Disasters and Emergencies in Switzerland 2020

What risks is Switzerland exposed to?

Schweizerische Eidgenossenschaft
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Federal Office for Civil Protection FOCP

This brochure provides a summary of the key findings of the national risk analysis «Disasters and Emergencies in Switzerland 2020» (DES). It shows the broader public which hazards can occur in Switzerland, how likely they are and what damage they could cause.

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The risks in focus

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

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

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

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

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

Federal Councillor Viola Amherd
Head of the Federal Department of Defence, Civil Protection and Sport

The safety and security situation has become more acute

In 2015, the FOCP published the results of the last risk analysis «Disasters and Emergencies in Switzerland». It is important that this analysis is periodically reviewed in light of relevant changes to the risk landscape.

There is no doubt that the COVID-19 pandemic and its effects have accentuated the safety and security situation and have increased awareness of these issues worldwide. As things stand, we cannot say for certain what the exact consequences will be. But they are sure to be felt for a long time. In the previous version of this brochure, published in 2015, we stated that «Switzerland has not suffered any major disasters or emergencies in recent times». Sadly, we can no longer say the same.

Risk overview must be updated regularly
A few years ago, terrorist attacks such as those in Paris, Brussels and Berlin revealed a new, even more menacing side to security-related events in Europe. These attacks, the COVID-19 pandemic, but also the extreme drought in 2018, all show the need for us to update our risk analyses for Switzerland on a regular basis. The events also show that the hazard situation is constantly evolving, which in turn is affecting the risks that are relevant to Switzerland.

Update provides a more differentiated view
In this complex hazard situation, the approach used in the national risk analysis has proved its worth. As part of the 2020 update, we have further developed the hazard catalogue and methodology. Experts have reviewed the existing hazard files and helped us create new ones. Instead of 33 files, there are now 44. This has enabled us to provide information about other hazards that are relevant to Swiss civil protection.

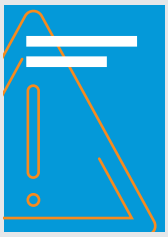
Fewer blind spots in risk assessment

Jack Radisch, Project Manager OECD High Level Risk Forum

Switzerland's national risk analysis incorporates key aspects of the OECD's «Recommendation on the Governance of Critical Risks». It mobilises an enormous breadth and depth of specialist knowledge. It thereby reduces blind spots and increases the focus on the complex risks that society is exposed to. With commendable transparency, it promotes public debate and thus enables society as a whole to deal with major risks more effectively.

Risk analysis: basis for preparedness planning

All products of the national risk analysis build on each other and pursue the same objective: to serve as a basis for strategy development and preparedness planning and thereby make Switzerland a safer and more secure place for everyone.

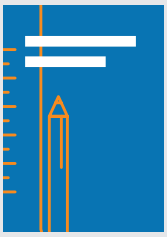


Hazard catalogue

Lists hazards that could have relevant effects for Switzerland

Hazard files

Describe each of the examined hazards in detail with a scenario



Methodology report

Explains the chosen analysis method in detail

Interdisciplinary workshops

In the interdisciplinary workshops, experts define the scenarios and determine the effects, frequency or plausibility, respectively of the selected scenarios.

All publications can be found at www.risk-ch.ch

Risk report

Describes the background and results for an audience of experts

Risk brochure

Summarises the key findings of all DES products, primarily for the broader public and political decision-makers

Domain nature

Natural hazards remain a major risk

Heat wave, earthquake, windstorm – these remain the three biggest risks among the 15 natural hazards that have been examined so far. What stands out: many natural hazards pose a high risk because they occur relatively frequently.

In view of climate change, it may seem surprising at first glance that the risk of hazards such as heat wave, drought and inland flooding has not increased in comparison to the last analysis in 2015. However, the consequences of climate change were already foreseeable at that time, and the participating experts had already taken these into account in their risk assessments.

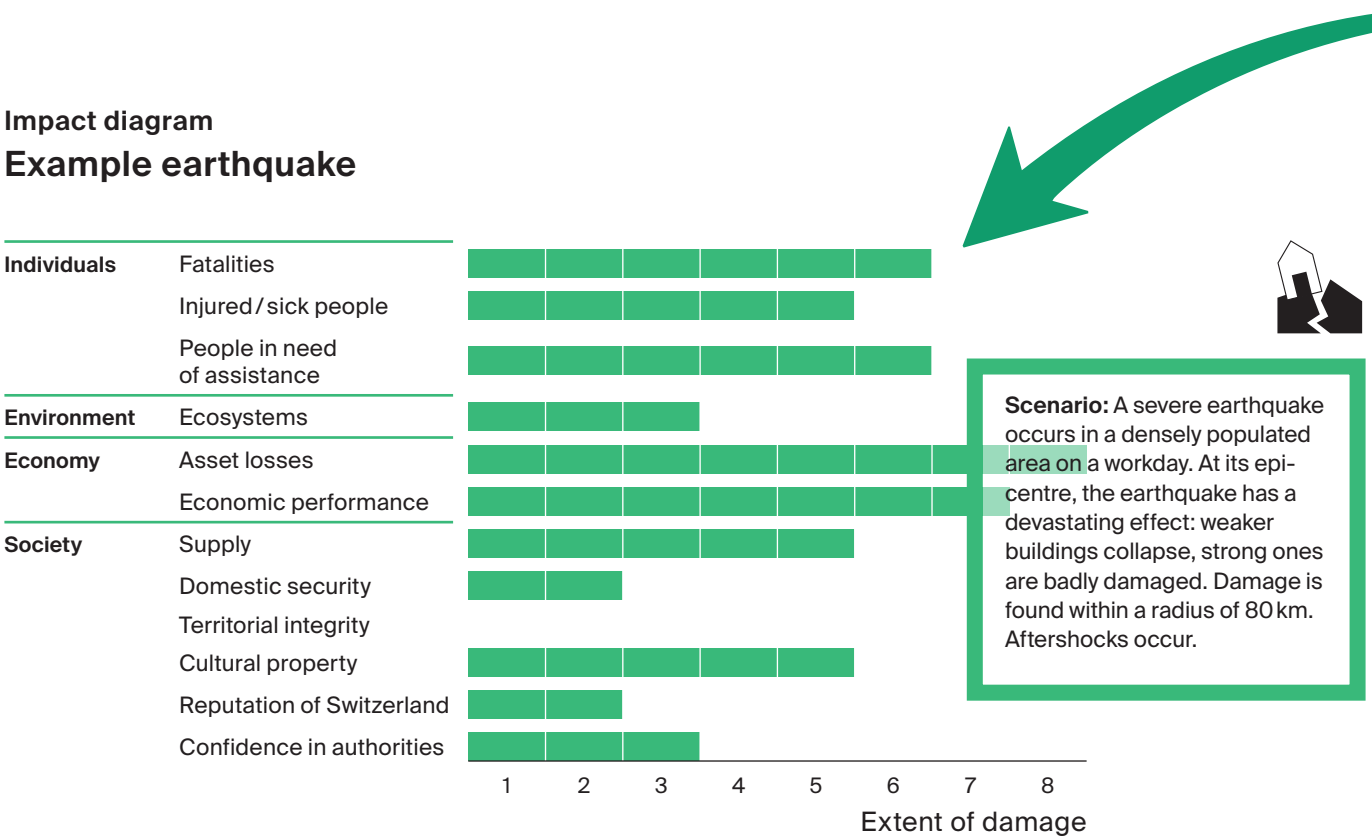
New findings

On the other hand, the risk of a solar storm has since decreased considerably. New scientific findings show that the frequency of occurrence is much lower than assumed in the 2015 analysis – but the consequences would still be significant.

Hailstorm, avalanche winter and volcanic eruption have been added as new hazards. Even if no volcanic eruption is expected in Switzerland, the effects of one abroad would also be felt here.

Impact diagram

Example earthquake



Examples of events can be found in the hazard catalogue at www.risk-ch.ch

Hydrological/meteorological natural hazards

Severe weather
A thunderstorm with heavy rain, lightning and hail across several regions

Hailstorm
Hail causes damage across an area of 100 km²

Heavy snowfall
70 to 80 cm of fresh snow in the Swiss Central Plateau

Windstorm
Severe storm with wind speeds of around 140 km/h across a large area for several days

Cold wave
Average temperatures of –10 °C for several weeks

Heat wave
Average temperatures of > 35 °C for several weeks

Drought
Nationwide drought for several months

Forest fire
Fire across several square kilometres of forest, including protection forest

Gravitational natural hazards

Inland flooding
High water with a recurrence interval of 300 years in several streams and rivers

Avalanche winter
Heavy snowfall in the Alps leads to numerous avalanches over the course of several weeks

Seismic and volcanic natural hazards

Earthquake
Severe earthquake with a devastating impact

Volcanic eruption abroad
Volcanic eruption disrupts air traffic over a period of several weeks

Spread of harmful organisms

Propagation of invasive species
Large-scale spread of an invasive plant with high damage potential

Other natural hazards

Meteor strike
Explosion of a meteor over a populated area

Solar storm
Solar storm causes partial outage of communication networks and the electricity supply

NEW Since the 2015 analysis, we have further differentiated the list of hazards and added new ones.

Domain technology

Electric power supply shortage: the biggest risk

Although it is expected that harm to people can be reduced significantly through more specific measures, the economic impact of an electric power supply shortage is estimated to be higher than in 2015.

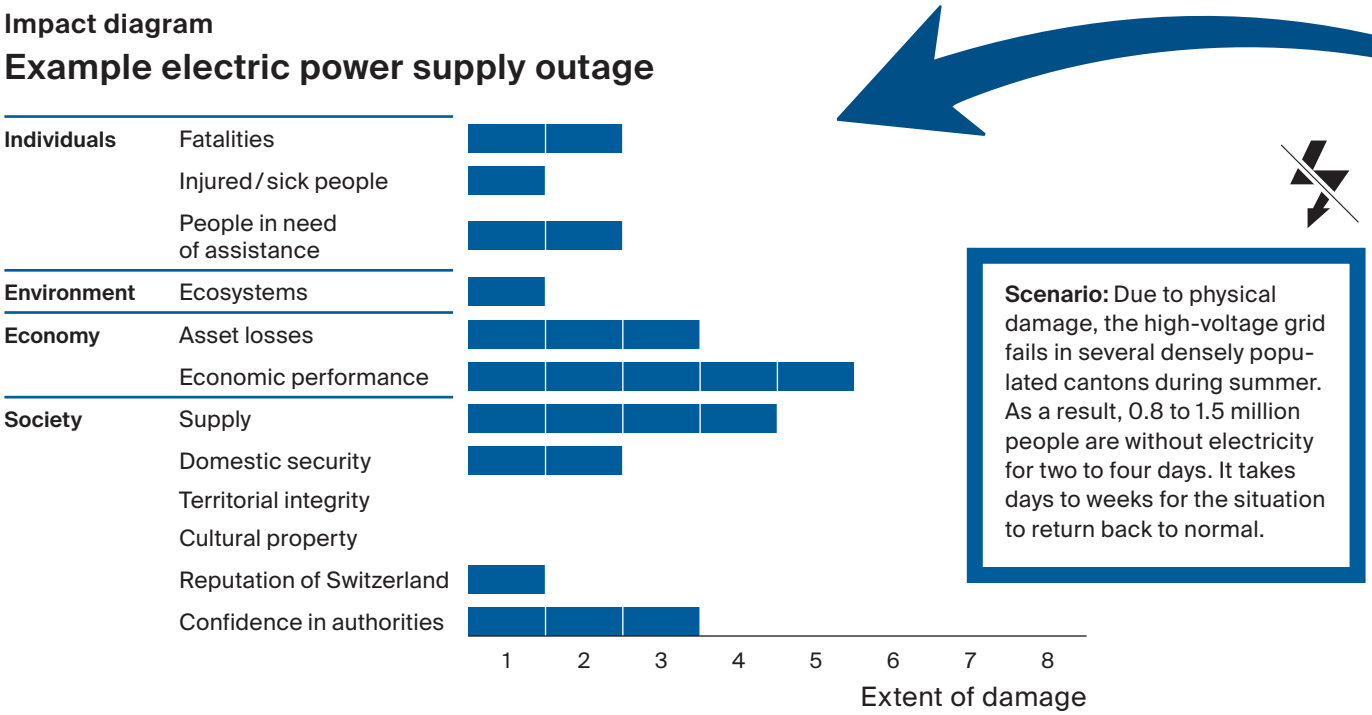
The risk picture for most technical hazards has hardly changed. It was possible to reduce the risk of a hazmat rail accident with additional measures. A shortage of petroleum products due to low water on the Rhine, strikes at a refinery or geopolitical tensions has been added to the catalogue as a new hazard, along with mobile network outage. This also highlights the growing importance of mobile communication technologies.

Awareness helps to manage risks

The Swiss Security Network Exercise 2014 and the national risk analysis 2015 highlighted the disruptive nature of an electric power supply shortage. With the help of a multi-stage escalation plan, a once-feared prolonged electricity shutdown can now be avoided to a large extent by means of appeals to reduce consumption, usage restrictions and quotas for large consumers. Fatalities and injuries can thereby be reduced by a factor of 30. However, the experiences of coping with the COVID-19 pandemic show that the economic impact of a protracted crisis must be cushioned with government support.

Impact diagram

Example electric power supply outage



Examples of events can be found in the hazard catalogue at www.risk-ch.ch

Passenger transport accident

Airplane crash
A fully occupied passenger plane crashes over a populated area

Accidents involving hazardous material

Rail accident involving hazardous material
Large quantities of chlorine gas are released in a populated area

Road accident involving hazardous material
Large quantities of toxic substances are released in a populated area

Accidents in production, distribution and storage facilities

Incident in a biological facility
Spread of dangerous pathogens outside a laboratory

NPP incident
Accident with unfiltered release of radiation

Incident in a chemical facility
Release of chemical substances in very harmful quantities

Dam accident
Flooding of a populated area below a dam

Failures and restrictions of critical infrastructures

Gas supply disruption
Failure of a central high-pressure pipeline causing short-term supply shortages

Data centre outage
Outages at multiple providers with an impact on critical sectors

Petroleum supply shortage
Supply of petroleum products reduced by 15 % over a period of several months

Mobile network outage
The mobile phone network of a provider is down for three days

Electric power supply outage
Major regional electricity outage lasting for several days

Restriction of shipping traffic
Blockade of the Swiss Rhine ports lasting for several weeks

Electric power supply shortage
Electricity shortage of 30 % for several months during winter

NEW Since the 2015 analysis, we have further differentiated the list of hazards and added new ones.

Domain society

Pandemic: the biggest societal risk

The result comes as no surprise: although the scenario does not describe a pandemic caused by a coronavirus, it can still be seen that an influenza pandemic poses the biggest societal risk. There is also a stronger focus on attack scenarios.

Both the national and other risk analyses in Switzerland and abroad have concluded that a pandemic poses a very high risk. This is due to its combination of a high frequency and a very high extent of damage.

The COVID-19 pandemic is following a different course to the flu pandemic described in the scenario. Nevertheless, the scenario still provides a good foundation for preparedness planning irrespective of the causative agent.

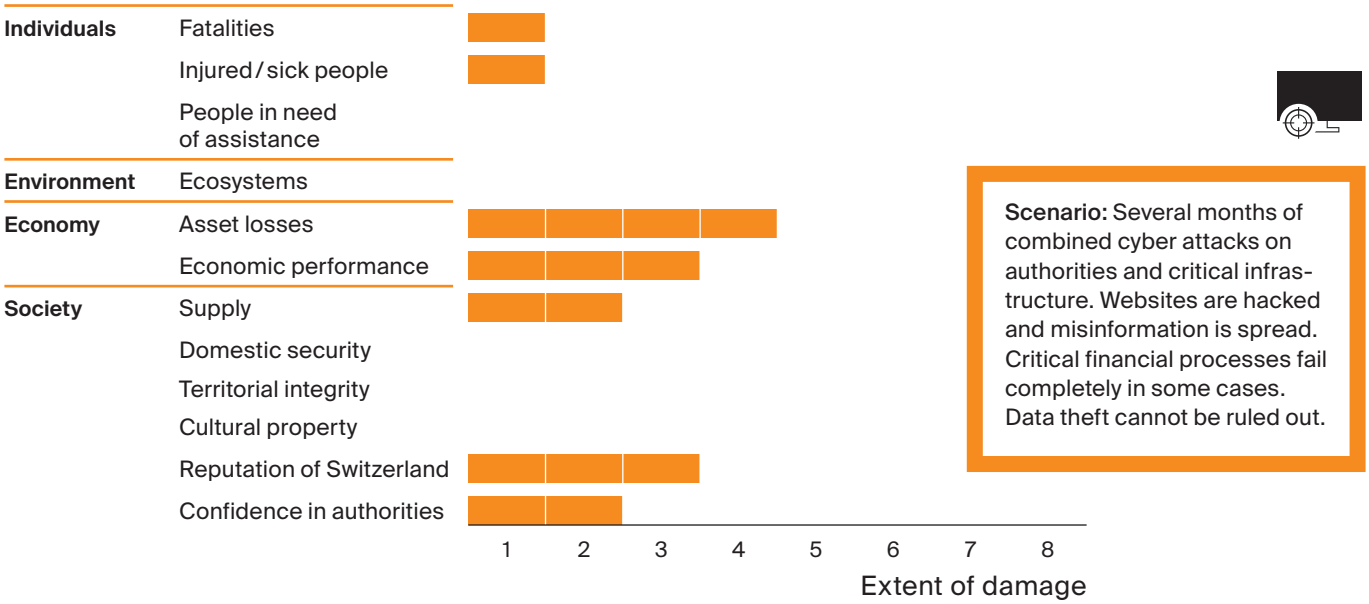
Attack scenarios reassessed
The domain «society» now includes 15 hazards. NBC attack scenarios have also been added.

Because the global security situation is becoming more acute, we have reassessed all attack scenarios. We have used an improved method for this purpose, which has made the process more systematic and comprehensible.

Although the individual forms of attack in the examined cyber scenario occur more frequently, carrying them out in combination is complex. A prolonged cyber attack is therefore thought to be less plausible than in 2015.

Impact diagram

Example Cyber-Angriff



Scenario: Several months of combined cyber attacks on authorities and critical infrastructure. Websites are hacked and misinformation is spread. Critical financial processes fail completely in some cases. Data theft cannot be ruled out.

Examples of events can be found in the hazard catalogue at www.risk-ch.ch

Human and animal diseases

Influenza pandemic
25 % of the population is infected with a new influenza virus

Animal disease outbreak
Nationwide epizootic disease with a high mortality rate among the affected animals

Terrorism

Conventional attack
Attack with multiple explosives in a very busy location

Chemical weapons attack
Sarin attack at an airport

Dirty bomb attack
Attack with a radiological substance in a city

Attack with chemicals
Hydrocyanic acid is released in a supermarket

Biological attack with viruses
Smallpox attack at a trade fair

Attack on hazardous material rail
Large quantities of toxic substances are released in a populated area

Biological attack with bacteria
A letter containing pathogenic anthrax spores is found at a mail distribution centre

Attack on nuclear material transport
Highly radioactive substances escape into the environment after an attack

Biological attack with toxins
Participants of a congress are poisoned with the toxin ricin

Cyber hazards

Cyber attack
Targeted attacks on critical infrastructure and data theft

Other hazards

Mass influx of people seeking protection
Influx of tens of thousands of refugees within a few months

Unrest
Riots in various cities lasting for several weeks

Armed conflict
Limited armed attack on Switzerland

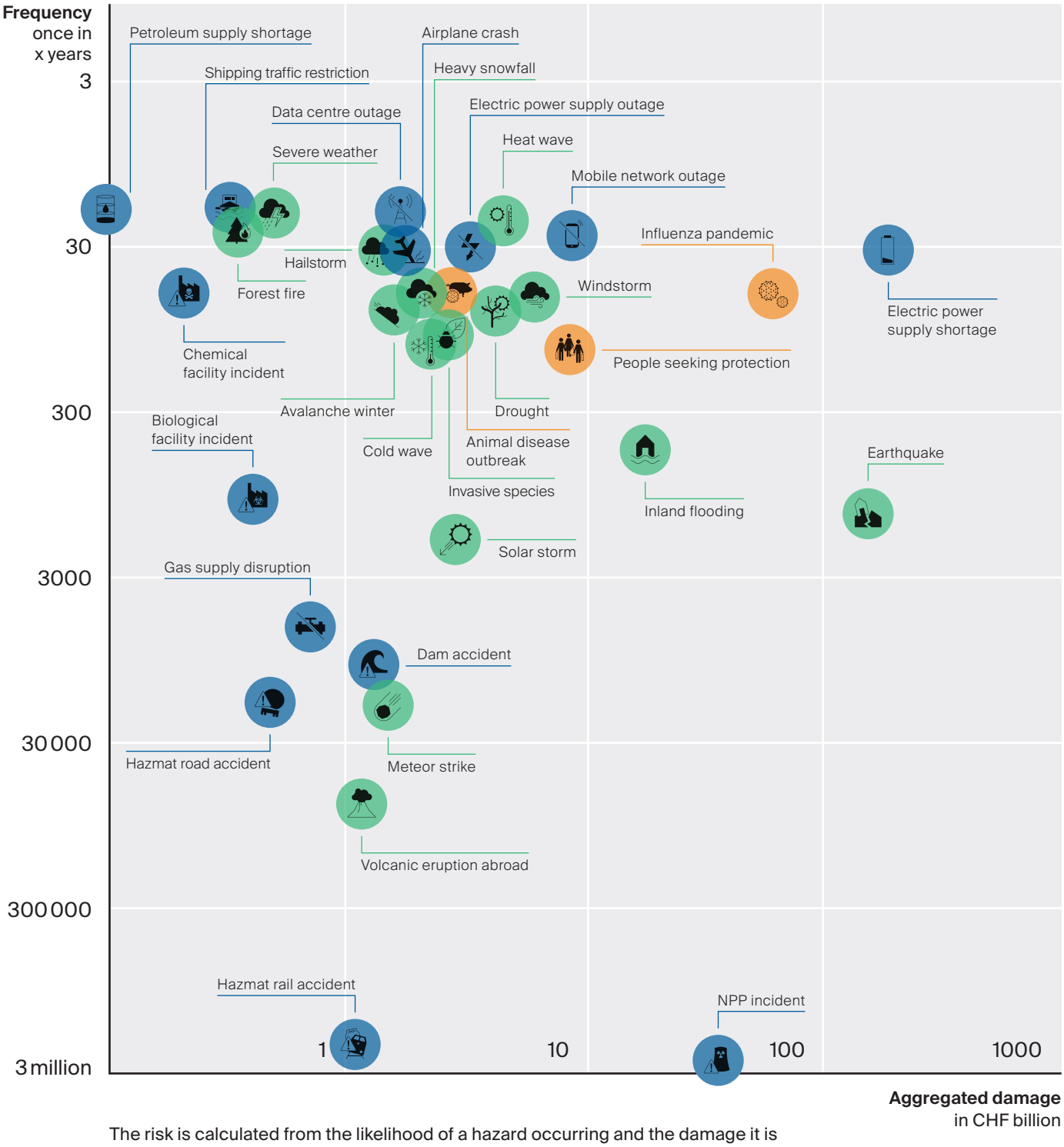
The line between war and peace is becoming increasingly blurred. Modern conflicts are characterised by different forms of attack being used covertly or overtly in concert, which is referred to as hybrid. Various other scenarios, such as cyber attacks, conventional or NBC attacks, can therefore also be part of an armed conflict. Armed conflicts are becoming increasingly common on the periphery of Europe. The consequences of a direct attack on Switzerland would be enormous. Due to the new forms of conflict, the plausibility of this scenario is difficult to assess. This is because the plausibility and effects of a direct attack on Switzerland cannot be reliably determined solely based on experiences or data relating to conflicts abroad. Plausibility is therefore not shown in the risk diagram.

NEW Since the 2015 analysis, we have further differentiated the list of hazards and added new ones.

Small or large risk: any event is possible

Risk diagram 1

Damage and frequency



The risk is calculated from the likelihood of a hazard occurring and the damage it is expected to cause. Both can be estimated on the basis of similar events that have happened in the past. The further towards the top right of the diagram that a hazard is situated, the bigger the risk it poses.

Risk diagram 2

Damage and plausibility

Risk diagram 2 includes deliberate events such as terrorist or cyber attacks. Their risks cannot simply be determined from their frequency, as there is usually no underlying data for this purpose. Based on experiences in other countries, we developed a method for systematically assessing the plausibility of such hazards.

Consider all relevant hazards

Not only a pandemic poses a high risk, but other hazards, too. And the risk landscape remains dynamic. This makes it all the more important to have a detailed understanding of which hazards are relevant and how their risks relate to one another.

The year 2020 was characterized by the COVID-19 pandemic. However, the internationally recognised «all-hazards approach», which the national risk analysis also pursues, shows that other hazards are also relevant to Switzerland, such as earthquakes, electric power supply outages and terrorist attacks. We must not lose sight of these and other risks. If such an event were to occur, the effects are different from those of a pandemic. Nevertheless, they could still have a severe and lasting impact on our society.

Environmental, technological and societal trends are changing our risks

One thing is certain: the risk landscape is dynamic. To ensure that preparedness planning is as effective as possible, it is therefore necessary to consider which trends are affecting the hazards that are relevant to Switzerland. Climate change, for example, is real and its effects will become even more noticeable. The trend towards urbanisation and thus towards the concentration of material assets is also advancing, as is digitalisation. These developments are changing the risks that we will face tomorrow.

The effects will differ. This makes it all the more important to have a wide range of damage indicators, like those developed for the national risk analysis. Be it for damage to people and their health, to the environment or to the economy, or the effects on domestic security and cultural assets – we calculate an aggregated, monetised damage figure for each hazard. This and the frequency are essential for comparing the various risks with one another.

Commitment to the «know your risk» principle

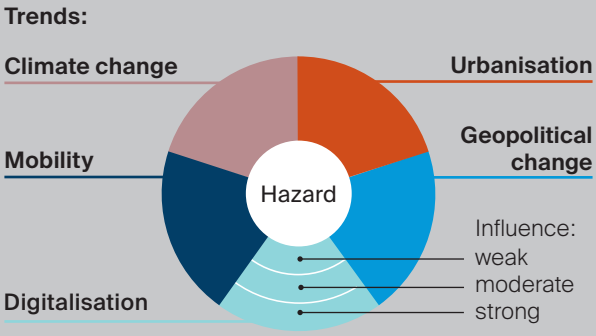
Mami Mizutori, Special Representative of the Secretary-General for Disaster Risk Reduction of the United Nations

When it comes to disaster management and risk reduction, nothing is more important than good governance. The new national risk analysis demonstrates Switzerland's commitment to the «know your risk» principle – both as a pillar of its national risk reduction strategy and as a strategic objective of its international cooperation.

Trend radar

Risk development

As a result of megatrends such as climate change and digitalisation, some hazards will occur more frequently or cause greater damage in the future. For nine exemplary hazards, the graph shows how much the trends increase their risk.



Domain nature

Drought

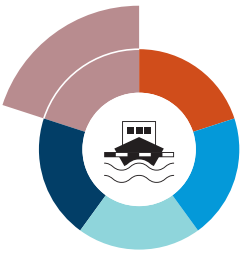
Inland flooding

Earthquake

Domain technology

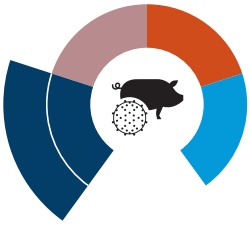
Electricity power supply outage

Mobile network outage



Restriction of shipping traffic

Domain society



Animal disease outbreak

Cyber attack

Mass influx of people seeking protection

Risk-based planning increases safety and security

Hazard and risk analyses form the basis for safety-related planning – and not only in civil protection. The integrated risk management approach is becoming increasingly established in Switzerland.

Integrated risk management is intended to further improve Switzerland's resistance, adaptability and regenerative capacity – or, in other words, its resilience to disasters and emergencies.

Resilience: a combination of preparedness, response and recovery

We can only create a resilient system if we carry out risk and trend analyses to identify future developments at an early stage, develop preventative measures to avert specific hazards and prepare for possible events. Ingrained coping skills and quick access to resources (materials and personnel) for continuity measures are also needed. Following an incident, restoration work and an evaluation of the events are required, as well as means for long-term reconstruction.

This understanding of resilience also corresponds to the approach of integrated risk management in the area of civil protection, which is used by the FOCP as a basis for disaster preparedness in Switzerland.

The national risk analysis helps to identify where measures might be appropriate. In this sense, it is important to always «think the unthinkable», in order to avoid being left completely unprepared for any damaging event.

The ideal approach for all risks

Bruno Spicher, President of the National Platform for Natural Hazards (PLANAT)

Risk management has been around for years. Integrated risk management, however, is a more recent development. It offers one major advantage: it makes the process much more effective. With the integrated approach, we consider all hazards and determine all risks using comparable scales. We can thereby develop a wider range of preventative measures and find optimum solutions for risks that we do not want to accept. Integrated also means involving all affected parties. In this way, we can ensure that they understand the necessary measures and implement them on a long-term basis. This is an important step towards a risk-competent society.

Model

Integrated risk management

Practically relevant analysis

Although the FOCP is responsible for the national risk analysis, we could not have developed the various products on our own. Furthermore, the large number of participants ensures a high level of acceptance for the results. It remains important to have a broad basis of expertise and a transparent approach.

The United Kingdom, the Netherlands, Singapore and other countries have been conducting national risk analyses for years similar to that of Switzerland.

No other country involves so many experts
Compared internationally, Switzerland's approach is characterised by two aspects in particular. The analysis is very broad-based. So far, 298 experts from the public sector, private sector and academia have contributed to the analysis. Their knowledge and experience are needed for developing the hazard scenarios, as well as for assessing their effects, frequency or plausibility, respectively.

This cooperation increases the acceptance of the results and the willingness of different actors to use them in their own work.

Information available to all
Another aspect that makes the national risk analysis unique is its accessibility: the results and products have been made publicly available in order to promote and facilitate cooperation in the area of disaster management. After all, the management of disasters and emergencies in Switzerland calls for everyone – i.e. public authorities, the private sector, academia and the population – to work together.

Percentage distribution

Background of the 298 participating experts

10 % academia
Representatives of universities, research centres and scientific forums

26 % private sector
Representatives of associations, consulting firms and engineering companies, insurance providers and critical infrastructure

64 % public sector
Representatives of municipalities, cantons and the federal government

Start signal for international dialogue

Detlef Koschny, Co-Manager Planetary Defence Office, European Space Agency (ESA)

The Swiss risk analysis was the start of an international dialogue on asteroid impacts. To date, we have organised three workshops with up to six countries, worked through various scenarios and learned a great deal. This has given rise to the «Near-Earth Object Information Plan» of the ESA, which defines the information that is needed by the civil protection authorities. We are currently in the process of transferring everything from a European to a global context and are working with asteroid experts on a platform to generate global warnings.

Experiences of the electricity sector used and applied

Werner Meier, Delegate for National Economic Supply and Head of Group Security Alpiq

The electricity sector in Switzerland has long been addressing the issue of supply security. It even has its own organisation, that deals with severe shortages on behalf of the National Economic Supply mechanism. We were able to incorporate the experiences from this into the national risk analysis and thereby also make it available to others.

DES methodology has proved its worth

Isabel Hunger-Glaser, former Director of the Swiss Expert Committee for Biosafety (SECB)

In its 2019 report «Biological Risks in Switzerland», the SECB compared and prioritised different biological hazards. The chosen methodology was heavily based on DES. We also monetised the damage and adopted all of the DES damage indicators, which made our work much easier. Having a larger group of people involved in the risk assessment has also proved to be valuable in our case. However, the SECB study not only covers isolated events but also possible developments to the biological risks. It therefore complements the DES approach.

Successfully applied on various levels

The products are now widely used in practice. Specialist agencies at all levels of government and the economy are increasingly using them, be it the hazard catalogue, the hazard files or the damage indicators.

The use of the products has grown constantly in recent years. Cantons, cities, critical infrastructures and even small municipalities – based on the national risk analysis, many of these have developed a civil protection approach that is appropriate for their communities, their responsibilities and their available resources.

Creating a common basis

If the common planning fundamentals are used by as many different actors as possible, it will help to make Switzerland a safer and more secure place. After all, if scenarios and methods are comparable, it becomes easier for the various parties to work together. It also becomes easier to compare the results and coordinate the activities.

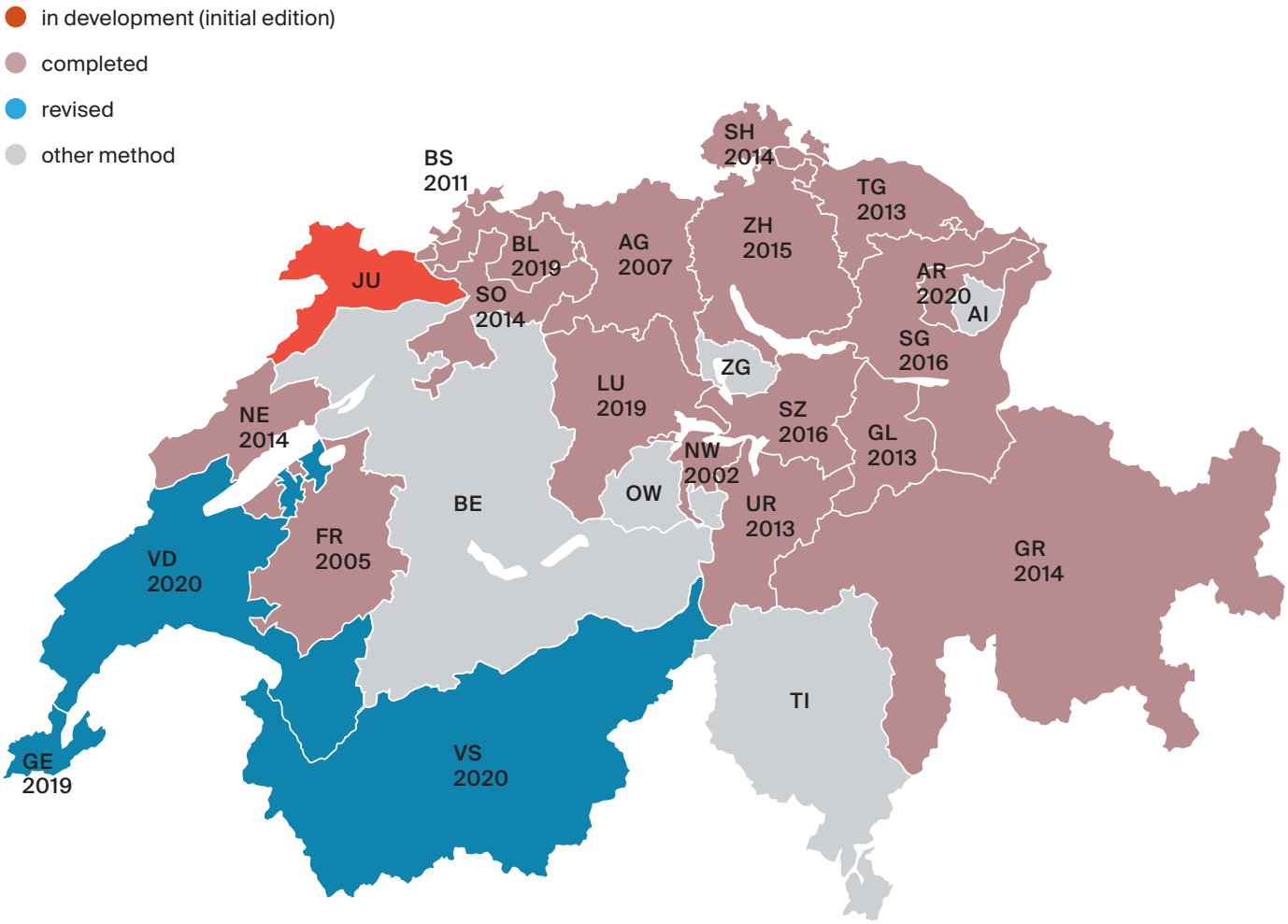
It can be seen that an increasing number of actors in the Swiss civil protection system is now taking an integrated risk management approach. They are ensuring that their planning fundamentals are always up to date, and they are regularly asking themselves questions such as: Which hazards are relevant to us? Which risks should be prioritised? What shortcomings do the scenarios reveal? Many actors have already internalised this process. They are regularly realigning their preparedness plans to make sure they are better prepared for future events. What risks we ultimately deal with in Switzerland, and how, is a political decision.

Small municipalities also benefit

Felix Senn, Municipal Council and Head of Security of the municipality of Maur (Zurich)

Our Security Committee felt it was important to improve its preparedness planning in the area of civil protection. The «hazard catalogue» – and, above all, the DES hazard files – were a great help to us in this respect. It is not reasonable to expect small municipalities like Maur to develop such fundamentals by themselves. They lack the required know-how, and they simply do not have the necessary resources. We were able to tailor the DES files to the exact needs of our municipality and have thereby taken a major step forward in the field of civil protection.

Overview of cantonal risk analyses according to the KATAPLAN guideline
As of October 2020



Federal government and cantons can learn from each other

Claire Walenda, Federal Commission for NBC Protection and Head of the Centre for Risk Analysis Canton Geneva

DES supplements the work carried out in the Canton of Geneva and is crucial for nationwide scenarios such as pandemics or electricity shortages. Of course, other hazards (e.g. flooding, terrorism) also have to be adapted to the cantonal situation. Overall, it is an iterative process, covering also NBC protection. The impulses from the Federal Commission and the national risk analysis stimulate the work at the cantonal level. The cantons translate these for use at the operational level. Insights gained from real-world experiences then flow back into the strategy of the Federal Commission.

How to continue from here?

Risk management is a continuous process. The safety and security situation will also evolve in the future. Thus, there remains a need to review the national risk analysis on a regular basis.

In summary, the following can be said about the 2020 update: A number of relevant hazards have been added or have changed in comparison to the risk picture in 2015. It can be assumed that this trend will continue – even if it is not yet possible to predict the future changes. We will therefore continue the national risk analysis as an ongoing process.

Integrated preparedness planning
The DES products are already being used in strategy development and preparedness planning at all levels. It is important to us that the manifold effects of disasters and emergencies are also taken into account in other work. After all, the more precisely that analyses and prevention planning are coordinated with one another, the more effective disaster management will be throughout Switzerland.

Periodical update of fundamentals
The FOCP is planning to update the national risk analysis again in 2025, with the aim of reassessing the various products and developing them further. In addition, we will continue to pursue the goal of offering products that promote risk dialogue and offer the greatest possible value for civil protection in Switzerland and thus for safety and security in Switzerland as a whole.

Adopting approaches from the private sector in national risk management

Patrick Raaflaub, Group Chief Risk Officer at Swiss Re, Member of the ETH Risk Center Advisory Board

Early risk detection is only possible through dialogue. And the dialogue should be continuous. This also allows common interests to be identified and advanced together. Every crisis has its own rules. Checklists are not always helpful. And disasters sometimes take pleasure in not adhering to official structures. A position like the one of Chief Risk Officer offers a horizontal overview, with no bias towards specific authorities. This would be highly advisable for countries and cities, too.

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