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Consultative Group on Disaster Risk Reduction

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Switzerland's voluntary national report to the Mid-term Review of the implementation of the Sendai Framework for Disaster Risk Reduction 2015 – 2030

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Content

1	Introduction.....	4
1.1	Risk landscape of Switzerland	4
1.2	Approach to dealing with hazards and risks.....	6
1.3	International cooperation.....	6
1.4	Federalism and sharing of responsibilities	7
1.5	Equal opportunities.....	7
1.6	Methodology, scope and structure of this report.....	7
2	Retrospective Review	8
2.1	Progress towards the outcome and goal.....	8
2.2	Progress on achieving the SFDRR targets	9
2.3	Progress on risk assessment, information and understanding	13
2.4	Progress on risk governance and management	15
2.5	Progress on investment in risk reduction and resilience	19
2.6	Progress on disaster preparedness	23
3	Contextual shifts, new and emerging issues and challenges	26
3.1	Response to the COVID-19 pandemic – experiences from the crisis management.....	26
3.2	Climate change	28
4	Conclusion and outlook.....	30
4.1	Conclusion.....	30
4.2	Outlook	30
	Abbreviations.....	32
	References	33

1 Introduction

The year 2022 almost marks the midpoint in implementing the Sendai Framework for Disaster Risk Reduction (SFDRR) as well as other related agreements and conventions such as the 2030 Agenda for Sustainable Development.¹ The UN General Assembly decided to hold a midterm review of the implementation of the SFDRR and a high-level meeting at which an action-oriented political declaration will be adopted. The political declaration will inform the quadrennial review of the Sustainable Development Goals (SDGs) at the Economic and Social Council's High-Level Political Forum on Sustainable Development in July 2023 and the deliberations of Member States and stakeholders at the SDG Summit during the 78th Session of the UN General Assembly in September 2023.

Switzerland committed to writing a voluntary national report that gives an overview of the status quo, progress, as well as gaps and challenges in implementing DRR strategies and measures. Furthermore, it provides an outlook on the priorities in the coming years.

Switzerland was actively involved in the negotiations for the predecessor framework as well as for the SFDRR. Switzerland is committed to the framework and fully supports it both at national level and in international cooperation. However, no formal body or process for the strict implementation of the framework has been established. The National Platform for Natural Hazards (PLANAT) serves as an SFDRR focal point and coordinates the annual progress monitoring process. Concrete strategies, measures and activities, however, are implemented by the responsible authorities and sectors. The midterm review is therefore an opportunity for Switzerland to gain a cross-sectoral overview and to use synergies for the necessary next steps.

Long-standing experience in the management of natural hazards has led to the development of well-functioning governance structures to address risk prevention and risk reduction. Over the years, public financing and coordination mechanisms have been put in place or reinforced and multi-stakeholder management, as such, has been institutionalised. Switzerland was one of the first countries to establish the National Platform for Natural Hazards in 1997. Other risks that the country is facing, for instance major chemical or biological accidents or health-related risks, are addressed through sectoral policies and institutions. The national disaster risk assessment gives a cross-sectoral overview of Switzerland's risk landscape (see below). However, there is no overarching body or institution that covers all risks and the related measures.

Disaster risk reduction (DRR) is an important part of Switzerland's international cooperation. For decades, Switzerland has been promoting a systematic and integrated approach to risk management. Switzerland supports partner countries in their efforts to build resilient communities in line with the SFDRR and various regional and international DRR-related organisations and initiatives.

Since 2014, a consultative group on DRR, comprising representatives from federal agencies, PLANAT, academia, NGOs and insurance companies, has sought to harmonise and strengthen Switzerland's international engagement in DRR and to foster the exchange of knowledge. The group was originally established in order to coordinate a Swiss position for the post-Hyogo Framework for Action negotiations and has since been expanded to include new members. It still maintains a strong focus on natural hazards, which explains the relative predominance of natural hazards in this report. Climate change, the recent COVID-19 pandemic and Russia's military aggression against Ukraine reveal the need for a more coherent and wide-ranging approach to the management of risks. The consultative group seeks to promote such an approach.

This report is intended to provide information to the United Nations Office for Disaster Risk Reduction (UNDRR), but also sets out the current situation, challenges and work ahead for the attention of Swiss stakeholders, the agencies responsible and civil society.

1.1 Risk landscape of Switzerland

Switzerland is densely populated and its space intensively used. It is expected that over the next three decades more and more people will live in Switzerland. Since the 1930s the population has doubled: at the end of 2016, around 8.4 million people lived in Switzerland, around eight out of ten of them in cities and agglomerations. It is assumed that by 2040 the number of people living in Switzerland will rise to more than 10 million. Between 1985 and 2009, settlement areas increased by 584 km². This corresponds roughly to the area of Lake Geneva. The areas used for settlement purposes – mainly buildings, roads and other infrastructure – have thus expanded by 23.4 % in 24 years.² This translates into increasing risks. As the example of floods shows, around 20% of the Swiss population currently

lives in areas that could be affected by floods. Moreover, around 30% of workplaces and 25% of material assets, i.e. CHF 840 billion, are located in these areas.³

The national disaster risk assessment 'Disasters and Emergencies in Switzerland' gives a comprehensive overview of the most relevant risks the country is facing.⁴ Forty-four natural, technological and societal hazards were selected and assessed. Of the 44 hazards examined, 32 are assigned to non-deliberate events and 12 hazards count as deliberate events including terrorist attacks, unrest and cyberattacks. In the current analysis, the two hazards posing the greatest risk are 1.) an electric power supply shortage and 2.) an influenza pandemic. Both scenarios would cause extensive damage and it is assumed that they could occur relatively frequently compared to other scenarios. The other top ten risks are: 3.) mobile network outage, 4.) heatwave, 5.) earthquake, 6.) electric power supply outage, 7.) windstorm, 8.) data centre outage, 9.) people seeking protection, and 10.) drought.

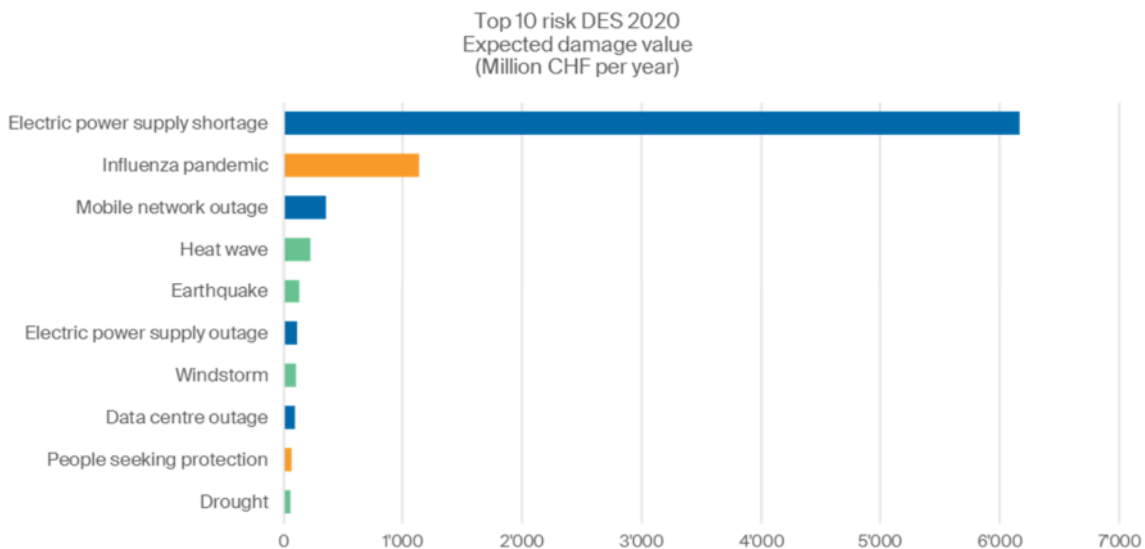


Figure 1 Top 10 risks in Switzerland according to the national disaster risk assessment (DES) 2020.

The considerable risk posed by a pandemic is also documented in other countries' risk analyses (e.g. the United Kingdom and the Netherlands). The risk analyses of most cantons also cover pandemics. The COVID-19 pandemic has followed a different course to the pandemic described in the scenario. However, the influenza pandemic scenario set out in the national risk assessment still provides a good basis for preparedness planning, as this includes challenges such as overburdening the healthcare system, absence from work, damage to the economy, medical equipment supply shortages, restrictions on public transport and social life, and uncertainty among the public. These impacts occur regardless of the type of pathogen. However, experiences gained during the COVID-19 crisis suggest that the economic impact of a pandemic was previously underestimated and that the risks posed by a pandemic need to be reassessed as a whole. Mental health was also a big challenge throughout the pandemic. The mental health consequences are still evident and will continue to be felt for many years to come.⁵ Due to Russia's military aggression against Ukraine, some of the top ten risks are manifesting themselves. On 29 June 2022, the Federal Council informed the public of possible gas supply shortages and, as a consequence, electric power supply shortages in the winter of 2022/2023 and presented precautionary measures.⁶

With regard to natural hazards, Switzerland is often affected by storms, hail, surface run-off, floods, debris flows, landslides, rockfall and avalanches.⁷ Major earthquakes are rare, but as history has shown, they do sometimes occur and present one of the biggest risks. Hazardous events occur regularly and are not restricted to specific geographical areas (except mountain hazards). In 2022, Switzerland experienced the second warmest summer since measurements began in 1864. The persistently high temperatures and limited precipitation led to low water levels, overly warm waters and a high risk of forest fires.⁸

1.2 Approach to dealing with hazards and risks

The Federal Constitution and several laws have as their main objective the protection of people, livelihoods and economic and ecological assets. To achieve this, Switzerland strives to reduce existing risks substantially and to prevent new risks. Moreover, Switzerland is committed to strengthening the ability of its society, economy and environment to resist and adapt to hazards and recover from disasters, thereby safeguarding people's welfare. The concept of resilience has been introduced into the strategies on natural hazards,⁹ climate change adaptation,¹⁰ and the protection of critical infrastructure.¹¹

Switzerland pursues integrated risk management,¹² which uses a systematic approach to identifying and assessing all relevant types of risk (what can happen?), evaluating and prioritising them (what is allowed to happen?) and taking appropriate measures to reduce them (what needs to be done?). The broad range of measures and actions in the areas of prevention and mitigation, preparedness, response and recovery are seen as complementary mechanisms that need to be combined in an appropriate and balanced way. Risks that a society faces can never be completely eliminated. The objective is therefore to keep the residual risk at an acceptable level that can be borne by people, communities and societies, given existing social, economic, political, cultural and environmental conditions. An important aspect of the integrated risk management process is the involvement of all relevant actors, e.g. decision-makers, specialists and those affected.

DRR and climate change adaptation (CCA) share common concerns and approaches. These challenges have also been recognised by both the DRR and CCA communities. Switzerland understands CCA as a complementary process to the reduction of greenhouse gas emissions. If we do not effectively curb climate change, the extent of the effects will exceed the ability of systems to adapt and adaptation measures will become more complicated and more costly.¹³

By ratifying the Paris Agreement Switzerland set itself the target of reducing its greenhouse gas emissions by at least 50% of its 1990 levels by 2030. By 2050, Switzerland should no longer be releasing more greenhouse gases into the atmosphere than can be absorbed by natural and technical sinks. This is referred to as net-zero emissions.¹⁴ Information on progress in reducing the greenhouse gas emissions is not included in this report, but is available in Switzerland's greenhouse inventory.¹⁵ Climate, along with biodiversity and energy, is one of Switzerland's three priority topics in implementing the 2030 Agenda, and is therefore included in the National Voluntary Review on implementing the 2030 Agenda for Sustainable Development.¹⁶

1.3 International cooperation

The effective implementation of the aforementioned agreements is also one of the main objectives of Swiss foreign policy for the period 2020–2023¹⁷ and Switzerland's foreign economic policy strategy.¹⁸ In line with its commitments, Switzerland assists developing countries with the implementation of multilateral agreements, in particular in reducing emissions and adapting to climate change as well as reducing disaster risk and expanding ex ante financial protection against disasters.

DRR is strongly rooted in Switzerland's international cooperation work. Its International Cooperation Strategy 2021–2024¹⁹ includes DRR as a specific objective, focusing on preventing disasters and ensuring reconstruction and rehabilitation (that also links with SDG 11): *“Switzerland is committed to disaster risk reduction and to reconstruction and rehabilitation in order to prevent natural disasters as far as possible and to restore basic services after a disaster or an armed conflict”*. Furthermore, DRR is one of four core themes of Swiss Humanitarian Aid.

Switzerland shares its experiences in integrated risk management, and its expertise is both acknowledged and in demand internationally. Switzerland supports its partner countries in strengthening disaster preparedness and systematically integrates risks related to climate change, the environment, and natural hazards into its international cooperation programmes and projects. The COVID-19 pandemic has demonstrated the need for a holistic, cross-sectoral and interdisciplinary approach to risk analysis and for the integration of broader structural factors and systemic prevention measures.

Switzerland's international cooperation also includes its commitment to supporting the implementation of the SFDRR, and its support for international partners such as the UNDRR, the World Bank's Global Facility for Disaster Reduction and Recovery, the World Bank's Disaster Risk Finance Umbrella, the Global Network of Civil Society Organisations for Disaster Reduction, and the International Federation of Red Cross and Red Crescent Societies (IFRC). As a member state of the United Nations (UN),

Switzerland also regularly hosts the Global Platform for Disaster Risk Reduction, where progress in the implementation of the Sendai Framework is reviewed.

1.4 Federalism and sharing of responsibilities

Switzerland is a federal state. This means that state powers are divided between the Confederation, the cantons and the communes in accordance with the principle of subsidiarity. The Confederation only undertakes tasks that the cantons or communes are unable to perform, or which require uniform regulation at the national level. This also applies to DRR: responsibility for legislation and the hazard management policy lies with the Confederation and federal authorities, which also provide financial support to the 26 cantons and are in charge of warning and alerting the population and cantonal authorities in the event of a disaster. The cantons are responsible for the enforcement of federal laws, for contingency planning and for emergency management at cantonal level. The communes are responsible for planning and implementing preventive measures and responding to disasters. In order to ensure that the Confederation, cantons and communes can play their respective roles, financial resources are allocated at the three levels of government and guaranteed over the long term.

1.5 Equal opportunities

As stated in the Voluntary National Review on Implementing the 2030 Agenda,²⁰ Switzerland aims to be an inclusive society in accordance with the principles of the Federal Constitution. The preamble to the Constitution emphasises the determination of the Swiss people "to live together with mutual consideration and respect for their diversity". This corresponds to the UN promise *to leave no one behind*. Switzerland also aims to ensure the greatest possible equality of opportunity between its citizens. Everyone must enjoy the same opportunities to develop and realise their personal potential, including through their own achievements. Compulsory education is seen as an important factor that furthers social cohesion and equal opportunities. Switzerland adopted the Gender Equality Strategy 2030,²¹ enacted amendments to the Gender Equality Act²² and recorded successes with regard to the legal and real-life equality of women and men, e.g. by diminishing the wage gap, according to the Voluntary National Review on Implementing the 2030 Agenda.

With regard to DRR and CCA, Switzerland does not pursue a specific gender-responsive policy but intends to apply the principles of equal opportunities in these fields as well, for instance by ensuring the equal representation of women in decision-making bodies at all administrative levels.

1.6 Methodology, scope and structure of this report

The report follows the Guidance for UN Member States provided by UNDRR²³ and is based on existing status and accountability reports, evaluations of strategies, studies and project documents (see *references*), which have been synthesised.

The DRR consultative group referred to above has co-authored this report with PLANAT, the Swiss Agency for Development and Cooperation (SDC), Federal Office for the Environment (FOEN) and Federal Office for Civil Protection (FOCP) as the leading institutions. The scope and content of the report were discussed in various meetings. Various members of the consultative group provided input on specific themes and issues. Draft versions of the report were shared with the group on several occasions and its written feedback was taken into consideration as far as possible.

This report covers natural, technological and societal hazards. However, it focuses primarily on issues relating to natural hazards due to Switzerland's particular experience in this area. The report primarily sheds light on national processes and, in addition, provides information on selected Swiss international cooperation initiatives.

The structure is oriented to the SFDRR and includes the progress made and challenges presented in relation to the expected outcome and goal (*section 2.1*), the targets A to G (*section 2.2*), and the four priorities for action (*sections 2.3 to 2.6*). The contextual shifts caused by the COVID-19 pandemic and climate change are described in sections 3.1 and 3.2. The final section 4 sets out the conclusions, provides an outlook on the main DRR-related challenges and outlines the fields of action.

2 Retrospective Review

2.1 Progress towards the outcome and goal

It is not possible to make a general statement about progress towards the outcome of substantially reducing risks and loss of lives and assets. There is too much uncertainty given the rapidly changing conditions. Moreover, the war in Ukraine on the European continent, which started in February 2022, has already affected energy supply, including in Switzerland, and global food security. The longer-term consequences for the implementation of the DRR goals for Switzerland are not yet foreseeable.²⁴

There are even areas where the trend points in the opposite direction of the intended goal. It is assumed, for example, that the probability of occurrence of an electric power supply shortage is increasing. The Swiss Security Network Exercise in 2014²⁵ and the national risk analyses in 2015 and 2020 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 should now be avoided to a large extent by making appeals to reduce consumption, restricting usage, setting quotas for large industrial consumers and implementing controlled rolling blackouts.²⁶ However, significant challenges remain as various factors (prolonged drought in Europe, low water levels of reservoirs, possibly limited imports, etc.) could trigger an electricity shortage. Despite these effective measures, experience of coping with the COVID-19 pandemic has shown that it is necessary to cushion the economic impact of a protracted crisis through government financial support.

In other areas, it has been possible to reduce the risks by implementing appropriate measures, as shown by the specific examples below:

- A possible **petroleum supply shortage** provides a good example of how effective risk reduction measures can be. It is assumed that imports of petroleum products (petrol, diesel, heating oil, and jet fuel) will decrease by up to 15% over the course of several months. Such a supply shortage of petroleum products, whether it is due to low water on the Rhine, strikes at a refinery, or geopolitical tensions, can be expected relatively frequently. It is expected that such events will occur more frequently in the future, especially due to climate change. However, the consequences of such events can be mitigated (and the risk kept low) through compulsory stockpiling and inventory management during a crisis. Without these measures, an event of this kind would have a far larger impact.²⁷
- **Hazmat rail accident:** additional far-reaching safety measures have been implemented in recent years for transporting chlorine by rail. Furthermore, less chlorine is transported by rail in Switzerland overall. Maximum transport speeds have also been lowered and new rolling stock introduced. These measures have significantly reduced the likelihood of an incident occurring.²⁸
- It is essential to demonstrate that **protection measures against natural hazards**, e.g. floods, avalanches, landslides and rockfall, are cost-effective. Federal subsidies are available for measures where this evidence is provided. The effectiveness has to be proven in terms of risk reduction. This means that the risk reduction due to measures taken in these concrete locations is well known.

2.2 Progress on achieving the SFDRR targets

2.2.1 Progress and trends




The SFDRR consists of 7 targets that quantitatively measure progress towards reducing losses (targets A to D) and towards increasing the availability of DRR strategies (target E), early warning systems (target G) and investment in international cooperation (target F). Switzerland has committed to collecting and reporting data on several indicators and providing regular updates in the Sendai Monitor.²⁹

Responsibility for reporting is shared among:


- FOCP (targets A to D)
- PLANAT (target E)
- SDC (target F)
- Steering Committee on Intervention in Natural Hazards (LAINAT) (target G)

The broad hazard spectrum and the wide range of indicators correspond to a large number of data owners. Information is gathered from the Federal Statistical Office and other federal agencies, universities and research institutions, insurance companies and associations. Data has to be actively looked for and obtained from the responsible authorities at federal and cantonal levels as well as from the private sector.

Based on the data, the trends were assessed qualitatively. The rating icons show whether or not the indicator is moving in the desired direction according to the SFDRR targets. Analysed trends are classified as follows:

	Positive trend following target path		Negative trend counter to target path
	Unchanged no significant trend	N/A	No classification possible for technical reasons (such as a break in the time series or irregular progression) or because the time series is too short

The qualification for targets A, B, C and D is based on the data for 2015–2020 compared to the baseline period 2005–2014. No data on single events could be gathered due to data protection issues. The data for targets A to D therefore includes minor events as well as major events. Target A covers fatalities due to snow avalanches, floods, debris flows, landslides, rockfall, windstorms, lightning, ice avalanches and earthquakes, fire in buildings, traffic accidents, infectious diseases and heatwaves. Infectious diseases are included only if a Public Health Emergency of International Concern (PHEIC) is declared by the WHO, which was the case for COVID-19 that also affected Switzerland. Targets B and C cover natural hazards and fire in buildings, data for target D is derived from target C.

Target A	Switzerland commits to ... substantially reducing global disaster mortality by 2030, aiming to lower average global mortality per 100,000 between 2015–2030 compared to 2005–2014
Reported indicator A:2	Number of deaths attributed to disasters
Trend	 Tendency of a decrease in mortality overlaid by major single events like heatwaves and the COVID-19 pandemic. These events result in the number of fatalities being higher in the reporting period compared to the reference period.

Explanation:


- No major single event has taken place during the reference period of 2005 to 2014 (baseline).
- The frequency of heatwaves is increasing. After the heatwave of 2003, measures were taken to improve the ability to cope with such events.

- The data also includes fatalities due to traffic accidents³⁰ which are decreasing thanks to effective measures. They are still an order of magnitude larger than fatalities due to fire in buildings or natural hazards. The data encompasses all traffic accidents, i.e. also events with a very low number of fatalities.
- The fatalities due to COVID-19 are orders of magnitude higher than the other fatalities.

Target B		Switzerland commits to ... substantially reducing the number of affected people globally by 2030, aiming to lower the average global figure per 100,000 between 2022–2030 compared to 2005–2014.
Reported indicators B:3 and B:4		Number of people whose damaged / destroyed dwellings were attributed to disasters
Trend	N/A	No statement regarding a general tendency with the available data possible yet, except for major single events (e.g. hail storms in 2009, 2018) where higher impacts are noticeable.

Explanation:

- Period of data collection too short to make a qualified statement for this target.
- The data also has high volatility. The largest values are from years with large hailstorms (2009 and 2018). The number of affected people is derived from the number of affected buildings, which is very high during hailstorms. Data on affected people during heatwaves cannot be collected.

Target C		Switzerland commits to ... reducing direct disaster economic loss in relation to global gross domestic product (GDP) by 2030.
Reported indicator C:2 to C:5		Direct economic loss (of crops, productive assets, in the housing sector, damaged or destroyed critical infrastructure).
Trend		Tendency of slight decrease of economic losses overlaid by single events like hailstorms and floods. Natural hazards dominate the level of losses.


Explanation:

- At the beginning of the reference period, in 2005, an extraordinary flood event took place in Switzerland.
- The negative impact on GDP due to the COVID-19 pandemic is not covered by provided data.

Target D		Switzerland commits to ... substantially reducing disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including by developing their resilience by 2030.
Reported indicator D:1		Damage to critical infrastructure attributed to disasters
Trend	N/A	No statement regarding a general tendency with the available data possible yet.

Explanation:

- Period of data collection too short to make a statement at this moment in time.

Target E		Switzerland commits to adopting and implementing national disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015–2030
Reported indicator E:1		Availability and implementation of national DRR strategies in line with the SFDRR
Trend		6 existing strategies in DRR-related fields at national level in 2017

Explanation:


- There is no baseline, data is reported only for the year 2017.
- Several strategies covering different aspects of DRR have been put in place at national level during the last decade.
- 6 DRR strategies have been included in target E and have been analysed according to the 10 core requirements:
 - Management of risks from natural hazards (2018)
 - Adaptation to Climate Change in Switzerland (2012)
 - Sustainable Development Strategy 2016–2019
 - Critical Infrastructure Protection (2018–2022)
 - Strategy for Civil Protection and Civil Protection Organisation (2015)
 - Swiss Influenza Pandemic Plan (2018)

For more details on the strategies see section 2.4.

Target F		Switzerland commits to ... substantially enhancing international cooperation for developing countries by providing adequate and sustainable support to complement their national actions for implementing this framework by 2030.
Reported indicator F:1		Total official investment in international cooperation
Trend	N/A	Between 2015 and 2020, Switzerland invested USD 690 million in DRR through its international cooperation. During these 6 years, the share of DRR expenditure in relation to total ODA was 3.50%.

Explanation:

- USD 690 million is the total sum invested by Switzerland for prevention, preparedness and recovery measures (excluding emergency relief) through its international cooperation between 2015 and 2020.
- It is not possible to determine a trend as sources and calculation methodology have changed over the reporting period (e.g. introduction of a DRR policy marker in 2019) as part of the process of refining the reporting methodology.

Target G		Switzerland commits to ... substantially increasing the availability of and people's access to multi-hazard early warning systems and disaster risk information and assessments by 2030
Reported indicator G:1		Availability of multi-hazard early warning systems
Trend		Substantial improvement of warning systems and risk information since 2015

Explanation:

- Increased availability of and access to warning products for wildfires.
- New warning products are planned for mass movements and droughts.
- Improved disaster mapping flights.

2.2.2 Gaps and challenges

Due to the short observation period, no quantitative assessment of the indicators is possible. However, a qualitative evaluation of whether trends are following or countering the target paths shows that the efforts seem to be paying off: for targets E and G, Switzerland already has a high standard which is constantly being improved.

The target of reduced direct economic loss (target C) shows a slight positive trend that is overlaid by single major events. An assessment of the economic loss is difficult because of the strong annual fluctuations.

The **economic losses due to the COVID-19 pandemic** are not included in the data collection of the Sendai Monitor. However, general economic data shows that Switzerland has faced significant

economic challenges during the pandemic, in particular a sharp and simultaneous drop in supply and demand. The Federal Council therefore took numerous measures to cushion the economic consequences of the COVID-19 pandemic during the first wave in 2020: short-time work compensation, income replacement compensation for the self-employed and the COVID-19 credit line and, in addition, the enactment of the COVID-19 Hardship Assistance Ordinance³¹ for companies particularly affected by the pandemic. The overarching goals of these measures were to support and maintain the purchasing power of employees and the self-employed, and to provide financial transitional solutions for generally solvent and long-term viable companies. Despite these cushioning measures, Switzerland experienced the sharpest economic downturn in decades in 2020. However, the measures taken by the Federal Council created the conditions for a dynamic economic recovery after the epidemic had flattened out. After a decline of 2.4% in 2020, Switzerland's GDP grew by 3.6% in 2021.³² By international standards, the Swiss economy recovered relatively quickly. In the second half of 2021, the pre-crisis level of net product was already significantly exceeded. In the summer of 2021, the Federal Council adopted an economic policy transition strategy with three pillars to further support this economic recovery.

The target of **reduced fatalities** (target A) shows a negative tendency which can be attributed to the COVID-19 pandemic. The high death toll shows that Swiss society is also vulnerable. Proven steering instruments no longer seem to be fully effective.

The data collection of fatalities due to natural hazards (e.g. floods, landslides and avalanches) over a much larger timeframe – not included in the Sendai Monitor – reflects this statement.³³ The average number of fatalities in the period 1946–2020 is stable compared to the 19th century. In view of the significant population increase, it even decreased in relation to the total population. This development is not due to the fact that there are fewer severe events today, but to the fact that numerous hydraulic engineering and forestry protection measures were implemented in the last 100 years. However, it also reflects the improved organisational measures and the comprehensive possibilities that are now available for warning and rescuing people. Therefore, the number of fatalities due to natural hazards is now at a low level.³⁴

The indicators of the SFDRR are related to losses and do not show a complete picture of the goals achieved, which is especially true for the objective of risk prevention and reduction. A risk inventory would complement the data.

Another aspect concerns the fact that there is no nationwide database with all damage data from individual events or incidents of damage. Disaster-related data is collected by various entities, e.g. federal offices or insurance companies, which have different methods of collecting data and allocating damage. Not all data is publicly available for data protection reasons. Furthermore, the level of granularity requested by the Sendai Monitor is rather high. Consequently, substantial effort is required in order to identify data, coordinate with data owners, and check the quality of data with regard to usability.³⁵

2.3 Progress on risk assessment, information and understanding

2.3.1 Progress and trends

Switzerland has a solid information base regarding hazards and risks, which has been continuously refined and expanded in recent years. Most of these analyses have been requested by the Federal Council or Federal Administration, or are required by law. They serve as a basis for further instruments and planning, e.g. land-use planning or contingency planning.

Assessments of risks from multiple hazards

In 2013, the first analysis of risks from multiple hazards from the areas of nature, technology and society was published at national level. The analysis was expanded and updated in 2015 and 2020 (12 hazards were initially analysed in 2013, 33 hazards in 2015 and 44 hazards in 2020). The assessments involved almost 300 experts from the public and private sectors, from academia and insurance companies. Jointly, they developed the hazard scenarios and estimated their effects, frequency (for non-deliberate hazards) and plausibility (for deliberate hazards, e.g. cyberattack, terrorist attack or social unrest). All the results and products are publicly available. They are used for national preparedness planning, exercises and strategy development.

In a federal system, it is also necessary for the subnational entities to conduct their own risk assessment and preparedness planning, as they are the main actors responsible in the context of civil protection and disaster management. The FOCP has issued guidelines to assist the cantons.³⁶ Since the guidelines were published in 2013, 21 cantons have implemented or are in the process of implementing hazard and risk analyses according to national guidance.

The study 'Extreme flood events on the River Aare', which was published in 2021, provides the basis for assessing the hazard of very rare floods (return period of 1:1000 up to 1:100,000 years). Detailed flood hazard analyses were carried out for five sites, including the nuclear power plants Mühleberg, Gösgen and Beznau. This provides authorities and plant operators with a sound basis for protecting buildings, facilities and infrastructure of critical importance to public safety and the local economy against extreme floods.³⁷

From natural hazards maps to risk assessments

Switzerland has a long tradition in drawing up hazard maps related to floods, avalanches, landslides and rockfall on a regional and local scale. These maps are required by federal and cantonal laws, and their development is subsidised through appropriate financial support provided by the Swiss Confederation on a four-year basis. The hazard maps must be taken into account in spatial planning. The status of the creation of hazard maps and their implementation in communal land-use planning is surveyed on an annual basis. As of 2021, 98% of the areas have avalanche maps, 97% flood maps, 92% landslide maps and 92% rockfall maps.³⁸ There are also hazard maps on a national scale for floods, storms, avalanches, landslides and rockfall.³⁹ The national earthquake assessment was last updated in 2015.⁴⁰ These hazard assessments also provide the basis for construction standards and building codes.⁴¹

For two of the lesser-known or even neglected natural hazards in Switzerland, sound hazard assessments have been carried out recently in public-private partnerships with insurance companies. 'Hail Climate Switzerland' (2021)⁴² represents a significant improvement on the previous hail hazard maps and includes information on hail frequency, hailstone sizes and return periods based on updated data. The 'Surface runoff risk-map' (2018)⁴³ covers the whole country.

In the last three years, efforts have been made to define principles on how to derive risk maps from hazard maps for floods, avalanches, landslides, rockfall and exposed assets. The hazard maps are overlaid with land-use plans, enabling potentially affected assets to be identified. They show, for example, whether a person, building or section of road could be affected by a landslide or by flooding. If the possible consequences (death or damage to property) are estimated, the risk can be calculated. The principles are agreed between the federal and cantonal agencies with a view to ensuring a coherent nationwide overview.⁴⁴

Based on the seismic hazard model, a national model for seismic risk is currently being developed. It takes the influence of the local subsurface and the vulnerability and value of buildings into account. Due to be published in 2023, it will show in great detail the damage that can be expected to occur in Switzerland as a result of earthquakes.⁴⁵

Access to information

Detailed risk information, including the aforementioned assessments, is easily accessible and available for professional and private use, mostly free of charge. Several platforms provide the hazard and risk analysis information. Depending on the need, information can be found on national, cantonal or even municipal websites, either regarding single hazards or in the form of comprehensive overviews.

Extensive information is available on the federal [geoportal](#). The '[Schutz-vor-Naturgefahren](#)' (protection against natural disasters) website is more user-friendly as it is aimed at building owners, architects and engineers. It provides location-based information on prevailing natural hazards, and recommends protection measures. A further information source is the [flood-risk research initiative](#) of the University of Bern, which offers different tools for assessing damage to buildings due to flooding ('damage simulator') or to visualise the damage that flooding could cause.

2.3.2 Gaps and challenges

The current risk assessments mainly focus on hazards, hazard frequency and exposure to hazards. When addressing vulnerabilities, many assessments only take physical vulnerability into account, e.g. that of infrastructure or buildings. One reason might be that vulnerabilities stemming from people's socio-economic status are largely covered by the social security system, e.g. mandatory health and building insurance, unemployment insurance, the old-age and survivors' insurance and invalidity insurance schemes, and social welfare. Assessments or a debate on social vulnerability are absent in Switzerland. The 2010 'Factsheet on Social Vulnerability to Disasters'⁴⁶ identified persons that might be at risk apart from those with physical and mobility restraints, e.g. children, the elderly and persons with disabilities. It lists persons who cannot understand any of the national languages well, who do not have the financial means for preparedness or who are already at the margins of society (homeless people, persons of no fixed residence and illegal immigrants).

In addition, no data is collected or assessments made in relation to gender or persons with disabilities. It is necessary to consider whether studies undertaken abroad in comparable situations could be applied to Switzerland.⁴⁷

Despite the gaps, a large amount of data and information on risks is available or has been compiled and refined by research, but much of this data does not reach decision-makers. As more and more entities and organisations develop the information, it is challenging to maintain an overview. Another challenge is how to adequately feed the information into planning and decision-making processes and to turn the information into concrete (risk-reducing) action. Pilot projects have been launched to test such strategies and methods, for example a training course providing 'guidance on accepted risk'⁴⁸ or 'social learning videos' aimed at building owners.⁴⁹

Activities in international cooperation

A key part of Switzerland's international cooperation is supporting its partner countries in making risk assessments.

Examples include:

Switzerland supports the **government of Jordan** through the National Centre for Security and Crisis Management and the relevant institutions in establishing a **national approach to integrated flood risks management**. The support is based on a request from the government of Jordan and will provide the basis for coordinated flood risk management and improved national development planning processes. The SDC, in collaboration with the FOEN, is facilitating the transfer of Switzerland's extensive experience in hazards and risk mapping and strengthening risk governance.

Through the **City Resilience Program**, implemented by the World Bank, Switzerland is helping cities in partner countries to conduct risk assessments and use them for comprehensive, multi-sector planning efforts in the context of rapid urbanisation and increasing climate and disaster risks. The project also supports cities in accessing finance from public and private sources to implement interventions and infrastructure investments that reduce their risk exposure.

2.4 Progress on risk governance and management

2.4.1 Progress and trends

Switzerland has strong track record in risk governance built on a sound legal framework, strategies, clearly defined roles and functions across the administrative levels and sectors, and adequate funding mechanisms.

National legal framework

The **legislation governing flood protection and forests**⁵⁰ is currently being revised so that it fully incorporates the integrated risk management approach. It is planned that the amended legislation will come into force in 2025. The laws aim to protect people and assets from gravitational hazards and will include mitigation measures and provisions on state (financial) support.

The **Waters Protection Act**⁵¹ was amended in 2011. The law requires the renaturation of rivers and lakes in order to restore their natural functions and to strengthen their social benefits. The requested watercourse area also serves to attenuate flood peaks. After a period of planning, projects are now being implemented.

The **Civil Protection and Civil Defence Act**⁵² entered into force in 2019. It aims to protect people and livelihoods from disasters and to respond and limit loss and damage. Among other things, it assigns responsibilities to the national warning entities and the Steering Committee on Intervention in Natural Hazards (LAINAT).

In April 2013, the Confederation added a provision to the **Major Accidents Ordinance**⁵³ requiring the cantons to coordinate major accident prevention using spatial planning. Careless construction activities and zoning changes can significantly influence population density around a facility and lead to an increase in risk. This repeatedly leads to conflicts of interest, especially in densely populated Switzerland.

In the health sector, Switzerland has had a revised and updated **Epidemics Act**⁵⁴ since 2016, which underlines the leadership role of the Confederation by strengthening its coordination and supervisory function. Under the Act, the Federal Council, with the involvement of the cantons, is responsible for defining objectives and strategies, while the cantons are responsible for enforcement. The Act also provides further detail on the division of labour between the Confederation and the cantons in dealing with a national health emergency by introducing a three-tier model for 'normal', 'special' and 'extraordinary' situations. In the aftermath of the COVID-19 pandemic, the Epidemics Act is currently undergoing further revision.

The aforementioned national laws have their counterparts at cantonal level.

National strategies

Several **national strategies**, which have been adopted or noted by the Federal Council, identify DRR as a policy priority. Most of them concern only one sector or policy area or have been formulated from a particular perspective. But they all have a common focus on the prevention of new risks and reduction of existing risks. The most relevant strategies are:

- **Management of Risks from Natural Hazards** (first version in 2003, revised in 2018, produced by PLANAT).⁵⁵ The revised version incorporates and develops proven elements such as the approach of integral risk management. It also takes account of current conditions, such as the increase in extreme weather events and greater urbanisation. The revised strategy also introduces the concept of resilience.

The measures required to implement the strategy are set out in the report 'Dealing with natural hazards in Switzerland' (2016).⁵⁶ It makes a comprehensive and broad-based assessment of the current situation and identifies 46 (action) goals and 67 measures. The report was prepared by representatives of the Federal Administration, cantonal specialist agencies, national infrastructure companies, the homeowners' association, the Association of Swiss Communes and Swiss Union of Cities, insurance companies and the scientific community. The implementation of the measures is monitored and reported on a 5-year basis.

- **Adaptation to Climate Change in Switzerland** (strategy in 2012, 1st Action Plan 2014–2019, 2nd Action Plan 2020–2025).⁵⁷ The strategy was developed with the participation of several federal agencies and adopted by the Federal Council in March 2012. It consists of two parts, the first of which sets out the overarching goals, challenges and fields of action. The strategy

aims to exploit the opportunities arising from climate change, minimise the risks of climate change and protect the population, real assets and natural resources, and increase the adaptability of society, the economy and the environment.

The specific goals and options for action are defined in 9 sectoral strategies. The sectors are: water management, management of natural hazards, agriculture, forestry, energy, tourism, biodiversity management, (human and animal) health and spatial development. All sub-sectors mention goals and measures for reducing risk, avoiding new risks or strengthening resilience. Examples of resilience include space for watercourses, avoidance of heat stress in animals and plants, adaptable tree species and adapted building technology.

- **Sustainable Development Strategy:** since 1997, the Federal Council has formulated a strategy setting out its policy for sustainable development in Switzerland. The strategy has been updated regularly since 2008 as part of the four-year legislative cycle. At the moment, a revised version, the '2030 Sustainable Development Strategy' is in force.⁵⁸ The strategy sets out the priorities in the policy areas where there is a particular need for action and coordination in order to implement the 2030 Agenda at federal level. Three priority themes have been defined: 1.) sustainable consumption and production, 2.) climate, energy and biodiversity and 3.) equal opportunities and social cohesion.
- **Strategy for Critical Infrastructure Protection** (first version in 2012, revised in 2017) aims to reduce the vulnerabilities of critical infrastructure and hence improve its resilience.⁵⁹ Critical infrastructure does not just include buildings and facilities, but also supply systems and services in the broadest sense. Serious disruptions, for example an earthquake or nationwide power cut, can have far-reaching consequences for the population and cause considerable damage to the economy. The protection of critical infrastructure consists of various structural, technical, organisational and legal measures aimed at preventing such disruptions or restoring functionality if an incident occurs. The measures are implemented collaboratively with the operators of critical infrastructure, with the supervisory and regulatory authorities in various sectors, and with the cantons, while the main responsibility remains with the operators. The FOCP has a mandate for coordination.
- **Swiss Influenza Pandemic Plan:** the influenza pandemic plan was first developed in 1995 and was in its 5th edition⁶⁰ in 2018. It is currently undergoing a total revision based on the findings from the COVID-19 pandemic. The purpose of the pandemic plan is to save lives and protect people's health. It also describes the targeted preparation of the Swiss health system for a pandemic. It is primarily aimed at the responsible authorities at federal and cantonal level. This preparation ensures that Switzerland is sufficiently equipped for a pandemic of any severity, i.e. that it can respond in a coordinated and efficient manner to limit the impact of a pandemic on people and society.

The coordination between the strategies varies. While in the adaptation strategy the sub-strategies are aligned to a common goal, in other documents there are only references to other sectoral strategies.

As on the national level, sectoral strategies are available in most cantons. In some areas, including sustainable protection, protection of critical infrastructure and health, cantons directly implement measures aligned to the national level without developing their own strategies. Apart from strategies as a means of adapting national requirements to local conditions, cantons have several different ways of implementing national guidelines: they can refer to the national strategy, they can include strategic measures in their cantonal laws or regulations, or they may find that cantonal laws and regulations already accommodate new strategic directions.

Stakeholder coordination and collaboration

Several **multi-stakeholder committees and bodies** carry out coordination, alignment, strategic advising, and problem-solving work. Switzerland was one of the first countries to establish a National Platform for Natural Hazards (PLANAT) in 1997. The extra-parliamentary commission consists of 18 members from national and cantonal authorities, universities, insurance companies, and the private sector and is responsible for the Swiss strategy 'Management of Risks from Natural Hazards'. Furthermore, PLANAT serves as a Sendai focal point.

At federal level, responsibility for dealing with hazards is divided between several governmental offices and university institutions. In order to better coordinate and join efforts, several inter-ministerial, inter-

sectoral bodies have been created. For instance, LAINAT (founded in 2009) seeks to harmonise the issuance of warnings on natural hazards for the public and cantonal and/or community authorities.⁶¹ The National Centre for Climate Services (NCCS), founded in 2014, brings federal authorities together to serve as a knowledge hub for climate services.⁶² Since 2014, a working group and a consultative group on DRR with representatives from several federal offices, PLANAT, academia, NGOs and insurance companies seek to harmonise and strengthen Switzerland's international engagement in DRR. The working group has recently been expanded to include a youth representative.

The Steering Committee for Natural Hazards and Building Resilience was set up in response to the clarification of the division of tasks between the public sector and insurance industry carried out between 2010–2012. It comprises key players from the insurance industry (private and building insurers), homeowners' organisations, industry, the scientific community, banks, reinsurers and the public sector (Confederation, cantons, municipalities).

The **vertical coordination** between the Confederation and the cantons has been intensified in the last 10 years by establishing regular dialogue platforms such as the 'natural hazard conference', the 'warning conference' and the 'civil protection conference'. They follow a sectoral logic with some overlap between sectors.

The implementation of concrete protection measures related to floods, avalanches or landslides is subject to **participation procedures** in accordance with the rule of law. The Confederation fosters a participative approach by using financial incentives as part of the subsidies provided.

2.4.2 Gaps and challenges

In contrast to other international frameworks, such as the 2030 Agenda for Sustainable Development, no organisational structures have been established in Switzerland for the purpose of implementing the SFDRR. To a large extent, this task is performed by the relevant authorities, administrative bodies, committees and entities referred to above. Policy coherence is furthered by various consultation processes, which include the federal agencies concerned, joint reporting procedures, and public consultations.

For a more holistic approach to risks that includes various types of hazard and addresses their interconnectedness, the present governance arrangements have to be expanded to involve all relevant sectors and further institutionalised. For instance, there is a large and acknowledged thematic overlap between natural hazard management and climate change adaptation. While the climate change adaptation strategy functions as an umbrella for the measures and a coordination mechanism at federal level is in place, there is limited integration in practice.

A further challenge is to ensure a whole-of-society approach. In terms of gender equality, for instance, women are still underrepresented in decision-making processes. Women are represented on only 25% of municipal councils and only 16% of local chairmanships are held by women.⁶³ On the other hand, credit proposals for specific projects (e.g. flood dykes) will be submitted to the electorate. Women have equal access to these votes, as do all citizens over the age of 18.

Activities in international cooperation

Examples of projects concerning risk governance implemented by the SDC, Swiss NGOs and partners include:

- The **government of Tajikistan** endorsed the **National DRR Strategy 2019–30**, the National CCA Strategy 2019–30 and appointed a National Focal Point for DRR at the level of deputy prime minister. Switzerland supported these processes through the United Nations Development Programme.

- In **Bolivia and Haiti**, **local administrations** have been or are being strengthened in their DRR governance through organisational development (creation of local DRR officers and offices); tools (hazard maps, land-use and construction regulations); training and capacity-building; and awareness-raising regarding risks and DRR that also includes civil society and private sector actors.

Gender equity is one of the SDC's strategic goals including with respect to the gender dimension in DRR. Within the framework of the relevant UN commissions and multilateral development organisations Switzerland is committed to the further development of international policies and standards. Accordingly,

it conducts a policy dialogue with its partner countries. Switzerland supports the agreed conclusions of the Commission on the Status of Women that put its focus on 'climate change, environment and disaster risk reduction' as the priority theme in its 66th session. The focus was on 'gender equality at the centre of solutions' covering *inter alia* the importance of women's economic empowerment to enhance their resilience, the importance of gender-responsive social assistance, their leadership capacity to shape important measures in DRR, or the need for gender data.

2.5 Progress on investment in risk reduction and resilience

2.5.1 Progress and trends

In the last few years, financial resources for the purpose of realising risk reduction and resilience measures have fortunately not been critical in Switzerland.

Natural hazards – DRR financing

Investing in the prevention and mitigation of natural hazards has been a priority for more than 150 years based on national legislation governing flood protection and forests. However, no complete, up-to-date pool of data is available to provide an accurate overview of investments. Only PLANAT prepared an overview of investments in the area of floods, storms, earthquakes, extreme temperatures, snow avalanches, landslides and rockfall⁶⁴ in 2007. This study shows that at that time around CHF 3 billion was being invested per year in protection against natural hazards in Switzerland. This included the cost of preventive measures, response, insurance premiums, and reserves for reconstruction. Over half this amount, i.e. CHF 1.7 billion, was borne by industry, business, agriculture, (semi-)private infrastructure operators and households. The remaining CHF 1.2 billion was covered in similar proportions by the federal government, cantons and municipalities. Now, 15 years later, experts assume that the level of investment and the distribution among the actors have not changed significantly, although the latest data has not been studied.

Since 2008, programme agreements have been the main instrument for implementing environmental policy – including natural hazard protection – in partnership between the Confederation and cantons. To that end, every four years, the Confederation and cantons agree on the services that will be provided by the cantons to reach the strategic goals of the Confederation. At the same time, the Confederation agrees to provide the cantons with appropriate financial support in the form of subsidies. These agreements also cover measures related to rivers and (protection of) forests, namely against floods, snow avalanches, landslides and rockfall, and include structural measures, hazard mapping and re- and afforestation.⁶⁵ These subsidies account for up to 45% of the total cost while the cantons and municipalities pay one third each. Extra funds are made available by the Confederation for large projects such as the River Rhône training work. These long-term schemes follow the integrated risk management principles. The level of subsidies has remained more or less constant over the last decade. In 2019, a total of around CHF 235 million was spent on protection against natural hazards. However, following the floods in 2005, Parliament substantially increased the funds in 2008 in response to recovery needs. The additional resources were used to rebuild infrastructure and repair structural protection measures. Since 2010, a portion of the subsidies (some 5%) have been directed towards organisational measures such as contingency planning or early warning systems. For the renaturation of rivers, the Confederation makes available around CHF 30 to 40 million per year.

Incentives in the form of additional contributions should motivate the cantons to apply a combination of protection measures as well as a participatory approach. Consideration has been given to distributing funds for protection measures in a risk-based manner. However, this could lead to a concentration of funds in the already financially strong urban centres, which would disadvantage the sparsely populated mountain regions. The cantons are clearly opposed to this approach.⁶⁶

The Confederation – on the basis of the revised legislation – will oblige the cantons to prepare master plans regarding natural hazards. These plans will be based on risk overviews, an assessment of the status of protection measures, and strategic considerations regarding the need for action and options. The master plan will prioritise planning, organisational, biological and technical measures and indicate the necessary long-term resources.

Implementation of DRR measures

By the end of 2019, 25% of the measures (by September 2022: 48%) defined in the report 'Dealing with natural hazards in Switzerland' (2016) had been implemented, the majority of these in the priority fields 'hazard and risk assessments' and 'response and recovery'. The measures are implemented using the available financial and human resources of the federal offices, cantons and insurance companies involved. Examples of completed activities are:

- Revision of building codes: the Swiss Society of Engineers and Architects (SIA) supplemented the existing standard (261 'Actions on load-bearing structures') with detailed information regarding the design of structures endangered by natural hazards. The standard 261/1 'Actions

on load-bearing structures – supplementary specifications’ includes technical requirements for protecting buildings from hail, snow pressure and all gravitational natural hazards (flooding/surface run-off, landslides, rockfall, debris flow and avalanches) as well as from earthquakes. It came into force in 2020.⁶⁷

- Incentives for property owners: the insurance companies mobilise private property owners to take hazard-proofing action. They provide information platforms,⁶⁸ guidance and financial support for measures to protect existing buildings.

Mobilising the private sector: involvement of big enterprises

A persistent electricity supply shortage is considered to be the highest risk for Switzerland. Reasons that can lead to a long-lasting crisis situation include climatic conditions with little precipitation and consequently low water in the reservoirs or limited import options for electricity on a temporary basis. In such a case, the Federal Council may order measures to ensure that the balance between electricity production and electricity consumption can be maintained at a reduced level. Energy supply companies that are responsible for electricity production, the transmission grid and the distribution grid serve on the OSTRAL committee.⁶⁹ They will implement the measures. In fall 2021, a campaign was launched to encourage large enterprises (factories, service providers, transport providers, etc.) to improve their business continuity management and contingency planning.

A mobile network outage is also one of the three highest risks for Switzerland. Operators and mobile telecommunication networks need to take additional measures to ensure that the Swiss population and economy can continue to use essential mobile services during a power outage. In 2020, the Federal Council therefore decided on a two-step approach. The first step, to be completed within a timeframe of five years, is to ensure that there is no disruption to emergency services during a power outage. The second step is to ensure over the long term that mobile voice and data services continue to be provided in the event of a power supply crisis. Relevant work is under way to assess possible measures.⁷⁰

2.5.2 Gaps and challenges

In the course of revising the flood protection legislation, a debate was launched on whether beneficiaries, such as infrastructure operators, should co-finance structural measures. The costs incurred would – as a minimum – cover the additional benefits they would gain from the measures. The debate also included discussion regarding the extent of state responsibility. However, the draft legislation was hotly contested during the consultations.

By law, spatial planning has instruments to ensure the integration of different actors and cross-cutting issues. Examples are the overarching balancing of interests and cantonal structure plans. Many activities of risk management are related to spatial planning. However, concrete projects (such as rezonings of settlements in the case of natural hazards) often fail due to political or economic priorities. Recently, two sets of guidelines were published to facilitate implementation: firstly, on how to integrate climate change into strategic planning, aimed at the cantonal authorities⁷¹ and secondly, on how to consider the prevention of major accidents in spatial planning.⁷²

Activities in international cooperation

Development endeavours, such as watershed management, rural development and natural resource management, which have been practised for a long time in international cooperation, contribute significantly to DRR. Furthermore, Switzerland considers DRR to be a core element of adaptation to climate change.

Project examples are:

- **Sustainable management of watersheds:** flash flooding and mudslides threaten the inhabitants of the Muminabad district in Tajikistan. A project of Caritas Switzerland (completed in 2019) helped set up inclusive civil society organisations such as pasture user unions and forestry guards. In cooperation with government representatives, these organisations developed integrated watershed action plans. These plans laid the foundation for the scaling of sustainable land management techniques and livestock grazing, and for multipurpose afforestation. This has reduced disaster risk, enhanced livelihoods, and protected forests. Some measures improved energy efficiency for cooking and heating.

- **Sponge city:** this new urban construction model aims to alleviate waterlogging, water resources shortages, and urban heat island effects for cities and improve the ecological environment and

biodiversity by absorbing and capturing rainwater and using it to reduce flooding. This approach has been applied in Vietnam through the Mekong Urban Flood Proofing and Drainage Programme.

- **Cities in emerging economies** are supported in strengthening their defences and protection against climate-related natural hazards as well as other financial risks. Supportive measures include, for instance, spatial and financial risk assessments, the installation of surveillance systems, investment in infrastructure, and professional training for public authorities.

- Work on **urban flood proofing and drainage** in Vietnam: the Mekong Delta region is particularly vulnerable to climate change and flood-related disasters. At the same time the Delta is heavily populated and the vulnerability to flooding thus creates a large negative impact on the socio-economic development. There is a lack of procedures and capacities at national and subnational level to implement measures to deal with these risks effectively and in a sustainable way. Local partners in three cities in the Mekong Delta are being supported to improve their capacity through the development of nationwide standards and policies on urban drainage and the reduction of flood risk, as well as to reduce urban flood risk and improve early warning.

The approach to DRR of Switzerland's international cooperation

SDC is responsible for coordinating Switzerland's development cooperation and humanitarian aid. SECO is the competence centre for economic development cooperation. Both institutions work actively in DRR.

SDC's approach to DRR

Conceptually, the SDC concentrates its DRR activities by adopting a disaster risk management approach which comprises support for an enabling environment for DRR, risk analysis, prevention/mitigation, preparedness for better response, and risk transfer.⁷³ Informed by the SFDRR, the SDC's approach to addressing DRR is based on the three following lines of action:

1. Implementing targeted DRR programmes: the SDC assists partner countries (through governments, civil society, communities, the private sector and international organisations) by implementing targeted programmes to reduce disaster risks and increase resilience, and supporting national strategies and initiatives.

2. Mainstreaming DRR within the SDC and systematically in development and humanitarian programmes and projects. The SDC and its partner organisations screen projects, programmes and strategies in development and humanitarian interventions, and incorporate DRR considerations where relevant.

3. Influencing international policy: the SDC influences the international DRR policy system and institutions at regional and global level, which in turn aim to reduce risk in disaster-prone countries and enhance institutional partnerships.

For Switzerland's international cooperation, DRR is particularly relevant in countries and regions where natural events are frequent and intense, where risks for the population and their livelihoods are high, and where coping capacities are low. As DRR implies a long-term perspective and commitment, DRR-targeted programmes are preferably embedded in development cooperation activities. However, the mainstreaming of DRR is done in all relevant countries and/or sectors where the SDC is active.

An external, independent evaluation of the SDC's performance in DRR (2010–17)⁷⁴ found that the SDC is regarded as a credible actor and a convincing mediator. To ensure that it remains a key player, the evaluation recommended that the humanitarian-development nexus be enhanced by developing shared end goals for the implementation of DRR beyond the humanitarian context. Following the internal reorganisation of the SDC in 2022, DRR will be merged with the topics 'climate' and 'environment'. In addition, the SDC's operations will be hosted in geographic divisions covering both humanitarian and development instruments, allowing for a stronger and more systemic approach, including in the mainstreaming of climate, DRR and environment in the SDC's operations. The evaluation also recommended that the SDC's work on DRR make use of specific Swiss expertise, for instance using the Swiss Humanitarian Aid Unit's experts not just in humanitarian crises but also in prevention and preparedness initiatives.

Regarding climate change, **Switzerland's international cooperation funding** in this area is set to increase gradually from CHF 300 million per year in 2017–20 to approximately CHF 400 million per year by the end of 2024, equivalent to around 15% of total international cooperation resources. These funds

are used for climate change mitigation and adaptation, but always within the mandate to reduce poverty and promote sustainable development.

SECO's approach to urban DRR and resilience

Today, the world's population and economic activity is concentrated in cities. With the urban population expected to increase from today's 50% to 70% by 2030, cities offer huge development opportunities. At the same time, urbanisation and climate change create significant challenges for cities. The large majority of cities are located near rivers, mountains, or coastlines which makes them vulnerable to negative climate change effects and extreme weather events. Unplanned urban sprawl can even fuel that exposure, leading to increased economic losses and more poverty.

Consequently, cities must mitigate climate change risk and respond to evolving challenges. Business as usual, reactive planning and misinformed decision-making will not allow cities to face these challenges adequately, let alone adapt and prosper further. Delivering a climate-resilient urban future requires risk-aware, integrated and inclusive solutions. This contributes to long-term sustainability as potential future losses can be reduced or avoided, and recovery accelerated. Investing in climate change resilience thus pays off financially and contributes to further economic development.

SECO supports cities to better prepare for, withstand, and recover from disaster in a timely and efficient manner. To this end, SECO strengthens municipal capacities to 1.) better understand disaster risks and their threat to people, assets, and the economy, 2.) mainstream them into urban planning and management processes, 3.) prepare, finance and implement necessary DRR measures and investments. This allows municipalities and utilities to operate public services reliably in the event of disasters.

SECO's support for urban disaster risk reduction (DRR) is part of its wider support for sustainable urban development.⁷⁵ Urban DRR support aligns with the following principles:

1. Key intervention area is resilience against climate change-induced extreme events and disasters.
2. Activities are mainly in urban areas and with cities, often with a link to national level strategies and policies. Municipal administrations and utilities as main project partners.
3. Economic infrastructure services and related investments are the focus area. Key sectors such as mobility, energy management, and water are especially important.
4. Focus lies on prevention and preparedness, less on post-disaster recovery.
5. Grant funding is provided for institutional and policy development, technical assistance and capacity-building, less for hardware and investments.
6. DRR financing and mobilisation of private finance for resilience are important.

As with the general SECO approach to sustainable urban development, projects on urban DRR support cities along the urban value chain and seek to have an integrated, cross-sectoral character. This means that municipalities are supported to plan, finance and operate relevant DRR interventions and infrastructure investments.

2.6 Progress on disaster preparedness

2.6.1 Progress and trends

In recent years, significant progress has been made in forecasting as well as in warning and alerting of natural and other hazards. Efforts have been made to improve preparedness, business continuity management, contingency planning and staff training in several sectors. In the period from 2015 to 2020, there were events that could be handled well with the existing means and mechanisms. Lessons from those events served to optimise the processes. Experiences gained from the COVID-19 pandemic are depicted in section 3.1.

Early warning

The analysis of the devastating floods of 2005 showed that the damage caused by natural hazards can be reduced significantly with the help of improved preparedness, early warning and response.⁷⁶ Shortly after the floods, the Federal Council initiated the project 'Optimisation of Early Warning and Alerting of Natural Hazards' (OWARNA) and mandated the responsible federal authorities to implement associated measures at strategic, organisational and technical levels. It included the monitoring and forecasting of hazards, warning and alerting procedures, the enhancement of information flows to the subnational authorities and the public, as well as the establishment of a 'natural hazards crisis staff unit' to facilitate coordination between various federal offices in the case of a major disaster related to natural hazards. Furthermore, training services for the role of local natural hazard advisors were developed and established.⁷⁷

The relevant federal agencies are constantly monitoring the hazard situation and are, by law, responsible for issuing warnings to the cantonal and communal authorities and the public. Warnings on severe hazards that are reaching very critical levels may be subject to a binding broadcast obligation, in which case they will be issued as government warnings by public and private radio and television broadcasters. In addition, mobile app-based push warnings and alerts are able to target the population effectively. Based on the recommendations and instructions given, individuals can protect themselves or help minimise losses. Established in 2014, the [Natural Hazard Portal](#) is a publicly accessible real-time platform that displays natural hazard warnings issued by the federal agencies in a coherent and easy-to-understand way.⁷⁸ It also provides information on the various hazards and, most notably, recommends how to behave during certain hazard situations. The password-protected expert tool 'Joint information platform natural hazards GIN' combines all available real-time data on natural hazards in Switzerland on a web-based map platform.⁷⁹ Another dissemination tool is the in-built natural hazard tile within the very popular mobile [weather app](#), provided by the Federal Office for Meteorology and Climatology (MeteoSwiss). Due to its high level of penetration among the population, the app also helps considerably in sensitising the public to and warning them effectively of natural hazards.

In the past, the responsible federal offices harmonised their data, forecasts and warnings. Today, the national authorities issue high-quality, timely warnings and alerts related to hazardous weather conditions, avalanches, floods, forest fires and earthquakes using various information channels and platforms. The forecasting and warning of critical landslide dispositions as well as early warnings of droughts are currently being developed.⁸⁰

Local and individual preparedness

In the last few years, progress has been made at local and cantonal level by drawing up contingency plans, improving the warning and alerting chain, and training intervention staff. Furthermore, civil staff units and emergency services have been reinforced by local hazard advisors who bring local and technical expertise. Since 2010, the cantons have trained local natural hazard advisors to serve municipal authorities or communities.⁸¹

Switzerland has a nationwide network of audible sirens that may be used to alert the population to disasters and emergencies. The web-based and mobile app Alertswiss, which was put in place in 2018, is designed to complement this audible warning system and issue rapid warnings to the general population. The Alertswiss [app](#) and [website](#) provide real-time information on various hazards as part of the alert chain, make specific behavioural recommendations and provide tips for emergency planning. They also make specific recommendations for conducting and facilitating emergency planning. Alertswiss is in use throughout Switzerland among civil protection authorities. Thanks to a participative consultation process involving persons with disabilities, the warning and alerting system is inclusive and

accessible. It ensures that at least two senses are addressed for a particular warning: you can hear the sirens and/or see the warning through the app or through a push notification.

Currently, cantonal and communal authorities are planning and establishing emergency meeting points all over Switzerland. During disasters and emergencies, information and basic support (food, first aid, shelter, means of communication) are available to the population at these emergency meeting points and, where necessary, collective evacuation can also be organised from these points. The authorities can provide information via radio, television and Alertswiss when the emergency meeting points are in operation. The emergency meeting points are not to be confused with public shelters where people find refuge, primarily in the event of an armed conflict.

Financial preparedness

Risk transfer schemes, especially insurance, play an important role in Swiss risk management. Cover for natural hazards, such as floods, avalanches, storms or rockfall, was already introduced in the first half of the 20th century as part of the public building insurance that is now compulsory in 22 of 26 cantons.

The Swiss insurance system is based on solidarity between insured persons, as everyone pays the same premium, regardless of whether or not the area is at risk. The claims burden from all damage relating to natural hazards is divided among the companies affiliated to the Swiss natural perils pool⁸² according to their national market share. This ensures that the risks in areas particularly exposed to natural hazards are also insured. Besides insurance cover, social protection provided by the government as well as solidarity mechanisms at household level are additional common forms of risk transfer (e.g. emergency funds in cash or in kind provided by Swiss Solidarity or other NGOs).

Earthquakes, which are one of the major risks in Switzerland, are not (yet) covered by insurance. However, efforts are under way to introduce an earthquake insurance. The 'Earthquake Claims Organisation', founded in mid-2021, will support the response to severe earthquakes by assessing damaged buildings and estimating the costs of reconstruction. This will ensure cost-effective rebuilding, as the financial resources from insurance benefits and relief funds can be distributed quickly. The organisation is a public-private partnership consisting of representatives of cantons, building insurers and private insurance companies.⁸³

In order to ensure that the methodology for buildings assessment and the training of experts in charge of buildings assessment are uniform throughout Switzerland and compatible with international standards, a manual was written and published in 2021.⁸⁴ Currently, experts are trained in the uniform methodology.

2.6.2 Gaps and challenges

Two large scale household surveys in 2015 and 2020 revealed that the average level of awareness of natural hazards and the level of preparedness is rather low. However, significant regional differences were detected, e.g. between mountain regions and lowlands. Nevertheless, the studies found that personal experience, risk communication and general attitudes towards nature and risks influenced the respondents' level of awareness.⁸⁵ Analyses show that taking responsibility for natural hazard risk prevention is not only related to personal experience and the perceived probability of hazard events, but also, crucially, influenced by social forms of communication and integration. These factors should be taken into account when motivating citizens to take action and develop a sense of personal responsibility.⁸⁶ This is important because integral risk management involves all stakeholders as well as the population. Regarding early warnings, activities are under way to include a more needs- and impact-oriented perspective and to issue weather warnings in plain language that is easy to understand.

In order to improve the warning chain from producers to users, greater technical integration is needed. Technical optimisation and higher integration should be achieved particularly at interfaces in order to save valuable lead time when transmitting information and warnings to users. Many technical elements, such as data capture, data harmonisation, data aggregation and disaggregation, data dissemination, data exchange, data visualisation and data publication require greater digitalisation and automatisisation, automatic real-time processing, central data production (single source of truth) and central production of services (once only principle). These integration aspects are important to delivering up-to-date information and warning services in a timely fashion, without redundancy, which are consistent for all users everywhere. It is important, however, to consider interfaces which require human intervention,

input or interpretation. The activities described are in line with the Federal Digitalisation Strategy 2020–2023⁸⁷, the Federal e-Government Strategy 2020–2023⁸⁸ and agreed technical standards. Furthermore, several parliamentary motions have called for the establishment or expansion of digital interfaces by the Federal Administration.

In the aftermath of the devastating floods in Europe in summer 2021, the introduction of cell broadcasting in Switzerland was re-evaluated. Based on the findings, developments in the EU, and experiences gained in practice in recent years, the study team believes it would be expedient for Swiss civil protection to supplement the public warning system with cell broadcasting in the near future. This would ensure that in time-critical emergencies, public warnings reach as many people as possible, even if one or more warning channels fail partially or completely.⁸⁹

While for many years, bilateral agreements exist with neighbouring countries on mutual assistance in the event of disasters, Switzerland has been linked to the European Union Civil Protection Mechanism (UCPM) since 2017 through an administrative arrangement. The arrangement, which is non-legally binding, simplifies the exchange of information between the operational centres. In other areas, cooperation is difficult. The UCPM improves prevention, preparedness and response to disasters. Since its introduction, over 500 requests for assistance have been realised worldwide. A commissioned study evaluated the opportunities and challenges for Switzerland in becoming a participating state to the UCPM and identified a number of opportunities at cantonal, federal and international levels.⁹⁰ From a security policy perspective, the option of Switzerland joining the UCPM as a third country needs to be examined.

Activities in international cooperation

Switzerland contributes to international initiatives that help countries most at risk to improve their preparedness and to take action early in anticipation of disasters. One example here is the **Climate Risk and Early Warning Systems (CREWS)** initiative, an innovative pooled fund mechanism. CREWS aims to significantly increase access to early warnings and risk information in least developed countries and small island developing states. CREWS projects build community response capability by strengthening early warning, preparedness and awareness.

Through the **Weather4UN pilot project**, Switzerland supports the development of the World Meteorological Organisation's (WMO) Coordination Mechanism. It aims to provide easy access to relevant weather, water and climate information and expert advice for the humanitarian community in order to anticipate and better prepare for and respond to disasters, emergencies and crises. The project is being implemented by MeteoSwiss in close collaboration with the SDC, the WMO secretariat and WMO members as well as with the IFRC and the humanitarian community.

In the Andes mountains, a regional initiative aimed at **strengthening national meteorological and climate services** is being implemented in four countries (Peru, Ecuador, Bolivia and Argentina). This initiative specifically benefits vulnerable population groups. It aims to integrate early warning systems and early action protocols and mechanisms into local and national disaster risk management systems.⁹¹

3 Contextual shifts, new and emerging issues and challenges

3.1 Response to the COVID-19 pandemic – experiences from the crisis management

The COVID-19 pandemic over the past two years posed the greatest challenge to Switzerland's crisis management since the Second World War. This prolonged crisis affected all sectors of society and required crisis management at all three levels of government: federal, cantonal and municipal.

In the health sector, Switzerland has had a revised and updated Epidemics Act since 2016, which underlines the leadership role of the Confederation by strengthening its coordination and supervisory function. Under the Act, the Federal Council, with the involvement of the cantons, is responsible for defining objectives and strategies, while the cantons are responsible for enforcement. The Act also provides details on the division of labour between the Confederation and the cantons in dealing with a national health emergency by introducing a three-tier model for 'normal', 'special' and 'extraordinary' situations. In addition, Switzerland has a pandemic plan for influenza that complies with World Health Organisation (WHO) guidelines, which was first developed in 1995 and whose fifth and most recent version dates from 2018. It serves to save lives and protect the health of the population and describes the targeted preparation of the Swiss health system for a pandemic. The plan is primarily aimed at the competent authorities at federal and cantonal level and enables a coordinated and efficient response by the authorities to a pandemic, thereby minimising its impact on the population and society. The crisis organisation at national level was also revised several times in the years leading up to the COVID-19 pandemic. For example, the pandemic plan designates the interdepartmental Federal Civil Protection Crisis Management Board as the coordination body under the lead of the relevant federal agency, while the Directive on Crisis Management in the Federal Administration in Extraordinary Situations,⁹² which dates from 2019, provides for an ad hoc crisis unit supporting the decision-making process of the Federal Council.⁹³

Many of the tools and processes envisaged proved to be appropriate and effective in the pandemic, while there is a need for optimisation in some others. For example, there is a lack of specificity regarding responsibilities and processes for initialising crisis management at federal level. The pandemic plan banks on early detection and strategy adaptation, i.e. early registration of the warning signs of a pandemic at the technical level and subsequent vertically coordinated adaptation of the planning bases. However, it became apparent that the political-strategic level was involved in early detection too late and it was unclear within the active crisis management structures which body would carry out the national risk assessment and subsequent holistic strategy development and when and how this should be done. In the area of crisis organisation, the planned structures at federal level proved to be insufficient in terms of coherence and stability. The crisis units were not set up in accordance with the planning principles so that the political-strategic and operational levels of crisis management were not sufficiently separated. Furthermore, leadership changes have been experienced among the different interdepartmental and departmental crisis units.⁹⁴

The ambiguous crisis organisation at federal level made it difficult to ensure coherent crisis management by means of clear interfaces to the cantonal level. Also, at the beginning of the pandemic, there was no established mechanism for including science and society in the crisis organisation, for example through an institutionalised interface between politics and science or expert commissions. In addition, Switzerland lacks institutionalised access to the EU entities and mechanism on serious cross-border threats to health, even though the country was granted a limited access on an ad hoc basis at the beginning of the pandemic.⁹⁵

Numerous evaluations and assessments of the crisis management during the COVID-19 pandemic are currently under way or have already been completed in Switzerland at both federal and cantonal levels.⁹⁶ The latest evaluation of crisis management at federal level during the second phase of the pandemic, published in June 2022, makes thirteen recommendations.⁹⁷ In order to strengthen anticipation and coordination within the Federal Administration during a crisis, options for the organisation of crisis management at strategic and operational levels are to be presented to the Federal Council. Through cooperation between the federal levels of government, coordination and consultation should be improved, for example by integrating digital tools for urgent consultations with the cantons. In addition, options for the future design of scientific policy advice are to be presented to the Federal Council. The experiences of the Federal Administration in ongoing projects to revise, for example, the Epidemics Act, the pandemic plan and crisis-related ordinances and directives are to be taken into account in future.

Lessons learned from exercises and crises are also to be taken into account more systematically as part of the overall planning of large-scale exercises.

Switzerland's international cooperation response to the COVID-19 pandemic

From humanitarian supplies to global partnerships, Switzerland has provided a comprehensive response to the COVID-19 pandemic. The Federal Council approved two credits for the response to the COVID-19 pandemic in April 2020⁹⁸ and April 2021⁹⁹. These involve contributions to multilateral efforts as well as to bilateral and humanitarian programmes in the priority countries for Switzerland's international cooperation.

For SDC, this meant that Swiss embassies and SDC cooperation offices adapted their activities to the context and local needs and reprogrammed projects in response to the pandemic. For instance, in Eastern Europe (including the South Caucasus and West Balkans) and Central Asia, the SDC shifted the focus of its intervention from extremely rapid ad hoc response and agile reprogramming across 7 sectors (health, economy, governance, education, water and sanitation, art and culture, and humanitarian aid) to systematising lessons learnt from the crisis in order to adapt existing programmes over the long term. In developing new regional cooperation programmes, entry points were identified to mainstream emergency and preparedness in the SDC's strategy for strengthening health systems.

3.2 Climate change

The impacts of climate change are becoming increasingly evident, including in Switzerland. As an alpine country, Switzerland is characterised by significant differences in altitude over short distances and relatively high precipitation volumes; climate change exacerbates the hazard situation. Climate change is also having an effect on the environment, the economy and society. Switzerland is making efforts both in terms of mitigation and adaptation.

Climate policy

In January 2021, the Federal Council adopted the long-term climate strategy to 2050, which sets out how the goal of net zero greenhouse gas emissions can be achieved by 2050. At the same time, the Federal Council approved the submission of the strategy to the UN Climate Change Secretariat.¹⁰⁰ The strategy sets out the climate goals and emission pathways for the construction, industrial, transport, agricultural and food sectors, financial markets, synthetic gases, aviation and the waste industry.

The CO₂ Act¹⁰¹ defines targets and provides details of national-level measures. Today's mix of instruments to reduce greenhouse gas emissions includes, for example, the carbon levy on fuels, emissions trading, schemes to promote building-related energy efficiency, CO₂ regulations for new cars, mandatory carbon offsets for importers of fossil fuels, a technology fund, and industry agreements. In 2021 the Swiss electorate rejected comprehensive amendments to the CO₂ Act. However, numerous measures remain in place or have been extended on the basis of a parliamentary initiative. Switzerland now faces the task of aligning its national climate policy consistently with international targets. The Federal Council sent a new bill for public consultation in December 2021.¹⁰²

In international cooperation, Switzerland is set to mobilise additional public and private funds for international climate financing. Developed countries pledged a total of USD 100 billion a year, from both public and private sources, for climate change action in developing countries from 2020 onwards. The Federal Council considers Switzerland's fair share to be CHF 450–600 million per annum from that date, including both public and mobilised private sector funding. Mobilising private sector climate financing remains a challenge in poorer developing countries, so in future greater consideration will be given to innovative new financial instruments.

Swiss civil society¹⁰³ advocates for an ambitious climate policy, which assumes responsibility for emitting greenhouse gases, and calls for a Swiss contribution to climate finance without compromising the budget for international cooperation. Furthermore, civil society is urging Switzerland to honour its commitment to and meet its responsibilities regarding net zero and carbon-neutral development paths.

Climate change scenarios and impact studies

Since 2014, the regular compilation of climate scenarios has been an official mandate of the federal government. In fall 2018, MeteoSwiss and ETH Zurich, together with other partners from the scientific community, provided up-to-date climate scenarios for Switzerland (CH2018). They are based on the global emission scenarios and describe an average level of climatic conditions over a period of three decades, grouped around the years 2035, 2060 and 2085. The CH2018 climate change scenarios show where and how climate change would affect Switzerland and quantifies the impacts. The expected consequences of climate change for Switzerland include more hot days, dry summers, heavy precipitation and winters with little snow.¹⁰⁴

Further research is being carried out in order to understand the spatial and temporal impacts in more detail, for instance on forests,¹⁰⁵ natural hazards and waterbodies. The Hydro-CH2018 hydrological scenarios show that at certain times and in certain regions this vital resource will become so scarce or so warm that people will have to curb their activities and nature will suffer. With climate change mitigation, the changes will be much smaller, meaning that such mitigation is worth the effort. The studies also indicate major consequences for the use of waterbodies. Drinking water abstraction, irrigation, electricity generation, heat production and cooling will be limited at times, and there will need to be trade-offs between different uses in order not to overload ecosystems.¹⁰⁶

Various parliamentary procedural requests have also called for in-depth analyses and action plans, e.g. on how to tackle future bottlenecks and water use conflicts¹⁰⁷ and the level of preparedness in responding to forest fires¹⁰⁸, to name but a few. As these requests are addressed to the Federal Council, the specialised federal offices usually prepare reports, which can be seen as guiding documents or action plans in that specific area.

Federal action plan for adaptation

The federal strategy on adaptation to climate change sets out the framework for a coordinated approach by the federal offices. In a consultation process, ten federal offices identified cross-sectoral challenges arising from the impacts of climate change, including greater heat stress in agglomerations and cities, increasing levels of summer drought, greater risk of flooding, and change in habitats, species composition and landscapes. They also agreed on action plans at federal level. Most of these measures aim to improve the framework for adapting to climate change, increase the knowledge base through monitoring and research, review and, where necessary, amend standards, develop new management strategies, and integrate adaptation into existing processes and forms of cooperation. The federal offices implement the measures as part of the relevant sector policy and finance them to a large extent within their existing budgets.

By 2020, 14 measures from the action plan 2014–2019 had been implemented, 28 were in progress, 19 were in the initial phase, and 2 had been postponed.¹⁰⁹ A survey showed that the strategy not only created a common framework for coordinated measures by the federal offices and the cantons, but also forced the federal agencies responsible for the target areas to act by raising awareness. Although concrete implementation of measures is often still sectoral, the cross-sectoral approach of the strategy is considered as an added value. Examples of measures: the Federal Office for Spatial Development is working on spatial planning instruments to reduce heat accumulation and improve the absorption capacity of precipitation through more open and green spaces in cities. The concept of 'sponge cities', which focus on increasing evaporation, infiltration, retention, controlled temporary flooding and providing emergency waterways, is a planning solution to prevent damage from surface run-off and to reduce the effects of heat. A recently published report details strategies and measures and presents numerous practical examples.¹¹⁰

Some cantons, cities and municipalities are already actively addressing aspects of adaptation to climate change and have developed studies, strategies or action plans. An online data collection in 2018 showed that half of the cantons had a strategy relating to climate change adaptation. Currently, the number is probably much higher, as several parliamentary requests in the cantons have called for such a strategy.

Gaps and challenges

Extreme events and uncertainties are increasing. Thus, in addition to the previously known 'classic' natural hazards such as floods, avalanches or rockfall, there are increasingly 'new' threats such as heatwaves or drought – and as a consequence – water shortages and forest fires, for example. However, the current focus of hazard and risk assessments is still on the changing pattern of the hazards which are expected to increase in frequency and in intensity due to climate change or environmental degradation. More systematic attention needs to be paid to the changes in vulnerability and exposure of people and assets. Research projects have been launched to better understand these risks. For instance, studies on heatwave fatalities reveals that small children, the elderly and people with pre-existing chronic diseases are most vulnerable to heatwaves.¹¹¹ This underlines the need to further investigate and address vulnerabilities and design measures accordingly.

As risk factors are constantly changing, regular forward-looking assessments are necessary but cannot yet be implemented in full. In addition to known events and statistics, possible extreme scenarios need to be considered. Future-oriented contingency planning needs to have a basis that takes the expected changes into account.

Integrated risk management is thus becoming increasingly important as it is a well-known and proven instrument for decision-making and action despite uncertainties. Efforts are already under way to assess the impacts of climate change on floods, avalanches and landslides and to factor these into hazard assessments and the planning of measures. The Federal Council recently published a report that sets out the necessary steps to fully apply the integrated risk management approach to forest fires. Measures include the training of fire brigades in regions with limited experience of forest fires, contingency planning or nationally standardised warnings.¹¹² A further study assessed the impacts of climate change on civil protection as a whole and concluded – among other things – that the roles of the relevant partners need to be clarified, and partners' capacities strengthened.¹¹³

4 Conclusion and outlook

4.1 Conclusion

In the past, Switzerland invested heavily to maintain a high level of security and safety. Since 2015, Switzerland has been able to embark on work towards implementing the SFDRR from a comfortable position. Switzerland has strong governance, reliable information on hazards and risks, highly qualified experts and financial capacity for taking measures. Mechanisms of solidarity among the population – e.g. reflected in the compulsory insurance system, fundraising in response to events and crises, social safety nets – seem to function well. Vulnerability to long-known natural hazards, such as floods, avalanches, landslides and rockfall, is therefore relatively low thanks to the continuous efforts made.

Despite the progress made, Switzerland is aware of the challenges ahead and that major efforts will continue to be necessary in future. Technical and socio-economic development with strong settlement growth and infrastructure expansion, biodiversity decline and increasingly noticeable climate change are increasing the risks. Crisis situations are becoming more complex and are often interconnected. Due to the fast-changing context – not least due to Russia's aggression against Ukraine – resources are becoming even more limited. It is necessary to prioritise measures that need to be implemented and determine risks that have to be borne.

Many activities are already under way to tackle these challenges, for instance providing more information on forest fires or water use. Furthermore, federal, cantonal and municipal authorities are taking measures to cope with the current highly volatile situation.

This report comprehensively assesses both the status quo and progress made in different risk fields. This has allowed perspectives to be broadened and needs for action identified. It calls for a careful assessment and management of risks that take social vulnerabilities into account and for the development of a more gender-responsive and inclusive lens on DRR that has mostly been absent to date. Governance arrangements need to be expanded so that a whole-of-society approach can be jointly realised. This is even more important, as integrated risk management strives to include all stakeholders and the population. However, more effort needs to be made to involve society in preparedness. Findings from social sciences may provide guidance here.

Lessons from the COVID-19 pandemic also show that there is a need for institutionalised integration of science into political decision-making on prevention and mitigation as well as into crisis management. In a future crisis, it will also be important to implement the planning principles, e.g. planned crisis units and interfaces downwards and upwards. In addressing climate change, it will be crucial to implement coordinated and risk-based preparedness planning across all sectors and levels of government.

Disasters do not stop at borders: regional and global risks have to be tackled together. Switzerland is striving for better access to relevant international forums for early risk detection and risk assessment, as well as for the crisis management.

4.2 Outlook

Based on the findings of this report and the challenges outlined, we see the following topics and priorities for action that we want to work on in the next few years, including at international cooperation level.

- Risks – as the COVID-19 pandemic revealed – are becoming more global and often have **compound consequences from multiple hazards**. We need to become aware through more comprehensive risk assessments that take into account interdependencies and cascading effects.
- **Risk governance arrangements** must include hazards of various types, address their interconnectedness and coordinate all levels of society. Furthermore, we have to ensure, that everyone is enabled to take action, that we protect everyone and leave no one behind by involving them in planning and decision-making processes.
- **Climate change is a game changer** that exacerbates many existing risks. The best prevention is to reduce the amplitude of climate change by reducing greenhouse gas emissions, but the narrow time window towards achievement is closing rapidly. With climate change effects already being felt, adaptation to increased events is paramount. This means that DRR and civil protection concepts have to be adapted to this new level of events. While supporting low carbon development pathways, adaptation capacities have to be further strengthened.

- Switzerland should maintain its strong focus on prevention. Switzerland considers **prevention and preparedness measures as an investment**: it is much more effective to consider the potential impact of hazards in all planning processes, rather than build back after a disaster has struck.
- As the biggest risks will affect both the present and the future, we need to adopt **an intergenerational approach to risk management**. We need to make progress on addressing the risks that will cause major consequences for future generations.



Abbreviations

ARE	Federal Office for Spatial Planning
CCA	Climate change adaptation
DRR	Disaster risk reduction
FCh	Federal Chancellery
FDFA	Federal Department of Foreign Affairs
FOCP	Federal Office for Civil Protection
FOEN	Federal Office for the Environment
FONES	Federal Office for National Economic Supply
FOPH	Federal Office of Public Health
FOT	Federal Office of Transport
GFDRR	World Bank's Global Facility for Disaster Reduction and Recovery
GNDR	Global Network of Civil Society Organisations for Disaster Reduction
GPD	Gross Domestic Product
IFRC	International Federation of Red Cross and Red Crescent Societies
LAINAT	Steering Committee on Intervention in Natural Hazards
MeteoSwiss	Federal Office for Meteorology and Climatology
NCCS	National Centre for Climate Services
NCCS	National Centre for Climate Services
ODA	Overseas Development Assistance
OWARNA	Optimisation of Early Warning and Alerting of Natural Hazards
PHEIC	Public Health Emergency of International Concern
PLANAT	National Platform for Natural Hazards
SDC	Swiss Agency for Development and Cooperation
SDG	Sustainable Development Goals
SECO	Economic Policy Directorate
SED	Swiss Seismological Service
SFDRR	Sendai Framework for Disaster Risk Reduction
SIA	Swiss Society of Engineers and Architects
UCPM	Union Civil Protection Mechanism
UN	United Nations
UNDRR	United Nations Office for Disaster Risk Reduction
WHO	World Health Organization
WSL	Swiss Federal Institute for Forest Snow and Landscape Research WSL

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