

Integrated Assessment of Europe's Mountain Areas

Report under preparation for the European Environment Agency
through the European Topic Centre for Land Use and Spatial Information

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Story lines

1. Mountains cover a **significant proportion of Europe**. Their delineation for **policy** purposes has, to date, been based on criteria relating to the difficult **conditions for agriculture** (e.g., altitude, steep slopes) and is influenced by the debate on subsidiarity. The NUTS 3 level is too coarse a resolution for analysis. A **topographic delineation** is most useful for the necessary level of detailed analysis. This can also be used to characterise **massifs** which have a certain degree of homogeneity or to which specific legal instruments (e.g., Alpine, Carpathian Conventions) apply.
2. A considerable proportion of the European **population** lives in and close to mountain areas. As many of the new EU Member States and the Accession States are highly mountainous, the importance as mountains as places to live has increased within the EU. At regional scales, there have been significant **demographic shifts**, including both emigration and immigration (for economic and amenity reasons), often leading to over-aged populations. These often contrast with trends in other parts of individual countries. Within mountains, the proportion of people living at lower altitudes (i.e., valleys, lower slopes) is generally increasing. There are also significant flows of people in and out of many mountain areas at various temporal scales, including commuters, tourists, and amenity migrants.
3. In addition to their complex topography, mountain areas have certain **common characteristics**, particularly relatively low **accessibility** and low **economic density** away from the few major access routes and from urban centres, which are usually found around the edges of massifs. While some major transport corridors cross mountain areas, road networks within these areas are often very limited, limiting economic development.
4. At every spatial scale, Europe's mountain ranges are highly **diverse** in most characteristics. They are found in every part of the continent, from the Arctic to the Mediterranean. The **economic diversity** of the mountains of the European Union has increased significantly through expansion, as shown by typologies of rural areas. Europe's mountains include both **wealthy** communities with highly

industrialised and/or tourism-based economies, mainly in parts of northern and western Europe, but also very **poor** regions with subsistence-based economies, especially in southern and eastern Europe. Such contrasts are also evident within individual mountain areas. Hence, **territorial, economic, and social cohesion** are of great importance for mountain areas.

5. Mountains are of importance not only because they provide direct sources of livelihood (agriculture, forestry, mining, tourism) for mountain inhabitants but also because they provide key **ecosystem services** to the majority of the European population. These include:
 - **provisioning services**: especially freshwater, but also renewable sources of energy;
 - **regulatory services**: especially natural hazard regulation, but also carbon sequestration and climate and water regulation;
 - **cultural services** (provided particularly by cultural landscapes): recreation/tourism, aesthetic values, cultural heritage;
 - **support services**: provision of habitat, water cycling, primary production.
6. **Climate change** has begun to, and will continue to, affect Europe's mountains disproportionately. Regional changes in **temperature, precipitation, snow cover, and runoff** have been recorded. Scenarios suggest that these trends are likely to continue, and the frequency of **extreme events** is likely to increase. Many ecosystem services are likely to be threatened, both directly and indirectly by climate change, often in conjunction with other factors, including economic and planning policies. These trends and their impacts will be regionally differentiated.
7. Mountains are the '**water towers**' of Europe: vital sources of fresh water, but also for its **storage** in glaciers, lakes and seasonal snow. Water from mountains is of importance for the production of **hydropower** and for **industry and agriculture**, particularly in the lowlands as irrigation increases; most critically in southern Europe. Consequently, not only the quantity but also the **quality** of mountain water is important; quality may be affected by pollutants from both agriculture and mining. Due to their topography and extreme precipitation events, mountains are also particularly prone to **floods**, with both up- and downstream consequences. **Climate change** will have significant impacts on water availability in terms of total seasonal flows and water **quality** (including sediment loads); and **floods** are likely to increase in frequency and magnitude. These changes and impacts will be regionally differentiated.
8. The **land cover** of Europe's mountains varies considerably with latitude and oceanicity/continentality, as well as the history of human uses. Given the difficult conditions for agriculture, 92% of the EU mountain area has been classified as **Less Favoured Areas (LFAs)**. In some mountain areas, **land cover changes** (1990 to 2000 to 2006) have been significant. The interacting driving forces are complex, including **depopulation**, internal and external **accessibility**, EU and national **subsidies, prices** for agricultural and forest products and – in Central and Eastern

Europe – economic, ownership, and social changes since the **end of state socialism**. One key area for investigation (through national case studies) may be whether the 8% of the EU mountain area that is not designated as LFA has experienced significantly different trends. Regional **scenarios** suggest how future land covers may evolve in response to **policy** emphases, **economic forces**, and **climate change**.

9. Mountains are **centres of biodiversity**, with high levels of both species and habitat diversity. Some mountain ecosystems are relatively ‘natural’; nevertheless, after centuries of human use, **cultural landscapes** are often also high in biodiversity. Many of these have been recognised as **High Nature Value (HNV) farmland**, which is found disproportionately in mountain areas. Such designation has considerable potential for improved management to **maintain biodiversity** and to **support mountain economies**, e.g., through branded produce and tourism.
10. Because of the high levels of biodiversity in mountains, the relative proportions of land designated at the national level as **protected areas** (within Natura 2000 sites and under national legislation) are particularly high. On an areal basis, Iberian massifs have the greatest proportion of Natura 2000 sites, while Nordic massifs have the greatest proportion of nationally-designated areas. Natura 2000 sites and nationally-designated areas **overlap** to different extents in different countries. Analysis of the extent to which these protected areas and HNV designation have been successful in **limiting loss** of both species and habitats depends on the availability of data provided by individual countries.
11. Changes in **land cover** within and near to **protected areas** can lead both to the loss of species/habitats or to improved conditions (e.g., through shifts from intensive to extensive agriculture, forest expansion). With **climate change**, spatial changes in the **environmental envelopes** suitable for particular species and habitats will lead to changes in the effectiveness of protected areas and increase the need for **corridors** or other forms of ecological connectivity to allow the movement of species and the expansion of habitats. Such measures will be particularly critical in mountain areas given their dissected topography and the fact that, with increasing altitude, the available area decreases.
12. **Policies** of relevance to mountain areas may be **specific** to these areas or influence them **directly** or **indirectly**, and **subsidiarity** is a key issue. In some countries, **sub-national regions** have policies of direct relevance to mountain areas. **National** policies influencing mountain areas may be sectoral or integrated. With a few partial exceptions (e.g., LFA, cohesion, structural funds, biodiversity), **EU** policies are generally not targeted specifically at mountain areas. At the macro-**regional** scale, **conventions** and related institutions (e.g., networks of protected areas) exist for the Alps and Carpathians; these also work in partnership and with international institutions (e.g., UN biodiversity and climate change conventions). Regional **institutional mechanisms** for cooperation exist in the Pyrenees, Jura and for sub-regions of the Alps and are under discussion for the Dinaric Arc and the mountains of South-Eastern Europe (Balkans).

13. All of these policies and institutions **interact** at scales from the individual enterprise or protected area to the economic sector (e.g., agriculture, tourism) to the region, so that evaluation of the effectiveness of their implementation with respect to desired outcomes is challenging. However, an attempt should be made to assess whether policies and specific interventions (possibly individually, but more likely in combination) have had – or are having – positive, neutral, or negative impacts on the diverse services that mountains provide: where are we approaching sustainable development, or not? **Case studies** can provide insights. The **evaluation** of policies is essential for the **realignment** of existing policies and the **design** of new policies; flexible, integrated (cross-sectoral) policies are essential in an era of rapid and dynamic change. In some mountain areas, such as the Alps and Carpathians, macro-regional strategies similar to those currently developed for the Baltic Sea might be envisaged. Less extensive mountain areas require other types of arrangements. It is of critical importance to explore what these might be.
14. The **evidence base** on which this integrated assessment will be based is highly variable, with many information gaps. It is only for relatively few variables/topics that comprehensive Europe-wide datasets of sufficiently detailed **spatial resolution** are currently available and, in most cases, these are only for one point in time. For a few variables (e.g., population, land cover), data from two or more years are available, allowing **trends** to be identified and evaluated. For some regions, notably the Alps, the depth of usable information is greater than for Europe as a whole. For many regions, data is more partial or only available at a relatively low level of spatial resolution. Hence, many issues will be illustrated through regional, national, or sub-national **case studies** chosen through expert judgement and consultation. As far as possible, these will be drawn to represent situations from across Europe's mountains.

May 2009