

## THE NATURAL ENVIRONMENT AND TOURISM POTENTIAL OF IARA-HĂȘDATE BASIN

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**ABSTRACT.** – **The Natural Environment and Tourism Potential of Iara-Hășdate Basin.** Analyzed mainly from a natural perspective, the tourism potential of the area shows important characteristics providing favourable premises for tourism planning and development. The morphological, climatic bioclimatic, hydrological and biogeographical features of Iara-Hășdate Basin are investigated in order to create a detailed inventory of the natural resources with a specific tourism potential and to identify different types and forms of tourism which can be developed.

**Keywords:** *Iara-Hășdate Basin, natural and anthropogenic tourism potential, gorges, defiles, cliffs.*

### 1. INTRODUCTION. GENERAL GEOGRAPHICAL AND TOURISM FEATURES

The area of study is located in the central and southern part of Cluj County and corresponds mainly to Iara-Hășdate Basin, Săvădisla – Luna de Sus Corridor and the mountain and hilly areas that border them on the periphery, completely integrating 6 administrative units (Băișoara, Ciurila, Iara, Petreștii de Jos, Săvădisla and Tureni). Therefore, it is situated at the contact of two major geographical regions that have a complex and complementary geographical and tourism potential: Apuseni Mountains and the Transylvanian Basin.

The geographical location provides not only a privileged situation but also a relative geographical unity marked by a complex and complementary natural environment. The varied landscape is the result of the lithological, geological and hydrological evolution which structured a morphological setting made up

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by a number of marginal mountain and hilly units: Feleacu Range, Sândulești and Petrești Ranges belonging to Trascău Mountains, Muntele Mare and Gilău Mountains, mountain basins and valley corridors (Pop, 2012, p. 101).

The whole area ranges in altitude from 1826 m in Muntele Mare Peak, on the limits of the study area, to 281 m in the lowest point of the region. The difference in height and the high fragmentation of the area due to the drainage network (Hășdate, Iara and Feneș rivers and their tributaries) determined implicitly a peculiar landscape diversity (Pop, 2012, p. 102). Even more, all these impacted in a specific manner on the climatic and bioclimatic features, the hydrological component and, not in the least, on the biogeographical range. Each of them may provide proper attractive resources but they are also auxiliary factors in promoting the features of the others as the favorable aspects derived from the cooperation of the parts are attached to the individual contribution of each, therefore outlining a complex, diverse and attractive natural environment.

The marginal mountain natural units surround a corridor, a geographical component that provided optimal habitat conditions and allowed the development of a system of rural settlements that have a specific personality. Its emergence and development was favored by a high communication potential and diverse complementary resources.

The area of study favored an intense, continuous and ancient habitation, proved by archaeological data from prehistoric, Dacian and Roman sites and continued in specific historical condition throughout the Middle Ages and the modern era.

The anthropogenic component was also constituted or completed throughout the ages in a positive manner by foreign communities, especially the Hungarian ones, colonized in this area since the 12<sup>th</sup> century, especially in the villages Săvădisla, Vlaha and Liteni. The Hungarians have had a specific impact on the habitat, the land use and, not least, the mentality.

All these led to the individualization of a true human settlement subsystem, made up by areas of ancient and intense habitation which were geographically and administratively an integral part of the county specific structures. The intense and continuous habitation led to the development, in time, of a system of rural settlements that have a specific physiognomy, usually respecting the general regional specificity without excluding interferences proper to the national communities inhabiting the analyzed territory. The activities have been adapted to the natural conditions, leading to a rural civilization that has a certain specificity. Within this civilization and for each geographical component, conditions have been created to develop a complex tourism that has peculiar characteristics, complementing the types and forms of classical tourism related to the usual tourism supply in the rural space and to the capitalization of morphological, landscape and climatic resources in the surrounding mountains.

Thus, from the point of view of tourism, the analyzed area has got enough arguments for the integration in the regional and national tourism but also for the involvement in the international, global or European tourism and the attraction of tourism flows from neighbouring countries (especially Hungary), from other European countries or from around the world.

The analyzed territory is located between two major axes of communication that border it in the North (DN 1 or E 60) and in the South (DN 75) and is crossed on SE-NW direction by Transylvania motorway. The main road of the area links all these roads and provides a good accessibility to the tourist attractions.

At the same time, the location of most of the settlements along the two main valleys that drain the basin (Hășdate and Iara, tributaries of Arieș River) and Săvădisla-Luna de Sus Corridor (Feneș Valley, a tributary of Someșul Mic River), along their tributaries, at their confluence or along roads linking them, allowed the development of junction settlements that provide the link to the marginal villages and a main axis along the road between the two mentioned national roads, as well as secondary axes along the tributaries or between them, that have an important impact on territorial organization and the every day life in the region.

The nearby presence of important urban centers like Cluj-Napoca, Turda and Câmpia Turzii played a major part in the highlighting and individualization of the entire analyzed space in relation to the similar regional units in terms of functions and size. The location of the area at the junction or along the roads connecting trade centers and regions (Transylvania and Crișana) has been a competitive advantage capitalized ever since the Middle Ages. The further social, economic and political evolutions enabled the analyzed territory to increase its importance at regional and national level.

In this context, one should note the presence of **a relatively complex natural and anthropogenic tourism potential**, which constitutes a *premise, a fundamental factor for tourism development and primary tourism supply* (which individualizes the area within Cluj County).

## 2. THE TOURISM POTENTIAL OF THE NATURAL ENVIRONMENT

The natural component of the tourism potential as a whole and across its components exerts an attraction for various categories of effective and potential tourists, providing favorable premises for the development of different types and forms of tourism. According to the natural environment component that is dominant, one remarks characteristic tendencies towards adapted ways of tourism planning taking into account the differentiated capitalization of the primary tourism supply.

**The natural heritage** is dominant due to its components in the mountain sector of the region, covering large areas in Muntele Mare Range, Gilău Mountains and the northern parts of Trascău Mountains (Săndulești/Petrești Range), as well as in Feleacu Range.

**2.1. The tourism potential of the landforms (morphological tourism potential)** is important mainly for the landscape. The variety and its attractive potential is tightly linked to the structure, lithology, tectonics and the impact of the external modeling factors which determine by altitude the zoning and variety of other physical-geographical components, related to climate, vegetation, fauna and soils.

The morphological and landscape component is vertically displayed on altitude levels and follows the general lines of the mountain ranges which border the region marginally in the West (Gilău Mountains), South-West (Muntele Mare Range), South (Trascău Mountains) and East (Feleacu Range). The altitude drops usually from West to East (Pop, 2012, p. 101).

There are therefore **mountain ranges, basins and valley corridors** which contribute to the individualization of the region and set up a specific physiognomy, like an amphitheater, for the entire analyzed space, providing the aspect of “natural fortress”. As a consequence, there are varied morphological conditions, including steeper or gently rolling slopes, higher or lower landforms, different aspects, continuing towards the basins and corridors with glacises of different size and fragmentation, clearly outlining the watersheds, basins and valley corridors.

From this point of view, one should remark first the marginal mountain units: Gilău Mountains in the West, Muntele Mare Range in South-West, Trascău Mountains in the South and Feleac Range in North-East. There is a sharp morphological and altitudinal contrast between these mountain landforms and the basins and corridors included in the analyzed region or beyond it, as for instance the Transylvanian Plain to the East. There is a large variety of landforms belonging to several morphological units (from 281 m in the lowest point of the region to 1826 m high in Muntele Mare Peak) that have a complex structure and a varied and long geological past and an important impact on all natural components, due to the value and diversity of tourist attractions.

**2.1.1. Gilău – Muntele Mare Mountains** are one of the highest ranges of Apuseni Mountains, second only to Bihor-Vlădeasa Mountains. They are located in the North-East of Apuseni Mountains, to the West of Hășdate-Iara Basin and Săvădisla – Luna de Sus Corridor. Huedin Basin delineates them to the North while in the South they reach the valley of Arieș River. To the West, they continue

with Bătrâna and Vlădeasa Mountains. The part included in the analyzed territory is drained by a series of left tributaries of Arieș River (Iara, Hășdate and Poșaga) and a right tributary of Someșul Mic (Feneș Valley) (Pop, 2006, p. 179).

They are made of crystalline schists and granite intrusions which are present in the center in the shape of the letter "L". There are also Cretaceous sedimentary rocks in the South, covering smaller areas, where valleys strongly deepened (Pop, 2006, p. 179).

Generally, the landscape is characterized by the high frequency of rounded ranges and flat areas – Fărcaș-Cârligatele, Măguri-Mărișel and Feneș-Deva erosion surfaces, bordered by steep slopes that come down for long distances towards the low valleys (Pop, 2006, p. 179).

Several areas of different sizes within the two ranges are characterized by the dominant presence of the limestones which allowed the development of varied karst landforms, of which the gorges are the most representative ones (Pop, 2006, p. 179).

The natural forest vegetation lays on several altitudinal levels and is made of spruce and fir trees in the upper parts, followed at lower altitude by deciduous species (beech, then oak). It was systematically subjected to intense human intervention, especially in Gilău Mountains, where forests were cut on large areas and later replaced by secondary grasslands and hay fields, as well as scattered settlements (such as Mărișel and Măguri). However, in Muntele Mare Range, there was a "swarming" process of the population towards the higher lands for sheep husbandry, which led to the creation of new settlements formed by people who owned parts of the mountains (for instance: Muntele Filii, Muntele Băișorii, Muntele Cacovei etc) (Pop, 2006, p. 179).

*2.1.2. Trascău Mountains* began in the north-eastern part of the analyzed region, on Tureni Valley, and reach the south-eastern part of the region, on Arieș Valley, which forms an attractive narrow sector between the mountains on the territory of Lungești and Buru villages. North of Arieș, Trascău Mountains are present by means of a Mesozoic limestone ridge, clearly standing out, crossed by Hășdate and Tureni valleys which form the spectacular Turda and Tureni gorges (Pop, 2006, p. 194).

In the immediate neighborhood of the area, within the same mountain unit, there are several surface and underground karst formations having a high aesthetic and landscape value: limestone pavements (Colții Trascăului, Bedeleu, Râmeț and Ciurnerna Ranges), isolated cliffs (Pleașa Râmețului, Piatra Grohotișului) and peaks (Piatra Cetii, Piatra Craivii). One should add dolines, lapies fields, caves (Huda lui Papară, 2 km long). Due to the steep slopes, the intense disintegrating processes determine the creation of expressive scree fans (Pop, 2006, p. 194).

The drainage network has generally a transverse character and a dominant direction North-West – South-East. The most important valleys are Tureni, Hășdate, Iara and Ocolişel. In their lower sectors, before their confluence with Arieș River, they cross the harder rocks of Săndulești Ridge (Jurassic limestones and ophiolites) and Petrești Ridge (crystalline schists), in which the valleys deepen forming the gorges of Tureni, Turda (between Petreștii de Jos and Cheia), Iara or Surduc Defile (between Surduc and Buru) (Pop, 2006, p. 195).

Within this mountain unit, the forests were also largely cut to make way for secondary grasslands and hay fields. Few compact forests remain, mainly on the slopes. The dominating species is the beech, while the fir tree is seldom found because of the lower altitudes (the highest peaks do not exceed 1300 m) and foehn winds, which make the oak to climb as high as 700m. Near the analyzed area, on the territory of Vidolm village, there is a compact forest of European larch (*Larix decidua*) (Pop, 2006, p. 195).

Among the composing elements that store higher attractive values, one lists the *peaks, landforms created by differentiated erosion, gorges and defiles, scarps and some landforms belonging to karst morphology (especially caves)*. They can all be destinations for an established mountain tourism.

### 2.1.3. Gorges and defiles that have an attractive potential

They represent landforms well known for their picturesqueness and spectacularity. They attract tourists because several attractive elements are grouped together and concentrated in their perimeter: cliffs, caves, ridges, waterfalls, meanders etc.

In the eastern, south-eastern and southern part of the analyzed region, the extension of Trascău Mountains (made up predominantly of Jurassic limestones) North of Arieș River favored the development of a specific morphology of gorges and defiles. The most representative are (*Planul de dezvoltare a județului Cluj*, 2005, p. 33):

- *Arieș Defile*, between Buru and Moldovenеști, about 3 km long;
- *Turda Gorges* (2,9 km long and covering 324 ha). They have been dug by Hășdate River and have a strong vertical development (slopes and vertical cliffs as high as 300 m), residual landforms, caves (Cetățeaua Mare and Cetățeaua Mică). It is also a nature reserve including more than 1000 rare plant species, some of them under protection (buttercup, valerian, monk's hood, iris, mouse-ear hawkweed, silver service tree, wild garlic etc.) and 67 species of birds (golden eagle), fish, batrachians, foxes, weasel, marten, wild boar, deer, snakes etc.

- *Tureni Gorges*, located near Turda Gorges, dug by Racilor (Tur or Tureni) Valley for 1.85 km. They are among the wildest gorges in Trascău Mountains, having steep high cliffs (100-150 m) and diverse forms and microforms specific for karst morphology: rapids and small waterfalls in the riverbed (up to 3 m high), and large waterholes, called "bolboane" (for example, "Bolboana Fetelor" – Girls' Whirlpool, "Bolboana Șerpilor" – Snakes' Whirlpool).

On the slopes there are 29 caves, such as Peștera cu Silex (Silex Cave, 64 m long), Peștera de sub grohotiș (Cave under the Scree, 27.5 m), Peștera Vulturilor (Eagles' Cave). One remarks Peștera Șura Mare (Big Barn Cave) because of its large entrance portal. Apart from these, there are also other attractive landforms and cliffs, such as Colțul Câinilor (Dogs' Corner) and Stâna Crinilor (Lilies' Fold), as well as 53 traces of settlements dating since the Middle Neolithic (*Strategia de dezvoltare a județului Cluj*, 2011).

The nature reserve was declared a "protected area" by Law no. 5 of 6 March 2000 regarding the approval of the National Master Plan – Section III – Protected Areas and it is also a Site of Community Importance (SCI). Across the reserve, there are three types of natural habitats of community interest: rupicolous calcareous communities or basophilic grasslands of the *Alyso-Sedionalbi*; subcontinental peri-Pannonic scrub; and calcareous rocky slopes with chasmophytic vegetation. They shelter diverse flora and fauna species, some of them protected at European level or even included on the IUCN red list (*Planul de dezvoltare a județului Cluj*, 2005, p. 30).

Among the plant species that occur within this nature reserve, one should mention the rowan (*Sorbus dacica*), Greek whitebeam (*Sorbus graeca*), germander meadowsweet (*Spiraea chamaedryfolia*), birthwort (*Aristolochia clematidis*), dandelion (*Taraxacum hoppeanum*), centaury (*Centaurea atropurpurea*), nailwort (*Paronychia cephalotes*), Transylvanian violet (*Viola jooi*), fragrant yellow onion (*Allium flavum*), bur medick (*Medicago minima*), mountain houseleek (*Sempervivum marmoreum*), Spanish catchfly (*Silene otites*), scalloped spirea (*Spiraea crenata*), thyme (*Thymus comosus*), basket of gold (*Aurinia saxatilis*) and barren strawberry (*Waldsteinia geoides*) (*Planul de dezvoltare a județului Cluj*, 2005, p. 27).

The fauna is represented by several species of amphibians, fish and insects, such as yellow-bellied toad (*Bombina variegata*), European fire-bellied toad (*Bombina bombina*), Transylvanian smooth newt (*Lissotriton vulgaris ampelensis*), spined loach (*Cobitis taenia*), and three butterflies: Jersey tiger (*Callimorpha quadripunctaria*), scarce fritillary (*Euphydryas maturna*) and Fenton's wood white (*Leptidea morsei*) (*Planul de dezvoltare a județului Cluj*, 2005, p. 28).

Apart from these gorges, there are several sectors of spectacular gorges, located in Petrești Ridge (also belonging to Trascău Mountains): Borzești Gorges (0.4 km) and Hășdate Defile (1 km). The longer Iara or Surduc Defile (3 km) is situated in Gilău-Muntele Mare Mountains (*Planul de dezvoltare a județului Cluj*, 2005, p. 6).

*2.1.4. Cliffs* are very spectacular landforms, resulted from the fast deepening of valleys especially in limestone geological structures.

They attract tourists because of their vertical extension, their grandness and spectacularity, and the landscape contrast they provide if compared to the neighboring areas.

Such forms are to be found first of all in certain sectors of Surduc Defile and Ocolișel Gorges but especially within Tureni and Turda Gorges, where the height of the cliffs may reach or exceed 250 m. The very diverse detailed morphology (overhangs, cracks, gulleys, scree corridors, ridges and headlands) have an aesthetic value and a visual impact creating a very attractive landscape.

Cliffs are not only attractive to tourists who are content to appreciate them from a certain distance, but they also address to a special category of tourists who are initiated in the practice of a specific form of recreational adventure tourism – mountain climbing, strictly conditioned by the presence of cliffs.

Due to their specificity, it is needed that the cliffs used for climbing to be appropriately equipped in order to be accessible.

Unfortunately, because of the high costs, the proper equipment actions take place only in the case of cliffs within the two mentioned areas. For instance, in Turda Gorges, there are 25 high difficulty climbing routes, graded between IV and VI: one route graded 6A, two graded 5B, six graded 5A, 9 graded 4B and 7 graded 4A. There are lots of other routes, less difficult, graded II or III, recommended for beginners in climbing (*Planul de dezvoltare a județului Cluj*, 2005, p. 7). In the future, by means of proper arrangement, this type of active tourism can be extended to the other cliffs of the nearby gorges that are favourable for the practice of sport climbing.

Gilău and Muntele Mare Mountains are mainly made up by crystalline schists with intrusions of granite and are mostly fragmented by Iara Valley and its tributaries, which determine a predominant North and North-West slope aspect. Rounded tops and summits are the dominant features, along with flat or slightly undulated surfaces, from which slopes descend fast and sometimes steep towards the deep valleys. The slopes are not steep enough for climbing but they are favourable for the practice of winter sports. For example, at the foot of Buscat Mountain, there are such features, and the necessary conditions in terms of length, slope and aspect are met, therefore the area has been developed, giving birth to the already famous ski area of Băișoara and the recently opened Buscat Mountain ski complex.



2.1.5. *The speleological potential* of the area is provided by the presence of several underground caves, concentrated especially in the area of Tureni Gorges (29) and Turda Gorges.

In *Turda Gorges*, there are about 50-60 caves, arcades (remains of the collapsed caves) or niches. Most caves are very small, only eight of them exceed 20 m in length, and the largest one reaches 123 m. The most important ones are “Cetățeaua Mare” Cave or Balica’s Cave, located near bridge no. 4, on the right side of Hășdate Valley. This is where an outlaw from Petreștii de Jos, Nichita Balica, used to hide. He took part in the kuruc rebellion against the Habsburgs in early 18<sup>th</sup> century.

There are 29 caves in the cliffs of *Tureni Gorges*, such as Peștera cu Silex (Silex Cave, 64 m long), Peștera de sub grohotiș (Cave under the Scree, 27.5 m), Peștera Vulturilor (Eagles’ Cave). One remarks Peștera Șura Mare (Big Barn Cave) because of its large entrance portal (*Planul de dezvoltare a județului Cluj*, 2005, p. 9).

**Table 1.** The main potentially attractive underground caves in the studied area

No.	Name of the cave	Mountain range	Attractive potential					Location potential	Difficulty grade
			Cave	Speleo-themes	Lakes, rapids	Fossil ice	Paleontological or archaeological remains		
1	P. de sub Creastă	Trascău	x					++	II
2	Peștera Cetățeaua	Trascău	x				x	++	I

xxx -high attractive potential  
 xx - average attractive potential  
 x - limited attractive potential

+++ - favorable location potential  
 ++ - satisfying location potential  
 + - unfavourable location potential

Source: P. Cocean (1995), p. 56-67

## 2.2. Climatic and bioclimatic potential

Due to its geographical position, the studied area has a moderate continental climate, characteristic for the western and north-western parts of Romania, and a predominant western circulation. As a consequence, maritime polar or maritime arctic air mass invasions from North-West are dominant in winter while warm air masses from the South-West are specific for summer, as part of the north- Mediterranean cyclonic activity moving northwards.

The characteristic climate of the reference area is the one for hilly regions and mountain basins at heights between 250 and 800 m. It is favorable for all categories of people because it is a sedative-indifferent sparing bioclimate. The climatic elements and bioclimatic indices are relatively moderate throughout the whole year, less stimulant or nonstimulant for the human organism that does not have to make any special efforts for adaptation and acclimatization. It is considered an ideal bioclimate, without any therapeutical contraindication in all seasons. The marginal western and southern sectors, corresponding to Gilău - Muntele Mare and Trascău mountain ranges, are characterized by the presence of a mountain stimulant tonic bioclimate, that appeals more to the neurovegetative and endocrine functions which coordinate and determine the acclimatization of the human body to specific environmental conditions (*Planul de dezvoltare a județului Cluj*, 2005, p. 21-22). This type of climate is also significantly influenced by the predominantly western and north-western circulation.

In this context, the main elements which define the study area specific bioclimate have the following features.

*2.2.1. Air temperature.* The annual average temperature values are favorable for tourism: Turda 8.4°C and Cluj-Napoca 8.2°C. In all months of summer, average temperatures are above 17°C in the hilly areas. The highest average temperature values are recorded in Cluj-Napoca (18.9°C).

Because of the high morphological fragmentation, there are topoclimatic peculiarities in each of the two main landforms – the mountains and the basins and corridors. The annual average temperatures are around 1.5-2.5°C on the tops of Muntele Mare Mountains, 3-6°C at the periphery of the mountains (Băișoara 4.2°C) and 7-9°C in the hilly areas and in the basins and corridors (Turda 8.4°C) (*Planul de dezvoltare a județului Cluj*, 2005, p. 23).

In winter, in anticyclonic conditions, there are frequent *temperature inversions*, which favour the emergence of hoarfrost, fog and stratiform clouds in the lower areas, meteorological elements that have a negative impact on tourism.

*2.2.2. The amount of rainfall,* considered as a decisive factor during the warm season, is characterized by the increase of annual average amounts of precipitation from the North-East to West and South-West, according to altitude and exposure to Western circulation.

There are high annual average amounts of precipitation, increasing from 600-700 mm annually in the basins and along the corridors up to more than 1000 mm annually or even 1200-1400 mm annually on the highest tops in the mountains (*Planul de dezvoltare a județului Cluj*, 2005, p. 21-22). There is also a high relative air humidity throughout the year leading to a decrease by 2-3°C of

the temperature felt by the human body compared to the real temperature and results in the offset of phenological stages by 2-3 weeks compared to the areas outside the basins.

The lowest average annual amount of precipitation is recorded in Turda – Câmpia Turzii Basin, which is in the shadow of western winds bringing precipitation, and also a consequence of the foehn circulation in this region.

The month that has the lowest average amount of precipitation is February: 19.8 mm at Câmpia Turzii and 32.8 mm at Băișoara. In average, snow begins to fall in October in the mountain areas and in the second decade of November in the hilly areas. The average day of the last snow is 30 March in the hilly areas and 20 April in the high mountains (*Planul de dezvoltare a județului Cluj*, 2005, p. 25). Therefore the cold season is about 5 months long in the mountains, where there is snow cover long enough for the practice of *winter sports and the associated types of tourism*.

2.2.3. *Nebulosity* presents different values for each of the mentioned areas, according to the landforms and the atmospheric circulation. The annual average values exceed 6/10 in Băișoara area, where the average annual number of clear days is 80, and drops to 5/10 in the Transylvanian Plain, where there are 110-120 clear days annually on average. There are about 124-150 overcast days annually in the basins and between 160 and 190 overcast days annually in the mountains (*Planul de dezvoltare a județului Cluj*, 2005, p. 23, 25).

All these elements are involved in the setting of bioclimatic indices, whose values are reflected in the degree of favorability or restrictiveness in the practice of outdoor tourism activities, especially air therapy and heliotherapy.

2.2.4. *The climatic tourism index (I)* has average-high values, which means that there are favorable conditions for the development of tourism activities. The index is calculated as  $I = S + T - 5D / 5$ , where I – the climatic tourism index; S – the duration of sunshine; T – average temperature; D – duration of daily precipitation in hours (if one takes into account that 1 hour of sunshine is the equivalent of 4 hours of rain) (Fărcaș et al., 1968).

The major configuration of the landforms, the detailed morphology and the vegetation cover are elements that influence and diversifies the climate, contributing to its impact on the human body. The climatic factors that have a bioclimatic impact (temperature, precipitation, humidity, winds, duration of sunshine, air composition, solar radiations etc.) have also an influence on leisure activities, the practice of season-specific sports, the treatment of different diseases. They all depend on the relation between the human organism and the bioclimate. The climatic therapy takes into account both temperature and hydrological factors. For *air therapy* as a type of cure by means of direct contact between the body and the atmosphere, one has to consider the temperature factor and air ionization (*Planul de dezvoltare a județului Cluj*, 2005, p. 21).

2.2.5. *The thermal comfort* is related to the capacity of the human body to maintain a constant temperature within the large limits of the environmental temperature. Homeothermy is made by transfer or accumulation of heat according to the environmental temperature. There is a neutral zone in terms of temperature which creates the sensation of thermal comfort for the human body, between 16.8 and 20.9°C (equivalent effective temperature). Under 16.8 there is a discomfort due to cooling and above 20.9 the discomfort due to warming. In the basin area and up to 600-700 m, there are more than 10 days of thermal comfort annually; while at altitudes of more than 1500 m a person in recess does not feel the sensation of thermal comfort (*Planul de dezvoltare a județului Cluj*, 2005, p. 21).

The thermal discomfort due to warming has an average duration of 5 days annually at altitudes between 500 and 900 m. Over 900 m, there is no such discomfort. The thermal discomfort due to cooling has an average duration of 5 days annually at 500 m of altitude, 10 days annually between 500 and 1000 m and 15 days between 1000 and 1500 m (*Planul de dezvoltare a județului Cluj*, 2005, p. 21).

As a result, *the number of days with thermal comfort*, when the human body is in recess and has light clothes, and does not need to transfer or to accumulate heat, exceeds 10 days in July on average in the hilly area. This value is similar to that of other parts of the Transylvanian Plateau, the Moldavian Plateau or the Subcarpathians. This relatively unfavorable situation is due to the rather high number of days with *thermal discomfort* because of the heating – about 5 days in the basin area due to insolation but completely missing in the high mountains. The low values in the basin areas are the result of the sheltering position provided by the surrounding mountain ranges and the relatively high forest cover within the region. There are also about 5 days of thermal discomfort due to cooling in winter (*Planul de dezvoltare a județului Cluj*, 2005, p. 21).

2.2.6. *Bioclimatic stress* is determined by the simultaneous impact of the climatic factors – temperature, humidity, wind – on the human body, especially on the skin and the respiratory system. In the specific conditions of the study area, the registered values are between 10 and 20. The months of November, December, January, February and March are usually hypertonic, while May, June, July, August and September are usually hypotonic. There are only two relaxing months of transition, April and October (Teodoreanu, 1984).

*Pulmonary stress* is produced as a result of respiratory transfer. The hydric discomfort in summer shows that the air is saturated by water vapours while the desiccant discomfort in winter demonstrates a low amount of vapors in the air. The values in the basin area are low (20-30) (*Planul de dezvoltare a județului Cluj*, 2005, p. 22).

As a result, in the basin area, the months of December, January, February and March are desiccant, while May, June, July, August and September are hydrating. This time, three transition months have balanced values: April, October and November.

The accumulation of the two categories of stress, bioclimatic stress and pulmonary stress, leads to the definition of total bioclimatic stress. Its values are under 40 in the basin area, which makes it a sort of a “bioclimatic island” surrounded by the marginal mountain ranges (*Planul de dezvoltare a județului Cluj*, 2005, p. 22).

*2.2.7. Snow cover* is another important climatic component that has a high impact in mountain tourism. Its characteristics – duration, depth, consistency and stability – are differentiated according to the altitude in the mountain areas and the slope aspect. When there are normal amounts of snowfall in winter, the snow cover provides the opportunity for practicing winter sports and for the complex development of ski tracks and mountain resorts for winter sports, extended over variable areas, up to the highest mountain altitudes.

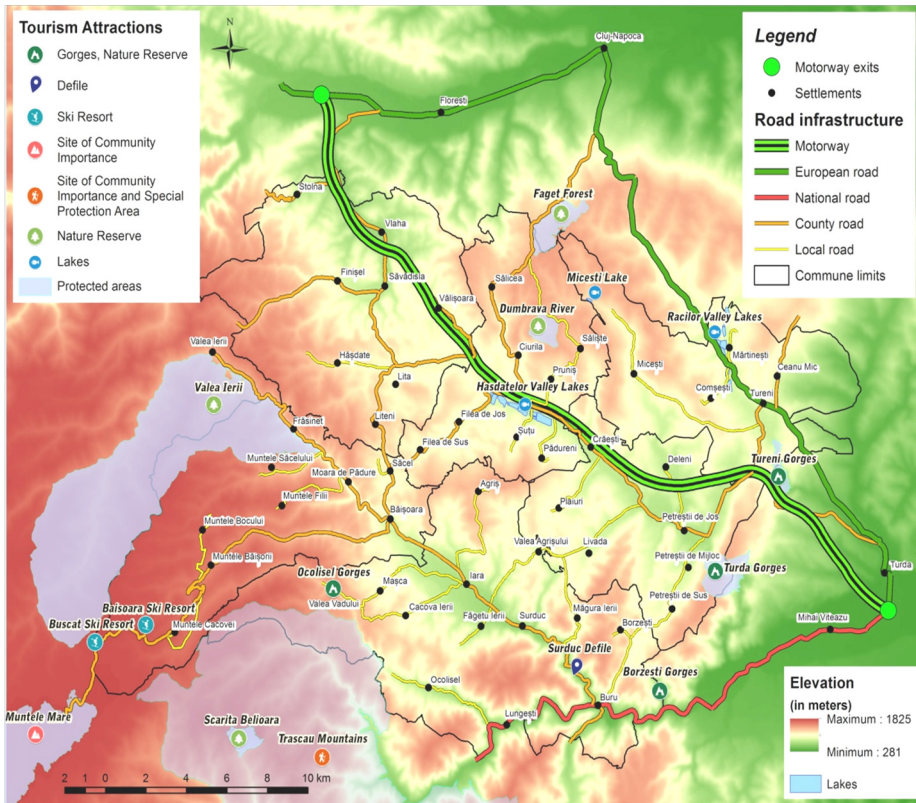
There are natural morphoclimatic conditions in the mountain region included in the analyzed space that meet the conditions for this type of tourism in several locations that might be integrated in the future supply if properly developed.

Thus, the complex analysis of the mountain ranges included in the analyzed region allowed the identification of an area around Buscat Mountain, close to Băișoara resort, which is adequate for the development of facilities for the practice of winter sports, mainly ski, as they meet the essential natural conditions that are necessary in this respect. In this area, there is an optimal combination of morphoclimatic elements – topographic factors (altitude, morphological configuration, slope aspect, morphometric features), climatic elements (snow cover duration and depth, air temperature and winds) – and the favorable location in relation to the main potential areas of origin for the customers and the degree of accessibility.

**2.3. The hydrogeographical tourism potential** is represented by the water categories that exist in the analyzed region.

*2.3.1. The surface hydrogeographical tourism potential* is relatively diverse and has a strong direct impact. The location and the dynamic and morphometric features of surface waters determine the residential, demographic and economic development of the entire analyzed space.

The drainage network crossing the reference territory takes part in the development or emergence of tourism activities in manners that come out from the margin effects revealed, the facilities for leisure (pick-nick) or fishing provided by some sectors and the landscape diversification of recreational areas.



**Fig. 1.** Main tourism attractions in Iara-Hășdate Basin and its surroundings

The physiognomy of the river banks (such as the detailed configuration and morphology, which is different according to the lithological structure, the landforms crossed and so on) plays a major part in attracting tourists, while the tourists' typology imposes the type of practiced tourism. For leisure tourism, forested banks are preferred (as they determine a margin effect), as well as less fragmented banks and an extended riverbed.

Iara and Hășdate are the rivers that have such sectors, proper for the development of the above-mentioned activities in the shape of short-period (mainly week-end) tourism.

However, on the whole, the tourism impact of streams is rather low, including the margin effect produced, not too much capitalized by the short-period tourism. This is due to the low discharge and depth of the rivers which do not allow the presence of sectors proper for the development of organized or spontaneous leisure tourism activities, like swimming or nautical sports.

2.3.2. *The lakes* are important both for their aesthetic and landscape value and for fishing.

The construction of dams led to the emergence of *man-made reservoirs* which have different sizes, shapes and functions. They have a favorable location in an area that has morphological, environmental and landscape values given the variety of landforms and the forest vegetation nearby. These lead to a significant individualization of the lakes in the landscape and enhance their attractiveness.

*The artificial dam lakes (reservoirs)* are proper tourist attractions because they may be used for leisure, boating, fishing or recreation. They are also elements that diversify the physiognomy of the landscape and reveal a complex margin effect, capitalized by means of recreational tourism. Therefore, the shores of the lakes concentrate a high number of tourists, especially during the warm season (*Planul de dezvoltare a județului Cluj*, 2005, p. 20).

The most important reservoirs are located along Racilor Valley near Mărtinești and Tureni, at about 20 km from Cluj-Napoca on the national road DN 1 (European road E 60/E 81). They cover approximately 35 ha and are the property of Sunfish SRL. The main fish species to be found are: common carp (*Cyprinus carpio*), silver carp (*Hypophthalmichthys molitrix*), grass carp (*Ctenopharingodon idella*), zander (*Sander lucioperca*), crucian carp (*Carassius carassius*), bream (*Abramis brama*), rudd (*Scardinius erythrophthalmus*).

Similar fish species can be found in the five reservoirs along Hășdate Valley, located downstream from Lita, near the villages of Șutu and Pădureni.

## **2.4. The biogeographical tourism potential**

2.4.1. *The vegetation cover* is very diverse and is made up by many associations and communities, which leads to high landscape diversity.

In this respect, from the point of view of tourism, *the forest* is the most important and complex natural ecosystem. It has a different vertical development depending on the age, it is perennial and its physiognomy is provided by the species composition and the spatial extension. It covers large areas, especially in the marginal mountain areas, but also in the basins and along the corridors.

The forest ecosystem is strictly related to the other components of the environment, especially the landforms and the climate, in terms of spatial distribution and the diversity of plant species. The altitude determines a certain zoning, and each zone covers about 300-500 m in height and contains specific vegetation associations.

The forest zones are vertically distributed from about 300 m to more than 1500 m. In the lower areas, deciduous forests are characteristic. They are made of sessile oak (*Quercus petraea*) in association with hornbeam (*Carpinus betulus*) or beech (*Fagus sylvatica*) in association with hornbeam (*Carpinus betulus*), especially on less fragmented terrain, at altitudes between 300 and 650 m. Higher

than that, one usually finds beech forests up to 1000 m, where the beech is already mixing with coniferous species like fir trees (*Abies alba*) and spruce (*Picea abies*). Above 1200 m, one finds the boreal forests made up of coniferous species, predominantly fir trees and spruce.

The mixed forests including species belonging to *Quercus* and other deciduous species cover smaller areas. They are characteristic for watersheds between 400 and 500 m and the dominant species is usually the sessile oak (*Quercus petraea*). In the alpine area, above 1650 m, the common chrySTALLINE schists morphological landscape is harmoniously completed with subalpine scrub and the herbaceous alpine vegetation creating vast meadows. During the flowering period, the varied chromaticism provided by the blossoming plants becomes part of the specific landscape of the upper mountain areas (Pop, 2006, p. 147-148).

Each of the zones consists of a diversity of species, which differentiate their appearance in each season. Between forestry zones, there are contact areas made up by a mixture of species belonging to both the upper and lower zones. They lead to an even higher physiognomic and landscape diversity.

This situation leads to the establishment of a tourist function for the forest vegetation. The forests also constitute areas of calmness, where pollution is absent or reduced, and it becomes a destination for people escaping the urban space, but not only. The forest is thus attractive and is used for leisure, recreation and entertainment, by means of different activities: observation of nature, photography, landscape contemplation, walks, hunting, fishing, phytotherapy, gastronomy, other traditional activities. In the forest, one combines the characteristics of leisure tourism with curative and sporting tourism.

From the point of view of forestry planning and management, the considered territory, delineated according to local government boundaries, corresponds to the territory of several forestry units, under the jurisdiction of Cluj Forestry Department: Turda Forestry Unit – which includes most of the analyzed area, Gilău Forestry Unit and Cluj-Napoca Forestry Unit (*Planul de dezvoltare a județului Cluj*, 2005, p. 25-26).

The compact forest landscape is supplemented by the forestry vegetation made up by isolated trees or clumps of trees, dispersed within the forestry units. They have an “island effect”, which is very important in tourism because of the physiognomic and structural contrast specific for the contact area between forests and hay fields or natural meadows. The glades or openings in the forest reveal a similar aspect of the “island effect” as they often break the monotonous forest landscape.

Unfortunately, the vast majority of the forests in the research area are not integrated in the national tourism flows as stand-alone components, meant to have an exclusive tourism function. Because they do not have the status of forests used for leisure, recreation and sanitary protection, they are included in



the economic circuits. Therefore, they provide wood for industrial use or for heating the dwellings in the villages that are not yet connected to the natural gas network.

As a result, the forests induce a minor social impact. The margin and island effects associated with the forests are less known and consequently are not capitalized by means of recreational and leisure activities during summer.

2.4.2. *The faunistic component* is an element that plays a part in making the territory more diverse and attractive. In the context of this analysis, it is important to note the presence of species that raise a scientific, aesthetic and sporting interest (for hunting or fishing). The balance of such species is performed by a thorough control of the forestry and environmental authorities.

Like the vegetation, the fauna is also structured according to altitude, contributing to the individualization of biocenoses that have a significant role in maintaining the ecological and trophic balance. It also provides the means for practicing a more exclusive type of tourism – *cynegetic tourism* (hunting). It is practiced by a rather small number of people who usually have higher living standards. Because the proper conditions are met, the practice of hunting is possible, as well as the possibility to acquire important hunting trophies, much searched especially by foreign tourists.

The fauna of hunting interest in the analyzed area includes mostly (*Planul de dezvoltare a județului Cluj*, 2005, p. 28):

- Terrestrial species: brown bear (in the forests of Gilău and Muntele Mare mountain ranges); red deer (in Muntele Mare Range); roe deer (consistently present in all the forests in the area); wild boar (inhabiting the deciduous forests and sometimes even the coniferous forests), rabbits, squirrels. One may add also the carnivore species: lynx, wolves, foxes, wildcats, pine martens, beech martens, polecats etc.
- Ornithological species (birds): partridge, quails, pheasants;
- Aquatic species of interest for fishing.

Hunting areas have been established in order to protect and preserve the endangered cynegetic species, to control hunting and to facilitate cynegetic tourism, by breeding and locating the game, building and maintaining the hunting infrastructure – lodges, watching huts, feeders, observation points, hunting trails.

For a better management, the territory has been divided into several *hunting areas*. Most of them (12) are included in Turda Forestry Unit: Feleac, Turda, Moldovenești, Lita, Băișoara, Valea Ierii, Harcana, Ceanu Mare, Triteni, Luna, Călărași and Ceanu Mic. Hunting lodges are at Moldovenești, Lita and Valea Ierii, while huts at Feleacu. Cluj-Napoca Forestry Unit includes 13 hunting areas: Stolna,

Feiurdeni, Chinteni, Baci, Șard, Florești, Someșeni, Corpadea, Suatu, Frata, Vaida Cămăraș, Geaca, Cătina (*Planul de dezvoltare a județului Cluj*, 2005, p. 28). However, only few of them cover a small part of the analyzed territory.

The drainage network of the analyzed territory shelters a diverse range of fish which represent a valuable asset for the development of fishing.

The fishing of trout is specific in the mountain areas, belonging to Turda Forestry Unit, in areas such as the Upper Iara Valley, Middle Iara Valley, Vadului Valley, Bondureasa Valley and Calului Valley.

**2.5. The landscape and scientific value** of some of the morphological, hydrographical or biogeographical components and the need for their protection has led to the initiative to set preservation regimes for natural areas that have a higher degree of complexity. The need to preserve the natural environment and its components also has a major tourism impact, resulting in the individualization of several areas that are protected and have a national or local (county) importance.

The categories have been set at national level by means of the Emergency Decree no. 236/2000 regarding the regime of protected natural areas, published in the Official Bulletin no. 625 on December 4, 2000, annotated by Law no. 462 of July 2001, published in the Official Bulletin no. 433 on August 2, 2001. They have been established according to the purpose and type of management as: *scientific reserves, national parks, natural monuments, nature reserves, natural parks, biosphere reserves, internationally important wetlands, world heritage natural sites, special areas of conservation and special protection areas for birds.*

The management of natural protected areas of national importance is regulated by a special act: Law no. 5 of March 6, 2000, regarding the approval of the National Master Plan – Section III – Protected Areas.

According to the stipulations of the Emergency Decree no. 236/2000, annotated as Law 462/2001, article 5, annex 1, there are *nature reserves* in the analyzed territory.

In Cluj County there are 20 nature reserves of national importance, of which three are located in the study area (table 2).

**Table 2.** Protected areas of national importance in the analyzed region

Name of the protected area	Location	Value	Category
Tureni Gorges	Tureni	mixed	Nature reserve
Turda Gorges	Mihai Viteazu, Petreștii de Jos	mixed	Nature reserve
Dumbrava Valley	Ciurila	botanic	Nature reserve

Source: *Planul de dezvoltare a județului Cluj*, 2005, p. 32-33.

Turda Gorges mixed nature reserve and Tureni Gorges mixed nature reserve have been presented above.

**Dumbrava Valley** is a botanic nature reserve that covers only 0.5 ha on the territory of Ciurila municipality. It shelters a species of lady's-slipper orchid (*Cypripedium calceolus*).

**Table 3.** Protected areas of county importance in the analysed region

Name of the protected area	Location	Value	Category
Bondureasa Reservoir	Valea Ierii	landscape	Protected area
Borzești Gorges	Iara	landscape	Protected area
Ocolișel Gorges	Iara	landscape	Protected area
Surduc Defile	Iara	mixed	Protected area
Arieș Defile	Iara	mixed	Protected area
Băișoara Mountain	Băișoara	mixed	Protected area
Șoimu Valley	Valea Ierii	cyngetic	Protected area
Iara Valley	Valea Ierii	landscape	Protected area

Source: *Planul de dezvoltare a județului Cluj, 2005, p. 31-32.*

In the research area there are also 8 natural protected areas of local (county) importance, declared as such throughout the time by the local county government (table 3).

### 3. CONCLUSIONS

The set of natural factors together with the richness and variety of the human component generated by the existence and development of specific social, historical and economic conditions led to the individualization of a complex and original geographical region, which has a strong impact on multiple plans as it has been shaped throughout the time. This fact is reflected and directly or indirectly materialized in different degrees in the relatively diverse tourism supply and the characteristics of tourism at local and regional scale.

As a result of this situation, one notices a certain concentration and specialization of the categories of tourism objectives on three main components, dominating either the natural ones or the anthropogenic ones, or a combination of the two.

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