Disasters and Emergencies in Switzerland 2020

National risk analysis report

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Federal Office for Civil Protection FOCP

This risk report is part of the national risk analysis 'Disasters and Emergencies in Switzerland 2020' (DES 2020). It explains the background and the chosen methodological approach and outlines findings and changes that have been made since 2015. It presents applications of these findings in civil protection and offers an outlook on the next steps. The report is aimed at an expert audience.

IMPRINT

This report was written by the Federal Office for Civil Protection FOCP
in cooperation with EBP Schweiz AG.
The following persons were involved in the work of the project team:

Federal Office for Civil Protection FOCP
Stefan Brem
Markus Hohl
Wilhelm Möller

EBP Schweiz AG
Lilian Blaser
Tillmann Schulze

Publisher
Federal Office for Civil Protection FOCP
Guisanplatz 1B, CH-3003 Bern

December 2020

Citation
Federal Office for Civil Protection (FOCP) (2020): National risk analysis report.
Disasters and Emergencies in Switzerland 2020. FOCP, Bern.

This document is also available in German, French and Italian. The original version is German.

Disasters and Emergencies in Switzerland 2020

National risk analysis report

Federal Office for Civil Protection FOCP
Bern, December 2020

Preface

Worldwide, the coronavirus pandemic led to great uncertainty and caused immense damage in 2020. It has also shown us how vulnerable Switzerland is – despite our well-established healthcare and civil protection systems, our strong economy and our deep-rooted ability to cooperate.

The COVID-19 pandemic has posed some major challenges for Switzerland. However, we must also make sure we are well-prepared for other disasters and emergencies. Risk-based preparedness planning is therefore more important than ever. We must analyse the risk situation for Switzerland in a sophisticated way and update it periodically.

The national risk analysis 'Disasters and Emergencies in Switzerland' (DES for short) provides broad insights into the hazards that we must deal with. These findings provide a solid basis for our preparedness planning. They help civilian executive staff, emergency organisations and policymakers, who can make decisions and provide training on the basis of the established reports and scenarios.

Other actors who are not directly involved in civil protection also apply the DES products. Among other things, the findings are used in the protection of critical infrastructures, in considerations concerning the effects of climate change, and in the assessments in the Federal Council's security policy report. Disasters and emergencies can only be dealt with successfully if everyone is aware of the risks identified.

Risk analyses on their own do not make Switzerland any safer. But they do help to identify what action is needed. It is now up to us to use these insights to increase the security of our country together

Federal Councillor Viola Amherd

Head of the Federal Department of Defence, Civil Protection and Sport

Summary

This report summarises the results of the refined and updated national risk analysis 'Disasters and Emergencies in Switzerland' (DES) from 2020. The aim of this national risk analysis is to analyse a broad spectrum of hazards that are relevant to civil protection, and to present these in a comparative way based on the risk that they pose. The fundamental stages of an integrated risk management process include identifying relevant hazards, developing scenarios, assessing risks, and engaging in a subsequent risk dialogue. This then forms the basis for deciding which risk reduction measures are to be implemented with which priority in order to improve the protection of the population and their livelihoods as efficiently and effectively as possible.

The Federal Office for Civil Protection FOCP published its first risk report in the context of DES in 2013 and the second one in July 2015. In addition to the second report, which is aimed primarily at an audience of experts, the FOCP has produced a brochure for a wider public. For the 2015 risk report, a total of 33 hazards were analysed using a specially developed method, and corresponding hazard files were created. More than 200 experts from the public sector, private sector and academia were involved in developing the method and carrying out the risk analysis leading up to 2015.

Risk management is a continuous process because the risk landscape is constantly changing. The national risk analysis is therefore updated periodically. The hazard assumptions and the methodological basis have to be reviewed, new hazards identified, and corresponding risks analysed.

In light of this, all DES products were reviewed and updated in the third iteration of analysis between 2017 and 2020. The updated hazard catalogue was published in 2019. It forms an important basis for the national risk analysis and subsequent work.

The risk assessment method, first published by the FOCP in 2013, has been further refined. The hazard files for 33 hazards and the scenarios contained therein have been reviewed and updated. Where necessary, hazard scenarios have been adapted and their risks re-analysed. All hazard scenarios for deliberate events (e.g. terrorist attack, cyber attack, unrest) have been assessed using a new plausibility method. In addition, eleven new hazards have been included in the national risk analysis. The number of experts involved has increased to 298 in total.

This risk report is divided into seven sections. Section 1 describes the background, the objectives, the purpose and the target audience of the national risk analysis. Section 2 presents the process of the national risk analysis and the resulting products. Sections 3 and 4 summarise the methodological basis and explain the methodological and conceptual changes in comparison to the 2015 report. Section 5 summarises the results of the third round of analysis. Section 6 outlines the importance of DES in the context of disaster management. The final section provides an outlook on the next steps.

Contents

1 Introduction

1.1 Risk analyses in the context of integrated risk management

In Switzerland, the Integrated Risk Management (IRM) model (FOCP, 2014) plays a key role in the management of disasters and emergencies (Fig. 1). The aim of using this model is to determine the risks that damaging events pose to the population and their livelihoods as integrally – i.e. comprehensively – as possible, conduct a risk dialogue with all affected parties, assess the identified risks and reduce them to an acceptable level through suitable measures. For the purpose of risk reduction, all potential measures from the areas of risk preparedness (prevention and emergency provisions), response and recovery should be considered in the process.

Figure 1: Model Integrated Risk Management FOCP 2019

The national risk analysis 'Disasters and Emergencies in Switzerland' (DES) offers an analytical basis to support preparedness planning in civil protection at all levels of government. This planning is an essential element in being able to prepare for and cope with disasters and emergencies. Civil protection management bodies are responsible for making sure that the population and their livelihoods are protected. Due to the wide variety of potential disasters and emergencies, they cannot limit their preparation to one particular hazard or group of hazards (e.g. natural hazards). Rather, they must be prepared for all dangers that the population could be exposed to. The management of disasters and emergencies usually involves numerous actors at different organisational levels and from different domains (public sector, private sector, academia, etc.). It is therefore necessary to discuss, plan, organise and practise how to deal with events that are relevant to civil protection in advance.

To obtain a differentiated overview of the risk potential of hazards for Switzerland, many civil protection and disaster management organisations make use of hazard and risk analyses. As with risk management (e.g. according to ISO 31000), the spectrum of potential hazards is identified first. Following this, specific scenarios are developed and described. The impacts of these are then analysed in a differentiated manner, and their likelihood of occurrence or plausibility respectively are estimated. This analysis makes it possible to compare various disasters and emergencies and, at the cantonal level in particular, provides an important basis for preparedness planning in the field of civil protection. At the same time, potential shortcomings in the ability to manage them can be identified from the results, and preparedness measures can be taken (see Fig. 1).

From a strategic point of view, DES is an important tool for strengthening the resilience[1] of Switzerland. In a comprehensive sense, a resilient system usually comprises the following elements:

- Anticipatory abilities through risk and vulnerability analyses
- Prudent (spatial) planning to avoid risks
- Preventative measures to avert and prevent specific hazards
- Emergency provisions to prepare for possible incidents
- Rehearsed response capabilities
- Quick access to resources for stopgap measures and restoration
- Capacities for evaluating events
- Resources for long-term reconstruction

This also corresponds to the integrated risk management approach for civil protection that disaster preparedness in Switzerland is based on.

However, it is not only in Switzerland that national risk analyses provide a basis for preparedness planning in civil protection. For example, in 2010, the European Union also advocated a comprehensive approach to national risk analyses. This approach is intended to provide a cross-sectoral overview of EU-specific risks arising from natural or man-made disasters (European Commission, 2010). A number of European countries, including Germany, the United Kingdom, the Netherlands and Sweden, have published the results of their analyses in various forms in recent years. Other international organisations, such as the UN (UNDRR, 2017) and the OECD (OECD, 2014), also recommend their member states to implement such analyses.

1.2 Risk analyses at the Federal Office for Civil Protection

The Federal Office for Civil Protection FOCP supports Swiss bodies that are active in the areas of disaster and emergency preparedness and incident management, particularly the relevant federal agencies, the cantons and the partner organisations of the civil protection network (police, fire brigade, medical services, technical services, civil protection organisations). The FOCP conceptually deals with options for limiting and managing major incidents that could harm the population and their livelihoods or cause damage to cultural goods (FOCP, 2014). In collaboration with the cantons, the FOCP conducts research and development in the areas of hazard and risk analysis and the management of disasters and emergencies (CPDA, 2019; SR 520.1). Since 2007, the FOCP has been supporting the cantons with the KATAPLAN guideline (FOCP, 2013b), which they can use for their cantonal hazard and risk analyses and their preparedness planning. The FOCP also supports operators of critical infrastructure, like with a critical sub-sector guide, which

[1] Resilience refers to the ability of a system, an organisation or a society to withstand disturbances caused internally or externally (resistance) while remaining as functional as possible (adaptability) or returning to functionality as quickly and completely as possible (regenerative capacity). (Federal Council, 2017)

covers risk analysis and preparedness planning, among other topics.

In 2009, based on a resolution by the Federal Council from December 2008 and a research article in the Federal Act on Civil Protection and Civil Defence (CPDA), the FOCP began working on a new national risk analysis for disasters and emergencies. This analysis was intended to build upon existing methods and work in the field. However, it was also important to ensure that the hazard spectrum and the range of possible impacts could be broadened. The analysis was to take into account events and developments that have a negative impact on people, the environment, the economy and society.

In 2013, the FOCP published the first risk report on possible disasters and emergencies in Switzerland (FOCP, 2013d). It focused on a selection of twelve scenarios with which the developed method and the approach were tested in practice. This first analysis cycle showed that the risk analysis method could be successfully put into practice to analyse disasters and emergencies in Switzerland. Due to the good applicability of the method, the traceability of the results, and the considerable interest in the first DES products among actors in the realm of civil protection, it was decided in 2013 to extend the risk analysis by 21 additional hazards. The results of the first update from 2015 are explained in a technical risk report (FOCP, 2015b) and summarised in a risk brochure (FOCP, 2015c) for a wider public.

With this risk report 2020, the analysis and update cycle continues. In doing so, the FOCP is also taking into account that the range of relevant hazards, as well as the safety and security situation, are constantly changing. When further developing DES, the FOCP also considers new methodological and practical findings from specific damaging events and exercises. The present document outlines the results of the work that was carried out between 2018 and 2020.

1.3 Objectives and purpose

The overarching objective of DES is to provide risk-based planning fundamentals for organisations that are responsible for the strategic or operational management of disasters and emergencies. The focus is on enabling a transparent and comparative risk overview. This forms an important basis for engaging in dialogue about all relevant risks with all affected and responsible actors. Ideally, this risk dialogue also involves carrying out a comprehensive risk assessment. On the basis of this, decisions must then be made regarding possible risk reduction measures and their priority. This also allows Switzerland's various disaster management measures to be better aligned with one another for the purpose of integrated civil protection.

For DES 2020, the focus was on the following objectives in particular:

- Refining and improving the existing method, including with regard to the assessment of deliberate events.
- Revising the hazard catalogue and adding further hazards.
- Reviewing the existing hazard files and developing further files for hazards that are relevant to civil protection in the domains nature, technology and society.
- Conducting the risk analysis using the updated methodology and creating updated risk and impact diagrams.

The results of DES 2020 support the risk dialogue between actors in the area of civil protection, foster the development of a risk culture in disaster management, and systematise the preparedness and management of disasters and emergencies. The broad-based products also reduce the effort for the federal government, cantons, municipalities and critical infrastructure operators when conducting their own risk analyses. They raise awareness of the topic of integrated risk management and facilitate the creation of training measures and exercises. As a result, they form an important basis for subsequent work on continuously improving civil protection and disaster management.

1.4 Audience

The work of crisis management organisations and emergency services typically brings them into contact with various actors from different disciplines and different areas of responsibility. In the event of a disaster or emergency, it is not only essential to cooperate across various areas of responsibility but also across the different federal agencies as well as on strategic and operational level. Standardised planning fundamentals based on systematic analysis are an important tool to facilitate joint preparations. The analysis and products of DES are therefore aimed primarily at actors that are concerned with the management of disasters and emergencies and which plan, prepare or carry out the necessary measures in the event of an incident.

The main users of the national risk analysis include all organisations that are responsible for managing disasters and emergencies at the national level and ensuring that

Switzerland is prepared for them (e.g. the Federal Civil Protection Crisis Management Board (CCMBO, 2018; SR 520.17). However, civil protection management bodies at cantonal, regional and municipal level also use the DES products, especially the scenarios in the hazard files.

As seen since the publication of the risk report 2015, the DES products and the results contained therein are also used by other actors. For example, they have been used in the critical infrastructure protection programme, in the implementation of the strategy for civil protection and civil defence 2015+, and in the climate change adaptation strategy. They also serve as a basis for training courses and exercises, such as the Swiss Security Network Exercise 2014 (Projektorganisation SVU 14, 2015). In addition, the products and analyses were used in measures for dealing with the COVID-19 pandemic. For example, the Federal Civil Protection Crisis Management Board was able to base advanced analyses of possible supply shortages on the results of the national hazard and risk analysis.

2 Process and products

The national risk analysis 'Disasters and Emergencies in Switzerland' (DES) consists of three sub-steps:

— Risk identification and selection of hazards

— Risk analysis and scenario development

— Risk evaluation and risk presentation

Each sub-step is documented in its own separate product that shows the process and the results. Fig. 2 provides an overview of the three sub-steps with their corresponding products.

2.1 Risk identification and selection of hazards

Risk identification is the first sub-step in the national risk analysis. The FOCP creates a hazard catalogue for this purpose. The catalogue provides an overview of all hazards that are relevant to civil protection in Switzerland. It lists hazards from the three domains 'nature', 'technology' and 'society' in which incidents could potentially occur in Switzerland (e.g. inland flooding, electric power supply outage, terrorist attack) or that could have major consequences for Switzerland (e.g. solar storm, volcanic eruption abroad).

The FOCP revises and updates the catalogue periodically with the involvement of numerous actors from the public sector (federal and cantonal), the private sector and academia. The results of the Civil Protection Trend Analysis, which the FOCP conducts along with the Center for Security Studies at ETH Zurich, are also taken into account during selection. (Roth et al., 2014; Hauri et al., 2020) Other studies on emerging risks are also considered, such as the annual SONAR report of Swiss Re (Swiss Re, 2020), the Global Risks Report of the World Economic Forum (WEF, 2020) and the UN Global Risk Assessment (UNDRR, 2019).

In consultation with the relevant specialist agencies, the FOCP selects those hazards from the hazard catalogue that are to be examined in more detail in the subsequent analysis. The focus is on hazards that are particularly relevant for civil protection and disaster management in Switzerland at a national level. Everyday risks (e.g. sports and household accidents) (FOCP, 2003), financial crises or hazards such as espionage, proliferation or organised crime do not form part of this analysis. The last three of these hazards are addressed in the annual progress reports of the Federal Intelligence Service (FIS), the annual reports of the Federal Office of Police (fedpol), and the security policy reports of the Federal Council. The latter have an even broader thematic focus, covering the entire spectrum of threats and dangers that are relevant to security policy.

Various criteria play a role in the selection of hazards. These are events that have already led to disasters and emergencies in Switzerland (e.g. earthquakes, inland flooding), events that have led to major damage abroad and are also conceivable in Switzerland (e.g. a major electric power supply outage) or possible events that have the potential for a disaster or emergency (e.g. an attack with a radiological bomb or other serious terrorist attacks). The list of hazards to be analysed in detail is reviewed during each revision cycle and adapted if necessary.

2.2 Risk analysis and scenario development

The risk analysis includes defining the fundamentals and developing scenarios for the selected hazards. The hazard files are then derived from this analysis. They form the main basis for the subsequent risk evaluation. Each file contains a definition of the hazard, examples of incidents, influencing factors, a scenario describing the impacts, impact and risk diagrams, as well as the legal basis and further information.

The FOCP develops a scenario for each hazard file. Federal and cantonal agencies, academic institutions and experts from the private sector correct and validate the draft files.

The hazard file is re-validated in expert workshops because it forms the basis for the subsequent risk evaluation.

Figure 2: Overview of process and products of the national risk analysis DES

2.3 Risk evaluation and risk presentation

The risk evaluation is the decisive analytical and participatory step in DES. Risk is defined as the measure of the hazard potential of an event or development. In the case of DES, a risk consists of two factors: extent of damage (negative impact on the population and their livelihoods) and likelihood of occurrence (or plausibility for deliberate events). These two factors are evaluated by experts in hazard-specific workshops. For the DES risk evaluation, the FOCP developed its own method based on other risk analyses, which has been updated for this analysis cycle (FOCP, 2020b). Experts from the public sector, private sector and academia were involved in developing it. It was validated at various workshops in 2011 before the first national risk analysis was conducted and has proved its worth ever since then.

The main results of the risk evaluation are the risk diagrams with all analysed scenarios (see Fig. 5 and 6, p. 34–35) and the impact diagrams for the respective scenarios (see Fig. 7, p. 36–37 for examples).

The two variables 'extent of damage' and 'likelihood of occurrence' (frequency) or the plausibility of the various events can be shown in relation to one other and presented in a risk diagram. This makes it possible to assess the risks holistically. Policymakers can then decide, for example, whether they consider a risk to be bearable and then accept it, or whether they consider it to be too big and must therefore plan and implement measures to reduce it.

2.4 Overview of the products of the national risk analysis

An overview of the various coordinated products of the national risk analysis is shown below (see also Fig. 2, p. 15):

- Hazard catalogue (FOCP, 2019)
  The hazard catalogue comprises hazards that lead to disasters and emergencies, that generally can occur in Switzerland, or that could have a significant impact on Switzerland.[2]
- Hazard files (FOCP, 2020a)
  The 44 hazard files each contain a definition of the hazard, examples of incidents, influencing factors, a scenario describing the impacts, an impact and risk diagram, as well as the legal basis and further information.[3]
- Methodology report (FOCP, 2020b)
  The DES method describes the approach and fundamentals of the risk assessment. This is to ensure that the hazards and their risks are analysed systematically and equivalently and that the generated results are traceable.
- Risk report
  This risk report summarises the approach and the main results of the national risk analysis. It is aimed primarily at an expert audience.
- Risk brochure (FOCP, 2020c)
  The risk brochure presents the results of the national risk analysis to a wider public.

[2] Because an increasing number of users is applying the hazard catalogue as a general overview or to assist in the selection of hazards that are relevant for cantonal, regional or municipal risk analysis or for critical infrastructure, the catalogue also includes hazards relevant to cantons, municipalities and critical infrastructure.

[3] The hazard files show the risk diagram (frequency/plausibility) with all analysed hazard scenarios.

3 Method

The method developed for the national risk analysis 'Disasters and Emergencies in Switzerland' (DES) is based on earlier risk analyses in the area of civil protection in Switzerland, e.g. KATANOS (FOCP, 1995) and KATARISK (FOCP, 2003). However, it also takes into account fundamental aspects of risk analysis, like those described in ISO standard 31000 (ISO 31000:2018). At the same time, the DES method is also based on approaches used in other countries (e.g. the United Kingdom and the Netherlands). It has been updated and refined in light of the 2020 analysis.

Recent academic studies categorise the DES method as a 'storyline' approach. (Shepherd et al., 2018) This has significant advantages over probabilistic model approaches in terms of general decision-making and the implementation of measures. Storylines are especially useful for considering risks in which the interaction of several influencing factors may cause major damage and lead to disasters and emergencies. Storylines go beyond standard modelling of probabilistic approaches, as they present a hazard in clear terms and take into account a variety of effects. This protects against false precision and helps to avoid surprises. (Shepherd, 2016) Storylines also facilitate the necessary risk dialogue in politics, business, the media, and society.

Compared to the earlier analyses KATANOS (FOCP, 1995) and KATARISK (FOCP, 2003), the DES method can cover a broader range of impacts. This wide spectrum enables a better presentation of the damage caused by a specific event. As a result, impact profiles are more detailed than in earlier analyses: fatalities/injuries and environmental, economic and societal damage are analysed in more depth and the extent of damage is presented in greater detail. This also makes it possible to identify hazard-specific and general challenges more effectively and derive the necessary risk-reduction measures.

3.1 Metrics for the extent of damage, likelihood of occurrence and plausibility

To determine the extent of damage, likelihood of occurrence and plausibility, DES uses a method that allows for a systematic and reproducible process of analysis.

To determine risks, DES measures the two factors 'extent of damage' and 'frequency' (as a measure of the likelihood of occurrence). In the case of deliberate events, plausibility, not frequency, is determined for a scenario.

3.1.1 Extent of damage

Twelve damage indicators are available for analysing the extent of damage (see Table 1).

These indicators were selected on the basis of the Swiss Federal Constitution and the protected assets defined therein. The two damage indicators *reputation of Switzerland* and *confidence in state / institutions* are exceptions, as the Constitution does not explicitly list them as protected assets. However, they are still relevant for disaster management – especially with regard to the credibility (and thus the acceptance) of official behavioural recommendations in the public. They are also important for communication with other countries, like when foreign tourists are affected by an event or if officially prescribed measures affect neighbouring countries. The twelve damage indicators are grouped into four damage categories: people, environment, economy, and society. The methodology for the national risk analysis describes the damage indicators in detail (FOCP, 2020b). An overview of the 12 damage indicators and the 8 damage extent classes is provided in Table 8, p. 56–57.

Table 1: Overview of examined damage indicators with reference to corresponding articles in the Swiss Federal Constitution

Damage area	Damage indicator		Unit	Federal Constitution articles
Individuals	I1	Fatalities	Number of people	Art. 10, 57, 58, 61, 118
	I2	Injured / sick people	Number of people	Art. 10, 57, 58, 61, 118
	I3	People in need of assistance	Person days (number of people multiplied by days)	Art. 12, 115
Environment	En1	Damaged ecosystems	Affected area multiplied by number of years of adverse effects (km^2 multiplied by years)	Art. 74, 76, 77, 78, 104
Economy	Ec1	Asset losses and cost of coping	CHF	Art. 61
	Ec2	Reduction of economic performance	CHF	Art. 100
Society	S1	Supply shortfalls and disruptions	Person days (number of people multiplied by days)	Art. 102
	S2	Diminished public order and domestic security	Person days (number of people multiplied by days)	Art. 52, 185
	S3	Impairment of territorial integrity	Qualitative according to intensity and duration	Art. 58
	S4	Damage to and loss of cultural property	Qualitative according to significance and number	Art. 2, 69, 78
	S5	Damage to the reputation of Switzerland	Qualitative according to significance and number	Art. 54
	S6	Loss of confidence in state / institutions	Qualitative according to significance and duration	Preamble, Art. 2, 5

3.1.2 Likelihood of occurrence

For non-deliberate scenarios (e.g. *earthquake*, *electric power supply outage*, *animal disease outbreak*), frequency is determined in addition to damage as a second factor for measuring the likelihood of occurrence (see Table 2).

The likelihood of occurrence indicates how probable it is that a certain event will occur (exactly once or at least once) within a certain period (e.g. in the next 10 years). This likelihood is always expressed as a value between 0 and 1 or 0 and 100%. Return period is a synonym for likelihood of occurrence. The return period 'once in x years' represents the period during which a certain event occurs once on average. In Swiss civil protection, the return period (called 'frequency') is commonly specified. Annuality (reciprocal value of frequency) is also used. All three values for describing the likelihood of occurrence are interrelated and can be converted into one other.

In the DES workshops, likelihood of occurrence or frequency, respectively, are assessed on the basis of eight likelihood classes (L classes) if no other data is available. The classes are described to facilitate categorisation. For calculations, an average value of the respective class is used (see FOCP, 2020a) to estimate the class.

Table 2: Likelihood classes (L-classes)

L-class	Description	Frequency* (once in x years)	Annuality (1 / frequency)	Likelihood** for 10 years (%)
L8	On average, few events in Switzerland during a human lifespan.	≤ 30	≥ 0.03	≥ 28
L7	On average, one event in Switzerland during a human lifespan	> 30 – 100	< 0.03 – 0.01	< 28 – 9.5
L6	Has occurred in Switzerland before, but possibly several generations ago	> 100 – 300	< 0.01 – 0.003	< 9.5 – 3.3
L5	May have never occurred in Switzerland, but is known to have happened in other countries	> 300 – 1000	< 0.003 – 0.001	< 3.3 – 1.0
L4	Several known events worldwide	> 1000 – 3000	< 0.001 – 0.0003	< 1.0 – 0.33
L3	Only few events worldwide	> 3000 – 10 000	< 0.0003 – 0.0001	< 0.33 – 0.1
L2	Only individual known events worldwide, but also conceivable in Switzerland.	> 10 000 – 30 000	< 0.0001 – 0.00003	< 0.1 – 0.033
L1	Only individual, if any, known events worldwide. Such an occurrence is regarded as very rare even on a global scale, but cannot be fully ruled out for Switzerland either.	> 30 000	< 0.00003	< 0.033

* In Switzerland the term 'return period' is also used for the common term 'frequency'

** For at least one occurrence within the given time period.

3.1.3 Plausibility

For deliberate events (e.g. in connection with political developments, terrorism or cyber attacks), it is difficult to estimate the frequency or likelihood as the threat situation can change very quickly. Furthermore, there is very little empirical data for these types of events. The plausibility of a possible occurrence must therefore be estimated for these hazards.

DES 2020 supplements the expert-based Delphi method, which was previously used for plausibility assessment, with an indicator-based approach.

The plausibility assessment is now based on two key indicators that assess the 'intent and capabilities of the perpetrator' and the 'realisability or executability of the scenario'. The key indicators are assigned sub-indicators with defined assessment criteria. These are determined by experts during the workshops. Using this indicator-based method, plausibility indices are defined for the individual scenarios and assigned to five plausibility classes (P-classes) (see Table 3). The procedure is documented in more detail in the DES methodology report (FOCP, 2020b).

As with likelihood of occurrence, the estimation of plausibility is scenario-specific. They enable a relative comparison of the plausibility between the different scenarios.

Table 3: Plausibility classes (P-classes) for deliberate events. The details relating to the perpetrator's intentions and the realisability of the scenario within the descriptions are based on the key indicators for the method.

P-class	P-index	Plausibility	Description
P5	5.0	highly plausible	The possibility of the event occurring in Switzerland is very well conceivable in comparison to other scenarios. There are undeniable indications of the potential perpetrator's intent. The feasibility of the scenario is easy overall.
P4	4.5 4.0	plausible	The possibility of the event occurring in Switzerland is well conceivable in comparison to other scenarios. There are undeniable to clear indications of the potential perpetrator's intent. The feasibility of the scenario ranges from easy to challenging overall.
P3	3.5 3.0	quite plausible	The possibility of the event occurring in Switzerland is conceivable in comparison to other scenarios. There are clear to non-existent or indiscernible, respectively indications of the potential perpetrator's intent. The feasibility of the scenario ranges from easy to complex overall.
P2	2.5 2.0	somewhat plausible	The possibility of the event occurring in Switzerland is little conceivable in comparison to other scenarios. There are clear to non-existent or indiscernible, respectively indications of the potential perpetrator's intent. The feasibility of the scenario ranges from challenging to complex overall.
P1	1.5 1.0	hardly plausible	The possibility of the event occurring in Switzerland is hardly conceivable in comparison to other scenarios, but cannot be fully ruled out. There are no indications of the potential perpetrator's intent. The feasibility of the scenario is complex overall.

3.2 Analysis process

The DES method describes the process for analysing hazards and risks. It is designed to enable the FOCP to work with experts to develop hazard scenarios and conduct a risk evaluation for the respective hazard. This allows the knowledge and experience of the different experts to be incorporated into the analysis.

3.2.1 Scenarios for the analysis

For the hazards being examined, existing information relating to the impacts of events that have actually occurred is processed and systematic scenarios are developed on the basis of this. The scenarios provide an overview of the course of events and the consequences of a possible incident in Switzerland. In all scenarios, the following aspects are described and analysed in a standardised way:

- Initial position / pre-phase
- Event phase
- Recovery phase
- Timeline and spatial extent of the event
- Impact on the areas of 'individuals', 'environment', 'economy' and 'society'

The scenarios are based on known events as much as possible. However, they also take into account potential future developments. The descriptions focus on the impacts that are to be expected in direct connection with the event.

For each hazard, a scenario of significant, major and extreme intensity is briefly described in order to show the stages of escalation and the range of possible courses (see Table 4, p. 23 for examples).

The intensities are defined as follows:

'Significant': A scenario that is considerably more severe than an everyday event. Such scenarios are relevant for municipal and cantonal hazard and risk analyses, for example.

'Major': A scenario of great intensity. Nevertheless, considerably more severe occurrences and courses of events are conceivable in Switzerland.

'Extreme': A scenario of extreme intensity. Such events are barely conceivable in Switzerland.

The intensity of an event depends on various influencing factors. To describe the scenarios and their intensity, hazard-specific influencing factors were used to determine the extent of the impact of an event (e.g. wind speed during storms or the duration of an electric power supply outage). In the case of the *drought* hazard, spatial expansion and the duration of the event, for instance, are important factors in determining its intensity. The intensity always refers to the occurrence of the hazard in Switzerland. As the intensity of the event increases (e.g. an increase in the magnitude of an earthquake), its impact also becomes greater. This increase in impact is hazard-specific. For example, the effects of a forest fire as the area becomes larger do not increase in the same proportion that the effects of an electric power supply outage are felt the longer it goes on for.

Each scenario of major intensity is described in detail in the hazard files. This also forms the basis for evaluating the extent of damage by means of the twelve damage indicators and their frequency or plausibility. Because the experts evaluate scenarios for very different hazards of the same intensity, the various analysed hazards can be compared to one another in a risk diagram (cf. Fig. 3).

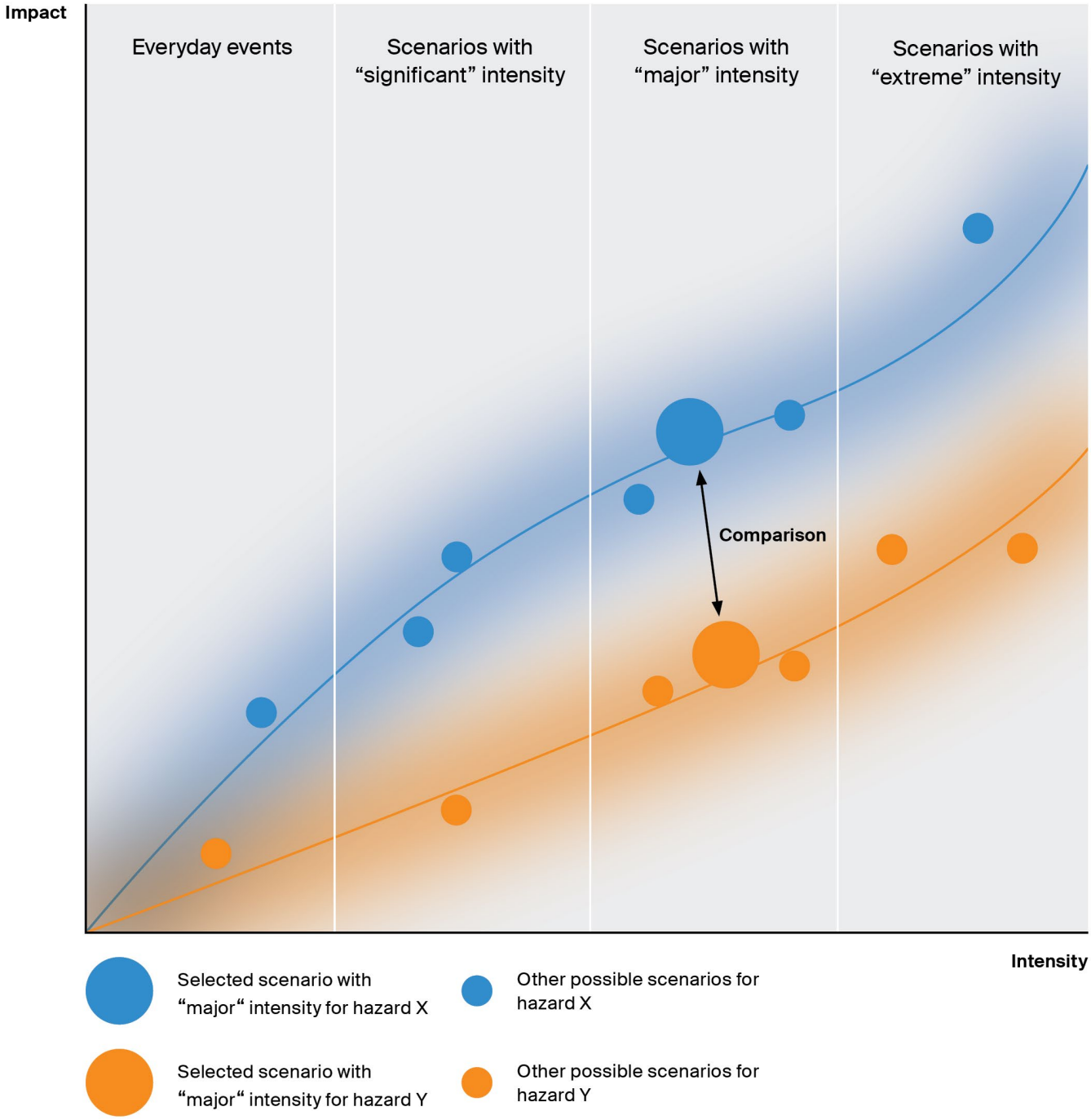


Figure 3: Schematic depiction of the process for selecting and comparing scenarios. From the three scenarios of significant, major and extreme intensity, the scenario 'major' was analysed for two different hazards (e.g. forest fire and electric power supply outage). This makes it possible to compare very different hazards in one risk diagram.

Table 4: Description of the main values for the scenarios of 'significant', 'major' and 'extreme' intensity, using three hazards in the domains nature, technology and society as examples

Intensity	Earthquake	Dam accident	Animal disease outbreak
1 – significant	Magnitude approx. 5.5 Intensity (EMS) VII (building damage) No aftershocks Damage radius 25 km Radius of damage epicentre 5 km Low infrastructure density Time: afternoon	Overflowing due to blocked spillway Season: start of summer Advance warning: a few hours Small villages in flood area (several hundred inhabitants at risk)	Individual regions in Switzerland affected Appears first in surrounding countries (advance warning) The causative agent is known Low infection rate
2 – major	Magnitude approx. 6.5 Intensity (EMS) IX (destructive) Aftershocks occur Damage radius 80 km Radius of damage epicentre 25 km High infrastructure density Time: late spring, weekdays in the morning	Spillover due to rock slide into the reservoir Season: autumn (reservoir full) Populated valley in the flood area (large village, a number of farms and individual industrial businesses; a few thousand people at risk in total) Advance warning: a few days Time of occurrence: daytime	Whole of Switzerland affected Appears first in surrounding countries (advance warning) The causative agent is known High rate of infection
3 –extreme	Magnitude approx. 7.0 Intensity (EMS) XI (devastating) Aftershocks occur Damage radius 120 km Radius of damage epicentre 40 km High infrastructure density Time: winter, at night	Failure due to unexpected geological movement of an abutment No warning signs; advance warning limited to time it takes for dam water to reach populated area Almost entire content of dam emptied in a matter of minutes Densely populated valley in the flood area	Whole of Switzerland affected Occurs first in Switzerland (no advance warning) The causative agent is known or unknown High rate of infection

3.2.2 Risk evaluation

To evaluate the risk of the individual scenarios, the FOCP organised and held the hazard-specific expert workshops mentioned above. In these workshops, the experts not only discussed the scenarios but also estimated the extent of damage based on the indicators, as well as the frequency or, where necessary, the plausibility of the scenarios. The estimations were carried out in structured discussions based on the process used in the Delphi method. The analysis process involves multiple steps: The participants first put forward their own evaluations. The FOCP then analyses the responses and informs the participants of the results of the first round. The participants then mainly discuss the extreme values of the various estimations. In this way, the Delphi method makes it possible to narrow down the estimations and consolidate the estimated values. (FOCP, 2020b)

When determining the risks associated with the different hazards and events, the experts drew on existing fundamentals such as analysis of events and exercises, statistics, their own experiences, other scenarios, etc. If specific information was not available or if there was great uncertainty about the impacts or the likelihood of occurrence for a scenario, the experts made well-founded assumptions.[4] Using the Delphi method, it was possible to make the subjective evaluations as objective as possible.

[4] The estimations were often based on the likelihood classes (cf. Table 3, p. 20) and the extent of damage (cf. Table 8, p. 56–57)

3.2.3 Composition of the expert workshops

A large number of experts from Switzerland took part in DES, and some even came from abroad. The pool of experts has increased by a further 96 people since 2015, meaning that a total of 298 experts from the public sector (federal and cantonal), private sector and academia have participated in the development and validation of the method and in the DES workshops since 2012. 64 percent of the experts worked in the public sector, 26 percent came from the private sector, of which most were critical infrastructure (CI) operators, and 10 percent came from academia.

Between five and 15 experts took part in each workshop. Some of them were involved in several workshops. The participants did not receive a fee. The composition of the expert workshops was based on the existing information requirements for the different scenarios. The workshops were attended by experts with specialist knowledge of the causes and the progression of the hazards to be analysed, as well as by experts with extensive knowledge of the impacts that a hazard can have in the damage categories of 'people', 'environment', 'economy' and 'society'.

The experts had to validate the classification of the scenarios into the intensities of 'significant', 'major' and 'extreme'. They also had the task of reviewing and, if necessary, adjusting the description of the course of events for the incident and estimating the scenario's impacts and likelihood of occurrence.

The involvement of experts from outside the FOCP made it possible to generate broad-based results and products within a reasonable period of time. In addition, the approach increased the quality and acceptance of the products.

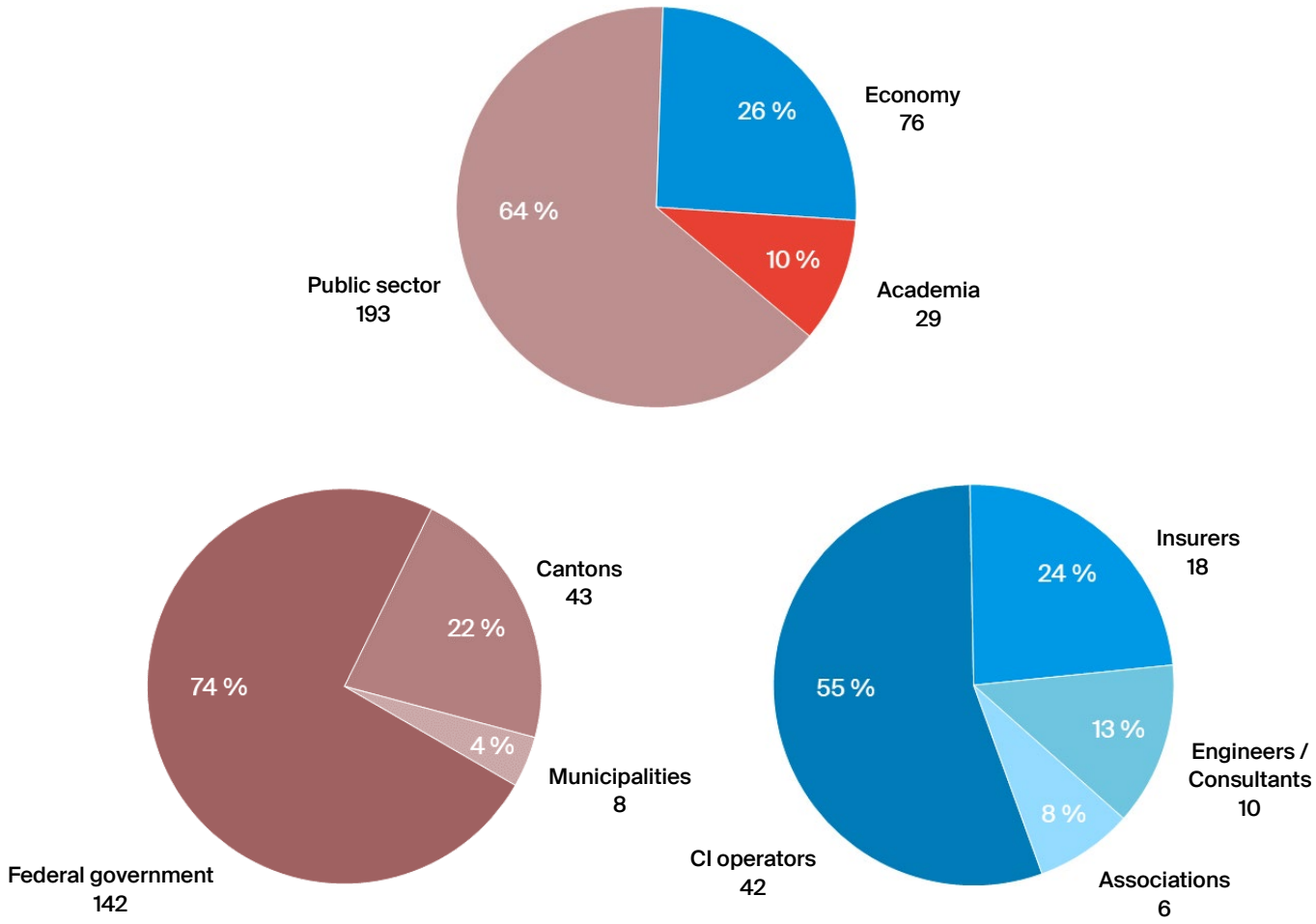


Figure 4: Breakdown of parties involved in the risk analysis DES 2020

3.2.4 Monetisation and aggregation of damage

To be able to visualize the impacts that are determined using the twelve damage indicators in a risk diagram, the recorded damages are converted into a monetary amount (i.e. monetised).

For monetisation, marginal costs were defined for each damage indicator (cf. Table 5). The marginal costs roughly represent the amount of money that society would likely be willing to pay to reduce the damage by one unit of damage. (FOCP, 2003; Ecoplan, 2016) This amount is derived from environmental and economic studies, for example, or defined normatively.

For monetisation of non-quantitatively defined indicators, e.g. damage to or loss of cultural property, the methodology prescribes using the average value of the corresponding extent class of the damage indicator *asset losses and cost of coping*. (FOCP, 2020b)

The monetised damage of the individual damage indicators is then added up (i.e. aggregated). In this way, the aggregated damage of a scenario provides a measure for impacts across all damage indicators. As a result, it not only corresponds to the direct costs incurred due to the event but, rather, also represents the total damage potential that a certain hazard poses across all examined damage indicators.

The aggregated damage reflects material damage (e.g. damage to property) and immaterial damage (e.g. loss of confidence in government institutions among the Swiss public). The conversion into monetary values allows the different scenarios to be compared in terms of the damage associated with them. The procedure for aggregating the damage values is explained in detail in the DES methodology report (FOCP, 2020b).

3.2.5 Fuzziness in the risk evaluation

The analysed scenarios include known and well-documented hazards and incidents (e.g. storm) as well as more difficult to imagine and less documented ones (e.g. solar storm or meteor strike) or deliberate events. For the former, empirical values and statistical fundamentals can be used for determining the frequency and extent of damage. However, this is not generally possible for deliberate or lesser-known events. Expert elicitations are therefore particularly relevant here. However, these estimations are equally essential for more common hazards, such as for determining the extent of the damage indicators for a specific scenario. Expert elicitations are not always reliable or precise, but this can also be said of data from studies and other similar sources. In addition to fuzziness surrounding data and assumptions, there is also fuzziness when it comes to the modelling of risks. The compared risks always refer to a representative selection of scenarios. While developing the scenarios, there is a certain degree of freedom when defining the causes, the sequence, and the consequences. In turn, this has an influence on the impacts and the likelihood of occurrence of the different scenarios.

By analysing historical data and model calculations, the estimated values can be validated to some extent. This makes it possible to check whether an estimation from the expert workshop is consistent with values derived from historical data on the basis of the models. Such a validation was carried out for the hazards *hazmat road accident*, *windstorm* and *inland flooding*. (Spada et al., 2018) The results for these three hazards show that the risk estimates and the risk model are well-aligned.

Table 5: Overview of the marginal costs used in DES 2020 to monetise the damage

Damage indicator		Unit	Marginal costs per unit
I1	Fatalities	Number of people	CHF 6 million*
I2	Injured / sick people	Number of people	CHF 500 000
I3	People in need of assistance	Person days (number of people multiplied by days)	CHF 250
En1	Damaged ecosystems	Affected area multiplied by number of years of adverse effects (km^2 multiplied by years)	CHF 330 000
Ec1	Asset losses and cost of coping	CHF	1
Ec2	Reduction of economic performance	CHF	1
S1	Supply shortfalls and disruptions	Person days (number of people multiplied by days)	CHF 500
S2	Diminished public order and domestic security	Person days (number of people multiplied by days)	CHF 500
S3	Impairment of territorial integrity	Qualitative according to intensity and duration, 5 classes	Average value of the respective class Ec1 in CHF
S4	Damage to and loss of cultural property	Qualitative according to significance and number, 6 classes	Average value of the respective class Ec1 in CHF
S5	Damage to the reputation of Switzerland	Qualitative according to significance and duration, 8 classes	Average value of the respective class Ec1 in CHF
S6	Loss of confidence in state/institutions	Qualitative according to significance and duration, 8 classes	Average value of the respective class Ec1 in CHF

* Of the CHF 6 million, CHF 5 million is allocated to I1 Individuals, and CHF 1 million to Ec2 Reduction of economic performance.

4 Update and further development

The national risk analysis 'Disasters and Emergencies in Switzerland' (DES) should be seen as a continuous process. The methodological basis has to be critically reviewed after each analysis round and, where necessary, updated in view of new scientific findings.[5] In consultation with the specialist agencies, the FOCP selects further hazards to be analysed, which leads to an expansion of the DES hazard spectrum. Assessments of the damage and the frequency or plausibility of disasters and emergencies change depending on experiences of actual incidents, exercises, measures taken, and new scientific findings. The risk analyses must therefore be updated periodically.

The FOCP has now transitioned the DES work stages into a continuous process that can be periodically updated and optimised. The process encompasses the ongoing development of the method, the identification of relevant hazards, the development of new scenarios and their risk evaluation, as well as updates to the risk and impact diagrams and the corresponding publications.

Between 2017 and 2020, the DES updates were mostly done during workshops, but some of the work was also carried out by correspondence. A total of 143 experts were involved.

4.1 Methodological changes

The first change to the analysis method was made after the first round of the national risk analysis, which resulted in the Risk Report 2012 (FOCP, 2013d). Whereas the twelve examined hazards were presented in a single risk diagram in the first risk report, the 33 hazards analysed in the risk report from 2015 (FOCP, 2015b) were shown separately in two diagrams: non-deliberate events (e.g. earthquake, electric power supply outage, animal disease outbreak) in a risk diagram with a frequency scale, and deliberate events (e.g. terrorist attack, cyber attack) in a risk diagram with a relative plausibility scale. On the one hand, the examined hazards were divided into two graphs because they had almost tripled in number. The results would otherwise have been very difficult to read in a single graph. On the other hand, it was done to avoid having two diffe-rent scales on the vertical axis in the same diagram.

4.1.1 Plausibility assessment

The method that was originally developed for assessing plausibility enabled meaningful results for the 2012 and 2015 risk reports. However, the risk report from 2015 recommended refining the plausibility assessment method. Although it was based on a nominal scale, plausibility could ultimately only be assessed in relative terms. What was lacking, in particular, were clearly defined criteria for selecting the right plausibility level. Although the experts could use the descriptions to make it easier to assign scenarios to likelihood and frequency classes, the assessments were still highly subjective and dependent on the composition of the respective expert workshop and the impetus gained in the Delphi rounds.

For assessing the plausibility of deliberate events, the expert-based Delphi method was therefore supplemented with an indicator-based approach for DES 2020. The new method for assessing plausibility was developed with the involvement of various groups of experts and tested in workshops. The United Kingdom (Cabinet Office, 2017) and Singapore have also used an indicator-based approach for their national risk analyses. For DES 2020, the FOCP adopted some elements of these and adapted them to the Swiss context. The methodology was developed along with the Federal Intelligence Service (FIS) and the Federal Office of Police (fedpol).

Following discussions with experts, the eight plausibility classes were reduced to five, and a more systematic gradation of the terms used for the qualitative descriptions of these classes was introduced, e.g. plausibility from 'highly plausible' to 'hardly plausible', as compared to plausibility from 'relatively plausible' to 'hardly imaginable' in DES 2015. The plausibility assessments for DES 2020 and DES 2015 are therefore not comparable in terms of their descriptions; however, a comparison is still possible based on their positioning in the risk diagram.

4.1.2 Marginal costs

In addition to refining the methodology for the plausibility assessment, updating DES also required changes to marginal costs and two damage indicators. These adjustments have been made in light of new findings gained

[5] To be able to compare the results of the national risk analyses with one another over time, any changes to the method should always be small and gradual.

from a range of other work over the past five years. The following changes to marginal costs were necessary:

- The marginal cost of a fatality was increased from CHF 5 million to CHF 6 million. As before, CHF 1 million of this amount is attributed to the indicator *Ec2 – Reduction of economic performance* for each fatality. Among other things, the higher marginal costs have resulted from a study on determining the willingness to pay to reduce accident and health risks commissioned by the Federal Office for Spatial Development (ARE) (Ecoplan, 2016). In 2016, the 'value of statistical life' (VOSL) was estimated to be CHF 6.2 million.[6]
- Marginal costs for an injured or sick person remain at 10% of the marginal costs for a fatality (excluding the Ec2 portion) and therefore now amount to CHF 500 000 instead of CHF 400 000.
- Marginal costs for indicator *En1 – Damaged ecosystems* were adjusted in line with the assumptions made in the implementation aid relating to the FOCP's critical infrastructure protection (CIP) guidelines. The document, re-vised in July 2018, assumes CHF 330 000 per km^2 per year.
- Marginal costs for indicator *S2 – Diminished public order and domestic security* were also increased from CHF 300 to CHF 500 in line with the FOCP's CIP implementation aid.

4.1.3 Scales of damage indicators

For the scales of damage indicators, the class boundaries must show the same monetised value for all indicators. To ensure this, the scales for indicator *S1 – Supply shortfalls and disruptions* had to be adapted.

A further change was made to the indicator *S4 – Damage to and loss of cultural property*. The original method showed five damage extent classes, three of which included cultural property of international significance. The S4 damage indicator now comprises six damage extent classes, although only the highest class, A6, includes cultural objects of international significance (under enhanced protection). The descriptions of the other damage classes were also adjusted on this basis (see Table 8, p. 56–57).

4.2 Hazard catalogue

The hazard catalogue (FOCP, 2019) includes hazards that lead to disasters and emergencies, that generally can occur in Switzerland, or that could have a significant impact on Switzerland. In the national risk analysis, the catalogue serves as a basis for systematically determining the relevant hazards and thus for defining the hazard spectrum. Because the general range of hazards and the perception of hazards are constantly changing, the catalogue of potential hazards from 2013 was revised and republished in October 2019.

For the revision, the FOCP involved various actors from the public sector (federal and cantonal), private sector and academia in consultations and workshops.

One significant change relates to the classification of hazards. Supply shortfalls and disruptions are shown in the newly created category 'Critical infrastructure failure and restrictions' under the domain 'technology'. As a result, hazards such as electric power supply shortage, petroleum supply shortage and gas supply disruption are no longer shown under the domain 'society' but rather in the domain 'technology'.

4.3 Hazard files and risk evaluation

The responsible specialist agencies have reviewed all 33 hazard files from 2015, and the FOCP has made corresponding changes where necessary. Among the main reasons for making a change were new scientific findings about the hazard, experience from actual incidents, as well as legal and institutional developments. For bigger changes to the scenario, the risks were reassessed using the Delphi method.

In addition, eleven new hazard files were developed and assessed in workshops. Due to the COVID-19 pandemic, it was not possible to hold any workshops requiring physical attendance in spring 2020. The FOCP therefore collected the expert opinions by correspondence. Although this meant that the valuable discussions between the experts could not take place in the workshops, the process allowed them to continue the work of analysis despite the pandemic and generate results based on expert opinions.

[6] The value was last adjusted by the ARE in October 2019 and stands at CHF 6.7 million for 2017. This change will be reflected in the indicator Ec2 in the next DES update.

The plausibility of the twelve deliberate events was assessed using the new method. The results of the hazard-specific evaluations were then validated in an overall workshop. This process ensured that the scenarios evaluated in the hazard-specific workshops could be reviewed again by the experts in an overall context and, if necessary, moved by a maximum of one plausibility class. This made it possible to identify and correct distortions that may occur due to the composition of the hazard-specific expert workshops, for example.

The results of the overall risk analysis are summarised in the following section. Based on these results, the risk brochure 'What risks is Switzerland exposed to?' was updated consequently.

Table 6: Overview of the hazards analysed in DES 2020 in the domains nature, technology and society

Domain nature		**Domain technology**		**Domain society**	
– Severe weather		– Airplane crash		– Influenza pandemic	
– Hailstorm	**new**	– Hazmat rail accident		– Animal disease outbreak	
– Heavy snowfall		– Hazmat road accident		– Conventional attack*	
– Windstorm		– Biological facility incident		– Dirty bomb attack*	
– Cold wave		– Chemical facility incident		– Biological attack with viruses*	
– Heat wave		– NPP incident		– Biological attack with bacteria*	**new**
– Drought		– Dam accident		– Biological attack with toxins*	**new**
– Forest fire		– Gas supply disruption		– Chemical weapons attack*	
– Inland flooding		– Petroleum supply shortage	**new**	– Attack with chemicals*	**new**
– Avalanche winter	**new**	– Electric power supply outage		– Hazmat rail attack*	**new**
– Earthquake		– Electric power supply shortage		– Nuclear transport attack*	**new**
– Volcanic eruption abroad	**new**	– Data centre outage		– Cyber attack*	
– Invasive species		– Mobile network outage	**new**	– People seeking protection	
– Meteor strike		– Shipping traffic restriction		– Unrest*	
– Solar storm				– Armed conflict**	**new**

* Hazards due to deliberate events for which plausibility is assessed instead of frequency.
** No plausibility assessment was carried out for the scenario *armed conflict* (cf. p. 38).

5 Results

5.1 Hazard spectrum

The national risk analysis 'Disasters and Emergencies in Switzerland' (DES) from 2020 covers a total of 44 hazards. These are divided into the domains 'nature', 'technology' and 'society' based on the hazard catalogue. 15 hazards are assigned to the domain nature, 14 to the domain technology, and 15 to the domain society (see Table 6, p. 29).

Of the 44 hazards examined, 32 are assigned to non-deliberate events. Frequency and extent of damage were determined for these hazards. 12 hazards count as deliberate events. For these hazards, plausibility and extent of damage were analysed.

33 hazards had already been examined in the 2015 analysis and were updated for the 2020 analysis. The following eleven hazards have been newly incorporated into the analysis:

- Nature: hailstorm, avalanche winter, volcanic eruption abroad
- Technology: petroleum supply shortage, mobile network outage
- Society: five different forms of NBC (nuclear, biological, chemical) attack, armed conflict

5.2 Risks for non-deliberate events

The analysis results for the extent of damage and frequency of the 32 examined scenarios are presented in a risk diagram (see Fig. 5, p. 34).

In the current analysis, the hazards *electric power supply shortage* and *influenza pandemic* pose the biggest risk. Both scenarios cause extensive damage, and it is assumed that they can occur relatively frequently compared to other scenarios.

The considerable risk posed by a pandemic is not only documented by the DES analysis but also by other national risk analyses (e.g. the United Kingdom, the Netherlands) or the risk analyses in most cantons. The COVID-19 pandemic has followed a different course to the pandemic described in the scenario. However, the DES scenario *influenza pandemic* still provides a good basis for preparedness planning, as challenges such as overburdening the healthcare system, absence from work, damage to the economy, supply shortages of medical equipment, restrictions to public transport and social life, and uncertainty among the public are already included in the scenario. These impacts occur regardless of the type of pathogen. However, the experiences made during the COVID-19 crisis suggest that the economic impact of a pandemic has been underestimated and that the risk of a pandemic needs to be reassessed as a whole. As the COVID-19 pandemic was not yet over at the time of the DES analysis and assessment, the FOCP chose not to change the scenario and reassess the risk during this round. Findings from the COVID-19 pandemic will be incorporated in the next update of the national risk analysis. However, the fact that a pandemic poses one of the biggest risks to Switzerland is not likely to change even after this update.

Hazards in the domain nature
Heat wave, earthquake, and windstorm remain the three biggest risks among the 15 natural hazards that were examined in this round. But other natural hazards pose a major risk too. These include the newly examined hazards *avalanche winter* and *hailstorm*. The majority of the natural hazard scenarios examined can cause damage amounting to tens of billions. Compared to the hazards *meteor strike* and *volcanic eruption abroad*, all other natural hazards can occur relatively frequently, resulting in comparatively high risks. Inland flooding, earthquakes, and solar storms occur much less frequently.

Hazards in the domain technology
In the domain technology, the scenarios *mobile network outage* and *petroleum supply shortage* were added to the analysis. The analysis showed that a three-day outage of the mobile network in Switzerland also poses a major risk. Nowadays, many business processes and services rely on a functioning mobile network and a communication system that is resilient to electric power supply outages. Downtime can cause significant disruption to critical supply chains and services – up to a failure of the command and operational capabilities of command and operational bodies. This can have major consequences for the population and the economy. Due to the steady progression of digitalisation, the consequences of a mobile network outage are likely to be even more severe in future.

The *petroleum supply shortage* scenario provides a good example of how effective risk reduction measures can be. This scenario assumes that imports of petroleum products (petrol, diesel, heating oil) will decrease by up to 15% over the course of several months. Such a supply shortage of petroleum products, whether it is due to low water on the Rhine, strikes at a refinery, or geopolitical

tensions, can be expected relatively frequently. This is partly due to the fact that disruptions to the supply of petroleum products from abroad have become more frequent in recent years.[7] There is also the expectation that such events could occur more often in the future, e.g. due to low water levels on the Rhine following a drought. However, the consequences of such events can be cushioned (and the risk kept low) through compulsory stockpiling and inventory management during a crisis. Without these measures, an event of this kind would have a far larger impact.

Alongside the aforementioned *electric power supply shortage*, the hazards *mobile network outage*, *electric power supply outage* and *data centre outage* have been identified as the biggest risks in the domain technology. These are also major risks in the overall context. Both the extent of damage and the frequency are high for these scenarios.

In contrast, the frequency of hazards with technological causes, such as *hazmat road accident*, *dam accident* and *NPP incident* (nuclear power plant), is estimated to be relatively low, partly due to the strict safety requirements for operating technical equipment or transporting hazardous goods.

The extent of damage for an NPP incident involving the release of significant amounts of radiation is estimated to be very high. However, the likelihood of the examined scenario occurring is considered to be very low, due to Switzerland's strict safety regulations and continuous monitoring. The *NPP incident* scenario therefore has a relatively low risk value. However, in the media and in political debate, the risk is often perceived to be much higher, because the extent of the damage and the associated consequences for our country are so severe, but probably also because of experiences of actual incidents abroad.

Hazards in the domain society

In the domain society, two other hazards are considered in addition to the influenza pandemic already described above: *animal disease outbreak* and *mass influx of people seeking protection*. For both scenarios, the frequency is high and the consequences are relatively serious:

- According to the assessments of the participating experts, the scenario *animal disease outbreak* can cause relatively significant economic damage and requires the involvement of the competent authorities from the field of veterinary medicine as well as various other organisations, such as the police, fire brigade and civil protection organisations.
- The scenario *mass influx of people seeking protection* is a special case, as it is not a hazard as such but rather an event in which Switzerland must deal with the effects (e.g. support and accommodation for people seeking protection). The scenario can also be used to plan major evacuations in Switzerland, e.g. in the event of an NPP incident or wide-scale inland flooding.

5.3 Risks for deliberate events

The results of the analysis of the extent of damage and plausibility for the 12 examined scenarios that can be caused deliberately can be presented in a diagram showing the plausibility and the aggregated extent of damage (see Fig. 6, p. 35).[8]

At first glance, terrorist attacks, unrest and cyber attacks on Switzerland are not typical civil protection issues. However, the effects of such serious events in terms of injuries and fatalities or supply shortages are still relevant to the protection of the population and their livelihoods. Such hazards are therefore included in DES.

The risk of deliberate events can be derived from the positioning of the plausibility and the aggregated extent of damage. Scenarios with a high extent of damage and a high plausibility index indicate a very high risk. However, scenarios with a very low extent of damage and a very high plausibility index, or a very high extent of damage and a low plausibility index, can still pose a significant risk.

Seven scenarios are assigned to the plausibility class ‘quite plausible’ (see Fig. 6, p. 35). It is relatively easy to realise these scenarios. However, as with all of the examined scenarios, there are currently no clear indications of specific intent by a potential perpetrator.

The scenario *biological attack with bacteria* (in this case, with pathogenic anthrax) is new to the analysis and its risk has been assessed. The damage potential for this scenario is even higher than for the *dirty bomb attack* scenario, in which the detonation of a radiological bomb is estimated to cause damage amounting to tens of billions. The extensive damage caused by an anthrax attack is due

[7] See events in the hazard file petroleum supply shortage (FOCP, 2020a).

[8] For the hazard *armed conflict*, no plausibility assessment was carried out like for the other deliberate events (see info box, p. 38); it is therefore not included in the risk diagram (Fig. 6, p. 35).

to the fact that anthrax is usually spread in letters and parcels. For supply chains, the consequences of contamination are severe. This is especially true for the distribution of letters and parcels, where the consequences are also of an economic nature. In the case of an attack with a radiological bomb, radioactive contamination causes great damage to the economy. For both scenarios, the high plausibility class and the extensive damage culminate in a relatively high risk.

The scenarios *conventional attack*, *unrest* and *attack on hazardous material rail* are also assigned to the plausibility class 'quite plausible'. The expected damage in all three scenarios amounts to less than ten billion CHF. The scenarios *biological attack with toxins* (in this case, ricin) and *attack with chemicals* (in this case, hydrocyanic acid) also fall into this plausibility class. However, the damage for these is significantly lower (less than one billion CHF). Compared to an attack with anthrax or a radiological bomb, they pose a correspondingly smaller risk.

The scenarios *attack on nuclear material transport*, *cyber attack* and *chemical weapons attack* are classified as 'somewhat plausible'. They are considerably more difficult to realise, or there are no clear signs of specific intent by a potential perpetrator. For all three scenarios, damage amounting to less than ten billion CHF is expected. The risks for these scenarios are therefore smaller than the risks for an attack with a radiological bomb or anthrax. These risks are similar in magnitude to those for scenarios with lower damage in the plausibility class 'quite plausible'.

A biological *attack with viruses* (in this case, smallpox) is classified as 'hardly plausible'. Realising such an attack is technically very complex and associated with relatively high costs. The damage that it can cause is estimated at less than ten billion CHF. The risk of this kind of attack is therefore considered to be relatively small.

5.4 Risk diagrams

Risk diagrams are an important tool for comparing the risks of different scenarios with one another. It is common practice to define risk as a measure for the hazard potential of an event using the likelihood of occurrence and the extent of damage. When interpreting the results, it should be taken into account that logarithmically scaled axes are often used to cover a wide range of values. (Fig. 5 and 6, p. 34–35)

The risk can also be calculated mathematically as an expected damage value (expected damage monetised per year) by multiplying the factors 'extent of damage' (monetised) and 'likelihood of occurrence'.

When calculating the expected damage value, the two factors 'extent of damage' and 'likelihood of occurrence' may relativize each other. However, in doing so, it cannot be seen whether the hazard scenario is a scenario with a very high extent of damage and a low likelihood of occurrence, or a scenario with a low extent of damage and a high likelihood of occurrence. Thus, when assessing the risks, it is also important to take into account the extent of damage and the frequency of the respective hazard (Table 7). In particular, the detailed impact diagrams can provide indications of capability gaps and the need for action. The impact diagrams for the different scenarios are contained in the hazard files. Six diagrams for the hazards with the biggest extent of damage are shown as examples. (Fig. 7, p. 36–37)

Table 7: Overview of the top 10 scenarios of the national risk analysis DES 2020 – broken down by risk, extent of damage, and frequency

Top 10 risk* (expected damage value**)	Top 10 extent of damage	Top 10 frequency
1 Electric power supply shortage	1 Armed conflict	1 Shipping traffic restriction
2 Influenza pandemic	2 Electric power supply shortage	2 Petroleum supply shortage
3 Mobile network outage	3 Earthquake	3 Data centre outage
4 Heat wave	4 Influenza pandemic	4 Severe weather
5 Earthquake	5 NPP incident	5 Heat wave
6 Electric power supply outage	6 Inland flooding	6 Forest fire
7 Windstorm	7 Biological attack with bacteria	7 Mobile network outage
8 Data centre outage	8 Dirty bomb attack	8 Electric power supply outage
9 People seeking protection	9 Mobile network outage	9 Electric power supply shortage
10 Drought	10 People seeking protection	10 Airplane crash

* For scenarios relating to deliberate events, an expected damage value cannot be calculated without considering further factors.

** As a measure of the risk for a scenario, the expected damage value (monetised damage per year) can be calculated as monetised damage multiplied by annuality (1 / frequency).

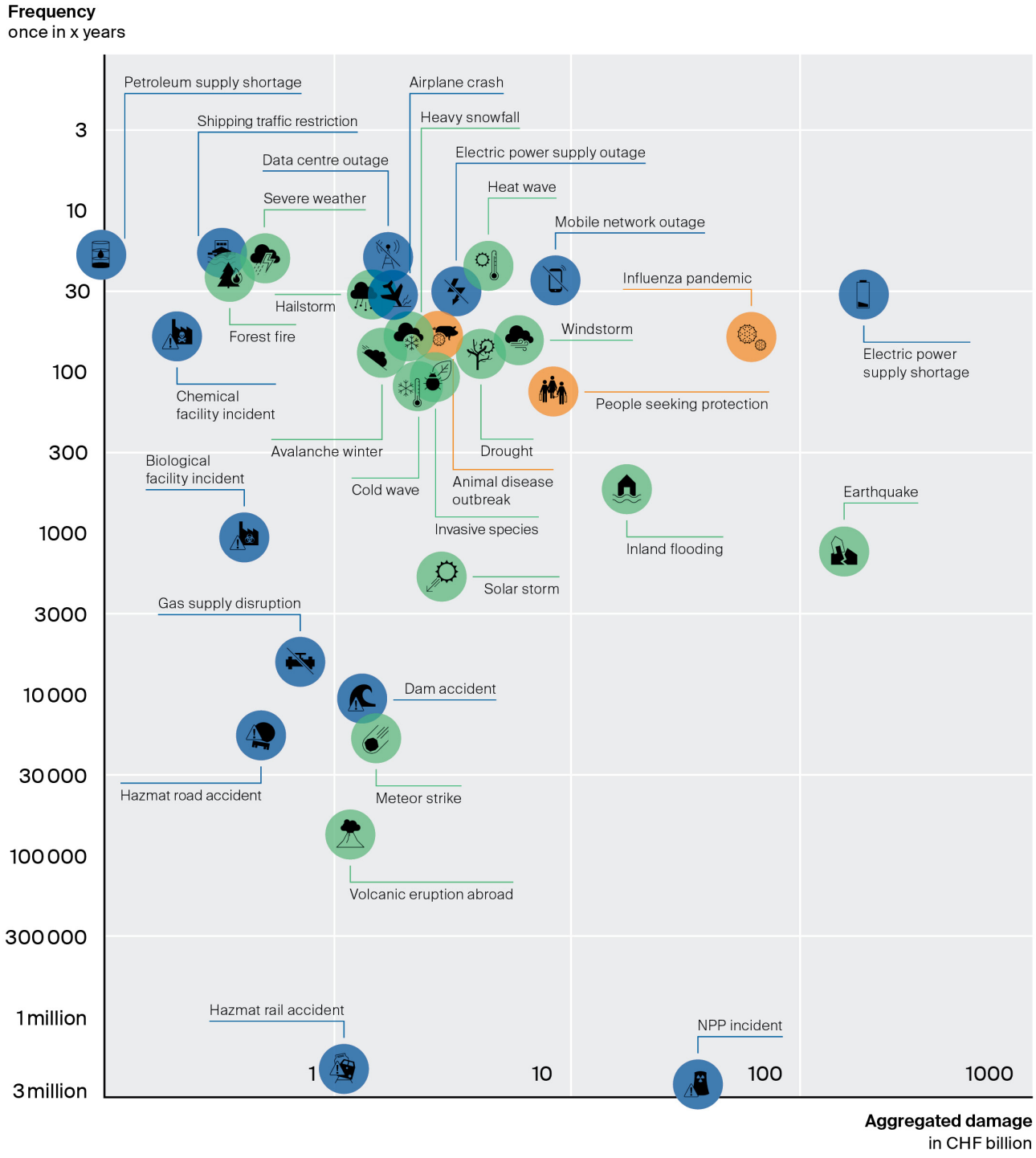


Figure 5: Risk diagram DES 2020 for non-deliberate events. The vertical axis of the diagram shows the frequency (once in x years), while the horizontal axis shows the aggregated extent of damage. The axes 'Frequency' and 'Aggregated damage in CHF billion' are logarithmically scaled, i.e. the frequency and extent of damage decreases or increases by a factor of 10 with each incremental line. The risk is calculated from the frequency of a hazard and the expected aggregated damage in the case of an event. The further towards the top right of the diagram that a risk is situated, the bigger the risk is.

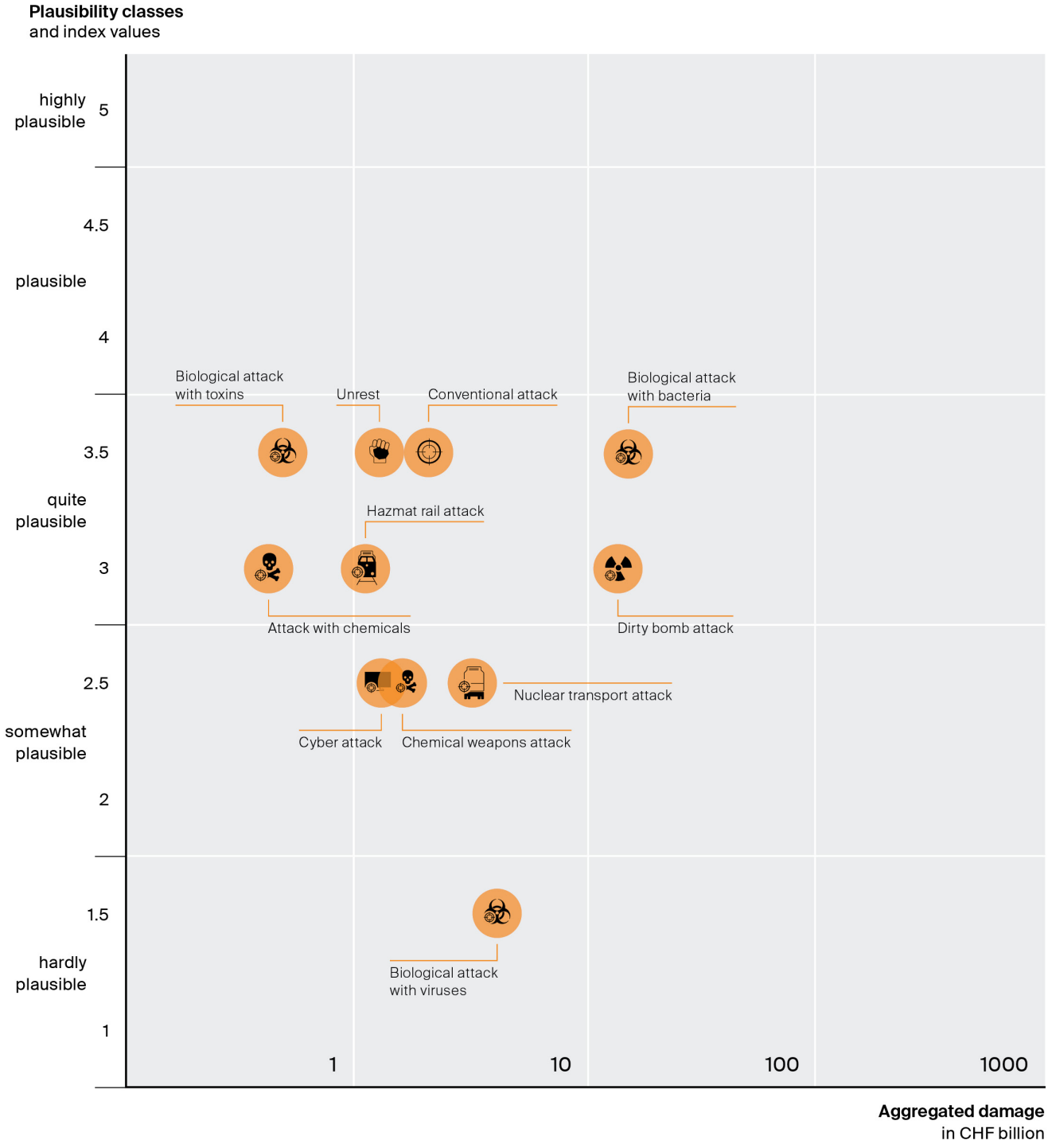
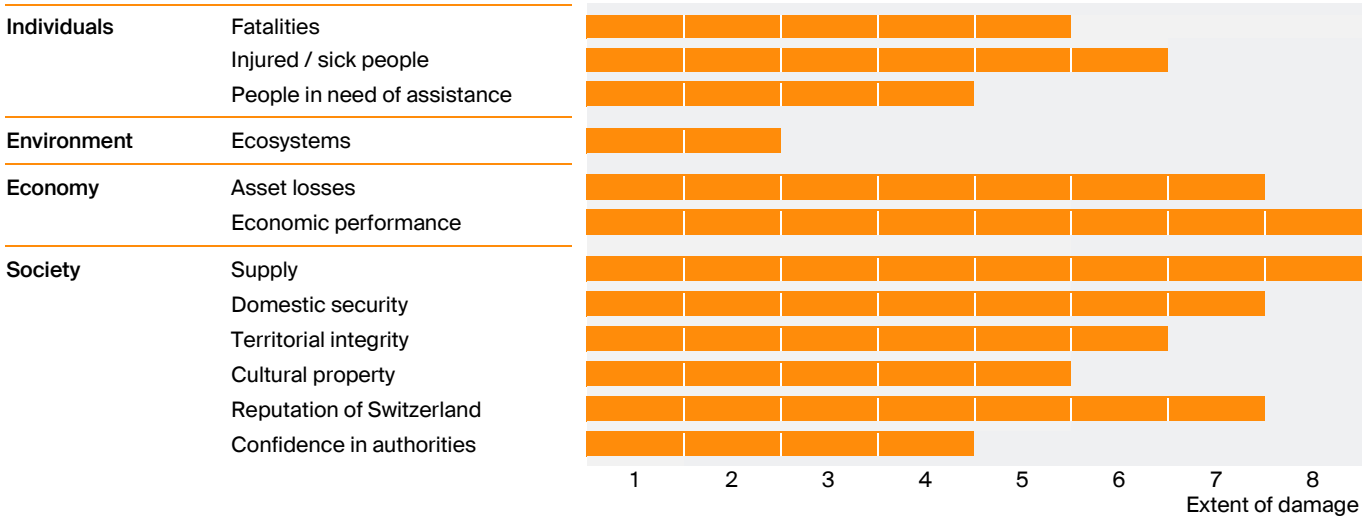
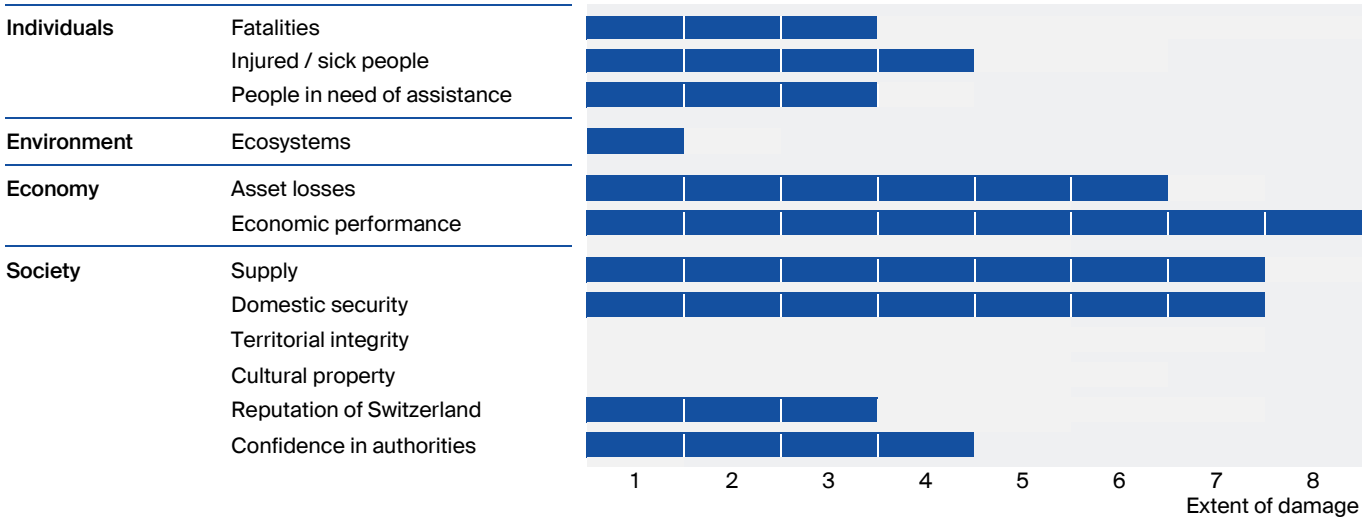


Figure 6: Risk diagram DES 2020 for deliberate events. The vertical axis of the diagram shows the results of the plausibility assessment using the newly developed method. The plausibility is divided into five classes, ranging from 'hardly plausible' to 'highly plausible'. The horizontal axis shows the aggregated extent of damage in CHF billion. This axis is logarithmically scaled, i.e. the extent of damage decreases or increases by a factor of 10 with each incremental line.

Armed conflict



Electric power supply shortage



Earthquake

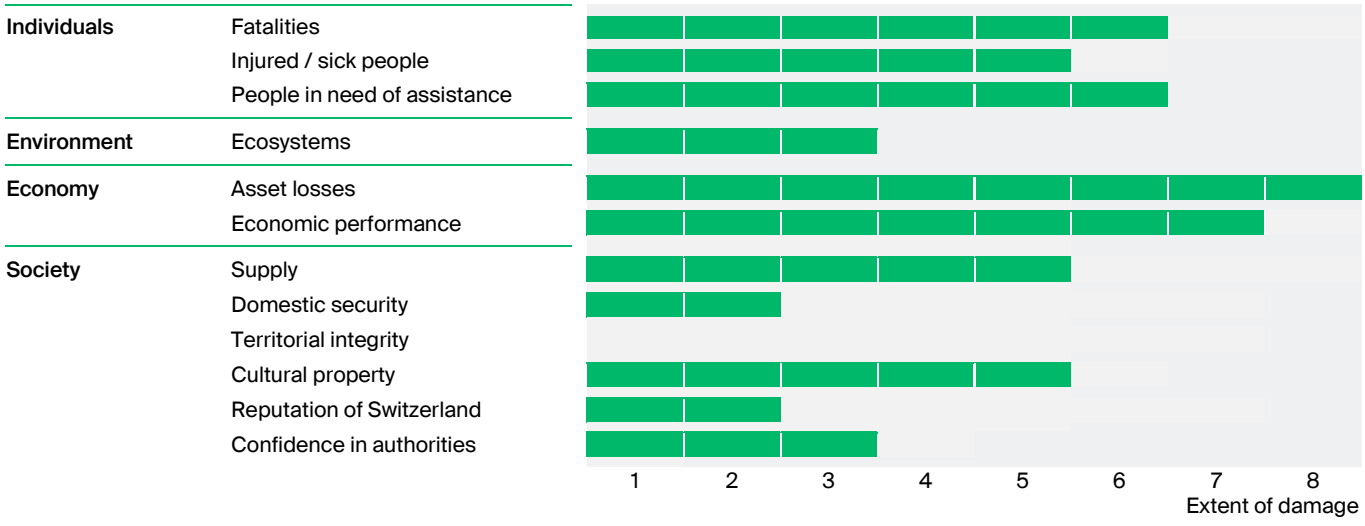
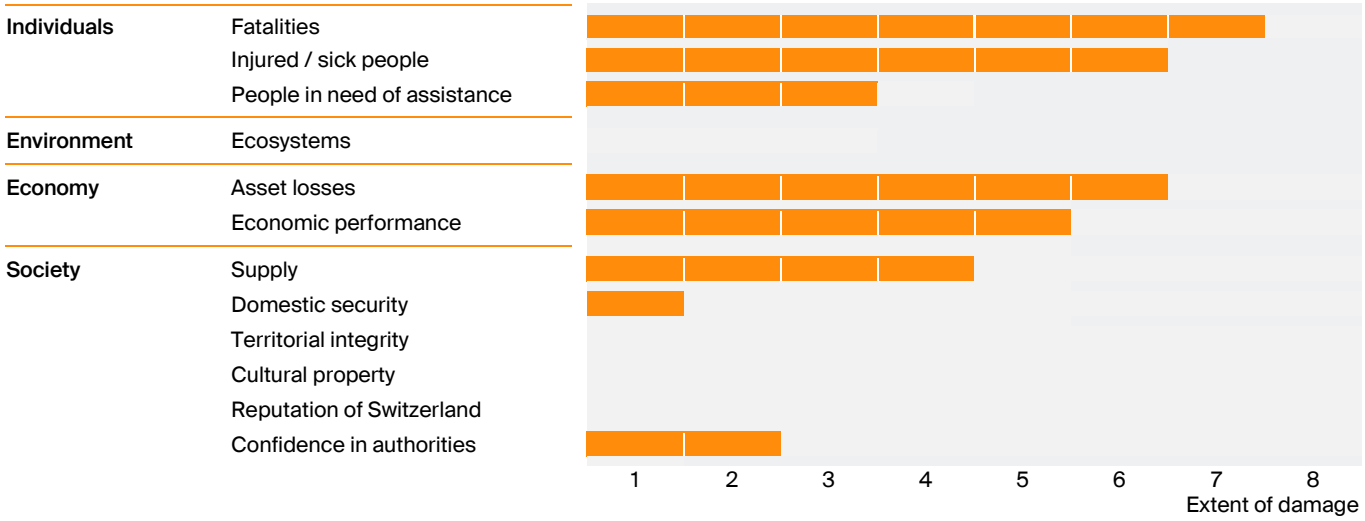
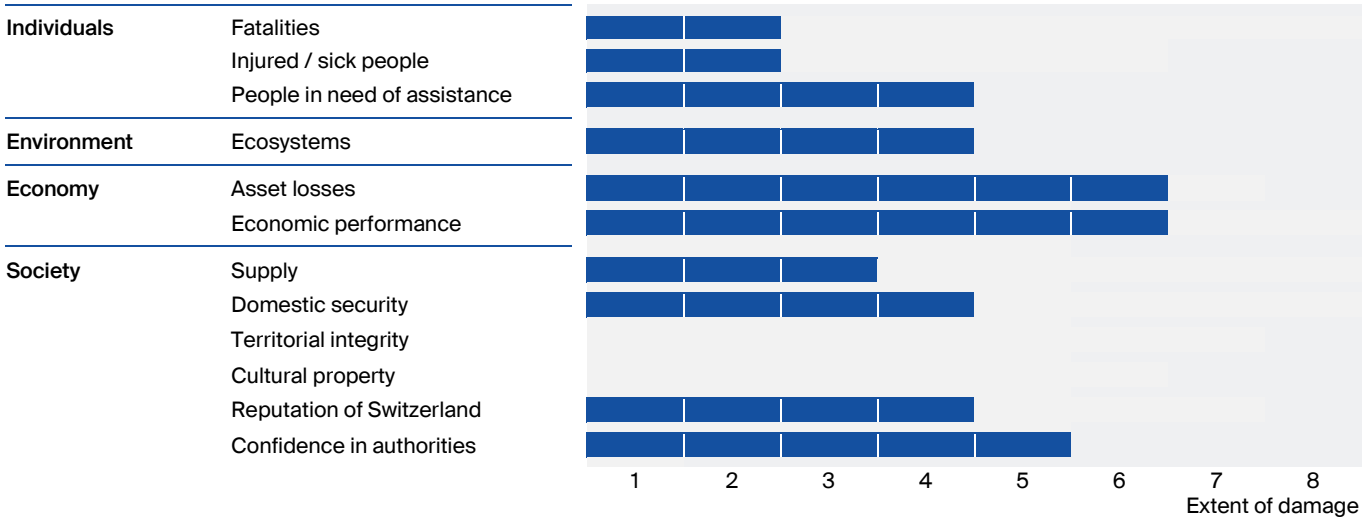


Figure 7: Impact diagrams DES 2020 – the six scenarios with the highest extent of damage

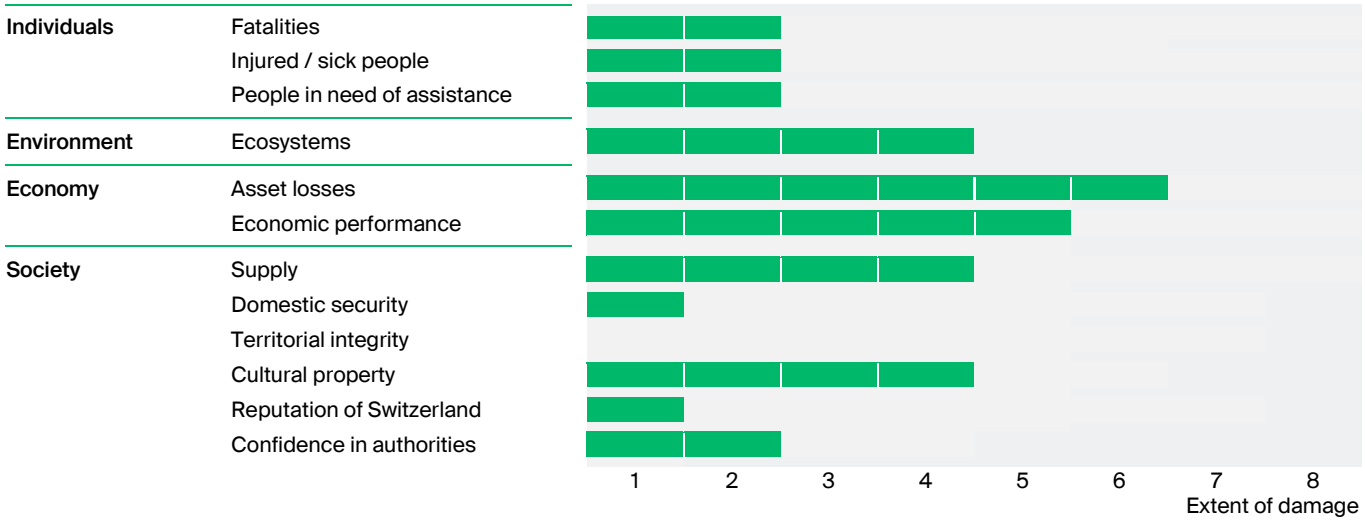
Influenza pandemic



NPP incident



Inland flooding



Armed conflict

The responsibility for dealing with the impact of an armed conflict against Switzerland does not rest solely with the armed forces. Other security policy agencies such as civil protection organisations, intelligence services, the police, and the Federal Office for National Economic Supply must also work together to ensure the best possible protection for the population and their livelihoods. Protecting the population and their livelihoods in the event of an armed conflict is just as much a civil protection task as ensuring the same in disasters and emergencies (Art. 2 CPDA).

The scenarios developed by the armed forces are not very suitable for preparedness planning in the area of civil protection or for civil-military cooperation across all affected security policy agencies, as they provide hardly any insight into how an armed conflict might affect the population and their livelihoods. In DES, the causes of the conflict and the military aspects are less important. A hazard file was therefore developed in collaboration with the armed forces. It contains a specific scenario focusing mainly on the impact on the population and their livelihoods. On the basis of this detailed scenario, the various security policy agencies can assess the associated challenges as well as their skills and requirements. It also provides a standardised basis for planning how they will cooperate in the event of an armed conflict.

The line between war and peace is becoming increasingly blurred. Modern conflicts are characterised by different forms of attack being used in concert – covertly or overtly. This is referred to as ‘hybrid’. Various other scenarios, such as cyber attacks, conventional or NBC attacks, can therefore also be part of an armed conflict.

Armed conflicts are becoming increasingly common on the periphery of Europe. In many regional conflicts in that territory, there is considerable potential for conflict to develop or escalate, as has been shown in the annual situation reports of the Federal Intelligence Service (FIS). Such conflicts could have a considerable adverse impact on Switzerland's national security. However, despite the deteriorating security situation, it is not very likely that Switzerland itself will become the direct victim of an armed attack in the coming years. Nevertheless, the consequences of a direct attack on Switzerland would be enormous.

For armed conflict scenarios, it is hardly possible to assess the plausibility with the same methodology used for other hazards: Due to new, ‘hybrid’ forms of conflict, which can consist of a combination of various other scenarios, the plausibility of this scenario is difficult to assess. At the same time, the plausibility and the impact of a direct attack on Switzerland cannot be reliably determined solely on the basis of experiences or data relating to conflicts abroad, as these cannot simply be transferred to Switzerland. As a result, the risk diagram does not show an assessment of this plausibility. However, it was possible to assess the potential impact of the analysed scenario based on the DES method, with the damage amounting to several hundred billion.

5.5 Changes compared to risk analysis 2015

5.5.1 Changes to the risks of non-deliberate events

As a whole, the risk landscape in the 2020 analysis has not changed much in comparison to the 2015 analysis. Some changes to the risks were made because of adjustments to the methodology. Some of the scenarios were changed in light of new findings about the hazards, which led to the risks being reassessed. For a small number of scenarios, new findings relating to frequency have been incorporated into the analysis.

Some of the marginal cost values for the aggregation of damage have been increased in order to better align the different damage indicator categories with one another. The scale for damage to cultural property has been redefined. These adjustments cause an increase of the aggregated extent of damage which in turn leads to slightly higher risks from an overall perspective compared to the 2015 analysis. However, these risk increases are not solely attributable to higher estimates of the extent of damage or the frequency or plausibility. They can also be partly explained by the necessary methodological adjustments that were made. However, the relative positions of the risks among one another have only changed marginally as a result of this.

In light of studies such as 'Swiss Climate Scenarios CH2018' by the National Centre for Climate Services (NCCS, 2018), which predicts that the frequency and intensity of meteorological events will increase, it may seem surprising at first glance that the risk of hazards such as heat waves, droughts or inland flooding has not increased in comparison to DES 2015. However, the consequences of climate change were already foreseeable during the last analysis cycle five years ago, and the participating experts had already taken the climatic changes into account in their risk evaluations at the time.

For the hazards *gas supply disruption* and *electric power supply shortage*, the risk evaluation changed due to adjustments being made to the scenarios and a new estimate of the frequency and extent of damage.

The risk of an electric power supply shortage has increased in comparison to 2015.[9] The scenario was adjusted as part of the update, and so the risk had to be reassessed. The Swiss Security Network Exercise 2014 (Projektorganisation SVU 14, 2015) and the national risk analysis 2015 have already highlighted the disruptive nature of an electric power supply shortage. The Federal Office for National Economic Supply (FONES) subsequently reviewed and adapted the preparedness measures. It is now assumed that a dreaded prolonged electric power supply outage can be largely avoided with the help of a multi-stage escalation plan (appeals to reduce consumption, usage restrictions and quotas for large-scale consumers). The new scenario takes into account the experiences of the Federal Office for National Economic Supply in particular. The subsequent reassessment of the impact has shown that injuries and fatalities can be reduced by a factor of 30 as a result. In contrast, the impact of an electric power supply shortage on the economy and society was estimated to be much higher than in the 2015 analysis, despite the decision not to have any cut-offs. This reassessment is based on the experiences of dealing with the COVID-19 pandemic, which was already causing major economic and social disruption in spring 2020. In addition, the frequency of such a scenario was estimated to be higher than in 2015. According to the participating experts, this was because of growing uncertainty relating to the energy transition throughout Europe. (ElCom, 2020)

Along with the risk of an electric power supply shortage, the risk of a gas supply disruption is also thought to be much higher now. During a risk analysis among high-pressure gas pipeline operators, it was found that the intensity of the previous DES scenario was too low to fall into the 'major' category.[10] The scenario was therefore adjusted on the basis of the CIP analysis, and the new assessment of its impact was adopted for DES 2020.

In the 2020 analysis, the estimated risk of a solar storm is much lower than in the 2015 analysis. The difference is down to new mathematical models (Moriña et al., 2019) for determining the likelihood that such events will occur. These new models show that a solar storm of the intensity assumed in the scenario occurs much less frequently than was previously thought. According to this model, the frequency of the scenario is ten times lower.

Another scenario for which the risk is estimated to be much lower than in DES 2015 is a *hazmat rail accident*. Additional far-reaching safety measures have been implemented in recent years for transporting chlorine by rail. Furthermore, less chlorine is transported by rail in Switzerland overall. Maximum transport speeds have also been

[9] The electric power supply shortage situation was not examined in the national risk analysis 2012 (FOCP, 2013d). At that time, an influenza pandemic posed the biggest risk.

[10] Swissgas carried out the risk analysis with the FOCP, SFOE and FONES as part of the critical infrastructure protection (CIP) programme.

lowered and new rolling stock introduced. These things have significantly reduced the likelihood of occurrence. (FOEN, 2019, FOT, 2020) These findings are also taken into account in DES 2020.

5.5.2 Changes to the risks of deliberate events

Due to the changes made to the marginal cost values, the aggregated damage amounts for the scenarios examined in the current analysis have increased overall compared to 2015. However, the positions of the assessed hazards in relation to one another have changed only slightly as a result of these adjustments. A comparison with the 2015 plausibility assessment is only possible to a limited extent, due to the methodological changes described above (see Section 4.1.1).

For the *cyber attack* scenario, however, a change can be observed that is not solely attributable to the differences in methodology. In 2015, a cyber attack was still the most plausible of all the scenarios examined. Following a reassessment of its plausibility, the scenario now has a much lower plausibility value than other scenarios. The reason for this is that the circumstances in the scenario have been assessed differently. The scenario describes a combination of different forms of attacks carried out in a targeted manner over a period of several months. The individual forms of attack in the scenario can be categorised as highly plausible. Such cyber attacks are already a regular occurrence. The difference now is that combining these forms of attack has been reassessed as highly complex and sophisticated. Carrying them out is resource-intensive. Furthermore, there are currently no clear indications of intent from a potential perpetrator. The experts have therefore classified the scenario as ‘somewhat plausible’.

6 Significance for the disaster management in Switzerland

The aim of the national risk analysis 'Disasters and Emergencies in Switzerland' (DES) is to create a comparative risk overview. It is also intended to serve as a basis for a risk dialogue. As a result, decisions can be made regarding the prioritisation of risks and associated risk reduction measures. Last but not least, DES also serves as a basis for the important task of preparedness planning in the area of civil protection.

The current update to DES includes various products that are available for disaster management in Switzerland (see also Fig. 2, p. 15):

- Hazard catalogue (already revised in 2019)
- 44 hazard files with scenarios in the domains nature, technology, and society, including damage extent diagram and risk evaluation
- Methodology report for national risk analysis – with refined method for assessing the plausibility of deliberate events, as well as better alignment of marginal costs and damage indicator scales
- Current risk report with summary of the main results of the risk analysis
- Risk brochure 'What risks is Switzerland exposed to?' for a wider public

6.1 Use of the products

The products were not only used in various activities at the federal level but also in cantonal, municipal, and other risk analyses. The various examples show the large circle of users of the products, as well as the products' importance for disaster management in Switzerland. The DES products make it possible to leverage synergies: Use of the products at the various federal levels, in the private sector and in academia leads to a general harmonisation of hazard assumptions, widespread use of a standardised methodology, coordinated risk-based planning in disaster preparation, as well as the ability to compare risks within the context of a risk dialogue. This development is essential for a system in which efficient and effective disaster management is based on good cooperation between the various organisations involved. It also helps to save time and resources.

6.1.1 Cantonal analyses

The cantons have been conducting hazard and risk analyses as a basis for their preparedness planning in the area of civil protection for several years already. With a few exceptions, they base their work on the KATAPLAN guideline, which the FOCP published in 2007 and republished in revised form in 2013. The method is similar to that used in the national risk analysis: The cantons identify relevant hazards, develop scenarios for them, and estimate the likelihood of their occurrence and the extent of damage on the basis of indicators. The analysis in the cantons serves to show the current status of preparations for the different scenarios. This can then be used to identify areas where action is required and to derive specific preparation measures.

Since the publication of DES in 2015, the cantons of Appenzell Ausserrhoden, Basel Landschaft, Jura, Lucerne, St. Gallen and Schwyz have conducted or completed such analyses. The cantons of Geneva, Vaud and Valais have updated their previous analyses. The DES products provided an important basis for this – especially the hazard catalogue and the scenarios developed for the hazard files.

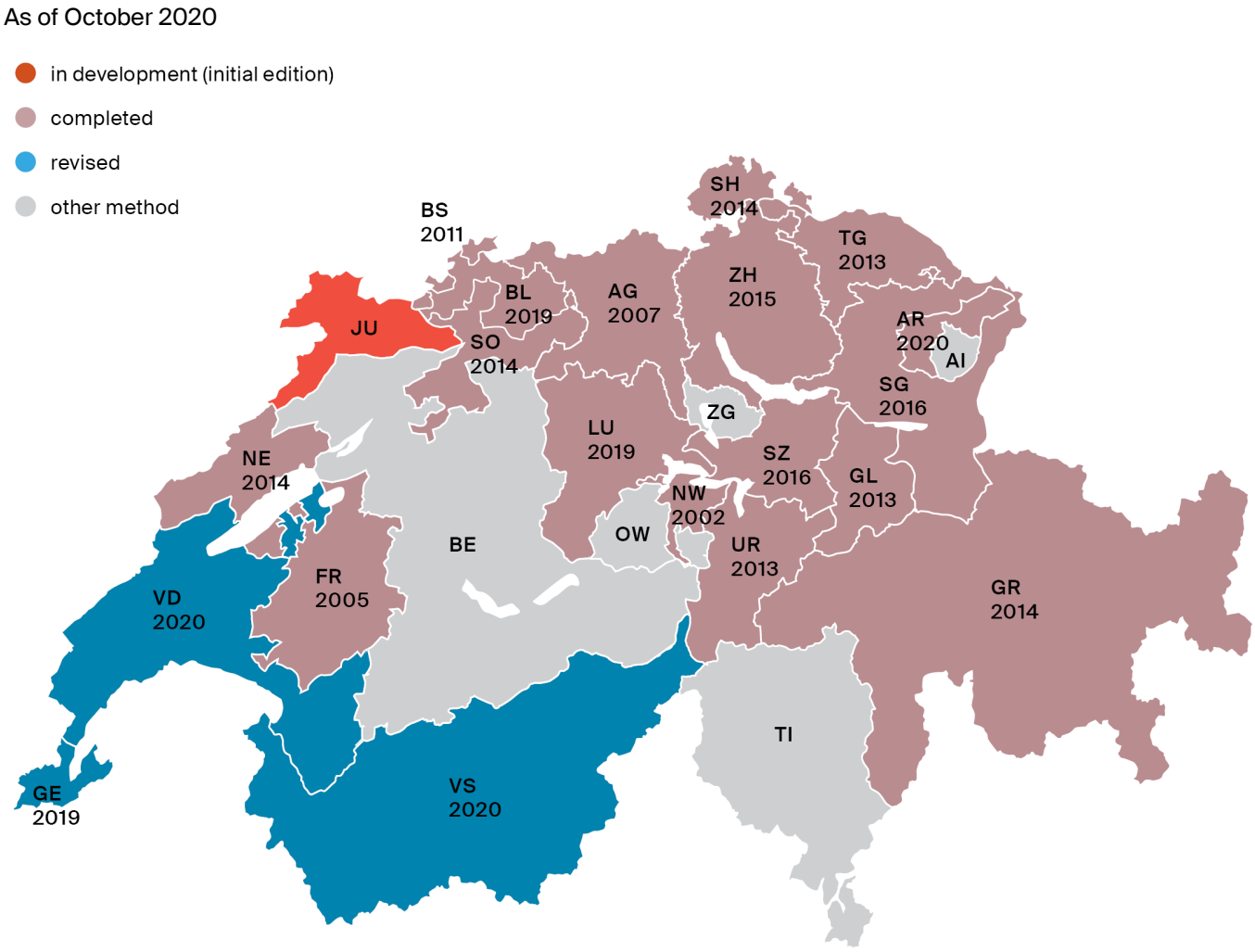


Figure 8: Overview of cantonal risk analyses according to the KATAPLAN guideline

6.1.2 Municipal analyses

Municipalities are also conducting risk analyses more and more often. Some of these are required by cantonal legislation. The work is supported by the cantonal agencies, as in the Canton of Graubünden, for example. The products of the national risk analysis are also used at this level, as can be seen in the risk analyses carried out by the cities of Zurich and Bern, for instance. But small rural municipalities such as Maur (Canton of Zurich) and Reiden (Canton of Lucerne) have also used DES products for their analyses. This trend is expected to continue in the coming years.

6.1.3 Analyses in critical infrastructure protection

As part of the critical infrastructure protection (CIP) programme and the implementation of the Federal Council's CIP strategy, DES products such as the methodology and scenarios are used to carry out risk and vulnerability analyses in critical sectors and sub-sectors. For example, the FOCP has implemented critical infrastructure protection guidelines (FOCP, 2018) in the gas supply sector in collaboration with Swissgas and other high-pressure gas pipeline operators, the Swiss Federal Office of Energy (SFOE) and the Federal Office for National Economic Supply (FONES). DES products (particularly the method and scenarios in the hazard files) were used to identify and assess the risks associated with a gas supply failure. This made it possible to incorporate the results and findings from the gas sector analysis into the risk evaluation at the national level and improve its analysis results.

Another example is the ordinance on the coordination of transport in the event of disasters and emergencies (CTIO). Since the last revision of the ordinance in 2016, the competent management body no longer conducts its own

risk analyses. Instead, it relies on the findings of DES to identify the hazards that may have national or international implications for transport infrastructure, means of transport and traffic flows.

6.1.4 Analyses of cyber risks

While implementing the national strategy to protect Switzerland against cyber risks, the FOCP worked with the responsible authorities, associations and critical infrastructure operators to identify relevant risks and vulnerabilities relating to cyber risks in various critical sub-sectors. Based on that, they co-developed proposals for potential measures to improve the resilience of affected critical infrastructures. DES products (methodology report and scenarios) were also used for these analyses in the sub-sectors

6.1.5 Analyses for the further development of telematics systems in civil protection

DES products (e.g. hazard catalogue and hazard files) were also used to analyse and prioritise possible telematics systems that might be needed in the future for communications between civil authorities, management bodies and emergency services. Among other things, the findings from the analysis have shown that a failure of the existing wired broadband communications represents a substantial security deficiency, which would impede the work of management bodies and make it more difficult for AORS[11] to deal with an event. To correct this deficiency, the Federal Parliament approved a guarantee credit for the creation of the Secure Data Network System (SDNS) in 2019.

6.1.6 Analyses on the Federal Civil Protection Crisis Management Board

The Federal Civil Protection Crisis Management Board (CCMB) uses the hazard files and the scenarios for the preparedness planning of possible operations. Based on the scenarios, the CCMB develops so-called start strategies that summarise potential measures for a specific damaging event and clarify the responsibilities at the federal level. In the event of an incident, the CCMB can thus draw on comprehensive documentation to carry out its work more effectively.

6.1.7 Scenarios as a basis for training concepts

On behalf of the Coordinated Medical Services (CMS), the Bern University of Applied Sciences (BFH) has created a training concept to develop incident management skills across the medical services. To this end, it relied on insights from the hazard files and identified three typical basic patterns for the stress triggers and duration of an event. Based on the impact diagrams, initial modules were developed in the competence areas of management, emergency provisions, law, resources, and communication to train experts for specific hazards and related hazards.

6.2 Expertise and network

DES has not only produced numerous products – it has also created a large pool of experts and knowledge. The national risk analysis and its network, which includes numerous organisations in the areas of security policy and disaster management, has established itself as an important interface. For instance:

- The FOCP participated in the risk analyses of the cantons of Appenzell Ausserrhoden, Jura, Lucerne, St. Gallen and Vaud in working groups, as well as ensuring that the cantonal work was coordinated with the federal level.
- In recent years, the Swiss Expert Committee for Biosafety (SECB) has subjected seven different biological hazards that reflect the entire range of the Commission's work (e.g. antibiotic resistance, GM plant breeding methods) to a risk assessment along the lines of the national risk analysis, drawing on the FOCP's expertise in this process.
- In an international context, DES was highlighted as a best practice example in the UN guidelines on national disaster risk assessment. (UNDRR, 2017)
- The FOCP has formed the Disaster Risk Reduction Consultative Group along with the Swiss Agency for Development and Cooperation (SDC) and the Federal Office for the Environment (FOEN). This group coordinates the Swiss implementation of the UN's Sendai Framework for Disaster Risk Reduction (SFDRR). Within this context, Switzerland was able to contribute its expertise from the national risk analysis towards the development of a globally valid indicator system for monitoring progress made in the area of risk reduction. The FOCP carries out this monitoring at the national level with the help of a damage database.
- The FOCP participates in the annual meetings of the High Level Risk Forum of the Organisation for Economic Co-operation and Development (OECD) and is also represented on the associated steering committee. At the same time, it regularly shares its

[11] AORS: Authorities and Organisations for Rescue and Security

experiences of risk analysis methods with the other member states. Switzerland's expertise has also been incorporated into the products of the High Level Risk Forum in various ways.

6.3 Risk dialogue

The risk dialogue between all actors provides an essential basis for an integrated assessment of relevant risks, for prioritisation and decision-making with regard to the risk reduction measures to be taken, as well as for associated controlling. Engaging in such a dialogue increases general awareness of risks and improves knowledge about hazards and their impacts. It makes the public and businesses aware of how they too can share the responsibility for risk reduction. Dialogue and cooperation between public authorities, the private sector, and academia improves the skills needed to deal with certain hazards. Networking between the various actors is also established and improved. For the experts involved in the management of different events, the exchange with other experts during the analysis process for certain hazards is very valuable, as it benefits planning and implementation of necessary risk mitigation measures.

Risk analyses are a part of integrated risk management in civil protection. Like all other risk analyses, DES shows what could potentially happen, as well as how often a certain event can be expected or how plausible, respectively, it is. This information can be further analysed and then used as a basis for taking measures aimed at preventing events as much as possible, minimising damage or being better prepared to deal with incidents.

For economic, ecological and societal reasons, implementing every conceivable measure is neither appropriate nor possible. It is therefore sensible and necessary to discuss exactly which disasters and emergencies Switzerland wants to prepare for and to what extent, and which risks it is willing to accept. This dialogue process can be accompanied by experts but, ultimately, decisions have to be made at the political level. The national risk analysis provides a sound basis for discussing and determining the scope of preparations and their proportionality.

The risk dialogue between public authorities, the private sector, academia, and the population must be further encouraged in order to use the available resources sustainably and eliminate any shortcomings in the area of disaster preparedness. The risk dialogue in general, but also within strategic bodies (e.g. National Platform for Natural Hazards; PLANAT), in the Federal Commission for NBC Protection (ComNBC), and in specialist committees (e.g. Steering Committee Intervention Natural Hazards), or on the Federal Civil Protection Crisis Management Board, should be continued and intensified.

6.4 Integrated preparedness planning

At present, there is no systematic and interdisciplinary national overview of the measures implemented to date and the plans for further risk reduction measures. In many places, this also applies for appropriate controlling of the effectiveness of measures that have already been decided or implemented.

However, the various risk analyses in the area of civil protection in Switzerland are an essential prerequisite for successful, integrated risk management. They form the basis for preparedness planning and preparations for dealing with disasters and emergencies. Preparedness planning creates the necessary conditions to be able to respond as quickly and efficiently as possible to events, as well as for improving the resilience of society and critical infrastructure. Implementing specific measures developed within the context of preparedness planning can take many years. Furthermore, preparedness planning must be periodically reviewed and adapted to changing conditions.

Numerous measures have already been taken to reduce the risks analysed in DES. For example:

- In relation to earthquakes, the Federal Council has updated the programme of measures for the years 2017 to 2020. The main focus areas include quality assurance in earthquake-resistant construction, the creation of a national earthquake risk model, and the further optimisation of preparedness planning, including building assessments. Another programme of measures for 2021 to 2024 is currently being developed and will place greater emphasis on cooperation between the federal government and the cantons.
- The Swiss Federal Office of Energy (SFOE), along with the FOCP and other organisations, has revised the emergency response concept for NPP accidents. The updated version formed the basis for subsequent legal amendments.
- In collaboration with the Swiss Tropical and Public Health Institute (SwissTPH), the Federal Office of Public Health (FOPH) has developed a toolbox to help relevant actors implement measures for coping with heat waves.

- With the support of the FOCP, the first cantons (Aargau, Nidwalden and Solothurn) and the city of Zug have set up municipal emergency meeting points where the public can get help and information, such as in the event of an electric power supply outage. Other cantons are also planning to introduce such meeting points.
- The implementation of risk reduction measures is promoted by programmes such as the one for the protection of critical infrastructure (CIP) or the strategy to protect Switzerland against cyber risks.

The COVID-19 pandemic has shown that a pandemic is not problematic for the health sector alone and cannot be tackled by the actors in this field on their own. A pandemic has a far-reaching impact on the economy, supply, education, culture, sport, and, ultimately, on society as a whole.

The experience of the COVID-19 crisis also shows that integrated risk management calls for integrated preparedness planning. But other risks such as electric power supply shortages, earthquakes, and animal disease outbreaks also have far-reaching consequences in various areas. The preparations for dealing with these events must therefore not only involve the actors whose direct responsibility it is, but also those that can make an important contribution to handling the related consequences.

7 Outlook and next steps

The year 2020 has been characterized by the COVID-19 pandemic, which has caused great uncertainty and immense damage around the world. The pandemic has shown just how vulnerable Switzerland is, despite having well established healthcare and civil protection systems. It has also shown that Switzerland can be hit hard despite its strong economy. At the same time, COVID-19 has repeatedly tested our ability and our will to cooperate and reach a consensus. Our experiences gained during this pandemic will ensure that we are better prepared for the next one. However, we also need to be ready for other possible disasters and emergencies that could have similar consequences to those of the COVID-19 pandemic. These can occur just as suddenly and last for just as long.

The national risk analysis 'Disasters and Emergencies in Switzerland' (DES) shows in a transparent and comparative way which other risks our country is exposed to and where additional preparedness measures should be discussed and taken in order to reduce the biggest risks to an acceptable level.

The internationally recognised 'all-hazards approach', which DES also takes, shows that other hazards are also relevant to Switzerland, such as earthquakes, electric power supply outages, and terrorist attacks. DES provides broad insights into the hazards that should be addressed by policymakers, civil protection organisations, and emergency services, but also by the general population.

However, DES 2020 only represents a snapshot of the situation. Switzerland's hazard situation will continue to change, and so too will the relevant risks. For example:

— Digitalisation will continue to advance and will become even more complex due to the use of artificial intelligence. Society's dependence on digital services and secure communications will keep growing. At the same time, the digitalisation and interconnectivity (Internet of Things) of critical infrastructure will also increase. This makes the potential consequences even more severe should any of this critical infrastructure fail.

— The Swiss population is becoming increasingly mobile. The distance between home and workplace has grown continually in recent years. The flow of goods has also increased steadily. The COVID-19 pandemic, in particular, has shown just how essential it is to have well-functioning supply chains. But they are also vulnerable to other damaging events, such as the effects of drought on shipping or the consequences of an electric power supply outage on all areas of infrastructure and society as a whole.

— Climate change presents new challenges for civil protection and disaster preparedness as well. It is thought that the frequency and intensity of disasters and extreme events will increase in the coming decades as a result of climate change. Heat waves such as those in 2003, 2015 and 2018 are likely to become more common, as are droughts and heavy precipitation. In conjunction with cantons and municipalities, the FOCP is supporting a project to conduct further research into those challenges posed by climate change that are relevant to civil protection. This will make it possible to determine the required action more accurately.

— There is a continuing trend towards urbanisation and thus towards the concentration of physical assets. This means damaging events can cause more serious consequences for people and infrastructure. Due to the intensity of events, it will become more difficult in future to prevent damage through preventative measures alone. It is becoming increasingly important to take a comprehensive resilience approach, especially at the municipal level.

— The threat situation has not fundamentally changed in recent years, but the change to the geopolitical landscape is undeniable. The international situation has become more unstable, and the hazards more diverse and complex. Armed conflicts have also become more plausible on the periphery of Europe. Terrorism, even by unconventional means, remains a threat. Newer hazards such as cyber attacks have also come along and now represent a real threat – one that is expected to intensify as a result of digitalisation and the rise of artificial intelligence.

The impact of these trends on the risk situation differs for each hazard. Overall, however, it can be assumed that the majority of the examined risks will increase in the medium term. Risk-based and integrated preparedness planning is therefore more important than ever. Thus, there remains a need to analyse the risk situation for Switzerland in a sophisticated manner, to update it periodically, and to conduct a continuous risk dialogue.

Figure 9: Expected influence of trends on risk development. For nine hazards, the graph shows how much influence the trends of climate change, mobility, digitalisation, geopolitical change and urbanisation are considered to have on risk development. (assessment by FOCP, 2020c)

In summary, the following can be said about DES 2020: A number of relevant hazards have been added or have changed in comparison to the risk landscape in 2015. It can be assumed that this trend will continue – although it is not yet possible to predict where changes will occur. The FOCP will therefore keep working on DES as an ongoing process.

The next update of the risk analysis is planned for 2025, with the objective to reassess the various products and develop them further. With DES, the FOCP continues to pursue the goal of offering systematically derived products that are useful in practice (e.g. the hazard catalogue), in order to further promote a risk dialogue and improve civil protection in Switzerland – and thus the level of safety and security in Switzerland as a whole.

With the consolidation workshop for deliberate events (e.g. terrorist attacks, cyber attacks, unrest), the FOCP has introduced a new methodological element. This workshop has proved to be a useful tool for validating and consolidating risk values from the hazard-specific workshops. In light of this, there is a need to verify whether this procedure should also be applied to non-deliberate events in future. This will make it possible to strengthen the risk dialogue even further and make the results even more broad-based.

In countries with a federal structure and in a compound task such as civil protection, not everything can be standardised and prescribed from a federal perspective. However, the cooperative approach of DES has proved its worth and has helped to ensure that a wide range of actors have been involved in the creation and use of DES products. This is also reflected in its international recognition and its widespread use at all levels of government, as well as in the private sector. With DES, the FOCP is prepared to continue making an important contribution to preparedness planning in the area of civil protection and thus to the safety and security of Switzerland.

Annex

A1 Bibliography

Bundesgesetz über den Bevölkerungsschutz und den Zivilschutz (Bevölkerungs- und Zivilschutzgesetz, BZG) vom 20. Dezember 2019; SR 520.1.

Cabinet Office (2017): National Risk Register of Civil Emergencies. Cabinet Office, London.

Ecoplan (2016): Empfehlungen zur Festlegung der Zahlungsbereitschaft für die Verminderung des Unfall- und Gesundheitsrisikos (value of statistical life). Ecoplan, Bern.

European Commission (2010): Risk Assessment and Mapping. Guidelines for Disaster Management (No. SEC (2010) 1626 final).

Federal Council (2017): Nationale Strategie zum Schutz kritischer Infrastrukturen 2018–2022 vom 8. Dezember 2017 (BBl 2018 503). Federal Council. Bern.

Federal Electricity Commission (ElCom) (2020): Stromversorgungssicherheit der Schweiz 2020. ElCom, FOCP.

Federal Office for Civil Defence (FOCD) (1995): KATANOS – Katastrophen und Notlagen in der Schweiz. Eine vergleichende Übersicht. FOCD, Bern.

Federal Office for Civil Protection (FOCP) (2020a): Gefährdungsdossiers. Katastrophen und Notlagen Schweiz 2020. FOCP, Bern. Available online at: www.risk-ch.ch in German, French and Italian.

Federal Office for Civil Protection (FOCP) (2020b): National risk analysis methodology. Disasters and Emergencies in Switzerland 2020. Version 2.0. FOCP, Bern.

Federal Office for Civil Protection (FOCP) (2020c): What risks is Switzerland exposed to? Disasters and Emergencies in Switzerland 2020. FOCP, Bern.

Federal Office for Civil Protection (FOCP) (2019): Katalog der Gefährdungen. Katastrophen und Notlagen Schweiz. 2nd edition. FOCP, Bern.

Federal Office for Civil Protection (FOCP) (2018): Leitfaden Schutz kritischer Infrastrukturen. FOCP, Bern.

Federal Office for Civil Protection (FOCP) (2015a): Notfallschutzkonzept bei einem KKW-Unfall in der Schweiz. FOCP, Bern.

Federal Office for Civil Protection (FOCP) (2015b): Technischer Risikobericht 2015. Katastrophen und Notlagen Schweiz. FOCP, Bern.

Federal Office for Civil Protection (FOCP) (2015c): What risks does Switzerland face? Disasters and Emergencies in Switzerland 2015. FOCP, Bern.

Federal Office for Civil Protection (FOCP) (2014): Integrated risk management: significance for the protection of the population and their livelihoods. FOCP, Bern.

Federal Office for Civil Protection (FOCP) (2013a): Katalog möglicher Gefährdungen. Grundlage für Gefährdungsanalysen. 1st edition. FOCP, Bern.

Federal Office for Civil Protection (FOCP) (2013b): Leitfaden KATAPLAN. Kantonale Gefährdungsanalyse und Vorsorge. FOCP, Bern.

Federal Office for Civil Protection (FOCP) (2013c): Methode zur Risikoanalyse von Katastrophen und Notlagen für die Schweiz. Version 1.03. FOCP, Bern.

Federal Office for Civil Protection (FOCP) (2013d): Risk Report 2012. Disasters and Emergencies in Switzerland. FOCP, Bern.

Federal Office for Civil Protection (FOCP) (2003): KATARISK – Katastrophen und Notlagen in der Schweiz. Eine Risikobeurteilung aus der Sicht des Bevölkerungsschutzes. FOCP, Bern.

Federal Office for the Environment (FOEN) (2019): Gemeinsame Erklärung II. Standbericht Phase I und Roadmap Phase II. FOEN, Bern.

Federal Office of Transport (FOT) (2020): Risiken für die Bevölkerung und die Umwelt beim Transport gefährlicher Güter auf der Bahn. Aktualisierte netzweite Abschätzung der Risiken 2018. FOT, Bern.

Hauri, Andrin / Kohler, Kevin et al. (2020): Trend Analysis Civil Protection 2030. Uncertainties, Challenges and Opportunities. Center for Security Studies (CSS), ETH Zurich.

ISO 31000:2018 (2018) Risk Management – Guidelines.

Moriña, David / Serra, Isabel et al. (2019): Probability Estimation of a Carrington-like Geomagnetic Storm. Scientific Reports 9, 2393 (2019). Nature.

National Centre for Climate Services (NCCS) (2018): CH2018 – Climate Scenarios for Switzerland. Technical Report. NCCS, Zurich.

Organisation for Economic Co-operation and Development (OECD) (2014): Recommendation of the Council on the Governance of Critical Risks. OECD, Paris.

Projektorganisation SVU 14 (Hrsg.) (2015): Schlussbericht SVU 14. Sicherheitsverbundsübung 2014 (SVU 14). Projektorganisation SVU 14, Bern.

Roth, Florian / Herzog, Michel et al. (2014): Civil Protection Trend Analysis in 2025. Opportunities and challenges in the areas of environment, technology & society. Center for Security Studies (CSS), ETH Zurich.

Shepherd, Theodore G. (2016): A Common Framework for Approaches to Extreme Event Attribution. Current Climate Change Reports 2.

Shepherd, Theodore G. / Boyd, Emily et al. (2018): Storylines: An Alternative Approach to Representing Uncertainty in Physical Aspects of Climate Change. Climate Change 151.

Spada, Matteo / Burgherr, Peter / Hohl, Markus (2018): Toward the Validation of a National Risk Assessment against Historical Observations Using a Bayesian Approach: Application to the Swiss Case. Journal of Risk Research. Volume 22, 2019 – Issue 11.

Swiss Re (2020): Swiss Re SONAR – New Emerging Risk Insights. Swiss Re Institute, Zurich.

United Nations Office for Disaster Risk Reduction (UNDRR) (2019): Global Assessment Report on Disaster Risk Reduction. UNDRR, Geneva.

United Nations Office for Disaster Risk Reduction (UNDRR) (2017): Words into Action Guidelines. National Disaster Risk Assessment. UNDRR, Geneva.

Verordnung über den Bundesstab Bevölkerungsschutz (VBSTB) vom 2. März 2018; SR 520.17.

Verordnung über die Koordination des Verkehrswesens im Hinblick auf Ereignisfälle (VKOVE) vom 18. Mai 2016; SR 520.16.

World Economic Forum (WEF) (2020): The Global Risks Report. 15th edition. WEF, Geneva.

A2 List of abbreviations

AORS	Authorities and Organisations for Rescue and Security
ARE	Federal Office for Spatial Development
CCMB	Federal Civil Protection Crisis Management Board
CI	Critical infrastructure
CIP	Critical infrastructure protection
CMS	Coordinated Medical Service
ComNBC	Federal Commission for NBC Protection
CPDA	Civil Protection and Civil Defence Act
DES	Disasters and Emergencies in Switzerland
ElCom	Federal Electricity Commission
EU	European Union
fedpol	Federal Office of Police
FIS	Federal Intelligence Service
FOCP	Federal Office for Civil Protection
FOEN	Federal Office for the Environment
FONES	Federal Office for National Economic Supply
IRM	Integrated risk management
KATANOS	Disasters and Emergencies in Switzerland. A comparative overview.
KATAPLAN	KATAPLAN guideline. Cantonal hazard scenario analysis and emergency preparation.
KATARISK	Disasters and Emergencies in Switzerland. A Risk Assessment from a Civil Protection Perspective.
NBC	Nuclear, biological, chemical
NCCS	National Centre for Climate Services
OECD	Organisation for Economic Co-operation and Development
PLANAT	National Platform for Natural Hazards
SDC	Swiss Agency for Development and Cooperation
SDNS	Secure Data Network System
SECB	Swiss Expert Committee for Biosafety
SFOE	Swiss Federal Office of Energy
SwissTPH	Swiss Tropical and Public Health Institute
UN	United Nations

A3 Participating institutions

Public sector

Cantonal Laboratory, Canton of Bern

Cantonal Police, Canton of Basel City

Department for Forests and Natural Hazards, Canton of Graubünden

Department of Military and Civil Protection, Canton of Aargau

Federal Chancellery (FCh)

Federal Department of Foreign Affairs (FDFA)

Federal Electricity Commission (ElCom)

Federal Food Safety and Veterinary Office (FSVO)

Federal Intelligence Service (FIS)

Federal Office for Agriculture (FOAG)

Federal Office for Civil Protection (FOCP)

Federal Office for National Economic Supply (FONES)

Federal Office of Civil Aviation (FOCA)

Federal Office of Communications (OFCOM)

Federal Office of Meteorology and Climatology (MeteoSwiss)

Federal Office of Police (fedpol)

Federal Office of Public Health (FOPH)

Federal Office of the Environment (FOEN)

Federal Office of Transport (FOT)

General Secretariat DDPS

Military Intelligence Service (MIS)

Office cantonal de la protection de la population et des affaires militaires, Canton of Geneva

Office for Military Affairs and Civil Defence, Canton of Graubünden

Reporting and Analysis Centre for Information Assurance (MELANI)

Service de la sécurité civile et militaire, Canton of Vaud

State Secretariat for Migration (SEM)

Swiss Armed Forces

Swiss Expert Committee for Biosafety (SECB)

Swiss Federal Nuclear Safety Inspectorate (ENSI)

Swiss Federal Office of Energy (SFOE)

Swiss Security Network (SSN)

University Hospital Zurich

Zurich Cantonal Police

Zurich City Police

Zurich Emergency & Rescue Services

Zurich Forensic Science Institute

Private sector

Allianz Suisse AG

BKW

Carbura

CSS Insurance AG

EBP Schweiz AG

Erdgas Ostschweiz AG

Federation of Migros Cooperatives

Follini Partners

Gebäudeversicherung Basel-Stadt

Gebäudeversicherung Kanton Graubünden

Industrielle Werke Basel IWB

Mobiliar

OSTRAL (organisation for electricity supply in extraordinary situations)

Rhaetian Railway RhB

SBB

Schweizer Hagel

SIX

SWICA

Swiss Contractors' Association

Swiss International Air Lines

Swiss Post

Swiss Re Ltd

Swisscom

Swissgrid AG

Zurich Insurance Company Ltd

Academia

Avenir Suisse

Bern University of Applied Sciences (BFH)

Center for Security Studies (CSS, ETH Zurich)

ETH Zurich

Geneva Centre for Security Policy

Institute for Snow and Avalanche Research (SLF)

Swiss Federal Institute for Forest, Snow and Landscape Research (WSL)

SWITCH

University of Bern

A4 Index of tables

A5 Index of figures

A6 Scales of damage indicators

Table 8: Damage indicators and damage extent classes with descriptions

Damage area	Indicator		Unit	A 1	A 2	A 3
Individuals	I1	Fatalities	Number	≤ 10	11 – 30	31 – 100
	I2	Injured / sick people	Number	≤ 100	> 100 – 300	> 300 – 1000
	I3	People in need of assistance	Person days	≤ 200 000	> 200 000 – 600 000	> 600 000 – 2 million
Environment	En1	Damaged ecosystems	km^2 x year	≤ 150	> 150 – 450	> 450 – 1500
Economy	Ec1	Asset losses and cost of coping	CHF	≤ 50 million	> 50 – 150 million	> 150 – 500 million
	Ec2	Reduction of economic performance	CHF	≤ 50 million	> 50 – 150 million	> 150 – 500 million
Society	S1	Supply shortfalls and disruptions	Person days	≤ 100 000	> 100 000 – 300 000	> 300 000 – 1 million
	S2	Diminished public order and domestic security	Person days	≤ 100 000	> 100 000 – 300 000	> 300 000 – 1 million
	S3	Impairment of territorial integrity	Qualitative by intensity and duration	–	–	–
	S4	Damage to and loss of cultural property	Qualitative by significance and number	Damage to or loss of individual cultural property of local significance	Damage to or loss of several cultural property of local significance or individual cultural property of regional significance	Damage to or loss of several cultural property of regional significance or individual cultural property of national significance
	S5	Damage to the reputation of Switzerland	Qualitative by significance and duration	Damage to reputation lasting only a few days and related to issues of medium importance (e.g. negative coverage in foreign media)	Damage to reputation lasting from one up to a few weeks and related to issues of medium importance (e.g. negative coverage in foreign media)	Damage to reputation lasting from one up to a few weeks and related to important issues (e.g. negative coverage in foreign media)
	S6	Loss of confidence in state/institutions	Qualitative by significance and duration	Impairment of confidence lasting only a few days and related to issues of medium significance (e.g. very critical coverage in Swiss media)	Damage to confidence lasting for one up to a few weeks and related to issues of medium significance (e.g. very critical coverage in Swiss media; occasional demonstrations)	Damage to confidence lasting for one up to a few weeks and related to significant issues (e.g. extremely critical coverage in Swiss media; occasional demonstrations)

	A 4	A 5	A 6	A 7	A 8
I1	> 100 – 300	> 300 – 1000	> 1000 – 3000	> 3000 – 10 000	> 10 000
I2	> 1000 – 3000	> 3000 – 10 000	> 10 000 – 30 000	> 30 000 – 100 000	> 100 000
I3	> 2 – 6 million	> 6 – 20 million	> 20 – 60 million	> 60 – 200 million	> 200 million
En1	> 1500 – 4500	> 4500 – 15 000	> 15 000 – 45 000	> 45 000 – 150 000	> 150 000
Ec1	> 0.5 – 1.5 billion	> 1.5 – 5 billion	> 5 – 15 billion	> 15 – 50 billion	> 50 billion
Ec2	> 0.5 – 1.5 billion	> 1.5 – 5 billion	> 5 – 15 billion	> 15 – 50 billion	> 50 billion
S1	> 1 – 3 million	> 3–10 million	> 10 – 30 million	> 30 –1 00 million	> 100 million
S2	> 1 – 3 million	> 3 – 10 million	> 10 – 30 million	> 30 – 100 million	> 100 million
S3	Short-term, intentional violation of territorial integrity (e.g. civilian or military operations of foreign security forces on Swiss soil)	Short-term, severe violation of territorial integrity (e.g. repeated civilian or military operations of foreign security forces on Swiss soil)	Temporary, severe violation of territorial integrity (e.g. temporary occupation of a limited area of Swiss soil)	Temporary, very severe violation of territorial integrity (e.g. temporary occupation of a considerable area of Switzerland)	Long-lasting, very severe violation of territorial integrity (e.g. occupation of a significant part of Switzerland)
S4	Damage to or loss of many cultural property of regional significance and individual cultural property of national significance	Damage to or loss of several cultural property of national significance	Damage to or loss of several cultural property of national significance and few cultural property of international significance (under 'enhanced protection')	–	–
S5	Damage to reputation lasting several weeks and related to important issues, but with minor impact on Switzerland's standing and international cooperation	Damage to reputation lasting several weeks and related to important issues, with impact on Switzerland's standing and international cooperation (e.g. termination of agreements with Switzerland, temporary expulsion of Swiss ambassador)	Considerable damage to reputation lasting several weeks, with impact on Switzerland's standing and international cooperation (e.g. termination of significant agreements with Switzerland, expulsion of Swiss ambassador)	Considerable damage to reputation lasting up to several months with visible impact on Switzerland's standing and international cooperation (e.g. political isolation, boycotts)	Lasting, severe and even irreversible loss of reputation with far-reaching impact on Switzerland's standing and international cooperation (e.g. political isolation, boycotts)
S6	Damage to confidence lasting for a few up to several weeks and related to significant issues (e.g. strikes, larger demonstrations)	Damage to confidence lasting several weeks and related to significant issues weeks (e.g. multiple strikes, occasional mass demonstrations)	Considerable damage to general confidence lasting several weeks (e.g. extended strikes in many areas, mass demonstrations across Switzerland)	Considerable damage to general confidence lasting up to several months (e.g. general strikes)	Lasting, severe or even irreversible loss of general confidence (formation of local or regional groups for self-organisation of public life, up to the point of vigilante group formation)

Federal Office for Civil Protection FOCP

Guisanplatz 1B
CH-3003 Bern
risk-ch@babs.admin.ch
www.bevölkerungsschutz.ch
www.risk-ch.ch