Disasters and Emergencies in Switzerland 2025

National risk analysis methodology

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This report documents the methodological approach used in the national risk analysis Disasters and Emergencies in Switzerland (DES) 2025. The methodology ensures a systematic and comparable analysis and evaluation of hazards and their associated risks, generating transparent results.

Contents

Disasters and Emergencies in Switzerland 2025

National Risk Analysis Methodology

Version 3.0
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Summary

This report provides the foundation for the updated and expanded risk analysis for *Disasters and Emergencies in Switzerland* (DES) 2025.

The report describes the general conditions and the three-step methodology used in the DES national risk analysis:
- (1) Risk identification and hazard selection
- (2) Risk analysis and scenario development
- (3) Risk evaluation and risk presentation

The methodology ensures that the risk analysis of the hazards covered in DES 2025 is systematic, and that the assessed risks are comparable and transparent.

The methodology draws on best practice. It was first applied in the 2012 risk report and published as version 1.0 in 2013. Version 2.0 followed in 2020, with adjustments to the assessment of plausibility for malicious hazards and some marginal cost approaches and scaling factors.

The current version 3.0 remains largely unchanged. Modifications were made to four damage extent indicators – casualties, people requiring assistance, supply disruptions, and cultural heritage damage and loss – and to the depth of content in the consolidation workshops.

The methodology report is aimed primarily at experts assessing risks for DES and, more broadly, at anyone interested in a proven method for conducting risk analyses.

The report comprises six sections:

Section 1 (Introduction) provides an overview of the objectives and target readership, the development of and adjustments to the national risk analysis methodology, and the methodology report.

Section 2 (Risk identification and hazard selection) describes the procedure for identifying the relevant hazards and compiling them in a hazard catalogue. It also sets out the process for selecting the hazards that will undergo more indepth risk analysis.

Section 3 (Risk analysis and scenario development) explains the scenario-based approach applied to the risk analysis and the ranking of the analysed scenarios on an intensity scale.

Section 4 (Risk evaluation and risk presentation) sets out the risk evaluation method. This includes the use of expert elicitation to estimate the extent of damage, the likelihood of occurrence – or plausibility in the case of events with malicious intent – and how risks are presented.

Section 5 (Use of the results) addresses the various aspects that must be considered when interpreting the results and performing a risk assessment. This includes uncertainty and risk aversion.

Section 6 (Conclusion) presents an overall conclusion on the DES methodology and provides an outlook on the next update cycle.

1 Introduction

The national risk analysis *Disasters and Emergencies in Switzerland* (DES) is central to the country's emergency and disaster preparedness. It provides comprehensive insights into the hazards facing the Swiss population and their livelihoods, forming the foundation for national disaster management and civil protection activities. DES enables authorities to identify relevant hazards, assess the risks they pose, and make informed decisions about appropriate prevention and preparedness measures. It serves as a valuable tool for risk dialogue and comparison, providing a basis for setting risk-based priorities in planning. The analysis also supports emergency responder training and the planning of drills and exercise.

DES employs a three-step methodology:
- Risk identification and hazard selection
- Risk analysis and scenario development
- Risk evaluation and risk presentation

The outputs from all three steps detail both the procedure and results (FOCP, 2023; 2026a, 2026b, 2026c, 2026d).

1.1 Target audience and uses

The primary audience comprises federal experts and multi-agency emergency management teams at cantonal, regional and communal levels. DES outputs also inform various projects related to risk and the development of specific strategies (such as critical infrastructure protection and civil protection capability analysis). This methodology report provides transparent insight into risk analysis approach and process for a wider audience interested in proven methods for conducting such analyses.

DES creates the conditions for better coordinated planning and development in disaster management across Switzerland. Its methodology and outputs enable a more systematic approach to disaster and emergency preparedness, supporting the establishment of a risk culture in disaster management.

The methodology describes the procedure and provides the basis for risk evaluation in DES 2025. It ensures that risks for each hazard can be assessed consistently and compared in a comprehensible, transparent way. The ability to compare hazards as objectively as possible is essential for disaster management in civil protection, as the wide variety of hazards requires targeted and efficient use of limited resources.

1.2 History of Switzerland's national risk analysis

Work on the first national risk analysis began in 2008. The FOCP has since established a five-yearly review cycle in which updates and developments are carried out. This cycle comprises several steps: identifying relevant hazards, constructing new scenarios, updating risk assessments, and revising impact and risk diagrams. The methodological foundations are also reviewed and refined in each cycle, incorporating the latest research findings.

Regular review and revision of the national risk analysis and its outputs is essential, as environmental influences, trends and global developments continually reshape the hazard and risk landscape. This ensures that targeted improvements to measures can be based on current information.

The current update (DES 2025) took place between 2023 and 2025, mainly through expert workshops with some correspondence. A total of 265 experts from the public sector at all federal levels, industry and academia were involved in preparing and updating the hazard files and conducting the overall evaluation (consolidation workshops).

The DES methodology was first published in 2013 (FOCP, 2013b) and updated in 2020 (FOCP, 2020). It was developed in collaboration with experts from government, academia and industry, and has been scientifically validated (Spada, Burgherr & Hohl, 2019). It builds on previous civil protection risk analyses in Switzerland, such as KATANOS (FOCP, 1995) and KATARISK (FOCP, 2003), as well as work from other countries (BBK, 2010; Cabinet Office, 2025; DHS, 2011; Ministry of the Interior and Kingdom Relations, 2009; ANV, 2019). International standards and guidelines also informed the development of DES (ISO 31000, 2018; ISO/PAS 22399, 2007; European Commission, 2019).

The methodology was previously revised for DES 2020, when the expert-based Delphi method for assessing plausibility was supplemented by an indicator-based approach and marginal costs were adjusted based on the latest findings. The methodology for DES 2025 builds on these previous versions (FOCP, 2013b, 2020). Section 1.3 explains the specific adjustments made for this fourth update of the DES national risk analysis.

1.3 Methodological changes

The DES 2025 methodology saw significant changes to marginal cost approaches and to the scaling and categorisation of different damage classes.

1.3.1 Marginal costs

Marginal costs were adjusted for the DES 2025 update based on findings from various studies conducted over the past five years. The marginal costs for *I1 – Fatalities* were increased from CHF 6.2 million to CHF 7.4 million per victim.[1] The CHF 7.4 million comprises CHF 5 million for I1 – Individuals, with an additional CHF 2.4 million added directly to total costs to reflect the loss of labour and consumer spending.

1.3.2 Adjustments to damage indicators

When estimating damage indicator *I2 – Casualties,* the distinction between degrees of severity was aligned with terminology used by the Federal Roads Office (FEDRO). The categories are now *life-threatening, significant* and *minor* casualties, rather than *severe, moderate* and *minor*.

Indicator *I3 – People requiring assistance* is now assessed in greater detail. The number of people needing to be *evacuated, temporarily accommodated* or *otherwise cared for* is estimated separately for each of these three categories in workshops and listed individually in hazard files. These values are then aggregated under damage indicator I3.

Indicator *S1 – Supply disruptions* now records in detail severe restrictions in the supply of 20 different goods and services for the affected population. Goods and services are classified as *essential, very important* or *important*, and aggregated under damage indicator S1. Services and goods relevant only to individual scenarios are listed specifically in the respective files.

Indicator *S4 – Cultural heritage damage and loss* was also adjusted. DES 2025 uses eight measurement classes rather than the previous six, with classes now subdivided in greater detail according to the extent of damage and number of cultural assets affected. Cultural property of international significance is no longer listed separately, as it is classified as *cultural property of national significance* and therefore already included in the assessment.

[1] The increased marginal costs are based on the study commissioned by the Federal Office for Spatial Development (ARE) *Empfehlungen zur Festlegung der Zahlungsbereitschaft für die Verminderung des Unfall- und Gesundheitsrisikos [Recommendations for determining willingness to pay for the reduction of accident and health risks]* (Ecoplan, 2016). In 2024, the *value of statistical life* (VOSL) was estimated at CHF 7.4 million.

2 Risk identification and hazard selection

To identify relevant hazards, all civil protection hazards that have a significant impact in Switzerland or could cause major damage are first compiled in a hazard catalogue (FOCP, 2023) (Section 2.1). A selection of these hazards is then chosen for in-depth analysis based on various criteria (Section 2.2).

2.1 Risk identification based on the FOCP hazard catalogue

The hazard catalogue encompasses hazards from three areas – nature, technology and society – that could realistically occur in Switzerland, have a significant impact on the country, and fall within the remit of civil protection and its partner organisations.

The hazard catalogue is revised periodically – usually every five to six years – with input from stakeholders across federal government, the cantons, academia and industry.

Findings from the civil protection trend analysis (Kamberaj, Aebi & Hauri, 2024) inform both into the development of the hazard catalogue and the refinement of individual hazard files. The trend analysis, which the FOCP conducts with the Centre for Security Studies (CSS) at ETH Zurich, explores medium- and long-term trends affecting Swiss civil protection and their impact.

The process also draws on other emerging risk studies, including Swiss Re's annual SONAR report (Swiss Re, 2025), the World Economic Forum's Global Risks Report (WEF, 2025) and the UN's Global Risk Assessment (UNDRR, 2025).

2.2 Hazard selection

Several criteria inform the selection of hazards for detailed analysis. Hazards or events are chosen that:

- have already caused disasters or emergencies in Switzerland (such as earthquakes and inland flooding),
- have caused major damage abroad and could plausibly occur in Switzerland (such as a major power supply outage), or
- have the potential to trigger a disaster or emergency (such as an attack with a radiological bomb or a solar storm).

The catalogue therefore encompasses hazards that would require a coordinated response from civil protection partners or the deployment of a multi-agency emergency management team. During each revision cycle, the list of hazards selected for in-depth analysis is reviewed with the relevant specialist departments and updated as needed.

Recent events in Switzerland and neighbouring countries, combined with the effects of climate change, have prompted the creation of two new natural hazard files: *rockfall* and *heavy rain with surface runoff.* The geopolitical situation has also led to the development of a hazard file on *natural gas supply shortages* under the technology category, prepared in cooperation with the FOCP's *Critical Infrastructure Protection unit.*

Three hazards have been removed from the analysis: *severe weather, data centre outage* and *attack on hazardous material rail.* Severe weather is now covered indirectly by other hazard files (windstorm, hailstorm and heavy rain), data centre outage no longer carries the critical relevance it had five years ago, and attacks on hazardous material transported by rail are no longer considered plausible given the measures now in place.

3 Risk analysis and scenario development

The selected hazards undergo a scenario-based risk analysis (Section 3.1). The fundamentals are reviewed, and scenarios of varying intensity are developed, with the *major-intensity* scenario examined and assessed in detail (Section 3.2). The hazard files form an essential part of the risk analysis (Section 3.3).

3.1 The scenario-based approach

In disaster management, scenario development is widely used to establish the foundations for preparedness efforts. The scenarios described in detail in the hazard file form the basis for the risk analysis and provide an overview of how an event might unfold.

The scenarios are not forecasts or predictions, but rather describe possible sequences of events during disasters and emergencies as a conceptual model. Developing possible scenarios for each hazard makes it possible to anticipate how such an event could evolve and the impact it might have. This allows potential impacts to be identified before events actually occur.[2]

For each scenario developed for non-malicious hazards, the extent of damage and the likelihood of occurrence can be determined and the corresponding risk calculated. For hazards with malicious intent, the term plausibility is used instead of likelihood. The risk can be derived from the positioning of plausibility with respect to aggregate damage.

3.2 Scenario intensity

In DES, each hazard is characterised according to three scenarios of differing intensity – or escalation – levels. This approach ensures that not just one but several possible courses of an event are considered when analysing the hazard.

For each hazard, a scenario of significant, major and extreme intensity is outlined. Even the lowest level is already *considerably* higher than the intensity of so-called *everyday events* (such as sports or traffic accidents). All three intensity levels can only be managed through the combined efforts of civil protection services.

Intensity levels are determined by the characteristic of the hazard in Switzerland and by the reference framework provided in the national risk analysis.

The three intensity levels are defined as follows:

Significant intensity
A scenario that is considerably more intense than an everyday event. Such an event can cause local or regional emergencies, and dealing with it represents a challenge. Such scenarios are relevant, for example, for hazard and risk analyses at cantonal or communal level.

Major intensity
A scenario with major intensity and impacts of national significance. Such events represent a serious but nevertheless plausible occurrence. Their incidence in Switzerland could be even higher, and the course they take more severe. For a scenario to be of major intensity, it must meet several of the following criteria:

- Large geographical area covering several regions or affecting many people, such as a windstorm sweeping across the whole of northern Switzerland, power supply shortages or pandemics.
- Events that can no longer be handled by individual communes or cantons and require intercantonal, national or even international cooperation, coordination and/or support, such

[2] Recent scientific studies therefore classify the DES method as one of the so-called *storylines* (Shepherd et al., 2018). Storylines are particularly helpful for analysing risks where the interaction of several factors causes serious damage and can thus lead to disasters and emergencies. They go beyond standard modelling of probabilistic approaches by vividly capturing a hazard and taking multiple impacts into account. This guards against spurious precision and helps avoid surprises (Shepherd, 2016). Storylines also facilitate the necessary risk dialogue in politics, business, the media and among the public.

as the distribution of casualties in the event of a mass casualty incident (MCI) or severe burn injuries.
- Critical sub-sector with national implications affected, e.g. navigation restrictions on the Rhine.
- Local events with national implications due to potential impacts on transport or energy infrastructure, such as rockfall.
- Local events with national significance, e.g. a terrorist attack involving chemical weapons.
- Events with serious consequences for domestic confidence in the state or with far-reaching diplomatic consequences.

Extreme intensity
A scenario with extreme intensity. Such events would have catastrophic consequences for the entire country and are barely conceivable in Switzerland.

Risk-specific parameters are taken into account when describing the intensity levels, such as factors that determine the extent of an event's impacts (e.g. wind speed during windstorms, duration of a power supply outage, or temperature and duration during heat waves). As the intensity of the event increases – for example, with the increase in the magnitude of an earthquake – the impact also increases. This increase in impact is hazard-specific. For example, the impacts of a spreading forest fire do not increase to the same

Table 1: Description of the key parameters for the scenarios of significant, major and extreme intensity, using the example of three hazards classified under nature (earthquake), technology (power supply shortage) and society (animal disease outbreak).

Intensity	Earthquake	Electric power supply shortage	Animal disease outbreak
1 – Significant	– Magnitude: approx. 5.5 – Maximum intensity (EMS): VII (building damage) – Weaker aftershocks, causing no further damage – Damage radius 25 km – Damage epicentre radius 5 km – Low infrastructure density – Time: summer, afternoon	– Season: spring – Power supply reduction (-15%) – Appeals to the public and businesses to reduce consumption – Package of management measures for five weeks (e.g. quota system for large consumers (10–15%) – No power cuts – No uncontrolled power supply outages	– Individual regions in Switzerland affected – Appears first in surrounding countries (advance warning) – Known pathogen – Moderate infection rate – Culling of several hundred mammals or several tens of thousands of poultry
2 – Major	– Magnitude: approx. 6.5 – Max. intensity (EMS): IX (destructive) – Several strong aftershocks causing further damage – Damage radius 80km – Damage epicentre radius 25 km – High infrastructure density – Time: late spring, weekday morning	– Season: autumn to spring – Power supply reduction (-30%) – Appeals to the public and businesses to reduce consumption – Package of management measures for 12 weeks (restrictions on use and bans on certain applications and activities; quotas for large consumers of up to 40%) – Centralised management of controllable power stations and restrictions on cross-border energy exchange coordinated with neighbouring countries for eight weeks – No uncontrolled power supply outages	– Cases in several regions – With or without advance warning – Known pathogen – High infection rate – Culling of several thousand to 10,000 mammals or several hundred thousand poultry
3 – Extreme	– Magnitude: approx. 7.0 – Maximum intensity (EMS): XI (devastating) – Numerous strong aftershocks with further significant damage – Damage radius 120km – Damage epicentre radius 40km – High infrastructure density – Time: winter, at night	– Season: winter / spring – Power supply reduction (-40%) – Appeals to the public and businesses to reduce consumption – Package of management measures for 16 weeks (e.g. quota system for large consumers of up to 50%) – Network shutdowns for four weeks and quotas for companies that may be exempted from network shut-downs and do not belong to the exempted consumer categories – Uncontrolled power supply outages cannot be ruled out	– Whole of Switzerland affected – Occurs first in Switzerland (no advance warning) – Known or unknown pathogen – High infection rate – Culling of over 10,000 mammals or 1 million poultry

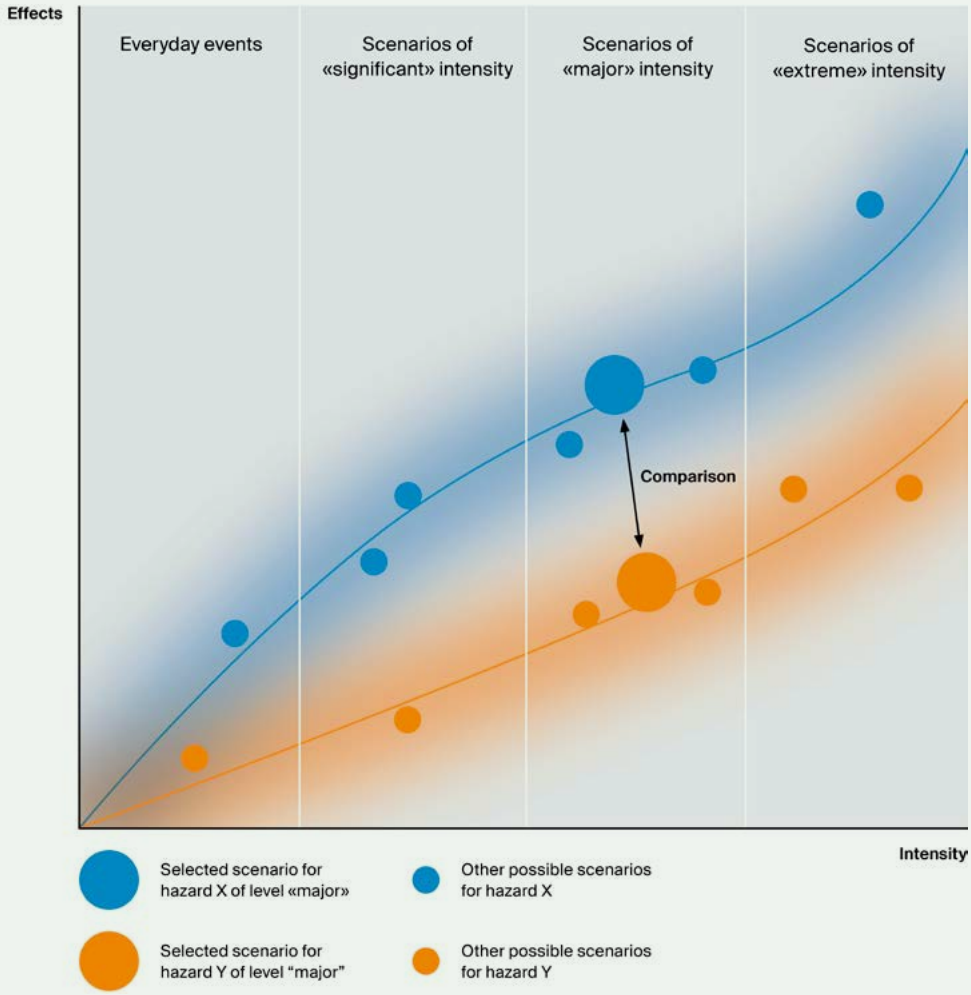


Figure 1: Schematic representation of the process for selecting and comparing scenarios used in the national risk analysis DES. Of the three scenarios outlined for each hazard with significant, major and extreme intensity, the scenario with major intensity is described in detail and subjected to a risk evaluation. This makes it possible to compare risk evaluations of multiple hazards in a single risk diagram.

degree as those caused by a protracted power supply outage. Table 1 lists examples from each area – nature, technology and society.

For the national risk analysis, the outlined scenario of *major* intensity is described in detail and used as the basis for the risk evaluation (see Fig. 1). Using the same intensity across all hazards examined ensures that the risks can be compared with each other.

3.3 Hazard files

The *hazard files* (FOCP, 2026a) form an essential part of the risk analysis. They are available for each individual hazard and as a *collection of hazard files* (FOCP 2026b).

When compiling a hazard file, the project team uses guidelines[3] to create a draft file, which is reviewed and refined in consultation with various specialist departments. The possible sequence of events in the major-intensity scenario and its impacts, which form the core of the files, draw as far as possible on known events. The descriptions focus on the impacts anticipated under the scenario. The structure and contents of the DES 2025 hazard files are listed in Table 2.

3 FOCP (2023): DES guidelines for the preparation of hazard files / FOCP (2023): DES guidance on reviewing hazard files

Table 2: DES 2025 hazard files – Content overview

Section	Contents
Definition	Definition of the hazard, including – in certain cases – distinctions from other hazards
Examples of events	Examples of events from Switzerland or abroad
Influencing factors	Factors that influence the emergence, evolution and impact of the hazard (source of danger, timing, location, scope, course of event)
Scenario intensity	Outline of the scenario according to intensity level – *significant, major* and *extreme*
Scenario	Detailed description of a *major*-intensity scenario – Initial position / pre-phase – Event phase – Recovery phase – Timeline – Spatial extent of the event
Impacts	Impacts, including impact diagram, on these four areas: – Individuals – Environment – Economy – Society
Risk	Risk matrix showing the risk of the analysed hazard in comparison with other analysed hazards
Legal bases	Legal bases (Federal Constitution, acts and ordinances)
Additional information	Additional information – About the hazard – About the national risk analysis

When creating or revising scenarios, possible future developments are also taken into account, drawing on existing foundations and further information such as event analyses, experience reports, statistics and academic literature. Trends and scientific findings are also incorporated.

4 Risk evaluation and risk presentation

Risk evaluation is the crucial analytical step in the national risk analysis *Disasters and Emergencies in Switzerland* (DES).

The risk or potential danger posed by an event or development comprises two factors: *impact* (damage to the population and their livelihoods; Section 4.2) and *likelihood* – in the case of non-malicious events – or *plausibility* for those with malicious intent (Section 4.3).

Based on the *major-intensity* scenarios described in detail in the hazard files, the impacts are assessed using 12 damage indicators and the likelihood or plausibility is assessed in expert workshops. The assessments are carried out in expert workshops using the Delphi method and, for certain sub-indicators, through group discussions (Section 4.1). Expert assessments using *expert elicitation*[4] are a common method in risk analysis. The Delphi method makes it possible to aggregate subjective assessments of hazards and objectify them as far as possible. In the absence of sufficient empirical data, risk values (frequency and extent of damage) can thus be estimated (Beaudrie et al., 2016). Expert surveys ensure the consistency, credibility and acceptance of risk assessments (Frye, 2023).

If the initial situation and basic assumptions have remained unchanged since the last revision and the main specialist department responsible still considers the previous risk assessment appropriate, the assessments from the last revision are retained, adapted to the methodological changes in this edition, and validated through written consultation or bilateral discussions with the relevant specialist departments.

Following the expert survey and consultative review, the assessments are validated at consolidation workshops to compare the likelihood and plausibility as well as the extent of damage across all hazard scenarios and, where necessary, to make adjustments. This allows potential distortions arising from the composition of individual expert workshops to be balanced out and missing information to be supplemented, ensuring the comparability of results (Section 4.4).

The results of the risk evaluation – the two dimensions of impact and likelihood or plausibility – are presented in a risk matrix (Section 4.5). This places the various hazards in perspective and allows the different risks to undergo comparative risk assessment.

4.1 Expert elicitations

The expert workshops play a central role within the entire DES process. Depending on the scenario, a varying number of experts from the public sector, business, NGOs and academia participate in the workshops. The size and composition of the expert teams is determined by the information requirements to best capture the various aspects of the hazard (causes, chains of effects, impacts, etc.). This is because the outcomes are based on the diversity of education, experience and reasoning within the team rather than the negotiation skills and personalities of those involved (Frye, 2013). The composition of the expert groups is recommended by the FOCP and supplemented by the specialist agencies involved.

[4] The US Nuclear Regulatory Commission (NRC) defines expert elicitation as a formal, highly structured and well-documented procedure for obtaining the judgements of several experts (Frye, 2013).

4.1.1 Procedure

The expert workshops proceed as follows:

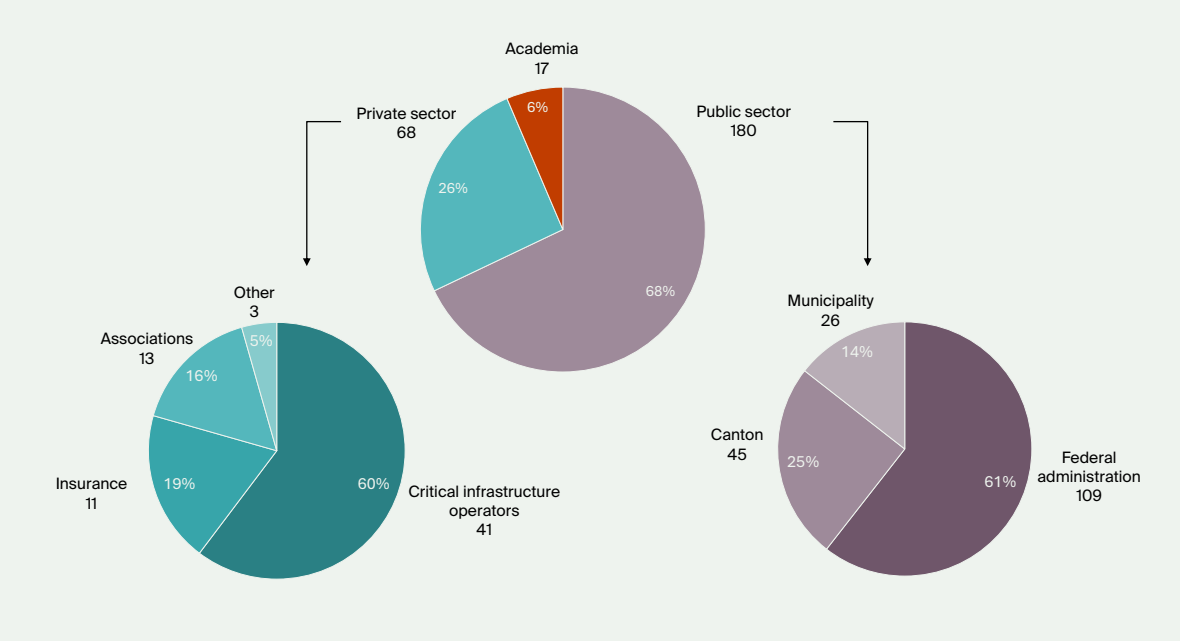
0. Preparation before the workshop
- Participants are asked to read through the file and the summary of the method in advance. Any questions or uncertainties that arise during preparation, or requests for adjustments, are discussed at the workshop and taken into account where necessary.
- Participants also receive an Excel file containing the 12 damage indicators, which they may complete individually in advance.

1. Information and clarification of the facts
- All participants are informed about the objectives and schedule of the workshop, the scenario to be evaluated and the method used.
- The *major-intensity* scenario is discussed in depth and assumptions are defined to facilitate the assessment of impacts (e.g. affected area).

2. Individual and group assessments
- The experts individually assess the likelihood or plausibility and the extent of the impact for nine of the 12 damage indicators using the Delphi method. Moderated group discussion is used to assess the remaining three damage indicators: I2, I3 and S1. Since these three indicators comprise several components that need to be assessed, it is neither efficient nor practical to collect these estimates individually.
  i. For scenarios with preliminary estimates of likelihood taken from the literature (e.g. *solar storm*), expert committees (e.g. *nuclear power plant accident*) or models[5] (e.g. *heat waves, earthquakes*), these preliminary assessments are confirmed by expert surveys and modified if necessary. For scenarios without a preliminary risk assessment, the likelihood is based entirely on the results of the expert survey.
  ii. The plausibility assessment for scenarios involving malicious events is also carried out as an expert survey using the Delphi method described above, but consists of four sub-indicators (Section 4.3).
- The assessments can be given as specific values (e.g. number of years for likelihood) or in classes (see overview in Appendix A4 – Scales of damage indicators). Since a specific value is required to calculate the risk, the average value of the class is used as an estimated value when a class value is specified. During the workshop, the FOCP moderation team enters the estimated values into an Excel file, which displays the median, mean, minimum and maximum values for the group discussion.

[5] For example, frequency probability models based on historically repeatable events are used for earthquakes. Meteorological and climatological models are taken into account for, among others, heat waves and droughts. Event and fault tree analyses are used in probability calculations for malfunctions in technical facilities such as nuclear power plants.

Figure 2: Overview of the composition of experts for DES 2025



- To avoid being influenced (*anchoring*) by other workshop participants as far as possible, participants write down their individual estimates and then share them with the group.

3. Group discussion and consensus building
- A group discussion takes place after each round of estimates. The aim of this moderated process is to establish an estimated value (consensus value) by mutual agreement. If no consensus can be reached, an average value of the estimates (or median, if applicable) is used.
- First, the moderation team presents the individual estimates and their distribution. In the discussion, the workshop participants justify their own estimates, starting with the minimum and maximum values. Workshop participants may then adjust their own estimates accordingly, if necessary.

4. Documentation of estimated values and key aspects
- The experts' assessments, key aspects of the discussion and the values agreed upon by the group are documented (in the minutes). The individual assessments are only used internally and are not communicated.

4.1.2 Composition of the panel of experts

Numerous experts from Switzerland and some from abroad contribute to DES. A total of 90 experts attended the kick-off information event at the end of 2022, some of whom remained involved throughout the entire process until the final outputs were delivered at the end of 2025.

In total, 265 experts from the Federal Administration, cantons, academia and business contributed to updating and revising the hazard files, validating the overall assessment, developing and validating the methodology, and participating in the DES workshops (see Fig. 2). Sixty-eight per cent of experts work in the public sector, 26 per cent come from the private sector (in particular operators of critical infrastructure), and 6 per cent come from academia.

Between six and 25 experts participate in each workshop, with some involved in multiple workshops. The experts' task is to validate the classification of scenarios into *significant, major* and *extreme* intensities, review and adjust the description of how events unfold, if necessary, and assess the impacts and likelihood or plausibility indicators for each scenario.

Expert involvement enables the generation of broadly supported results and outputs within a reasonable timeframe. This approach enhances both the quality and acceptance of the outputs.

4.2 Impacts

In DES, the impact or extent of damage in the analysed *major-intensity* scenarios is estimated using 12 different damage indicators. These damage indicators fall within four damage areas – *individuals*, the *environment*, the *economy* and society – and are each defined by eight damage *severity* classes (A 1 to A 8) with corresponding parameters (see Tab. 3). By assigning marginal costs to each indicator, the extent of damage can be monetised and aggregated (see Tab. 4).

This defined multi-criteria approach enables better assessment of an event's damage characteristics across the wide range of hazards examined. It also allows detailed impact profiles to be created, which form the basis for planning measures.

4.2.1 Damage timeframe

Depending on the event or development and the damage indicator under investigation, the damage timeframe may vary widely between hazards. For example, a rockfall causes direct property damage within seconds or minutes, whereas other damage persists for weeks (e.g. reduced tourism revenue in a valley). Hazards arising from developments can have impacts lasting many years or even decades (e.g. the propagation of invasive species). The period over which the impact is considered is determined on a scenario-specific basis.

4.2.2 Damage indicators

The 12 damage indicators were selected based on, among other factors, the Federal Constitution and the protected assets it specifies (see Tab. 3).

Eight of the 12 damage indicators are quantifiable. For example, indicator *Ec1 – Assets losses* is expressed in Swiss francs (CHF). The remaining four damage indicators assess impacts that cannot be quantified. These indicators place impacts into qualitatively defined severity class (e.g. *S3 – Territorial integrity violation*) before monetisation.

The values given for damage extent per indicator represent a marginal analysis counting all impacts the event may cause that would not otherwise occur. For many damage indicators,

Table 3: Overview of damage indicators and the applicable articles in the Federal Constitution

Damage area	Damage indicator		Federal Constitution articles
Individuals	I1	Fatalities	Art. 10, 57, 58, 61, 118
	I2	Casualties	Art. 10, 57, 58, 61, 118
	I3	People requiring assistance	Art. 12, 115
Environment	En1	Ecosystem damage	Art. 74, 76, 77, 78, 104
Economy	Ec1	Asset losses and response costs	Art. 61
	Ec2	Loss of economic output	Art. 100
Society	S1	Supply disruptions	Art. 102
	S2	Public order and security disruption	Art. 52, 185
	S3	Territorial integrity violation	Art. 58
	S4	Cultural heritage damage and loss	Art. 2, 69, 78
	S5	National reputation damage	Art. 54
	S6	Loss of public confidence in government	Preamble, Art. 2, 5

everyday events produce minimal impact. For example, people die every year in Switzerland from dehydration or traffic accidents. In the case of heat waves, therefore, all heat-related fatalities must be recorded, minus those that would have occurred from dehydration even without a severe heat wave.

Table 3 provides an overview of the damage indicators used in DES 2020 and the articles in the Federal Constitution that relate to each protected asset.

4.2.3 Damage monetisation and aggregation

To calculate the total damage across the 12 damage indicators, which use different units, the recorded damage is converted into a monetary value, or monetised.

For monetisation purposes, marginal costs are defined for each damage indicator (see Tab. 4). These roughly represent the amount society would be willing to spend to reduce a certain level of damage by one damage unit (FOCP, 2003; Ecoplan, 2016).

For monetising indicators that are not defined quantitatively, the average value of the corresponding damage indicator *Ec1 – Asset losses and response costs* is used. The monetised thresholds and mean values of the damage classes are identical across all damage indicators – for example, the threshold between A1 and A2 is always CHF 50 million, between A2 and A3 it is CHF 150 million, and so on.

The monetary value of damage for each damage indicator is then aggregated. The aggregated damage of a scenario thus represents a measure of impact across all damage indicators. It therefore corresponds not only to the direct costs caused by the event, but represents the total potential damage that the analysed scenario presents, taking into account all the damage indicators examined.

The aggregated damage encompasses both material damage (e.g. damage to property) and non-material damage. Monetising the damage enables comparison of damage extent across multiple scenarios.

Table 4: Overview of the units and marginal costs used to monetise damage in DES 2025

Damage indicator		Unit	Marginal costs per unit
I1	Fatalities	Number of people	CHF 7.4 million
I2	Casualties	Number of people (aggregated and weighted)	CHF 500 000
	I2-1 Life-threatening casualties	Number of people [factor 1]	
	I2-2 Serious casualties	Number of people [factor 0.1]	
	I2-3 Minor casualties	Number of people [factor 0.003]	
I3	People requiring assistance	Person days (number of people multiplied by days, aggregated)	CHF 250
	I3-1 Evacuation	Person days (number of people multiplied by days)	
	I3-2 Accommodation	Person days (number of people multiplied by days)	
	I3-3 Other support	Person days (number of people multiplied by days)	
En1	Ecosystem damage	Affected area multiplied by number of years of adverse impact (km^2 multiplied by years)	CHF 330 000
Ec1	Asset losses and response costs	CHF	CHF 1
Ec2	Loss of economic output	CHF	CHF 1
S1	Supply disruptions	Person days (number of persons times days, aggregated and weighted)	CHF 500
	S1-1 to S1-6 Essential goods/services	Person days (number of people multiplied by days) [Factor 1]	
	S1-7 to S1-15 Very important goods/services	Person days (number of people multiplied by days) [Factor 0.1]	
	S1-16 to S1-20 Important goods/services	Person days (number of people multiplied by days) [Factor 0.01]	
S2	Public order and security disruption	Person days (number of people multiplied by days)	CHF 500
S3	Territorial integrity violation	Qualitative according to intensity and duration, 5 classes	Average value of the respective class Ec1 in CHF
S4	Cultural heritage damage and loss	Qualitative according to significance and number 8 classes	Average value of the respective class Ec1 in CHF
S5	National reputation damage	Qualitative according to intensity and duration, 8 classes	Average value of the respective class Ec1 in CHF
S6	Loss of public confidence in government	Qualitative according to significance and duration 8 classes	Average value of the respective class Ec1 in CHF

4.2.4 Description of damage indicators

The following describes each of the 12 indicators across the four damage areas. For each damage indicator, the eight extent classes are specified with intervals in their respective unit of measurement. The average values indicated in brackets[6] for each damage class are used in the estimate to calculate the total damage.

Individuals

The indicators for the Individuals damage area record the impact of a hazard on the life and limb of the population (I1, I2). Mental health is included under I2. I3 captures the number of people requiring assistance as a result of the hazard event.

I1 – Fatalities

Indicator I1 relates to all deaths that can be directly or indirectly attributed to the event described in the scenario. The causality and the period during which fatalities are taken into account are hazard-specific and are discussed in the respective workshop and specified in the hazard file..

The marginal costs per fatality are taken from the study commissioned by the Federal Office for Spatial Development (ARE) *Empfehlungen zur Festlegung der Zahlungsbereitschaft für die Verminderung des Unfall- und Gesundheitsrisikos [Recommendations for determining willingness to pay for the reduction of accident and health risks]* (Ecoplan, 2016). In 2016, the *value of statistical life* (VOSL) was estimated at CHF 6.2 million. These figures are updated on an ongoing basis. In 2024, the VOSL was set at CHF 7.4 million (ARE, 2025).[7]

I1 – Fatalities: Number of people							
A 1	**A 2**	**A 3**	**A 4**	**A 5**	**A 6**	**A 7**	**A 8**
≤ 10	11–30	31–100	> 100–300	> 300–1000	> 1000–3000	> 3000– 10 000	> 10 000
(5,5)	(17)	(55)	(170)	(550)	(1700)	(5500)	(17 000)

[6] The average value Av associated with a class interval (min–max) corresponds approximately to the value Av = √(Min*Max)

[7] The CHF 7.4 million is divided between CHF 5 million towards *I1 – Individuals* and CHF 2.4 million towards total costs in order to maintain the threshold value of the I1 indicator consistently throughout the entire analysis period analysis period, while incorporating the most recent VOSL value in the final calculations.

I2 – Casualties

Indicator I2 covers the number of persons who suffer an injury or illness that can be directly or indirectly attributed to the event. The indicator takes into account physical and mental illnesses or injuries connected to the hazard. Three levels of severity[8] are distinguished and estimated separately: (i) life-threatening, (ii) significant, and (iii) minor injuries/illnesses.

Individuals who succumb to their injuries or illness are not included in this indicator, but rather under *I1 – Fatalities.*

Individuals requiring one-off emergency psychological care but who do not suffer from an underlying psychological illness are covered by indicator *I3 – People requiring assistance.*

The different degrees of severity of injuries are aggregated according to their significance using weighting factors; *life-threatening injuries* are weighted with a factor of 1, significant injuries with a factor of 0.1 and *minor injuries* with a factor of 0.003.[9]

The marginal costs for *I2 – Casualties* remain at 10% of the marginal costs for a fatality (excluding Ec2 share), i.e. CHF 500,000 per person.[10]

I2 – Casualties: number of people, taking account of their injury/illness (weighted)

A 1	A 2	A 3	A 4	A 5	A 6	A 7	A 8
≤ 100	> 100–300	> 300–1000	> 1000–3000	> 3000–10 000	> 10 000– 30 000	> 30 000– 100 000	> 100 000
(55)	(170)	(550)	(1700)	(5500)	(17 000)	(55 000)	(170 000)

Classification of injuries and illnesses according to severity

Degree of severity	Injury / Illness
Life-threatening casualty [Weighting: 1]	– The individual has a life-threatening injury/illness. – Life-threatening injuries/illnesses are defined as significant impairments of vital functions. – The individual requires hospital care for at least 24 hours. Without treatment, a fatal outcome is to be expected. In general, the patient is unconscious or barely conscious. – Treatment in the intensive care unit is required.
Serious casualty [Weighting: 0.1]	– The individual has a serious injury/illness. – Serious injuries/illnesses are defined as severe, visible impairments of normal activity. Vital functions are not initially affected. The patient may be unconscious or have impaired consciousness. – Inpatient medical care is necessary.
Minor casualty [Weighting: 0.003]	– The individual has a minor injury/illness. – Minor injuries/illnesses are defined as minor impairments that would still allow the person to leave the scene of the accident or their place of residence independently. – The individual is usually conscious but may be somewhat confused or anxious. – Outpatient treatment at the hospital or by a doctor may be necessary.

8 The severity levels are based on the terminology used by FEDRO for traffic accidents (FEDRO, 2018).

9 The weighting factors were derived from Bickel and Friedrich (2005) and Bickel et al. (2006) and checked for topicality with the European Commission (2020).

10 This is in line with the findings of studies by Bickel et al. (2006) and the European Commission (2015).

I3 – People requiring assistance
Indicator I3 covers individuals who, before, during or after an event, need to be (i) evacuated, (ii) temporarily accommodated or (iii) otherwise cared for (e.g. psychological care, provision of food, drinking water or other essential goods to persons in locations cut off from the outside world, support for elderly persons or persons with disabilities).

Impacts such as supply disruptions affecting large sections of the population are not covered by I3, but by indicator *S1 – Supply disruptions.*

The unit to quantify the need for assistance is the person day. This is determined by multiplying the number of people requiring assistance with the duration of impairment in days.

The effective duration of assistance required is aggregated across all individuals. The minimum unit per person is one day. What is counted is the duration for which assistance is needed, not the period during which assistance services are provided. For example, the count captures the number of days that traumatised people require psychological emergency assistance following an event, not the duration for which care providers are on duty. For evacuations and psychological support, one day of assistance per person is typically estimated.

The marginal costs are CHF 250 per person per day. The cost of providing support services is accounted for in the indicator *Ec1 – Asset losses and response costs.*

P3 – Unterstützungsbedürftige: Personentage (Anzahl Personen mal Tage)

A 1	A 2	A 3	A 4	A 5	A 6	A 7	A 8
≤ 200 000	> 200 000–600 000	> 600 000–2 Mio.	> 2–6 Mio.	> 6–20 Mio.	> 20–60 Mio.	> 60–200 Mio.	> 200 Mio.
(110 000)	(350 000)	(1,1 Mio.)	(3,5 Mio.)	(11 Mio.)	(35 Mio.)	(110 Mio.)	(350 Mio.)

Einteilung des Unterstützungsbedarfs nach Art der Unterstützung

Unterstützungsart	Beschrieb
Evakuierung	– Anzahl Personen, die im Ereignisfall vorsorglich evakuiert werden müssen. – Z. B. bei Wasseralarm bei einem potenziellen Unfall bei einer Stauanlage
Unterbringung	– Anzahl der Personen, die aufgrund einer Evakuierung, eines unbewohnbaren oder zerstörten Zuhauses kurzfristig oder langfristig untergebracht werden müssen. – Z. B. Anzahl Personen, deren Zuhause nach einem Erdbeben nicht mehr sicher ist oder noch bausicherheitstechnisch freigegeben werden muss. – Hinweis: Personen, die bei Freunden oder Verwandten unterkommen oder eigenständig alternative Unterbringung finden, werden hier nicht dazugerechnet.
Anderweitige Betreuung	– Anzahl Personen, die psychologisch betreut werden müssen (psychologische Erstintervention z. B. durch Careteams) – Anzahl Personen, die sich in von der Aussenwelt abgeschnittenen Ortschaften befinden und mit Lebensmitteln, Trinkwasser oder anderen wichtigen Gütern versorgt werden müssen – Anzahl Betagte oder Personen mit Beeinträchtigungen/ Erkrankungen, die Unterstützung benötigen

En1 – Ecosystem damage: affected area multiplied by number of years of adverse impact (km² multiplied by years)							
A 1	**A 2**	**A 3**	**A 4**	**A 5**	**A 6**	**A 7**	**A 8**
≤ 150	> 150–450	> 450–1500	> 1500–4500	> 4500–15 000	> 15 000–45 000	> 45 000–150 000	> 150 000
(82)	(260)	(820)	(2600)	(8200)	(26 000)	(82 000)	(260 000)

Environment

The indicator for this damage area expresses the impact of a hazard on the environment. The main impacts concern water and soil pollution.

En1 – Ecosystem damage

Indicator En1 describes the extent and duration of damage to ecosystems (forests, agricultural land, water-courses, lakes, wasteland) that are significantly impaired or whose ecosystem services are restricted. In particular, this includes damage from which the affected systems can only recover naturally over very long periods of time, if at all.

An ecosystem is considered damaged, for example, if its natural balance is significantly disrupted or soil fertility is significantly impaired. Damage can be caused by chemical or radiological pollution, biological or non-biological contamination, or physical impairments such as erosion. For example, indicator En1 records severe chemical pollution of surface waters. If a lake's water level drops significantly as a result of drought, but without damaging the flora and fauna in the medium to long term, this is not considered an adverse impact on the eco-system.

Impairments to ecosystem services are only counted if other indicators do not already cover the impairment (e.g. use for leisure and recreation). If the drinking water supply from surface waters is restricted for parts of the population as a result of drought, this is recorded using indicator *S1 – Supply disruptions.* The economic consequences (e.g. for forestry and agriculture) of ecosystem damage are not recorded using indicator En1, but rather using economic indicators Ec1 and Ec2.

The unit for measuring adverse impacts is the area × year (km² × year). It is calculated by multiplying the affected area with the number of years that the adverse impact lasts. If an area is under the influence of multiple impacts, it is only counted once.

The duration of impairment corresponds to the period of ecosystem damage or restriction of use (e.g. restrictions on agricultural land cultivation due to contamination). The cycle of different ecosystems stages, e.g. in managed forests, must be taken into account. An ecosystem is considered damaged until it has returned to its *normal* state. For instance, in the case of a forest damaged by an extensive fire, the duration is the time until early succession stages are re-established.

The marginal costs for indicator *En1* are based on the FOCP's Critical Infrastructure Protection (CIP) guidelines. The document, revised in July 2018, assumes CHF 330,000 per km² per year.

Economy

Economic impact and damage are counted as asset losses and response costs (Ec1) and loss of economic output (Ec2).

Ec1 – Asset losses and response costs

Damage indicator Ec1 measures damage to existing assets and infrastructure and the costs of responding to it.

Assets consist of fixed assets[11] and financial assets[12]. Asset losses include all damage to assets, even if insurance companies or the state compensate for the costs, because these costs must still be covered through premiums, taxes or debt.

Response costs include expenditure on emergency services as well as the costs of vehicles (e.g. excavators, material transporters), equipment (e.g. dirty water pumps, emergency power generators) and materials (e.g. mobile flood protection elements). The costs of emergency accommodation and providing for people requiring assistance should also be included in response costs.

Depending on the impacts of a hazard, different perspectives can be adopted to assess asset losses:

- Macroeconomic: Nationwide costs of responding to the disaster and damage to public property.[13]
- Individual or small-scale: Response costs and financial losses for individuals or within a spatially limited area.[14]

The example used to illustrate this indicator is inland flooding. Such an event causes damage to multiple buildings and a factory, incurring costs for pumping out basements and removing rubble and driftwood (response costs). The property damage represents a financial loss, as the buildings and facilities have lost value.

Ec1 – Asset losses and response costs: CHF

A 1	A 2	A 3	A 4	A 5	A 6	A 7	A 8
≤ 50m	> 50 – 150m	> 150 – 500m	> 0.5 – 1.5bn	> 1.5 – 5bn	> 5 – 15bn	> 15 – 50bn	> 50bn
(27m)	(87m)	(270m)	(870m)	(2.7bn)	(8.7bn)	(27bn)	(87bn)

11 Fixed assets are also referred to as real capital and include, for example, buildings, civil engineering structures, machinery and equipment, production facilities, household goods, livestock and crops, and computer programs (see FSO indicator T10 Net non-financial capital stock).

12 Financial assets include cash, shares and pension fund entitlements. Financial assets correspond to the balance of assets (receivables) and liabilities, cf. SNB Net financial assets. If this effect is offset as a loss of output in Ec2, it is not counted here.

13 Including Switzerland's net assets abroad. This is mainly relevant for hazards that apply uniformly across the country, e.g. rising healthcare costs due to diseases of affluence.

14 Particularly relevant for spatially limited events, e.g. landslides, hazardous material accidents.

Ec2 – Loss of economic output
Damage indicator Ec2 includes indirect economic impacts that reduce value creation in Switzerland. While indicator *Ec1 – Asset losses and response* costs records the costs of response and damage to existing assets, Ec2 captures the consequences for future value creation.

Depending on the impacts of a hazard, different perspectives can be adopted to assess asset losses:

- Macroeconomic: The sum of domestic value creation serves as an indicator of total economic output. It is quantified in terms of Gross Domestic Product (GDP). A loss of economic output therefore corresponds to a decrease in GDP.[15]
- Individual or small-scale: A loss of economic output of those affected or of a spatially limited area.[16]

The example used to illustrate this indicator is inland flooding (cf. example in Ec1). Due to the damage caused by such an event, the affected company has zero output for several weeks and therefore suffers a loss of income.

Ec2 – Loss of economic output: CHF							
A 1	**A 2**	**A 3**	**A 4**	**A 5**	**A 6**	**A 7**	**A 8**
≤ 50m	> 50 – 150m	> 150 – 500m	> 0.5 – 1.5bn	> 1.5 – 5bn	> 5 – 15bn	> 15 – 50bn	> 50bn
(27m)	(87m)	(270m)	(870m)	(2.7bn)	(8.7bn)	(27bn)	(87bn)

[15] For example, in the event of a severe earthquake leading to a prolonged interruption of most economic activities.
[16] For example, an impairment of manufactured goods distribution due to transport route interruption is recorded as a loss in added value.

Society

The damage area relating to society measures significant disruptions caused by the hazard under investigation. On the one hand, there are impacts on the Swiss population, for example through supply disruptions (S1) or public order and security disruption (S2), and long-term social impacts such as cultural heritage damage and loss (S4). On the other hand, it captures impacts on the state: territorial integrity violation (S3), national reputation damage (S5) or loss of public confidence in government among the Swiss population (S6).

For the monetisation of indicators that are not defined quantitatively (S3, S4, S5, S6), the average values of the corresponding measurement class are used.

S1 – Supply disruptions

This indicator covers the failure or severe restriction of the supply of essential goods or services to the population affected by the event. A total of 20 different goods and services are considered, divided into three groups according to their importance: *essential, very important* and *important*. Here too, as with I2, weighting has been applied, with *essential factors* weighted at 1, *very important* factors at 0.1 and *important* factors at 0.01.[17]

Supply shortfalls are calculated by multiplying the number of people affected by the duration of disruption in days. The effective duration of the supply disruption for those affected is added together. Thus, what is calculated is the duration of the actual disruption. For example, estimates capture the total duration of a power supply outage, i.e. the sum of downtimes, rather than the number of days over which power management with daily interruptions of a few hours extends.

The economic consequences of disruptions are captured by indicators *Ec1 – Asset losses and response costs* and *Ec2 – Loss of economic output.*

When assessing indicator S1, only goods and services relevant to the respective scenario are evaluated. The completeness of the goods and services listed in the scenario is reviewed during expert workshops and adjusted if necessary. In addition, goods/services relevant to only one scenario are listed and evaluated accordingly..[18] An overview of the goods/services with brief explanations can be found in *Appendix A5 – Brief descriptions of the goods and services for S1.*

The marginal costs of indicator *S1 – Supply disruptions are* set at CHF 500 per person per day.

S1 – Supply disruptions: Person days (number of persons times days, weighted)

A 1	A 2	A 3	A 4	A 5	A 6	A 7	A 8
≤ 100 000	> 100 000 – 300 000	> 300 000 – 1m	1 – 3m	> 3 – 10m	> 10 – 30m	> 30 – 100m	> 100m
(55 000)	(170 000)	(550 000)	(1.7m)	(5.5m)	(17m)	(55m)	(170m)

[17] There is no scientific basis for the weighting. The factors were therefore developed and adapted while applying the method.
[18] The scenario-specific goods/services of financial services and law enforcement and criminal justice are classified as very important and important, respectively.

Goods/services to be considered under S1																			
Essential						Very important							Important						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Drinking water	Food	Medicines and medical devices	Emergency medical care	Emergency services	Emergency calls	Electricity	District heating	Natural gas	Petroleum products	Telecommunications (excluding emergency calls)	Outpatient/inpatient medical care Healthcare (excluding emergency care)	Laboratory services	Waste/wastewater disposal	Postal services	Press	Road traffic	Rail transport	Air transport	Shipping

S2 – Public order and security disruption
This indicator measures how many people living in Switzerland are affected by restrictions on order and security, and for how long. This includes disruptions resulting from internal unrest, security measures or threats that affect or excessively restrict the daily lives of the population. Such adverse impacts are measured in person days. The minimum duration per person is one day.

Also in line with the FOCP's CIP implementation guide, the marginal costs of indicator S*2 – Public order and security disruption* are set at CHF 500 per person per day.

S2 – Public order and security disruption: person days (number of people multiplied by days)

A 1	A 2	A 3	A 4	A 5	A 6	A 7	A 8
≤ 100 000	> 100 000 – 300 000	> 300 000 – 1m	1 – 3m	> 3 – 10m	> 10 – 30m	> 30 – 100m	> 100m
(55 000)	(170 000)	(550 000)	(1.7m)	(5.5m)	(17m)	(55m)	(170m)

S3 – Territorial integrity violation
This indicator qualitatively describes the intensity of violations of Swiss territory. The focus is on violations of Swiss airspace and soil.

This indicator comprises various forms of Swiss territorial violations by another state. It takes into account the intensity and duration of the violation.

Effects are only determined from impact class A4 onwards, as only damage that could lead to a significant violation of territorial integrity is recorded.

S3 – Territorial integrity violation: qualitative according to intensity and duration

A 1	A 2	A 3	A 4	A 5	A 6	A 7	A 8
-	-	-	Short-term, intentional violation of territorial integrity (e.g. civil or military operations by 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)	Persistent, very serious violation of territorial integrity (e.g. occupation of a significant part of Switzerland)
(27m)	(87m)	(270m)	(870m)	(2.7bn)	(8.7bn)	(27bn)	(87bn)

S4 – Cultural heritage damage and loss
This indicator captures in qualitative terms the damage to or loss of cultural heritage in Switzerland.

Cultural heritage worthy of protection includes movable or immovable assets of great importance to cultural heritage. Examples include buildings, artwork, monuments, archaeological sites, books, manuscripts, scientific collections, archival material and reproductions of cultural assets. This also includes buildings such as museums, libraries, archives, monasteries or places where movable cultural assets can be kept safe.[19]

A distinction is made between cultural assets of local or regional (B objects) and national (A objects) significance.

Damage is defined as serious impacts on cultural assets that destroy them or require considerable investment of time or money to restore or repair them.

Loss includes theft (burglary, robbery) and irreversible destruction (e.g. as a result of fire, explosion, water).

S4 – Cultural heritage damage and loss: qualitative according to significance and number

A 1	A 2	A 3	A 4	A 5	A 6	A 7	A 8
Damage to or loss of individual cultural assets of local, regional and national significance	Serious damage to or loss of individual cultural assets of local, regional and national significance	Damage to or loss of several cultural assets of local, regional and national significance	Serious damage to or loss of several cultural assets of local, regional and national significance	Damage to or loss of many cultural assets of local, regional and national significance	Serious damage to or loss of many cultural assets of local, regional and national significance	Damage to or loss of very many cultural assets of local, regional and national significance	Serious damage to or loss of very many cultural assets of local, regional and national significance
(27m)	(87m)	(270m)	(870m)	(2.7bn)	(8.7bn)	(27bn)	(87bn)

[19] See the Hague Convention of 1954, Art. 1. (SR 0.520.3)

S5 – National reputation damage

This indicator comprises the intensity and duration of reputation damage for Switzerland abroad. One example is damage to Switzerland's reputation that could result in Switzerland being excluded from bilateral and multilateral agreements and international treaties, or being shunned as a business location or tourist/event destination.

This indicator qualitatively captures the intensity of damage to the country's reputation and its duration.

S5 – National reputation damage: qualitative according to intensity and duration							
A 1	**A 2**	**A 3**	**A 4**	**A 5**	**A 6**	**A 7**	**A 8**
Reputation damage lasting a few days and relating to topics of medium importance (e.g. negative reports on social media abroad, negative reporting in foreign media)	Reputation damage lasting from one to a few weeks and relating to issues of medium importance (e.g. negative reports on social media abroad, negative reporting in foreign media	Reputation damage lasting from one to a few weeks and relating to important issues (e.g. negative reports on social media abroad, negative reporting in foreign media	Reputation damage lasting from a few to several weeks, relating to significant issues, but with minor consequences for Switzerland's standing and international cooperation (e.g. threat of termination of agreements with Switzerland)	Reputation damage lasting several weeks and relating to significant issues, but with consequences for Switzerland's standing and international cooperation (e.g. termination of agreements with Switzerland, temporary expulsion of Swiss ambassador)	Significant reputation damage lasting several weeks, with consequences for Switzerland's standing and international cooperation (e.g. termination of important agreements with Switzerland, expulsion of Swiss ambassador)	Significant reputation damage lasting several months, with clear consequences for Switzerland's standing and international cooperation (e.g. political isolation, boycotts)	Lasting, severe and even irreversible loss of reputation with farreaching impact on Switzerland's standing and international cooperation (e.g. political isolation, boycotts)
(27m)	(87m)	(270m)	(870m)	(2.7bn)	(8.7bn)	(27bn)	(87bn)

S6 – Loss of public confidence in government

Indicator S6 covers the intensity of damage to the population's confidence in the state as a whole or in its institutions, as well as the proportion of the population losing confidence. State institutions include executive, legislative and judicial bodies, as well as state or cantonal organisations, the Armed Forces, the police and state or state-affiliated bodies.

The intensity of such loss of confidence is described qualitatively and includes, for instance, whether the loss of confidence extends to individual cantonal administrative units or to the Federal Administration in general.

S6 – Loss of public confidence in government: qualitative according to significance and duration

A 1	A 2	A 3	A 4	A 5	A 6	A 7	A 8
Impairment of confidence lasting only a few days and relating to issues of medium significance (e.g. highly critical reporting in Swiss media, negative posts on social media)	Confidence damage lasting from one to a few weeks and relating to issues of medium significance (e.g. highly critical reporting in Swiss media, negative posts on social media, isolated demonstrations)	Confidence damage lasting from one to a few weeks and relating to significant issues (e.g. extremely critical reporting in Swiss media, negative posts on social media, isolated demonstrations)	Confidence damage lasting from a few to several weeks and relating to significant issues (e.g. dissemination of fake news on social media, large demonstrations	Confidence damage lasting several weeks and relating to significant issues (e.g. dissemination of fake news on social media, isolated mass demonstrations, even strikes)	Considerable damage to general confidence lasting several weeks (e.g. dissemination of fake news on social media, mass demonstrations throughout Switzerland, prolonged strikes in many sectors)	Significant damage lasting several months to general public confidence (e.g. increased dissemination of fake news, general strikes)	Lasting, severe or even irreversible loss of general confidence (e.g. increased dissemination of fake news, formation of local or regional groups that organise public life themselves, up to the point of vigilante group formation)
(27m)	(87m)	(270m)	(870m)	(2.7bn)	(8.7bn)	(27bn)	(87bn)

4.3 Likelihood and plausibility

Alongside the impact or extent of damage, the likelihood or plausibility of the scenarios is the second factor taken into account in risk assessment. For non-malicious hazard events, DES uses the likelihood (Section 4.3.1). For malicious events, however, plausibility is assessed (Section 4.3.2).

4.3.1 Likelihood, recurrence interval and frequency

Likelihood refers to a possible event. The aim is to determine the likelihood of a certain event – for DES, the scenario with major intensity – occurring at least once within a defined period (e.g. within the next five or ten years). Likelihood always takes a value of between 0 and 1. A value between 0 and 100% is equivalent.

In DES the method for estimating likelihood is mainly based on expert elicitation conducted in hazard-specific workshops; the results are thereby determined by consensus. Results from frequentist or probabilistic models can also be taken into account or included (e.g. earthquake risk model).

In Switzerland, it is common practice in civil protection to specify the return period – referred to as frequency – instead of the likelihood. All these measures are essentially equivalent; they simply use different scales. The most important factors are the return and observation periods.

The return period refers to the time span expressed in years during which statistical computations or estimates expect a given event to occur at least once on average. It is expressed as (once in x years).

The frequency (or annual occurrence rate) describes the expected number of events per year. It is expressed as x times per year. Frequency is the reciprocal of the return period. The relationship between the variables is shown in Table 5.

A return period of 50 years (frequency of once in 50 years) corresponds to an annual likelihood – the likelihood of the event occurring in any given year – of 0.02 or 2%. The likelihood of the event occurring in the next ten years is therefore 20%.

However, the recurrence period or frequency is not a forecast or prediction, but should continue to be interpreted as a measure of likelihood. A 100-year flood does not occur regularly every 100 years or only once in 100 years. In any given 100-year period, a 100-year event may occur once, twice, more often, or not at all. The return period is an overview of very long time horizons – over a period of 1,000 years, a 100-year flood occurs on average 10 times.

Likelihood classes

It is possible to estimate with a high degree of precision the likelihood of occurrence (return period or frequency) for natural and technological hazard

Table 5: Likelihood classes (L-classes)

L-class	Description	Frequency* (once in x years)	Annual occurrence rate (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 occurs 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 isolated known events worldwide, but also conceivable in Switzerland.	> 10 000–30 000	< 0,0001–0,00003	< 0,1–0,033
L1	Only isolated, 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 Swit-zerland 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.

scenarios (as well as for certain societal hazard scenarios). This work is based on statistics or – where the data are lacking – on expert elicitation.

If point estimates are not possible, the likelihood of occurrence (or frequency) can be attributed to a likelihood class (L-class). Since a specific value is required to represent the risk in the risk diagram, the average value of an L-class is used when assessing that class.

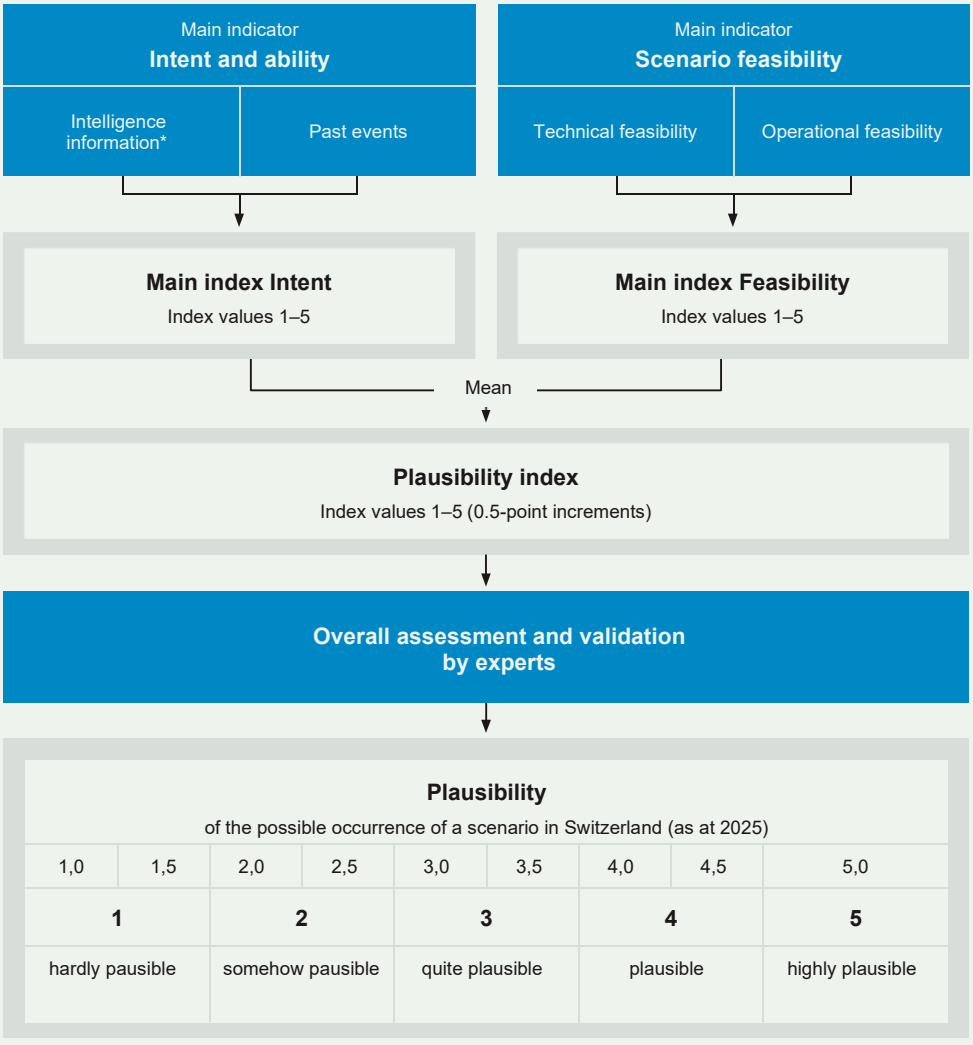
DES uses eight likelihood classes (L1 to L8) (see Tab. 5). The likelihood of occurrence is expressed as the return period with the corresponding description.

4.3.2 Plausibility

In the case of malicious events, DES assesses their plausibility, not the likelihood of occurrence.

Malicious events (e.g. in connection with terrorism, political events or armed conflicts) do not allow for reliable statements about the likelihood (or frequency) of occurrence due to the unpredictability of the actors, the changing willingness to act and reactions to changed security situations, the rapidly changing threat landscape, and the general lack of statistically evaluable case numbers (Brown, 2011).

Figure 3: Overview of the indicator-based method used in DES 2025 to assess the plausibility of malicious events



*The indicator *Intelligence information* is replaced by *Police information* in the Unrest scenario and by *Cybersecurity Information* in the Cyberattack scenario.

An indicator-based method is used to assess plausibility. Several expert groups were involved in developing the new methodology; they also tested it in a workshop setting. The United Kingdom and Singapore also use an indicator-based approach for their national risk analyses, which were further developed for Switzerland's specific context.

4.3.3 Indicator-based plausibility assessment

The plausibility assessment is based on two main qualitative indicators: the perpetrators' *intent and ability,* and the scenario feasibility (see Fig. 3).

The main indicators are each assigned two sub-indicators with pre-defined evaluation criteria; these are set for each scenario in an expert workshop. The indicators are used to determine a plausibility index with index values from 1 to 5 (in increments of 0.5), which are assigned to five plausibility classes (P-classes).

Using an evaluation system, a main index is determined for each of the two main indicators (one for *intent and ability* and one for *feasibility*) with index values from P1 to P5, combining the evaluations for the sub-indicators. The average of these two main indices provides the indicator-based P-index for a given scenario.

Main indicator *intent and ability*

The main indicator *intent and ability* captures signs of a potential perpetrator's intent with or without the relevant ability to use the weapon discussed in the scenario or a comparable weapon in Switzerland.

The main indicator *intent and ability* is supported by two sub-indicators: *intelligence information* and *past events.*

Sub-indicator *intelligence information / police information / cybersecurity information*

The sub-indicator *intelligence information* records intelligence information on activities, efforts or other indications of the intent of one or more perpetrators to carry out the described or a similar scenario in the case of (terrorist) attack scenarios.

The sub-indicator *police information* collects police information for the unrest scenario on the prerequisites in terms of collective intent and ability (*collective intentionality*) among the population to realise the scenario described or a comparable scenario.

The sub-indicator *cybersecurity information* records evidence of activities, efforts or other signs of the intent of one or more perpetrators to carry out the described or a similar scenario.

The *intelligence information* sub-indicator is assessed exclusively by the Federal Intelligence Service (FIS), with the exception of three scenarios: in the *armed conflict* scenario, both the FIS and the military intelligence service assessments are decisive, while in the *civil unrest* scenario, the assessment is carried out by the Federal Office of Police (fedpol). For the cyberattack scenario, the *cybersecurity information* sub-indicator is assessed by the National Cyber Security Centre (NCSC).

Sub-indicator *past events*

The sub-indicator *past events* records events that have occurred worldwide of the type described or comparable events, or the foiling of such attacks, regardless of the current existence or suspected existence of a possible perpetrator (applies mutatis mutandis to the *unrest* scenario).

Main indicator *scenario feasibility*

The main indicator *scenario feasibility* assesses the feasibility or practicability of the described scenario or a comparable scenario in terms of the necessary technical and operational requirements, regardless of who is responsible.

Two sub-indicators are assigned to the main indicator *scenario feasibility: technical feasibility* and *operational feasibility.*

Sub-indicator *technical feasibility*

The sub-indicator *technical feasibility* covers the technical aspect of feasibility in Switzerland, i.e. general technical requirements, requirements for specialised equipment, procurement, preparatory work and knowledge, as well as hazards associated with handling.

Sub-indicator *operational feasibility*
The sub-indicator *operational feasibility* covers the operational aspect of implementation in Switzerland, i.e. the effort involved in terms of organisation, human resources, necessary communication structures, financial resources, training, preparation time, etc.

Plausibility index and plausibility classes
Using the indicator-based method, plausibility indices (index values from P1 to P5 in increments of 0.5) are determined for individual scenarios and assigned to one of five plausibility classes (P-classes P1 to P5) on an ordinal scale. Classed from P1 to P4 are each assigned two possible index values; P5 is assigned one. The plausibility indicated by the P-classes ranges from hardly plausible to highly plausible. The metrics of the P-indices and P-classes with descriptions are shown in Table 6.

Table 6: P-classes and P-indices. The information in the descriptions with regard to indications of the potential perpetrators' intent and scenario feasibility is derived from the main indicators and main indices. Only an approximate definition can be provided for indications of intent and scenario feasibility in P-classes P4, P3 and P2.

P-class	P-index	Plausibility	Description
P5	5,0	Highly plausible	The possibility of the event occurring in Switzerland is highly conceivable compared to other scenarios. There are undeniable indications of potential perpetrator intent. Scenario feasibility is easy overall.
P4	4,5 4,0	Plausible	The possibility of the event occurring in Switzerland is certainly conceivable compared to other scenarios. There are undeniable to clear indications of potential perpetrator intent. Scenario feasibility ranges from easy to challenging overall.
I3	3,5 3,0	Quite plausible	The possibility of the event occurring in Switzerland is conceivable compared to other scenarios. There are clear to non-existent or indiscernible indications of potential perpetrator intent. Scenario feasibility ranges from easy to complex overall.
I2	2,5 2,0	Somewhat plausible	The possibility of the event occurring in Switzerland is not very conceivable compared to other scenarios. There are clear to non-existent or indiscernible indications of potential perpetrator intent. Scenario feasibility ranges from challenging to complex overall.
I1	1,5 1,0	Hardly plausible	The possibility of the event occurring in Switzerland is hardly conceivable compared to other scenarios, but cannot be fully ruled out. There are no indications of potential perpetrator intent. Scenario feasibility is complex overall.

4.4 Consolidation workshops

In 2020, DES held its first consolidation workshop, which focused on reviewing the estimated plausibility indices of all malicious events. This review ensured the quality of the risk evaluation carried out at that time.

As part of the DES 2025 update, the review approach was much broader in scope: all hazards – both malicious and non-malicious – are now included in the assessment. The aim was to compare, validate and, where necessary, adjust assessments of likelihood/plausibility and extent of damage across all scenarios.

To facilitate a structured and focused discussion, the hazards were divided into three thematic groups. Accordingly, three separate consolidation workshops were held:

1. **Natural hazards** – with the exception of *volcanic eruptions* and *solar storms,* which are addressed under hazards with an impact on infrastructure. The *dam accident* file was included in this workshop because the scenario addresses an overflow caused by a rockslide and resembles gravitational natural hazards in terms of how events unfold.

2. **Technological hazards with an impact on infrastructure** – in particular those with a primary impact on critical infrastructure. In addition, this workshop also addressed the natural but technologically relevant hazard of solar storms.

3. **Malicious hazards and non-malicious NBC hazards** – i.e. attack scenarios and dangers caused by nuclear, biological and chemical substances.

The workshops are run on an interdisciplinary basis by representatives from public administration, business and academia. Many of the participating experts had already been involved in preparing individual hazard files and/or had participated in hazard-specific expert workshops. This ensures a high degree of familiarity with the specific content and sound specialist knowledge that can be incorporated into the consolidated assessment.

The three primary objectives of such consolidation workshops are to:

1. **correct any distortions** that may have arisen during the risk-specific individual workshops

2. **add any missing information** to supplement the hazard files, particularly regarding cross-sectoral interdependencies

3. **conduct cross-hazard validation** of the positioning of individual scenarios of malicious and non-malicious hazards on the risk matrix.

To ensure comparability of results, the basic rule is applied that any adjustments regarding the *extent of damage* and *likelihood*/*plausibility* may not deviate by more than one rating unit upwards or downwards. This rule ensures methodological rigour while preventing serious changes that are not sufficiently substantiated.

This structured approach further sharpens the overall picture of the risk landscape, validates existing assessments and lays the foundation for consistent refinement of DES 2025.

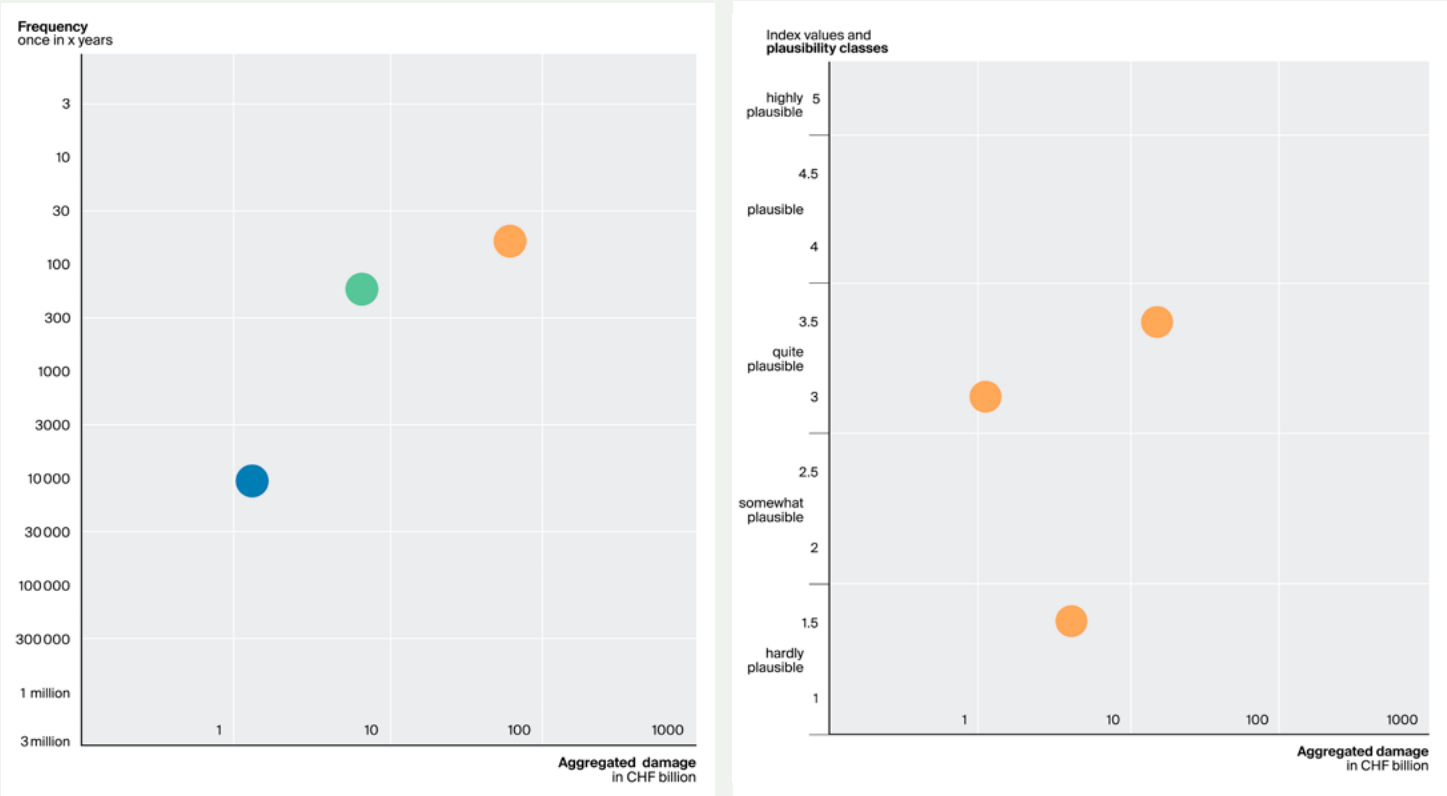


Figure 4: Model risk diagrams DES 2025 for non-malicious (left) and malicious (right) hazard events

4.5 Risk presentation

Comparing hazards and scenarios in terms of their impacts and risks is a key outcome of DES. Appropriate impact and risk diagrams are created for this purpose. The risk of non-malicious events and those of malicious intent are presented in two separate risk diagrams.

The comparison serves as a basis for risk dialogue and discussions on risk acceptance (risk assessment). It also serves to prioritise risks and the associated risk mitigation measures.

4.5.1 Impact diagrams

The impacts of the analysed scenarios are illustrated in impact diagrams (FOCP, 2026a, 2026b). The damage determined for the 12 damage indicators is specified in damage severity classes rather than as exact values. This takes into account the procedure for estimating damage (use of damage severity classes) and the associated uncertainties (see Section 5.1). This damage profile makes it possible to see at a glance which areas are severely affected and which are less affected.

4.5.2 Risk diagrams

Risk diagrams allow (visual) comparison of the risks posed by a range of hazards. Two separate risk diagrams are created because DES assesses the plausibility of maliciously induced events rather than their likelihood of occurrence. Figure 4 shows a model representation of the risk diagrams used for DES 2025.

Risk diagram for non-malicious events

In DES, the risk diagram for non-malicious events is designed so that the determined impacts are entered as monetised and aggregated damages (in CHF) on the x-axis and the likelihood as frequency (once in x years) on the y-axis. The scales of both axes are logarithmic, making it possible to capture the wide range of values in a single diagram. The value points are colour-coded according to the categories nature (green), technology (blue) and society (orange).

Concrete values for aggregated damage and frequency are used to determine where each hazard is positioned on the diagram. These can be concrete estimated values or mean values of an estimated class.

Risk diagram for malicious events
The risk diagram for malicious events is designed so that the calculated impact is also expressed as monetised and aggregated damage (in CHF) on the logarithmic x-axis. Plausibility, on the other hand, is represented as an index value on the y-axis, divided into five plausibility classes.

Comparison of risk diagrams
The risk diagram for non-malicious events allows direct comparison of aggregated damage with the hazards in the risk diagram for malicious events.

However, because different approaches are used, the frequency values for non-malicious events cannot be compared with the plausibility values for malicious events.

5 Use of the results

One key benefit of the national risk analysis *Disasters and Emergencies in Switzerland* (DES) is that it enables risks relevant to civil protection to be presented in a risk diagram and compared with one another. This provides an essential basis for risk dialogue both within professional circles and with the general public, enabling sound risk assessment by the responsible authorities and individuals. It also provides the foundation for further analysis, strategies and exercises. When conducting such risk assessments, various aspects inherent to the methodology must be taken into account, as outlined below.

5.1 Uncertainty

The (semi-)quantitative risk analysis method used in DES enables the calculation of precise risk values by visualising risks in the corresponding risk diagrams. It should be noted that these diagrams model risks, not reality. They also reflect a degree of uncertainty in data collection and scenario modelling. This uncertainty needs to be taken into account when interpreting the risk analysis results.

Uncertainty in data collection
DES compares well-known hazards (e.g. flooding) with hazards that are less tangible (e.g. terrorist attacks involving NBC substances) in terms of their risk and extent of damage. For certain hazards, empirical values and a statistical basis are available for establishing the frequency and extent of damage for each hazard scenario. This is not the case for more obscure hazards, where the risk analysis relies more heavily on assumptions and expert assessments. Even with well-known hazards, expert assessments are essential, for example when determining the extent of certain damage indicators.

To a large extent, careful data collection and awareness of the respective collection methods can help preclude distortions, resulting in good data quality The involvement of experts from different disciplines and administrative levels also helps reduce these ambiguities.

Uncertainty in modelling
The choice of scenario and the marginal costs used to express damage in monetary terms may lead to model uncertainty.

Comparisons are always made between the risks of the representative scenarios for events related to a given hazard. There is a certain amount of leeway in developing scenarios and assigning them to a comparable intensity level (major). This, in turn, affects impact and likelihood. Furthermore, this approach does not provide an overview of the entire intensity spectrum of a hazard, but is limited to a specific point on an intensity scale (see Fig. 1). The total risk across a range of different aggregate damage amounts and their likelihood may differ from the DES results. This corresponds to a deliberate operational focus of the national risk analysis: although some smaller, more frequent everyday events can cause high damage costs in mathematical terms, they are often of little relevance to civil protection. At the same time, the potentially high damage values of extreme, rare events can strongly influence the setting of priorities – without offering any concrete benefits for contingency planning.

The monetisation of damage based on marginal costs reflects societal preferences. The marginal cost rates and risk aversion factors used here may have a crucial effect on aggregate damage and must therefore be validated periodically.

5.2 Risk aversion

The phenomenon of assigning greater weight to possible events with a high damage level than would be appropriate based on the associated extent of damage – empirically observed in many situations and justified theoretically – is referred to as *risk aversion towards major events,* or simply *risk aversion* (FOCP, 2008).

As this phenomenon is a societal norm, it must be factored in when interpreting risks.

In addition, the calculation of risk (as the mathematical product of the extent of damage/impact and the likeli-hood of occurrence) must recognise that information is lost about whether the given scenario is associated with major damage and low likelihood or with minor damage and high likelihood of occurrence.

6 Conclusion

The updated DES 2025 methodology provides a systematic framework for risk identification and hazard selection, risk analysis and scenario development, and risk evaluation and presentation for hazards relevant to civil protection, while incorporating current events, developments and trends. The resulting risk analysis and detailed hazard files will remain relevant for the next five to ten years, supporting the development of action plans and informing strategies to protect the population and strengthen social resilience. DES also provides the basis for updating hazard analyses at cantonal level, as described in the KATAPLAN guidelines (FOCP, 2013a).

Completing a DES update cycle also marks the beginning of the next. The DES 2025 methodology will be critically reviewed and refined over the coming years, incorporating the latest research findings and international best practice. This iterative approach ensures that DES 2030, the fifth update, will rest on a robust, current methodological foundation.

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A2 Index of tables

A3 Index of figures

A4 Scales of damage indicators

Damage area	Damage indicator		Unit	A 1	A 2	A 3
Individuals	**I1**	Fatalities	Number	≤ 10	11 – 30	31 – 100
	I2	Casualties	Number	≤ 100	> 100 – 300	> 300 – 1000
	I3	People requiring assistance	Person days	≤ 200 000	> 200 000 – 600 000	> 600 000 – 2 million
Environment	**En1**	Ecosystem damage	km^2 x year	≤ 150	> 150 – 450	> 450 – 1500
Economy	**Ec1**	Asset losses and response costs	CHF	≤ 50 million	> 50 – 150 million	> 150 – 500 million
	Ec2	Loss of economic output	CHF	≤ 50 million	> 50 – 150 million	> 150 – 500 million
Society	**S1**	Supply disruptions	Person days	≤ 100 000	> 100 000 – 300 000	> 300 000 – 1 million
	S2	Public order and security disruption	Person days	≤ 100 000	> 100 000 – 300 000	> 300 000 – 1 million
	S3	Territorial integrity violation	Qualitative by intensity and duration	–	–	–
	S4	Cultural heritage damage and loss	Qualitative by significance and number	Damage to or loss of individual cultural assets of local, regional and national significance	Serious damage to or loss of individual cultural assets of local, regional and national significance	Damage to or loss of several cultural assets of local, regional and national significance
	S5	National reputation damage	Qualitative by intensity and duration	Reputation damage lasting only a few days and relating to issues of medium importance (e.g. negative coverage on social media abroad or in foreign media)	Reputation damage lasting from one to a few weeks and relating to issues of medium importance (e.g. negative coverage on social media abroad or in foreign media)	Reputation damage lasting from one to a few weeks and relating to important issues (e.g. negative coverage on social media abroad or in foreign media)
	S6	Loss of public confidence in government	Qualitative by significance and duration	Impairment of confidence lasting only a few days and relating to issues of medium significance (e.g. very critical coverage in Swiss media, negative coverage on social media)	Confidence damage lasting from one to a few weeks and relating to issues of medium significance (e.g. very critical coverage in Swiss media, negative coverage on social media, occasional demonstrations)	Confidence damage lasting from one to a few weeks and relating to significant issues (e.g. extremely critical coverage in Swiss media, negative coverage on social 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	> 500 million – 1.5 billion	> 1.5 – 5 billion	> 5 – 15 billion	> 15 billion – 50 billion	> 50 billion
Ec2	> 500 million – 1.5 billion	> 1.5 – 5 billion	> 5 – 15 billion	> 15 billion – 50 billion	> 50 billion
S1	> 1 – 3 million	> 3 – 10 million	> 10 – 30 million	> 30 – 100 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. civil or military operations by foreign security personnel 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	Serious damage to or loss of several cultural assets of local, regional and national significance	Damage to or loss of many cultural assets of local, regional and national significance	Serious damage to or loss of many cultural assets of local, regional and national significance	Damage to or loss of very many cultural assets of local, regional and national significance	Serious damage to or loss of very many cultural assets of local, regional and national significance
S5	Reputation damage lasting up to several weeks and relating to important issues, but with minor impact on Switzerland's standing and international cooperation	Reputation damage lasting several weeks and relating 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 reputation damage 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 reputation damage 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 farreaching impact on Switzerland's standing and international cooperation (e.g. political isolation, boycotts)
S6	Confidence damage lasting up to several weeks and relating to significant issues (e.g. dissemination of fake news on social media, major demonstrations)	Confidence damage lasting several weeks and relating to significant issues (e.g. dissemination of fake news on social media, isolated mass demonstrations, strikes)	Considerable damage to general confidence lasting several weeks (e.g. dissemination of fake news on social media, mass demonstrations across Switzerland, extended strikes in many sectors)	Considerable damage to general confidence lasting up to several months (e.g. increased dissemination of fake news, general strikes)	Lasting, severe or even irreversible loss of general confidence (e.g. increased dissemination of fake news, formation of local or regional groups for self-organisation of public life, up to the point of vigilante group formation)

A5 Brief description of the goods and services relating to S1

Good or service		Brief description	Impact: Impairment / shortfall
S1-1	Drinking water	Supplying the population with drinking water. Drinking water is defined as water that is used for drinking, cooking and preparing food and beverages, or for personal hygiene and cleaning, as well as for cleaning objects that come into contact with food (glasses, crockery, cutlery) or the human body (clothes, laundry).	The affected population cannot be supplied with drinking water, or only to a very limited extent.
S1-2	Food	Supplying the population with basic foodstuffs. This includes animal-based foods (meat products, eggs, dairy products), plant-based foods (cereal products, vegetables, sugar) and oils/fats.	The affected population cannot be supplied with basic foodstuffs, or only to a very limited extent.
S1-3	Medicines and medical devices	Supplying the population with essential medicines (e.g. painkillers, antibiotics, anaesthetics, blood products, medicines for cardiovascular diseases) and medical devices (e.g. dressings, infusion materials, syringes, surgical instruments, medical equipment, hygiene masks).	People dependent on medicines and/or medical devices cannot be supplied with them, or only to a limited extent.
S1-4	Emergency medical care	Access to emergency medical care for the population. This refers to the care of patients with injuries/illnesses that require immediate treatment to prevent permanent damage or death (e.g. treatment of heart attacks, severe burns, poisoning).	People requiring emergency medical care cannot be treated in an emergency, or can only be treated with severe restrictions (e.g. due to destruction of premises or overloading of infrastructure/staff).
S1-5	Emergency services	Rescue operations by the fire brigade and medical and rescue services, e.g. in the event of fire, explosion, natural hazards, NBC events and medical emergencies. *Police security and public order operations fall under indicator S2.	People in distress cannot be rescued, or can only be rescued with severe limitations (e.g. time delays).
S1-6	Emergency calls	The population has access to emergency services, i.e. to the relevant emergency numbers.* *The operational management of the fire brigade, police, and medical and rescue services falls under the remit of the emergency services.	Affected people cannot reach the emergency services, or can only do so with difficulty, to make an emergency call.
S1-7	Electricity	Supplying the population with electricity.	The affected population cannot be supplied with electricity, or only with severe restrictions (e.g. selective switching on and off at certain times).
S1-8	District heating	Supplying the population with space heating by means of thermal networks.	District heating and process heat are not available or only available to a very limited extent. Affected people cannot be supplied with heating in their buildings or homes.
S1-9	Natural gas	Supply of natural gas for heating buildings and cooking.	Natural gas is not available or only available to a very limited extent. Affected people cannot be supplied with natural gas for heating their homes and for cooking, or can only be supplied partially.
S1-10	Petroleum products	Supplying the population with petroleum and petroleum products, in particular for heating buildings.* *Any failure or disruption to vehicle refuelling will be taken into account by the respective transport operators.	Petroleum is not available or only available to a very limited extent. This means that the supply of heating oil for heating the homes of those affected is not guaranteed once oil tanks are empty.
S1-11	Telecommunications (excluding emergency calls)	The population has access to telecommunications networks and services. This includes telephony (mobile and landline), internet and other messaging and data transmission services. *Emergency services are covered separately.	The affected population cannot make phone calls, use the internet or send messages or data, or can only do so to a very limited extent.
S1-12	Outpatient and inpatient medical care (excluding emergency care)	The population has access to outpatient and inpatient medical care (excluding emergency care). Outpatient care refers to treatment provided by a medical professional in a doctor's surgery or hospital. Inpatient care involves round-the-clock treatment and care in a hospital or other medical facility.	People requiring outpatient or inpatient medical care cannot be treated, or can only be treated to a very limited extent (e.g. due to destruction of premises or overburdened infrastructure/staff).

S1-13	Laboratory services	The population has access to laboratory services. This includes pre-analysis (sample collection, transport and storage), analysis (analysis of samples) and post-analysis (transmission of results).	Laboratory services for affected people cannot be provided or can only be provided to a very limited extent.
S1-14	Waste/wastewater disposal	Waste and sewage disposal services are available to the population.	Waste and/or sewage disposal for the population in the affected area is not working or is only working to a very limited extent.
S1-15	Postal services	The population has access to postal services. This includes the delivery of letters and parcels.	The affected population has no or only very limited access to postal services. This means that letters and parcels will no longer be delivered or will only be delivered to a limited extent.
S1-16	Press	The population has access to print media (newspapers and magazines) and electronic media (radio, television, internet services, mobile apps).	The affected population has no or only very limited access to newspapers or electronic media such as radio, television or internet services.
S1-17	Road traffic	The population has access to the road network and public transport (trams, trolleybuses and buses).	The road network is unavailable or severely restricted for travellers using private motorised transport and/or public transport in the affected area.
S1-18	Rail transport	The population has access to public rail transport. * Railways only	Rail transport is no longer available or only available to a very limited extent for travellers in the affected area.
S1-19	Air transport	The population has access to air transport (scheduled and charter flights).	Air travel is no longer available to travellers, or only to a very limited extent.
S1-20	Shipping	The population has access to passenger shipping.	Shipping is no longer available for travellers, or only to a very limited extent.

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