

1. Introduction

1.1 Mountains: a key issue at the global scale

The world's mountain areas cover 24% of the Earth's land surface (Kapos et al., 2000) and are home to 12% of the global population (Huddleston et al., 2003). A further 14% of the global population is estimated to live in their near vicinity (Meybeck et al., 2001). A far greater proportion of the global population relies on the goods and services provided by these areas, particularly water, which can be vital for agriculture, communities, and industries hundreds or even thousands of kilometres from the mountains. In an increasingly urbanised world, the mountains are also key centres for recreation and tourism; their attraction is often heightened by their remarkably high levels of biodiversity (Messerli and Ives, 1997).

In 1992, the global importance of mountains was recognised at the United Nations Conference on Environment and Development, held in Rio de Janeiro. Chapter 13 of 'Agenda 21', the plan for action endorsed at this meeting by the heads of state or government of most of the world's countries, is entitled "Managing fragile ecosystems: sustainable mountain development". The inclusion of a chapter on mountains in this key global document placed them on a comparable footing with other major global issues such as tropical deforestation, climate change, and desertification. The global recognition of the importance of mountains was further underlined by the designation of the year 2002 as the International Year of Mountains (IYM) by the General Assembly of the United Nations.

Chapter 13 clearly recognised that, while adequate levels of information are essential prerequisites for informed policy making with regard to the people and environments of mountain regions, there is inadequate knowledge about many aspects of these regions; and that the degree of availability of information is highly variable at every spatial and temporal scale. This is true for all parts of the world, although levels of information are generally higher for Europe than other continents. These points have been reiterated at many subsequent meetings, such as the 1996 European Intergovernmental Consultation on Sustainable Mountain Development, which involved representatives of 21 European countries and the European Commission (Backmerhoff et al., 1997) and the seminar on Community Policies and Mountain Areas, organised by the European Commission in October 2002 within the context of the IYM.

1.2 Europe's mountains and their values

In spite of its small size in relation to other continents, Europe has many mountain ranges. They occur in almost all parts of the continent, and most of Europe's countries have at least some mountains. The northernmost mountains are those of Iceland and Scandinavia; the southernmost are those along the northern shores of the Mediterranean, on the many mountainous islands of the Mediterranean – from the Balearic islands to Cyprus – and in much of Turkey. On the western side of the continent are the mountains of Portugal, Spain, and the United Kingdom and Ireland. The Urals define the easternmost extent of the continent, and to their southwest is the Caucasus, which includes the continent's highest peak (Elbrus, 5,633 m). The longest chain is found along the spine of Scandinavia; the second longest is the Urals, and the

third longest is the Caucasus. Perhaps the most famous, and certainly the most visited, mountains are the Alps, rising to 4,807 m at the summit of the Mont Blanc massif, shared by France, Italy and Switzerland. Yet, as well as those mentioned above, there are other mountain chains in western Europe, such as the Pyrenees, the Apennines, and the many older – and lower – mountains stretching from the Massif Central in France to the Sudetes on the Czech-Polish border. Central and Eastern Europe also have many mountain ranges, including the Carpathians and the Dinaric and Balkan mountains, which cover a large part of the Balkan states.

Stretching from the Arctic to the Mediterranean, and with climates also ranging from oceanic to continental, the physical conditions of Europe's mountains are very diverse. Added to the factor of location within any particular mountain range or massif is the range of microclimates, resulting from variations in altitude, slope, and aspect: one of many factors leading to the great diversity of both ecosystems and land uses. These are highly varied across the mountains of Europe, which include some very wealthy communities with highly industrialised and/or tourism-based economies in parts of western and northern Europe, but also very poor regions with subsistence-based economies, particularly in southern and eastern Europe. Yet throughout Europe, the mountain landscape reflects the interactions of human beings with biophysical systems over centuries, whether one considers, for instance, the forests of Scandinavia, the pastures of the Alps, or the dry grazing lands of much of the Balkans. To some extent, the impacts of extremes of climate on livelihoods and quality of life can be mitigated by investment in transport, communications, and other types of infrastructure. Nevertheless, the marked diurnal (daily) and seasonal variability of the climate must always be borne in mind when considering options for land use and economic development.

Europe's mountains are of vital importance to the continent's population in many ways, and have been described as 'the undervalued ecological backbone of Europe' (EEA, 1999). Specific national and European Commission policies focussing on Europe's mountain areas have tended to focus primarily on agricultural production, which remains an essential element of mountain economies and cultural identity. However, the mountains' greatest value at the European scale is probably as 'water towers', intercepting water from air masses and storing it either as snow or in lakes and reservoirs. In spring and summer, water coming from mountain rivers supplements the earlier high flows from the lowlands, which typically occur in autumn and winter. For example, even though only 11% of the Rhine river basin is in the Alps, these mountains supply 31% of annual flow and, in summer when water is particularly needed for agriculture, over 50% of flow (Mountain Agenda, 1998). In the drier areas of Mediterranean and Balkan Europe, mountain water is of even greater significance. Mountain water is also a source of hydroelectric power for many parts of Europe. In the Alps, most of the sites have already been developed, producing electricity which is used not only in the Alpine countries, but is also exported across European grids. In other mountain regions, many sites have been developed for hydro-electric generation, but many potential sites remain. However, although the economic costs of production may be relatively low, the environmental costs are often high. These may include sediment discharge, bank erosion, altered biological diversity of riparian zones, changes in microclimate, and eutrophication in reservoirs.

At both continental and regional scales, a second key value of Europe's mountains is as centres of diversity. The mountains include many of the continent's centres of biological diversity (Nagy et al., 2003), and a significant proportion of these are conserved as national parks, nature reserves, and other types of protected area. Two measures of the high biological diversity and its importance are that two-thirds of Europe's flora are found predominantly or completely in mountain areas (EEA, 1999) and that 42 of the 169 habitat types in Annex 1 of the Habitats Directive are in mountain areas (Hopkins, 1998). The reasons for the high biological diversity include evolution and migration over geological time, contrasting conditions across the wide range of altitudes and on different aspects, and the existence of many microhabitats. In addition, many of Europe's mountains south of the Arctic contain species that are relics of the last ice age – left behind as the glaciers retreated – as well as many habitats and species that have been lost through centuries of human activities in the adjacent lowlands. While the existence of many species depends principally on the occurrence of specific biophysical factors, some mountain habitats, such as meadows and pastures maintained by haymaking and grazing, are the result of human activities and must be maintained through continued human intervention. These habitats and species are often endangered by depopulation and changing land-use practices driven, particularly in Central and Eastern Europe, by the transition towards a market economy. Thus, while agriculture and forestry remain important within local economies in many of Europe's mountains, they are also the centres of occurrence for many of the continent's remaining large animals, some of whose populations are growing where anthropogenic pressures on habitat are decreasing; eight of the 35 mammal species protected under the Habitats Directive live mainly or entirely in mountains (Hopkins, 1998).

As in many parts of the world, biological and cultural diversity are closely related in Europe's mountains. They are the home of many of Europe's ethnic minorities, with specific cultures, languages or dialects, and traditions. However, this remarkable cultural diversity is being diluted in many areas by external influences and the loss of local people, especially from younger generations. This affects not only mountain people's sense of identity, but also the ways in which they use the landscape, the crops they grow, and the food they produce. Yet there is increasing recognition of the market values of goods that can only be produced in specific mountain environments, often from particular breeds of animals or varieties of plants with limited distribution, both cultivated and non-cultivated (e.g., herbs and mushrooms). The (re)discovery of the economic value of many of these mountain products is leading to both an economic and a cultural renaissance in a number of mountain regions. Thus, the diversity of mountain products is also important. Suitable approaches for production, processing and marketing – e.g., through labelling of quality products of restricted origin – may increasingly be one key to the future of many mountain communities where production from agricultural and forest land remains important in, or the basis of, local economies (Euromontana, 2000).

Tourism and recreation are the third key value of Europe's mountains for the entire continent, and even the world. Many of the aspects of endangered cultural heritage mentioned above, including food and drink of high quality, are key attractions from people coming from increasingly similar urban centres. Mountains represent places for escape, for people to experience different life styles and customs, enjoy attractive landscapes that combine human land uses and relatively natural ecosystems, or find

inspiration. They also provide opportunities to take part in a very wide range of sporting activities. Downhill skiing is perhaps the most visible of these, but the list of mountain sports is long and expanding, from hiking and snowshoeing to the more extreme sports of kayaking, whitewater rafting, and canyoning. All of these require specific conditions, often found only in the mountains at certain times of the year. Yet sports go in and out of fashion, and the mountain tourist season is often quite short, so that it is essential for communities which invest in this sector to also maintain other means of livelihood.

In spite of the European importance of mountain areas for tourism, the degree of tourism development varies considerably at every scale. Even in one small part of a mountain range, one valley may have well-developed resorts and infrastructure for skiing and other activities, while an adjacent valley may have very limited, if any, facilities. Even in the Alps, one of the global centres of tourism receiving over 100 million visitors a year, only 10% of municipalities have large mono-structured tourist infrastructure, and 40% have no tourism (Bätzing et al., 1996). Yet it is increasingly recognised that the value of the mountain landscape for tourism depends not just on facilities specifically for tourism, but also the quality of the mountain landscape which is maintained by a wide range of land uses. For this reason, in some parts of the Alps, tourism-dependent communities have begun to support landscape-maintaining activities in adjacent communities without tourist facilities.

A fourth key value of Europe's mountain regions is their sensitivity to environmental change (Cebon et al., 1998; Steininger and Weck-Hanemann, 2002). The sharp climatic and ecological gradients of mountain areas mean that relatively small changes in global climate may be translated into significant changes in local environmental conditions. These are likely to have significant impacts on agriculture and forestry. They also mean that mountain geo- and ecosystems have considerable potential as indicators of climate change – yet their sensitivity to climate change may also decrease their vital ability to protect settlements and infrastructure (especially roads and railways) against natural hazards, such as floods, landslides, and avalanches. The likely increase in the frequency of extreme weather events means not only that such natural hazards – and also fires in forests and scrub vegetation (e.g., Mediterranean maquis) – are likely to become more common, but also that it may become increasingly difficult to cope with these natural hazards, all of which may have severe downstream effects. A critical threshold is freezing point, as above this precipitation falls as rain, and below this, as snow. As temperatures rise, shifts from snow to rain will have major influences on the runoff and storage of water, affecting both mountain and downstream regions. In particular, the winter tourism based on skiing industry may become non-viable at lower altitudes, leading to economic losses and greater pressures on higher-altitude locations. Downstream floods and droughts may also become more frequent. Important evidence of climate change has already been provided by the upslope melting of glaciers in most parts of Europe, and by the upward movement of plants on many summits in the Alps.

A key point to make with regard to all of these diverse values of Europe's mountains – water, biological and cultural diversity, tourism and recreation, and sensitivity to environmental change – and many of their other characteristics is that, while it is relatively easy to make generalised statements such as those above, there is generally a lack of data for the continent as a whole (or even the EU 15) at a scale appropriate

for developing policies and evaluating their impacts (EEA, 1999). High-quality data at national and sub-national scales are available on many specific subjects. Yet, even where such data are available for a number of countries, trans-national or European comparisons are often made difficult by differences in definitions, methodologies and dates of data collection, and methods of analysis. A further fundamental challenge with respect to mountain areas is the range of national definitions of what and where ‘mountains’ are: an issue addressed in Chapter 3 of this report.

1.3 Mountains in the context of European cohesion and enlargement

In its work on social and economic cohesion, the European Commission has recognised the existence of regions whose permanent natural handicaps limit their potential for development in specific ways. The three types of regions thus defined are mountain areas, territories with a low population density, and island territories. It should be recognised that many mountain areas occur on islands and/or have low population densities. The Second Report on Economic and Social Cohesion (European Commission, 2001) notes that “Mountainous areas represent geographical barriers.... While some mountainous areas are economically viable and integrated into the rest of the EU economy, most have problems, as witnessed by the fact that more than 95% of them (in terms of land area) are eligible for assistance under Objectives 1 or 2 of the Structural Funds.”

What factors are decisive here? Two broad issues are important. The first is of course the impact of topography and climate. Economic activity is restricted where the terrain is particularly rough and slopes are steep. High altitudes mean lower temperatures and shorter growing seasons. People live in the valleys, and travel between adjacent valleys may often be difficult; it is often easier to descend to a main valley or the lowlands than to cross directly from one valley to the next. In general, accessibility may be low even where distances ‘as the crow flies’ are not long. Second, many mountain regions form parts of national peripheries. They are sparsely populated, and generally have poor access to national and European markets, which are far away. Mountains often constitute national and regional borders. Traditionally, the border region is where the road ends. In other words, mountains are commonly located on the margins of national economic – and often political – systems.

With regard to enlargement, all of the acceding countries, as well as Bulgaria and Romania, have mountains with the exception of the Baltic States and Malta. The basis of the economy in these regions primarily derives from agriculture and forestry, which are generally at a significantly lower level of development than in the present Member States. Where there have been mining or manufacturing industries, these are generally in decline and, in many cases, will have been phased out before accession. Transport infrastructure is often not well-developed; these areas are typically peripheral in terms of accessibility and economic development. These characteristics have significant implications for many policies of the European Union, notably the CAP and transport policy, but also regional, enterprise, and competition policy.

In an expanding and increasingly complex Europe, the definition of future policies for mountain areas must be based on a thorough understanding of the current social, economic and environmental situation and the degree of success of past and current policies which directly or indirectly affect these areas. There have been many general

statements in this regard; yet the key need is adequate statistical data to allow, first, comparisons of the situation in mountain areas with national and European references and, second, benchmarking for the evaluation of the degree of success of future policies.

1.4 Objectives of the study

The aim of this study is to provide an in-depth analysis of the mountain areas of the European Union, the acceding countries, Bulgaria and Romania, as well as Norway and Switzerland.

The study has three complementary sets of objectives:

- 1) to develop a common delineation of the mountain areas of the European Union, the acceding countries, Bulgaria, Romania, Norway and Switzerland;
- 2) to compile statistical and geographical information necessary to describe and analyse the situation in these mountain areas (including in relation to national and EU references); to develop a typology of these areas; and to create a database on which future analyses and policies may be based;
- 3) to analyse the measures and policies implemented by the Member States, the acceding countries and the other concerned European countries, and the European Union with regard to mountain areas; to evaluate the impacts of these measures and policies; and to develop proposals for adjustments to make them better suited to the situation of mountain areas, their needs and opportunities.

1.5 Organisation of the study

The study was commissioned by the Directorate-General for Regional Development (DG Regio) of the European Commission. An international consortium, under the leadership of Nordregio, was awarded the contract in August 2002.

The project commissioned by DG Regio covers the 15 Member States of the European Union plus the 10 acceding countries and Romania and Bulgaria. The mountainous countries of Iceland, Norway, and Switzerland were invited to participate on their own expense. Norway and Switzerland accepted this invitation. In total, 29 countries are therefore covered by the study.

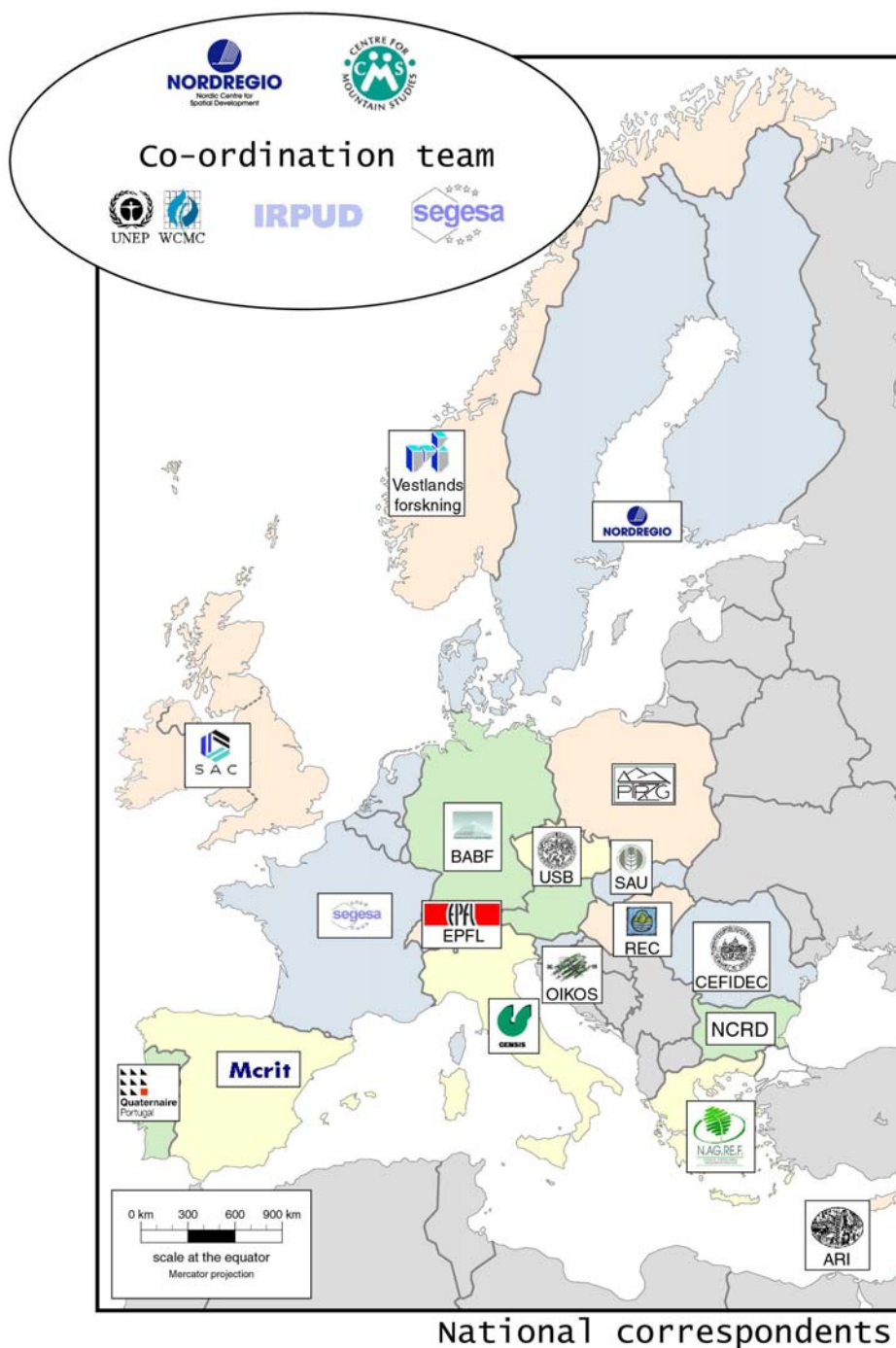
Within the consortium, there are 22 partners: the co-ordination team, consisting of five partners with thematic responsibilities; and 17 additional national experts with responsibilities for providing data and expertise in their respective countries (Figure 1.1).

Members of the coordination team are:

- Nordregio, the Nordic Centre for Spatial Development (Sweden), as Lead Partner and coordinator on data gathering;
- The Centre for Mountain Studies at Perth College, UHI Millennium Institute (UK), in charge of scientific coordination;
- The UNEP-World Conservation Monitoring Centre, UNEP-WCMC (UK), responsible for the development of criteria to delineate mountain regions;

- Institut für Raumplanung, Universität Dortmund, IRPUD (Germany), responsible, together with Nordregio, for the establishment of the database and the analysis of the socio-economic situation in mountain areas;
- Société d'études géographiques, économiques et sociologiques appliquées – SEGESA (France), in charge of mountain policy analysis.

Figure 1.1. Project consortium



The national experts are of fundamental importance, as the analyses require a detailed knowledge of mountainous areas and policies related to them. The experts have provided information on socio-economic data and on mountain policies in each country. The national experts and their responsibilities are:

- Federal Institute for Less-Favoured and Mountain Region (BABF) (Austria, Germany);
- Ph de Boe consultants (Belgium, Luxembourg, the Netherlands);
- Nordregio (Denmark, Sweden, Finland, Estonia, Latvia, Lithuania, Malta);
- Société d'études géographiques, économiques et sociologiques appliqués, (SEGESA) (France);
- National Agricultural Research Foundation (NAGREF) (Greece);
- Scottish Agricultural College (SAC) (Ireland, United Kingdom);
- CENSIS (Italy);
- Quatenaire (Portugal);
- Multicriteria Consulting (MCRIT) (Spain);
- National Centre for Regional Development (NCRD) (Bulgaria);
- Agricultural Research Institute (ARI) (Cyprus);
- University of South Bohemia (USB) (Czech Republic);
- Regional Environmental Centre for Central and Eastern Europe (Hungary);
- Polish Society of the Development of Mountain Areas (PTRZG) (Poland);
- Training and Innovation Centre for Development in the Carpathians (CEFIDEC) (Romania);
- Slovak Agricultural University (SAU) (Slovakia);
- Oikos Ltd. (Slovenia);
- West Norway Research Institute (Norway);
- L'Ecole Polytechnique Fédérale de Lausanne (EPFL) (Switzerland).

During the project, there have been five Interservice meetings with the European Commission services and representatives of Norway, Switzerland, Euromontana and the Association Européenne des Elus de Montagne (AEM).

All project partners have met twice: at the inception meeting in Brussels and at a seminar in Stockholm where the national reports on mountain policies were discussed.

1.6 Organisation of the report

Following this introduction, the report contains nine chapters and annexes. Chapter 2 introduces the data sources on which the remainder of the report is based, and discusses key issues with regard to their availability. Chapter 3 describes the process of developing a delineation of European mountain areas, and presents the results. Chapters 4 to 7 characterise the mountain areas delineated in Chapter 3, using the national and European-scale quantitative data introduced in Chapter 2. This process involved the compilation and linking of various layers of the database, leading to the creation of tables and maps to be used in analysis. The four chapters address, respectively:

- 4) environment, land covers and uses in mountain areas;
- 5) demographic patterns and trends in mountain areas and adjacent transition areas;
- 6) economic characterisation of mountain areas;
- 7) infrastructure and services for mountain areas.

Chapter 8 presents current mountain policies in Europe at both national and wider scales, together with examples of best practice. Chapter 9 summarises the conclusions from interviews and reports prepared by the national experts. Chapters 10 and 11 bring together the findings of the previous chapters, developing typologies of mountain areas and presenting a diagnosis on which conclusions and recommendations are based. The chapters of the report are complemented by a number of annexes providing complementary information or presenting results in greater detail than in the main part of the report.

