

Planning Nature Conservation and Tourism Development in Cheile Turzii

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Abstract

Biodiversity conservation appeared as a result of the uncontrolled man induced impact upon the environment. In order to protect vulnerable habitats, certain protection decisions and politics were adopted worldwide. Protected areas were created. For these areas to be viable in terms of biodiversity protection as well as to ensure local population's welfare, economic activities and resource exploitation, tourism in particular, were integrated.

Cheile Turzii is a deeply rural area, where two natural complex reservations exist: Cheile Turzii and Cheile Turenilor. Nevertheless, the status of protected area is not taken into consideration by the local population that has a subsistence living standard and exploits the reservations' natural resources. Tourism, along with other environment friendly activities, may be the solution for developing this area. Therefore, a territorial planning action is needed for setting the protected zones, the exploitation zones and future development zones.

Keywords: *natural complex reservation, protection status, territorial zoning, regional identity, tourism*

Rezumat. Planificarea protecției mediului natural și dezvoltarea turismului în Cheile Turzii

Conservarea diversității biologice a apărut ca urmare a artificializării necontrolate a mediului natural. Pentru a proteja habitatele vulnerabile, o serie de măsuri și politici de protecție au fost adoptate la nivel mondial. În cele mai multe cazuri au fost înființate arii protejate, care pentru a fi viabile atât din punctul de vedere al protecției biodiversității, cât și pentru a asigura bunăstarea populației locale, au integrat și activități economice de exploatare a resurselor, cum ar fi turismul.

Cheile Turzii este o astfel de zonă, profund rurală, unde există declarate două rezervații naturale complexe: Cheile Turzii și Cheile Turenilor. Totuși, statutul de zonă protejată nu este respectat, populația locală ducând un trai de subzistență, exploatând resursele naturale ale rezervațiilor. Soluția de dezvoltare a zonei ar fi promovarea turismului și a activităților cu impact minim asupra mediului natural. Astfel este necesară elaborarea unui plan de organizare teritorială, pentru a reglementa arealele de protecție, cele de exploatare și cele de dezvoltare viitoare.

Cuvinte-cheie: *rezervație naturală complexă, regim de protecție, zonare funcțională a teritoriului, identitate regională, turism*

INTRODUCTION

Natural amenity-rich areas are attractive for tourism. Spectacular landscapes, represented by geologic and geomorphologic landforms, rare flora and fauna, constitute the primary natural resources that can be exploited by tourism. Nature, in its most primitive and unchanged status, is the premises for tourism development, and, at the same time, an attraction in itself. But, tourists are in search not only of unique landscapes, they are also looking for the cultural specificity of a place and they value good access and accommodation infrastructures. In some cases, wishing to develop tourism and increase a community's welfare, the built infrastructures and tourism practices have harmed the biodiversity of the natural areas.

In order to protect biodiversity, which is threatened on the one hand by the development of urban centres and, on the other hand, by inadequate tourism practices, a nature conservation system has been put into place in Europe, as well as at the international level.

Nature conservation in Europe is represented by protection sites and lately, by ecological networks, based on landscape ecological principles. Ecological networks consist of core areas, corridor zones, buffer zones and, in some cases, nature rehabilitation areas for the re-establishment of nature. Ecological networks reflect the planning system of a region or country. Since ecological networks consist of both ecological and human components, the interaction between nature and culture is a priority to consider in both nature

conservation and sustainable development (Jongman and Pungetti, 2004).

The study area - Cheile Turzii – is situated in the northern part of the Trascău Mountains, delimited in the west by Iara and Petrești sedimentary basins, the village of Tureni in the north, Cheia and Săndulești in the east, the Arieș valley in the south (Fig. 1). The chalky bar of Petrești represents the central structural element of the region, the “spine” of this territory. Due to the chalk deposits, a series of gorges and narrow sectors appeared, as a result of fluvial erosion. The most well-known are Cheile Tureni and Cheile Turzii in the northern part of the region and Cheile Borzești in the south (Măhăra and Popescu-Argeșel, 1993). Due to its geological, geomorphological and biogeographic diversity, Cheile Turzii and Cheile Turenilor were declared Natural Complex Reservation sites, being one of the most spectacular and well-represented karst landscapes, both in the Apuseni Mountains and in Romania.

Such a rich natural potential determined a significant tourism attraction for the inhabitants of the urban centres located in Transylvania. The different forms of mountain tourism - hiking, climbing, paragliding - and eco-tourism may develop most favourably in this area. Unfortunately, as a result of a deficient management, the biodiversity of the area is threatened by uncontrolled grazing and tourist activities. The industrial exploitation of chalk deposits in Săndulești, in the vicinity of the Cheile Tureni Reservation is even more alarming.

Taking these dysfunctions into account, the present paper aims at making an inventory of the amenities of the area and to integrate them in a sustainable development plan that will include a functional zoning of the territory in accordance with the protection target, while equally meets the needs of the rural communities in terms of economic development.

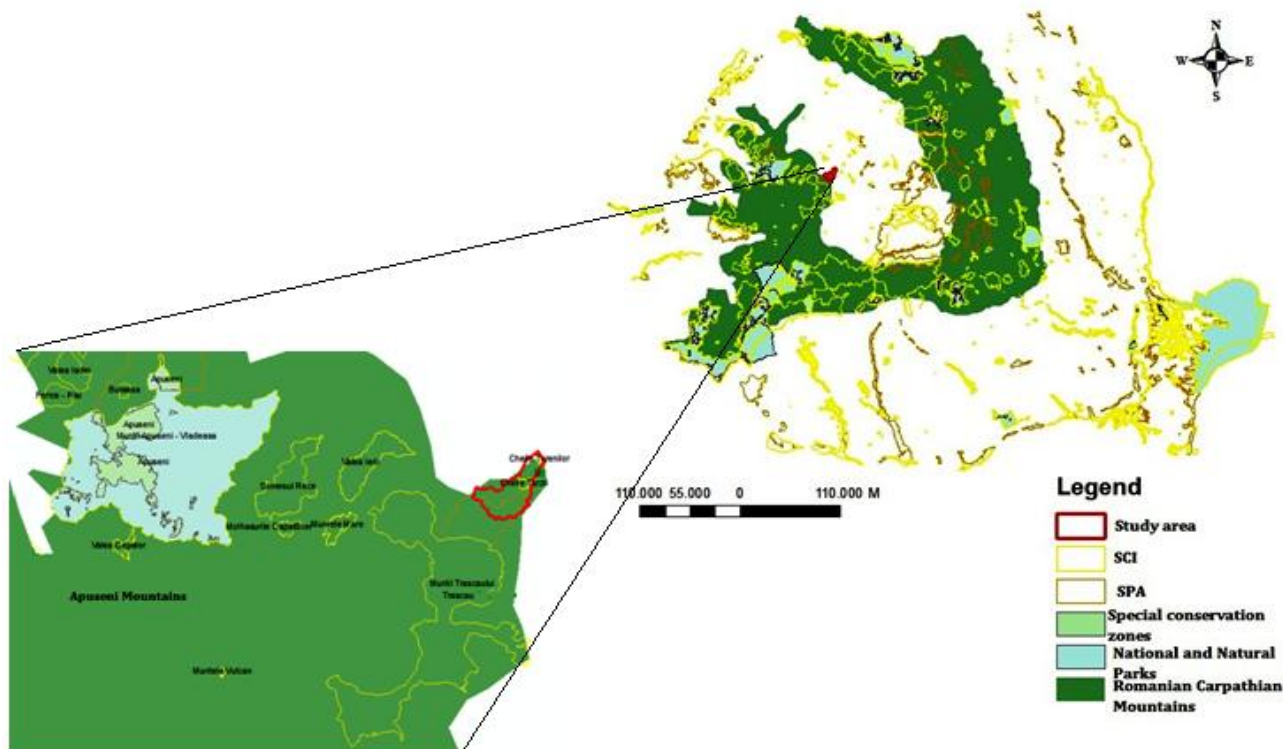


Fig. 1. The location of the study area within the national system of protected areas (adapted after the Romanian Ministry of Environment and Forests database)

DATA AND METHODS

The assessment of the study area was carried out by consulting the bibliography research on the subject of interest; collecting the available data from the Statistics Institute; collecting graphic material (maps, orthophotographs) of the area; field trips and GIS modelling.

First of all, some geographic information on the study area is necessary. From a geomorphological point of view, Cheile Turzii is situated in the northern part of the Trascău Mountains, a section where Tithonic chalk deposits are predominant. In the south, there is the Arieș River valley, the most important hydrographic artery, which represents the base level of the hydrographic network of Cheile Turzii. The valleys and beds of the water courses are young and overflow due to heavy rainfalls. They are

deeply incised into the resistant rocks, creating many gorges, the most important of which are: the Arieș Valley forming a gorge on the section between Buru and Moldovenești localities; the Borzești Valley with the Borzeștilor Gorges; the Hășdatelor Valley which forms Cheile Turzii and the Racilor Brook with Cheile Turenilor (Cocean, 1988).

The overall climate is moderately continental with the altitudinal zonation of climatic elements. The average annual temperature is 5°C and the average annual precipitation is 1000 mm. In winter, temperature inversions occur in the depressions, rendering these areas inappropriate for the production of some agricultural cultures. In relation to mountain tourism (trekking, climbing, hiking), the average number of days with precipitation is around 140 days/year. May is the most favourable month for mountain tourism, while June is the wettest month of the year, with significant cloudiness and strong infiltration in the limestone area, making it difficult to visit the caves. From July to mid-September, the weather becomes stabilized and this is one of the best periods to practice tourism. Until October the weather is rather stable, but it is becoming slightly colder. (Vasile and Barbelian, 1986)

The vegetation of Cheile Turzii reflects the complex lithology of the area. The forest level is made up of oak and beech trees. On the lower hills cornel-tree and hawthorn associate and on the steeper slopes of the gorges yew-trees appear.

The flora of Cheile Turzii is extremely various, it comprises over 990 species, among which some are very rare endemic species: *Allium obliquum*, *Ferula sadleriana*, *Aconitum fissurae*, *Dianthus integripetalus*, *Hieracium tordanum*, *Iris gürtleri*, *Viola jobi*, etc. (Vasile and Barbelian, 1986)

The fauna is also very rich, represented by a varied hunting domain: wild boar, fox, deer, rabbit etc. The rare species are under protection in Cheile Turzii Reserve: *Aquila chrysaetos* counts only three families.

Secondly, we shall present the stages we underwent in our research, focusing on the theoretical models and the assessment tools, on which our planning scenario is based.

Every territory has a set of geographic data that can be processed in GIS. Thus, the first step of the research was to gather and draw an inventory of this data in the *bibliography research stage*. The GIS method has further on helped us to solve the problems raised by the management of the data on the area in the analysis and diagnostic stages. It also served as a forecast medium offering a global and cross-disciplinary approach for the users, the

decision-makers and the citizens. It enabled the planner to map the networks, the real estate, and the protected areas and to build thematic maps. This capitalization of thematic and geographic data corresponds to the stage known as *the territorial approach of the study area*. The GIS also offered multiple possibilities for analyses and simulations. In prior stages it made possible to inventory those zones that could welcome the introduction of the planned infrastructure.

The planning vision of Cheile Turzii is based on the concentric model for a biosphere reserve, initiated and promoted by UNESCO, through The *Man and the Biosphere Programme* (MAB). In addition, the area is planned within *green infrastructure framework*, which refers to an interconnected green space network, planned and managed for its natural resources value and for the associated benefits it confers to human people. (Benedict and McMahon, 2006).

Within the protected area such as a biosphere reservation, land use is disposed according to a radio centric scheme, which controls the exact location of the access and circulation infrastructure as well as the touristic infrastructure inside the reservation (Fig. 2).

The core area of integral protection has a very low degree of artificiality and a maximum biodiversity for one or two ecosystems. It is built inside the reservation in order to ensure a long-term protection of the flora and fauna in specific points (according to the needs, several integrated reservations can be built in the same park). Restrictions on some human activities or tourists' circulation have been imposed. Only a small number of persons coming with a scientific purpose have access to this area. In this way, it becomes possible to preserve biodiversity, to closely monitor the endangered ecosystems, to put the disrupted ones under surveillance. (Ciangă and Dezs, 2007)

Buffer zones and ecological corridors often coincide with multifunctional landscapes. These landscapes support both nature and other land use functions.

IUCN defines a *buffer zone*: a zone peripheral to a national park/ reserve where restrictions are placed upon resource use or special development measures are undertaken to enhance the conservation value of the area (Oldfield, 1988 cited by Jongman and Pungetti, 2004). The more socio-economic approach is expressed by the World Bank definition: a social agreement or contract between the protected area and the surrounding community, where size, position and type of buffer zone is

defined by the conditions of this agreement (Jongman and Kristiansen, 2001).

Buffer zones aim at controlling human activities within the adjacent lands to a core protected area by promoting their sound management, thus decreasing the potential impacts. The presence of a local population is permitted within the buffer zone. The current approach in buffer zone design tends to accept them as development areas, meant to ensure the protection of biotopes but also to serve the purposes of the economic production, ecological education, recreation and ecotourism.

Thus, the buffer zone is (or should be) designed (Jongman and Troumbis, 1995 cited by Jongman and Kristiansen, 2001):

- to protect the local traditional land use;

- to shape irregularities of the core area;

- to segregate land use like agriculture but also recreation or touristic activities, from the core area in order to avoid adverse effects;

- to locate developments that would have a negative effect on the core area if they were situated elsewhere.

Within an ecological network (Fig.3), *ecological corridors* are mostly multifunctional landscape structures. They can be greenbelts with a protection status, recreational corridors (linear open spaces with intensive recreational use), scenic corridors, utilitarian corridors (canals, power lines), trails (designated routes for hikers and outdoor recreation having a function as a natural corridor as well).

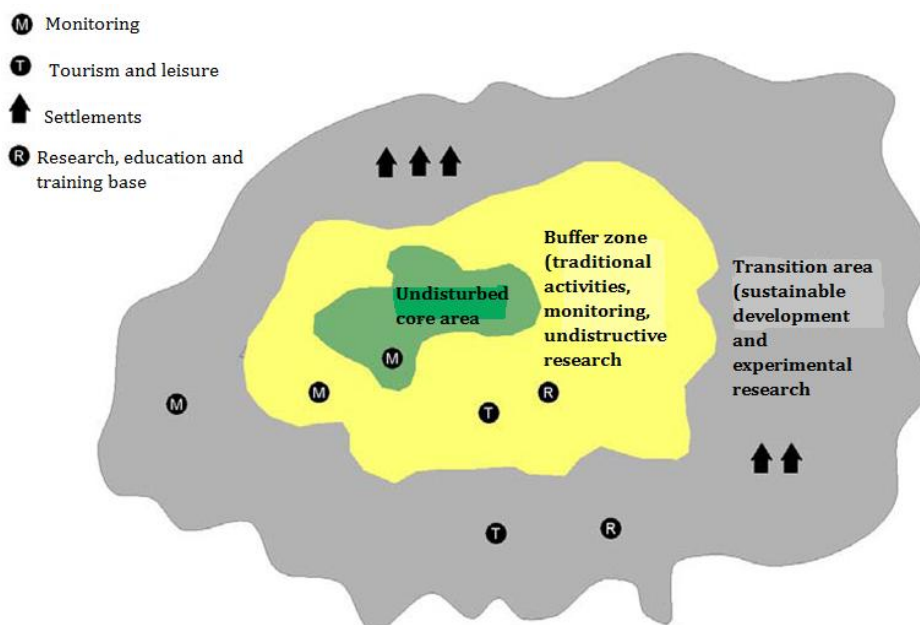


Fig. 2. The general model of a biosphere reserve (after Primack et al., 2008)

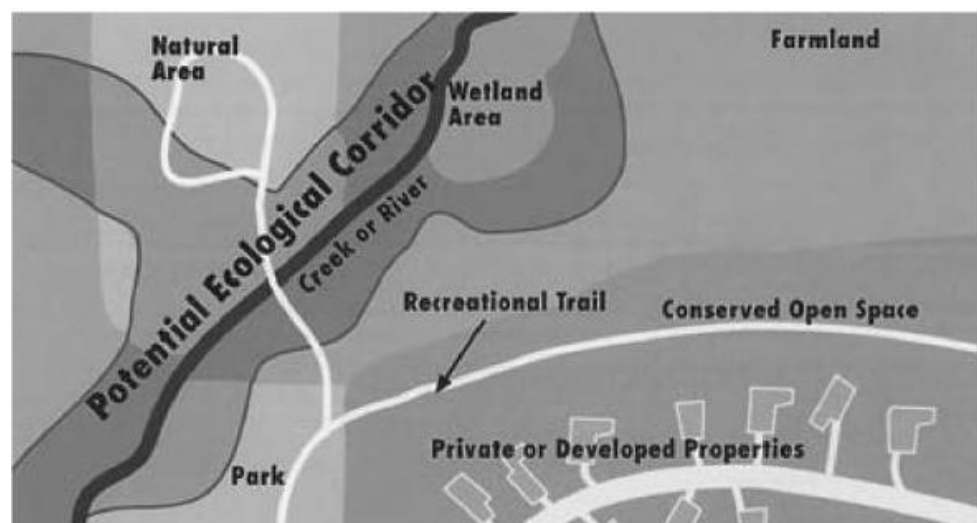


Fig. 3. An example of green infrastructure territorial planning (after Benedict and McMahon, 2006)

The transition area, which relates in-situ and ex-situ conservation, is also known as the free access zone for leisure. The protection regime is maintained, however, at the same time, economic and traditional activities are allowed, even encouraged, provided they are in accordance with the sustainable development of the region – reducing the human pressure and safeguarding the natural, cultural and social heritage, as well as the location of tourism infrastructure (accommodation facilities) which ensure the tourism practices inside the reservation (the reception, distribution and control of visitors' flows). This area is among the most important ones in the process of territorial planning, since it has to be conceived as a cooperation zone, where the land can be used according to the traditional practices of the communities living in the area. This implies an ecological use of the waters, forests, pastures, hayfields and arable lands, by supporting the building of infrastructures meant to render these resources profitable, as long as the ecological reconstruction is not impeded. This is the area where the necessary infrastructure for mountain, rural and hunting tourism could be built: hunting cottages, observation towers, lodges, and rural guest farms.

Even if the spatial distribution of these three zones was initially thought as concentric circles, they have a variety of forms when actually put into practice, derived from the necessity to adapt them to the local conditions of each and every area, thus highlighting the creativity and the flexibility of the planning concept.

DISCUSSIONS

In order to correctly set the dimensions and the extension of the protected area, it was necessary to take the following factors into consideration: the distribution of population, the biological potential of the territory, the political and historical factors.

As a general rule, the commercial value of the lands that are subject to conservation issues is low, as they are usually located in areas with steep lands, that are not too fertile and with low population density.

The main questions that have to be answered in order to work out the optimum solution for the protection of a planned conservation area are:

- How large does the protected area have to be?
- Is it better to create one large protected area or several smaller ones?

- How many specimens of a protected species have to be preserved in a protection area, in order to prevent its extinction?
- Which is the best shape that a protected area should have?
- How to optimize the land use and diversify the functions of the region – the touristic function in particular?
- How to preserve and highlight regional identity?
- How to conceive a viable environmental planning that can both protect the biodiversity of the region and the welfare of communities?

These are important questions to be answered by the planner as they influence the decision-making actors, from the central administration to the land owners, who are involved in approving the territorial planning and the development strategy.

Bearing these questions in mind, our attempt has been to analyze the possibilities of planning a tourism-oriented and ecological farming area in Cheile Turzii. In the planning approach, an attempt has been made to come up with a solution that, on the one hand, satisfies the tourists' demand for infrastructure and tourist facilities and, on the other hand, effectively protects the endemic species and the landscape.

The natural amenities of the area

Cheile Turzii benefits from a varied natural potential due to the presence of limestone associated with crystalline knolls. Therefore, on the basis of the type of rock found in the substratum, it is possible to identify:

- a relief formed on crystalline rocks – i.e. the gorge that the Arieș River carved in the crystalline rocks found near Buru;
- a relief formed on ophiolites – i.e. Hășdatelor and Turenilor gorges;
- a karst relief, represented both by shallow karst (karren grike, dolinas, gorges: Cheile Turenilor, Cheile Turzii, Cheile Borzeștilor) and deep karst (excavations and caves).
- Landforms formed by physical weathering landforms (periglacial erosion cliffs, periglacial peaks, towers, pillars, needles).

The cultural heritage is not as spectacular or as rich as the natural one. It is represented by a certain number of prehistoric tumuli, Roman artefacts, churches and monasteries (Fig.4).

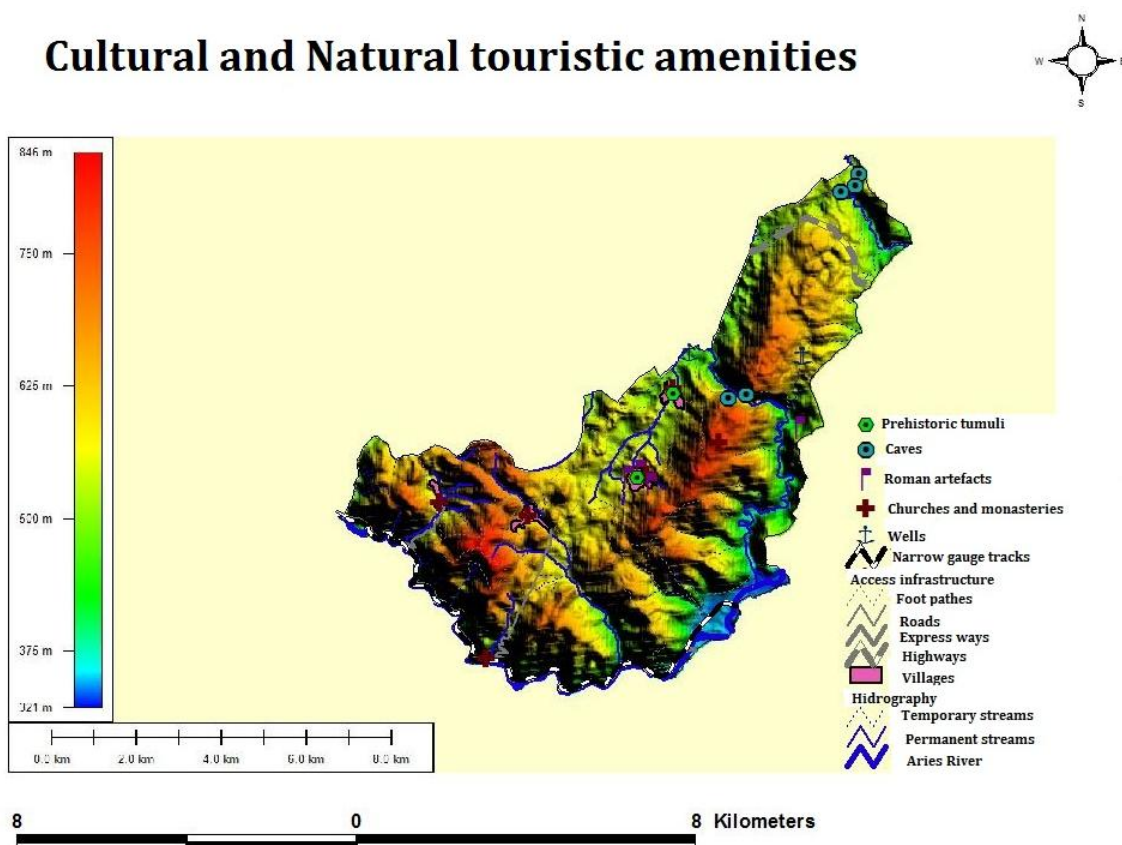


Fig. 4. Tourism potential in Cheile Turzii area

Diagnosis

The dysfunctions that can be identified in this region are on the one hand natural dysfunctions related to the morphology of the area (rainwash and gully erosion landforms, landslides, debris flow, fluvial erosion, rock fall), to the hydrological characteristics of the drainage basins found in the region (floods and flash floods), and, on the other hand, anthropogenic dysfunctions related to insufficient public utility infrastructures, poor access infrastructure, uncontrolled grazing, extensive traditional agriculture, industrial exploitation – limestone quarries, disorganized tourism and ageing population.

It has been stated that the area is rich in valuable natural amenities. The anthropogenic amenities are less spectacular, but specific to the rural environment, thus creating regional identity. The agricultural characteristics of the area further strengthen the rural dominance. The economic activities developed here are a consequence of the high quality raw materials found and produced in the region. However, the industrial exploitation endangers the unique biodiversity of the area, which is subject to protection status. Consequently, the

tourism organization of the region is a possible solution for its sustainable development.

The present tourism organization of the area is insufficient and rather obsolete. The accommodation infrastructures are concentrated in three points, which are in connection with the access roads and the natural attractions. In the northern part of the region, in the vicinity of Tureni, two accommodation infrastructures, a hotel and a guest ranch were registered in 2008 that totalize 56 places. There is a hiking halting-place and a refreshment bar near Cheile Turenilor. In the southern part of the region, in Buru, the Buru chalet can be found. On the eastern side, at the entrance to Cheile Turzii, Cheile Turzii chalet can be found with 40 beds, a restaurant and a small nearby camping site. Other tourist facilities include those developed inside Cheile Turzii Reservation: bridges and security structures on the steep slopes of the Hășdate River Gorges.

Many tourism-related dysfunctions were pointed out in order to be improved so that the region could become attractive for tourists:

- the tourist infrastructure is limited, unsatisfactory and underdeveloped for the present flows of tourists;
- the lack of halting-places and places of refuge;

- the lack of first aid stations;
- the lack of infopoints;
- improper signposting;
- inappropriate hiking paths;
- the main natural destinations are not organized for touristic purposes;
- the industrial activities penetrate into the protected area.

Organizing the region

For the optimization of land use, it is necessary to properly make a functional zoning of the analysed territory (Fig.5), to clearly state the destination of the land plots by conceiving and applying a Land Use Regulation.

FUNCTIONAL ZONING

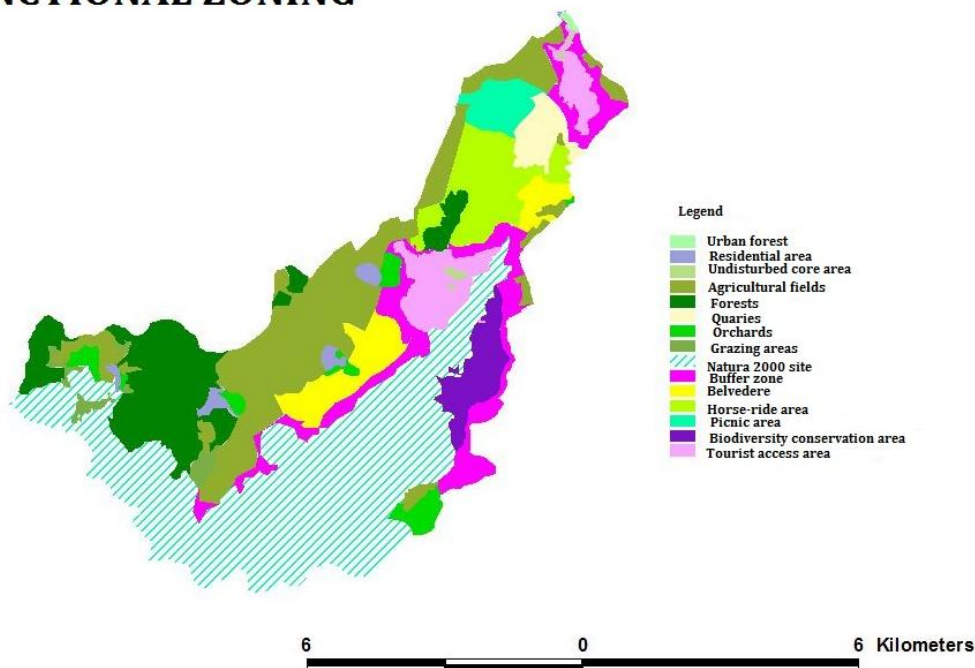


Fig. 5. The functional zoning of the area of the Cheile Turzii

The development of the area can be built around a number of activities that are already practiced by the local population and that can be adapted to the protection status of the area, in order that economic development should not harm the biodiversity of the area.

The management of protected areas and of the local population is an important part of the management plans, which must make reference to the way the resources from the protected areas are used by different interest groups. Therefore, when planning the future economic development of a region, it is highly important to keep the interest of the local community in mind, which is the following: while abiding by the regulations imposed by the protection status, the local community has to gain a certain welfare, which would allow it to continue living in peaceful terms with the authorities of the reservation. In the best scenario, the local population is implicated in the management and in the planning process of

conservation actions, being trained and employed in the protected area.

In the studied area, the local communities practice subsistence agriculture. The agricultural function can be further developed in this area, as its agricultural potential is high. It could be oriented towards ecological farming, which would agree both with the set protection and development objectives. Another function that meets the two main objectives mentioned above is the touristic function, which can be oriented towards „milder” forms such as agro-tourism, eco-tourism and sports tourism. The infrastructure needed for these forms of tourism is ‘light’ and does not modify the natural appearance of the area significantly. However, it is important to monitor the tourism practices, especially inside the reservation, in order to prevent the non-ecological behaviour of the tourists and to minimise any possible damage.

The industrial function may be developed in the area, in relation with agriculture – a light industry

e.g. food processing industry meets the required premises of development – and cottage industry that can sell its products to tourists. The limestone quarry degrading the landscape, polluting and endangering the very heart of the Cheile Turenilor Reservation at present, should be closed and an ecologisation process should be initiated. Unfortunately, it is difficult to stop the exploitation, taking into consideration that this quarry supplies the raw material for the cement industries in the area. Although a clear delimitation of the exploitation area can still be made, so that the exploitation should not extend at random.

The regional identity can be highlighted by identifying regional specificity and by better branding. The development of operational programmes for agriculture, manufacturing and tourism fields is a possible option for the region to financially support and promote its renewal.

Planning scenario

The region can be structured and organized on three major poles of tourist attraction that exist in

the area: the Cheile Turzii, the Cheile Turenilor and the Cheile Borzeștilor. Another three supplementary poles can be added and planned to these poles: an eco-museum in Borzești village, a holiday village in Măgura Ierii and four access gates in the reservation, on each cardinal side. The access gates will play an important role in welcoming tourists and offering information on the visited area (entertainment, available sports facilities, guided tours, ecological education, etc.). The gates will be located in Tureni for northern access to the reserve, in Buru for the southern, in Cheile Turzii for eastern and in Petrești de Jos for western access. Hence, the area can be easily accessed by tourists wherever they come from.

The minimum tourism infrastructure (Fig.6) that needs to be developed consists of: alpine refuges, access ways, signposting, hiking paths, camping and picnic platforms, agro-tourism infrastructures (guest ranches).

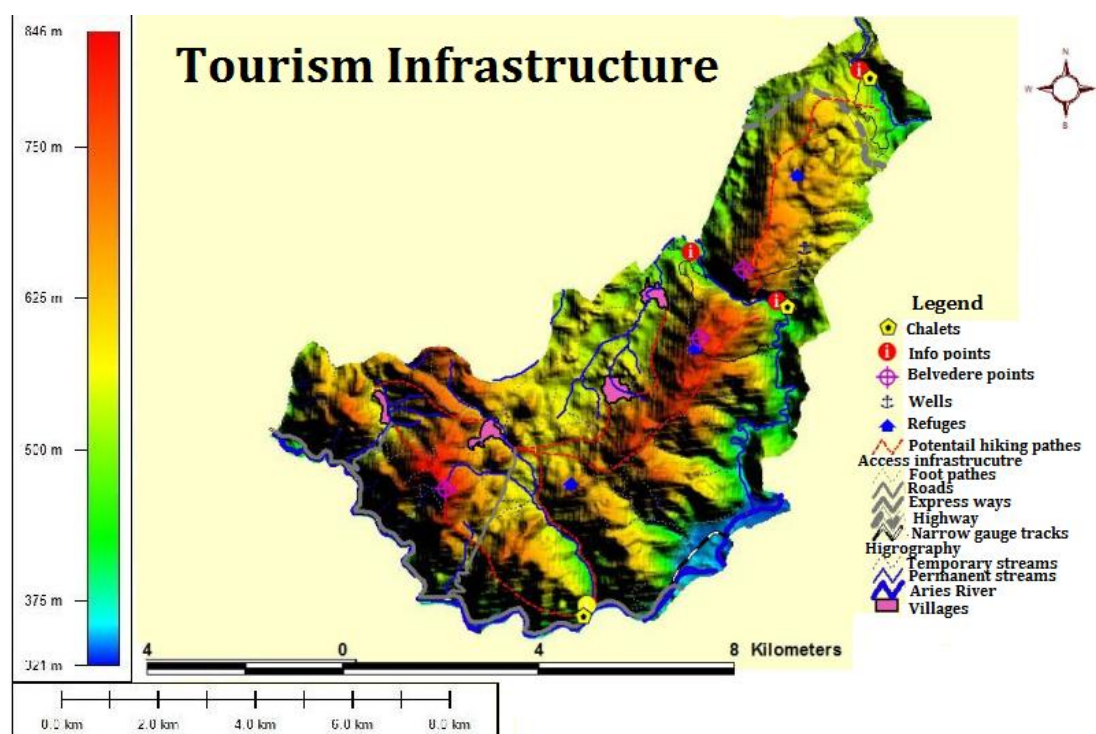


Fig. 6. Tourism Infrastructure Organization in the Area of Cheile Turzii

Designed as a simple shelter, the alpine refuge makes it possible to halt mid-way on the ascent to the top. In Cheile Turzii building of new refuges is suggested on the Borzești Hill, where the summit hiking path for the Petrești peak starts. Another refuge can be planned on the Bisericii Hill near the Cheile Turzii Monastery and another one on the Sandului Hill, half way between Cheile Turzii and

Cheile Turenilor. The refuges are planned in relation to the signed hiking paths that shall be included in thematic circuits such as: The discovery of Borzești Gorges, The Grand Tour of the Gorges, etc.

An urban forest may be planned in the north, near the Cheile Turenilor. On the one hand it will screen the limestone exploitation quarry, and, on the

other hand, fulfil the recreational and ecological functions.

In consequence of the frequent week-end picnics in the area, a picnic platform should be considered, located in the northern part of the region, at the entrance from Tureni, near the urban forest. It is important to establish this kind of land utilization during the zoning process because certain uncontrolled tourism practices may have negative effects on the biodiversity.

As it can be seen, tourism is an important economic activity in many biosphere reserves. It is important to promote the suitable tourism forms, that do not harm the biodiversity. Therefore, impact studies and planning are indispensable for a sustainable development of tourism activities in protected areas. Zoning as well is important as it divides the area into clearly designated zones, listing the types of tourism activities and infrastructure that are acceptable and could be developed.

CONCLUSION

The planning proposal we have presented was meant to protect the biodiversity of the region, endangered by the human abusive use of the natural resources and to sustainably develop the region, by promoting the touristic attractions of the area.

An important characteristic of the area, which has been taken into consideration in the plan proposal, is the presence of a valuable natural biodiversity fund and at the same time, of a traditionally rural community that inhabits the area. Therefore, our planning vision consists of a light tourism infrastructure which does not endanger the area. In our opinion it is highly important to preserve the natural characteristics of the area of Cheile Turzii and to diversify the economic activities carried out by the locals. Resources exploitation zoning was used to solve the conflicts related to resources' exploitation in protected areas. It has taken into consideration the management objectives of the protected area and selected the places where exploitation activities (forestry, grazing, hunting, mining, tourism) are possible. The challenge of the zoning process was to reach a compromise that the local population will accept and keep in the long term.

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