Climate change adaptation in the tourism sector

Roadmap towards a climate-resilient tourism sector
on the example of the Puster Valley

eurac research

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ADAPTNOW

Climate change in the Puster Valley

Climate change affects almost all natural and human systems and penetrates deep into social and economic sectors via cascading effects, as the European Environment Agency's new Climate Risk Assessment shows (EEA, 2024).[1]

The effects of climate change are already being felt in South Tyrol as well. The average temperatures rose by more than 2 °C in the last 40 years, climate impacts such as extreme events have demonstrably increased and will continue to increase due to advancing climate change. Within the framework of **ADAPTNOW**, the future trend of some tourism-relevant climate indicators for the Puster Valley was surveyed. They are shown in the following infographic.

1 EEA, 2024. European climate risk assessment: executive summary. Publications Office, LU.

Climate risks and adaptation

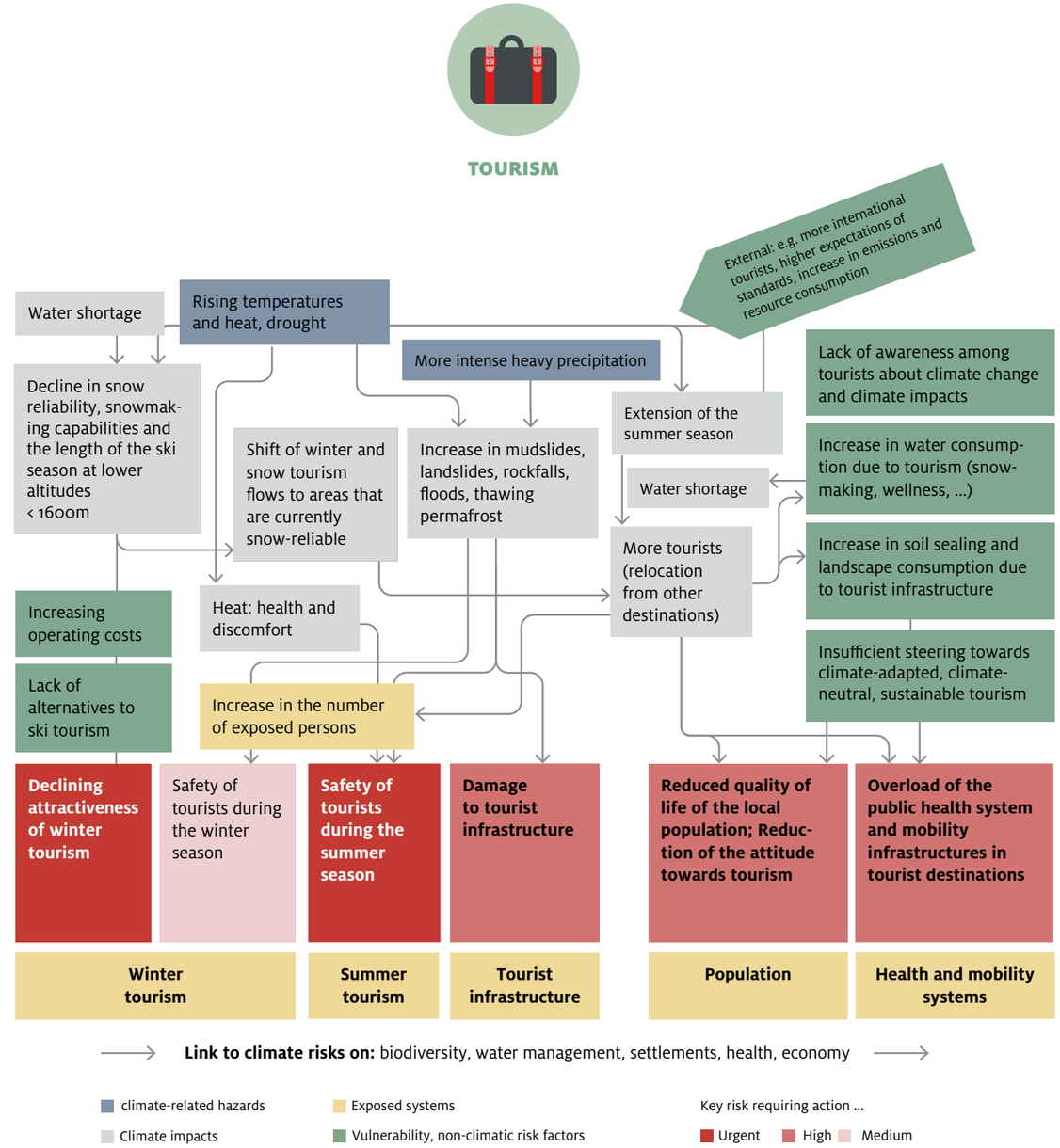
In order to reduce the negative consequences of climate risks for the environment, people and society, two closely interlinked strategies are needed:

Climate protection: The aim is to limit the temperature increase to well below 2 °C compared to pre-industrial levels by limiting greenhouse gas emissions and reducing them to net zero by the middle of the century at the latest (e.g. through renewable energies, sustainable mobility systems, etc.).

Climate adaptation: The aim is to reduce the vulnerability of natural and social systems to negative climate impacts or to increase their resilience as well as to exploit possible opportunities arising from changing climate conditions. Climate adaptation requires knowing climate risks, systematically reviewing past activities and the handling of climate risks, adapting flexibly to changing conditions and, if necessary, abandoning old practices.

In the project to develop the scientific basis for the South Tyrolean Adaptation Strategy, several risks were identified for the tourism sector, in which the described climatic developments manifest themselves (see so-called impact chain on the next page). However, these risks do not only result from climatic effects but are essentially caused by other factors such as exposure (= exposed elements of society, e.g. settlements or increasing number of tourists in the region) or vulnerability (= political, social, institutional and resource-related vulnerability/fragility). These and other non-climatic factors such as e.g. the degradation of ecosystems or increasing soil sealing are also the most important points of intervention for effective climate change adaptation.

As part of the participatory development of measures (see chapter "The participatory process towards the roadmap"), one **key risk** was identified for summer and one for winter tourism, for which in-depth adaptation measures were identified in the following workshops (see the dark red key risks with a high need for action in the impact chain on the next page).



Zebisch, M., Pedoth, L., Pörnbacher, M., Renner, K., Fritsch, U., Alberton, M., Bertoldi, G., Bisignano, J., Corradini, P., Crespi, A., Crippa, C., Ducati, V., Eisendle, F., Hilpold, A., Hoffmann, C., Horvath, K., Kircher, V., Lun, G., Maino, F., ... Thaler, F. (2025). *Klimarisiko und Anpassung - Wege zu einem klimaresilienten Südtirol*. https://doi.org/10.57749/4EHB-1753

Phases and activities towards a climate-resilient tourism

The roadmap presents the successive three phases "**Analysis"**, "**Vision**" and "**Action Plan/Implementation**" and corresponding activities in adaptation planning. However, the specific activities in each case are not to be considered in a strict chronological order, but should indicatively show the necessary steps in adaptation planning (priority measures with a red border).

Analysis

Climate risk assessments
for tourism offers and destinations
Priority: high

Objective: Analysis of the effects of climatic changes on tourism offers and resources (e.g. with regard to water availability, snow reliability, extreme events, etc.) through detailed climate and vulnerability analyses. This should be carried out on several levels based on existing climatic analyses: at the level of the region, at the level of the destination and possibly at the level of infrastructures. The analysis assesses the climatic impact on ecological and social systems, as well as the resilience of tourism offerings. Based on this, necessary adaptation measures can be derived. Due to the complexity of these analyses, it is necessary to involve experts. Follow-up measures are required: meetings to plan adaptation and consolidate measures, initiation of the adaptation of tourism offerings, and ongoing review.
Lead: LAG, TA, Research
Integration: TO, subsystems (e.g. hotel industry, infrastructure operators), research

Inventory of the hiking and cycle path network
Priority medium

Objective: To create a comprehensive overview of the condition of the hiking and cycling network in the Puster Valley and to regularly check their safety. The results of the participatory inventories of vulnerabilities and risks, accompanied by experts, are interpreted against the background of the climate risk assessment (e.g. increased heavy precipitation and landslides). Based on this, measures (also of a strategic nature), such as the expansion, maintenance and adaptation of the path network to the climatic challenges of the future, are derived and prioritized. Accordingly, political framework conditions for the construction of new infrastructures must also be created, responsibilities for cost assumption and maintenance must be defined, and liability issues clarified.
Lead: Forestry Department, Natural Parks, Hiking and Alpine clubs, TO, TA
Integration: Municipalities, politics

Market research and acceptance studies
Priority: high

Objective: To investigate guest reactions and acceptance of changes in the tourism offer (e.g. climate-adapted alternatives in winter and summer tourism). Market research is to be used to proactively shape changes and develop solutions that consider both the needs and expectations of guests and the new climatic challenges. A corresponding strategic integration into marketing and awareness-raising activities should then be promoted.
Lead: IDM, Research
Integration: TA, TO

Vision

Mission statement process
for climate change adaptation in tourism
Priority: high

Objective: The participatory development of a common, systemic, integrated mission statement for tourism and its subsystems in the Puster Valley and associated mission statements for the individual destinations, based on the climate risk assessments. The aim is to develop a reference framework for the strategic development of tourism, the management of conflicts and the planning and implementation of climate adaptation measures in tourism. A participatory and transparent process is intended to ensure that the perspectives of all relevant stakeholders are included, which increases the acceptance and feasibility of the measures. As part of the process, the resilience of the region and how to cultivate compatible, sustainable and resilient tourism in the long term should be critically reflected.
Lead: LAG, TA
Integration: TO, subsystems (e.g. hotel industry, citizens, gastronomy, infrastructure providers)

Raising awareness among key tourism stakeholders
Priority: high

Objective: To sensitize key tourism stakeholders (cable car operators, hotels, restaurants, huts, etc.) to the consequences of climate change by providing and disseminating practical information materials. Awareness should also be raised by planning and conducting targeted events on climate-related topics based on the results of climate risk assessments. There is a particular focus on communicating practical adaptation strategies through real-life examples and professional exchanges between experts and companies.
Lead: LAG, IDM
Integration: TA, TO, Research

Provision of information on climate risks
Priority: high

Objective: To ensure that guests are informed promptly and reliably about natural hazards, climate-related risks and relevant events by passing this information on to guests through tourism associations and companies.
Joint collection and preparation of the current information with the Agency for Civil Protection (AfCP) and dissemination to local contact points and guests via digital, easily accessible and multilingual platforms (new communication channels should be created and existing ones adapted, such as factsheets, hotel television, info screens in cable cars/trains/buses) through cooperation with municipalities and the Provincial Association of Tourism Associations of South Tyrol (LTS). Current hazard, warning and weather information, as well as potential local natural hazards and risks, should be integrated into the IDM guest app with the support of tourism organizations and linked to other information channels, such as the official weather app and personal information at receptions or guest information points.
People who are in direct contact with guests should be professionally trained in the area of risk management in order to be able to pass on relevant information efficiently. In addition, accompanying training courses and training of emergency organisations on crisis management should be carried out (based on climate risk assessments).
Lead: LAG, TO
Integration: AfCP, LTS, Association of Municipalities, Municipalities, Companies, blue-light organizations

Promotion of research and innovation
Priority: low

Objective: To promote scientific research on climate-related challenges and market trends in tourism, the acceptance of new offers and the testing of innovative concepts in order to create an evidence-based basis for the further development of sustainable and climate-resilient tourism as well as the political framework in the Puster Valley and beyond. Furthermore, relevant research fields are to be identified from the point of view of tourism organizations and businesses, while a corresponding funding pool should be established, with tourism organizations acting as intermediaries between research institutions and potential donors as well as project initiators.
Lead: Research, IDM
Integration: TA, TO

Action Plan/ Implementation

Action Plan: implementation of adaptation measures
Priority: high

Objective: Implementation of adaptation measures and adaptation of tourism offerings to climate change based on previous analyses and findings (A1, A2, A3, B2, C1). This can be carried out based on the following steps:
Lead: IDM, TA, TO, companies
Engagement: LAG, municipalities, banks, research

1. **Definition of responsibilities and roles**
- Identification of the relevant actors for planning and implementing adaptation measures
- Definition of responsibilities and roles between tourism actors and their subsystems
- Cooperation with local actors
- Involvement of municipalities and authorities

2. **Development of ideas**
- Definition of the central experiences (e.g. active tourism, wellness, cuisine)
- Brainstorming:
  - Activities independent of snow
  - Hybrid winter operation
  - Concept for skiing in winters with little snow (Which slopes will be opened or closed first? Definition of core areas, etc.)
  - Adjustment of operating hours (e.g. longer opening hours of pools during hot spells)
  - Adaptation of tourist infrastructure: building cooling and shading, retention areas, torrent control, etc.)
  - Enable access to cool places and drinking water points
  - Systematic observation of endangered areas (sections of paths, etc.)
  - ...

3. **Examination of the options and choice of the measures**
- Consideration of aspects of sustainability (environmental, social and economic sustainability) through the active involvement of civil society and stakeholder groups through participatory formats.

4. **Concept development and planning**
- Preparation of a detailed schedule with specific intermediate steps and responsibilities
- Preparation of a business and resource plan (cost-, financing and income planning)
- Planning of necessary infrastructure and services

5. **Implementation**
6. **Marketing and sales (see measure below)**
7. **Test phase, ongoing evaluation, monitoring and optimization**
8. **Long-term development**

Visitor guidance based on real-time data
Priority: high

Objective: Smart management of tourism flows during touristic peak times via homepage, app and digital information points in the case of extreme events (heavy rain, storms) or in the case of a lack of snow in winter, based on real-time data such as weather warnings, forest fire danger, heat warning, visitor numbers, traffic volume, etc. This is intended to ensure the safety of those seeking recreation through visitor guidance and the avoidance of infrastructure overload and ecological damage. Visitors can also be redirected to public transport.
The responsibilities, the resources to be made available and the intervention mechanisms (steering system) must first be clarified.
Lead: TA, IDM
Integration: TO, LAG

Inclusion of climate adaptation issues in communication and marketing
Priority: medium

Objective: To position the Puster Valley as an attractive, (more) snow- or weather-independent, year-round destination (e.g. indulgence and cultural programs, wellness and/or weather-appropriate nature experiences) by integrating climate adaptation into communication and marketing activities at various levels. Guests should be informed about climate effects, and safe behavior should be taught, while alternative offers should be actively promoted.
Lead: TA, TO, IDM
Integration: Businesses

Vision for winter tourism

The Puster Valley is a versatile, attractive, interconnected and sustainable winter destination that is more independent from more frequent lack of snow and is in a balanced relationship with its subsystems.

Challenges and opportunities in adaptation planning

The planning and implementation of adaptation measures is associated with a wide variety of challenges that require early consideration. However, comprehensive, targeted planning also offers opportunities for effective and consistent implementation of the measures:

CHALLENGES

OPPORTUNITIES

CHALLENGES	OPPORTUNITIES
The participatory development of visions/mission statements and measures is complex and resource-intensive.	The involvement of municipal and provincial politics is crucial to create trust in processes and results.
Effective planning, implementation and follow-up requires the support of experts in order to design the process in a targeted and successful manner.	Political acceptance enables the long-term and targeted creation of legal and financial framework conditions for tourism.
Legal requirements can delay or complicate the implementation of adaptation measures (e.g. non-climate-adapted hazard zone planning or community development programs). Early consideration of legal requirements is necessary to identify obstacles and proactively circumvent them.	A wide range of diversified tourist offerings reduces dependence on climate-sensitive activities and strengthens the resilience of tourism.
Generational conflicts in tourism businesses can have an impact on the acceptance and implementation of new offers and products.	New opportunities arise through the development of innovative and complementary offerings.
Conflicts over the use of resources, especially water (e.g. also from storage basins), require participatory negotiation processes, considerations and clear regulations.	The expansion of the public transport network is crucial to promote tourism mobility and accessibility of the destinations and to improve the overall experience of the region.
The acceptance of tourism by the local population cannot be taken for granted and should be investigated, for example through citizen science projects.	Participatory measures can promote awareness and sensitization among the population and guests, which increases acceptance of climate adaptation.
The decrease in the personal responsibility of the population and guests represents an additional challenge.	

General recommendations for the next steps in climate change adaptation

1

Analysis of which actors and organizational structures are necessary to promote the topic and activities of climate adaptation in tourism in the Puster Valley and thus successfully initiate and implement them.

2

Establishment of a permanent core team for climate adaptation both by anchoring it within the tourism companies, tourism associations, tourism areas and local action groups, as well as between these committees to develop the basis for decision-making and to implement measures.

3

Provision of financial and human resources at various levels (businesses, tourism associations, tourism areas) and definition of specific responsibilities to implement measures.

4

Establishment of regular meetings between the tourism areas, tourism associations and the local action groups in order to discuss and conceptualize activities and to make decisions for the initiation.

5

Engagement, awareness-raising and storytelling: Participation of civil society in the planning and communication of adaptation measures as an added value for sustainable and responsible tourism.

6

Resilience through interconnectedness: Cooperation and improvement of public transport connections between destinations in order to efficiently network the tourist offer across valleys and destinations.

7

Greater integration of roadmap content into existing instruments (e.g. GSTC certification, municipal development programs, etc.) to increase their impact and reach.

8

Increased involvement of public actors (e.g. province, IDM, municipalities) in the planning and implementation of adaptation measures in order to create framework conditions (legal, financial, structural).

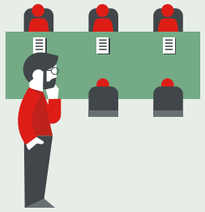
9

Consideration of communication-specific aspects:

- Strategic marketing orientation and balanced communication between advertising for tourist offers and climate risks.
- Taking into account the changing target groups and adapting the means and channels of communication accordingly for the effective communication of the tourism function.
- Short-term, effective communication about (climate) risks and suggestions for behavioral adjustments from guests and local populations.

The participatory process to the roadmap

Within the framework of **ADAPTNOW**, measures were to be developed and implemented in the pilot region of the Puster Valley to increase the ability to adapt to climate change. In order to respond to local socio-economic, ecological and climatic challenges in the most targeted manner possible, the comprehensive participation of local actors is essential for effective climate change adaptation. **ADAPTNOW** therefore began by identifying the key risks to tourism. Local conditions and adaptation needs were then defined with stakeholders, and joint discussions were held on how to plan and implement appropriate measures (see timeline on the right):



2
Stakeholder workshop
Workshop with tourism stakeholders to determine current adaptation capacity, gaps and weaknesses in climate change adaptation, and to identify exemplary adaptation measures.

4
Introductory module:
Introductory workshop for tourism stakeholders for the knowledge transfer in the field of climate change, climate risks and adaptation

6
Information event,
presentation and discussion of the roadmap

06.2023 — 19.07.2023 — 09.2023-06.2024 — 10.2024 — 04.2025

1
Identification of relevant stakeholders and conducting interviews to initially define adaptation needs

3
Meetings with key stakeholders
Joint identification of the two key climate risks for summer and winter tourism and ongoing roadmap planning

5
In-depth module and creation of the roadmap:
In-depth workshop with tourism stakeholders and representatives of environmental groups in order to jointly develop the vision for a climate-resilient Puster Valley and necessary climate adaptation measures, as direct input for the roadmap (details on the workshop under „Organisation and procedure of the in-depth module“)

Organization and procedure of the in-depth module:

The aim of the participatory workshop, co-organized and moderated by alpS GmbH, was to develop a common vision for the future of winter and summer tourism in the region and the corresponding contents of the present roadmap in a structured process. The basis for the work was a two-part roadmap template, which structured the moderation of the small groups (separated into summer and winter tourism with group changes):

Section 1: Definition of basic information
In the first section, relevant basic information was presented, supplemented and the most important factors influencing summer and winter tourism were discussed:

- **Key climate risks identified for winter and summer tourism**
- **Climatic influences and resulting biophysical and socioeconomic effects**
- **Affected tourism subsystems**

Section 2: Development of vision and activities
In the second phase, a long-term vision for winter and summer tourism in the Puster Valley until 2040 was developed against the background of the key risks (see on pages 11 and 17). Based on this, the milestones and activities for the gradual implementation of this visions (presented in the previous chapters), as well as communication aspects, challenges and opportunities, were developed and partly supplemented by experts.

Final product

The final product is an application-oriented, targeted roadmap for climate change adaptation in the tourism sector in the Puster Valley. As a strategic planning tool, it serves as a response to the identified key risks in winter and summer tourism and is intended to show how long-term goals can be achieved in a structured and targeted manner. It provides clear guidance and supports the joint development of solutions, especially in the given complex and dynamic context (see steps below for replication of the roadmap).

Steps to replicate the roadmap

While the content presented here explicitly refers to the Puster Valley, the focus on the process of developing the content and the process-based structure of the roadmap means that the content can also be replicated in other regions and contexts. The following elements are particularly important in this regard:

Climate risk assessments, contextualization and vision

The first and most important step is a comprehensive assessment of current and future climate risks in the region, including a comprehensive consideration of the non-climatic factors of vulnerability and exposure through intensive cooperation between science and local stakeholders. The inclusion of non-climatic factors involves:

- **General analysis** of regional/local policies, the local socio-economic, specifically the tourism context or the status quo of the tourism system at different levels to determine the specific direct and indirect climate change impacts on tourism activities, the resulting opportunities, the adaptation gaps and needs.

- **Possible key indicators:**
  - Tourism flows by summer and winter season
  - Accommodation facilities and existing tourist infrastructure
  - current main tourist markets and marketing strategies
  - the tourism-related systems concerned (subsystems)

A jointly developed vision based on this analysis then provides the framework for strategic development.

Action Plan: Identification of Adaptation Measures

Definition of responsibilities and roles and identification of possible specific, targeted adaptation measures for the different levels (destination, municipality, companies, infrastructures, politics, guests, etc.) through the exchange of experiences with other regions and/or the involvement of experts:

- **Technical and infrastructural adaptation**
- **Business, product-related and strategic adaptation**
- **Behavioral Adaptation**

Detailed planning of the measures by means of the creation of a concrete schedule with specific responsibilities as well as a business and resource plan.

Implementation of the adaptation measures with accompanying marketing and awareness-raising activities for guests and the local population.

Monitoring

Monitoring and evaluation of adaptation measures.

Vision Summer Tourism

The Puster Valley is a (safe), liveable and environmentally respectful region for everyone.

The ADAPTNOW project

ADAPTation Capacity Strengthening for Highly Affected and Exposed Territories in the Alps NOW

The main objective of the project is to increase the **climate change adaptation capacities** of highly affected and exposed Alpine areas (HAET) through the implementation and assessment of agile, integrated, systemic and participatory approaches and **to improve** risk management.
In the pilot region of the **Puster Valley**, measures to strengthen the adaptation capacity of the forestry and tourism sectors were developed and implemented together with local and regional stakeholders.
We would like to take this opportunity to thank all participants of the workshops and the participants from the tourism sector, who have contributed significantly to the development of this roadmap through their input in the course of the project. Special thanks go to alpS GmbH for their support during the workshops and in the development of this roadmap, as well as to the LAG regional management Pustertal and the Bezirksgemeinschaft Pustertal for their ongoing support in the project.

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