Interreg Co-funded by the European Union
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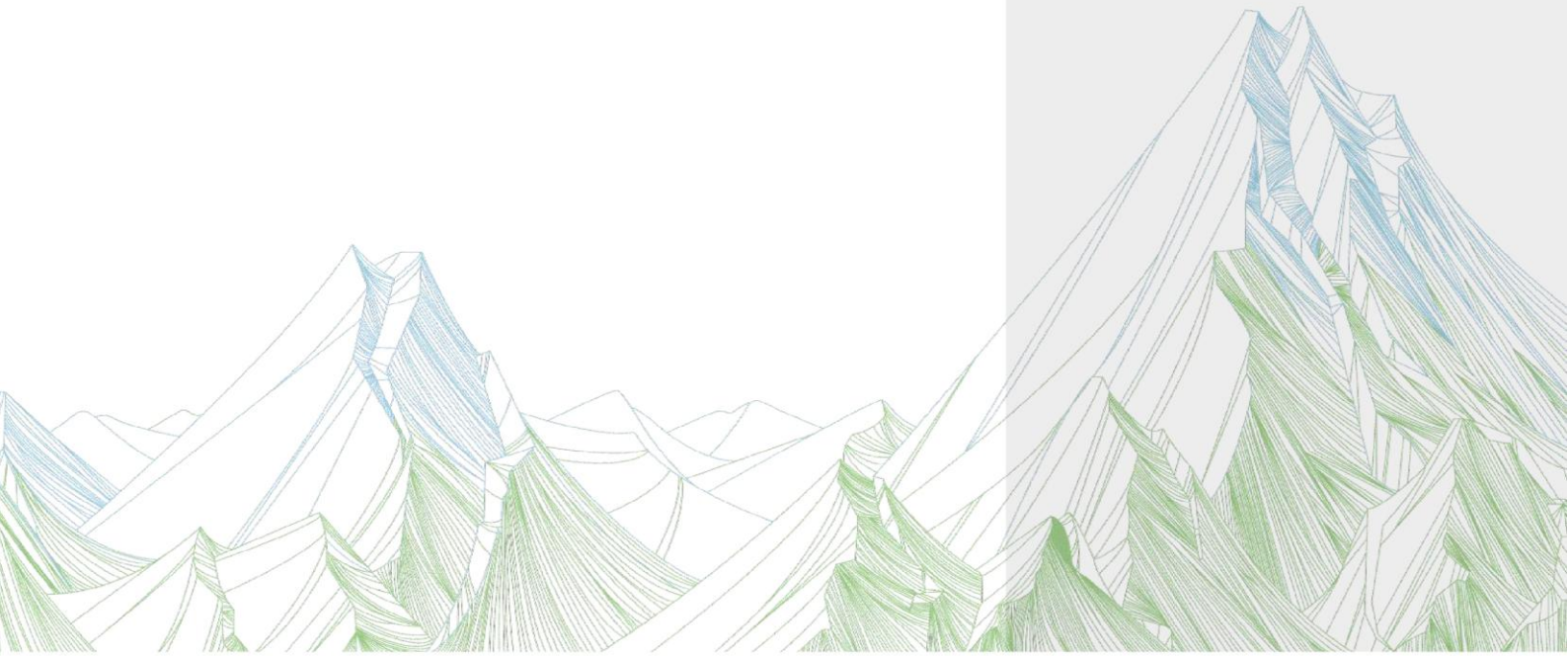
X-RISK-CC

TAILORED ACTION PLAN
FOR RISK MANAGEMENT IMPROVEMENT

Interreg Alpine Space X-RISK-CC project – 2023/2025

PILOT AREA:

South Tyrol



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PROJECT PARTNERS

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REPUBLIC OF SLOVENIA MINISTRY OF THE ENVIRONMENT, CLIMATE AND ENERGY

PROJECT: **X-RISK-CC**

How to adapt to changing weather eXtremes and associated compound RISKs in the context of Climate Change

IMPRESSUM:

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X-RISK-CC - Alpine Space Programme

INTRODUCTION TO THE X-RISK-CC PROJECT

Project Background and Objectives

The X-RISK-CC project addresses the increasing challenges posed by climate-related extreme weather events across the Alpine Space. Recent years have demonstrated that compound and cascading extremes—such as storms combined with heavy precipitation, or heatwaves followed by drought and flooding—can challenge current risk management capacities. The unexpected magnitude and intensity of these extremes can cause compound impacts and domino effects that turn into complex, long-lasting, or even irreversible consequences. While scientific evidence links climate change to the increasing intensity and frequency of such events, knowledge and management of their cascading impacts and risks remain insufficient. The X-RISK-CC project aims to improve risk management of such extreme events in the context of climate change. By considering selected pilot areas across the Alpine Space, co-designed, context-specific interventions are elaborated based on a comprehensive assessment of past extreme events, future climate projections, and systematic evaluation of existing risk management capabilities and gaps. This document presents the Tailored Action Plan developed for one of the project pilot areas.

The Pilot Area of Reference

In South Tyrol, in the eastern Italian Alps, two pilot areas were analysed in the scope of the project. One pilot area comprised the municipalities of Aldino, Nova Levante, and Nova Ponente, all heavily affected by the Vaia storm in 2018. The other pilot area was the Fleres Valley, which was affected by a cascading event in summer 2021: the debris flow of the Toverino River diverted the main Fleres River causing unexpected flooding of the valley.

For further details on the pilot areas, the natural hazards that occurred and the activities that led to the co-creation of the tailored action plan, refer to the documents “PILOT DOSSIER: ALDINO; NOVA LEVANTE AND NOVA PONENTE IN SOUTH TYROL” and “PILOT DOSSIER: FLERES VALLEY IN SOUTH TYROL”, available at the project website under “Outcomes”.

Outcomes:
X-RISK-CC - Alpine Space Programme
https://www.alpine-space.eu/project/x-risk-cc/

X-RISK-CC – Web GIS:
Information on intensity and frequency of weather extremes in the entire Alpine Space
https://cct.eurac.edu/x-risk-cc

THIS DOCUMENT

Based on the results of participatory workshops with local stakeholders, this document presents the Tailored Action Plan (TAP) which outlines the priority actions to strengthen the region's capacity across all phases of the risk management cycle. The TAP addresses key gaps in early warning systems, data integration, coordination mechanisms, infrastructure resilience, legal frameworks, and public awareness. The actions are designed to be implementable, measurable, and aligned with both regional and transnational objectives of the Alpine Space for disaster risk reduction and climate change adaptation.

Purpose and Concept

While this document provides the overall structure and documentation, the TAP itself is conceived as a living set of implementation-oriented actions, forming a dynamic and evolving database of priority measures. The actions can be continuously updated and adapted over time and serve as a practical reference for identifying next steps, tracking ongoing initiatives, and maintaining a clear overview of progress in strengthening regional resilience. This flexible approach acknowledges that effective risk management in the context of climate change requires ongoing learning, adaptation, and coordination among stakeholders.

Methodology

The methodology employed to develop the TAP for each pilot area of the project follows a **Community-Based Approach** engaging stakeholders across all phases of the risk management cycle (prevention, preparedness, response, recovery). **Participatory workshops with local stakeholders** were conducted **between 2023 and 2025** in each pilot area.

Participants in the workshops of the pilot areas in South Tyrol:

- Civil Protection Agency (AFBS)
- Provincial Weather Service
- Forestry Department (Abteilung Forst)
- Municipal civil protection coordinators
- Volunteer and professional fire brigades
- Infrastructure managers (roads, railways, utilities)
- Land-use planning authorities
- Emergency medical services
- Research institutions

Prioritization Strategy of Actions

Prioritization was carried out separately for each pilot area in the project and is therefore not uniform across pilot regions, reflecting different risk contexts, institutional settings, and capacities.

For South Tyrol, all actions proposed during the participatory workshops in each pilot region were first collected and clustered by topic to address overlaps. The X-RISK-CC team then identified, for each action, the institution with primary responsibility and agency for its implementation. Based on this, targeted exchanges were held with the relevant offices and authorities to discuss feasibility, existing or planned activities, resource availability, and possible implementation pathways.
Prioritization was derived qualitatively from these discussions and reflects the assessment of the responsible institutions in each pilot. Priority levels consider urgency, feasibility, and the timeline for implementation (immediate versus stepwise or long-term), as well as expected impact, co-benefits, climate change relevance, and institutional readiness. The assigned priority therefore indicates the level of readiness and urgency for action within a specific pilot context, rather than a cross-pilot ranking of importance.

STRUCTURE AND CONTENT OF THE TAILORED ACTION PLAN

Each action in this document includes:

- **IDENTIFICATION:** Unique code, title, and summary
- **GAP ADDRESSED:** Specific weakness or need in current risk management
- **FRAMING:** Position in risk cycle, action type, governance level, ownership, target groups
- **DESCRIPTION:** Detailed explanation of the action, preliminary steps, expected benefits, and potential challenges
- **VALIDATION:** Indicators and parameters for monitoring progress and success
- **FEASIBILITY:** Timeline, funding status, responsibilities, and implementation pathway

Action Plan Fields Explained

ID Number	Unique identifier assigned to each action. This allows for easy reference, tracking of connections between actions, and integration with other planning documents.
Title of the Action	Brief, descriptive name that clearly communicates the core focus of the action.
Gap(s) it refers to	Specific deficiencies, weaknesses, or missing elements in current risk management practice that this action aims to address. Gaps may include missing infrastructure, inadequate procedures, lack of coordination, insufficient data, legislative limitations, communication deficiencies, or capacity constraints.
Risk Cycle Position	The phase(s) or interphase(s) of the risk management cycle where this action primarily operates: Prevention, Preparedness, Response, Recovery, or Interphases (e.g., "Preparedness-Response," "Recovery-Prevention").
Type	Classification of the action according to its primary mechanism: • **Knowledge and Data:** Actions focused on improving information, understanding, monitoring, or data systems • **Communication:** Actions aimed at improving information flow, awareness, warnings, or coordination

	• **Legislative:** Actions requiring changes to laws, regulations, standards, or formal procedures • **Technical Measures:** Actions involving physical infrastructure, technology deployment, or engineering solutions • **Capacity Building:** Actions focused on training, institutional strengthening, or resource development
Level	The primary governance or implementation scale: Local (municipal level), Provincial/Regional, National, Cross-border/International, or Multiple levels.
Ownership	The institution(s) or organization(s) with primary responsibility for initiating, implementing, and ensuring completion of the action. Ownership implies decision-making authority and accountability.
Actors	Other institutions, organizations, or groups that play significant roles in implementing the action, providing input, or whose cooperation is essential for success.
Target Groups	The populations, sectors, or constituencies that will directly benefit from or be affected by the action. This may include general population, specific vulnerable groups, professional sectors, municipalities, emergency responders, or infrastructure operators.
Priority	Ranking from 1 (High Priority) to 5 (Low Priority) based on the prioritization methodology described above. Priority reflects urgency, impact potential, feasibility, and stakeholder consensus. TAP includes only actions assigned to priority level 1 and 2.
Funding	Current or anticipated funding status: Funded (source identified), Partially funded, Funding sought, no funding required (resourced through existing budgets), or to be defined.
Finalize by (timewise)	Target date or timeframe for completion of the action: Short-term (within 1-2 years), Medium-term (3-5 years), Long-term (5+ years), Ongoing (continuous improvement without fixed endpoint), or Specific dates where applicable.
Progress Status	Current state of implementation: e.g., Concept, Planning, Approved, In Progress, Completed, On Hold, or Continuous

Connection to other actions (ID)	Lists the ID numbers of related actions that must be completed first (prerequisites), should be coordinated with (synergies), address related gaps (thematic connections), or may conflict with (trade-offs to manage).
Comments/Details/Observations	Additional context, clarifications, challenges identified, lessons learned, or other relevant information that does not fit in structured fields.
Documentation and Links	References to supporting documents, reports, legal texts, technical studies, websites, or other resources relevant to understanding or implementing the action.

TAILORED ACTION PLAN

Table of actions

Table 1 provides a comprehensive overview of all identified actions. Each action is coded according to the system described in the previous section and can be filtered by its position in the risk cycle, type, priority level, or progress status. **Detailed descriptions of each action are provided in the Annex**, including the rationale, the gap or need addressed, its position within the risk management cycle, institutional ownership and involved actors, target groups, and current implementation status. Together, these descriptions contextualize the actions, support prioritisation and monitoring, and provide a transparent basis for coordination, decision-making, and future updates of the action plan.

ID Number	Title of the Action	Gap(s) it refers to	Risk Cycle position	Type(s)	Level	Ownership/Responsibility	Actors	Target Groups	Priority	Funding	Finalize by (timewise)	Progress Status	Connection to other actions (ID)	Comments/ Details/Observations	Documentation and Links
A01	Information Workshops on Civil Protection for municipal administrations	Need for systematic, up-to-date communication between province and municipalities on civil protection topics.	Prevention	Data and Knowledge, Communication	provincial/ regional	Civil Protection Office of the Autonomous Province of Bolzano	Municipal administrations, local civil protection oganizations (e.g., volunteer fire brigades)	Municipal dministrations, Professional and Volunteer Fire Brigade, Civil Protection	1	no extra need	ongoing	completed for 2025, planned next round	A02	material from the past x-risk-cc workshops are available internally, the responsibility after the end of the project pertains to the Civil Protection Office of the Province of Bolzano.	X-RISK-CC Materials internally
A02	Civil protection package for municipalities	Need for a clear, accessible entry point for municipalities to overview their civil protection responsibilities.	Prevention	Data and Knowledge, Communication	provincial/ regional	Civil Protection Office of the Autonomous Province of Bolzano	Municipal administrations, local civil protection oganizations (e.g., volunteer fire brigades)	Municipal dministrations, Professional and Volunteer Fire Brigade, Civil Protection	1	no extra need	start in 2026	not started yet	A01, A05	assembling an explanatory package/ website using existing civil protection materials and resources, accompanied by explanations of the basics, similar to the Natural Hazards Portal	Il portale web dei Pericoli naturali in Alto Adige
A03	Introduction of a standardized debriefing procedure	Need standardized post-event debriefing procedure and shared form.	Recovery	Data and Knowledge, Legislative	provincial/ regional	Directorate of the Civil Protection Agency, Civil Protection Office of the Autonomous Province of Bolzano	Provincial offices, risk managers, first responders, municipal administrations, local civil protection oganizations		1	no extra need	start in 2026	in planning			the idea of "just culture"
A04	Make NOWTICE operational	Need to harmonize contact lists and improve adoption of NOWTICE among actors.	Prevention, Interphase: Prep - Resp	Data and Knowledge, Communication	provincial/ regional	Directorate of the Civil Protection Agency	Civil Protection Office of the Autonomous Province of Bolzano, Provincial Warning Centre	Provincial offices, risk managers, first responders, municipal administrations, local civil protection oganizations	1	no extra need	Start in 2026, year by year process in mid term	in planning		there currently are redundancies in contact administrations internally in offices, the NOWTICE platform is already deployable and would tackle the problem, but not broadly used yet	
A05	Civil protection package for tourism operators	Tourism operators and hoteliers lack tailored hazard information to share with tourists.	Interphase: Prev - Prep	Data and Knowledge, Communication	provincial/ regional	Provincial Warning Centre		Tourism associations and tourism operators (hoteliers)	1	no extra need	start in 2026	in planning	A02	connection to the communication strategy planned in 2026	
A06	Establishment of a working group for the revision of hazard zone planning and organizational structure for natural risks	No regulations ensure structured provincial involvement in hazard zone plan revisions. Regulations are missing to include climate change & compound, cascading events.	Prevention, Interphase: Rec - Prev	Legislative	provincial/ regional	Provincial Warning Centre	Regional government and 16 regional offices, distributed across 4 departments in 4 different assessorates		1	no extra need	ongoing	established, start working in 2026	A12	action bought on by mudtiple instances, like the risk assessment by Eurac for the Autonomous Province of Bolzano an dthe Project ADAPTNOW	
A07	Coordination and mediation with transport infrastructure operators through communication channels	Need for regular communication channels with transport operators during disruptions.	Prevention, Preparedness, Response	Communication	provincial/ regional	Directorate of the Civil Protection Agency	Highway and Railway transport infrastructure operators	Municipalities along the Brenner Corridor	2	no extra need	start withing the next 2 years				
A08	Communication and data collection on people with disabilities for emergency response	No accessible data on people with disabilities for evacuation or similar systems.	Prevention	Data and Knowledge	provincial/ regional	Provincial Warning Centre	Organizations for people with disabilities, people with disabilities	first responders in emergencies	2	no extra need	start withing the next 2 years			The Province of Trento has a "best-practice" in this regard, that could be apopted and adapted by the province of Bolzano as well.	
A09	Inclusive accessibility and accessible formats for warning report	Warning reports only in DE/IT/partial EN; accessible and inclusive formats missing.	Preparedness	Communication	provincial/ regional	Provincial Warning Centre		People with disabilities, individuals with diverse support needs, disability associations, civil protection staff, municipalities	2	no extra need	start in 2026, implamentation mid-term (few years)		A05, A08	connection to the communication strategy planned in 2026	
A10	Availability and use of avalanche triggering equipment at provincial and municipal level	Limited access to avalanche triggering technology; municipalities cannot always act immediately.	Preparedness	Technical measures, implamentation proposal	provincial/ regional	Civil Protection Office of the Autonomous Province of Bolzano	Office for Meteorology and Avalanche Warning, Municipalities Affected, Avalanche Commissions	Municipalities Affected, Avalanche Commissions	2	to be defined	mid term - years	informed - discussions started		agreement: Municipal commissions request support; framework set by responsibles office to coordinate avalanche triggering solutions and responsibilities.	
A11	Real-time thunderstorm nowcasting and early warning system for the Province of Bolzano	More frequent/intense thunderstorms due to climate change; limited real-time alerts and localized risk info for authorities.	Preparedness	Technical measures, implamentation proposal	provincial/ regional	Provincial Warning Centre	FBK (Fondazione Bruno Kessler)	Municipalities, stakeholders, civil protection operators, citizens (e.g. farmers, cable car operators)	1	Funded (EFRE)	first round by end of 2027	ongoing			
A12	Integrated management of data on natural hazards events and their impacts	Existing databases on hazards, impacts, and costs are poorly linked, preventing a comprehensive and traceable overview of natural hazard events.	Interphase: Recov - Prev	Data and Knowledge	provincial/ regional	Provincial Warning Centre	Provincial technical offices		2	no extra need	mid to long term (at least 5 years)	kickoff	A06		
B01	Forest service coordination for the management of firefighting infrastructure and support to local volunteer fire brigades	Existing forest fire infrastructures could benefit from enhanced maintenance and updating, alongside more shared assessments of water needs in the context of increasing wildfire risk.	Preparedness	Technical measures, implamentation proposal	provincial/ regional	Forest inspectorates	Forest inspectorates, Local Volunteer Firefighter Organisations	Local Volunteer Firefighter Organisations	1	no extra need	constant work	ongoing			

TABLE 1: *Complete inventory of the Tailored Action Plan for the pilot areas in South Tyrol.*

The table is visible by zooming in

CONCLUSIONS AND NEXT STEPS

This document represents a living framework for improving risk management in the X-RISK-CC pilot areas in South Tyrol in response to climate-related extreme events. The actions identified through participatory workshops with local stakeholders address critical gaps across all phases of the risk management cycle.

Key Outcomes:

- Comprehensive inventory of the tailored actions co-designed with local stakeholders
- Systematic coding system enabling efficient tracking, monitoring and coordination
- Integration of scientific climate projections with local knowledge and practical experience

ANNEX

In the following, each action listed in the table is described individually.

Actions with an ID number starting with “A” fall under the responsibility of the Agency for Civil Protection of the Autonomous Province of Bolzano. Accordingly, the “Responsibility” field for these actions refers to the relevant internal departments of the Agency.

Actions with an ID number starting with “B” are also implemented at the provincial level; however, they do not fall under the direct responsibility of the Agency for Civil Protection, Instead, responsibility lies with other departments of the Autonomous Province of Bolzano.

A01 – Information Workshops on Provincial and Municipal Warning and Civil Protection Systems for municipal administrations

GAP THE ACTION ADDRESSES

Necessity of keeping the municipalities updated on civil protection thematics, from the functioning of the civil protection system to all updates and new procedures in the field.

FRAME OF THE ACTION

- **Risk Cycle Phase:** Prevention
- **Type:** Knowledge and Data, Communication
- **Level:** Provincial
- **Responsibility:** Civil Protection Office of the Autonomous Province of Bolzano
- **Target Groups:** Municipal administrations, local civil protection organizations (e.g., volunteer fire brigades)
- **Priority:** 1
- **Links to other actions in the document:** A02
- **Timing:** The action was discussed within the Civil Protection Agency and its continuation in 2026 with new topics is planned

DESCRIPTION OF THE ACTION

The action consists of conducting workshops in municipalities and represents an ongoing activity building on the approach and experience gained from the workshops already carried out in South Tyrol in 2025. Data and materials related to these workshops are available internally in the X-RISK-CC folders or upon request from the project's responsible contact person.

A02 – Civil protection package for municipalities: overview of municipal responsibilities – web platform

GAP THE ACTION ADDRESSES

Need for an accessible entry point that provides municipalities with a clear overview of their responsibilities in the field of civil protection. This is particularly useful following municipal elections but also serves as an ongoing resource for municipal administrations.

FRAME OF THE ACTION

- **Phase of the Risk Cycle:** Prevention
- **Type:** Knowledge and Data; Communication
- **Level:** Provincial
- **Responsibility:** Civil Protection Office
- **Target Groups:** Municipal administrations; local civil protection organizations (e.g., volunteer fire brigades)
- **Priority:** 1
- **Links to other actions in the document:** A01
- **Timing:** The action was discussed within the Civil Protection Agency and its start is planned for 2026.

DESCRIPTION OF THE ACTION

The action consists of assembling an explanatory package/web platform based on existing civil protection materials and resources, accompanied by explanations of the main concepts, similar to the Natural Hazards Portal (Il portale web dei Pericoli naturali in Alto Adige) Only limited new content will be created. Instead, existing resources will be consolidated, structured and presented in a clear and user-friendly way to make them readily usable by municipalities. The materials can subsequently be disseminated through Action A01.

A03 – Introduction of a standardized debriefing procedure

GAP THE ACTION ADDRESSES

Need to implement a standardized procedure and shared form for post-event debriefings to ensure complete information collection, facilitate the comparison of events, and improve the integration of results into preventive planning.

FRAME OF THE ACTION

- **Phase of the Risk Cycle:** Recovery / Prevention Interface
- **Type:** Knowledge and Data, Legislative
- **Level:** Province
- **Responsibility:** Civil Protection Office, Agency Directorate
- **Target Groups:** Provincial offices, risk managers, first responders, municipal administrations, local civil protection organizations
- **Priority:** 1
- **Links to other actions in the document:** –
- **Timing:** Start in 2026

DESCRIPTION OF THE ACTION

The Civil Protection Agency already conducts post-event debriefings, but without a standardized procedure. This action aims to implement a simple, replicable model supported by standardized forms, and to ensure the application of “Just Culture” principles, emphasizing non-punitive reporting and a process-focused analysis rather than individual blame. To be effective, this initiative should be issued as a top-down directive from the Agency Directorate and involve all relevant actors.

A04 - Make NOWTICE operational and disseminate it – maintenance, communication, and activation

GAP THE ACTION ADDRESSES

Need to securely harmonize contact lists and links between relevant actors, which are currently managed in a fragmented way. Although NOWTICE is already operational, it is not sufficiently well known or consistently used, resulting in redundancies and parallel processes. The main gaps therefore lie in system dissemination, organizational adoption, and governance rather than in technology itself.

FRAME OF THE ACTION

- **Phase of the Risk Cycle:** Prevention, Preparedness - Response interphase
- **Type:** Knowledge and Data, Communication
- **Level:** Province
- **Responsibility:** Provincial Warning Centre, Civil Protection Office, Directorate of the Civil Protection Agency
- **Target Groups:** Provincial offices, risk managers, first responders, municipal administrations, local civil protection organizations
- **Priority:** 1
- **Links to other actions in the document:** –
- **Timing:** Start in 2026, with a phased approach over the medium term

DESCRIPTION OF THE ACTION

The action starts with mapping current users and existing processes, identifying redundancies in contact management, and defining organizational responsibilities. All contact lists and internal links must be harmonized before dissemination to individual units. Implementation follows a gradual approach: each year a new organizational unit (e.g., traffic, logistics, mayors) is engaged, while previously activated groups are consolidated. The entire process is coordinated by the Provincial Warning Centre with support from the Civil Protection Office and in line with directives from the Agency Directorate.

A05 – Civil protection package for tourism operators: overview of alerting systems, communication of warnings, and appropriate behaviour – web platform

GAP THE ACTION ADDRESSES

Currently, tourism associations and hoteliers do not receive hazard and warning information tailored to their needs, and communication to tourists largely relies on individual initiative. Warning messages are rarely embedded in tourism communication, and there is no shared culture of risk awareness in this context—unlike in mountain huts, where weather conditions or avalanche risks are routinely communicated. Although the bulletin is already available in English, it could be further tailored to the multilingual context of international tourism.

FRAME OF THE ACTION

- **Phase of the Risk Cycle:** Prevention - Preparedness interface
- **Type:** Knowledge and Data; Communication
- **Level:** Province
- **Responsibility:** Provincial Warning Centre
- **Target Groups:** Tourism associations and tourism operators (hoteliers)
- **Priority:** 1
- **Links to other actions in the document:** A03
- **Timing:** Start in 2026

DESCRIPTION OF THE ACTION

The action aims to integrate warnings into tourism communication by providing tourism operators with a practical information package and raising awareness of the importance of warning communication in mountainous regions. Similar to Action A03, it is supported by an information website that consolidates existing resources such as widgets and brochures. Implementation is gradual, involving hotel associations and potentially incorporating feedback from the Eggental Tourism Association. Warnings are tailored to the tourism sector and integrated into existing communication channels.

A06 - Establishment of a working group for the revision of hazard zone planning and organizational structure for natural risks

GAP THE ACTION ADDRESSES

There is a need to introduce regulations that ensure the structured involvement of provincial offices in the revision of hazard zone plans. Currently, revisions are driven solely by municipalities, with no incentives to integrate new models or to account for changes following natural events or the construction of protective structures. Furthermore, the plans are based exclusively on simple scenarios, without systematically considering climate change or compound/cascading events, limiting their ability to reflect real-world risk conditions. Revising the regulations would allow tools, scenarios, and procedures to be updated coherently, improving preparedness and the management of natural hazard risks at both provincial and local levels.

FRAME OF THE ACTION

- **Phase of the risk cycle:** Prevention, Interphase Recovery - Prevention
- **Type:** Legislative
- **Level:** Province
- **Responsible authority:** Provincial Warning Centre
- **Involved:** Regional government and 16 regional offices, distributed across 4 departments
- **Target groups:** Municipalities, regional offices
- **Priority:** 1
- **Links with other measures in the document:** A12
- **Timeline:** already started, ongoing in 2026

DESCRIPTION OF THE ACTION

The provincial government mandates the Civil Protection Agency to convene a conference with competent provincial offices, the municipal consortium, and representatives of individual municipalities to present the current situation, challenges, and needs.

A working group consisting of representatives from the Department of Nature, Territory and Landscape, the Civil Protection Agency, the Forestry Service, the Building and Technical Service, and the Municipal Consortium, will develop a proposal for a new law on hazard planning, update and simplify related regulations, and propose an organizational structure responsible for natural hazards and risks.

A07 - Coordination and mediation with transport infrastructure operators through communication channels

GAP THE ACTION ADDRESSES

Heavy rain, snowfall, or construction works on highways and the railway in the northern parts of the Province of Bolzano can disrupt traffic and train operations. In such cases, municipalities must manage stranded vehicles and passengers, rerouted services, and local traffic impacts. Although highways and railways are not under municipal responsibility, coordination with emergency services, local authorities, and infrastructure operators is required. A regular and functioning communication channel is necessary to ensure effective coordination and timely information exchange.

FRAME OF THE ACTION

- **Phase of the risk cycle:** Prevention – Preparation – Response
- **Type:** Communication
- **Level:** Province, Municipality, National
- **Responsible authority:** Directorate of the Civil Protection Agency of the Autonomous Province of Bolzano
- **Target groups:** Municipalities along the affected highway
- **Priority:** 2
- **Links with other measures in the document:** -
- **Timeline:** Start within the next two years

DESCRIPTION OF THE ACTION

The Directorate engages with infrastructure operators to establish regular and effective communication channels. It also mediates between municipalities, operators, and emergency services to ensure coordinated responses during operational disruptions on highways and railways.

A08 - Communication and data collection on people with disabilities for emergency response

GAP THE ACTION ADDRESSES

There is currently no information on people with disabilities who may require additional support in the event of an evacuation. Such information could potentially be integrated in Mapview (the online WebGIS of the Province of Bolzano) or similar systems; however, issues related to data privacy and data protection must be carefully addressed.

FRAME OF THE ACTION

- **Phase of the risk cycle:** Prevention
- **Type:** Data and Knowledge
- **Level:** Province, Municipality
- **Responsible authority:** Provincial Warning Centre
- **Target groups:** Disability associations, people with disabilities, first responders in case of emergency
- **Priority:** 2
- **Links with other measures in the document:** -
- **Timeline:** Start within next two years

DESCRIPTION OF THE ACTION

The action foresees consultations with the Civil Protection Service in Trento to learn best practices for collecting and managing information on people with disabilities who may require additional support during evacuations. Possible approaches may include voluntary data provision through disability associations, subject to appropriate data protection safeguard. Coordination with the Province of Trento will be explored to obtain guidance and ensure alignment with existing practices.

A09 - Inclusive accessibility and accessible formats for warning report

GAP THE ACTION ADDRESSES

The warning report and related civil protection information are currently available only in German, Italian, and partly in English. Accessible formats and measures to ensure inclusive access for people with diverse needs and specific accessibility requirements are currently lacking.

FRAME OF THE ACTION

- **Phase of the risk cycle:** Preparedness
- **Type:** Communication
- **Level:** Province
- **Responsible authority:** Provincial Warning Centre
- **Target groups:** People with disabilities, individuals with diverse support needs, disability associations, civil protection staff, municipalities
- **Priority:** 2
- **Links with other measures in the document:** A05
- **Timing:** Start in 2026, implementation over the medium term

DESCRIPTION OF THE ACTION

The action aims to expand the range of languages used in warning reports and civil protection information and to provide accessible formats tailored to different user needs.

A10 - Availability and use of avalanche triggering equipment at provincial and municipal level

GAP THE ACTION ADDRESSES

There is an operational gap in controlled avalanche triggering for civil protection and public safety purposes: in South Tyrol, avalanches cannot be triggered with explosives but only using acoustic pressure technology. Only one helicopter company operates with this technology, which is contractually primarily available to ski resorts. Municipal avalanche commissions are therefore not always able to implement all safety measures immediately.

FRAME OF THE ACTION

- **Phase of the Risk Cycle:** Preparedness
- **Type:** Technical measures, implementation, legislative
- **Level:** Province, Municipalities
- **Responsibility:** Office for Meteorology and Avalanche Warning, Civil Protection Office
- **Target Groups:** Avalanche commissions, Municipalities
- **Priority:** 2
- **Links to other actions in the document:** –
- **Timing:** The action was discussed within the Civil Protection Agency and will be further elaborated in 2026

DESCRIPTION OF THE ACTION

Municipal avalanche commissions will formally request support from the Civil Protection Office via their mayors through the municipal association (*Gemeindeverband*), initiating a procedure to prioritize this issue. Options under consideration include obtaining permissions for the use of explosive-based avalanche triggering methods, the potential procurement of acoustic pressure technology, and the sharing of devices across regions. No final decisions have been made; the action establishes a framework to define responsibilities and coordinate discussions between the relevant authorities.

A11 - Real-time thunderstorm nowcasting and early warning system for the Province of Bolzano

GAP THE ACTION ADDRESSES

With climate change, thunderstorms are becoming more frequent and intense, while their development in time and space remains difficult to predict using traditional forecasting methods. Although a radar-based tracking system exists at provincial level, there is a lack of specialized algorithms for real-time analysis and prediction of thunderstorm development. As a result, the warning system does not yet integrate real-time thunderstorm alerts, and authorities and decision-makers receive limited localized risk information, reducing their capacity for timely preventive action.

FRAME OF THE ACTION

- **Risk cycle phase:** Preparedness
- **Type:** Knowledge and data development, communication and warning systems
- **Level:** provincial, Local (municipalities),
- **Responsibility:** Provincial Warning Centre of the Autonomous Province of Bolzano
- **Target groups:** Municipalities, civil protection operators, citizens (e.g., farmers, cable car operators)
- **Priority:** 1
- **Links to other actions in the document:** –
- **Timing:** Step one until the end of 2027

DESCRIPTION OF THE ACTION

The action focuses on the development of a real-time thunderstorm nowcasting system for the province, integrating weather radar and measurement networks with AI-based predictive algorithms to estimate short-term storm movement and intensity. As a first step, existing short-term warning systems from neighboring regions and countries are benchmarked. Based on this assessment, a locally adapted concept and implementation plan are developed, including the definition of required measurement networks and forecasting algorithms. The resulting information is distributed to end users through a modular alert system and a dedicated visualization tool, improving risk communication and enabling timely, localized warnings for authorities and the public.

A12 - Integrated management of data on natural hazards events and their impacts

GAP THE ACTION ADDRESSES

There is a lack of structured links between existing databases that document different aspects of the same natural hazard event, such as the hazard process, its impacts on the territory and related costs. As a result, no comprehensive overview or full traceability of events and related information is available.

FRAME OF THE ACTION

- **Risk cycle phase:** Prevention, recovery, interphase between them
- **Type:** Knowledge and data
- **Level:** Provincial
- **Responsibility: Provincial** Warning Centre of the Autonomous Province of Bolzano
- **Target groups:** Provincial technical offices
- **Priority:** 2
- **Links to other actions:** A06
- **Timeline:** The first meeting with people responsible of the databases relating to natural hazard events took place in December 2025. This is a long-term action with an expected duration of five years.

DESCRIPTION OF THE ACTION

The action aims to improve cross-departmental management of natural hazard event data by linking and integrating existing databases. A key component is raising awareness among the different offices responsible for data management about the importance of connecting information across the entire event cycle, from hazard occurrence to impacts on the territory, post-event damage compensation, and cost estimation. This integrated approach supports a comprehensive overview, full traceability of events, and improved risk analysis and decision-making, including an understanding of the overall costs of natural hazard events.

B01 - Forest service coordination for the management of firefighting infrastructure and support to local volunteer fire brigades

GAP THE ACTION ADDRESSES

In many areas, dedicated fire-fighting infrastructures for forest fires are in place, but they are often not maintained or updated in a systematic manner. At the same time, with climate change, the risk of forest fires is increasing, and shared assessments of actual water requirements for effective interventions are lacking, despite the existence of studies and analyses.

FRAME OF THE ACTION

- **Risk cycle phase:** Preparedness
- **Type:** Technical measures, communication
- **Level:** Provincial, municipal
- **Responsibility:** Forest inspectorates at provincial level
- **Target groups:** Municipalities, local forest stations, local volunteer fire brigades
- **Priority:** 1
- **Links to other actions in the document:** -
- **Timing:** Started in 2025, ongoing

DESCRIPTION OF THE ACTION

The action is led by the forest service and aims to assess and improve firefighting infrastructure for forest fires. It includes functionality checks of existing structures in cooperation with competent authorities, verification of water availability, expansion of existing infrastructure and increase of water storage facilities, and the replacement of missing structures at strategic points with suitable existing infrastructure. In addition, the action foresees the review and updating of existing forest fire maps, correction of errors, and assessment of the suitability of infrastructure for helicopter operations. Coordination and targeted training with volunteer fire brigades support implementation.

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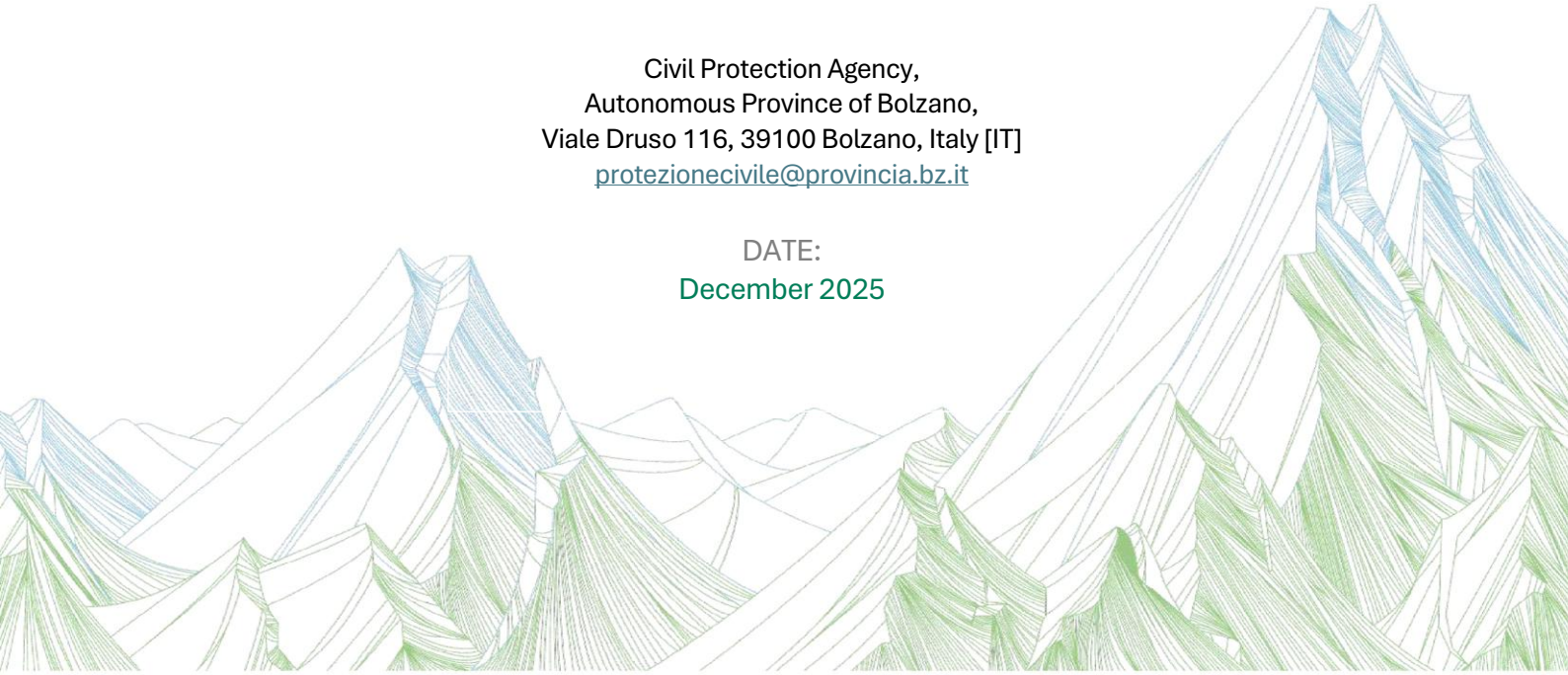
DATE:
December 2025



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