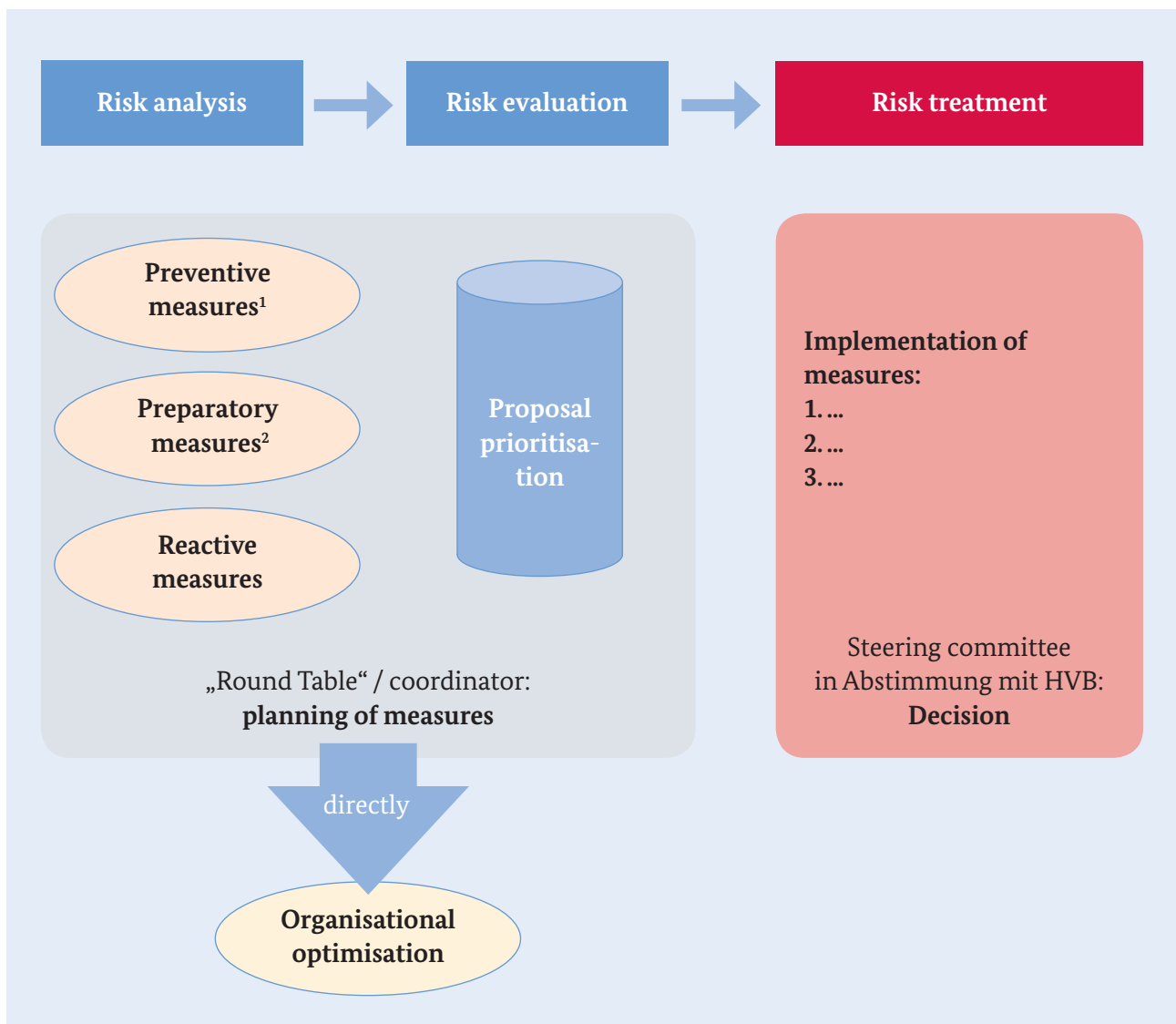


Part V: From risk evaluation to risk treatment

The results of the analysis workshop are now available for a scenario. You know what damages can be expected when this event occurs in your jurisdiction, you are aware of all the coping capacities and capabilities that are available to you, and

you have a technically well-founded assessment of what deficits may exist (target-actual comparison), so that you can work together to handle the event in the best possible way (with the least possible damages to the protected assets).

Figure 1: Schema for the responsibilities of risk analysis, evaluation and treatment



1 Prevention (of an event through structural measures, such as dams, or regional planning measures)

2 Emergency planning measures for the occurrence of an event e.g. through the evaluation of risk analyses

1. Risk evaluation

On the basis of the results of the target-actual comparison, the Round Table will now prepare proposals for measures for the reduction or – ideally – for the removal of identified deficits, under the leadership of its coordinator. This step is an essential working basis for the **risk evaluation**. It can start directly upon completion of the analysis workshop. It may be sensible to restrict the group of participants to those directly involved in disaster management. The technically justified measures can take the following forms:

- a. **Preventive measures:** They are implemented before the event occurs, with the aim of avoiding or reducing its potential negative effects.
- b. **Preparatory measures** (as a component of the preventive measures): Adjustments with respect to an event which occurs “nevertheless”. These may, for example be adjustments to the emergency planning (disaster management plans, site plans, alarm and response regulations, ...), training measures for the emergency personnel, the contractual securing of particular capabilities or capacities (administrative contracts) etc.
- c. **Reactive measures:** Increase of defence potential through, for example, increasing the number of emergency personnel, procuring additional technical equipment etc.

In Fig. 1, the decision-making route in the context of risk analysis, evaluation and treatment is represented schematically.

Information which makes an immediate implementation conceivable can also be gained from the analysis workshop. Here, it is a case of recognised organisational measures, which can be evaluated and implemented on a purely specialist basis. This should take place as quickly as possible within the framework of the available human resources.

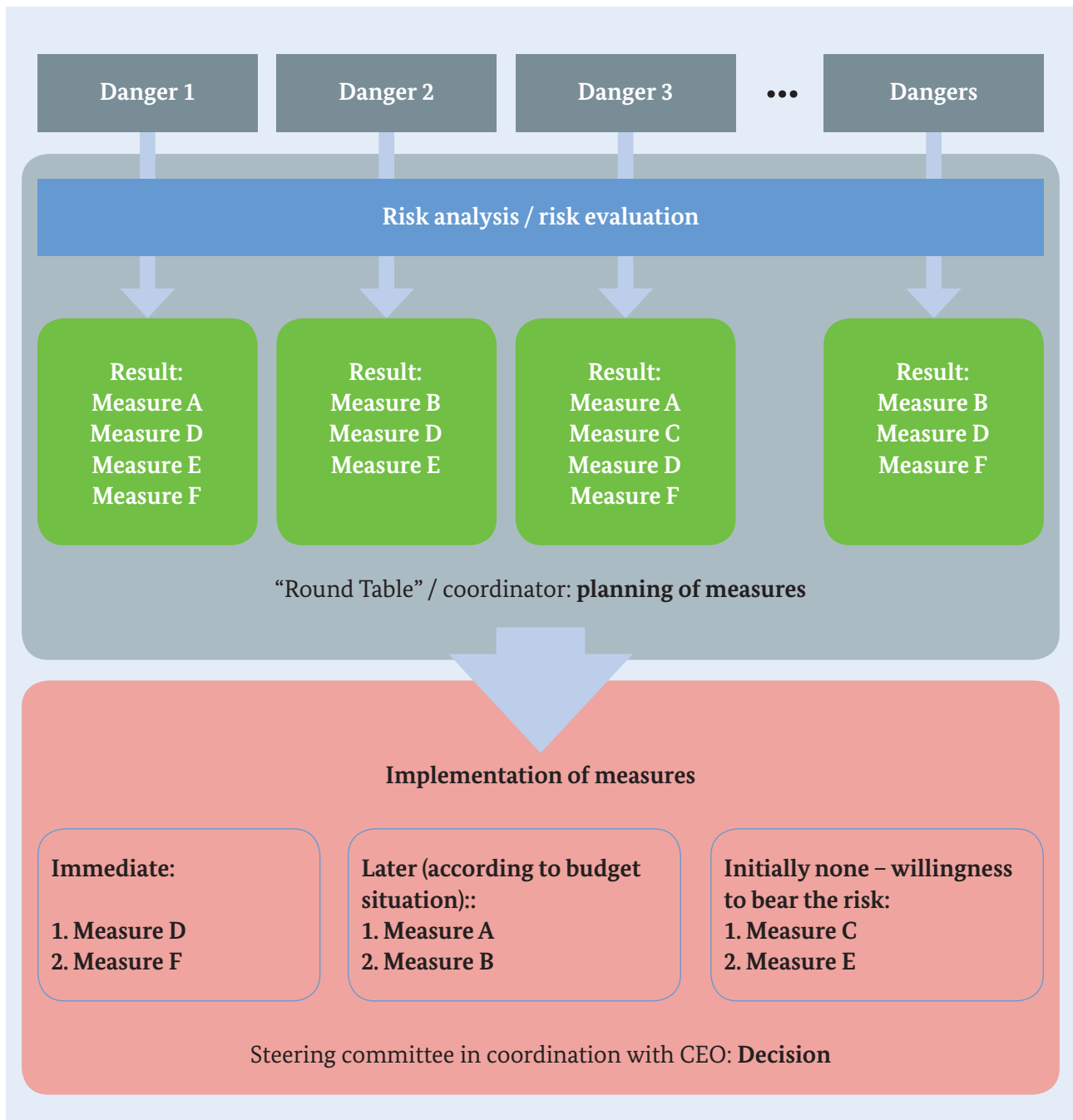
A complete risk evaluation is only possible if all the risks considered to be relevant by the steering committee (see Chapter 3, Part II, 2.1) are analysed. After these risk analyses have been performed, information with respect to the capabilities and, in particular, the limits of the capabilities of hazard prevention for your jurisdiction is available.

2. Risk treatment – decision regarding the implementation of measures

Decisions regarding risk treatment – i.e. relating to measures to be initiated which can have an effect on the budget – must always be made by the steering committee, in accordance with the usual route for administrative decisions. The working level of the Round Table, under the leadership of the coordinator, will prepare the necessary bases of evaluation for this.

In Fig. 2, the relationships are represented – from the results of the risk analyses to the deficits identified in the target-actual comparison, to a planning of measures with a subsequent prioritisation and decision-making regarding risk treatment.

Figure 2: Schema for the responsibilities of risk analysis, evaluation and treatment:



This information will lead to recommendations for measures from the Round Table experts, under the leadership of the coordinator. These recommendations will be provided to the steering committee, which now has the task of putting the technically justified measures into an order for processing that puts the political decision-makers in a position to be able to make decisions.

Information may, in turn, be gained from this which makes a quick implementation of risk-mitigating measures necessary.

Before a cost-intensive procurement, it is necessary to check whether missing capacities or capabilities can be made available cost-efficiently through public law agreements with third parties.

**Key task of the procedure:
risk management as a support
for decision-making**

In the first instance, the effectiveness of the results achieved by the individual measures can be used as a basis for decision-making. The recommendations for measures at an expert level relate to a specific scenario in each case – in the overall view of all the analyses, however, certain measures may turn out to be necessary for handling various events. Coping capacities/capabilities which are **frequently recognised as a deficit** should be implemented correspondingly urgently. Special capabilities which are only necessary for an individual type of event may, for example, be provided with a lower prioritisation for implementation. In addition to the technically justified measures, the steering committee/the decision-makers also have other decision-supporting information at their disposal:

- The likelihoods of the analysed scenarios provide important indications of which of the events under consideration is statistically most likely to occur at this point. Insofar as events identified as “more likely” or with a higher “plausibility” are shown here, the measures proposed for these events should be given a higher priority accordingly.
- The information on the potential economic damages may possibly help you to be able to evaluate the impact on the public budget.

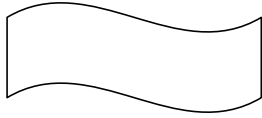
An open book is shown from a low angle, looking down at the pages. The pages are yellowed with age and are fanned out, creating a sense of depth. A white circular overlay is centered over the book's spine, containing the text 'Chapter' in a blue serif font, a horizontal line, and the number '7' below it.

Chapter

7

Appendices

Appendix 1 Sample final report for a risk analysis for an electric power breakdown

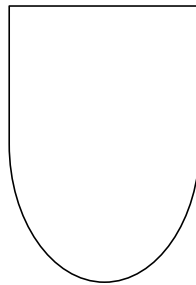


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Risk Analysis

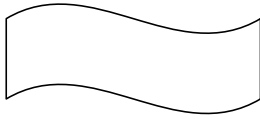
“Scenario ...”

FINAL REPORT



County

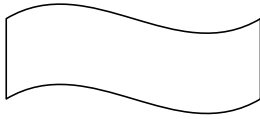
Author:, County/city administration



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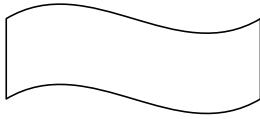
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List of abbreviations

BBK	Federal Office of Civil Protection and Disaster Assistance
DLK	Turntable ladder with basket
DRK	German Red Cross
DWD	German Meteorological Service
ELW	Operational command vehicle
FF	Voluntary fire brigade
GAU	Maximum credible accident
GW	Tool and equipment wagon
GW-AS	Tool and equipment wagon for respiratory protection / radiation protection
GW-G	Tool and equipment wagon for hazardous substances
GW-TS	Tool and equipment wagon for a portable powered pump
HLF	Relief operation crew cab fire engine
KatS	Disaster management
KdoW	Command vehicle
KTLF	Small water tender
KTW	Patient transport ambulance
LBKG	Land Act on Fire Protection, General Aid and Disaster Management
LF	Fire engine
MefG	Crew cab measuring vehicle
MLF	Medium fire engine
MTF	Crew car
MTF-L	Crew car with loading area
MTW	Crew car
MZF	Multi-purpose vehicle
NEF	Emergency doctor ambulance
NKTW	Emergency ambulance
OV	Local association
PSNV	Psychosocial crisis management
RTH	Rescue helicopter
RTW	Ambulance
RW	Heavy rescue vehicle
SEG	Rapid Intervention Unit
StLF	Squadron fire engine
SW	Hose cart
TEL	Operational Command Post
TGM	Telescopic mast
THW	Federal Agency for Technical Relief
TLF	Water tender
TSA	Portable powered pump trailer
TSF	Portable powered pump vehicle
TSF-W	Portable powered pump for water
VG	Association of municipalities
VRW	Immediate response vehicle



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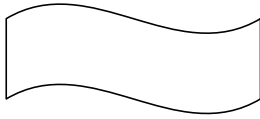
1 Introduction – e.g. for an electric power breakdown scenario

The Münsterland snow chaos at the end of 2005 and other similar events have shown that even a highly developed country such as Germany cannot escape a major electric power breakdown and its consequences. Smaller electric power breakdowns occur time after time for a wide variety of reasons. However, if the electric power fails for several days or even longer, life comes to a halt due to the high dependence on the power supply. In the case of such an event, fast action is required from the authorities. Good preparation is, therefore, indispensable.

In order to be able to take the necessary precautions for such a case, the county / the town independent of a Kreis has prepared a risk analysis on the subject of an “electric power breakdown” with the support of the manual “Risk Analysis for Civil Protection – a stress test for general hazard prevention and disaster management” of the Federal Office of Civil Protection and Disaster Assistance (BBK). The objective of the risk analysis was to evaluate whether the organisations that are active in a disaster situation, i.e. fire brigades, the Federal Agency for Technical Relief or the German Red Cross, are prepared for a corresponding scenario. At the same time, possible weak points should be discovered and – where possible – smoothed out.

Since the middle of 20.., preparations have been made for this, information gathered, and enquiries initiated at various authorities. In the month of XYZ, 20.., a two-day workshop took place, in which all the affected relief organisations participated, in order to provide a professional appraisal of the scenario. The necessary capacities were compared with the anticipated damages, and a target/actual comparison was conducted.

In the following final report, the results of the risk analysis for an “electric power breakdown” will be presented, and the measures which have been taken, so that we are as well-prepared as possible for a protracted electric power breakdown, will be explained.



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2 Scenario

The following scenario is the starting point for the risk analysis for an “electric power breakdown”:

There has been heavy snowfall in the county for over a week. In the night from Wednesday, 2nd February to Thursday, 3rd February, there are heavy rain showers, mixed with snow. Temperatures are between 0 and -2 °C. The German Meteorological Service (DWD) reports severe weather and a storm front with gales of force 9 to 10.

On Thursday morning, lightning strikes the XYZ substation in XYZ. Both transformers, each 30 MW of electric power, filled with 50 tonnes of oil, catch fire. The oil from the transformers runs into the concreted drip pans which are situated under the transformers. This causes the electric power in _____ to fail.

Map

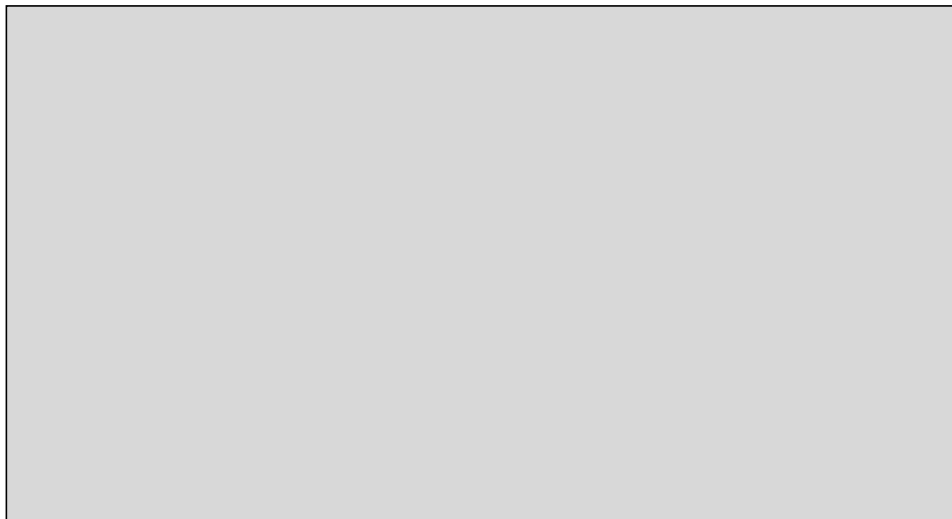


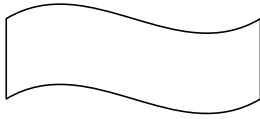
Fig 1: Overview of the affected area

According to the assessment of ____, the restoration of the power supply will take a few days.

In addition to the population, the hospital XYZ, a nursing home in XYZ and one in XYZ, five supermarkets in XYZ, innumerable retail outlets, as well as X agricultural holdings in the affected area, are without a power supply.

On Thursday evening, the following lines are switched by _____:

- The line X is connected to the supply of Y; thus, the hospital XYZ is supplied with electric power again. However the industrial estate XYZ remains disconnected.

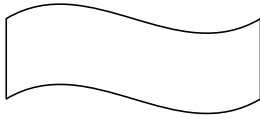


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- The line X is also connected to the supply of Y. The localities XYZ are supplied with power once again.
- The lines X and Y are connected to the supply of XYZ; the districts XYZ are supplied with power once again.
- X is connected to the supply of Y; thus, everywhere from A to Z has electric power again. However, the industrial estate XYZ remains disconnected.
- B is supplied via D; the same applies for the districts F and G.
- As a result of the connection of M to the supply of O, XYZ have electric power once again.

The municipal area X and the localities Y and Z are still not supplied with electric power.

Although a severe weather warning was issued by the DWD early on Wednesday morning, the population was not prepared for the intensity of the event.



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3 Comparison of the affected protected asset categories and the available resources

3.1 Affected protected asset categories

As technical progress means that almost all processes – whether in the private sphere or in the business community – are dependent on energy and a functioning power supply nowadays, an electric power breakdown has an impact on all areas of everyday life. The following sections shall examine what impact can be expected for the various protected assets, in the event of a protracted electric power breakdown. The protected assets have been brought together under the headings **man, environment, economy and non-material**.

3.1.1 Impact on the protected asset “man”:

Human beings, or the population, can be affected by an electric power breakdown in a wide variety of ways. In the worst case, there may even be deaths, e.g. in the case of patients who are dependent on medical home devices and who cannot be helped quickly enough. A large number of sick persons should also be expected, as the risk of infection increases at sub-zero temperatures and with a lack of heating. The extent of the illness also plays a role here – can the affected person get out-patient treatment, or must he/she be admitted to hospital, possibly even for intensive medical care?

The majority of the population is in need of assistance as a result of the electric power breakdown, whereby the need for assistance manifests itself in a wide variety of forms. Some must be accommodated elsewhere because of a lack of heating; it is necessary to ensure that transport to the accommodation is provided.

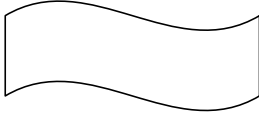
The provision of food to the population must be guaranteed. Very few will store sufficient supplies at home which can be eaten cold, or will be able to prepare warm dishes for themselves with a camp stove, for example. In addition to the affected persons who are accommodated in centralised accommodation facilities, it is to be expected that many people who have remained in their own homes also have to be fed.

Anyone who is dependent on medical or nursing care is also in need of assistance.

The drinking water supply also plays a role in the consideration of the impact of the event. If a supply area is higher than the water supply facilities, the drinking water supply is suspended, as the transportation is also dependent on the power supply.

3.1.2 Impact on the protected asset “environment”:

In the category “environment”, an electric power breakdown primarily has an impact on livestock. In the area that is affected by the electric power breakdown according to the present scenario, there are a number of agricultural holdings of various sizes, some with livestock farming. The interruption of the power supply primarily has an impact on farms which work with milking machines or feeding systems. It is possible that livestock will die there or have to be slaughtered.



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3.1.3 Impact on the protected asset “economy”:

The economy is also affected by an electric power breakdown. In the public sector, tax deficits can be expected on the one hand, as companies are not able to produce or sell anything. At the same time, high additional expenses accrue for the local authorities, for example through the provision of accommodation and supplies to the affected population.

The business community has to expect losses of revenue, as no products can be sold.

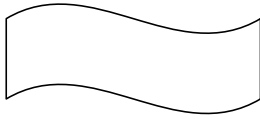
Private households are also, even if to a lower extent, affected by the electric power breakdown. Here, costs may, for example, arise for the replacement of lines which are frozen as a result of the electric power breakdown and the weather conditions.

3.1.4 Impact on the protected asset “non-material”:

A protracted electric power breakdown also has an impact on non-material protected assets. Thus, for example, public security and order is affected. The police, fire brigades and relief organisations such as the German Red Cross or the Knights of Malta will be working around the clock, and will be called upon by the population. These organisations face challenges not only because of the high workload, but also because communication via radio is not possible to an unlimited extent in the event of an electric power breakdown.

Throughout the duration of the situation, a high level of public interest can be expected, with the result that there is an impact on politics. Quick and effective action, as well as open, transparent communication, is expected from the responsible politicians and officials. The question of whether better preparation would have been possible may arise. Whether there are then political consequences, e.g. calls for resignations, depends on the crisis management.

Finally, a psychological impact can also be expected. The event can trigger different behaviour in the affected persons. It shows the population, above all, that there is often a lack of risk awareness, and that too few or no provisions have been made for an emergency.



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3.2 Available resources

3.2.1 General hazard prevention and disaster management resources in the county XYZ

In accordance with the XYZ Land Act on Fire Protection, (...), the municipalities are responsible for fire protection and general aid, and the counties and towns independent of a Kreis for supralocal fire protection and supralocal general aid, as well as for disaster management.

In this context, the municipalities have to set up a fire brigade corresponding to the local conditions, and equip it with the necessary facilities, such as fire stations and vehicles.

For the performance of their tasks, the counties and towns independent of a Kreis have to keep facilities and equipment for supralocal fire protection and supralocal general aid ready, provide disaster management units and facilities and to furnish these with the necessary equipment.

As the county (and the towns independent of a Kreis) does not have its own staff, it makes use of the local fire brigades or the professional fire brigade. The county's own vehicles, which have to be kept available in accordance with the Ordinance on Fire-Fighting, are, therefore, stationed with the local fire brigades, and the unit is trained in handling the equipment.

The county keeps the following vehicles available for its aforementioned tasks:

Type of vehicle	Unit	Location
ELW 2	Fire protection / disaster management	Professional / voluntary fire brigade ...
GW-G2	Fire protection / disaster management	Professional / voluntary fire brigade ...
MZF II (Decon)	Fire protection / disaster management	Professional / voluntary fire brigade ...
MefG	Fire protection / disaster management	Voluntary fire brigade ...
SW 2000	Fire protection / disaster management	Voluntary fire brigade ...
GW for forest fires	Fire protection	Voluntary fire brigade ...
Trailer for spill containment	Fire protection	Voluntary fire brigade ...
Mobile oil separator	Fire protection	Voluntary fire brigade ...
Radio car	ABC service	Voluntary fire brigade ...
Ambulance	Medical service	DRK OV ...

Table 1: list of vehicles of the county XYZ

The vehicles of the fire brigades are also used. Appendix 2 contains a list of all the voluntary fire brigades in the county with their manpower and vehicle potential.

In addition, the Federation plays a supporting role in disaster management by providing the counties with vehicles which it has to keep available for a case of civil protection, and by allowing the counties to use these in disaster situations.



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Vehicle type	Unit	Location
Fire engine for disaster management	Fire protection	FF ...
Tool and equipment vehicle – decontamination of personnel	ABC service	FF ...
HGV for logistics / care	Medical task force	DRK...
Tool and equipment wagon – care	Medical task force	Worker’s Samaritans...
KTW type B	Medical task force	Knights of Malta...
Tool and equipment wagon - medical	Medical task force	St. John’s Ambulance Association...

Table 2: List of vehicles assigned by the Federation

The rescue service is the supporting pillar for the medical care of the population, even in the event of a disaster. In the county, the rescue service is performed by the rescue service XYZ, which also covers county Y in addition to county X. In county XYZ, there are four rescue stations in X, Y, Z and D, at which a total of two emergency doctor ambulances, four ambulances, one emergency ambulance and two patient transport ambulances are stationed. In addition, the rescue helicopter Christoph 10 is stationed at St. Elisabeth hospital in XYZ.

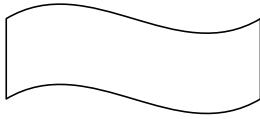
The rescue service is supported by a large number of honorary assistants, who work in the areas of medical service, welfare and catering. In the county, XYZ is/are the established relief organisation(s). In 20.., they agreed to participate in the disaster management in the county by means of an agreement. In a disaster situation, XYZ provides its whole potential, in order to make the maximum assistance possible. To this end, XYZ has set up so-called Rapid Intervention Units in the areas of medical, welfare and catering service, which are funded by the individual local associations.

Location	Manpower	Module
OV ...	80 members	Medical service
OV ...	42 members	Catering service
OV ...	25 members	Command
OV ...	24 members	Medical service
OV ...	14 members	Welfare service
OV ...	11 members	Welfare service
OV ...	30 members	Welfare service
OV ...	15 members	Welfare service

Table 3: Number of staff of the DRK local associations

In addition, 10 honorary workers are available for psychosocial crisis management.

In addition to the county’s own vehicles and the vehicles which are provided by the Federation for the medical, welfare and catering service, the DRK has its own vehicle potential, which is used in a disaster situation. A precise list can be found in Appendix 1.



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3.2.2 Additional resources

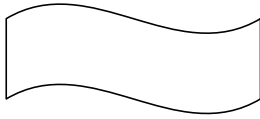
A community centre is available in almost every municipality of the county for setting up collection points or accommodating people. There are also a number of primary schools, secondary schools in XYZ, and gymnasias and multi-purpose halls.

Accommodation in schools offers some advantages in comparison to community centres. Due to the division into classrooms, only a limited number of people are accommodated together. In contrast to accommodation in a large hall, such as a gymnasium or a community centre, this offers more privacy. At the same time, infrastructure is available: the classrooms are furnished with tables and chairs, sanitary facilities are available, usually showers too. Nowadays, a number of schools also have a canteen with kitchen facilities, so that all-day pupils can be fed. All this can be used for the accommodation of people. Secondary schools are preferred here as, on the one hand, they are larger than the primary schools; on the other hand, the furniture in primary schools is geared towards children up to the age of 10, and is impractical for adults.

However, a problem with all premises is that very few have their own emergency power supply. The fire brigades and the Federal Agency for Technical Relief do have sufficient power generators in various sizes – however, they cannot be used without a feed-in facility. A list of the generating sets of the Federal Agency for Technical Relief and the fire brigades can be found in Appendices 3 and 4.

Accommodation may also take place in the XYZ barracks in XYZ. In XYZ, approx. 300 places are available, and the kitchen capacity is sufficient for feeding up to 900 persons. Another advantage of the barracks is that there are already beds available there. In the event of accommodation in schools, the affected persons must bring mattresses or mats and blankets with them themselves, as there are no camp beds or similar kept there, and these can also not be provided by the relief organisations in sufficient numbers.

For the transportation of persons, Y buses from a total of X bus companies are available, with a total seating capacity of 5,052. There are also vehicles from the Federal Armed Forces.



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3 Risk analysis

4.1 Determination of the extent of the damage as a result of this scenario

Under 3.1, the protected assets which may be affected by a protracted electric power breakdown were listed. The next step is to analyse how great the anticipated damage actually is and what resources are required for coping with it, on the basis of this scenario. This is the only way of assessing whether the available resources are sufficient, whether the described situation is negotiable in an emergency, or whether additional measures have to be taken.

4.1.1 Protected asset category “man”

4.1.1.1 Fatalities

The event “electric power breakdown” does not lead directly to fatalities. In the course of the scenario, it should, however, be assumed that persons who are dependent on medical equipment, e.g. ventilators, cannot be helped on time and that these will die. This can be expected primarily in old people’s homes and amongst people who are cared for at home. As hospitals are required by law to have an emergency power supply lasting 24 hours, it can be assumed here that critically ill patients can be transferred on time. The number of fatalities is estimated at 5.

The required resources focus on the affected relatives in terms of emergency pastoral care. The psychosocial crisis management personnel of the German Red Cross always work in pairs, meaning that – for five anticipated fatalities – ten psychosocial crisis management personnel are required to look after the relatives.

4.1.1.2 Injured persons

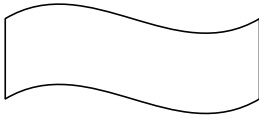
Here, a distinction must be made between slightly injured, seriously injured and very seriously injured persons, as well as persons without a chance of survival. No injuries will occur directly as a result of the electric power breakdown; they can only be put into a causal relationship.

A person is slightly injured if he/she can still walk and talk. Considered across the affected area and over the length of the electric power breakdown, approximately 50 slightly injured persons can be expected. As well as injuries which come up every day, such as cuts, an increasing number of contusions or lacerations can be expected during the electric power breakdown, as people can fall in the dark.

Slightly injured persons are generally treated on site. A Rapid Intervention Unit for Medical Service is necessary for this. If treatment in a hospital’s ambulance is necessary, the affected persons are brought to a hospital outside the affected area. For 50 slightly injured persons, a crew car (9-seater) would be necessary for this, as well as six personnel over the entire period of three days. Two people would take on a 24-hour shift together.

A person is regarded as seriously injured if he/she cannot walk, but can talk. It is expected that approximately 60 persons can be assigned to this category, e.g. due to a broken leg.

A person is classified as very seriously injured if he/she can neither walk nor talk. This includes, for example, victims of traffic accidents which can be attributed not to the electric power breakdown, but to the weather conditions.



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For 60 seriously and 50 very seriously injured persons, 35 transports and 70 transportation hours are necessary for bringing the patients to hospitals. A total of five ambulances are needed for this. For very severely injured persons, care by an emergency doctor is also necessary. With 24-hour shifts, three emergency doctors would be deployed over three days.

In addition, it is to be expected that there will be five persons without a chance of survival. These include patients with medical equipment who can foreseeably not be given any help on time. Ten psychosocial crisis management personnel are required here to look after the injured persons and their relatives.

Special types of injury are normally transferred to a specialist clinic. The “Register of centralised Land-wide treatment capacities” provides information about which clinic specialises in which injuries. In the context of the scenario, however, exceptional injuries should not initially be assumed.

4.1.1.3 Sick persons

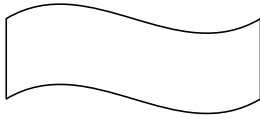
In addition to chronically ill persons who require regular medical treatment, it is to be expected, in the event of the present scenario, that other parts of the population will fall ill, due to the weather conditions and the lack of heating. A distinction must be made here between out-patient and inpatient treatment.

Out-patient treatment is normally performed by resident doctors. In the event of an electric power breakdown of this scale, it can, however, be assumed that most practices will not open, due to the lack of infrastructure. The care of chronically ill persons is thus also not guaranteed. Anyone who is unable to visit a practice outside the affected area is dependent on the medical or welfare service. This is, however, not possible firstly for personnel reasons, and secondly because the equipment is not designed for this. One approach is to man the panel doctor emergency service which has premises in the hospital X. As hospitals are required by law to have an emergency power supply for 24 hours, the practice of the emergency service would also be supplied. Here, GPs can work in shifts and take care of patients. However, this must be agreed with the Association of Panel Doctors.

The number of persons to be given out-patient treatment (not including chronically sick persons) cannot be estimated. Provided that the panel doctor emergency service can start its service, it can be assumed that one Rapid Intervention Unit for Welfare is sufficient. This is designed for the care of a maximum of 50 persons.

Hospitals generally perform the inpatient treatment of patients. The hospital in Gerolstein is, however, directly affected by the electric power breakdown. Even if it is connected to the power supply again as soon as the first evening, according to the scenario, there is no guarantee that the electric power will not fail a second time. Furthermore, no full capacity is possible for at least 24 hours, in spite of the aforementioned emergency power supply. The primary care of the patients can be guaranteed; however, additional sick persons will not be admitted in such a case. Seriously injured persons, in particular, will be referred directly to nearby hospitals. If the electric power breakdown lasts longer than 24 hours, as in the present scenario, the patients of hospital X – where they cannot be discharged – must be transferred.

Inpatient treatment should only be necessary for patients who are already suffering from pre-existing conditions, or who are dependent on medical equipment. Here, particular mention should be given to the residents of old people’s homes or nursing homes, who already require intensive care. These persons would be transferred to a hospital to undergo further treatment there. As that would tie up too many capacities in the event of the present scenario, however, efforts must be made to continue to care for the residents in the institutions. Ideally, the institutions have their own emergency power supply, so that they can continue to run as usual. As no information was available on this, all the institutions have already been sent a questionnaire developed by the leaders of organisational affairs in the run-up to the actual risk analysis.



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As well as general questions, such as the number of rooms and places in the home, the questionnaire also includes questions on medical equipment. The questionnaire is enclosed as Appendix 5. The evaluation showed that most medical equipment, such as ventilators, oxygen concentrators or enteral feeding devices, is not battery-backed, and can thus only be operated with a power supply. In the event of an electric power breakdown, direct restrictions arise as a result of this, which may lead to life-threatening situations for the residents. At the same time, hardly any institution has its own emergency power supply. Only the old people's home XYZ in X provided for its own emergency power supply when the institution was put into operation in the 1980s. In all other homes, there is only emergency lighting.

If appropriate precautions were taken by the homes, the affected persons could continue to be cared for in their familiar environment. An agreement with the homes is, therefore, urgently necessary.

The intensive medical treatment of patients should only be necessary in individual cases or for the persons who were already in the emergency ward of a hospital before the occurrence of the electric power breakdown. Here, a transfer to a hospital outside the affected area is absolutely necessary. As well as an ambulance, an emergency doctor is required for care during the journey.

4.1.1.4 Interruption of power supply

The whole population in the affected area is affected by the interruption of the power supply; this can be assumed to be approximately 8,000 persons.

It is not possible to help each household individually with an emergency generating set. The population can only be informed about the situation via loudspeaker announcements. These announcements should communicate where collection points have been set up, where people can warm up and get a warm meal. 10 crew cars with loudspeakers, as well as police vehicles, are required for this.

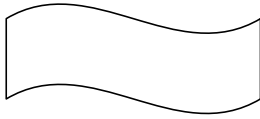
4.1.1.5 Interruption of heating energy

Another consequence of the electric power breakdown is the interruption of heat generation. As fireplaces or stoves which can be used to heat at least some of the rooms are available in many households, in addition to the central heating, it can be assumed that there are approximately 5,500 persons whose premises remain cold as a result of the electric power breakdown.

Here, there is also the possibility of providing information via loudspeaker announcements, and announcing the collection points.

4.1.1.6 Interruption of drinking water supply

The drinking water supply in the affected area can be maintained even in the event of a protracted electric power breakdown, according to the municipal utilities X. The drinking water requirements in the supply area of the municipal utilities X is – without the large consumer Z well, which cannot produce in the event of an electric power breakdown – approx. 2,000 m³ per day. The feeding of the containers is controlled such that the water storage tanks are always full in the event of a disruption, which makes up a total storage volume of 11,000 m³. As more than 2,000 m³ drinking water per day run into the system from sources without energy, the water supply is secured even in the event of a longer electric power breakdown. In addition, private emergency generating sets are kept in the available elevated tanks for operating the pump units, and the corresponding feed-in facilities are available.



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As no impairments are expected in the area of the drinking water supply, no measures have to be taken.

The sewage could, on the other hand, lead to problems. Damages arise, but for the environment, not the population.

4.1.1.7 Requirements for the transportation of persons

According to the responsible people, transportation for approx. 2,400 persons is required, so that they can be cared for and fed in a community centre or another collection point. The distance should be 10 kilometres on average. The transportation will be spread across the entire period of the electric power breakdown, as some will try to stay in their houses for a short time, others for longer. A large number of private drivers is also assumed.

Max. 50 bus journeys are required, spread across the entire period.

4.1.1.8 Accommodation

Here, a distinction must be made between short-term (one night) and medium-term (two to three nights) accommodation. It is expected that approximately 500 persons will have to be accommodated for one night, and another 500 persons for two or three nights. The division derives from the fact that some of the population will initially attempt to remain in their own house or apartment, but will then decide – due to the temperatures – to seek out heated accommodation after all. The majority of the population will stay in their own premises throughout the electric power breakdown, or visit relatives and friends who live outside the affected area.

Secondary schools, in particular, come into consideration as premises for the accommodation. For a total of 1,000 persons to be accommodated, two schools are required. There is also the corresponding personnel. Here, at least one Rapid Intervention Unit for Welfare is required to register the persons in need of assistance, to care for them, and to supply them with urgently required personal items.

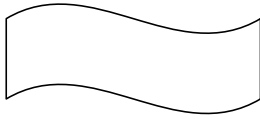
4.1.1.9 Catering

Two groups must be considered in relation to the subject of catering: the population on one hand, and the emergency personnel on the other. It is expected that there will be 1,500 persons every day in the emergency accommodation who have to be fed. In addition to persons who spend the night in the accommodation, this also includes persons who are still staying at home, but have no possibility of preparing warm meals. A total of five kitchen units are necessary for this.

In addition, around 100 emergency personnel must be provided with food every day. Here, it is necessary to bear in mind that the catering takes place on a decentralised basis at the respective place of operation, as it is not practicable to bring the emergency personnel to a collection point for the meals. An additional Rapid Intervention Unit for Catering is required for this.

4.1.1.10 Medical / nursing care

An estimate of how many people are dependent on medical or nursing care during the disaster situation is not possible. Here too, it is necessary to bear in mind that the measures are carried out on a decentralised basis, as the affected persons can not only stay in emergency accommodation, but can also continue to stay



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in their houses or apartments. This includes primarily older people who use the German Red Cross or Caritas medical alarm.

In terms of personnel, a Rapid Intervention Unit for Welfare is necessary, as well as the medical or nursing equipment, and drugs. As the precise number of affected persons cannot be determined, the precise quantity of equipment and materials cannot be estimated. What makes the situation more difficult is that it is not possible to estimate in advance specifically which drugs will be required.

4.1.1.11 Other logistics

Affected persons and non-affected persons require information during an ongoing damage situation. A County Information Bureau should be set up by the county with the task of collecting data from affected persons and passing information on to authorities or relatives. Thus, for example, all persons who are accommodated in emergency accommodation will be registered, and the hospital to which someone has been taken for treatment will be recorded. On the basis of these data, a County Information Bureau can provide the authorised persons with information about the whereabouts of a person. The same applies to the emergency personnel.

4.1.2 Protected asset category “environment”

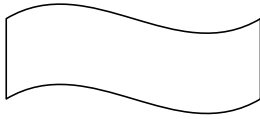
4.1.2.1 Surface water

To determine the damage to bodies of water, the municipal utilities and the local nature conservation authority have been contacted again in writing. In their assessments of the restriction of the drinking water supply in the event of a protracted electric power breakdown, the municipal utilities also indicated that, in such a case, the wastewater must presumably be discharged into the bodies of water, (at least partially) untreated, as the wastewater treatment plants are not working properly.

It has been explained by the municipal utilities that the consequences of an electric power breakdown for the wastewater treatment plant, and then for the sewage system and adjacent bodies of water, are dependent on several factors. Thus, in addition to the volume of wastewater at the time of the electric power breakdown, a role is also played by whether a mixed water or dry weather inflow¹ can be assumed. In the event of an electric power breakdown, the accumulating wastewater is stored in the sewage system. In dry weather, this does not lead to any problems over several hours, depending on the sewer volume. If it can be foreseen that the electric power breakdown will be protracted, the effluents of the rain relief structures can be closed in dry weather and the storage volume can also be used for the accumulated wastewater. When the energy supply is working again, the wastewater can be fed back to the wastewater treatment plant. In this case, there is no danger for the bodies of water.

In the event of a mixed water inflow, the wastewater quantities accumulate correspondingly faster in the sewage system. At low points, the wastewater can then escape from the sewage system. If the wastewater gets into the wastewater treatment plant, only mechanical purification can be performed there. The mixed water which leaves the wastewater treatment plant is highly diluted by the rainwater. The responsible people only assume a small amount of damage to the bodies of water here.

¹A mixed water inflow is when rainwater is flushed into the wastewater treatment plants in addition to the wastewater. In the case of a dry weather inflow, only wastewater accumulates accordingly.



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The biological purification of the wastewater is not possible in the event of an electric power breakdown. For this, oxygen must be fed into the wastewater, so that oxygen-consuming bacteria can remove the remaining impurities. Without electric power, no oxygen can be fed into the wastewater, causing the microorganisms to die after four to six hours at the latest. The biology of the plant is overturned. This process cannot be reversed when power is restored. The regeneration of the biology can take from a few days to several weeks.

The local nature conservation authority has disclosed that the protracted introduction of untreated wastewater into the watercourses is very likely to lead to considerable impairments of the water quality. Specifically, this depends on a number of different factors, however: is it an industrial or local sewage treatment plant that is failing? Which water system is affected? What is the precipitation frequency or the temperature? According to the local nature conservation authority, a failure of a wastewater treatment plant lasting several days in a period that is low in rain with higher temperatures would trigger a “maximum credible accident” because the necessary biological oxygen requirements for self-purification could not be used up. Specifically, there would be a danger that a large proportion of the aquatic fauna would die, which would in turn have an impact on the fish population. As the scenario under consideration was a winter scenario, this consequence can be ruled out.

Semi-natural bodies of water with edge strips and grassland use in the river meadows can deal better with cargoes of hazardous substances than man-made, canalised bodies of water. However, even semi-natural bodies of water would be powerless against a protracted, increased introduction of untreated wastewater, and would suffer damage from this.

To sum up, the bodies of water suffer more damage, the longer the electric power breakdown lasts and the longer the normal purification performance of the wastewater treatment plant is not available.

4.1.2.2 Animals

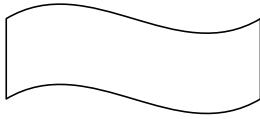
As described under 3.1.2, agricultural holdings with livestock farming are affected by an electric power breakdown if they have automatic feeding and milking systems. However, it is not possible to put the number of farms and animals that are affected by this into concrete terms. It is also unknown which farms have installed their own emergency power supply. An enquiry to the County Farmers’ and Vintners’ Association in the run-up to the analysis has already revealed that it is not known which farms have their own emergency power supply and which do not. Therefore, it is only possible to estimate the required resources with difficulty. It can be assumed that the affected farms would have to be supplied with emergency power twice a day. The duration of this depends on the size of the farm, and can hardly be estimated.

4.1.3 Protected asset category “economy”

The actual damages which affect the public sector, the business community or private households cannot be estimated.

Private households will presumably only be affected to a small extent, for example through defective household appliances or spoiled food. However, the damage keeps within manageable limits.

In the business community, on the other hand, considerable damages can be expected due to business interruptions. The precise amount depends on the size of the enterprise, the goods produced and the actual length of the electric power breakdown, and cannot be estimated in advance.



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The same applies to public budgets. Here, tax deficits can be expected on the one hand. How high these are depends on the business interruptions to the companies and cannot, therefore, be estimated. At the same time, costs are incurred for supplying the affected population. The level of the costs depends on the number of persons and the duration of the electric power breakdown. An estimate is hardly possible.

4.1.4 Protected asset category “non-material”

4.1.4.1 Public security and order

Damages which affect public security and order can primarily be expected such that the situation makes an increased deployment of police, fire brigades and relief organisations necessary.

In order to protect public safety and order, additional police patrols are necessary. It is also important that the affected population in particular, but also the public as such, is regularly informed about the current state of affairs. The measures taken by the authorities must be transparent, in order to avoid disturbances, and in order to show that everything is being done to restore the normal situation as quickly as possible.

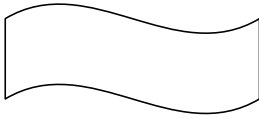
4.1.4.2 Political impact

The electric power breakdown as such has no direct impact on politics. Such an impact may arise in retrospect if the crisis management has not gone smoothly. Therefore, damage is not initially assumed. A good crisis communication is absolutely necessary across all levels of responsibility.

4.1.4.3 Psychological impact

The situation may lead to stress situations for sections of the population, e.g. for relatives of persons who are cared for at home, or who even have to be provided with artificial respiration. It is not possible to specify a concrete number here.

Many affected persons may respond violently to the situation, making it all the more important to set up contact points for the population. These include the County Information Bureau, which was already mentioned under 4.1.1.11.



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4.2 Target-actual comparison and need for action

The comparison of the required resources with those available in the county paints a positive picture to begin with. The described scenario remains within limits which can be handled. In particular, there is no shortage of vehicle capacity. On other issues, the only requirement is for final planning, so that it is possible to respond efficiently in an emergency.

However, the area of personnel poses a major problem. In almost all areas, there is a need to man the available vehicles with trained personnel. Due to its size, the county only has one Rapid Intervention Unit each for medical service, welfare service and catering service. A situation on this scale cannot be managed with the county's own units; additional Rapid Intervention Units from the neighbouring counties are necessary for coping with it. Here, agreements are necessary in advance.

In concrete terms, there is the following need for action (a breakdown into the individual protected asset categories is dispensed with, as a number of points overlap):

With five anticipated fatalities and provided that psychosocial crisis management personnel always work in pairs, ten honorary personnel are sufficient to handle the situation in this scenario. In the case of larger-scale emergencies, however, full utilisation of the capacity is quickly reached. In addition, problems occur even in this situation if one of the psychosocial crisis management personnel is on holiday or ill. In order to be able to work out a multiple shift system, additional personnel must, therefore, be recruited and trained for psychosocial crisis management.

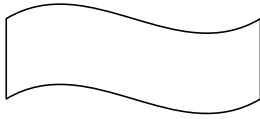
For the transportation of slightly injured persons, one crew car and six personnel are required over the whole period. An additional crew car should be available in the background as a reserve vehicle. As the voluntary fire brigades and the German Red Cross together have 31 crew cars, this is not a fundamental problem. It just requires some planning, so that one of these vehicles remains free for this purpose. Agreements are also required with regard to the personnel. A Rapid Intervention Unit for Medical Service would be employed here from preference. As this will presumably already be heavily involved elsewhere, it would be sensible to prepare a shift plan in collaboration with the fire brigade here.

For the transportation of 60 seriously and 50 very seriously injured persons, five ambulances are required over the whole period. The ambulance stationed in XYZ is utilised to 50% of its capacity with its regular operations in the rescue service. All the other ambulances of the rescue services will still be called out for regular operations first. The transportation can, therefore, not be done by the regular rescue service. The county has three ambulances at its disposal for disaster management, which can be used for this. In addition, two additional ambulances from the neighbouring counties are required. As the personnel have to keep to driving and rest periods, twice the crew must be requested and provided for both ambulances from the neighbouring counties.

Very seriously injured persons also require emergency medical care during the journey. In the present scenario, the transportation of 50 very seriously injured persons with the emergency doctors active here can, on no account, be guaranteed, especially as they can also be alerted in the case of regular rescue service operations. One possibility for solving the problem is to contact emergency doctor pools.

These find doctors for vacancies, as holiday cover or for shift work in the rescue service.

The Association of Panel Doctors must also be contacted to clarify whether the emergency service in the hospital can be manned in the event of a disaster such as this one, and how the organisation proceeds.



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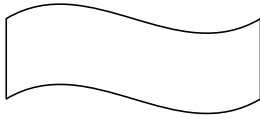
During the risk analysis, it was assumed that inpatient treatment only becomes necessary for residents of old people's or nursing homes. In order to avoid transfers here, the homes should be connected to an emergency power supply. As already stated under 4.1.1.3, only a single institution in the county has its own emergency power supply. For the others, a concept must be drawn up for the emergency.

So that five people with a need for intensive medical treatment can be transferred, an emergency doctor ambulance, which is not kept in the county, is required. Here too, agreement with the neighbouring counties is necessary.

There is a great need for action in the area of communication and information. All other areas can be summarised under this heading.

On the one hand, as partly already stated under 4.1, agreements must be made with neighbouring counties or the Federal Armed Forces and the Federal Agency for Technical Relief. Here, the following must be mentioned, in particular:

- If powerful emergency generating sets are required, it is sensible to call in an electricity supply expert group from the Federal Agency for Technical Relief. The locations of X and Y are closest to the county. Here, it is necessary to clarify how quickly such a unit can be at the place of operation and provide help. At the same time, the corresponding capacities of the Federal Armed Forces must be queried, for there are also powerful emergency generating sets there.
- Even if no impairment of the supply of drinking water to the population is to be expected in the present scenario, the information from the suppliers must be evaluated for other scenarios. The awareness of the suppliers must continue to be raised for dealing with the subject of emergency power supply. Private sets or feed-in facilities are not available comprehensively. In a corresponding damage situation, this could prevent something worse.
- In the area of requirements for the transportation of persons, it has been explained that 50 bus journeys spread across three days does not pose a problem when there are 14 bus companies based in the county. However, the bus company operators must be informed that they may be enlisted for such purposes in a disaster situation.
- If schools are to be used for the accommodation of the affected population, their logistics should be checked in advance. They may already have been used for such situations in the past, or for the accommodation of participants of a large event, the experiences from which can be used. It is also necessary to clarify where camp beds are available, as the county does not keep any itself. In addition, it is necessary to agree with the neighbouring counties where their Rapid Intervention Units for Welfare are to be stationed, as the county's own units are not sufficient for looking after the accommodated persons.
- According to the scenario, 1,500 persons and 100 emergency personnel must be fed every day. The county only provides one of the six catering units that are necessary for this. Planning for an emergency is necessary here. If accommodation in a school is planned, the canteen kitchens which provide the schools with meals for the all-day pupils may also be involved. Capacities of the Federal Armed Forces can also be queried, or neighbouring counties can be asked for support in the form of a Rapid Intervention Unit for Catering. Possibilities are available which have to be recorded in a preparedness plan.
- In the context of the out-patient treatment of injured persons or of medical or nursing care, one possibility could be to accommodate the affected persons in an old people's home for short-term care. The



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prerequisite for this is, of course, that the home has its own power supply. Provided that the general conditions allow such accommodation, it is necessary to clarify at what short notice residents can be admitted to short-term care and who bears the costs for this.

- With regard to agriculture and livestock farming, the farms should, once again, be explicitly advised of the existing problems and the benefits of an emergency power supply of their own. The Veterinary Office should also be involved in this subject.
- The same applies to the municipal utilities. As described under 4.1.2.1, a protracted electric power breakdown may lead to massive damage to the environment, depending on the type of plant and the weather conditions, if the accumulating wastewater cannot be purified as usual. Here, the plants cannot rely on assistance being provided by the fire brigade or the Federal Agency for Technical Relief in an emergency. Instead, the operators must be held responsible. They must identify critical processes and, if necessary, work out an emergency concept. In this area too, a private emergency power supply must be considered, in order to keep damages to the environment, as well as to their own plant, as low as possible. Once the biology of a wastewater treatment plant is overturned, high costs can be expected for restoring it to ordinary operation.

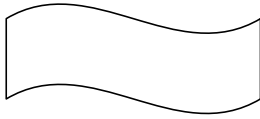
Furthermore, the awareness of the population, as well as of private enterprises, must be raised with regard to the subject of self-help. The fire brigades and private relief organisations can only provide effective aid if the population is in a position to continue to care for itself to a certain degree. A flood of requests for aid ties up too many capacities and prevents the emergency personnel from being able to do their work.

The population must be shown that they have to take a certain level of precautions themselves, as fire brigades and relief organisations cannot be on the spot on a permanent basis. The majority of people are not aware of which everyday items no longer work in the event of an electric power breakdown and of how dependent we are on the power supply, especially during the winter months. Corresponding surveys have shown in the past that very few households have sufficient food supplies, a camp stove, a battery-powered radio or sufficient torches and candles to be able to prepare warm meals, follow the news or light up their rooms.

For companies, the focus of the information is on the subject of an emergency power supply. Larger enterprises should be aware of what massive losses of revenue they have to expect if the electric power completely fails for an extended period. The investment in an emergency power supply of their own is cheaper in comparison. Here, the involvement of the Chamber of Crafts, the Chamber of Commerce and Industry and the Business Development Corporation may also be helpful.

In addition to information about possibilities for precautions, there is also a need for action in terms of the information policy in the crisis situation itself. Here, a distinction should be made between enquiries by the media and enquiries by persons who would like to have information about their relatives. In a disaster situation such as this one, the media activities are managed by field S5 in the Operational Command Post or the administrative staff. The county is well-positioned here.

The collection of personal data (e.g. accommodated, injured and deceased persons), as well as the provision of information, is the task of the County Information Bureau. The German Red Cross already has such a bureau. In the event of a damage situation on this scale, however, a flood of enquiries can be expected, with the result that it is questionable whether these can be managed by the County Information Bureau of the German Red Cross. Therefore, it is necessary to check whether an additional County Information Bureau can be set up by the county administration. This primarily depends on whether the authorities can still be reached by telephone in the event of the failure of the power supply and thus consequently of the communications. Otherwise, alternatives must be checked



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4.3 Measures taken

After the completion of the risk analysis, the following sections will show what measures have been taken in the county, according to the need for action, in order to remove deficits. Also, if the risk analysed here only relates to part of the county, all the measures have been applied to the whole area of the county to cover other scenarios as well.

4.3.1 Medical care

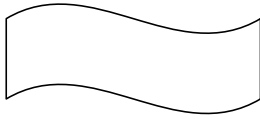
As described under 4.2, there is a need for action in the area of medical care in particular, as the main shortage here is of personnel for coping with such a damage situation over several days. In addition to personnel at the relief organisations, e.g. medical assistants, there is also a lack of emergency doctors. On the other hand, the infrastructure also causes problems in the event of a protracted electric power breakdown. In order to be well-prepared to face the electric power breakdown in an emergency, the following measures were taken by the county:

As already described in detail, it has to be assumed that most resident doctors will not open their practices for as long as the electric power breakdown lasts, as everything depends on the power supplier here too. A solution that has been suggested is to man the panel doctor emergency department in the hospital XYZ, as this has its own emergency power supply. For this reason, we have written to the Association of Panel Doctors to clarify whether this solution is feasible. According to its information, there are no concrete plans for such a case; however, the proposal does not pose a problem. The power supply is guaranteed through the hospital and personnel are available. It is not possible to oblige the doctors based on site to do stand-by duty, but external doctors can be enlisted, with whom the emergency service has worked for a long time. However, a lead time of several hours can be expected before things are running properly. The emergency service is then manned around the clock and not only in the evenings, Wednesday afternoons and at the weekend as usual. It is kept informed by the integrated control centre, which has the contact details of the Association of Panel Doctors.

Thus, it is possible to ensure that out-patient care can be maintained in the event of an electric power breakdown, without the medical service being flooded with such cases.

Care by emergency doctors will also cause problems in the disaster situation. To counter this, the emergency doctor pool has been contacted. As it happens, emergency doctors were dispatched from there to the Elbe flood in 2002. The organisation was also already active in crisis situations internationally, for example at the earthquake in Haiti in 2010. The emergency doctor pool informed us that it is possible to support the county with personnel in a disaster situation. An agreement concerning this is to be concluded in advance, which clarifies all the necessary questions, e.g. regarding the insurance cover of the doctors employed. In an emergency, the emergency doctor pool can provide the desired number of emergency doctors within 24 hours after a request by us. Occasionally, an earlier start of the deployment is also possible. For an emergency doctor, an hourly rate of € 35.00 must be paid, as well as a commission of € 80.00 per doctor and day (both plus VAT). Accommodation and catering must continue to be guaranteed by the county.

The corresponding agreement is shortly to be set in motion.



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The evacuation of an old people's or nursing home is generally a sensitive issue. In the present scenario too, it would have to be well-prepared and would make use of a lot of time, vehicles and personnel. If all homes had an emergency power supply, this would greatly ease the situation or grant the responsible people at least enough time to plan the necessary measures. As described under 4.1.13, this is unfortunately not the case, however. Only one nursing home is equipped with its own emergency power supply. For this reason, all the old people's and nursing homes located in the county have been contacted and informed about the subject of an emergency power supply and its benefits. To this end, it was explained that the emergency personnel cannot provide aid everywhere at the same time, and that the generating sets of the fire brigade or the Federal Agency for Technical Relief cannot be used at all, unless a feed-in facility is available. In addition, it is not guaranteed that the sets are compatible with the feed-in device. A private emergency power supply, therefore, brings enormous benefits which are more than worth the investment.

In some areas, the county would be dependent on the assistance of its neighbouring counties in a scenario like that described here. As was already clear before the performance of the risk analysis, a query to the neighbouring counties was started in the preparation phase. The objective of the questionnaire was to get an overview of the vehicles and Rapid Intervention Units of the neighbouring counties in the area of medical service, welfare and catering. At the same time, the locations of rescue stations and vehicles, together with their periods of use, were recorded. Thus, an overview of all the units and vehicles which are, in principle, available in the context of assistance from neighbours exists in a disaster situation. However, it does not constitute a guarantee of actual assistance. Which rescue service vehicles can be alerted is at the disposal of the control centre. The Rapid Intervention Units, for their part, are only deployed if enough personnel are available.

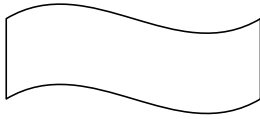
4.3.2 Accommodation of the population

Just like in the scenario described here, it may become necessary to provide centralised accommodation for some of the population in any other disaster situation. Community centres and schools lend themselves to this, in particular. If the trigger is an electric power breakdown which lasts several days, however, further requirements are necessary in order to be able to accommodate people. Without an emergency power supply, even community centres and schools remain dark; the heating does not work there either. Even if a kitchen is available, no meals or warm drinks can be prepared.

For this reason, all the municipalities have been contacted in writing and, like the old people's homes and nursing homes, informed about the benefits of a private emergency power supply. Particularly if a renovation of a community centre or the construction of a new one is pending, it is advisable to take appropriate precautions. In comparison to the other construction costs, only low costs are incurred for this. The same also applies, of course, to the retrofitting of an emergency power supply. The local fire brigade can provide assistance with the planning.

To get an overview of the actual situation, the municipalities were also requested in the letter to inform us if corresponding devices or sets are already available at the community centres or if retrofitting has taken place.

Some municipalities have then got in touch with regard to this subject. Thus, for example, in XY and Z, generating sets are already available, and the community centres are already equipped with an appropriate feed-in facility. Other municipalities have, according to their own statements, taken the letter as an occasion to discuss the subject in their local councils and, where applicable, also to install their own emergency power supply. The county administration hopes that many municipalities will decide to do this, and will continue to collect the data.



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4.3.3 Agriculture

The area of agricultural is an extremely sensitive subject. In a number of discussions with the fire brigade's managers, and at the workshop on risk analysis, past operations were reported on, in which there was also an electric power breakdown and farmers asked for their farm to be supplied with emergency power.

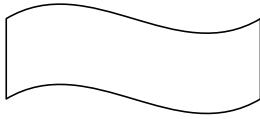
With the large number of agricultural holdings in the county, however, it is not possible to provide all of them with the required assistance, especially as fast assistance is also expected by the population in the scenario that is taken as a basis here. In this case, supplying farms engaged in livestock farming is a low priority. It is all the more important to show the farmers the significance of self-help. Here too: anyone who has an emergency power supply is independent in the event of an electric power breakdown and is not reliant on assistance from others.

After the association was initially unable to provide any data on the emergency power supply of the farms, a corresponding enquiry was initiated at the request of the county administration – however, responses were not received to this from all the farmers. Out of 54 farms which replied, only nine have an emergency generating set, and a further eleven have the option of borrowing a set. To continue to extend this number, an information letter was issued for all the farmers, which was distributed via the Veterinary Department of the county administration.

The Veterinary Office was also able to provide additional important information. The majority of farmers with dairy cows provide their milk to XY GmbH, which is located in X. The company lays down certain standards for all dairy farms through the quality programme "XYZ". In Germany, the programme has been in effect since September 2013. One requirement stipulates that the cows are able to be milked in the event of an electric power breakdown on the farm. An emergency power supply is not mandatory, yet this specification forces the farm to deal with the subject and to take appropriate precautions (for details see Figure 2).

Only in the case of automatic milking systems (AMS) is it recommended that an emergency generating set be kept available. Whether the guidelines of XYZ GmbH are observed is regularly reviewed in so-called farm audits. If a criterion is not satisfied, the farm receives the opportunity to rectify this within a particular period.

The guidelines of XYZ GmbH coincide with the ideas of the county administration, with the result that it can be assumed that the majority of agricultural holdings in the county can manage without assistance in the event of a protracted electric power breakdown.



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313 The cows have to be able to be milked in the event of an electric power breakdown on the farm.

It is important that you can milk your cows even in the event of an electric power breakdown, so that the welfare of the animals is maintained.

It is recommended, in particular where AMS are used, that you have your own emergency power supply. There are four possibilities for satisfying the requirement for an emergency power supply, so that milking can take place in the event of an electric power breakdown:

1. You have a maximum of 15 cows, which can be milked by hand.
2. A connector plug for the emergency power supply must be available.
3. A tractor or a vacuum pump powered by a machine, with the necessary accessories, is available.

A certificate signed by an electrician is available, certifying that the connection to the emergency power supply can be made within six hours.

In the case of new buildings, it is recommended that an emergency power supply be set up.

For livestock facilities where animals are not guaranteed an adequate supply of food and water in the event of an electric power breakdown, an emergency power supply should be available.

This applies, in particular, to livestock farms with their own water supply facilities and automatic feeding systems.

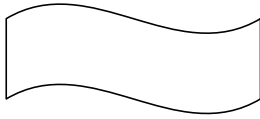
Emergency generating sets and alarm systems should be checked for their functionality at technically necessary intervals.

Fig 2: Extract from the “XYZ” quality programme of XYZ GmbH

4.3.4 Business community

Commercial enterprises are also affected by an electric power breakdown. The extent depends on the size and orientation of the enterprise. It is conceivable that large enterprises, such as, for example, Gerolsteiner Brunnen, have already taken appropriate precautions to keep losses or damages as low as possible. However, the county administration does not have specific information about this. The extent to which the enterprises do or do not implement risk management is also not generally known.

In Switzerland, the Federal Department of Economic Affairs and the Federal Office for National Economic Supply have published an information brochure with the title “Assuring sustainable business success – even in times of crisis”. In this brochure, enterprises are encouraged to address the risks and hazards which could threaten their company. Thus, with regard to the subject of a power failure, the enterprises are recommended to identify the systems which must not fail in such a situation. It is recommended that a UPS (uninterruptible power supply) be installed in order to bridge short-term disruptions, and in order to keep informatics systems and lighting operational, so that operating reliability is guaranteed.

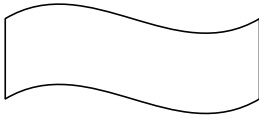


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In order to find out how the subject of crisis management is being dealt with in the enterprises, the county's Business Development Corporation (WFG), the Chamber of Commerce and Industry (IHK) and the Chamber of Crafts (HWK) were asked for their cooperation. The county administration asked them whether it is known to what extent the companies are occupied with crisis management, whether lists are available of which companies have an emergency power supply, whether advisory services are offered by the WFG or the chambers, and whether there is even a legal obligation to maintain an emergency power supply for some areas. The WFG has been requested to disclose whether, in its opinion, an information letter similar to those which have been issued to municipalities, nursing homes and farms makes sense for commercial enterprises. In a meeting with the WFG, it was possible to ascertain that no information is available as to whether enterprises have taken precautions for an electric power breakdown or not, and whether crisis management is generally an issue. To date, this has not yet been made the subject of discussion; there has been no need for advice on the part of the entrepreneurs. Advisory services offered by the IHK or HWK are also not known. With regard to this, the WFG will get in touch with the contacts.

The WFG has agreed to draw up an information letter and send it to the companies. The focus here will be on the producing companies. Smaller enterprises, such as, for example, a painter, could – if necessary – help themselves in an emergency.

The information letter is to be issued shortly. If an increased need for advice arises as a result, the WFG is prepared, in cooperation with the specialist department of the county administration, to offer an event or similar on the subject of crisis management. This issue is to be addressed in the future during company visits, which the WFG conducts on a regular basis.



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5 Conclusion and outlook

With the completion of the risk analysis for an “electric power breakdown”, an initial major step has been made in the direction of risk management for the county. Nevertheless, there is still a lot of work ahead of everyone involved. As already described above, some measures have already been taken in order to be better prepared for an emergency. However, one decisive issue is still outstanding: the provision of information to the population of the county.

Society is dependent on the power supply nowadays. There is almost no appliance, no process that can be controlled without it. At the same time, people are hardly aware of what impact this dependence has in the event of an electric power breakdown. Everyone is used to the power supply working around the clock. Everyone has experienced an electric power breakdown – however, at worst, this has only lasted for a couple of hours. This time is easy to bridge. But who is prepared for an electric power breakdown that lasts for several days? Who has sufficient food supplies in the house to feed themselves for four, five days or longer? And who still has a camp stove for preparing warm meals? Are enough candles or torches with batteries available to get your bearings in the dark? And very few people nowadays will possess a radio which can be operated with batteries.

As there have fortunately not been any political crises and major natural disasters in our region for years, awareness of self-help has largely receded into the background. People are used to everything working at the push of a button and to being able to buy everything that is missing in their home in the nearest shop. The aim of the risk analysis must, therefore, also be to bring the subject of self-help back into the public awareness. To this end, the county is going to issue a letter to all households. It is to provide information about the risks of an electric power breakdown and to address the awareness of the population with regard to preparedness, but not to go into too much detail. The Federal Office of Civil Protection and Disaster Assistance (BBK) has issued a brochure “Prepared for an emergency – preparedness and self-help in emergency situations”, which is to be referred to in the letter. The brochure is to be laid out in the county administration and other contact points for people to take with them. In coordination with the press and information office, it is also conceivable to report on the risk analysis in the media. Here too, the request to deal with the subject of self-help and preparedness could be clarified again.

With respect to a comprehensive risk management, this risk analysis will not be the last. The analysis paints a positive picture of the disposition of the disaster management units in the county. This is largely because the affected area remains comparatively small. If you extend the scenario to the area of the entire county, the situation looks different. As a consequence, therefore, the next step must be to run through the same scenario again with a larger focus area. Here, additional aspects are sure to be revealed, which have not yet been considered in the present risk analysis.

A risk analysis could also be created for other scenarios. Examples include severe storms, heavy rain or prolonged snowfall. Flooding could also play a role. The precise scale of such a scenario may, however, only be evaluated in the context of a further risk analysis.



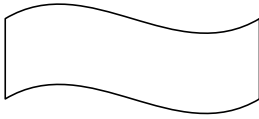
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6 Appendices

Appendix 1

Vehicle potential of the German Red Cross

TYPE	Location	Ownership
GW for technology-security	XYZ	OV XYZ
GW for medical service		
MTF 9-seater		
MTW 6-seater		
Passenger car trailer		
KTW 4-stretcher Ford		DRK County Association
ELW		
Passenger car trailer 1.2t closed box		
HGV – second-hand clothes		
Passenger car trailer – mobile games library		
Passenger car trailer – mobile crockery lending service		
Welfare centre		
Welfare centre		
Welfare centre		
Meals on wheels		
MTF 9-seater		OV XYZ
Passenger car trailer 0.6t		
Passenger car trailer – welfare		DRK County Association
HGV 7.49 t		OV XYZ
MTF 9-seater		
HGV trailer SEG 3t		
HGV trailer FKH 1.2 t		
Passenger car trailer 1.2 t, tarpaulin		
HGV trailer FKH 1.2 T		DRK County Association
Medical team		
RTW		OV XYZ
MTF		
Passenger car trailer		
RTW		
MTF 7-seater		
Passenger car trailer		
MTF 9-seater		

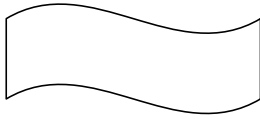


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Appendix 2

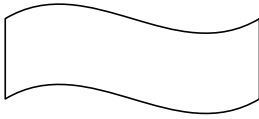
Vehicle potential and manpower of the local fire brigades, divided into associations of municipalities

Fire brigade	Type of vehicle	Personnel
Association of municipalities XYZ		
	LF8	27
	GW-TS	13
	MTF	
	GW-TS	17
	MTF	
	MLF	26
	TSF	
	DLK 23/12	61
	TGM	
	TLF 16/25	
	VRW	
	KdoW	
	HLF 20/16	
	MZF	
	MTF	
	Boat	
	TSF	
	TSF	
	GW-TS	
	GW-TS	
	GW-TS	
	GW-TS	24
	MTF	
	GW-TS	
	GW-TS	26
	TSF	32
	SW 500	
	HLF	
	TLF 16/24	22
	MTF	44
	LF 8	
	MLF	
	GW-TS	19
	LF 8	23
	TLF 16/25	55



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Fire brigade	Type of vehicle	Personnel
	GW-TS	
	LF 8/6	
	MTF	
	GW-TS	16
	TSF	11
	TSF	15
	MLF	21
	TSF	16
	RW 1	29
	HLF 10/10	
	LF 8	
	LF 8	28
	GW-TS	15
	TSF	25
	MTF	25
	TSF	
	TSF-W	19
	TLF 8	28
	TSF	24
	TSF	22
	GW-TS	5
	TSF	13
	GW-TS	30
	GW-TS	18
	Trabant	
	MTF	
	GW-TS	31
	MTF	
	LF 8	36
	MTF	17
	MLF	
	GW-TS	15
	GW-TS	15
	GW-TS	12
	LF 8	22
	LF 8/6	
	LF 8	21
	GW-TS	16
	GW-TS	13
etc.



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Appendix 3

Power generators of the Federal Agency for Technical Relief

3.1 Management division XYZ

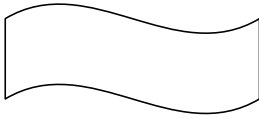
Local section	Power generator	Notes	Distance OV - XYZ
	120 kVA		40 km
	50 kVA		
	-		55 km
	-		20 km
	175 kVA	with lighting tower	100 km
	120 kVA	with lighting tower	
	20 kVA		20 km
	140 kVA	with lighting tower	110 km
	40 kVA		85 km
	250 kVA		55 km
	50 kVA		60 km
Small sets	13 kVA	4 pcs	
	8 kVA	23 pcs	
	5 kVA	3 pcs	



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3.2 Management division XYZ

Local section	Power generator	Notes	Distance OV - XYZ
	20 kVA	Fixed installation in GWK 2 with lighting tower	70 km
	50 kVA		
	30 kVA		85 km
	67 kVA		90 km
	50 kVA		150 km
	-		90 km
	42 kVA		90 km
	-		95 km
	50 kVA		110 km
	20 kVA	with lighting tower	
	175 kVA		95 km
	50 kVA	with lighting tower	95 km
	56 kVA		130 km
Small sets	13 kVA	8 pcs	
	8 kVA	26 pcs	
	5 kVA	33 pcs	

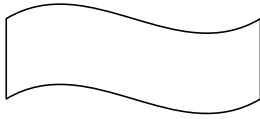


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Appendix 4

Power generators of the fire brigades

all RWs, GWs, VRWs with power generator, lighting mast and min. 2 x 1000 W	RW 1: 8 kVA GW: 5 kVA VRW: 5 kVA TGM XYZ: 15 kVA LF 10/6 XYZ: 11.5 kVA HLF 10/10 XYZ: 8 kVA TSF-W XYZ: 8 kVA DLK XYZ: 5 kVA HLF 10/10 XYZ: 11.5 kVA LF 20/16 XYZ: 8 kVA
Power generator 8 kVA with 5 m tripod and projectors	XYZ (9 kVA) XYZ vehicle for decontamination of personnel: 9 kVA with PowerMoon balloon light 1000 W
Power generator 5 kVA with 5 m tripod and projectors	XYZ (2 pcs) XYZ XYZ (6.5 kVA)
Power generator with projectors	XYZ
Fire brigade trailer light	6.5 kVA with 4x1000 W on lighting tower in XYZ



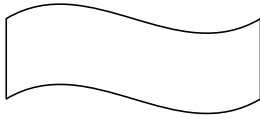
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Appendix 4

Sender

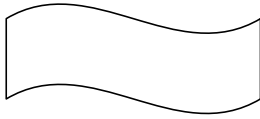
Questionnaire for old people's and nursing homes in the county XYZ

Institution:		
Contact:		
Tel. / Fax:		
E-mail address:		
Organisation responsible:		



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1	Number of places in the home:		
2	Number of rooms:		
3.1	Number of residents who have to be transported lying down in a vehicle		
3.2	Number of residents who do not have to be transported lying down, but cannot move independently		
3.3	Number of residents who cannot move without aids		
	of which: number of residents who have to be constantly looked after due to severe dementia		
4	Emergency power supply	<input type="checkbox"/> Yes	<input type="checkbox"/> No
5	Lift with emergency battery operation	<input type="checkbox"/> Yes	<input type="checkbox"/> No
6	Restrictions in the event of an electric power breakdown		
7	Medical equipment		
7.1	Ventilators without batteries	<input type="checkbox"/> Yes	<input type="checkbox"/> No
		Number:	
	Ventilators with batteries	<input type="checkbox"/> Yes	<input type="checkbox"/> No
		Number:	
	For how long can these work without a power supply?		



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7.2	Oxygen concentrator without batteries	<input type="checkbox"/> Yes	<input type="checkbox"/> No
		Number:	
	Oxygen concentrator with batteries	<input type="checkbox"/> Yes	<input type="checkbox"/> No
		Number:	
	For how long can these work without a power supply?		
	For how long can patients be supplied with their own oxygen cylinders?		
7.3	Enteral feeding devices which only work with electric power	<input type="checkbox"/> Yes	<input type="checkbox"/> No
		Number:	
7.4	Pressure relief mattresses	<input type="checkbox"/> Yes	<input type="checkbox"/> No
		Number:	
7.5	Evacuation mattresses	<input type="checkbox"/> Yes	<input type="checkbox"/> No
		Number:	
	Of which with a distinctive emblem		
7.6	Other medical equipment with a 230 V connection		
8	Other special features		

Appendix 2 Anonymised risk analysis of a county: TARGET-ACTUAL

Protected asset	Damage parameter	Anticipated damage as a result of the event (scenario)	TARGET resources	ACTUAL resources (information provided by the county)	Difference	Need for action
Man	Fatalities	5	10	The psychosocial crisis management is organised by the German Red Cross County Association. Here, 10 people work in an honorary capacity to look after relatives and emergency personnel after traumatic experiences.	0	Psychosocial crisis management multiple shift system (due to holiday illness probably less) 24/7 shift additional requirements!
	Injured persons: slightly injured – T3	50	1 crew car – care outside county (if applicable also transportation by buses – 6 people (24 hour operation)	The German Red Cross local associations are responsible for the Rapid Intervention Unit for Medical Service. The total number of personnel is 140. (Sheet 36). The Rapid Intervention Unit for Medical Service can fall back upon one medical tool and equipment wagon, three ambulances and one 4-stretcher patient transport ambulance; additional vehicles, such as crew cars for the transportation of personnel are available in other local associations or the County Association and can also be used by agreement (for details, see the list of vehicles in the description of the reference area). If the capacities of the Rapid Intervention Unit for Medical Service are no longer sufficient because there is a large number of injured persons requiring care, XYZ may be requested to keep the materials and medical equipment for a casualties clearing station (BHP) 150 (3 x BHP 50) available.	plus 1 crew car	where applicable 2 crew cars in the background (available in county) – consider personnel! Coordination of fire brigade and relief organisations

Protected asset	Damage parameter	Anticipated damage as a result of the event (scenario)	TARGET resources	ACTUAL resources (information provided by the county)	Difference	Need for action
Man	Seriously injured - T2	see T1	see T1	<p>The area covered by the German Red Cross rescue service encompasses the counties XYZ. In the county, there are a total of 2 emergency doctor ambulances, 4 ambulances, 1 emergency ambulance and 2 patient transport ambulances, stationed at 4 rescue stations. In the county, there are a further 3 emergency doctor ambulances, 6 ambulances, 1 emergency ambulance and 1 patient transport ambulance available. In addition, the rescue helicopter Christoph 10 is stationed at the hospital. If necessary, vehicles from the neighbouring rescue service districts can also be deployed; the disposition is planned by the control centre.</p>	-	see T1
	Very seriously injured - T1	50	T1-T2+T4 = 5 ambulances 3 emergency doctors		<p>0.5 ambulances are available for use in the county. Because of a long approach time in the county, at least 2 ambulances from neighbouring counties (incl. personnel) are necessary. Personnel must be recruited for at least 4 ambulances from neighbouring counties, so that driving and rest periods can be observed.</p>	<p>Coordination with neighbouring counties (speak to probably 4 neighbouring counties). Permanent coordination in preliminary planning! Involve emergency doctor pool/establishment of contact!</p>

Protected asset	Damage parameter	Anticipated damage as a result of the event (scenario)	TARGET resources	ACTUAL resources (information provided by the county)	Difference	Need for action
Man	Without a chance of survival – T4	5	10 (see Fatalities)	10 (see Fatalities)	0	see Fatalities
	Special types of injury	0	0	Central Land-wide treatment capacities	0	-
	Sick persons: out-patient treatment	cannot be estimated by Medical Council. See need for action	1 Rapid Intervention Unit for Welfare	As most medical practices will not open in the event of an electric power breakdown, the medical service is very important. With regard to the establishment of the Rapid Intervention Unit for Medical Service, see above.	0	Establishment of contact with the Public Health Department, the Association of Panel Doctors – how will such a situation be handled?
Inpatient treatment	Scenario-dependent, see information provided by the county	0	The hospitals in X and Y have an emergency power supply for at least 24 hours, as prescribed by the law. However, no operation at full capacity is possible with this. The primary care of the patients can be guaranteed, but far from all the sick persons can be admitted. Seriously injured persons, in particular, should – where possible – be allocated directly to hospitals in the neighbouring counties. In the event of an electric power breakdown which lasts longer than 24 hours, or if the emergency power supply cannot be maintained for that long, the inpatients must also be transferred to other hospitals.	-	Question: old people's homes should have feed-in facilities – better than evacuation of 110 and 50 persons here (of which probably 50 must be evacuated lying down) to hospitals. Transfer to hospitals problematic!	
Intensive medical treatment	5 transfers may be necessary	1 mobile intensive care unit (over the three days)	Cultural World Heritage Site Severely damaged to total loss	1 mobile intensive care unit	Coordination with NRW!	
Special illnesses	-	-	-	-	-	-

Protected asset	Damage parameter	Anticipated damage as a result of the event (scenario)	TARGET resources	ACTUAL resources (information provided by the county)	Difference	Need for action
Man	Interruption of power supply: short-term (< 8 hours)	-	-	Very few residential dwellings will have feed-in facilities and their own emergency generating sets. In the event of an electric power breakdown, therefore, all the appliances in the house fail, unless they can be operated by batteries. Even if individual houses provide for a feed-in facility, it is not possible to supply this with electric power separately. There are also not enough emergency generating sets available. This is only possible at collective accommodation, such as community centres or gymnasias. 1 expert group for electricity supply available at the Federal Agency for Technical Relief. The Federal Armed Forces have some capacity in the vicinity (precise amount location-dependent)	-	-
	Interruption of power supply: medium-term (8 h – 3 days)	-	-		-	-
	Interruption of power supply: longer term (> 3 days)	8,000 persons	10 crew vehicles with loudspeakers, incl. police vehicles		Attention only 1 crew car still available from resources for injured persons – T3	Coordination with Federal Agency for Technical Relief (specialist units e.g. local associations X and Y) regarding which capabilities are available – how quickly is the Federal Agency for Technical Relief available? Exchange of information regarding capacities with Federal Armed Forces liaison officer
	Interruption of heating energy: short-term (< 8 hours)	-	-	The fire brigades do not keep heaters available. If the residential dwellings cannot be heated with stoves, the heating energy fails immediately in an electric power breakdown. However, the Federal Armed Forces have camp heaters; precise information on the number and their respective power cannot be provided.	-	Communication with the population (self-protection/self-help)
	Interruption of heating energy: medium-term (8 h – 3 days)	-	-		-	-
	Interruption of heating energy: longer-term (> 3 days)	5,500 persons	none		-	-

Protected asset	Damage parameter	Anticipated damage as a result of the event (scenario)	TARGET resources	ACTUAL resources (information provided by the county)	Difference	Need for action
Man	Interruption of drinking water supply: short-term (< 8 hours)	-	-	The drinking water supply is the responsibility of the respective municipal utilities. Depending on the supply area, an electric power breakdown can play no or a very large role for the drinking water supply. In the area of municipality X, the supplying of municipality Y becomes critical after 2 to 3 days. Water could then be transported to the elevated tank W by means of tank trucks. In the elevated tanks X, Y and Z, feed-in facilities and their own emergency generating sets are available. Therefore, drinking water supply causes few problems in the event of an electric power breakdown. Small sections of the municipality X, on the other hand, cannot be supplied without power. Here, the drinking water supply would be interrupted immediately when the electric power fails, as the supply area is higher than the water supply facilities. Details can be found in the appendices.	-	
	Interruption of drinking water supply: medium-term (8 h – 3 days)	-	-		possibly see ACTUAL	Coordination with the suppliers (other scenarios?) – feed-in facility/pressure maintaining pumps
	Interruption of drinking water supply: longer term (> 3 days)	-	-	-		possibly see ACTUAL
	Interruption of sewage	see Environment	-	-	-	-

Protected asset	Damage parameter	Anticipated damage as a result of the event (scenario)	TARGET resources	ACTUAL resources (information provided by the county)	Difference	Need for action
Man	Requirements for the transportation of persons: removal	2400 persons, 10 km each	50 bus journeys	The regular local public transport will be completely suspended as a result of the lack of fuel supply. However, a total of 14 bus companies are located in the county, which have 114 buses with a total seating capacity of 5,052, and a standing capacity of 1,004. If persons have to be transported, the companies can be enlisted for this. Furthermore, there are several vehicles available at the Federal Armed Forces bases in X and Y. The fuel supply can be maintained through the petrol station in XYZ”, which has a feed-in facility, as well as through the petrol station in X. This also has a tank truck for mobile refuelling. The operators have been contacted in writing, and informed that they will be enlisted in an emergency.	-	Check bases for planning

Protected asset	Damage parameter	Anticipated damage as a result of the event (scenario)	TARGET resources	ACTUAL resources (information provided by the county)	Difference	Need for action
Man	Accommodation: short-term (1 night)	500 persons for 1 night	1 school	Almost every municipality in the county has a community centre, where the population could be accommodated and taken care of together in the event of a protracted electric power breakdown. In addition, the gymnasias of schools and Kindergartens are also available. These have the advantage that showers are also available. However, very few community centres and gymnasias are equipped with their own emergency generating sets or feed-in facilities for heating the rooms or preparing meals. Feed-in facilities are only available in the following premises: community centre X, Y, Z. Power generators are available from the Federal Agency for Technical Relief and the fire brigades in a wide variety of sizes. Camp beds or blankets are not kept in the community centres. Accommodation in these rooms is, therefore, only a short-term solution. (List of all community centres and gymnasias: Appendix). medium-term (2 – 7 days) longer term > 1 week decentralised		Check possibilities of tent hire (heatable?). Check capacities of the barracks of the Federal Armed Forces for the admission of persons (incl. catering possibilities) Check schools with regard to logistics and infrastructure – suitability test (including gymnasias) Use experiences from events
	Accommodation: medium-term (2-7 days)	500 persons for 2 nights	1 school			Observance of the possibly higher space requirements; welfare personnel; consider pet problems 1 welfare unit from outside – coordination with neighbouring counties (planning of beds etc.)
	Accommodation: longer term > 1 week			The welfare service which is funded by the German Red Cross local associations X, Y and Z must take action here. In total, 59 employees are active here. If necessary, they are supported by the local associations X, Y and Z. In the medium or long term, the accommodation in hotels outside the area affected by the electric power breakdown must be considered. However, the question of the bearing of costs arises in this case.		

Protected asset	Damage parameter	Anticipated damage as a result of the event (scenario)	TARGET resources	ACTUAL resources (information provided by the county)	Difference	Need for action
Man	Catering: decentralised	Emergency personnel: 100 / day	1 kitchen unit			Planning
	Catering: centralised (e.g. in emergency accommodation)	1,500 persons in emergency accommodation / day	5 kitchen units	There are several possibilities for feeding the population. The Rapid Intervention Unit for Catering has a field kitchen and kitchen tents, meaning that centralised catering can be organised for at least part of the affected population. If parts of the population are accommodated in gymnasia or schools which have a canteen, the catering can take place there. The schools are, however, all supplied by caterers; the preparation of food is not possible in the canteens. The Rapid Intervention Unit for Catering is accomplished by the German Red Cross local association X with 42 members. The Federal Armed Forces also has a kitchen capacity for 900 persons at the location X, and even for 1,100 persons in X.	3 welfare units	Coordination with the Federal Agency for Technical Relief (a welfare unit in XYZ). Involvement of canteen kitchens – coordination with the operators (e.g. if a school in XYZ is planned as accommodation) – operators of old people's homes. Coordination with neighbouring county (e.g. canteen kitchen in Daun – school catering). If applicable coordination with Federal Armed Forces (Provisions Office of Federal Armed Forces).

Protected asset	Damage parameter	Anticipated damage as a result of the event (scenario)	TARGET resources	ACTUAL resources (information provided by the county)	Difference	Need for action
Man	Medical / nursing care: decentralised			<p>A list of all the doctors practising in the county has been provided by the Public Health Department. Most practices will not open without infrastructure. However, the practice of the panel doctor emergency service, which can continue to operate using the hospital's emergency power supply, can be found in the hospital X. The GPs could take turns to be on duty here, and thus relieve the pressure on the medical service.</p> <p>Light must be cast on the supply of drugs from two angles. The rescue service keeps a central store in Y. Here, it is exclusively a matter of drugs which are required in the rescue service, not those which can be issued to the population. The medical service can also be supplied by the central store. If the limits of the capacity are reached, replacements can be procured at short notice via the suppliers (hospital pharmacy XYZ). In X and Y, the Land has its own storage sites for drugs and medical devices.</p>		

Protected asset	Damage parameter	Anticipated damage as a result of the event (scenario)	TARGET resources	ACTUAL resources (information provided by the county)	Difference	Need for action
Man	Medical / nursing care: centralised	unknown – persons in need of care not registered centrally	Welfare unit	These may be requested by the counties in an emergency. In addition, the relief organisations for disaster management keep a supply of drugs for disaster management operations in X and Y. The distribution of drugs to the population can also take place through the local pharmacies, in accordance with the assessment of the German Red Cross County Association, if prescriptions are issued by the panel doctor emergency service. Settlement can also take place in retrospect, when electric power is available again. (Note: the distribution only works in those pharmacies that do not have an electrically controlled distribution system.) If their capacities are exhausted, replenishments must be provided from pharmacies outside the affected area. (Problem: prescribing when the emergency service is not manned?!)		Establishment of contact with Public Health Department, Association of Panel Doctors – how will such a situation be handled? Customer management of old people's homes with regard to admission for short-term care. Communication with the population. Verification of the capacity for accommodating emergency personnel who require care!

Protected asset	Damage parameter	Anticipated damage as a result of the event (scenario)	TARGET resources	ACTUAL resources (information provided by the county)	Difference	Need for action
Man	Other logistics		1 County Information Bureau	County Information Bureau (central information centre)		Establishment of a Central Information Bureau at the county administration (currently only German Red Cross). Check availabilities/check alternatives (announcement of telephone number through loudspeaker announcements) – public authorities number 115 as a possible alternative; dial up the affected associations of municipalities, if applicable, through neighbouring municipalities, in order to access the necessary data (coordination with Land Office for Statistics, if applicable). Verification and coordination with TK network operators (Telekom) Availability of exchange agencies
Environment	Protected areas	-				
	Surface water	If applicable, have wastewater treatment plant evaluated by environmental agency				Establishment of contact with suppliers/disposal companies (owner-operated enterprises); water authority and nature conservation authority
	Groundwater	-				

Protected asset	Damage parameter	Anticipated damage as a result of the event (scenario)	TARGET resources	ACTUAL resources (information provided by the county)	Difference	Need for action
Environment	Woodlands	-				
	Agricultural land	-				
	Animals		14xfeed-in (2x/day)	According to the assessment, emergency generating sets will probably only be available on specialised farms with automatic milking systems or on large pig farms. The large number of farms will also not have a feed-in facility. However, no precise information exists. It must, therefore, be expected that many farms will ask for help.		Contact County Veterinary Office; problem: power of the sets, risk communication – via agricultural authorities!
Economy	Impact on the public sector	Deployment costs	-	Unscheduled expenditure, put in supplementary budget later		Budget planning
	Impact on the private sector	Considerable damages due to business interruptions	-			Communication (self-protection/self-help/raising of awareness) to target groups (operators, chambers, Business Development Corporation)
	Impact on private households	Minor damages (defective household appliances, spoiled food)	-			Risk communication (self-protection/self-help)

Protected asset	Damage parameter	Anticipated damage as a result of the event (scenario)	TARGET resources	ACTUAL resources (information provided by the county)	Difference	Need for action
Non-material	Impact on public security and order	Increased deployment of police, failure of telephones, failure of medical alarm	Additional patrolling by police, information, responsiveness locally by fire brigades	How long can radio communication be maintained without a power supply? How will communication take place when radio communication fails?		Hotline (check power supply). Put problem areas in concrete terms and discuss them in the operations staff. Police units for supra-regional support necessary.
	Political impact	-				One-voice policy across all levels
	Psychological impact	If applicable stress situation for affected citizens (e.g. in the case of relatives of people using ventilators at home)	Mobile contact points of the regulatory agencies in the affected area, citizen hotline, County Information Bureau			Risk crisis communication
	Damage to cultural assets	-				

Appendix 3 Threshold levels – environment

Classification: Manual for Risk Analysis for Civil Protection – level of a county and town independent of a Kreis		Environment
	Environment – protected areas and woodlands (Protected areas = nature reserves and landscape conservation areas – nature parks – FFH, NATURA 2000 etc.)	Evaluation of the damage for damage parameter (assessment) damage category
very high	<p>Damages to protected areas and woodlands → The size of the area that is affected by the event can be rated as very large both in absolute terms and in relation to the total area in the county/the town independent of a Kreis. The affected area(s) are almost completely or completely severely damaged. A considerable amount of clean-up work by the general hazard prevention and disaster management personnel (several weeks to several months).</p> <p>The recovery of the areas by nature can, in some cases, only be expected after several years. Investment in and the expenditure of resources on restoration measures – removal of damages are not affordable on the basis of the budgets, in relation to the costs – support from Land and Federation is necessary.</p>	5
high	<p>Damages to protected areas and woodlands → The size of the area that is affected by the event can be rated as large both in absolute terms and in relation to the total area in the county/the town independent of a Kreis. The affected area(s) are predominantly (up to 75%) damaged. A large amount of clean-up work by the general hazard prevention and disaster management personnel (several days to several weeks, in some cases).</p> <p>The recovery of the areas by nature can, in some cases, only be expected within several growing seasons. Investment in and the expenditure of resources on restoration measures – removal of damages are not covered by the budgets in relation to the costs and can only be provided through assistance from the Land or, if applicable, the Federation.</p>	4

moderate	<p>Damages to protected areas and woodlands → The size of the area that is affected by the event can be rated as moderate both in absolute terms and in relation to the total area in the county/the town independent of a Kreis. The affected area(s) are partially damaged (up to 25%). A medium amount of clean-up work by the general hazard prevention and disaster management personnel (up to 4 weeks in some cases). The recovery of the areas by nature can, in some cases, be expected in more than one growing season. Investment in and the expenditure of resources on restoration measures – removal of damages are only feasible on the basis of the budgets, in relation to the costs, with the postponement of other planned measures.</p>	3
low	<p>Damages to protected areas and woodlands → The size of the area that is affected by the event can be rated as small both in absolute terms and in relation to the total area in the county/the town independent of a Kreis (up to 5%). The affected area(s) are minimally damaged. A small amount of clean-up work by the general hazard prevention and disaster management personnel (a few days in isolated cases). For the most part, the recovery of the areas by nature takes place within one growing season. Investment in and the expenditure of resources on restoration measures –removal of damages must be classified as low in relation to the costs and can be financed with the available funds.</p>	2
very low	<p>Damages to protected areas and woodlands → The size of the area that is affected by the event can be rated as very small both in absolute terms and in relation to the total area in the county/the town independent of a Kreis. The affected area(s) are only damaged to a small extent. A small amount of clean-up work by the general hazard prevention and disaster management personnel. For the most part, the recovery of the areas by nature takes place within one growing season. Investment in and the expenditure of resources on restoration measures –removal of damages can be rated as low in relation to the costs.</p>	1

Classification: Manual for Risk Analysis for Civil Protection – level of a county and town independent of a Kreis		Environment
	Environment – surface water and groundwater (Example eligible evaluation possibilities)	Evaluation of the damage for damage parameter (assessment) damage category
very high	<p>Damages/contamination of surface water and groundwater → The size of the area or the volume of water that is affected by the event can be rated as very large both in absolute terms and in relation to the total area – the total volume – in the county/the town independent of a Kreis. The affected area(s)/volumes of water are almost completely or completely severely damaged/contaminated. In the case of watercourses, the damaged area goes significantly beyond the county/town independent of a Kreis and even affects other federal states. A considerable amount of clean-up work/decontamination by the general hazard prevention and disaster management personnel (several weeks to several months). The recovery of the areas will only have been completed after several years. Investment in and the expenditure of resources on decontamination and other measures such as the removal of damages are not affordable on the basis of the budgets, in relation to the costs – support from Land and Federation is necessary.</p>	5
high	<p>Damages/contamination of surface water and groundwater → The size of the area or the volume of water that is affected by the event can be rated as large both in absolute terms and in relation to the total area in the county/the town independent of a Kreis. The affected area(s)/volumes of water are predominantly (up to 75%) damaged/contaminated. In the case of watercourses, the damaged area goes beyond the county/town independent of a Kreis and affects other counties/towns independent of a Kreis and possibly even other federal states. A large amount of clean-up work/decontamination by the general hazard prevention and disaster management personnel (several days to several weeks, in some cases). The recovery will only take place within several months. Investment in and the expenditure of resources on decontamination, as well as other measures such as the removal of damages, are not covered by the budgets in relation to the costs and can only be provided through assistance from the Land or, if applicable, the Federation.</p>	4

moderate	<p>Damages/contamination of surface water and groundwater → The size of the area or the volume of water that is affected by the event can be rated as moderate both in absolute terms and in relation to the total area – the total volume – in the county/the town independent of a Kreis. The affected area(s)/volumes of water are partially damaged (up to 25%). A medium amount of clean-up work/decontamination by the general hazard prevention and disaster management personnel (up to 4 weeks in some cases). The recovery will require several weeks. Investment in and the expenditure of resources on decontamination and other measures such as the removal of damages are only feasible on the basis of the budgets, in relation to the costs, with the postponement of other planned measures.</p>	3
low	<p>Damages/contamination of surface water and groundwater → The size of the area or the volume of water that is affected by the event must be classified as small both in absolute terms and in relation to the total area in the county/the town independent of a Kreis (up to 5%). The affected area(s)/volumes of water are minimally damaged/contaminated. A small amount of clean-up work/decontamination by the general hazard prevention and disaster management personnel (a few days in isolated cases). For the most part, the recovery will be completed within a week. Investment in and the expenditure of resources on decontamination and other measures such as the removal of damages must be estimated as low in relation to the costs and can be financed with the available funds.</p>	2
very low	<p>Damages/contamination of surface water and groundwater → The size of the area or the volume of water that is affected by the event must be classified as very small both in absolute terms and in relation to the total area in the county/the town independent of a Kreis. The affected area(s)/volume of water is/are only minimally damaged/contaminated. A small amount of clean-up work/decontamination by the general hazard prevention and disaster management personnel. For the most part, the recovery will be completed within a short time (a few days). Investment in and the expenditure of resources on decontamination and other measures such as the removal of damages can be rated as very low in relation to the costs.</p>	1

Classification: Manual for Risk Analysis for Civil Protection – level of a county and town independent of a Kreis		Environment
	Environment – agricultural land (example eligible evaluation possibilities)	Evaluation of the damage for damage parameter (assessment) damage category
very high	Damages to agricultural land → More than 75% of the agricultural land in the county/the town independent of a Kreis is affected. These areas show damages (e.g. through the discharge of chemicals or pollution with radionuclides) which do not disappear through natural regeneration processes. The areas have to be comprehensively restored and thus have to be taken out of use for an extended period. A considerable amount of clean-up work (not restoration work) by the general hazard prevention and disaster management personnel (several weeks to several months). Investment in and the expenditure of resources on rehabilitation – removal of damages are not affordable on the basis of the budgets, in relation to the costs – support from Land and Federation is necessary.	5
high	Damages to agricultural land → Up to 75% of the agricultural land in the county/the town independent of a Kreis is affected. These areas show damages (e.g. through the discharge of chemicals or pollution with radionuclides) which do not disappear through natural regeneration processes. The areas have to be comprehensively restored and thus have to be taken out of use for an extended period. A large amount of clean-up work (not restoration work) by the general hazard prevention and disaster management personnel (several days to several weeks, in some cases). Investment in and the expenditure of resources on rehabilitation – removal of damages are not covered by the budgets in relation to the costs and can only be provided through assistance from the Land and, if applicable, the Federation.	4

moderate	<p>Damages to agricultural land → Up to 25% of the agricultural land in the county/the town independent of a Kreis is affected. These areas show damages (e.g. through the discharge of chemicals or pollution with radionuclides) which do not disappear through natural regeneration processes. The areas have to be comprehensively restored and thus have to be taken out of use for an extended period. A medium amount of clean-up work (not restoration work) by the general hazard prevention and disaster management personnel (up to 4 weeks in some cases). Investment in and the expenditure of resources on rehabilitation – removal of damages are only feasible on the basis of the budgets, in relation to the costs, with the postponement of other planned measures.</p>	3
low	<p>Damages to agricultural land → Up to 5% of the agricultural land in the county/the town independent of a Kreis is affected. These areas show damages (e.g. through the discharge of chemicals or pollution with radionuclides) which do not disappear through natural regeneration processes. The areas have to be comprehensively restored and thus have to be taken out of use for an extended period. A small amount of clean-up work by the general hazard prevention and disaster management personnel (a few days in isolated cases). Investment in and the expenditure of resources on rehabilitation – removal of damages can be regarded as low in relation to the costs and can be financed by the available funds.</p>	2
very low	<p>Damages to agricultural land → Less than 1% of the agricultural land in the county/the town independent of a Kreis is affected. These areas show damages (e.g. through the discharge of chemicals or pollution with radionuclides) which do not disappear through natural regeneration processes. The areas have to be comprehensively restored and thus have to be taken out of use for an extended period. A small amount of clean-up work by the general hazard prevention and disaster management personnel. For the most part, investment in and the expenditure of resources on rehabilitation – removal of damages can be rated as low in relation to the costs.</p>	1

Classification: Manual for Risk Analysis for Civil Protection – level of a county and town independent of a Kreis		Environment
	Environment – livestock (Number of livestock alternatively also in livestock units – LU) (Example eligible evaluation possibilities)	Evaluation of the damage for damage parameter (assessment) damage category
very high	Damages to livestock → More than 75% of all livestock in the county/the town independent of a Kreis are affected and/or more than 10,000 animals are affected. The majority of the animals die or have to be culled. A considerable amount of clean-up work and support work for agriculture by the general hazard prevention and disaster management personnel (several weeks to several months). Investment in and the expenditure of resources on rehabilitation – removal of damages/purchase of new livestock are not affordable on the basis of the budgets – support from Land and Federation is necessary.	5
high	Damages to livestock → Up to 75% of the livestock in the county/the town independent of a Kreis are affected and/or 1,000 - 10,000 animals are affected. A large number of these die or have to be culled. A large amount of clean-up work and support work for agriculture by the general hazard prevention and disaster management personnel (several days to several weeks, in some cases). Investment in and the expenditure of resources on rehabilitation – removal of damages/purchase of new livestock are not covered by the budgets in relation to the costs, and can only be provided through assistance from the Land and, if applicable, the Federation.	4

moderate	<p>Damages to livestock → Up to 25% of the livestock in the county/the town independent of a Kreis are affected and/or up to 1,000 animals are affected. In some cases, the animals suffer such damage such that there are total losses or cullings are necessary. A medium amount of clean-up work and support work by the general hazard prevention and disaster management personnel (up to 4 weeks in some cases). Investment in and the expenditure of resources on agriculture – removal of damages/purchase of new livestock are only feasible on the basis of the budgets, with the postponement of other planned measures. In some cases, support may be necessary.</p>	3
low	<p>Damages to livestock → Up to 5% of the livestock in the county/the town independent of a Kreis are affected and/or up to 500 animals are affected. The affected animals have generally not suffered such damage that larger losses (and corresponding follow-up measures) can be expected. A small amount of clean-up work and support work for farmers by the general hazard prevention and disaster management personnel (a few days in isolated cases). Investment in and the expenditure of resources on agriculture – removal of damages/purchase of new livestock can be classified as low in relation to the costs and can be financed with the available funds.</p>	2
very low	<p>Damages to livestock → Up to 1% of the livestock in the county/the town independent of a Kreis are affected and/or up to 100 animals are affected. The affected animals have generally not suffered such damage that losses (and corresponding follow-up measures) can be expected. A small amount of clean-up work and support work for farmers by the general hazard prevention and disaster management personnel. Investment in and the expenditure of resources on agriculture – removal of damages/purchase of new livestock can be rated as very low in relation to the costs.</p>	1

Appendix 4 Threshold levels – economy

Classification: Risk Analysis for Civil Protection		Wirtschaft
	Sector: public sector (Example eligible evaluation possibilities)	Evaluation of the damage for damage parameter (assessment) damage category
very high	<p>Damages to public infrastructure → Investment costs for reconstruction, loss of tax revenue etc. are so considerable that they cannot be financed by the budget of the county/ the town independent of a Kreis alone.</p> <p>Due to the urgent reconstruction measures, not only extensive postponements and borrowing have to be implemented in the budget. Many services (e.g. closure of pools, restricted cultural programme etc.) can no longer be offered as usual. The local authority must be financially supported by the Land. The Federation will also provide financial resources when this event takes place (if applicable, funds will also come from the EU aid fund).</p>	5
high	<p>Damages to public infrastructure → Investment costs for reconstruction, loss of tax revenue etc. are such that they can no longer be financed by the budget of the county/the town independent of a Kreis alone.</p> <p>Due to the urgent reconstruction measures, extensive postponements and borrowing have to be implemented in the budget. Many services (e.g. closure of pools, restricted cultural programme etc.) can only be offered to a reduced extent or, in some cases, not at all. The local authority will request financial support from the Land. If applicable, the Federation will also provide financial resources when this event takes place.</p>	4

moderate	<p>Damages to public infrastructure → Investment costs for reconstruction, loss of tax revenue etc. can no longer be financed by the budget of the county/the town independent of a Kreis without major economic measures (postponements, borrowing).</p> <p>Due to the urgent reconstruction measures, a number of (infrastructural) measures will be deferred.</p>	3
low	<p>Damages to public infrastructure → Investment costs for reconstruction, loss of tax revenue etc. are sustainable for the budget of the county/the town independent of a Kreis. Some planned (infrastructural) measures, for example, may possibly be deferred.</p>	2
very low	<p>Damages to public infrastructure → Investment costs for reconstruction, loss of tax revenue etc. are very low and have as good as no impact on the budget of the county/the town independent of a Kreis. The processing of necessary (infrastructural) measures of the county/the town independent of a Kreis will be accelerated.</p>	1

Classification: Risk Analysis for Civil Protection		Economy
	Sector: private households (Example eligible evaluation possibilities)	Evaluation of the damage for damage parameter (assessment) damage category
very high	<p>e.g. damages for private households → Very high investment costs for reconstruction (damages not covered by insurance), increase of unemployment etc. can be recorded throughout the county/the town independent of a Kreis. Almost all the affected persons can only shoulder the damages by borrowing and/or with donations and significant state support.</p> <p>Many individuals lose their property and declare personal bankruptcy. Reconstruction largely only possible only in the long-term or, in some cases, cannot be financed. As a result of the companies affected by the event, many people become unemployed; a significant rise in unemployment can be attributed to the event.</p>	5
high	<p>e.g. damages for private households → High investment costs for reconstruction (damages not covered by insurance), increase of unemployment etc. can be recorded throughout the county/the town independent of a Kreis. A large number of affected persons can only shoulder the damages by borrowing and/or with donations and extensive state support. Some individuals are threatened with the loss of property (personal bankruptcy) or their property is lost.</p> <p>Reconstruction not possible or cannot be financed, in some cases. As a result of the companies affected by the event, a large number of people either end up in short-time work or are laid off by companies which have gone bankrupt; a significant rise in unemployment can be attributed to the event.</p>	4

moderate	<p>e.g. damages for private households → Investment costs for reconstruction (damages not covered by insurance), threatening unemployment etc. is noticeable in many places in the county/the town independent of a Kreis. Some affected persons can only shoulder the damages by borrowing and/or with donations and state support. As a result of the companies affected by the event, individuals end up in short-time work; some are laid off by the companies threatened by bankruptcy; a measurable rise in unemployment can be attributed to the event.</p>	3
low	<p>e.g. damages for private households → Investment costs for reconstruction (damages not covered by insurance), unemployment etc. can be borne by the affected persons alone in the affected county/the town independent of a Kreis with respect to the time, place and to a financial extent. A few individuals can be affected more severely financially. Depending on the occupation and the affected industry, there is a threat of short-time work for example. An increase in unemployment as a result of the event should not be expected.</p>	2
very low	<p>e.g. damages for private households → Investment costs for reconstruction (damages not covered by insurance), threatening unemployment etc. are limited in the affected county/the town independent of a Kreis with respect to the place, time and with regard to their financial scope and have as good as no sustainable impact on the affected persons.</p>	1

Classification: Risk Analysis for Civil Protection		Economy
	Sector: private sector* (Example eligible evaluation possibilities) * The private sector includes all three economic sectors (agriculture and forestry; trade and industry; services)	Evaluation of the damage for damage parameter (assessment) damage category
very high	e.g. damages to the private sector → Investment costs for reconstruction, losses of sales etc. affect all industries in the county/town independent of a Kreis. A large number of companies go bankrupt – a large number of companies are threatened by bankruptcy.	5
high	e.g. damages to the private sector → Investment costs for reconstruction, losses of sales etc. can be recorded in almost all industries in the county/town independent of a Kreis. Some companies go bankrupt – some companies are threatened by bankruptcy.	4
moderate	e.g. damages to the private sector → Investment costs for reconstruction, losses of sales etc. are noticeable for some affected companies; these may possibly even be threatened by bankruptcy.	3
low	e.g. damages to the private sector → Investment costs for reconstruction, losses of sales etc. are noticeable with regard to time and place and to a financial extent, but do not have any further existential impact on the affected industries or companies.	2
very low	e.g. damages to the private sector → Investment costs for reconstruction, losses of sales etc. are limited with regard to time and place and to a financial extent, and have no impact worth mentioning on the affected industries or companies.	1

Appendix 5 Threshold levels – non-material

Classification		Non-material
Level	in words	Political impact on those responsible for the reference area – e.g. with regard to pressure on those responsible or media resonance
	Intensity of the political impact	Explanation:
5	very high – local, regional, supraregional, Land-wide and nationwide	e.g. detailed reports in local, supraregional and nationwide media (TOP headline) – media reproach Mayor/County District Commissioner, the Land government and the Federal Minister of the Interior with faulty crisis management. Citizens and the press call for the resignation of the Minister of the Interior – the subject is broached at several meetings of the Committee of Internal Affairs and in the German Bundestag. Personnel consequences are unavoidable everywhere. Media resonance for several weeks. Political talk shows and personal reporting in the leading media of the Land exert considerable pressure on politicians. The Federal Chancellor issues a statement.
4	high – local, regional, supraregional, Land-wide, to some extent also nationwide	e.g. reports in local, supraregional and nationwide media – media reproach Mayor/County District Commissioner and the Land government with faulty crisis management. Citizens and the press call for the resignation of the Mayor and consequences in the Land Ministry of the Interior – the subject is broached at several meetings of the city council/county council. The Landtag is occupied with the crisis management of the Land government. A Committee of Inquiry is formed. The Committee on Internal Affairs of the German Bundestag also takes up the subject. A statement from the Federal Minister of the Interior is expected. There is a threat of personnel consequences. Nationwide media resonance for more than two weeks.
3	medium – local, regional, supraregional level	e.g. reports in local and supraregional media – media reproach Mayor/County District Commissioner with faulty crisis management – no more media resonance after 2 days.
2	low – local and regional level	e.g. reports in local and supraregional media – media reproach Mayor/County District Commissioner with faulty crisis management – no more media resonance after 2 days.
1	very low – local level	e.g. no or minor reproaches against the responsible people.

Classification		Non-material
Level	in words	Impact on the public security and order of the reference area
	Intensity of the impact with regard to effort (and e.g. danger)	Explanation: deployment of emergency personnel (police, fire brigade, relief organisations, Federal Agency for Technical Relief, Federal Armed Forces)
5	very high	e.g. deployment of emergency personnel throughout the reference area to an extent and intensity far above the normal everyday service. Extra shifts for the emergency personnel; very high number of operations throughout the reference area – support from personnel from the whole surrounding area/neighbouring federal states – border-crossing disaster assistance. Coordination of resources by German Joint Information and Situation Centre at the BBK. Situation Centre of the Federal Ministry of the Interior in operation. Request for assistance from abroad (by Emergency Response Coordination Centre (ERCC – formerly MIC)). Administrative assistance from the Federal Armed Forces in the whole event area.
4	high	e.g. deployment of emergency personnel in many areas to an extent and intensity significantly higher than in normal everyday service. Extra shifts for the emergency personnel, large number of operations in several counties – assumption of everyday business and disaster assistance by personnel from the neighbouring federal states. Coordination of resource allocation by German Joint Information and Situation Centre at the BBK. Civil-military cooperation (administrative assistance of the Federal Armed Forces) in the affected federal state initiated by Land commands. Situation Centre of the Federal Ministry of the Interior is on standby.
3	moderate	e.g. deployment of emergency personnel in some areas to an extent and intensity higher than in normal everyday service. Extra shifts for the emergency personnel necessary in some cases. Deployment in more than one district / the whole area of the county – partial assumption e.g. of the motorway service by personnel from the neighbouring territorial authorities. The county's honorary disaster management helpers work in shifts. Support from helpers from the neighbouring counties. Start of civil-military cooperation in the context of administrative assistance (by district or county liaison detachments).
2	low	e.g. deployment of emergency personnel to an extent and intensity within the framework of the normal everyday service. Composition of, for example, a group of one hundred for use in a district. Increased deployment of honorary helpers to support the full-time emergency personnel, in some cases. No request for administrative assistance from the Federal Armed Forces.
1	very low	e.g. deployment of emergency personnel to an extent and intensity within the framework of the normal everyday service.

Classification		Non-material
Level	in words	Psychological impact on inhabitants of the reference area
	Intensity of the impact on the population	Explanation:
5	very high	e.g. almost the entire population of the reference area (and far beyond) actively addresses the event and perceives it as a threat even for those who are not affected – very great increase in calls to citizen hotlines, police, fire brigade, etc. – deployment of reinforcements. Citizens undertake panic buying. Citizens no longer go to work and leave the area in large numbers. The whole of public life comes to a standstill to a large extent.
4	high	e.g. the majority of the population of the reference area actively addresses the event and perceives it as a threat even for those who are not affected – great increase in calls to citizen hotlines, police, fire brigade, etc. – reinforcements necessary. Some of the population undertake panic buying. Some citizens no longer go to work or leave the area. Normal everyday life is severely restricted.
3	moderate	e.g. sections of the population of the reference area take the event very seriously and deal intensively with this – significant increase in calls to citizen hotlines, police, fire brigade, etc.; isolated panic buying. In some cases, citizens consider no longer going to work or leaving the affected area.
2	low	e.g. the population takes an interest in the event – small increase in calls to citizen hotlines, police, fire brigade, etc.; no or isolated panic buying.
1	very low	e.g. the population takes note of the event – no significant increase in calls to citizen hotlines, police, fire brigade, etc.; no panic buying.

Appendix 6 Threshold levels and aid for the determination of the damage value “non-material – cultural asset”

1st step – how many cultural assets are affected by the event?

Classification		Non-material	
Value	in words	Affected cultural assets (here: e.g. churches and museums)	
	Intensity	1st category – number of affected cultural assets (churches, museums, ...)	Example: number of affected cultural assets e.g.
5	very high	>100	
4	high	51-100	
3	moderate	11-50	
2	low	3-10	
1	very low	1-2	3 ≡ ≡ ≡ ≡ ≡

3rd step – appreciation or depreciation of the damage value due to the consideration of the level of severity of the damage

Classification		Non-material	
Value	in words	3rd category – appreciation or depreciation with respect to the damage (duration of the restoration measures)	
-1	Depreciation of the damage value	The affected cultural asset exhibits minor damages. The repair measures or the restoration can be performed within the framework of the normal (brought forward, if applicable) maintenance activities, with regard to the expenditure (costs and time).	
= category	Value from 2nd step is retained	The affected cultural asset exhibits average damage, which entails extensive repair measures / restoration.	
+1	Appreciation of the damage value	The affected cultural asset is so damaged that it is possible to complain about a partial or even a total loss. The reconstruction measures or the restoration can be assessed as very high with regard to the expenditure (costs and time) and can, in some cases, only be completed in decades.	

2nd step – what significance do the affected cultural assets have?

Classification		Non-material	
Value	in words	Affected cultural assets (here: e.g. churches and museums)	
	Intensity	2nd category - assignment of significance to the affected cultural asset	Example: assignment
5	very high	UNESCO Cultural World Heritage Site	
4	high	Cultural asset of national significance (see Hague Convention)	
3*	moderate	Cultural asset of Land-wide significance →	1 church*
2	low	Cultural asset of supraregional significance →	1 castle
1	very low	Cultural asset of regional significance (e.g. monuments) →	1 museum
* höchste Kategorie legt Wert fest!			

4. Result – damage value

Application example: the affected church (category 3) is so severely damaged that reconstruction measures that take at least 10 years can be expected.

The necessary restoration work inside is also very extensive. The costs are immense. Thus the damage value is raised by a category.

Result (example) damage value for “cultural asset”: **4**

You can find editable documents for determining the damage value for a cultural asset at www.bbk.bund.de/risikoanalyse

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