



## ECONOMICAL AND NATURAL VALUE OF MOUNTAINS IN EUROPE

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### Summary

Despite its relatively small area European territory has many mountain ranges located in most of the countries. Land development in separate mountain ranges has a tendency to diversify. Not only is this phenomenon evident in regions with a great increase in agricultural, service sector, tourist and industrial functions, but also in regions which are agriculturally worthless and less economically valuable. Even though mountain areas in Europe are inhabited by more than 15% of population, the diversity of both particular countries and mountain ranges is large. Mountain areas, particularly in EU-15 countries, Switzerland and Norway, are as a rule poorly populated, while in Poland, Slovenia and Hungary these tendencies are disparate. Frequent phenomena facing mountain areas in Europe are an ageing of the local population and the rural depopulation. Mountains are of great significance for both the population and the diversity of continent's fauna and flora, besides, the natural resources of mountains are described as "the *undervalued ecological backbone of Europe*". The greatest value of mountains is attributed to their cultural diversity because mountainous areas are inhabited by numerous ethnic minorities differentiated by their culture, language, dialects and tradition. It should be noted that functions of mountains and their contribution to both the development and the living conditions of local population can be diversely classified. These functions, which include environmental, economical and socio-cultural ones, have been known for ages. They can also be divided into the green – connected with nature, the white – connected with health care, the blue – concerned with water and the yellow – concerned with life-span and economic development. Sustainability of strong demography units is the key precondition for the maintenance of natural and cultural richness, as well as for the economic significance of European mountains.

### Keywords

specificity of mountains • function of highlands • sustainable development

### 1. Introduction

Economy in mountain areas, showing a significant distinction and creating various difficulties of topographical, climatic and biotic nature, was a multifaceted issue, occurring since the dawn of the economy consciously pursued by man, including agriculture. Therefore, in the European economic space mountain areas were later overtaken by

the human element. Mountain areas were less densely populated, and later developed, and often largely marginalized. Over the centuries, at different latitudes, management and development of European mountains showed large variations, however, for many centuries, the treatment of these areas as less valuable was evident. Also, during the conquest mountains were often treated as a prey achieved at great effort, but less valuable, because of the sparse population and low potential for food production [Musiał 2008]. This was true for the Alps massif located centrally in Europe, and a little later developed Carpathians, mainly deserted Scandinavian Mountains, or some mountain areas recognized by the ancient ancestors as worthless, for example, the entire island of Crete. Mountains for centuries were borders (not entirely certain) between states, but it happened and that a state “sat” astride on the mountains (e.g. Austria). Although they had important and appreciated defense value, often were civilizational and economic periphery of countries, being a place of exile, the development of various types of troublemaking and lawlessness [Przyboś 1995]. Over time, their functions have expanded, which was connected with the development of the population of Europe, its growing civilization potential, and next felt the limitations of the available agricultural land. These processes happened at different times and different rates in different countries, and thus also in the mountain ranges. The scope and tempo of development, and therefore the appropriation and exploitation of the mountains were determined by both latitude position and in even more their height. Significant, and at times even dominant influence on the economy in the mountains had their affiliation to a particular country, the level of civilization and economic development, as well as the prevailing political system.

Since the formation of the capitalist economy, market orientation dominance occurred in the spatial management, including land development of individual mountain ranges. The primacy of profit, efficiency, productivity, supported by the liberal economic doctrine, already formed during the Enlightenment, which was, among others a sign of progress and renewal against absolutism, caused a major impact on the development of production space. Also the neo-liberal doctrine currently dominant in the socio-economic life implies socio-economic development, including the industrial, development of services or agriculture, often ignoring the external costs of the process [Czyżewski and Stępień 2011]. At the same time all-powerful process of the economy globalization determines its opening, the cancellation of all barriers for the allocation of production factors, the same production and its distribution. Globalization causes also the increase of the pressure to achieve microeconomic efficiency, which raises new challenges in European countries and in their problem areas such as mountains [Kowalczyk 2007]. External effects of globalization, including those negative for both social and environmental situations, are transferred to the local level [Zegar 2012]. Intervention in many adverse or even negative instruments of globalization takes place in the European area through a variety of mechanisms for coordination at the supranational level especially in the European Union. They are based mainly on the development and implementation of a common structural policy and the Common Agricultural Policy. In the case of domination of free market economy the capital

moves to countries and regions, and even sub-regions where organizing of production itself is cheaper and easier. To a large extent this applies to the location of the economy, especially the production in mountain areas, although some subregions in Switzerland, Austria and Italy may be an exception here, because there, also in the mountains, there are regions very well urbanized and highly industrialized.

Recently, for most mountain areas of the Europe, due to the long lasting deficit in the non-agricultural sectors of the economy, specific character and the weakness of agriculture indispensable and almost with no alternative becomes sustainable development [Czudec 2006, Dacko 2011]. This refers primarily to reduction of the pressure on the fragile environment and appreciation of its welfare and rarity. The idea of diversified production space management especially in areas of high natural values is the answer to their remarkable values as well as the inadequacy and unreliability of market mechanisms in the domain of distribution of goods in areas with escalated problems. An important condition necessary for the sustainable development of mountain areas is the increase of public awareness in the economy of goods management, and recognition of the uniqueness of their ecosystems. Full indexation of created in the mountains public goods including such non-market goods like the vitality of a village, culture and harmony of the landscape are also necessary. The challenges faced by the structural policy and the CAP (Common Agriculture Policy) for the entire EU including mountain areas are very large. However, they are often mutually exclusive with the liberal and commercial approach to the economy. The need for sustainable management of natural resources, provision of environmental and public goods, maintenance of biodiversity, or maintaining and creating of environmentally adapted economic development are often underestimated. These objectives are generally not be achieved without the formation of structural policy towards the mountains taking into account their natural, economic, social and cultural specific features [Kirner 2010].

This paper discusses the problem of economic and natural values of the European mountains. Consideration and evaluation of quantitative and statistical character were referred to the various European countries. Specific mountain ranges were not analyzed due to the lack of suitable data sources. Value of the mountains was evaluated by the functions they perform for the society, who live directly in mountains areas, or who indirectly uses the goods and services the mountains. These functions are presented from three perspectives, i.e. the so-called national-classic, as indicated by Euromont [Mountain study website 2004] and modern, adopted from the agricultural economics [Wilkin 2012]. Comprehensive analysis of natural value of the European mountains was treated as part of the economics of scarce resources, and thus sought marketable and valuable, and the natural goods that have eluded the assessment of economy, but also have underestimated, not valorised or deferred social and market values.

The essential issues of the development of European mountain areas were taken up, confronting the Polish perspective on the issues of sustainable development of mountain areas with the key problems of other countries and mountain ranges [Mountain Areas in Europe 2004b]. The study is based on the literature and is predominantly deductive analysis. The need of setting the economic development of the European

mountains with their natural specific, including their valuable properties and natural resources was indicated.

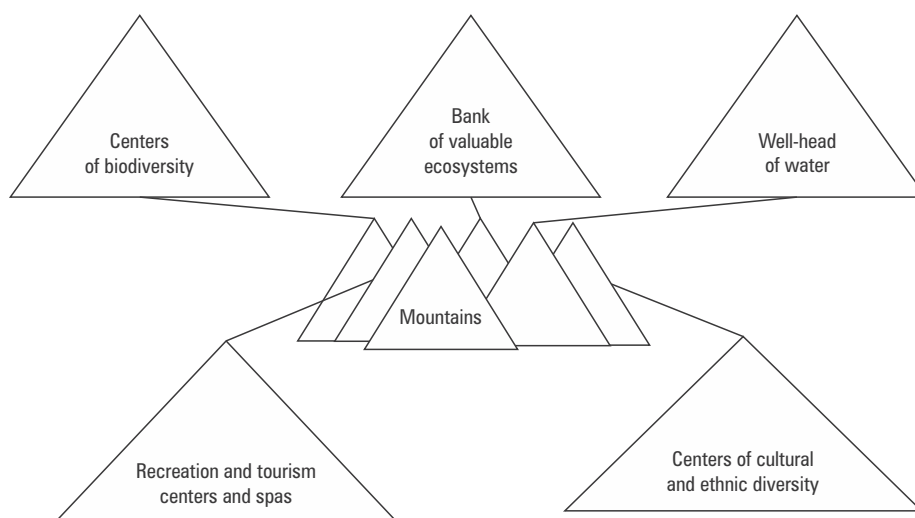
## 2. The core values of the European mountains

Mountain areas cover about 24% of the land area and are inhabited by more than 12% of the population across the globe, and it is estimated that a further 14% of the population live in their immediate vicinity. Much larger share than in the quantitative participation of the inhabiting population have different forms of economic and strict environmental services provided by mountain areas [Mountain Areas in Europe 2004a]. The global importance of the mountains was confirmed in 1992 at the Earth Summit in Rio de Janeiro, which adopted Agenda 21 documents. It includes an action plan signed by the representatives of states and governments of most countries in the world entitled: "Managing fragile ecosystems – the sustainable development of mountain areas". In those documents, crucial for environmental globe issues, the problem of the mountains was presented, placing them next to such important and high-profile issues of the modern world as climate change, desertification of agricultural land and reducing of deforestation. It also highlighted the issue of insufficient knowledge of societies, states, governments, and local governments on the importance of mountains and their specific relating to aspects of a natural, economic and cultural character [Czudec 2006]. This implies, among others inability to obtain complete and comparable data on the various mountain ranges, even within specific mountains, belonging to several countries. This also applies to European mountains, although the statistics are there more accessible, better developed, updated and compiled than, referring to the continent of Asia and Africa.

Despite its small size compared with other continents, and its rather lowland character, Europe has many mountain ranges located throughout most of the countries. However, about 74% of Europe lies at an altitude less than 300 m above sea level, 20% is at the altitude of 300–1000 m above sea level and only 6% of the continent lies at an altitude higher than 1000 m. In many European countries so called deficit in mountains can be seen, as they are at all devoid of mountains and even uplands, and they amount to 1–2%. In contrast, other countries have the kind of excess of mountains, which represents (or represented), for them, a big economic problem. In the north of the continent there are mountains in Iceland and Scandinavia. Southernmost mountains extend along the northern shores of the Mediterranean Sea from the Balearic Islands to Cyprus and to a large part of Turkey. In the western part of the continent mountains extend in: Portugal, Spain, the UK and Iceland. Ural mountain range is the furthest east of the European continent, and from the southeast the border is the Caucasus. The longest mountain ranges are located in Scandinavia and the second largest is located in the Urals, and the third in the Caucasus. In the central part of Europe, there extend the best-known and most frequently visited by tourists – Alps, located for the most part in France, Italy, Switzerland and Austria. In Europe, there are also many smaller mountain ranges such as the Carpathians, Pyrenees, the Apennines, as well as many lower and

older mountains stretching from the Massif Central in France to the Sudetenland, and the Dinaric Alps and Vosges [Mountain Areas in Europe 2004b].

Extending from the Arctic to the Mediterranean area mountains in different parts of the continent, are characterized by different types of climate, from oceanic to continental. An important natural factor for determining the local nature of individual mountain ranges and even the masses, is the microclimate, resulting from diverse geographical location, height and position relative to sea level, and also the physiographic formation of an area, its slope, sun exposure, etc. The microclimate is one of the determining factors of the great diversity of ecosystems, including the agrocenoses, historically shaped by agricultural use of the land. It also has an impact on the issues of population numbers, economic growth and the share of rural population and the attractiveness of the various mountain ranges, including predestination to develop their tourist infrastructure. European mountains are important for the abundance and diversity of flora and fauna of the continent, are referred to as „the ecologically underestimated backbone of Europe’s” [Mountain study website 2004].



Source: author's study based on Euromontana

**Fig. 1.** Key features of the mountains of Europe

European mountains are important for nature conservation, acting as biodiversity centers [Bohn 1993]. Protection of the most important parts of the mountains is carried out through the creation of national parks, nature reserves and other formal and informal types of protected areas. Two-thirds of European flora described botanically lives for the most part or entirely in mountain areas, that is why these areas are so important from the biodiversity point of view. [Mountain Areas in Europe 2004b]. Many

European mountain ranges south of the Arctic, contain species that are relics from the most recent ice age, which was later replaced by the continental ice sheet. While the existence of many species of wild plants and animals depend on the occurrence of specific biophysical factors, some mountain ecosystems, especially meadows and pastures, are maintained by mowing and grazing, and even alternate ploughing. This agricultural activity – but rather extensive – is indispensable for the existence of these ecosystems, and the abandonment of agricultural use means a reduction in biodiversity [Klepacka-Kołodziej 2009]. Living in these environments (particularly in Central and Eastern Europe), some species of wild plants and animals are threatened by depopulation and changes in the use of land system (intensification), resulting from the dictates of the market economy. There are also the opposite phenomena, relating mainly to the fauna and with the rapid decline in animal populations in sub-regions where human pressure on the environment decreases. Eight of the 35 species of mammals, protected by the Habitats Directive, live mainly or exclusively in the mountains [The Biogeographical Regions... 2002].

Agricultural policy of different countries, as well as the Common Agricultural Policy, extending to mountain areas and relating to their specific, focuses specifically on agriculture and agricultural production. Agriculture, considered retrospectively, and contemporary constitutes an important part of spatial planning and economic development of mountain areas, and significantly affects their economic and cultural identity (Figure 1). Somewhat less attention is paid to economic policy issues in the areas abundance of water, which seems to have the most value in contemporary Europe scale. The water in the mountains, originating from increased here snow and rain fall (in relation to the plains precipitation here is even 10 times higher), powers and initiates streams and rivers. They provide water for agriculture, industry and the needs of towns. Mountain water is also a source of hydroelectric power for many parts of Europe. Hydro power plants constituting relatively inexpensive and well-developed system of gaining power in the Alps and the Scandinavian mountains, are usually also well developed in other mountain ranges. Despite the low cost of energy production, however, they carry many risks perceived contemporary, including changes in the ecosystems, in the landscape, the release of sediment, erosion of slopes, etc.

Development of land in different mountain ranges also shows a large variation due to the fact that these areas are regions, where there is a intensification of various functions, industrial, commercial, tourist and agricultural. With regard to the agricultural use of the land in areas across Europe there is significant landscape differentiation, which reflects the human interaction with the biophysical system. An example is found in Scandinavia, intensity of forests, well-developed animal husbandry and herding in the Alps and the Carpathians. Also, a large area of dry land Balkans is a place for grazing animals.

European ethnic and cultural diversity is also strongly associated with mountain areas. They are the *home* to many European ethnic minorities, currently appreciated for their cultural specificity, language, dialects and traditions. In many mountain ranges or sub regions this diversity is *diluted* and *shallowed* by the influence of civilization

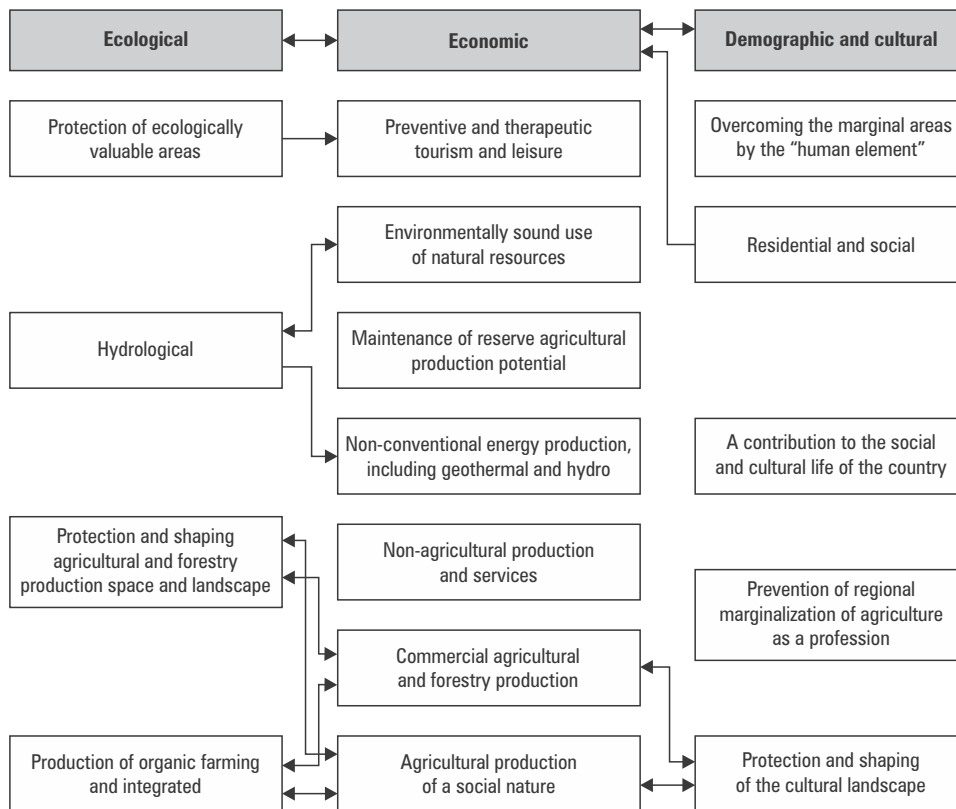
and culture coming from the outside, and by reducing the local population of people, especially the younger generation. Depopulation and migration of the younger generation outside the mountain areas not only causes negative effects on the maintenance of the identity of the mountaineers, but also how their material culture develops e.g. crafts and building, how they utilize the land (and to what extent they use technologies), which plants they grow at which intensity. This is important nowadays, due to the high weight and the use of institutional domestic and European solutions, relating to originality and awareness of regional products created here, of importance to diversifying, improvement of the quality and flavor of food. Cultivated here varieties of plants and farmed animals, often local atrophy races, also have important economic significance, not only for farmers – producers and created short marketing chains, but also for the entire region, making them *recognizable at the table*. This leads to economic and cultural revival and enrichment of many previously economically recessive mountain areas. The right approach to the production and marketing of specific products “from the mountains” could be the key to the future of many mountain communities, where agricultural production and forestry remain important for the local economy [Mountain study website 2004].

Tourism and recreation are very important values of the European mountains. Many aspects of the above mentioned cultural heritage include high quality food and drinks with the features of originality, which are key attractions for people from growing urban centers, sometimes even far from the mountains [Sprawozdanie... 2008]. Mountain areas represent places *where you can escape*, once literally, now more figuratively, because they give people the opportunity to experience a different world and also different lifestyles, different values and customs. They allow admiring the beauty of the landscape, in less altered and less polluted natural environment. For busy people, tired of civilization and urban noise, the mountains are often a place of rest and finding inspiration. They also provide the opportunity to participate in a wide range of sports – from very simple and popular (recreational skiing) to extreme sports, including those for which the conditions can be met only in the mountains [Chudy-Hyski and Żemła 2010]. The fundamental feature of the mountain sports, despite changes in fashion and trends in this field, is their considerable seasonality and usually a relatively short period in which they can be practiced. It is important for entrepreneurs and society that invest in this sector of the economy. The development of tourism in the mountains of Europe varies greatly and is in many respects. Even in a small part of a mountain range on the slopes or in the valleys, may be well-developed infrastructure for skiing or other sports may be well-developed, while the in adjacent areas, these facilities (and conditions) may not exist or may be quite different. Even in the Alps, the European mountain tourism center, visited annually by about 100 million of tourists only 10% of communes has a well-developed tourist infrastructure, and in 40% tourists appear occasionally [Eurostat databases... 2002].

For practicing mass tourism very important is recognizable and sustained for years landscape, which can ensure the co-existence of forests, grassland, and where there are favorable natural conditions also although rare – arable land. For these reasons, espe-

cially in some parts of the Alps, the Apennines and Carpathians societies economically dependent on tourism, but also on agriculture, for a long time began to support the work of agri-environment character and on a larger scale, than due to the attractiveness of tourism and commercialism of particular village, but also for the neighboring areas [Bohn 1993].

Another, key feature of mountain areas, perceived and appreciated in the mountains of Europe, is their sensitivity to environmental changes. The diversity and severity of climate, climatic belts and shaped by them storey distribution of species of plants and animals are, means that even relatively small changes in climate can be very important for agriculture and forestry, and cause unpredictable consequences, economically negative [EU Agricultural Economic Brief... 2011]. Also, climatic phenomena, showing increase in mountain areas, such as increased rain and snow falls, long winters, sudden changes of weather, storms, floods, landslides, avalanches, etc. cause a variety of difficulties and risks to human settlements and economic infrastructure. Likelihood



Source: author's study

**Fig. 2.** The main features of mountain lands – a classic shot



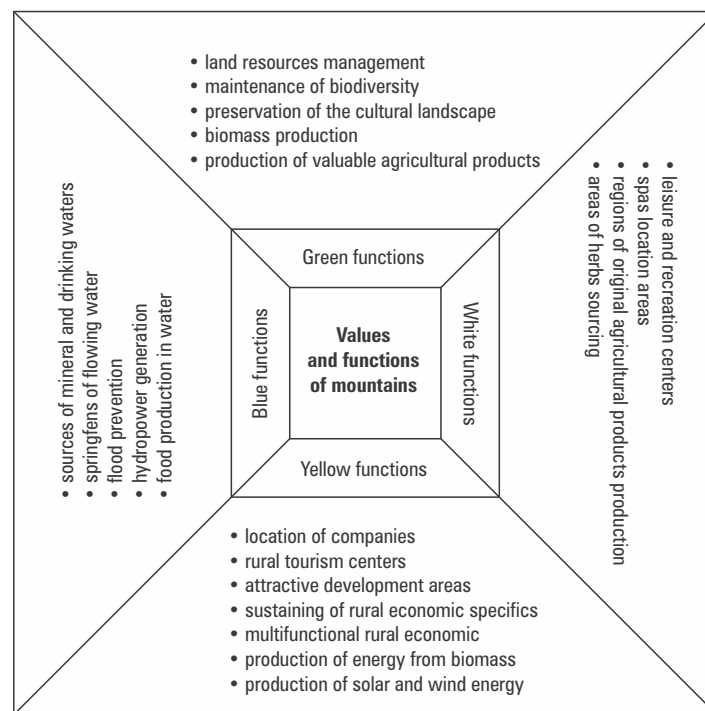
of an increased frequency of extreme events related to weather also means the natural hazards, such as forest fires, including non grazed logs and halls, the burning of makia in the Mediterranean area. Sensitivity to changes in the environment, including climate in mountain areas can also have negative economic consequences. Climate changes caused by global phenomena or changes in local habitat caused by (e.g. deforestation of subregion by a hurricane) may cause lowering the touristic attractiveness (e.g. in the Slovak Tatra mountains), and reduction of snowfall can limit the length of the ski season (e.g. in the Bieszczady Mountains but also in the Italian Dolomites). This may lead to a general reduction in the attractiveness of tourism and recreation in mountains in favor of areas located below. In view of the difficult to create and rapid financing alternative solution, it can endanger the economic stability of mountain areas.

Functions, and thus the economic importance of the mountains can also be analyzed from the point of view of the diversity of services they render to society and the local community [Musiał 2008] (Figure 2).

There are three categories of mountains functions: ecological, economic, and demographic and cultural. Mountain areas space, as well as in other parts of Europe have different ways of developing. It is a popular place for cities and also quite large (Innsbruck, Grenada, Podgorica, Zakopane), however, rural, forest and agricultural areas here are in a definite advantage. Execution of economic functions refers to different types of human activity of a production and service character, commercial, non-commercial and social. The current needs of the local and the immigrant populations are met here. In the mountains of Europe continue to be extracted various raw materials, even rocks, although limitations in this area are growing. Significant part and in some Scandinavian countries most of the energy is produced in hydroelectric, geothermal or wind power plants. Mountains, particularly in central Europe are large areas of forest production, with a wealth of flora and fauna are providers of various types of public goods. Where only edaphic and climate conditions permit they are locations for agricultural production, and especially the breeding and rearing of different species of animals known as herbivores. Often this is accompanied by the food processing and, generally better than in other non-mountain parts of the country, extensive gastronomy [Mountain Areas in Europe... 2004b]. Hotels, comprehensive travel services, especially related to winter sports are determining an economic value of mountains in particular the Alps, but also the Apennines, the Pyrenees, Carpathians, and even vestigial and low Świętokrzyskie Mountains. The functions European mountains are highly complex and ecologically diverse. They are mostly covered by various environment conservation regimes, including the highest safety requirements. This is due to the preciousness of natural resources, which are located in their area, including endemic plants and included in so-called Red List, and vertebrates and invertebrates found only in the mountains. Undeniably great values of the mountains are taken by them precipitations and water resources released. They are the resource that allows plant and animal life also in the surrounding valleys, basins, and also in the lowland parts of the country. They are also the basis for the economy especially agriculture. Mountains because of their topographical features are of great landscape and aesthetic

value, particularly appreciated in these countries, which suffer the shortage or the lack of mountains. In order to protect the environment, but also because of the limited capacity of the organization there commercial agricultural production, they are also locations for organic and integrated farming.

There are also many the functions and values of the mountains, which can be described as the demographic and cultural ones. They are home and somehow the reign of the human element. People live in the mountains even very high, i.e. also in the crags, where the fauna and flora almost disappears or is very sparse. Local people of the mountains – highlanders, once lived in large isolation from the population of the natural more convenient regions, shaped over the centuries a number of specific personal and social characteristics, even hard working, resourcefulness, ability to deal with the local community, giving priority to family values. Highlanders living in Europe probably have best preserved and cherish the historically developed distinct cultural values including dialect, music and dancing, crafts, and building in the region. They preserved today often separate even an anachronistic system of values based on the excessive prominence and cultivation their own culture, traditions, respect of goods brought by the ancestors, or the cult of the earth.



Source: author's study based on Wilkin 2012

**Fig. 3.** Economic and natural functions and values of mountains in Europe

These values still allow the sustaining in the mountains the agricultural use of land and a livestock production also in the low profitability and even the lack of profitability [Musiał and Wojewodzic 2011].

Another approach to the value and functioning of mountain areas can be indicated by their division into four categories defined by colors: green, yellow, blue and white (Figure 3). Such a classification of mountain refers mainly to their multifunctionality. Green functions are related to the management of natural resources, especially land resources. This is sustaining their special nature, including the protection of plants and wild animals. These functions can also include biomass production, which is used for livestock production, including wild animals and forest biomass. Yellow functions relate to maintaining consistency and viability of mountains, because then mountains increase their current use value and deferred time value. They are locations for business, area suitable for buildings and a generation site of solar and wind energy. Blue functions are associated with water and its resources management, protection of its quality, but also the prevention of floods. They also include food production in ponds and rivers and hydroelectric energy. Finally, the white features are important centers for relaxation, recreation and spas in the mountains. They are also regions producing highly regarded, original and healthy food, local products and herbs [Musiał 2008].

### 3. Problems of development of the European mountain areas

In Europe, more than 19% of the population lives in mountain areas, the diversity of individual countries in that respect is also large (Table 1). Leader in this field is Switzerland, in which 84.2% of the population lives in areas classified as mountains. In Slovenia, the ratio is 64.9%, and 63.4% of Norway. Almost half of the population in Greece, Austria and Slovakia (respectively 49.8, 49.6 and 48.6%) inhabits mountain areas. At the other end of such classification there are countries with a distinct shortage of mountains (and those in which there are no mountain areas at all), such as Belgium, where only 0.8% of the population lives in the mountains and subsequent Luxembourg 1.5% and Ireland 2.6%. Poland belongs to the group of European countries, where the shortage of mountains is expressed (if only referred to the European average), and mountains are home to only 5.8% of the population.

Considering the ranking of countries, defined based on the participation of mountain areas in the total area of the country, and similarly participation of the mountain and non-mountain population, clearly the *elite of mountain countries* (Table 1) is shaping. These include: Switzerland, Norway, Slovenia, Greece and Austria, closely followed by countries: Slovakia, Italy, Bulgaria and Spain.

Mountains are generally areas with poor demographic coverage. In all the countries of the old EU members (fifteen) and in Switzerland and Norway, the average population density in mountain areas is lower than in the lowlands.

**Table 1.** The population living in mountain areas of Europe

Country	Total population	The population living in mountain areas	The part of the population living in mountain areas in the total population
Total	<b>493 116 714</b>	<b>94 316 416</b>	<b>19.1</b>
European Union 15	<b>375 982 254</b>	<b>66 789 474</b>	<b>17.8</b>
Austria	8 024 449	3 993 337	49.8
Belgium	10 263 414	83 256	0.8
Finland	5 194 902	624 184	12.0
France	59 921 649	8 577 499	14.3
Germany	81 944 737	8 254 700	10.1
Greece	10 817 789	5 365 931	49.6
Ireland	3 917 203	101 903	2.6
Italy	56 095 135	18 267 183	32.6
Luxembourg	439 539	6 787	1.5
Portugal	10 356 116	2 741 590	26.5
Spain	40 738 016	15 681 826	38.5
Sweden	8 901 038	615 343	6.9
Great Britain	58 051 191	2 475 935	4.3
Newly adopted countries and candidate countries	<b>105 343 879</b>	<b>18 540 683</b>	<b>17.6</b>
Bulgaria	7 973 671	3 637 787	45.6
Cyprus	690 253	98 995	14.3
Czech Republic	10 215 299	2 385 905	23.4
Estonia	1 439 200	–	–
Hungary	10 246 939	709 239	6.9
Poland	38 632 453	2 255 261	5.8
Romania	22 236 918	5 535 706	24.9
Slovakia	5 401 316	2 624 492	48.6
Slovenia	1 992 035	1 293 298	64.9
Norway	4 503 436	2 854 051	63.4
Switzerland	7 287 145	6 132 208	84.2

Source: EUROSTAT NewCronos data 2000; NSO Malta, Including DOM. Values excluding DOM: Total population – 58255213, Mountain population – 7 633 595

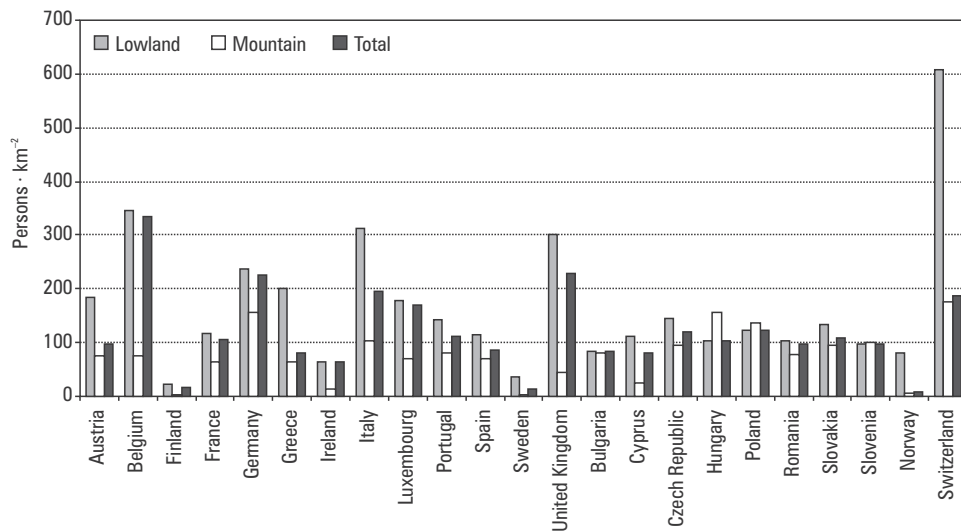
In some countries, these differences are very large, eg in the UK and Switzerland – multiple. Relationships are quite different in the three new EU member states, such as Hungary, Poland and Slovenia, in which these relations are opposite, i.e. mountain areas are relatively more populated than the lowlands and on average the whole coun-

try [Musiał 2010]. This reflects the relative economic and demographic attractiveness of the mountains in these countries, and for Hungary the state also results from the marginal area, to which concern the mountain statistics. Generally, the least populated municipalities in Europe are located in the mountainous areas. Ranges with the lowest population density, i.e., less than 25 inhabitants per 1 km<sup>2</sup> (or even less than 10 people), exist in the Nordic countries and in Scotland and Ireland, as well as the French Pyrenees. Other bands with a density significantly different from the national average of less than 50 persons · km<sup>-2</sup> are located on the island of Corsica, in the French Alps, the Massif Central, in the Spanish Pyrenees and in many mountain ranges in Bulgaria and Greece. The reverse relationship, i.e. high volume of population figures above 125 persons · km<sup>-2</sup> fall on most of the mountains of Germany, Basque Country, Catalonia, Sicily, the Swiss Jura and the Sudeten and Carpathian mountains located on the Polish area (west of the mountains) [Mountain study website 2004].

In some countries and mountain ranges can be observed an aging of the local population in relation to the population over 60 years, in which the share exceeds the average for the country and the lowlands. This phenomenon occurs clearly in Cyprus, where the national average is 14.7% of the population aged over 60 years and in the mountains the figure is 23.4%. A similar situation exists in Ireland and Greece, respectively, 15.0% to 18.4% and 21.9% to 24.0%. Completely different relationships are met in Austria and Slovakia, the percentage differences of percentages are negative for the population above 60 years of approximately 1% compared to the lowlands. In the mountains of Europe the phenomenon of demographic movements is also observed for years, including both depopulation, as well as a local or subregional thickening of the population (Figure 4). From 1991 to 2001 a significant or a large drop in population was recorded in mountains in Bulgaria, Finland, Norway, Portugal and Sweden. The greatest increase of the depopulation phenomenon was observed in the mountains of Corsica, Sicily and the central Apennines in Italy. Considering the rural areas as a whole, it should be noted, that almost in all the mountain countries of the Europe, mountain villages' depopulation rate was higher than in the villages in general, although exceptions have been also observed here. These relate to England (Wales), and in Belgium, Greece and Switzerland, the level of depopulation in mountain villages was similar to lowland areas. The causes of the depopulation directly related to the negative natural growth of the population living in the mountains (more deaths than births) over the decades in the highest degree related to France – 10.2%, Norway – 10.8%, Italy – 13.7%, Greece – 15.0%. In Finland, Romania and Greece, mountain areas are „rejuvenating” since birth have been here up to 15% higher than deaths. The second reason for the decline of the population of mountain areas is the migration of their inhabitants, outside mountain areas, mainly to urban centers [Mountain Areas in Europe 2004b].

European mountain areas, in addition to the problems of the demographic nature are plagued by numerous economic problems mainly of a structural nature. Their intensity and specificity varies from country to country and mountain ranges as well as economic groupings. Due to the low competitiveness of agriculture conducted in the mountains and optional or mandatory obligation to extensive (or medium extensive)

production, agriculture here is supported by specific support systems of an interventionist state. Support to agriculture in mountain areas in Europe is widespread and concerns in the first instance the EU and EFTA countries, but also beyond the European Economic Area, for example, Ukraine. This support has different nature and decidedly different amount per unit of surface or holding. It includes within the EU varied in their level; mountain payments, so-called support associated with the production, promotion of investment in farms, entrepreneurship development, processing and commercialization of production, and support for rural development. It is solid or highly varied regionally within a country (e.g. France and Italy), and supporting funds are both community and national as well as [Musiał 2010].



Source: Mountain Areas in Europe 2004a. Nordregio

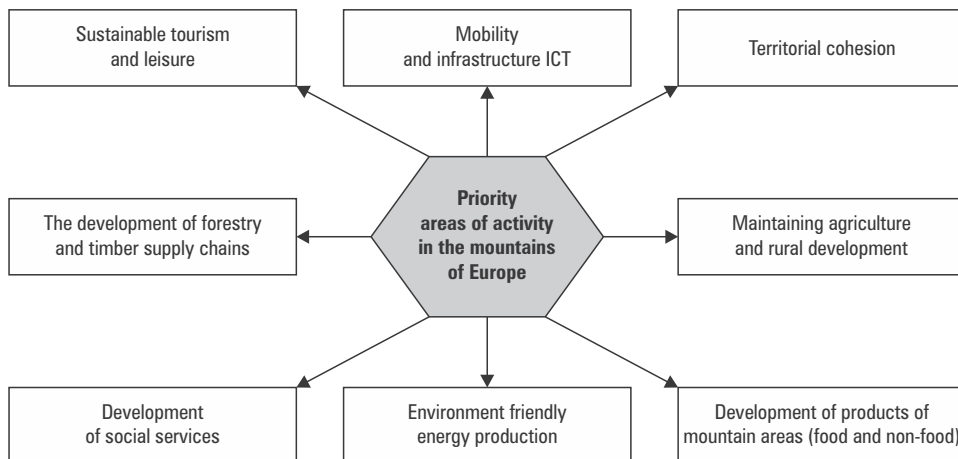
**Fig. 4.** The average population density in mountainous countries in Europe

It can be assumed that the territorial, spatial extent and size of the area that will be developed in the next few years for agriculture in the mountains depends largely on the community but also the regional (national) policy on agriculture in mountain areas. The European Union, which is the developer, promoter and organizer of the Common Agricultural Policy, to an increasing extent, creates the kind of dominating main structure of the policy, and the member states form detailed legal and organizational solutions of its implementation. Taking into account the various specific problems of the country, including mountains as well as separate areas creating for them special, often based on the conditions of production, climatic, natural and cultural criteria for access [Zegar 2012].

Some countries, especially in Central and Eastern Europe clearly feel the problem of disagrarisation of mountain areas and the abandonment of land, especially grass-

lands. A common phenomenon is the reduction or even abandonment of the so-called herbivorous livestock farming, what results in a lack of direct justification of supporting the agricultural use of the land. Further consequences of this situation reach beyond the sphere of production and economic and have their reference both to social issues and economic [Sprawozdanie... 2008]. Without economic and organizational support, of highlanders living in remote hamlets in small villages or in small mountain villages, the “descent” of highlanders from the mountains to urban and more populated areas will proceed. There they can count (or hope) on lighter and easier life. Ecological and environmental issues, boil down to the unwanted or unintended growth of bushes or to reforestation, decline in biodiversity, changes in the cultural landscape, and the rise of fire hazards. The change of the border between agricultural and forest land is proceeding, it is declining, which is not a new issue, but in Polish conditions under consideration since at least 50 years [Kruczała 1958]. With the reduction of the overall volume of agricultural production in many mountain ranges of Europe declines the possibility of local and regional products, and thus the construction of modern short supply chains and culinary attractiveness of the region.

Euromontana for almost 15 years has drawn attention to the eight problem areas that are considered a priority for the sustainable development of the mountains (Figure 5). These tasks can now be added to climate protection through the rational management of water and maintenance of vegetation cover, natural or agrocenosis [EU Agricultural Economic... 2011]. Important in the mountains especially in the event the use of natural resources such as acquisition of rocks and gravel, but also the so-called plow agrocenois is the prevention and active counteraction against the erosion, which is a threat to people, economic and nature.



Source: author's study based on Mountain Areas in Europe 2004b

**Fig. 5.** Priority areas of activity and the development of mountains in Europe by Euromontana 2013

Many of the actions that should be taken in the common European interest of sustainable development of mountain areas is essentially repeated for many years [Kruczała 1958].

It is a very important territorial cohesion, both in the sphere of economic exchange including tourism, but also in the sphere of science and joint projects and in culture (Figure 5). An important and difficult task, which seems to have been continued and operated as insufficient, especially in the poorer countries of the mountain is balanced communication. It should meet a set of features including modern movement of goods and people, but also save up and protect the environment. It may take place by the elimination of heavy transport with high emission by such transportation based on the use of electricity. Many of the priorities are the development of previously analyzed functions of mountain areas.

It is important that mountain areas of Europe should undertake various initiatives to modernize their social and economic structures. To draw good examples of development processes that have, or are still taking place in the more developed countries. Mountain countries should actively seek funds for growth and development, both at EU and national level. They should conduct joint investment, research and development projects. It seems that mountaineers are able to more quickly than other ethnic, national and social groups, put into practice ideas of broad international cooperation and solidarity of the European.

### 3. Recapitulation

The key importance of the European mountains includes both environmental and socio-economic issues. The mountains are appreciated centers of biodiversity, even though ecosystems of mountain environments are very sensitive to changes in the environment. They are springfens clean water, which is used by human settlements, agriculture and industry. Inhabited mostly by local people because of the historically slowed diffusion of civilizations they are highly appreciated centers of cultural and ethnic diversity. Because of the landscape attractiveness, the climate and the nature specificity and natural topography predestining practicing especially winter sports, they are the location areas of spas and tourism and recreation centers. European Mountains for years struggling with demographic problems are generally less populated areas. In the northern parts of Europe they are among the most sparsely populated areas. The largest increase of depopulation of the mountains includes: Corsica, Sicily and the Apennines, but also rural and mountainous areas of Bulgaria and Romania, Portugal, Sweden and Norway. In Finland, Romania and Greece mountain areas are rejuvenated, mainly due to positive population growth. Maintaining a strong demographic tissue is essential condition to maintain initial adequacy of nature and the economic importance of the European mountains. Still very important for mountain areas is the agricultural and forestry production. It should take into account the natural specificity of the mountains, which preferring of the environmental value over the production and economy. Mountains play and should continue to play many well-known and highly regarded functions for



society and local communities. They can be variously named and analyzed, a kind of mental shortcut and their colored descriptions are listed in the elaboration green, blue, white and yellow features. For the realization of these functions people living directly mountains, but also shaping and implementing policy for the mountains regional and national authorities, and European Union are responsible.

## References

- Bohn U.**, Natural vegetation of Europe and Turkey. 1993. Bundesamt für Naturschutz, Bonn.
- Caballero R., Riseth J.Å., Labba N., Tyran E., Musiał W., Molik E., Boltshauser A., Hofstetter P., Gueydon A., Roeder N., Hoffmann H., Moreira M.B., Coelho I.S., Brito O., Gil Á.** 2007. Comparative typology in six European low-intensity systems of grassland management. *Adv. Agron.*, 96, 351–420.
- Chudy-Hyski D., Żemła M.** (eds) 2010. Konsument na rynku turystycznym. Informacja turystyczna w Europie. Górnośląska Wyższa Szkoła Handlowa, Katowice.
- Czudec A.** 2006. Teoretyczne aspekty rozwoju zrównoważonego. [In:] A. Czudec, B. Grzebyk, G. Ślusarz (eds), *Odnawialne źródła energii jako element zrównoważonego rozwoju rolnictwa i obszarów wiejskich*. Uniwersytet Rzeszowski, Rzeszów, 8–20.
- Czyżewski A., Stępień S.** 2011. Wspólna polityka rolna UE a interesy polskiego rolnictwa. *Ekonomista*, 1, 9–36.
- Dacko M.** 2011. Koncepcja zrównoważonego rozwoju w naukach ekonomicznych – inspiracje, ewolucja, perspektywy. [In:] A. Bołtomiuk, M. Kłodziński (eds), *Natura 2000 jako czynnik zrównoważonego rozwoju obszarów wiejskich regionu Zielonych Płuc Polski*. IRWiR PAN, Warszawa, 19–42.
- EU Agricultural Economic Brief. 2011. What is a small farm? Brief No. 2. European Commission – DG Agri Brussels.
- Eurostat databases and data availability. 2002. Institut für Raumplanung, Universität Dortmund.
- Kirner L.** 2010. Bergbauerbetriebe und Betriebe in benachteiligten Gebiet in Oberösterreich. Endwihlung und oekonomische perspective. Bundesanstalt für Agrarwirtschaft, Wien, 42–48.
- Klepcka-Kołodziej D.** 2009. Wspieranie obszarów wiejskich o niekorzystnych warunkach gospodarowania w Polsce i w Unii Europejskiej. *Problemy Rozwoju Wsi i Rolnictwa*, IRWiR PAN, Warszawa.
- Kowalczyk S.** 2007. Globalizacja agrobiznesu i produkcja żywności. [In:] S. Kowalczyk (ed.), *Bezpieczeństwo żywności w erze globalizacji*. SGH, Warszawa, 47–58.
- Kruczała J.** 1958. Zagadnienia ekonomiki ziem górskich. *Polska Akademia Nauk, Zesz. Probl. Post. Nauk Rol.*, 14.
- Majewski K.** 1965. Ekonomiczne aspekty związane z ustalaniem granicy rolno-leśnej na terenach górskich i podgórszych, *Polska Akademia Nauk, Komitet Zagospodarowania Ziemi Górskich*, 9, Kraków.
- Mountain areas in Europe. 2004a. Final Report. NORDREGIO European Commission contract, 67–92.
- Mountain Areas in Europe. 2004b. Analysis of mountain areas in UE member states, acceding and other European countries, European Commission, Contract Nordregio.
- Mountain study website – report Nordregio 2004.
- Musiał W.** 2008. Ekonomiczne i społeczne problemy rozwoju obszarów wiejskich Karpat Polskich. *Problemy Rozwoju Wsi i Rolnictwa*, IRWiR PAN, Warszawa, 19–26.

- Musiał W.** 2010. Rozwój rolnictwa w górach z perspektywy prac Parlamentu Europejskiego. *ACTA Oeconomia*, 9, 3.
- Musiał W., Wojewodzik T.** 2011. Conditions and assessment of adequacy of supporting agriculture in polish Carpathian mountains. *ACTA Oeconomia*, 10, 4, Warszawa.
- Przyboś K.W.** 1995. Karpaty Polskie. Przyroda, człowiek i jego działalność, UJ Kraków.
- Sprawozdanie w sprawie sytuacji i perspektyw rolnictwa na obszarach górskich. 2008. Parlament Europejski 2008/2066 (INI).
- The Biogeographical Regions Map of Europe, European Environment Agency. 2002.
- Wilkin J.** 2012. Wielofunkcyjność rolnictwa – nowe ujęcie roli rolnictwa w gospodarce i społeczeństwie. [In:] J. Wilkin (ed.), *Kierunki badań; podstawy metodologiczne i implikacje praktyczne*. IRWiR PAN, Warszawa, 23.
- Zegar J.** 2012. *Współczesne wyzwania rolnictwa*. PWN, Warszawa.

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