

# D1.2. Regional Diagnosis for Climate Change Adaptation

Baselines for Demonstrator Regions and Factsheets for Replicator Regions



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# Executive summary

## The state of CCA in European mountain regions

**Great awareness, but lack of strategy and directionality for transformation:** Climate change adaptation is a pressing issue in all mountain regions, as awareness of current and looming climate change impacts is generally high. However, compared to climate change mitigation, adaptation is a relatively novel governance issue, as reflected in the limited availability of concrete strategies and transformative visions in most regions. While adaptation is specifically addressed at the national level in all MountResilience regions, only the Canton of Valais and Catalonia have a regional strategy that is solely dedicated to CCA. Hence, most regions lack a clear transformative vision that gives directionality for transformative adaptation in the short, medium, and long run.

**Change is incremental, and regional identity is both an adaptation driver and barrier:** To date, climate change adaptation in the regions is mainly incremental and reactive, lacking pro-active and forward-looking adaptation action. One reason is that regional adaptation priorities are not perfectly in line with regional systemic risks but often rather prioritise the maintenance of established economic pillars that are synonymous with a regional identity. With that, future-proofing sectors that are essential to that identity becomes a driving force for adaptation – though at best incrementally – while simultaneously complicating transformative adaptation that would call for thinking beyond existing self-images and envisioning alternative economic pathways and climate resilient regional futures. This partly explains the lack of transformative approaches to adaptation as apparent in all demonstrator regions.

**Governance innovation and behavioural change are dominant:** In all regions, emphasis is placed on innovations in governance (such as new modes of collaboration, policy coherence, improved institutional frameworks, or knowledge management) to effectively address climate change adaptation. However, much of the hopes and responsibilities is put on behavioral change of private households (via awareness raising and educational programs), whereas state regulations are rare. Also, while “intact” nature is a key resource and identity forming factor in most mountainous regions, nature-based solutions only play a subordinate role in climate change adaptation.

**Collaboration, knowledge, financing, and acceptance are key:** Four issues are recurrently stressed as impeding accelerated adaptation action: (1) Gaps in stakeholder inclusion and cooperation in CCA governance, (2) a lack of CCA-related data and, relatedly, detailed vulnerability assessments and intensified knowledge and data exchange, (3) the financing of adaptation actions lagging behind the will to adapt (particularly in less affluent regions), and (4) acceptance and awareness for the need to adapt among a wider population.

## General advice for CCA governance

**Establish context-sensitive climate change adaptation governance:** There are no one-size-fits-all solutions for regional climate change adaptation governance. Mountain regions vary greatly in their ecosystem and environmental conditions, their structural and functional geographies, as well as their socio-economic structure. These create significantly different patterns of exposure to climate risks and, in combination with established region-specific governance frameworks, local cultures, and well-proven technologies and practices, call for the development of place-based adaptation pathways. The MountResilience regions are trying their hand at it, but at the same time reveal how place-based adaptation governance is a balancing act between evidence and interests, path-dependence and path-shaping. This requires inclusive governance and experimentation for place-based adaptation to be accurate, legitimate and transformative. The Demonstration Activities can be valuable steppingstones towards that, if they are interpreted as resources of learning, capacity building and governance innovation.

**Develop clear, positive visions of climate resilient regional futures:** Regional climate change adaptation still often gives the impression of a haphazard approach. Numerous valuable ideas are being developed and individual adaptation actions are being implemented, but hardly in concerted fashion. One reason is that regions lack a transformative vision of what a climate-resilient regional economy and society would look like, how the main socio-economic sectors will need to change accordingly and by what means. Such visions are important, as they give directionality for decision-making about adaptation actions and, relatedly, security for investment in transformative projects. They draw up a clear pathway for change for private households and other stakeholders and hold decision-makers accountable. The co-creation of such transformative regional visions should thus be high on the agenda of Europe's mountain regions.

**Increase systemic risk awareness:** The concrete elaboration of climate change-related vulnerabilities and their interdependencies and cascading effects is an inevitable step to drive effective region-specific adaptation. In line with the IPCC (2022), this vulnerability assessment serves as a starting point and convincing argument for transformative measures, as it demonstrates the increase in risks and costs of inaction, coping or incremental adaptation measures. This requires a regionally well-structured CCA data governance and effective knowledge management between relevant stakeholder groups and decision-making levels. All MountResilience regions are pointing to the relevance of changes in regional governance to succeed in their CCA ambitions. However, there is still room for improvement when it comes to systemic risk awareness in general and among specific stakeholder groups, and as concerns its operationalization in tailored adaptation actions.

**Enhance transformative capacity:** The development of transformative capacities is indispensable for the success of transformative adaptation. Concluding from the regional diagnosis, the following regional capacities should be particularly emphasized: (1) Inclusive and multiform governance, that is, wide and diverse stakeholder participation and cross-sectoral diversity (specifically in Gabrovo, Lapland, Râu Sadului and Valais), (2) shared understanding, memory and system awareness of adaptation including its system components, implying socio-economic and climate system and ensuing region-specific climate risks (Gabrovo, Lapland, Râu Sadului and Tyrol), (3) foresight, shared CCA vision and understanding of alternative regional scenarios (Gabrovo, Tyrol and Valais), (4) polycentric and socially embedded leadership, allowing for the articulation and commitment of new visions (Piedmont and Valais), (5) empowered and autonomous communities that have access to resources and coalitions (Lapland and Râu Sadului), and (6) transformative projects and practices that allow practical experimentation (Piedmont and Tyrol).

*In all the above aspects, regional biophysical, socio-economic, technological and cultural specifics play significantly into the potential pathways for transformative adaptation, which leads to the following specific conclusions for the MountResilience Demonstrator Regions:*

The province of **Gabrovo**, with its namesake administrative centre, the municipality of Gabrovo, is located at the foot of the Balkan Mountains. It is particularly affected by climate change through flooding, forest fires, droughts and heat waves. In the municipality of Gabrovo, these extreme weather events are threatening urban green and blue infrastructure, and especially vulnerable population groups. Although the municipality of Gabrovo benefits from a well-connected stakeholder network and good leadership, current CCA approaches remain at focusing on raising awareness in the local community and sustainability initiatives. The municipality and the province both lack a comprehensive CCA strategy that provides concrete transformative vision and guidance for CCA actions. The diagnosis hence concludes that a comprehensive regional CCA governance framework should be established that focuses on (1) increased coordination and cooperation between the public sector and R&D, and (2) empowering and educating local farmers, business owners and residents in CCA practices.

(Northern) **Lapland**, a region with unique arctic conditions and home to the indigenous Sámi communities, is particularly affected by climate change. The main livelihoods in Northern Lapland, (winter) tourism and the traditional Sámi livelihoods of reindeer herding and fishing are especially vulnerable to rising temperatures and extreme weather events, as their economic viability and ultimately their existence is dependent on foreseeable seasonal and climatic

conditions. Even though Finland is a pioneer in CCA strategies in the EU, Lapland lacks a comprehensive CCA governance strategy, although adaptation actions are currently undertaken on an individual level and various projects regarding CCA in the Arctic have been conducted already. However, the intensification of land use conflicts and gaps in action and knowledge of adaptation possibilities intensify the (political) need of approaching CCA with a strengthened governance framework, an improved representation of independent communities, and financing instruments for adaptation action. The diagnosis suggests that in order to properly address its climate challenges, Lapland should utilize experiences from the breadth of prior climate- and sustainability related research and innovation projects and ecosystem-oriented local interventions for developing innovative adaptation actions and incorporate traditional knowledge and perspective of the Sámi in envisioning climate resilient human-nature relations and developing suitable nature-based solutions.

**Piedmont** faces an increased risk of droughts, hydrogeological instability, floods, forest fires, and coastal erosion. Substantial shifts in land use and farming practices in the region's vital agricultural and industrial sectors will only exacerbate climate change impacts. Key adaptation challenges include inefficient water governance, insufficient agricultural adaptation practices, loss of biodiversity and cultural landscapes, and cooperation, knowledge and action gaps. Addressing these challenges requires more coordinated governance efforts, active community involvement, and innovative water and land management approaches to enhance resilience and enable transformative change. Therefore, the adoption of stronger bottom-up, partnership-oriented approaches, improved data and knowledge exchange and the reduction of reluctance towards agricultural innovations is essential to embrace transformative ideas. With prevailing governance and complex ecosystem challenges related especially to the regional water infrastructure, the region should consider investing in and building strong regional CCA networks. As addressed in the systemic risk assessment, with changing climatic conditions and the increased risk of drought in Piedmont, also water-intensive agricultural products need to be replaced soon, together with finding new ways of governing more efficient water usage in private and agricultural practices and actively protect ground- and surface water availability. Advice is especially directed at the multifaceted challenges in agricultural water management. We identify the need for more flexible water governance, enhanced stakeholder coordination, generational shifts in farming practices, field training, and infrastructure enhancements to foster local resilience. Crucial elements to adaptation are also local community engagement in planning, supporting strategies like digitalising villages, together with building robust knowledge transfer networks among farmers and researchers.

**Râu Sadului's** key adaptation challenges include threatened (water and transport) infrastructures, endangered local livelihoods, and a lack of stakeholder collaboration and problem awareness among the population. The region is well aware that inclusive governance structures, local problem awareness, the provision of basic CCA funding instruments, active outreach and collaboration are essential. Given these challenges, support for building new stakeholder networks and collaboration is indispensable. As the systemic risk analysis for the agricultural sector has shown, climate change will lower agricultural yields, lead to a loss of biodiversity, depopulation and the abandonment of agricultural land. Hence, knowledge and financial support for local innovation-oriented activities are necessary for developing new solutions in one of the region's most fundamental economic sectors. For the successful implementation of the Demonstration Activity, we hence suggest increasing local stakeholder involvement, the provision of financial support for small farmers, a more thorough integration of research findings into policies, paying attention to balancing agricultural transformation and nature conservation, and fostering collaboration between local councils, educational institutions, and private actors.

**Tyrol** is a well-known (winter) tourism destination. Its rural, mountainous parts are experiencing increased ecosystem and infrastructure damage and reduced snow reliability for winter tourism, whereas the urbanised Inn Valley is increasingly affected by heat. Key challenges thus include the economic damage and vulnerability of tourism as one of the region's economic pillars, as well as a lack of awareness, ambition and (political) commitment to pro-active and transformative adaptation. Although Tyrol has been engaging in adaptation for more than ten years, the current strategic framework for CCA is considered insufficient. Addressing Tyrol's climate risks therefore requires political

leadership, including a concrete regional CCA vision, and increased implementation and upscaling of adaptation measures by providing more financial and human resources. CCA should be coordinated across administrative levels but implemented in close cooperation with regional managers and local associations and institutions, who are key intermediaries. It is thus advised to (1) initiate a holistic and inclusive discussion on alternative development paths that go beyond the preservation of the status-quo, (2) increase awareness of adaptation requirements, especially of buildings and pursue more profound changes in building culture, (3) strengthen the regional strategy framework and (4) prioritise key adaptation measures, rather than concert a multitude of approaches.

The Canton **Valais** is rich in water resources, but rising temperatures, decreasing precipitation in summer, change in snowmelt and precipitation patterns as well as increasing water needs result in increased periods of water shortage, especially in summer. This has far-reaching secondary consequences for private households, but also industry, tourism and agriculture. A key challenge in this regard is fragmented water governance, which lacks coordinated, proactive and foresighted management and prioritisation of water usage on a cantonal level. Additionally, awareness of CCA requirements and resources for adaptation appear to be lacking among the local administration. Addressing Valais' climate challenges hence requires novel approaches to governance that explore new forms of inter-communal cooperation beyond the strong autonomy of the communes but also consider the crucial role of civil society within Switzerland's direct democratic governance system. In this context, changing people's attitude and behaviour through awareness-raising and nudging is seen as a major lever for driving adaptation action in Valais. Additionally, although Valais is embedded in an extensive strategy framework for adaptation, there is a discrepancy between strategically formulated goals and the actions undertaken. It is therefore advised to (1) utilize the drive stemming from a renewed interest in improving water governance in Valais, (2) engage a critical mass of citizens in water governance, (3) address existing knowledge and power imbalances given that key data on water consumption are gathered by economic actors, and (4) reduce water-demand in general.

*First analytical peaks into the MountResilience Replicator Regions draw the following picture:*

In **Catalonia**, CCA is comparably high on the political agenda. The region has a dedicated adaptation strategy in place to tackle floods, droughts, heatwaves and wildfires and address adaptation needs in specific socioeconomic (sub)areas and environmental ecosystem dimensions. Implementing tailored governance innovations and nature-based solutions is recommended though to accelerate adaptation in practice.

**Primorje-Gorski Kotar** at the northern Adriatic coast is particularly challenged by prolonged dry periods followed by sudden and intense precipitation and flash floods, as well as sea level rise, which particularly endangers urban settlement areas. However, to date, CCA is only marginally addressed and the development of an adaptation plan for the coastal area is thus recommended to guide regional adaptation action.

The **Subcarpathian Region** is impacted by more irregular, heavier rainfall and frequent intense heat waves eventually leading to more severe droughts, forest fire and water scarcity. There is no regional adaptation strategy yet. However, resulting from a flagship project in 2015, the city of Rzeszów, which is the capital of the Subcarpathian Region, has published its own adaptation plan. This plan should serve as a starting point for the development of an evidence-based regional adaptation strategy that can tackle the risks for the wider socio-economic and ecosystem.

**Friuli-Venezia Giulia**, an autonomous Italian region in the country's Northeast, is experiencing an increase in climate hazards and altered precipitation patterns, which adversely affect local livelihoods and biodiversity. A working group composed of regional universities and administrations is already leading the way in CCA research, which is a hopeful for the development of a tailored, evidence-based regional strategy that guides the way for transformative adaptation.