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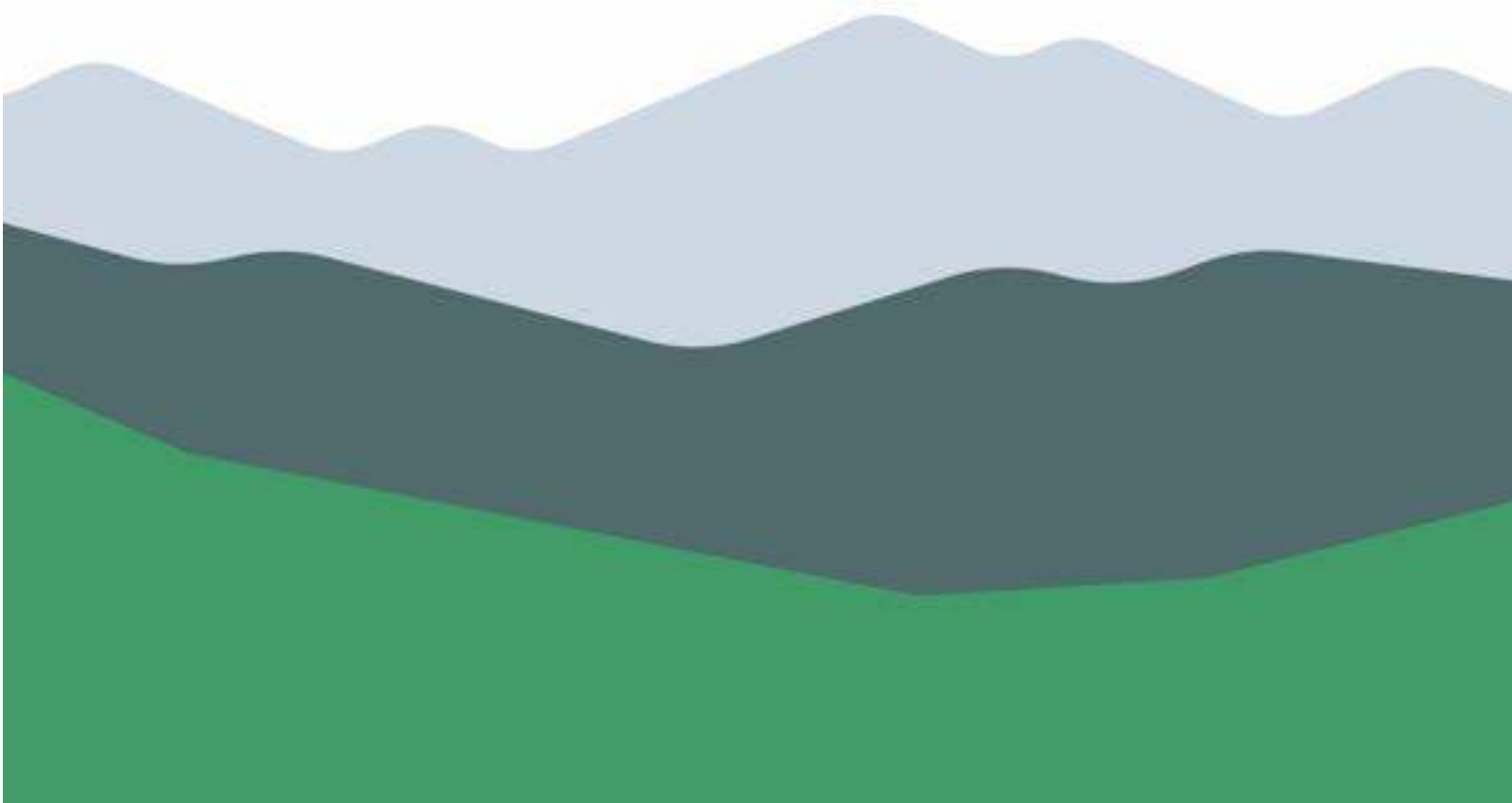
BeyondSnow

Alpine Space

Conceptual document on AS STD vulnerability and resilience assessment

D.1.2.1 – October 2023

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Who should read this report?

The intended audience of this document are:

Local and Regional Public Authorities, to increase the knowledge base and the awareness of local and regional public administrators on key concepts of vulnerability and resilience for the territories they are responsible for.

Local and Regional DMOs, to increase their understanding of the vulnerability and resilience concepts applicable to the Alpine Snow Tourism Destinations they are responsible for.

Tourism SMEs, to increase the knowledge base and the awareness on this specific aspect of climate change impacting on their activities, and to prepare them for the challenges and the necessary enhancement of climate and socioeconomic resilience through sustainable development alternatives.

Local communities of STDs, because they are also negatively impacted by increasing lack of snow and the diminishment of the attractiveness of skiing. By reading this document STDs citizens can increase their knowledge on key concepts of vulnerability and resilience applicable to their territory.

This publication is available on the project website <https://www.alpine-space.eu/project/beyondbeyondsnow/>

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Mission Statements

To provide the Consortium with a knowledge base regarding vulnerability and resilience assessment of Snow Tourism Destinations to Climate Change, indicators and guidelines for Pilot Working Areas data collection & evaluation foreseen in Action 1.3 of the project.

Disclaimer

The data and information in this document refer to and have been proposed specifically for the purposes and activities in the Pilot Areas of the BeyondSnow project. Some concepts are of course generalisable to all STDs in the Alps, but with due caution and precautions.

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Acronyms used in this report

BeyondSnow-specific acronyms are **bold**.

Acronym	Meaning
AR4	IPCC 4th Assessment Report (published in 2007)
AR5	IPCC 5th Assessment Report (published in 2014)
AS	Alpine Space
CC	Climate Change
CCA	Climate Change Adaptation
DMO	Destination Management Organisation
EbA	Ecosystem-based Adaptation
EbS	Ecosystem-based Solutions
EC	European Commission
ECO-DRR	Ecosystem-based Disaster Risk Reduction
EEA	European Environment Agency
ES	Ecosystem Services
EU	European Union
EUSALP	EU-Strategy for the Alpine Region
GIS	Geographic Information System
IPCC	Intergovernmental Panel on Climate Change
OECD	Organisation for Economic Co-operation and Development
PA	Pilot Action
PWA	Pilot Working Areas
RAM	Resilience Adaptation Model
RCP	Representative Concentration Pathways
RDMDT	Resilience Decision-Making Digital Tool
SME	Small and Medium-sized Enterprises
STD	Snow Tourism Destination
SWT	Snow & Winter Tourism
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization.
UNFCCC	United Framework Convention on Climate Change
UNWTO	United Nations World Tourism Organization

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1 Introduction and background

The present report, part of the activity A1.2, aims at providing the partnership with a solid knowledge base regarding vulnerability and resilience in the context of tourism destinations. The report encompasses key vulnerability indicators of STDs used in the BeyondSnow project, theoretical definitions, and approaches of resilience of tourism destinations.

1.1 Key definitions

Vulnerability

The propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements, including sensitivity or susceptibility to harm and lack of capacity to cope and adapt (IPCC, 2022).

Resilience

Resilience is the ability of individuals, households, communities, cities, institutions, systems and societies to prevent, resist, absorb, adapt, respond and recover positively, efficiently and effectively when faced with a wide range of risks, while maintaining an acceptable level of functioning without compromising long-term prospects for sustainable development, peace and security, human rights and well-being for all (United Nations, 2020).

Adaptation

Adaptation is understood as actions that help communities or their ecosystems cope with a changing climate, in particular, steps that reduce any losses or harm inflicted. The IPCC defines adaptation as an adjustment in natural or human systems to reduce the harm or exploit the benefits of actual or expected climatic stimuli or their effects (IPCC, 2022). Although there is variation from indicator to indicator, the BeyondSnow project does assume STDs and their communities have a baseline capacity to adapt and that a degree of forced adaptation is already occurring.

Maladaptive actions (Maladaptation)

Maladaptive actions are referred to as those activities that may lead to increased risk of adverse climate-related outcomes, including via increased greenhouse gas (GHG) emissions, increased or shifted vulnerability to climate change, more inequitable outcomes, or diminished welfare, now or in the future (IPCC, 2022). Most often, maladaptation is an unintended consequence.

Mitigation

Mitigation is broadly understood as action that stems global warming, i.e. that mitigates the warming effect. The IPCC defines mitigation as human intervention to reduce the sources or enhance the sinks of greenhouse gases (IPCC, 2022). Mitigation policies could be programmed to minimize the negative (and positive) impacts measured.

Disruption

A disruption is a break or an interruption in the normal course or continuation of some activity or process. Climate change represents a disruption as it alters the macro-environmental equilibrium that allows for the right conditions for human life and human activities on Earth (Woodward, 2019) and whose impacts are being felt sooner and more intensely as the concentration of greenhouse gases in the atmosphere leads to higher average temperatures (Dreyfus et al., 2022). Disruptions expose the affected system(s) to a greater vulnerability and can be differentiated between **shocks** and **stressors** (Lew, 2014; Walker et al., 2012), which may or may not be climate-related:

- **Shocks** are sudden and often violent events that exert pressure on a system, especially when they are unexpected and/or they occur abruptly. Examples of shocks can be natural disasters or health issues like a pandemic.
- **Stressors** are events or trends that have a gradual effect on a system by emerging with varying intensity during a specific time frame (IPCC, 2022). Climate change itself is considered a stressor as its effects are not sudden but rather the result of an ongoing process.

Climate change adaptation

Climate change adaptation refers to the adjustments societies or ecosystems make to limit the negative effects of climate change or to take advantage of opportunities provided by a changing climate. Adaptation can range from farmers planting more drought-resistant crops to coastal communities evaluating how best to protect themselves from sea level.

Ecosystem services

Ecosystem services are the benefits or “services” of an ecosystem to human life, such as clean water and the decomposition of organic matter.

Absorption (absorptive coping capacity)

It is the ability of the system, or tourism destination to “bounce back” to its original state or equilibrium (Alvarez et al., 2022). It involves anticipating, planning, coping and recovering from specific, mostly known shocks and short-term stresses. Absorptive capacity is about ensuring stability by moderating or buffering the impacts of shocks on livelihoods and basic needs (Béné et al., 2012; Jeans et al., 2017).

Adaptative capacity

It is the ability to make adjustments for managing different conditions in order to continue functioning without major changes in function or structural identity (Alvarez et al., 2022; Béné et al., 2012). Often more generally referred to as capacity of response, it is the system's ability to adjust to a disturbance, moderate potential damage, take advantage of opportunities, and cope with the consequences of a transformation that occurs (Gallopín, 2006).

Transformative capacity

it is the ability to make essential changes that address the underlying failures or weakness of the system (Alvarez et al., 2022). In other words, it is the capacity of individuals and organisations to be able to both transform themselves and their society, tackling the deep structures that cause or increase vulnerability and risk (Ziervogel et al., 2016).

Transition vs Transformation:

Transition is especially used within sustainability research to denote fundamental social, technological, institutional and economic change from one societal regime or dynamic equilibrium to another. Research approaches concerned with global environmental change, such as resilience and transformative adaptation, adopted *transformation* to refer to fundamental shifts in human and environmental interactions and feedbacks. *Transformation* is often defined by scholars as more radical, large-scale and long-term societal changes (including values and worldviews), different from politically top-down and technocratic *transitions* (Hölscher et al., 2018; IPCC, 2022)

Path dependence

Path-dependent processes are those that develop inertial resistance to large-scale systematic shifts, with resistance to change driven by favourable initial social and economic conditions and the momentum of increasing returns to scale (Seto et al., 2016). This term is usually used to explain the economic specialization of a region as a result of long-term processes, influenced by lock-in effects that push a technology, an industry, or a regional market along one path rather than another (Strambach, 2008). This state can be altered by either major intervention, some external shock, or through structural change in the long-term (Brouder & Eriksson, 2013)

Lock-in

Lock-in is a way of conceptualizing the outcomes of path-dependent processes and describes how particular technologies—through their co-evolution with social, institutional, cultural, and political systems—may become resistant to change, ‘closing down’ or constraining possibilities for the development of alternative socio-technical configurations. The potentially negative impacts of technological lock-in—also sometimes

referred to as entrapment, or entrenchment—include a host of environmental and social problems such as climate change, ecological degradation, resource depletion, pollution, health and social problems (Cairns, 2014). Specifically, the term *carbon lock-in* refers to innovation and competitiveness of low-carbon alternatives that are inhibited by initial conditions, increasing economic returns to scale, and social and individual dynamics. Lock-in can be technological, but also institutional and behavioural (Seto et al., 2016)

Forward and Backward loop

The cycle of adaptive change proceeds through (1) forward-loop stages of innovation, growth, exploitation, consolidation, predictability, and conservation, followed by (2) back-loop phases of instability, release, collapse, experimentation, novel recombination, and reorganization. This cycle, theorized by Holling (2001), usually characterizes processes of adaptive change in both ecological and social systems (Karkkainen, 2005).

Community model vs Corporate model

In tourism destinations, a *community model* involves a local destination management organization (DMO) that, for political and structural reasons, is concerned with promoting cooperation and the widest possible harmonisation of objectives within a destination. This framework consists in service providers that are individual independent business units, operating in a decentralised way and where no unit has any dominant administrative power or dominant ownership within the destination. Hence, decisions are based on stakeholder collaboration and compromises. European destinations are usually in this category. The *corporate model*, typical of North America, involves a business corporation as representing or dominating the destination management. Corporations, which are usually centred on the 'ski product', tend to have a significant weight on how the destination is operated as well as strong political influence in the community related development of the destination (Flagestad & Hope, 2001).

Tourism destination:

A tourism destination is a physical space with or without administrative and/or analytical boundaries in which a visitor can spend an overnight. It is the cluster (co-location) of products and services, and of activities and experiences along the tourism value chain and a basic unit of analysis of tourism. A destination incorporates various stakeholders and can network to form larger destinations. It is also intangible with its image and identity which may influence its market competitiveness (UNWTO, 2023).

2 Systemic perspective of (Snow) Tourism Destinations and Disruptions

In terms of vulnerability and resilience analysis, one of the main issues to initially address is the clear definition of the research framework, which can be based on the concept of "resilience of what to what," as articulated by Carpenter et al. (2001). In the case of the project BeyondSnow, **"Resilience of what"** encompasses the (Snow) Tourism Destination.

Tourism destinations are not merely geographic locations but comprise complex socio-ecological systems. Within these systems, numerous different actors and stakeholders intentionally or inadvertently contribute to the creation of the intangible product of the tourism experience (Berkes & Folke, 2002; Fabry & Zeghni, 2019; Sainaghi & De Carlo, 2016). The geographical scope of tourism destinations can vary depending on the analyst's but also guest's objectives, possibly encompassing a municipality, region, country, or even a transnational area (Sainaghi, 2006). The organizational structures of these destinations are contingent on both their internal arrangement and the connections among its various actors and stakeholders.

Drawing from the framework proposed by Flagestad & Hope (2001), a tourism destination can be positioned on a continuum between two models: the community model and the corporate model (see the figure below).

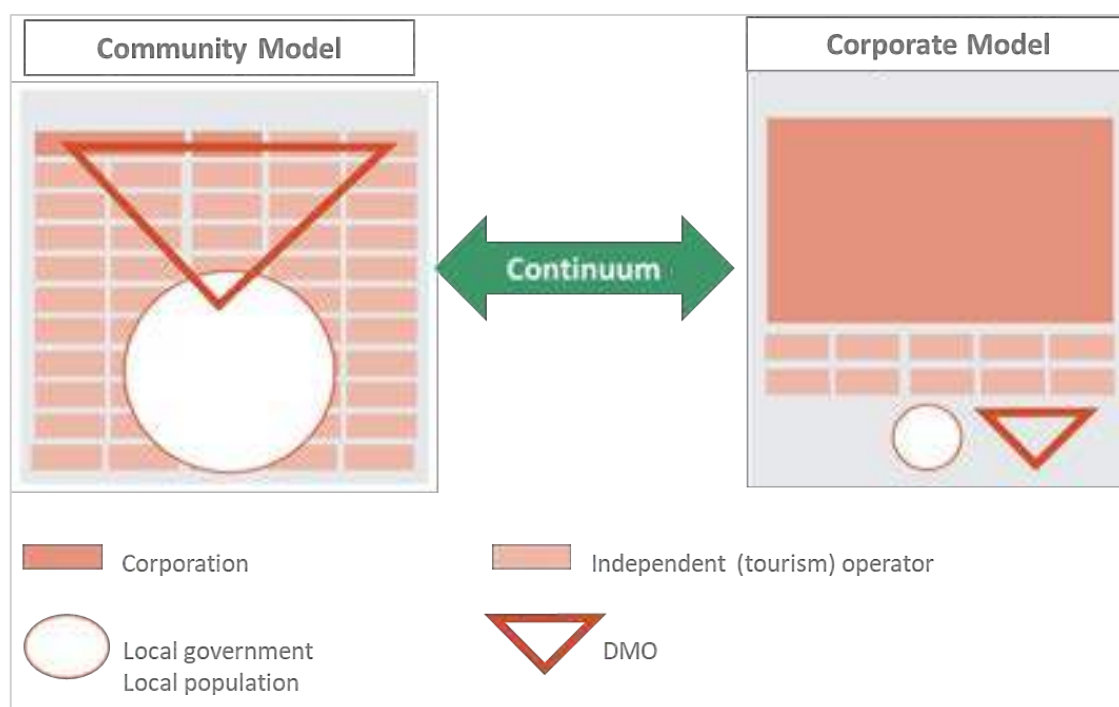


Figure 1: Continuum of tourism destination structures (Flagestad & Hope, 2001)

The community model represents a network of diverse independent stakeholders and actors, each exerting varying degrees of influence on the tourism system based on their social and economic standing. In terms of tourism management and governance, these networks often rely on a Destination Management Organization (DMO) to professionally unite the actors, foster cooperation, formulate strategic directions, and serve as a liaison between tourism actors, local government and ideally also the host community. Conversely, the corporate model is best exemplified by a typical tourism resort, featuring a dominant corporation that guides the development of the overall destination while leading the other actors.

Given the significant differences in decision-making processes between these two models, the implications for the vulnerability and resilience of different types of tourism destinations are considerable.

Fragmented, community-oriented destinations must ensure cohesive participatory approaches by involving stakeholders, relying heavily on the presence and actions of autonomous stakeholders and actors. These actions contribute to the pre-disruption reduction and readiness phases, influencing the vulnerability of the tourism destination, shaped also through the overall consensus-building capacity within the system. On the other they are connected to the resilience of the system by influencing the post-disruption response and recovery phases (Hystad & Keller, 2008; Laws & Prideaux, 2006). In contrast, hierarchical corporate-oriented destinations can adopt a more top-down-oriented approach to decision-making concerning the vulnerability and resilience-oriented actions of their tourism destination system.

In addressing the question "**Resilience to what**", the overarching terms of internal and external "disruptive events" and "disruptions" can be employed. This terminology provides a comprehensive basis for discussing a spectrum of impactful occurrences. Delving into the nature of each disruption, a nuanced differentiation emerges, classifying them into two broad categories: **sudden shocks** and **gradual stressors**. For instance, a terrorist attack exemplifies a sudden shock, while climate change represents a gradual stressor, although this stressor can also indirectly encompass sudden shocks, such as fire and flooding (Cioccio & Michael, 2007; Lew, 2014; Walker et al., 2012). It is noteworthy that both these categories, despite their disparate temporal characteristics, serve as strong drivers of change. The disruptions oblige affected systems to act, ideally based on distinct reactive and proactive strategies. The essential commonality lies in their adaptive/transformational influence, prompting an activation of the resilience mechanisms in place. Whether responding to the immediacy of a sudden shock or navigating the persistent challenges posed by gradual emerging stressors, the strategies employed by systems emphasize the dynamic nature of resilience. This realization underscores the imperative for tailored actions aligned with the unique issues connected to each disruption, ultimately contributing to a more comprehensive understanding of resilience in the face of diverse challenges.

3 Vulnerability

The ability to “measure” (or more correctly, to assess) the vulnerability is a fundamental pre-requisite for disaster risk reduction and for the application of the necessary adaptation strategies (Birkmann et al., 2023).

Although vulnerability has gained a high importance in scientific debates, there is still no unified understanding of the concept regarding what it describes, what factors constitute it, or how it can be measured. As of now, the Intergovernmental Panel on Climate Change (IPCC) offers the most comprehensive framework for understanding vulnerability in the context of climate change, recognizing the intricate interplay between environmental shifts and societal dynamics. Therefore, this chapter delves into the multifaceted nature of vulnerability to climate change, drawing upon the IPCC definition as a primary guideline.

The IPCC defines vulnerability as “**the propensity or predisposition to be adversely affected, a quality shaped by diverse factors, including exposure, sensitivity, and adaptive capacity**” (IPCC, 2022).

Exposure refers to the extent to which a system is exposed to climate stressors, sensitivity reflects the degree to which a system is affected when exposed, and adaptive capacity represents the ability of a system to adjust, moderate harm, or exploit new opportunities.

This definition captures the essence of vulnerability as a dynamic and context-specific concept, acknowledging that vulnerabilities are not uniform across regions, communities, or sectors. In fact, this general framework for assessing vulnerability has to be tailored more specifically in order to be applied to a specific area and/or circumstance.

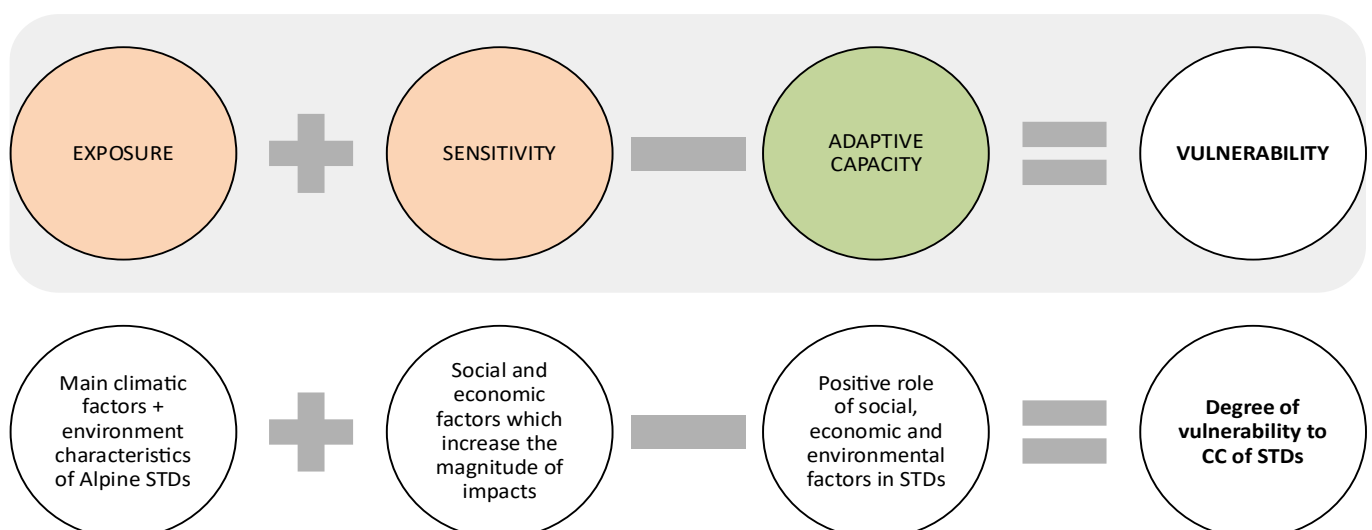


Figure 2: General framework for assessing vulnerability to climate change for BeyondSnow STDs (Based on IPCC, 2022).

In the context of the BeyondSnow project, [Section 3.2](#) proposes an application of the vulnerability framework for STDs.

At its core, vulnerability manifests a complex interplay between environmental, social, and economic factors (Alber et al., 2011). Climate-induced disruptions can vary greatly, ranging from extreme weather events (shocks) to water availability, from rising temperature to changing precipitation patterns (stressors). There pose distinct challenges to different regions and communities.

Regions with a high exposure to climate risks, such as mountain settlements and areas with key infrastructures (IPCC, 2023), tourist ones included, often face increased susceptibility to climate-induced changes. In these areas the risk of overloading the Residual Risk of Natural Hazards should also be taken into account (Schneiderbauer et al., 2018).

However, vulnerability is not solely determined by the physical exposure to climate hazards, but it is equally shaped by societal structures, economic systems, and governance frameworks. Social aspects, including demographic ageing, inequality, and governance structures, can either diminish or amplify vulnerability. For instance, areas that are marginal or with significant depopulation trends may lack the resources and capacities to cope with the impacts of climate change, exacerbating their vulnerability. Furthermore, economic aspects can also influence vulnerability, and can include GDP composition and growth rate, labour factors, workforce, and economic dependence on specific sectors. Therefore, understanding vulnerability in its complexity requires a holistic examination of the biophysical, social, and economic dimensions.

As for the BeyondSnow project, the first component of vulnerability is **Exposure**, which encompasses the character, magnitude, rate of change and variation of the climate (Fritzsche et al., 2014). In other terms, it is the foundational aspect representing the degree, duration, and/or extent in which the system is in contact with, or subject to, the (climatic) perturbation (Gallopín, 2006).

Sensitivity, the second component of vulnerability, highlights the differential impacts of climate change on various systems. Biological diversity, agricultural productivity, and water resources are examples of systems that exhibit varying degrees of sensitivity. Understanding sensitivity is essential for designing targeted adaptation strategies, as it reveals the specific weaknesses inherent in different sectors. Moreover, together with exposure factors, it can determine the **potential impacts**, which can be either direct or indirect, encompassing a variety of consequences across different systemic domains (Fritzsche et al., 2014).

Finally, **adaptive capacity** represents the ability of a system to adjust and respond to changing conditions. Societal factors such as education, infrastructure, technology, and governance play key roles in determining adaptive capacity. Communities equipped with solid institutions and effective governance, which are also

able to draw on technological innovations are better positioned to mitigate and adapt to the impacts of CC (OECD, 2014). Consequently, adaptive capacity acts as a crucial buffer, reducing the overall vulnerability of a system.

It is important to clarify that vulnerability cannot be treated as a measurable concept. Rather, it embodies the intricate interaction of different factors shaping a system's susceptibility to the impacts of CC. No fixed rule exists to dictate which factors to consider or the methods to quantify them. Therefore, vulnerability can only be "assessed" and not "measured". This acknowledgment underscores the complex, context-dependent nature of vulnerability, necessitating a holistic approach to its evaluation (Fritzsche et al., 2014).

Even the IPCC's vulnerability concept – the basis of the Vulnerability Sourcebook (Fritzsche et al., 2014) – is continually undergoing modifications, adding to the complexity of the term. The IPCC assessment report (AR5), published in 2014, introduced a new concept which aims to identify and evaluate the risk of impacts from climate change. In this concept, risk is a result of the interaction of vulnerability, exposure, and hazard. Consequently, the utilization of vulnerability in AR5 (2014) differs from that in AR4 (IPCC, 2007), with AR5 emphasizing exposure and vulnerability as the two main foundations of risk. Thus, as Williams & Baláž (2015) argue, it seems that the AR5 concept has been developed for vulnerability assessments specifically in the context of risk, whereas the AR4 vulnerability concept is mainly adopted for stand-alone vulnerability assessments, and thus is taken as primary guideline in the present report.

Overall, the concept of vulnerability to climate change, as delineated by the IPCC (2007), encapsulates a comprehensive understanding of the intricate relationships between environmental shifts and societal dynamics. **By acknowledging the multifaceted nature of vulnerability, researchers, policymakers, and practitioners can formulate targeted interventions addressing the specific challenges faced by diverse communities and regions.** Therefore, this first overview serves as foundation for a deeper inquiry into vulnerability, to be precisely defined and locally elaborated at the scale of STDs (municipal or sub-municipal) particularly within the context of tourism in mountain destinations.



Figure 3: Vulnerability key aspects (Own elaboration)

3.1 Vulnerability in tourism

In general, the tourism industry seems to be more susceptible to various disruptions than other sectors of the global and regional economies, of which the recent COVID-19 pandemic is a clear example. Furthermore, it has been demonstrated that natural disasters like earthquakes, tsunamis, and tropical cyclones induce sudden decreases in visitor numbers, which results in significant economic losses for the destinations (Alvarez et al., 2022).

Being composed of a multitude of different elements, risks and uncertainties are an integral part of tourism. Risk and uncertainty are essentially about the limits of knowledge that are characteristic of tourism among other economic sectors (Williams & Baláž, 2015). Given that disruptions can vary widely in tourism and mitigation as well as adaptation options do not follow a one-size-fits-all pattern, it is essential to address the persistent weak points, in order to cope with increasing uncertainty. It is probably these enduring susceptibilities that increase the sensitivity of tourism destinations to the lasting impacts of external shocks and stressors, as opposed to temporary and sporadic events (Alvarez et al., 2022). As previously mentioned, sensitivity, which is the degree to which a destination is affected by exposure to CC, is influenced by the pre-existing economic, social, political and environmental conditions that characterize the anticipatory and immediate response capabilities (Calgaro, Lloyd, et al., 2014).

Therefore, in navigating this complex terrain, frameworks such as the **Destination Sustainability Framework** (Calgaro, Dominey-Howes, et al., 2014) can provide a valuable tool for unravelling the intricacies that determine the destination's tendency towards either vulnerability or resilience. The framework highlights critical factors, offering approaches for impactful adjustments. Its focus on local populations is grounded in two primary considerations: the localized manifestation of vulnerability and resilience, and the key role of the destination as the overarching context shaping the entirety of the tourist experience. Including six fundamental components, the framework encompasses (1) the shock(s) or stressor(s); (2) the interconnected facets of vulnerability—exposure, sensitivity, and adaptive capacity; (3) the dynamic loops illustrating the consequences following actions (or lack thereof) in response to shocks or stressors; (4) the root causes and drivers shaping the distinctive attributes of places; (5) the scale; and (6) the varied timeframes dictating the evolution of conditions over time (Calgaro, Lloyd, et al., 2014). Nevertheless, this is simply an example of a useful approach that can be employed to better understand how destination vulnerability emerges and is influenced by a combination of multiple factors.

Furthermore, the outcomes arising from actions, inactions, or missteps regarding CC can also significantly exacerbate existing vulnerabilities. These implications inevitably establish new levels of exposure and sensitivity to future events. However, despite the critical significance of this process, there is still a tendency

to overlook the necessity for monitoring the diverse impacts of human actions over time and across varied locations, as emphasized by Calgaro et al. (2014). Hence, greater attention to the factors constituting destination vulnerability is crucial for informed decision-making and development strategies, ensuring a more resilient and responsive approach to the evolving challenges faced by tourism destinations.

3.2 STDs Vulnerability

The examination of vulnerability in Snow Tourism Destinations (STDs), a focal point within the AS Project BeyondSnow, requires a focused analysis tailored to the specific challenges faced by Alpine regions. A key point in mapping vulnerability lies in determining suitable information and indicators that effectively capture both biophysical and socio-ecological dimensions, and the way in which this information should be integrated (Preston & Stafford-Smith, 2009).

Moreover, vulnerability assessment in the context of STDs should also pay particular attention to tourism factors. These can include accommodation structures and capacities, arrivals and overnight stays within the different months, seasonality and intensity of winter/snow tourism, gross occupancy, guest source markets, transports accessibility, lift usage and pass sales, main tourism products (skiing, hiking, etc.) and their seasonality, and unique tourist attractions (UNESCO, etc.) (Alber et al., 2011).

Taking all these aspects into consideration, the elaboration of a Vulnerability Map of STDs in the context of the BeyondSnow project has followed primarily the aforementioned IPCC vulnerability concept (2007) – composed of exposure, sensitivity, potential impacts, and adaptive capacity – and the methodological guidelines provided in the Vulnerability Sourcebook by Fritzsche et al. (2014).

Moreover, the selection of indicators was motivated by and built upon previous AS projects such as AlpES (Alpine Ecosystem Services – mapping, maintenance and management), ClimAlpTour (Climate Change and its Impact on Tourism in the Alpine Space), and GreenRisk4ALPs, with which the BeyondSnow project shares a focus on ecosystem-based approaches as effective adaptation solutions (see [Section 5](#)). Hence, the indicators in Table 1 represent the selection used to elaborate the first Vulnerability Map of Alpine STDs.

Area	Indicator	Description
Exposure Current and future climate variability and change	Snowfall	Projected changes of Total Snowfall from November to April (%) between scenario RCP 4.5 data and historical data (1986-2005)
	Rainfall	Projected changes of Total Rainfall from November to April (%) between scenario RCP 4.5 data and historical data (1986-2005)
	Temperature	Projected changes of Winter Mean Temperature from November to April, between scenario RCP 4.5 data and historical data (1986-2005)
	Snow Season	Projected changes of Snow Season duration (based on natural snow on the ground) between scenario RCP 4.5 data and historical data (1986-2005)
	Ski Season	Projected changes of Days with normal height of snow of the ground (>= 30cm) between scenario RCP 4.5 data and historical data (1986-2005)
Sensitivity Natural/physical and societal environments	Population Density	People per sq. km of municipal area
	Old Age Dependency Ratio	Residents aged > 65 to residents aged 15-64 (%)
	Infrastructure at Risk	Infrastructure in hazard zone
	Outdoor Recreation Visitation Rate	Outdoor recreational Visitation rate
Adaptive Capacity Natural/physical and societal environments	Natura 2000 Areas	Total Natura 2000 areas per Municipal Area
	Site-protecting Forests	Site-protecting forests areas against avalanches, mudslides and rockfalls
	Outdoor Recreational Offer	Outdoor recreational availability

Table 1. Selection of relevant indicator for the STDs' Vulnerability (V. 0.92). (Own elaboration after BeyondSnow project, Deliverable 1.1.2)

Firstly, within mountain destinations, exposure factors play a key role in understanding vulnerability. Parameters such as “Total Snowfall from November to April”, “Total Rainfall from November to April”, “Snow Season duration” based on natural snow cover, “Ski Season duration” with a minimum snow height (>= 30cm), and “Winter Mean Temperature from November to April” were carefully selected to establish the climatic foundation for the vulnerability map in the Alpine Space.

Sensitivity in STDs exhibits significant variation in its components, with indicators such as “Population density”, “Old age dependency ratio” (Residents aged > 65 to residents aged 15-64 (%)), “Infrastructure at risk or within hazard zones”, and “Outdoor recreation visitation rate” serving as pertinent examples. The selection of these elements, however, depends on the identified potential impacts, which may involve alterations in winter tourism flows and attractiveness or, on a broader scale, the decline of the local economy.

Concluding the vulnerability assessment, factors contributing to adaptive capacity in STDs are multifaceted. Notably, ecosystem-based services emerge as a valuable solution (see [Section 5](#)). The essential role played by protected areas, forests, and outdoor recreation sites is of utmost importance in enhancing a system’s ability to adapt to climate change and mitigate vulnerability. Recognizing and employing these elements becomes fundamental in developing effective strategies to strengthen the resilience of snow tourism destinations in the face of evolving climate conditions. This holistic approach aims to provide a comprehensive understanding of vulnerability, paving the way for informed decision-making and sustainable management practices in STDs, increasing the adaptive capacity, decreasing in vulnerability to increase the total resilience of the system.

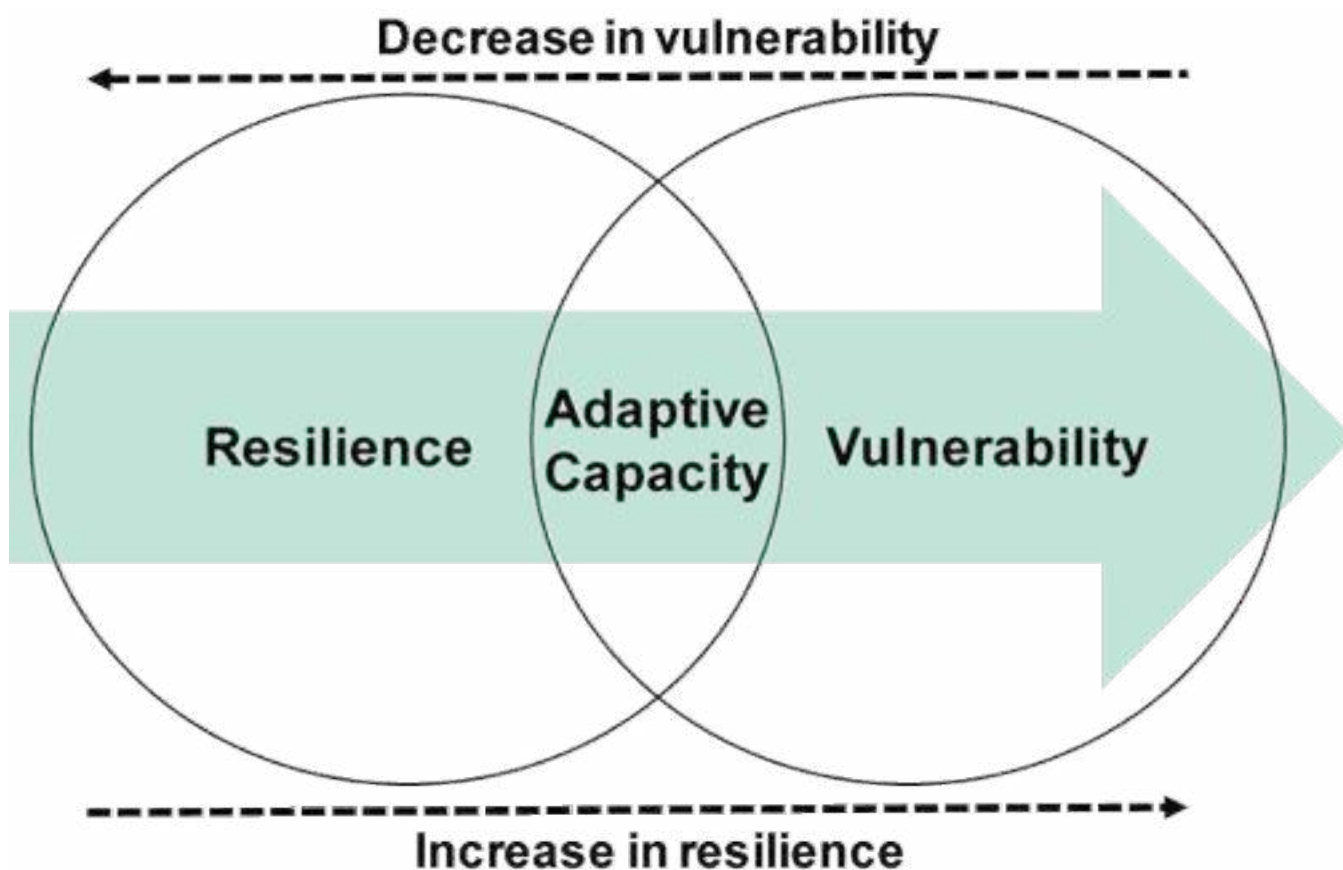


Figure 4. Vulnerability and resilience linked through the concept of adaptive capacity (Adapted from Engle, 2011)

4 Resilience

Referring to the definition by the United Nations (2017), resilience is “the ability of individuals, households, communities, cities, institutions, systems and societies to prevent, resist, absorb, adapt, respond and recover positively, efficiently and effectively when faced with a wide range of risks, while maintaining an acceptable level of functioning without compromising long-term prospects for sustainable development, peace and security, human rights and well-being for all”.

This definition represents a starting point to provide of an overview of the concept of resilience. In fact, it has gained prominence in recent decades due to the increasing recognition of the need to address, mitigate and adapt to the impacts of various stressors, including environmental changes, and unforeseen shocks on systems ranging from ecosystems to infrastructure. It is a multifaceted and evolving concept that has found application in a wide array of disciplines, from engineering and ecology to psychology, disaster management, economics, and governance. However, its diverse usage can sometimes lead to confusion, to the point that Davoudi et al. (2013) argue that it has become a contested concept, which risks acting as a buzzword mainly due to its overuse and ambiguity.

Within the field of ecology, Holling (1973) defined resilience as the capacity of a system to absorb disturbances, adapt to change, and recover while maintaining essential functions, structures, and identities. Holling’s work distinguished between engineering and ecological resilience, in order to emphasize two different aspects of stability (Holling, 1996) This distinction has gained wide recognition as it is helpful in approaching a topic as broad as resilience. From that, it has also evolved in relation to the dynamic development of complex adaptive systems, which considers also the systemic interactions across temporal and spatial scales.

Holling (1996) defined **engineering resilience** as the maintenance of stability near an equilibrium state, where resistance to disturbance and the speed of returning to the previous equilibrium are key measures of resilience, emphasizing efficiency and predictability. In particular, engineering resilience puts the emphasis on return time, i.e. “efficiency, constancy and predictability”, all of which are considered essential for optimal mathematics and engineering design (Davoudi et al., 2013). In other words, engineering resilience is measured on how fast a variable that has been displaced from equilibrium returns to the latter (Folke, 2006).

Ecological resilience is defined as “the magnitude of disturbance that can be absorbed before the system changes its structure by changing the variables and processes that control behaviour” (Holling, 1996, p. 33). According to this approach, there are several systemic equilibria since instabilities can cause a system to shift into a different stability zone, rejecting the idea that there is one single equilibrium (Davoudi et al.,

2013). As a result, contrary to engineering resilience, it emphasises traits such as persistence, change, and unpredictability, which contribute to the capacity for adaptation (Davoudi et al., 2012). Despite this difference, however, and also the fact that they originate from different disciplinary fields, what essentially characterizes both perspectives is the belief in the existence of equilibrium in systems, whether it is a pre-existing one to which a resilient system bounces back (engineering resilience) or a new one to which it bounces forth (ecological resilience) (Davoudi et al., 2012).

A third perspective of resilience was also introduced and theorised as **evolutionary resilience**. It challenges the whole idea of equilibrium and advocates that the very nature of systems change over time with or without an external disturbance (Davoudi et al., 2012). The evolutionary perspective views resilience as the capacity of complex social-ecological systems to change, adapt, or transform in response to disruptions and behaves in the form of an adaptive cycle rather than as a return to normality/equilibrium. Hence, what separates evolutionary resilience from engineering and ecological resilience is the notion of a perpetual transformation of the system. According to its adaptive cycle, systems go through a phase of creative destruction before entering a phase of regeneration and reorganisation that results in unanticipated systemic trajectories. This system transforms into something altogether new, which may be both desirable and undesired (Davoudi et al., 2013). This is a dynamic and uncertain process of continuous metamorphosis.

These concepts of resilience can be enhanced by consolidating: absorptive-coping, adaptive and transformative capacities (Béné et al., 2012; OECD, 2014). The **absorptive-coping capacity** denotes the system's aptitude to prepare for, mitigate, or prevent harmful impacts by deploying predetermined coping mechanisms. These mechanisms serve to safeguard and reinstate fundamental structural and functional attributes in the face of external disruptions. **Adaptive capacity** encompasses the system's ability to recalibrate, amend, or modify its inherent characteristics and structures, thereby diminishing potential future harm and capitalizing on emerging opportunities. This capacity ensures the system's continuity without undergoing substantial qualitative alterations in its functional essence or structural identity. **Transformative capacity** entails the system's capability to create an entirely novel systemic paradigm, also based on the impact of external disruptions. Such transformation becomes imperative when existing ecological, economic, and/or social structures make the prevailing system untenable (OECD, 2014).

In the context of this project, however, the primary emphasis resides within the domain of **adaptive capacity** as a property of ecological resilience. While acknowledging the significance of absorptive coping and transformative capacities as integral components of resilience, the specific focus lies on the augmentation of adaptive capacity. In this context, the ability to incrementally adjust existing attributes and actions is essential in navigating the complexities of the dynamic and ever-changing environment. By fortifying adaptive capacity, the aim is to provide socio-ecological systems with the tools and strategies necessary for

moderating potential harm and taking advantage of emerging opportunities, while maintaining a fundamental continuity in function and structural identity.

In general, resilience has emerged as a multifaceted concept with profound implications for engineering, ecology, and numerous other contexts. Thus, this overview of the various notions of resilience provides comprehensive support to address disruptions that can negatively affect socio-ecological systems like tourism destinations. In this regard, as Folke (2006) argues, resilience should not only be about being persistent or robust to disturbance. It should also be regarded as opportunities that arise through disturbances and disruptions in terms of recombination of evolved structures and processes, emergence of new trajectories as well as liberation of underutilized resources. It should involve an adaptive interplay between sustaining and developing with change for resilience to provide adaptive capacity that allows for continuous development.

4.1 Resilience in tourism

After building on a general overview of the concept of resilience, particular attention is now given to the application of the concept in the context of tourism destinations. The delineation of the project framework, based on the “resilience of what to what” (Carpenter et al., 2001), is necessary to ensure a more appropriately targeted working approach. This is because, as previously mentioned, resilience is used in various contexts (history, culture, economic development), in different timings (before, during, after the disruptions), in numerous locations and scales, thus often leading to confusion and even misuse (Fabry & Zeghni, 2019).

Tourism systems seen as interrelated socio-ecological systems, include a variety of actors who cooperate to reach the provision of positive tourism experiences. Starting within the ecological domain, the application of resilience concepts within tourism has grown in recent decades. In the 1970s, resilience was mainly explored in relation to the preservation and protection of natural parks. In the 1980s, it was oriented towards the examination of the environmental impacts of tourism on ecological systems. Afterwards, the concept progressively shifted from a strictly ecological point of view to climate and environmental changes as well as sustainability (Fabry & Zeghni, 2019). In fact, a variety of disruptions, including natural disasters, economic downturns, political unrest, internal strife, and others are increasingly causing severe disturbances for tourism destinations. Therefore, tourism resilience is currently more generally defined as “the capacity of these systems to deal with stresses by maintaining the stability of the tourism-related regional economy while ensuring the flexibility and diversity necessary for innovation and further development” (Luthe & Wyss, 2014).

However, few studies specifically address the resilience of tourism-oriented communities (Lew, 2014), which place a crucial focus on the ability to adapt pro-actively to significant internal and external events. In fact, such events may cause a destination's attractiveness (measured, for e.g., through the number of overnight stays, income, competitiveness, etc.) to decline over the short and long term (Sheppard & Williams, 2016). In this regard, the local population is often excluded from decision-making and politically marginalised, even though the ability of the tourism community to proactively respond to critical events is dependent upon the wellbeing of the tourism community members in the first place. Therefore, a careful and more thorough management of disruptions may be enhanced not only through a focus on infrastructure and tourism offer recovery, but also on local population wellbeing within the tourism community (Sheppard & Williams, 2016). Furthermore, if strong resilience is supplemented by capabilities for adaptation and innovation, a successful recovery does not only imply the re-establishment of the previous rate of growth, but it can also eventually lead to an improved development path (Gaki & Koufodontis, 2022)

Examples of established frameworks regarding tourism destination resilience are introduced below as they can serve as guidelines and provide indicators for the resilience assessment of the tourism sector.

The **resilience, adaptation and transformation assessment framework** is an example of comprehensive overview on the different aspects that need to be considered for a resilience framework analysis. Although not developed specifically for the tourism sector, this framework is oriented towards both systemic pre-disruption reduction and readiness, and post-disruption response and recovery (O'Connell et al., 2015). The first element, resilience, evaluates an entity's ability to withstand shocks, continue operating, and recover from disturbances or crises. The second component, adaptation, is concerned with an entity's capacity to alter its course strategically in response to changing conditions or anticipated future challenges. When resilience and adaptation are not sufficient, the third element, transformation, assesses the possibility for fundamental and sustainable changes in systems or practises.

Becken (2013) developed a conceptual model that focuses on enhancing the resilience of various components or subsystems within the broader tourism industry. The framework recognizes that tourism is a complex system comprising multiple interdependent parts and aims to address the vulnerability of these subsystems to various disruptions, such as economic crises, natural disasters, or environmental changes. Focusing primarily on socio-economic aspects, the **resilience of tourism subsystems** framework divides the subsystems based on the activities offered. It emphasizes the need for proactive strategies and policies to increase the resilience of each subsystem. This involves strategies like sustainable resource management, disaster preparedness, community engagement, and economic diversification.

Fabry & Zeghni (2019) approach destination resilience from a more wholistic perspective on the tourism destination level, emphasizing the role of its **resilience-based governance** through the inherent complexities happening at different cross-scale interactions. According to this framework, the challenge for a destination is to set up its governance for resilience in a context of constant change and learning. That means becoming resilience-oriented by thinking, preparing, acting, governing, as well as performing and defining resilience as a continuous and adaptive process. The resilience-based governance must continually involve all the stakeholders of the destination. This involvement should comprise a process based on two pillars: coordination and adaptation. Hence, it is based on collaborative, flexible and learning-based approaches, or adaptive destination co-management. Finally, the framework differentiates between reactive and proactive capabilities, both necessary to address disruptions (Fabry & Zeghni, 2019).

4.2 STDs Resilience

Within the tourism sector, STDs are facing unprecedented challenges due to climate change, which poses a significant threat to the sustainability of the ski industry. To navigate these challenges and build resilience, STD stakeholders must base their actions on a thorough analysis of their tourism destination, adopt adaptive strategies, collaborate with various actors, and consider the broader impacts on the community and the environment.

Polderman et al. (2020) emphasize that STDs can enhance their resilience through a combination of technological and business practices. So far, technological adaptations seem to be the main types of strategies adopted by tourism stakeholders in the Alps (OECD, 2007). Among these, technical snowmaking is often considered the primary strategy. However, while it addresses positively the immediate need for reliable snow cover, in certain cases it can represent a meaningful example of potential unintended contribution to **maladaptation**.

This phenomenon refers to actions that are taken ostensibly to reduce vulnerability but can unintentionally reinforce existing unfavourable development pathways and create lock-in situations (Scott et al., 2022). Infrastructure lock-in, in particular, is a situation where significant investments are made in certain technologies or practices, which then become difficult to change or abandon, even when they are no longer suitable or sustainable. The risk with such a dependency is that it locks STDs and their resources into a gradual process of 'rigidification' and growing inflexibility, which can oftentimes lead to a narrower and unsustainable development path. In fact, as mentioned by Stotten et al. (2021), overreliance on a single domain within the system, such as ski tourism, can make a community more vulnerable to disturbances. In the case of technical snowmaking, STDs may find themselves trapped in a cycle of ever-increasing

investment in snowmaking technology, even as the environmental and economic costs rise, or as the environmental conditions do not even permit to follow this path anymore (for ex., due to rising temperatures).

Therefore, for STDs to be truly resilient in the face of climate change and other challenges, it is crucial to widen the scope of options and alternatives. This implies, among other actions, diversifying the tourism offerings beyond snow-related activities. While technical snowmaking can play a role in maintaining snow reliability, it should be used cautiously to avoid maladaptation. Relying solely on a single domain can lead to infrastructure lock-ins and hinder the long-term resilience of these destinations. The OECD (2007) underlines the need for winter tourism operators to approach the changing climate by integrating technological adaptation practices with behavioural ones. Moreover, to ensure their sustainability, STDs must embrace a broader range of tourism options and year-round activities, considering the environmental and economic consequences of their adaptation strategies.

While non-snow-related offerings can support the winter business, they cannot replace snow-related activities altogether (OECD, 2007). Nonetheless, engaging in year-round tourism, exploring climate-independent offerings, or even considering to slightly alter the overall tourism system to reduce the snow-dependency, can represent relevant and desirable strategies. From this perspective, climate change can even act as a catalyst for resilience within the winter tourism industry, emphasizing the importance of adaptive capacity in determining the future of STDs under changing climate conditions.

5 The role of ecosystem-based approaches

Ecosystem-based approaches (EbA) focus on ecosystem restoration and enhancement of ecosystem services to protect society against negative impacts of climate change. As climate change makes itself increasingly felt through, e.g., droughts, extreme weather events and flooding, the urgency of adaptation measures increases (Climate-ADAPT, 2023).

EbAs are nature-based solutions for addressing climate change impacts (FEBA (Friends of Ecosystem-based Adaptation), 2017).

The Ecosystem based Solutions, hereinafter EbS, and their role in enhancing sustainability and resilience of systems have gained significant attention in recent years. These solutions recognize the importance that ecosystems play in supporting human well-being, fostering climate adaptation, reducing disaster risks, and promoting ecological connectivity and social cohesion. They are defined by Cohen-Shacham et al. (2016) as “actions to protect, sustainably manage and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits.”

At the core of the EbS framework is the concept of ecosystem services. As already discussed in D.1.1.1, these services are defined as the goods and services provided by ecosystems to humans, and are categorized into **life-supporting, provisioning, regulation, and cultural services**, encompassing vital functions such as the provision of food and water, the regulation of environmental conditions, and the provision of aesthetic landscapes and recreational activities (Haines-Young & Potschin, 2018).

Moreover, EbS can be implemented alone or be integrated with other solutions to societal challenges (e.g. with technological and engineering solutions) and are determined by site-specific natural and cultural contexts that include traditional, local and scientific knowledge (Cohen-Shacham et al., 2016).

Furthermore, EbS include issue-specific approaches such as **Ecosystem-based Adaptation (EbA)** and **Ecosystem-based Disaster Risk Reduction (Eco-DRR)**, which can both enable communities and ecosystems to adapt to the impacts of climate change and/or disasters through the sustainable management, conservation and restoration of ecosystems to provide goods and services (McVittie et al., 2018). In particular, EbA, if integrated into broader adaptation and development strategies, has multiple effects (Sudmeier-Rieux et al., 2019) and in particular the potential to reduce the vulnerability and increase the resilience of ecosystems and communities, while being a flexible, cost-effective and broadly applicable approach to tackle the impacts of climate change (Lo, 2016).



Figure 5. Multiple benefits of Eco-DRR/EbA. (Sudmeier et al, 2019, based on Nehren, 2014 as modified from Estrella & Saalisamaa 2013)

Depending on how the world’s ecosystems are managed, they can either amplify the negative effects of climate change or provide effective **Nature-based Solutions** for climate change mitigation and adaptation.

With regard of the former, **ecosystem-based mitigation** has the potential to be a significant contribution by preventing the degradation and loss of natural ecosystems. In other words, improved conservation and land management practices have the capacity to avert additional CO2 emissions, playing a substantial role in global mitigation efforts.

Ecosystems can also contribute to the fight against climate change by acting as “natural carbon sinks” as they absorb and store CO2 emissions effectively. Consequently, the conservation, restoration, and sustainable management of forests, wetlands, and oceans are vital for maintaining a healthy carbon cycle and regulating the planet’s climate. On top of this, ecosystems can benefit vulnerable communities, particularly those reliant on natural resources, in adapting and building resilience to the adverse disruptions connected to climate change, including extreme weather events and climate-related disasters (Cohen-Shacham et al., 2016).

Restoring and managing forests can be taken as an example among the most tangible ecosystem-based solutions in the face of multiple environmental challenges. The sustainable management and preservation of forests exemplifies how EbS can simultaneously contribute to climate change mitigation, disaster risk reduction, and human well-being. These vital ecosystems, when properly conserved, act as potent natural carbon sinks, sequestering carbon emissions and mitigating climate change (Cohen-Shacham et al., 2016).

Moreover, they play a crucial role in safeguarding against natural hazards, as seen in mountainous regions where well-managed forests can prevent landslides and avalanches (EEA, 2015; Poratelli et al., 2020). Beyond environmental benefits, forests offer a wide array of ecosystem services, such as timber, clean water, and **recreational opportunities**, supporting local livelihoods and fostering a deeper connection between communities and their natural surroundings (Lo, 2016).

Finally, in the context of tourism, the role of EbS takes on added significance. The sustainability and resilience of tourism destinations heavily rely on the maintenance and responsible utilization of ecosystems. As demonstrated by Loehr et al. (2022), the integration of EbS into tourism practices offers a multifaceted approach to strengthening the sector's resilience, ensuring the long-term well-being of both ecosystems and visitors.

Natural settings, particularly in Alpine regions, constitute the very essence of tourism destinations and one of the main resources of tourism attractiveness. They are widely acknowledged to be beneficial for boosting social connections, expanding local economies, fostering local and indigenous identity, connecting people with their cultural and natural heritage, and raising conservation awareness (Winter et al., 2020). Moreover, these ecosystems contribute significantly to the leisure-related services that underpin the tourism industry, including recreation, spiritual, and cultural experiences. Thus, tourism destinations that prioritize the conservation and sustainable management of these ecosystems are better positioned to provide an authentic and attractive array of leisure-related services. Overall, this mutually beneficial relationship underlines the vital role of EbS in enhancing tourism resilience and sustaining the sector's central leisure-related services.

Note:

Concrete examples of EbA and EbS can be found at the interactive searchable database of tools and methods relevant to EbA "Ecosystem-based Adaptation Tools Navigator" accessible at the website of the Friends of Ecosystem-based Adaptation (FEBA): <https://toolsnavigator.friendsofeba.com>

6 Conclusion

In the dynamic landscape of STDs, the intertwining concepts of vulnerability and resilience offer a helpful roadmap for addressing the challenges posed by climate change. The comprehensive vulnerability assessments, as outlined by the present report and the project BeyondSnow, aim to delve deep into the intricate web of climatic, socio-ecological, and tourism-specific factors that shape the fate of Alpine regions.

The vulnerability mapping process underlines the multifaceted nature of exposure, sensitivity, potential impacts, and adaptive capacity within STDs. Climatic elements, such as snowfall and temperature, lay the foundation, while sensitivity indicators, including population density and infrastructure risks, provide further socio-economic elements of analysis. The acknowledgment of the pivotal role played by ecosystem-based services underscores the importance of nature in fortifying adaptive capacities and resilience.

In the face of unprecedented disruptions, and based on vulnerability assessments as groundwork, the narrative seamlessly transitions to the imperative of resilience. The ski industry, a cornerstone of STDs in the Alps, is experiencing an increase of the quantity and intensity of challenges connected to climate change. Adopting a resilience-oriented vision presupposes the collaborative efforts of stakeholders, a meticulous analysis of destinations, the consideration of adaptive strategies, and the examination of broader impacts on communities and the environment.

Technological adaptations, notably technical snowmaking, emerge as a double-edged sword in the pursuit of resilience. While addressing the immediate need for reliable snow cover, the risk of maladaptation and infrastructure lock-in looms large. The cautionary tale emphasizes the importance of widening the scope of options and alternatives. Overreliance on a single domain, such as skiing, leaves destinations vulnerable to disruptions, necessitating a shift toward diversified offerings.

Within this ever-changing landscape, Ecosystem-based Services (EbS) seem to become a more significant role in the context of tourism. The sustainability and resilience of tourism destinations heavily rely on the maintenance and responsible utilization of ecosystems. The responsible integration of EbS into tourism practices offers a multifaceted approach to strengthening the sector's resilience, ensuring the long-term well-being of both ecosystems and humans (local inhabitants and guests alike). Natural settings, particularly in Alpine regions, constitute the very essence of tourism destinations and one of the main resources of tourism attractiveness. They are widely acknowledged to be beneficial for boosting social connections, expanding local economies, fostering local and indigenous identity, connecting people with their cultural and natural heritage, and raising conservation awareness. Furthermore, these ecosystems can contribute significantly to year-round tourism offers, including recreation, spiritual, and cultural experiences.

Therefore, tourism destinations that prioritize the conservation and sustainable management of their ecosystems can be positioned, due to the provision of authentic and attractive leisure-related services. This mutually beneficial relationship underlines the vital role of EbS in enhancing tourism resilience and sustaining the sector's central leisure-related services.

In essence, the future of STDs hinges on informed decision-making, adaptive strategies, and a commitment to sustainability. Vulnerability assessments, resilience-building efforts, and the integration of EbS can provide a blueprint for a thriving coexistence with the changing climate. As the snow tourism industry navigates uncharted territories, the integration of diverse insights and proactive measures can ensure not only survival but the flourishing of STDs in the face of evolving climates.

7 References

- Alber, K., Garbellini, Rutter, Scheibel, Schuckert, Siegrist, Strobl A, Urbanc M, Venuta, ML, Wyss R, Allamandola, M., Gessner S, Giupponi C, Herntrei M, Kolbeck F, Luthe T, Macchiavelli A, Matasci C, Mignone N, Moretto D, Muti S, Pasquettaz C, Pasutto I, Peters M, Peyrache-Gadeau V, Pipan P, Pozzi A, Rosset T, & Balbi S, Bausch T, Benati A, Bonzanigo L, Cetara L, Chaix C, Clivaz C, Colson A, Cremer I, Dissegna M, Doctor M, Dutto E, Elmi M, Fosson JP, Frigo B, Furlani R, Gallée H,. (2011). *CLIMALPTOUR: climate change and its impact on tourism in the Alpine space*.
- Alvarez, S., Bahja, F., & Fyall, A. (2022). A framework to identify destination vulnerability to hazards. *Tourism Management*, 90, 104469. <https://doi.org/10.1016/j.tourman.2021.104469>
- Becken, S. (2013). DEVELOPING A FRAMEWORK FOR ASSESSING RESILIENCE OF TOURISM SUB-SYSTEMS TO CLIMATIC FACTORS. *Annals of Tourism Research*, 43, 506–528. <https://doi.org/10.1016/j.annals.2013.06.002>
- Béné, C., Wood, R. G., Newsham, A., & Davies, M. (2012). Resilience: New Utopia or New Tyranny? Reflection about the Potentials and Limits of the Concept of Resilience in Relation to Vulnerability Reduction Programmes. *IDS Working Papers*, 2012(405), 1–61. <https://doi.org/10.1111/j.2040-0209.2012.00405.x>
- Berkes, F., & Folke, C. (Eds.). (2002). *Linking social and ecological systems: Management practices and social mechanisms for building resilience* (Transferred to digital printing). Cambridge Univ. Press.
- Birkmann, J., Schüttrumpf, H., Handmer, J., Thieken, A., Kuhlicke, C., Truedinger, A., Sauter, H., Klopries, E.-M., Greiving, S., Jamshed, A., Merz, B., Solecki, W., & Kirschbauer, L. (2023). Strengthening resilience in reconstruction after extreme events – Insights from flood affected communities in Germany. *International Journal of Disaster Risk Reduction*, 96, 103965. <https://doi.org/10.1016/j.ijdrr.2023.103965>
- Brouder, P., & Eriksson, R. H. (2013). TOURISM EVOLUTION: ON THE SYNERGIES OF TOURISM STUDIES AND EVOLUTIONARY ECONOMIC GEOGRAPHY. *Annals of Tourism Research*, 43, 370–389. <https://doi.org/10.1016/j.annals.2013.07.001>
- Cairns, R. C. (2014). Climate geoengineering: Issues of path-dependence and socio-technical lock-in. *WIREs Climate Change*, 5(5), 649–661. <https://doi.org/10.1002/wcc.296>
- Calgaro, E., Dominey-Howes, D., & Lloyd, K. (2014). Application of the Destination Sustainability Framework to explore the drivers of vulnerability and resilience in Thailand following the 2004 Indian Ocean Tsunami. *Journal of Sustainable Tourism*, 22(3), 361–383. <https://doi.org/10.1080/09669582.2013.826231>

- Calgaro, E., Lloyd, K., & Dominey-Howes, D. (2014). From vulnerability to transformation: A framework for assessing the vulnerability and resilience of tourism destinations. *Journal of Sustainable Tourism*, 22(3), 341–360. <https://doi.org/10.1080/09669582.2013.826229>
- Carpenter, S., Walker, B., Anderies, J. M., & Abel, N. (2001). From Metaphor to Measurement: Resilience of What to What? *Ecosystems*, 4(8), 765–781. <https://doi.org/10.1007/s10021-001-0045-9>
- Cioccio, L., & Michael, E. J. (2007). Hazard or disaster: Tourism management for the inevitable in Northeast Victoria. *Tourism Management*, 28(1), 1–11. <https://doi.org/10.1016/j.tourman.2005.07.015>
- Climate-ADAPT. (2023). *Ecosystem-based approaches—English*. <https://climate-adapt.eea.europa.eu/en/eu-adaptation-policy/sector-policies/ecosystem#>
- Cohen-Shacham, E., Walters, G., Janzen, C., & Maginnis, S. (Eds.). (2016). *Nature-based solutions to address global societal challenges*. IUCN International Union for Conservation of Nature. <https://doi.org/10.2305/IUCN.CH.2016.13.en>
- Davoudi, S., Brooks, E., & Mehmood, A. (2013). Evolutionary Resilience and Strategies for Climate Adaptation. *Planning Practice and Research*, 28(3), 307–322. <https://doi.org/10.1080/02697459.2013.787695>
- Davoudi, S., Shaw, K., Haider, L. J., Quinlan, A. E., Peterson, G. D., Wilkinson, C., Fünfgeld, H., McEvoy, D., Porter, L., & Davoudi, S. (2012). Resilience: A Bridging Concept or a Dead End? “Reframing” Resilience: Challenges for Planning Theory and Practice Interacting Traps: Resilience Assessment of a Pasture Management System in Northern Afghanistan Urban Resilience: What Does it Mean in Planning Practice? Resilience as a Useful Concept for Climate Change Adaptation? The Politics of Resilience for Planning: A Cautionary Note: Edited by Simin Davoudi and Libby Porter. *Planning Theory & Practice*, 13(2), 299–333. <https://doi.org/10.1080/14649357.2012.677124>
- Dreyfus, G. B., Xu, Y., Shindell, D. T., Zaelke, D., & Ramanathan, V. (2022). Mitigating climate disruption in time: A self-consistent approach for avoiding both near-term and long-term global warming. *Proceedings of the National Academy of Sciences*, 119(22), e2123536119. <https://doi.org/10.1073/pnas.2123536119>
- EEA. (2015). *Exploring nature-based solutions: The role of green infrastructure in mitigating the impacts of weather and climate change related natural hazards*. Publications Office. <https://data.europa.eu/doi/10.2800/946387>
- Fabry, N., & Zeghni, S. (2019). *Resilience, tourist destinations and governance: An analytical framework*. 15.

- FEBA (Friends of Ecosystem-based Adaptation). (2017). *Making ecosystem-based adaptation effective: A framework for defining qualification criteria and quality standards* [(FEBA technical paper developed for UNFCCC-SBSTA 46)]. <https://www.iied.org/g04167>
- Flagestad, A., & Hope, C. A. (2001). Strategic success in winter sports destinations: A sustainable value creation perspective. *Tourism Management*, 22(5), 445–461. [https://doi.org/10.1016/S0261-5177\(01\)00010-3](https://doi.org/10.1016/S0261-5177(01)00010-3)
- Folke, C. (2006). Resilience: The emergence of a perspective for social–ecological systems analyses. *Global Environmental Change*, 16(3), 253–267. <https://doi.org/10.1016/j.gloenvcha.2006.04.002>
- Fritzsche, K., Schneiderbauer, S., Bubeck, P., & Kienberger, S. (2014). *The Vulnerability Sourcebook: Concept and guidelines for standardised vulnerability assessments*. https://www.adaptationcommunity.net/download/va/vulnerability-guides-manuals-reports/vuln_source_2017_EN.pdf
- Gaki, E., & Koufodontis, N. I. (2022). REGIONAL TOURISM RESILIENCE AND RECOVERY IN TIMES OF CRISES. *GeoJournal of Tourism and Geosites*, 40(1), 259–266. <https://doi.org/10.30892/gtg.40131-827>
- Gallopin, G. C. (2006). Linkages between vulnerability, resilience, and adaptive capacity. *Global Environmental Change*, 16(3), 293–303. <https://doi.org/10.1016/j.gloenvcha.2006.02.004>
- Haines-Young, R., & Potschin, M. (2018). *Guidance on the Application of the Revised Structure*.
- Holling, C. S. (1973). Resilience and Stability of Ecological Systems. *Annual Review of Ecology and Systematics*, 4, 1–23.
- Holling, C. S. (1996). Engineering Resilience versus Ecological Resilience. In *Engineering Within Ecological Constraints*. <https://doi.org/10.17226/4919>
- Holling, C. S. (2001). Understanding the Complexity of Economic, Ecological, and Social Systems. *Ecosystems*, 4(5), 390–405. <https://doi.org/10.1007/s10021-001-0101-5>
- Hölscher, K., Wittmayer, J. M., & Loorbach, D. (2018). Transition versus transformation: What's the difference? *Environmental Innovation and Societal Transitions*, 27, 1–3. <https://doi.org/10.1016/j.eist.2017.10.007>
- Hystad, P. W., & Keller, P. C. (2008). Towards a destination tourism disaster management framework: Long-term lessons from a forest fire disaster. *Tourism Management*, 29(1), 151–162. <https://doi.org/10.1016/j.tourman.2007.02.017>

IPCC (Ed.). (2007). *Climate change 2007: Impacts, adaptation and vulnerability : contribution of Working Group II to the fourth assessment report of the Intergovernmental Panel on Climate Change*. Cambridge university press.

IPCC. (2014). *Summary for policymakers. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change: Vol. Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. https://www.ipcc.ch/site/assets/uploads/2018/02/ar5_wgII_spm_en.pdf

IPCC. (2022). *Climate Change 2022 – Impacts, Adaptation and Vulnerability: Working Group II Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (1st ed.)*. Cambridge University Press. <https://doi.org/10.1017/9781009325844>

IPCC, I. P. on C. (2023). Cities, Settlements and Key Infrastructure. In *Climate Change 2022 – Impacts, Adaptation and Vulnerability: Working Group II Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (pp. 907–1040). Cambridge University Press. <https://doi.org/10.1017/9781009325844.008>

Jeans, H., Castillo, G. E., & Thomas, S. (2017). *Absorb, Adapt, Transform: Resilience capacities*.

Karkkainen, B. C. (2005). *Panarchy and Adaptive Change: Around the Loop and Back Again*. 7.

Laws, E., & Prideaux, B. (2006). Crisis Management: A Suggested Typology. *Journal of Travel & Tourism Marketing*, 19(2–3), 1–8. https://doi.org/10.1300/J073v19n02_01

Lew, A. A. (2014). Scale, change and resilience in community tourism planning. *Tourism Geographies*, 16(1), 14–22. <https://doi.org/10.1080/14616688.2013.864325>

Lo, V. (2016). *Synthesis report on experiences with ecosystem-based approaches to climate change adaptation and disaster risk reduction*. (Technical Series No.85.). Secretariat of the Convention on Biological Diversity. <https://www.cbd.int/doc/publications/cbd-ts-85-en.pdf>

Loehr, J., Becken, S., Nalau, J., & Mackey, B. (2022). Exploring the Multiple Benefits of Ecosystem-Based Adaptation in Tourism for Climate Risks and Destination Well-Being. *Journal of Hospitality & Tourism Research*, 46(3), 518–543. <https://doi.org/10.1177/1096348020944438>

Luthe, T., & Wyss, R. (2014). Assessing and planning resilience in tourism. *Tourism Management*, 44, 161–163. <https://doi.org/10.1016/j.tourman.2014.03.011>

McVittie, A., Cole, L., Wreford, A., Sgobbi, A., & Yordi, B. (2018). Ecosystem-based solutions for disaster risk reduction: Lessons from European applications of ecosystem-based adaptation measures. *International Journal of Disaster Risk Reduction*, 32, 42–54. <https://doi.org/10.1016/j.ijdrr.2017.12.014>

O’Connell, D., Walker, B., Abel, N., & Grigg, N. (2015). *The Resilience, Adaptation and Transformation Assessment Framework: From Theory to Application*. <https://doi.org/10.4225/08/5A8B10A6DFAD8>

OECD. (2007). *Climate Change in the European Alps: Adapting Winter Tourism and Natural Hazards Management*. OECD. <https://doi.org/10.1787/9789264031692-en>

OECD. (2014). *Guidelines for Resilience Systems Analysis: How to Analyse Risk and Build a Roadmap to Resilience (Best Practices in Development Co-Operation) [Best Practices in Development Co-operation]*. <https://doi.org/10.1787/3b1d3efe-en>

Polderman, A., Haller, A., Viesi, D., Tabin, X., Sala, S., Giorgi, A., Darmayan, L., Rager, J., Vidovič, J., Daragon, Q., Verchère, Y., Zupan, U., Houbé, N., Heinrich, K., Bender, O., & Bidault, Y. (2020). How Can Ski Resorts Get Smart? Transdisciplinary Approaches to Sustainable Winter Tourism in the European Alps. *Sustainability*, 12(14), 5593. <https://doi.org/10.3390/su12145593>

Poratelli, F., Cocuccioni, S., Accastello, C., Steger, S., Schneiderbauer, S., & Brun, F. (2020). State-of-the-art on ecosystem-based solutions for disaster risk reduction: The case of gravity-driven natural hazards in the Alpine region. *International Journal of Disaster Risk Reduction*, 51, 101929. <https://doi.org/10.1016/j.ijdrr.2020.101929>

Preston, B., & Stafford-Smith, M. (2009). *Framing vulnerability and adaptive capacity assessment [electronic resource]: Discussion paper (Working Paper Number #2; CSIRO Climate Adaptation Flagship Working Paper Series; 2)*. <http://www.csiro.au/org/ClimateAdaptationFlagship.html>

Sainaghi, R., & De Carlo, M. (2016). How to Create Destination Capabilities in the Field of New Product Development. In *Competence-based innovation in hospitality and tourism*. <https://apeiron.iulm.it/handle/10808/17413>

Schneiderbauer, S., Hartmann, S., & Dalla Torre, C. (2018). *Beyond the Expected: Dealing with Cases of Overload and the Residual Risk of Natural Hazards in the Alpine Region*.

Scott, D., Knowles, N., & Steiger, R. (2022). Is snowmaking climate change maladaptation? *Journal of Sustainable Tourism*, 0(0), 1–22. <https://doi.org/10.1080/09669582.2022.2137729>

Seto, K. C., Davis, S. J., Mitchell, R. B., Stokes, E. C., Unruh, G., & Ürge-Vorsatz, D. (2016). Carbon Lock-In: Types, Causes, and Policy Implications. *Annual Review of Environment and Resources*, 41(1), 425–452. <https://doi.org/10.1146/annurev-environ-110615-085934>

- Sheppard, V. A., & Williams, P. W. (2016). Factors that strengthen tourism resort resilience. *Journal of Hospitality and Tourism Management*, 28, 20–30. <https://doi.org/10.1016/j.jhtm.2016.04.006>
- Stotten, R., Schermer, M., & Wilson, G. A. (2021). Lock-ins and community resilience: Two contrasting development pathways in the Austrian Alps. *Journal of Rural Studies*, 84, 124–133. <https://doi.org/10.1016/j.jrurstud.2021.04.001>
- Strambach, S. (2008). *Path Dependency and Path Plasticity: The Co-evolution of Institutions and Innovation—The German Customized Business Software Industry*.
- Sudmeier-Rieux, K., Nehren, U., Sandholz, S., & Doswald, N. (2019). *Disasters and Ecosystems, Resilience in a Changing Climate—Source Book*. <https://doi.org/10.5281/zenodo.3493377>
- United Nations. (2017). *Report of the High-level Committee on Programmes at its 34th session (International Labour Organization headquarters, Geneva, 26 and 27 September 2017)*. <https://digitallibrary.un.org/record/3844899>
- United Nations. (2020). *Executive Summary: United Nations Common Guidance on Helping Build Resilient Societies*. United Nations. <https://unsdg.un.org/sites/default/files/2021-09/UN-Resilience-Guidance-Exec-Summ-Sept.pdf#:~:text=Resilience%20is%20the%20ability%20of,level%20of%20functioning%20without%20compromising>
- UNWTO. (2023). *Glossary of tourism terms | United Nations World Tourism Organization*. <https://www.unwto.org/glossary-tourism-terms>
- Walker, B. H., Carpenter, S. R., Rockstrom, J., Crépin, A.-S., & Peterson, G. D. (2012). Drivers, “Slow” Variables, “Fast” Variables, Shocks, and Resilience. *Ecology and Society*, 17(3), art30. <https://doi.org/10.5751/ES-05063-170330>
- Williams, A. M., & Baláž, V. (2015). Tourism Risk and Uncertainty: Theoretical Reflections. *Journal of Travel Research*, 54(3), 271–287. <https://doi.org/10.1177/0047287514523334>
- Winter, P. L., Selin, S., Cervený, L., & Bricker, K. (2020). Outdoor Recreation, Nature-Based Tourism, and Sustainability. *Sustainability*, 12(1), Article 1. <https://doi.org/10.3390/su12010081>
- Woodward, A. (2019). Climate change: Disruption, risk and opportunity. *Global Transitions*, 1, 44–49. <https://doi.org/10.1016/j.glt.2019.02.001>
- Ziervogel, G., Cowen, A., & Ziniades, J. (2016). Moving from Adaptive to Transformative Capacity: Building Foundations for Inclusive, Thriving, and Regenerative Urban Settlements. *Sustainability*, 8(9), Article 9. <https://doi.org/10.3390/su8090955>

8 Annexes

8.1 Vulnerability & Resilience: Lessons learned adopting the Sensitive Diagnosis in 9 mountain areas in French massifs

8.2 Guidelines for Pilot Working Areas data collection & evaluation

Vulnerability & Resilience: Lessons learned adopting the Sensitive Diagnosis in nine mountain areas in the French massifs

D.1.2.1 Annex 1 – October 2023

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1 Introduction

Many mountain regions have already been disrupted by the fact that the planetary limits are increasingly exceeded (e.g., overuse of resources, intensification of climate change, collapse of biodiversity, etc.), and must prepare to face an uncertain and constrained future, shaped also by an increasing scarcity of energy, food, and water resources. Henceforth, they will have to deal with the multiplication of various serious disruptions, such as gradual emerging stressors and sudden shocks. Anticipating as far as possible through understanding, monitoring, and forecasting these disruptions, is the first essential step towards greater resilience. Hereby, as the first objective of territorial resilience, it has to be to ensure that the essential needs of local residents are met, independently of the entity of the future disruptions, whether they are of environmental, social, economic, geopolitical or even health-related nature.

The recent crises have highlighted the deeper issue regarding the local economic vulnerability & resilience of tourism destinations. Especially throughout the last two to three years questions about the ability of the sector's actors to cope with or adapt to (climate) disruptions impacting them either directly (heatwaves, floods, storms, decreasing/increasing number of visitors, etc.) or indirectly (price volatility, inflation, demographic changes, etc.), have been raised. Mountain tourism areas are often among the most exposed to climatic hazards. Oftentimes they are also among the least economically diversified.

Diagnosis, preparation, regulation, and crisis management can enable them to avoid, mitigate, absorb or adapt to the effects of disruptions (surge in the price of raw materials and food products, shortages, blackouts, etc.), and thus reduce their vulnerability and increasing their resilience through systemic transition paths.

To achieve this, a technical diagnosis of the area is required: what are the area's financial resources, its energy and food resources, its water resources, its communications and telecommunications network, the state of its infrastructure, etc.? However, a purely technical oriented approach is not enough. As Donella Meadows points out, "the scarcest resource is not oil, metals, clean air, capital, labour or technology. It is our willingness to listen, to learn from each other, and to seek the truth rather than to be right" (Meadows & Wright, 2011). Therefore, local, and regional actors, such as local authorities, businesses, associations, citizens, etc., need to embark on a process of assimilating socio-ecological issues, exchanging and sharing experiences, meeting, and cooperating.

This is because it is these local players, who will have to lead and manage the area, organise collective decision-making forums to decide what the priorities are, etc. There can be no resilience without organisations, such as local authorities and socio-economic players, with the capacity to lead, to plan, to

decide together and to arbitrate democratically. Resilience on the scale of a destination will only be effective if all stakeholders cooperate in order to adapt to increasingly complex changes: "a resilience-based destination is a learning destination" (Fabry & Zeghni, 2019). Yet it is the human dimension that most often acts as a barrier to change.

For this reason, the Fabrique des Transitions is offering territories a sensitive diagnostic tool. The aim of this diagnostic tool is to assess the capacity to support and manage transitions from a systemic point of view. It is a sensitive diagnosis because of the place given to subjectivity and inter-subjectivity, but also because of the political and sensitive dimension it carries. The challenge is to get away from the unspoken or the false pretence, to highlight the issues, and to identify the most suitable actors by questioning those who are able and are in a position to lead transition projects. The diagnosis reveals what the actors are thinking but not necessarily saying. It also reveals the real level of support and management for transitions beyond the official statements.

In addition to a comprehensive analysis that explores the whole territory and aims to collect quantitative data, the sensitive diagnosis looks into:

- Whether or not the players have a vision or strategy for their area;
- Their ability (or lack thereof) to plan ahead;
- The framework of thought in which the area is embedded: e.g., what relationship do the stakeholders have with the area's nature (wild nature, "gardened" nature, or "produced" nature)?
- The organisational framework: what governance mechanisms are in place (e.g., are municipal staff simply executors or are they able to take the initiative)?
- The way in which the players view the notion of transition: is it a simple technological adjustment for them, or rather a systemic approach?
- What the level and quality of their cooperation is.

The diagnoses carried out in nine mountain areas provided a variety of information on how to approach the issue of assessing vulnerability & resilience, as they focus on the conditions for managing successful change in an area.

2 Common points between observed areas

2.1 Current upheavals

The effects of the current upheavals are amplified: Social issues seem to be exacerbated in the mountains, in line with the perception of upheaval. This can be a source of blockages or conflicts, but also of increased energy and strong commitments. There are two main attitudes, seemingly at odds with each other, which are potential sources of tension:

- Greater availability, attentiveness, and willingness to listen on the part of many actors but sometimes a status quo with no visible movement;
- Fear, instinct to clutch at straws (to what already exists) for others, reinforced by the absence of openings to other possibilities, of collective dynamics.

2.2 Challenges of transition

The fact that the challenges of transition call into question the entire territorial model is not well understood: The perception of the ongoing upheavals is often linked to the direct effects of climate change that can be observed locally, often in a specific area. For many stakeholders, the systemic aspect (ecological, economic, lifestyles, mobility, etc.) is not immediately understandable, and collective work is essential to achieve this.

"I came to see how we could tackle the issue of energy costs, and I've realised that it's much more global than that, and that we're going to have to act across the board. It's changing everything we do" (President of a Regional Natural Park).

As a result, many actors and particularly elected representatives are looking for technological-technical solutions that should enable them to deal with their issues without questioning their entire territorial model. Yet it is essential not to remain isolated in the face of these challenges, not to stick to a single answer hoping to "have a say in our future" and not to try to find ready-made technical solutions or "recipes", but to delve into the real issues at work, to get advice from other peers on ideas, practices, etc., in order to be able to make the best use of the available resources.

2.3 Gap between knowledge and reality

Oftentimes there is a huge gap between knowledge (the identification of physical and biological data as perceived by elected representatives) and reality: And it's even worse when looking at the future, also because it can be found very difficult to project oneself into the future. The very notion of transition does not seem to be clearly understood locally.

"I had absolutely no idea what was in store for us... It's scary when you look at the future!" (Head of a tourist office in a large ski resort).

Even on the question of water, which currently is worrying everyone, there is a kind of paralysis and lack of anticipation.

Another example is the issue of risks, which is omnipresent while being in the mountains: severe droughts undermining activities (livestock farming, water-based leisure activities, supplying communities with drinking water, etc.), water damage caused by increasing extreme weather events, risk of ground collapse due to changes in freeze-thaw alternation, forest fires, etc.

"Back home there are no DFCI roads for the fire brigade. We had our first forest fires. It was the elected representatives who guided the fire brigade at night." (Head of a tourist office in a large ski resort).

Oftentimes territories are not able to measure the occurrences, also decreasing their ability to anticipate these disruptions and/or transformation of practices as well as approaches. In some places, there is even cynicism.

"The fact that many small mid-mountain resorts are experiencing difficulties is good for us". (Head of a tourist office in a large ski resort).

So, for the moment, everything seems to be going well in these areas: there's no identified need! The crisis for some is an opportunity for others!

3 Main strengths and weaknesses of the surveyed areas

3.1 Strengths

The analysed areas, within which significant efforts were made, are dynamic and on the move. These areas seemed to have taken advantage of a wide range of measures and set up transition initiatives in several sectors such as energy, food, soft mobility, recycling centres with integration projects, etc.

Numerous mechanisms for citizen involvement have been identified. These include a growing role for local associations, schemes such as recycling centres, efforts to promote short distribution channels and the establishment of numerous third-party centres.

Likewise, these areas are home to many examples of multi-actor projects that focus on cooperation, based on local, regional, or European schemes, and covering a wide range of areas such as health, water, biodiversity, etc. However, these multi-actor projects depend largely on individual initiatives and the quality of the interpersonal networks of the various players. In these areas, there are powerful resources and strong individual and collective wills.

3.2 Weaknesses

The transition is not perceived at the right level. It is still perceived as technical and segmented, and the interactions are rarely perceived from the outset. Sometimes, it is even perceived it as unnecessary, especially when the issues quickly become conflicting, such as *"Should natural areas be used for renewable energy installations?"*.

Projects and initiatives are lined up and grouped together beyond geographical boundaries, through a shared project and an overall vision. There is a lack of know-how about how to prioritise and choose more effectively, and how to avoid spreading the efforts too thinly in order to give an overall meaning to a regional project.

In general, the level of cooperation between the various stakeholders in the regions is oftentimes still too low to support regional projects based on a clear, shared vision. This translates into difficulties in going beyond the areas of responsibility of the various actors, the administrative boundaries of the area and its different layers, as well as the need to put in place more "reflective" spaces and times to evaluate the actions

implemented, to better capitalise on the projects and gain more perspective. Additionally, despite a great deal of goodwill in the regions, cooperation can be hampered by the lack of availability of the various stakeholders (such as elected representatives, socio-professional actors), by certain conflicts of use reflecting different and sometimes opposing visions of the region, as well as by a lack of understanding of the precise roles of the various actors, whose great multiplicity and heterogeneity is not sufficiently identified and mapped out.

Furthermore, there is still no real systemic approach, and the vision of transition remains too focused on that from one tourism model to another. The areas diagnosed are unable to break out of the traditional tourism patterns. For example, a ski resort, regardless of its size, occupies the whole framework of thinking, with the reflex of "moving upmarket" as a solution added to that of diversification, which does not respond to systemic issues. There is still no overall strategy for the region, and no project that goes beyond a purely touristic vision.

As a result, the implementation of policies to mitigate and adapt to climate change takes a subordinate role to the objectives of attracting tourists. Stakeholders surveyed in the areas are very aware of the richness of the region and its resources. Yet the assets of the regions are still seen as a tool for attractiveness and financial income, and not as a capital to be preserved in order to cope with the consequences of ongoing disruptions.

A few considerations divided by type of stakeholder to address the weak points identified:

- For elected representatives: changing their standpoints in order to propose responses that meet the challenges.
- For staff of local municipalities: developing new skills (leadership, co-construction, listening to stakeholders, systemic and cross-functional approach, etc.) to be able to capture weak signals from the territory.
- For socio-professional players: recognising the value of engaging in multi-actor approaches, which should encourage their inclusion.
- For the State representatives: gaining a better understanding of the difficulties faced by territories on the basis of reliable data on the one hand (so as to be more responsive when it comes to directing funding in particular) and, on the other, to carry out an in-depth review of the multiplication of territorial bodies and their governance, both respective and joint.

4 Main obstacles to transition

Lack of understanding of the reality of other people's needs and constraints

We are going to have to deal with compromises, take risks and move away from conventional solutions: trust between actors is becoming a key issue. In other words, cooperation between actors to tackle problems, which were previously misunderstood, has now become a logical outcome for many. We are going to have to think and act collectively. Yet not everything what this entails has been fully assimilated, and it will take time to build up an experience base so that we can evaluate the effects of this cooperation as we go further.

Complexity of the issues to be addressed

How can we rethink economic models? What can we do about the risks that threaten us? How can we manage dwindling resources? How can we set up consultation? Despite a great deal of goodwill in the territories, cooperation is hampered by the lack of availability of the various stakeholders (elected representatives, socio-professional actors), and certain conflicts of use (e.g., on water or land) are reflecting different and sometimes opposing visions of the present and future and a lack of knowledge about the precise roles of the various actors.

The ski question

It is perhaps even more a question of identity than of economics. The local people have a very strong emotional bond with skiing. It is a marker of their identity. The cultural weight of skiing sometimes acts like an anchor. This can block alternative ways of thinking, lead to situations of strong conflict within areas and to a clash of extreme mentalities.

Lack of training, skills development, and recognition

The context of ecological transition and climate emergency presupposes that elected representatives, local authority actors and business leaders need to acquire new knowledge about planetary limits. Furthermore, they need to be trained in new skills and techniques for leadership, co-construction, collective work and listening to stakeholders. This requirement may come up against a lack of time on the part of some actors, and a lack of allocated resources.

Too many discrepancies between regional and local policies

Policies and communications are sometimes contradictory depending on the territorial level. The difficulty is that there is no such thing as an absolute level of relevance. Each issue (energy, food, water, mobility, health, tourism, etc.) corresponds to a relevant territorial level. The challenge is to link these levels together.

5 Thoughts on vulnerability and resilience assessment criteria

Assessing the vulnerability and resilience of territories cannot be based solely on financial and quantitative data. Indeed, one of the challenges of sustainability is to make the invisible visible. All actors must therefore take the time to look at what they are doing and, above all, how they are doing it.

How can value be assessed? What does really count?

The first challenge is to move away from a purely monetary conception of value and a purely accounting approach to evaluation. To bring out what has value, we need to rely on other ways of telling the story: "not everything that counts can be counted, but it can be told". This is the whole point of storytelling, which allows us to listen to the way in which each person has experienced a story, what they learn from it, the shifts that have occurred, etc.

In addition to assessing the social and environmental impact of a legal entity, we will be looking at the production of added value for society as a whole. This means considering the tangible and intangible wealth created in a region from a systemic point of view, beyond the simple effects that can be measured by indicators. The evaluation systems will therefore be interested in the levels of commitment, the real efforts made (over and above the results obtained), the new uses put in place, the quality of cooperation, the movement of actors, etc. The challenge here is to evaluate the action and not the object.

This brings us back to the evaluation of cooperation, for example, which is a crucial issue for collective territorial dynamics. Currently, there is an obvious lack of human resources dedicated to this function, particularly in local authorities. There is also a lack of funding. Hence, evaluating the value created by cooperation is also a way of arguing for the introduction of long-term, structural funding mechanisms.

To be useful, evaluation must therefore be systemic. This requires a change of attitude, because we tend to prefer simple, mono-causal explanations, as they are more reassuring, quicker and, above all, they are a reflex rooted in our habits. The systemic approach requires an effort to try and put issues back into context, to step back, to re-articulate different levels of analysis, different ways of looking at things, and identify new actors. This can be destabilising, but this attention to interrelationships and the use of a complex analytical framework will enable us to develop more relevant, more transformative, and more powerful projects in the future.

There are several ways of achieving this.

This can involve, for example, an in-depth analysis of the effects produced by the current model: who does really benefit? And to what extent? Who suffers? And why? This means looking at impact chains, both geographically and over time, and paying particular attention to induced effects, i.e., externalities, which we often tend to limit to what we already know or to what we assume out of habit, or simply because it is the dominant discourse.

It also allows us to broaden the scope of the actors involved. For a given subject, it is useful to look for those who benefit indirectly from the useful effects, or those who suffer from consequences that were not anticipated at the outset. This effort to look at all the effects, including the negative ones, is virtuous because it allows us to establish a new working framework. In tourism, for example, it is not by continuing to look at the same quantitative indicators repeatedly (number of visitors, turnover per activity, number of overnight stays, occupancy rates, etc.) that will allow a territory to be able to redirect its policy and demonstrate innovation in this area.

It is important that this analysis work is disseminated and, above all, shared by all the stakeholders. This means that everyone takes ownership of it and considers it as valid. Because it is only on this basis that the stakeholders can really get involved, so that a shared vision of the territory's project can be developed. This process of empowering citizens and actors is essential for creating a climate of trust, which is the essential foundation for cooperation.

To ensure that all stakeholders are involved in the assessment, it is advisable to proceed in concentric circles, in a pragmatic way: first involve social groups that are already established, building on pre-established relationships, then turn to stakeholders on the fringes, on the periphery, who might not have been thought of at first. This will make it possible to successively integrate larger groups, and thus enrich the analysis.

Another way of setting up a complex analytical framework is to use storytelling.

The storytelling approach is both a way of involving stakeholders and an opportunity to place the evaluation within a longer trajectory. We need to distinguish between "the story" as a deliverable (and there can be as many as we imagine) and "storytelling" as a process, which is a political method, an approach for managing transitions.

First of all, it is a step aside in terms of political philosophy. The narrative approach consists in realising that we are determined by the stories we tell or that are told about us, more than we determine them. They define the way we represent ourselves in the world and therefore the way we act in it. By becoming aware of them, storytelling enables us to give better direction to the stories that shape us, and therefore to gain greater

autonomy, to allow alternative stories to be expressed, to construct preferred stories, and therefore to create spaces and times for this.

Secondly, it is about setting a course. Storytelling involves adopting a vectorial approach. We come from somewhere and we are going somewhere. The past offers resources for building the future. Past and future generations have something to tell to determine action and build a vision.

It is also a question of communication. Faced with the dominant narratives of happiness through growth and consumption, territories in transition need to speak with a different voice and make it heard. The narrative approach allows stories to be expressed and enables us to choose the stories - the narrative - that we would like to experience (in Loos-en-Gohelle, for example, going "from black to green"). In this sense, the idea is to offer gateways into this narrative to a whole series of targets: agents, elected representatives, residents in their various categories (farmers, shopkeepers, parents, future residents, etc.). There is a marketing dimension at the heart of the narrative approach, just as there is a political communication dimension, the embodiment of a narrative that we would like to see shared. This brings us back to the professions of institutional, political, and economic communication, and, at a time of information overload and lack of cooperation, these professions need to be re-examined in order to support transitions.

Putting narratives together avoids considering one narrative as the only one and, while still accepting a collectively preferred narrative, allows alternative and contradictory narratives to be recognised as having the right to express themselves. It is in this contradiction that resistance to the dominant narrative finds a place, as a way to improve that narrative and reduce the gap between what it projects and what staff, elected representatives, residents and stakeholders actually experience. The preferred narrative is strengthened as it opens up to alternative narratives that contradict and enrich it. In this sense, there can be no policy of storytelling without a genuine policy of involvement and participation by local people, starting with those who complain and express a story that contradicts the one promoted by the authorities (for example on tourism, or wind power or public services). This continues with those who enrich the narrative and would like to amplify it: the pioneers who are taking initiatives for transition, who have projects and ideas, who are the points of support for dialogue and improving territorial action. In this sense, powerful stories of transition go hand in hand with growing involvement. It is therefore essential to train the actors, agents and elected representatives to involve local residents.

By exposing vulnerabilities, mistakes and failures in a collective space that makes it safe to express them, we realise that we are all equal and we find ways of cooperating better, gaining confidence and the capacity to act. Storytelling is therefore an approach that renews territorial development, giving it depth and nurturing a collective capacity to act, undertake and innovate. This is at the heart of the territory's project.

Statements of workshop participants:

"Soft' project developments are expensive and it is difficult to get the public to accept them."

"Fear of change and particular interests are obstacles."

"There are reactions of withdrawal, defence of particular interests, difficulties in understanding the points of view of others."

"Sharing and delegating power is difficult, in addition to issues of time and financial viability."

"Possession of power creates oversized egos."

"There is a political blockage: they are not necessarily ready to change the business model, to accept that we need to change direction."

"How do we prioritise our actions? We can't fund everything; negotiation is not easy."

"Beware of 'wish lists', it takes time."

"We lack the means, time and energy for consultation."

"It is difficult to wipe the slate clean! Previous conflicts come back."

"It's always the same people and we are quite powerless to go after the non-participants."

"Money, fear, withdrawal, change of habits... These are the brakes."

"The lack of financial means, whatever the theme, is omnipresent."

"Disinformation on the Internet radicalises positions. There is no dialogue possible."

"These are very divisive issues and we have lost the habit of democratic dialogue."

"People don't have enough confidence in elected representatives and there are oppositions."

"With the urgency, we don't take the time to step back and co-construct. We put on band-aids."

"It is the secondary residents who take over local democracy."

"There is no neutral entity that takes charge of the general interest, nor tools for managing the common. We lack common perspectives, unifying tools, a common vocabulary..."

"The fear of failure is very present, especially among elected officials, in relation to financial investments. How do we proceed if we make a mistake and invest a lot of money?"

"Project timeframes do not correspond to the timeframe of the elected representatives' mandates."

"Small projects are less easy to finance than large ones, whereas we should be looking for quality rather than quantity."

"Budgets are not sustainable over the long term."

"There is a difficulty in seeing positive points in the projected situation."

"We don't know what the alternative proposals are."

"It is difficult to change to another model when you are making a profit."

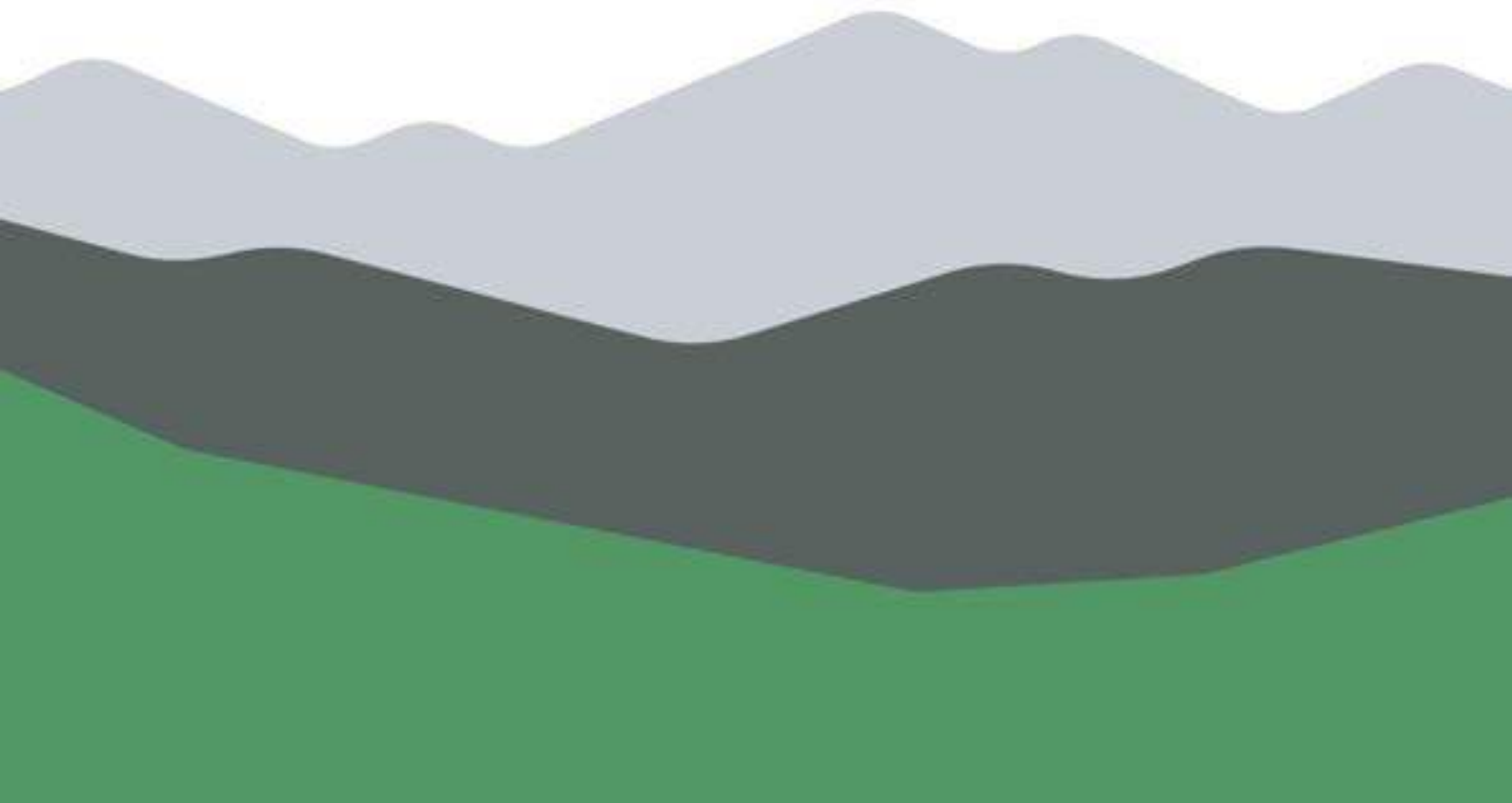
"The law sometimes blocks the necessary changes: some state services have a dogmatic vision and block projects."

D.1.2.1

PWA data collection: Information document for D.1.3.1

Philipp Corradini, Andrea Omizzolo

April 2023



Acronyms used in this document

Acronym	Meaning
AS	Alpine Space
CC	Climate Change
DMO	Destination Management Organisation
PA	Pilot Action
PWA	Pilot Working Area
RAM	Resilience Adaptation Model
RDMDT	Resilience Decision-Making Digital Tool
SME	Small and Medium-sized Enterprise
STD	Snow Tourism Destination
TG	Target Group

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1 Introduction and background

The purpose of this document is to supply each PP, who is responsible for a PWA, with a methodological guideline for the data collection within the respective PWA. The collected data will be the essential basis for the deliverable D.1.3.1 “Report and database of PWAs tourism system with a special focus on ecosystem-based solutions”, which is due in RP2 and comprises an overview regarding the PWAs. Specifically, the deliverable will encompass the assessment of each PWA tourism system based on quantitative and qualitative data. Environmental, physical, as well as social and economic datasets will be used and re-organized in order to deliver a proper description of the current situation of the PWAs. Furthermore, it will comprise a database of natural/cultural resources of each PWA and evaluation of their integration in ecosystem-based solutions. It will also represent an information basis for A1.4 (specifically regarding the indicators to be inserted in the RAM) as well as A2.1 (specifically regarding the possible initial approximation of the necessary structure of the PWA data). Additional data, which will be collected within the PWAs, concern the stakeholders, who are locally present in the PWAs and will also have to be involved during the different phases of the project.

The following data and information will be the focus of this document:

1. Tourism and socioeconomic data & indicators
2. Tourism supply: Activities & attractions
3. Stakeholders

The indicators have been chosen based on their adequacy to describe the realities of the PWAs with a special focus on the underlying tourism systems. The PWA-managing PPs will be asked to collect the data

- On municipal level, if the PWA boundaries can be specified specifically within one municipality;
- On intermunicipal level, if the PWA boundaries comprise more than one municipality;
- On provincial or regional level, if the PWA boundaries can't be identified specifically, or if the requested data is not available on municipal level.

Furthermore, based on the initial pre-data-collection activity undertaken in RP1, it became apparent that not all PWAs have all the requested quantitative data at their disposal. The absence of these data will be compensated with the collection of qualitative data.

The information to be collected regarding the PWA tourism supply is divided between activities & attractions, as they comprise some of the basic elements of tourism products.

The information regarding stakeholders on one side encompasses guidelines for their adequate identification by the PP within the PWAs and on the other offers a methodology for their classification based on the assessment of their influence & importance regarding the project and its activities.

The information will be collected in each PWA by the respective PWA-managing PP within RP2. The following timeframe for 2023 should be hereby followed:

- End of April/beginning of May: Transmission of the present document as well as the respective Excel-blueprints for the data collection to the PWA-managing PPs
- Beginning of May: Start of the data collection
- End of July: End of the data collection
- August/September: Analysis of the data
- October/November: Finalization of the documents for D.1.3.1 - Report and database of PWA tourism systems

2 Tourism & socioeconomic data and indicators

The PWAs underlying tourism destinations encompass socio-ecological systems, which can be initially assessed based on quantitative and qualitative data. The focus of this chapter lies on the importance of the collection of quantitative secondary data, which can be retrieved on a municipal and/or regional scale. For this purpose, the main indicators are presented and divided between indicators based on quantitative secondary data and calculated indicators (in grey).

2.1 Macro parameter "Tourism demand"

Tourism demand represents the macro parameter, which is connected to the current tourism flows within the STDs. Based on the data to be collected within the PWAs, the following indicators will be used for the assessment of the tourism demand:

Indicator code	Macro Parameters & Indicators	Description	Data type
T1	Tourism demand		
T1.1	Arrivals	Monthly tourism arrivals from 2013 to 2022	Secondary
T1.2	Overnight stays	Monthly tourism overnights from 2013 to 2022	Secondary
T1.3	Source markets	Segmentation of the arrivals & overnights based on main source markets	Secondary
T1.4	Ascent facility users	Monthly ascent facility users from 2013 to 2022	Secondary
T1.5	Seasonality	Gini index of overnight stays (yearly)	Calculated from T1.2
T1.6	Average length of stay	Monthly average length of stay	Calculated from T1.1 & T1.2
T1.7	Yearly Tourism Intensity Index	The ratio between yearly overnights and the local population residing (per 100 inhabitants)	Calculated: ((Yearly T1.2/365)/S1.2)*100
T1.8	Monthly Tourism Intensity Index	The ratio between monthly overnights and the local population residing (per 100 inhabitants)	Calculated: ((Monthly T1.2/days of the respective month)/S1.2)*100

Table 1: Tourism demand indicators

The basic tourism demand indicators are **Arrivals (T1.1)** and **Overnight Stays (T1.2)**. Both these indicators comprise the information regarding the number of persons, who spent at least one night in the PWA and are officially registered as guests/tourists. Besides yearly amounts, the specification of monthly arrivals and overnights stays gives an initial insight regarding the seasonality of the STD. Collecting data of several years generates an understanding regarding the development of the STD.

The segmentation of the monthly arrivals and overnights in the different **Source Markets (T1.3)** generates a deeper insight regarding their importance for the STD. Regarding this a minimal division between

domestic and foreign arrivals & overnights will already be very helpful. As preferences and travel patterns differ oftentimes greatly between guests of different nationalities, a basic understanding of the STDs' source markets represent a valuable information basis for future targeted product development and marketing. A further distinction between the nationalities of the different source markets provides further insights in the tourism flows based also on national holidays.

The **Ascent Facility User numbers (T1.4)** help identify the importance of ski tourism flows for the overall success of the STD in the winter and the tourism flows in summer. Furthermore, it comprises also the daily visitor flows, which otherwise cannot be assessed. It also represents an alternative indicator for STD, which have an almost inexistent accommodation sector and therefore no data regarding arrivals and overnight stays.

The **Seasonality (T1.5)** can be calculated based on the Gini Index. Traditional seasonality calculations consider oftentimes only months with highest and with lowest overnights, ignoring months which are part of shoulder seasons. The Gini Index has the advantage to consider all the months of the year and to generate a yearly coefficient, which is set between 0 (perfect equality – all months have the same number of overnights) and 1 (perfect inequality – all the overnights are generated in one of the months). The yearly coefficients can then also be compared, to generate an understanding regarding potential shifts in seasonality.

Based on their quotient of arrivals and overnights, the **Average length of Stay (T1.6)** can be calculated. This indicator encompasses the information of how many nights guests usually stay within accommodation structures. Varying between seasons (ex. summer vs. winter) and tourism destination types (ex. urban vs. mountain), a higher value of this indicator is usually connected with positive repercussions for the tourism destination, as it translates into lower traffic (ex. main traffic is usually generated during arrival and departure dates) as well as lower economic effort and resource consumption (ex. due to check-in and -out procedures, information provision regarding the destination to guests, final cleaning of accommodation facilities).

To gain a perception regarding the tourism intensity, a **Yearly and Monthly Tourism Intensity Index (T1.7 & T1.8)** will be calculated. While the former encompasses the ratio between the yearly overnight stays in accommodation establishments within the STD and the product between the population residing (per 100 inhabitants), the latter yields the same index but also considering the tourism flows within the different months of the year.

2.2 Macro Parameter "Tourism accommodation"

Tourism accommodation represents one of the macro parameters, which is connected to the tourism offer of the STDs. Based on the data to be collected within the PWAs, the following indicators will be used for the assessment of the tourism accommodation:

Indicator code	Macro Parameters & Indicators	Description	Data type
T2	Tourism accommodation		
T2.1	No. of structures	Divided in 5, 4, 3, 1-2 Star, Commercial apartment, Residence/Pension/B&B, Agritourism, Mountain Hut, Camping, Other	Secondary
T2.2	No. of beds	Divided in 5, 4, 3, 1-2 Star, Commercial apartment, Residence/Pension/B&B, Agritourism, Mountain Hut, Camping, Other	Secondary
T2.3	No. of 2nd Homes	Number of 2nd homes and indication if they are integrated in the accommodation structures or not	Secondary
T2.4	Beds per structure	Average beds per structure	Calculated from T2.1 & T2.2
T2.5	Gross Bed availability	Monthly and yearly availability of beds	Calculated from T2.2 & days of the respective month
T2.6	Gross Bed Occupancy	Monthly and yearly occupancy of beds	Calculated from T1.2 & T2.4

Table 2: Tourism accommodation

The overall accommodation structure of the STD can be identified based on the **Number of Structures (T2.1)** and **Number of Beds (T2.2)**, divided between the different accommodation categories. The latter is insofar important, as it helps to shed light upon the type of guests, who visit the STD, and what tourism flows can be expected throughout the different seasons. For example, higher star hotel categories are slightly less dependent on weather conditions, since they have dedicated infrastructures and activities, which can be used by guests if the conditions are not optimal. Furthermore, since these accommodation categories have higher fix and variable costs, their pressure to accommodate guests throughout the year is higher, as well as their (marketing) resources for achieving this. Both these examples can point towards a potential contribution of this accommodation category for attracting guest also in shoulder and low seasons. An ideal allocation of structures and beds between the different accommodation types considers the following categories:

5 Star Hotel	4 Star Hotel	3 Star Hotel	1-2 Star Hotel	Residence/Pension B&B
Commercial apartment	Agritourism	Mountain Hut	Camping	Other

Table 3: Tourism accommodation categories

The criticality of the presence of **2nd homes (T2.3)** in STDs depends on their number (in respect to the general local population) and on their integration in the accommodation sector as commercial apartments or not. If their number is high and if they are not integrated in the accommodation sector, they are often referred to as “cold beds” and can contribute in extreme cases to a perceived state of abandonment of the STD, especially in low seasons.

The average size of accommodation structures can be identified through the indicator **Beds per Structure (T2.4)**, while the **Gross Bed Availability (T2.5)** defines the yearly and monthly availability of beds within STDs and gives hints regarding the potential accommodation capacity of the structures. Although the Net Bed Availability would be a more specific indicator, as it also considers the actual opening days of the structures, due to the absence of this type of specific information, the calculations will have to be based on the gross bed availability. Based on T2.5, the yearly and monthly **Gross Bed Occupancy (T2.6)** yields an overview regarding the adequacy of the present accommodation structure in terms of quantity and the effectiveness of the structures in utilizing their bed capacity. Traditionally accommodation categories in higher categories have also a higher gross bed occupancy due to the examples described in the above paragraph. Monthly bed occupancy divided by accommodation structures can be a more precise indicator than the yearly occupancy, also because it can account for closing months of specific structures (for ex. campsites in winter).

2.3 Macro parameter "Socioeconomic Indicators"

The reason for the integration of socioeconomic data in the overall PWA analysis is important because it allows a closer look on the possible influence of the tourism sector on the local PWA communities and their dependence/independence from the tourism sector itself. Furthermore, some of these indicators are also necessary for the calculation of the approximate tourism intensity of the PWAs.

Indicator code	Macro Parameters & Indicators	Description	Data type
E1	Economic structure		
E1.1	GVA divided by sector	GVA divided by sector (if possible, NACE Rev 2. sectors) from 2013 to 2022	Secondary
E1.2	Employment by sector	Employment divided by sector (if possible, NACE Rev 2. sectors) from 2013 to 2022	Secondary
S1	PWA area		
S1.1	PWA area in km ²	PWA surface in km ²	Secondary
S1.2	Number of inhabitants	Number of inhabitants between 2013 - 2022	Secondary
S1.3	Demographic development	Number of inhabitants in different age categories between 2013 - 2022	Secondary

Table 4: Socioeconomic indicators

Both **GVA (Gross Value Added)** and **Employment (E1.1 & E1.2)** represent indicators, through which the economic situation of the PWA and its magnitude becomes apparent. Representing the statistical classification of economic activities in the European Community, the NACE Rev 2 categories¹ comprise also the category “Accommodation and food services”, which includes the economic activities of the tourism sector. The breakdown of the GVA into the categories confers a valuable overview regarding the economic importance of the different sectors and helps understanding the importance of the tourism industry for (& dependence of) the overall PWA-economy. An overview of the values from 2013 to 2022 translates into valuable insights regarding the tourism development of the PWA in economic terms.

Next to geographical and socioeconomic data already collected within the PWAs, the **PWA area in km² (S1.1)** as well as the **Number of Inhabitants (S.1.2)** of the PWA are information, which, when put in relation to the tourism flows, yield insights regarding the social pressures of the tourism sector, in terms of the tourism intensity (T1.7, T1.8). The **Demographic Development (S.1.3)** helps to determine the fragility of the demographic structure (demographic ageing, emigration). In order to allow a comparison between the PWAs as well as accommodate the probable data availability within the different areas, the data collection can be based on the following age groups as utilized by Eurostat²:

- Young people: 0 to 14 years
- Working age: 15 to 64 years
- Elderly: 65 years and older

¹ For a detailed explanation and list of the NACE Rev 2 categories, please refer to <https://ec.europa.eu/eurostat/documents/3859598/5902521/KS-RA-07-015-EN.PDF.pdf/dd5443f5-b886-40e4-920d-9df03590ff91?t=1414781457000>

² For a detailed explanation regarding the age groups, please refer to https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Population_structure_and_ageing#:~:text=To%20compare%2C%20in%202021%20the,20.8%20%25%20of%20the%20EU's%20population.

3 Tourism supply: Activities & attractions

Activities and attractions are essential elements of tourism products and contribute to the overall tourism experience. Although tourism destinations oftentimes focus on specific activities & attractions, the multi-optional tourist tends to request variety. The presence of a higher number of activities & attractions can also positively influence the average length of stay, by giving the guests the opportunity to try different things throughout their stay. Moreover, in terms of possible climate change adaptation, diverse activities & attractions can help decrease the STD’s dependency on snow and ski tourism. Therefore, a precise inventory of the different activities & attractions, which are located within the different PWAs is essential for the development of alternative transition paths by focusing initially on already present resources. Furthermore, a classification between winter activities & attractions besides skiing and/or not dependent on snow on one side, and, on the other, summer activities & attractions, is essential for the creation of tourism products throughout the different seasons of the year. Based on the initial pre-data-collection activity, the following activities have been identified within the different PWAs and subdivided in winter and summer activities:

Archery	Buoy descent	Canyoning	Ice climbing	Rock climbing	Cross-country skiing	Curling
E-biking	Fat biking	Fishing	Gastronomy	Guided tours	Hiking	Horse sliding
Horseback riding	Husky tour	Ice fishing	Ice skating	Kayaking/ Canoeing	Kneipp	Motorcycling
MT-biking	Night skiing	Paragliding	Rafting	Road cycling	Sailing	Shopping
Ski touring	Skijoring	Sledding	Snowshoe hiking	Swimming	Trail running	Tree climbing

Table 5: Activities within the PWAs

Based on these activities, a list of attractions has been developed. This list represents the classification of the attractions, upon which the data regarding the tourism infrastructure allocation within the PWAs will be collected. The data will be divided between the 3 main categories “**Natural attractions**”, “**Cultural attractions**” and “**Tourism & recreational infrastructure**”.

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Natural attractions	Cave	Tourism & recreational infrastructure	Alpine coaster
	Glacier		Adventure playground
	Lake		Bike park
	National/regional park		Bowling (indoor)
	Nature reserve		Climbing facility (indoor)
	Park		Climbing facility (outdoor)
	Protected area (UNESCO, Natura 2000)		Conference facility
	River, waterfall, gorge		Fitness center
	Other		Golf course
Cultural attractions	Archaeological/historic park		Health & Spa area
	Church/Cathedral		Minigolf
	Monument		Snow park
	Museum		Sports facility (indoor)
	Castle		Sports facility (outdoor)
	Other		Swimming pool (indoor)
			Swimming pool (outdoor)
			Water park
			Other

Table 6: Categories for data collections of PWA attractions

Next to the information regarding these attractions within the dedicated excel file (ex. Name, short description), the PPs will be invited to also insert their geographical coordinates (retrievable directly from Google Maps). The visualization of their geographical location within and marginally outside of the PWA will facilitate the assessment of their potential implementation within new sustainable tourism products. Before starting to collect the attractions individually, the PPs are advised to consult the local tourism office, DMO or regional management authorities to inquire regarding the possible existence of databases, which could already cover all or parts of the requested information.

4 Stakeholders

One of the essential elements for generating a coherent understanding regarding the PWAs' tourism structure, comprises the identification and analysis of stakeholders. In general terms, tourism destinations encompass a multitude of different actors and stakeholders, which consciously or unconsciously cooperate to generate the tourism product. Within the light of the BeyondSnow project, we define **stakeholders** as any group or individual that can actively or passively affect or is affected by the activities of the project. More specifically, their identification and analysis are crucial for three reasons.

1. Foster transparency and equal representation of the various interests at stake through the involvement of stakeholders by actions that affect them either directly or indirectly.
2. Enable their participation within the development of transition paths and strategies based on their knowledge and competences.
3. Reduce the risk that stakeholder undermine or hinder the project activities through active consultation and involvement as well as keeping them informed.

Each PP responsible for a PWA, who will identify and collect information regarding potential PWA stakeholders, can utilize the following general guiding questions for their initial identification and assessment:

- Who will be impacted by the project? Positively or negatively?
- Who has an interest in the project activities? Directly or indirectly?
- Who can have a key role in the success of the activities?
 - Who can be involved in order to increase the effectiveness of the activities?
 - Who can speak for or against the project and its activities?
- Who can hinder the success of the project activities if not informed?
- What initiatives are inherent in the activities? Who will be involved in these activities?
- With what other initiatives/projects would it be possible to establish a synergy? Who is involved?
- With what other initiatives and projects could conflicts arise in the area? Who is involved?
- What expertise/competences are needed for the different activities?
- Who can provide technical and financial support?

Hereinafter the information regarding the stakeholder data collection and evaluation.

4.1 Stakeholder information and classification

Based on the reflections made by each PWA manager, the PPs will be asked to fill out an initial table with general information for each identified stakeholder until the end of the data collection process in July 2023. The information requested will be:

a) General stakeholder information & affiliation:

- Denomination of organization
- Title, name, telephone, email, website, geographical location (also inside or outside PWA)
- Position: Director, Employee, Manager, Owner, President, Representative

b) Stakeholder reference categories, divided in:

Accommodation association/organization	Accommodation facility	Civic association	Consultancy	DMO
Environmental association/organization	Gastronomy facility	Higher education and research	Information office	Mayor
Municipal administration	NGO/non-profit organization	Other tourism business	Regional administration	Renting agency
Ropeway facility	Second home	Ski school	Snow infrastructure facility	Sports club
Tour operator/Travel agency	Tourism association/board	Tourist guide	Trade association	Youth association

Table 7: Stakeholder reference categories

c) Geographical area of influence/operation:

Municipal	Intermunicipal	Regional	National	International
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d) Referral of the stakeholder through PP or other stakeholders

4.2 Influence & Importance Matrix

Besides this general information, each PP will be asked to evaluate the stakeholders based on the following criteria:

Criteria	Question	Evaluation
Interest	What is the impact of the project on the stakeholder? Ex. is he/she highly dependent on (snow)tourism?	Scale from 0 to 5
Influence	How much can the stakeholder influence the implementation of the activities and their outcomes?	Scale from 0 to 5
Risk	How could the stakeholder hinder or block the implementation of the action? Only if his/her influence was indicated as high (5) and of negative type.	Scale from 0 to 5 and textual description of risk

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Legitimacy	What legal rights (e.g., ownership), formal competences or control over strategic resources does he/she have in the area/sector of project implementation?	Scale from 0 to 5
Knowledge	What level of knowledge does the stakeholder possess regarding the project areas?	Scale from 0 to 5
Contribution	How might the stakeholder contribute to the project? What competences does he/she have?	Textual description
Final assessment	What is the overall importance of the stakeholder to the implementation of the project activities?	Scale from 0 to 5

Table 8: Dimensions for stakeholder analysis

Most of the criteria will be represented on a scale from 0 to 5:

0 = None	1 = Very low	2 = Low	3 = Medium/Neutral	4 = High	5 = Very high
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The above-described information will be analyzed through the **influence & importance matrix**. Based on the overall **influence & importance** of each stakeholder, the matrix is divided into **4 quadrants**:

Quadrant A - Low influence & High importance:

As stakeholders in this quadrant will have to take special actions to protect their interests, they should be adequately informed about the development of the project and its activities but require only limited monitoring and management.

Quadrant B - High influence & High importance:

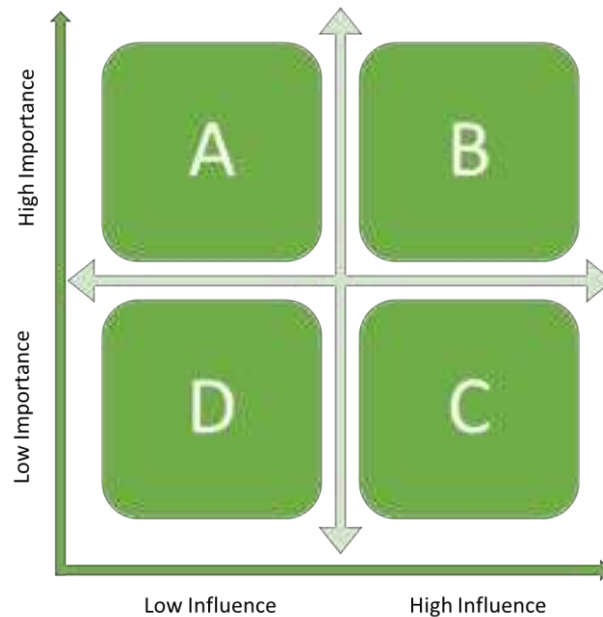
These stakeholders represent the most important group for the project and its activities. Their interests and expectations must be considered, and a good (working) relationship must be established in order to create an effective coalition and support.

Quadrant C - High influence & Low importance:

Stakeholders in this quadrant could be a risk source for the success of the project and need therefore to be monitored and managed.

Quadrant D - Low influence & Low importance:

These stakeholders exhibit a low priority in terms of involvement, require a limited monitoring and management and can just generally be informed regarding the project.



Both **importance** and **influence** are composite indices calculated by summing the values given for the respective dimensions within table 8:

- **Influence** is the summation of the stakeholder's ability to **influence** the activities and his/her **legitimacy**.
- **Importance** corresponds to the sum of the degree of **interest** and level of **knowledge**.

Based on the influence & importance matrix stakeholders can be prioritized in terms of their contact frequency, involvement, and information provision. The stakeholders located in quadrant B will have a high priority, while stakeholders located in quadrant A and C will have to be consulted and informed because (A) they are exposed to the consequences of the project activities or (C) they constitute a risk source for the project activities. The stakeholders in quadrant D should be kept informed, although with a lower priority. The allocation of the different stakeholders within the influence & importance matrix will be calculated based on the different values and represented through the scatterplot function of Microsoft Excel.

While the information of **4.1 (Stakeholder information and classification)** will have to be collected until **July 2023**, the evaluation of the stakeholders of **4.2 (Influence & Importance Matrix)** can be performed until the **end of 2023**, since the initial participative activities of **A2.2 (Implementation of co-design laboratories for the development of transition strategies for strengthening STD resilience)** can be also utilized to complete the information necessary for the evaluation of certain stakeholders.

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BeyondSnow is an Interreg - Alpine Space project co-funded by the European Union. It aims at decreasing the snow-dependency of Alpine Space snow tourism destinations, strengthen their resilience to climate change and retain/increase the viability for residents and their attractiveness for tourists.