EVALUATING THE LANDSCAPE ACCESSIBILITY FOR TOURISM ACTIVITIES IN POSTĂVARU MOUNTAINS

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ABSTRACT. – Evaluating the Landscape Accessibility for Tourism Activities in Postăvaru Mountains. Postăvaru Mountains represent one of the main tourism areas in Romania especially because of the location here of Poiana Brașov resort which is the go to destination for winter sports in the country. Because of this the financial return drops massively outside the winter season or if and when the snow layer does not allow for practicing winter specific sports. Thus a priority should be attracting tourism flows all year round by promoting and efficiently valuing the geomorphosites located in the proximity of the resort. The present study intends to analyse the synergy between the tourism infrastructure and the natural (relief) tourism potential of the Postăvaru Mountains in order to identify solutions and opportunities for a uniform flow of tourists all year round in Poiana Brașov resort.

Keywords: accessibility, tourism activity, geomorphosite, infrastructure, Postăvaru, Carpathians, Romania.

1. INTRODUCTION

Tourism activity is considered to be an important sector of the country's economy that can generate direct results. The development of tourism areas and the capitalization of the tourism potential (primarily the natural one) must be done judiciously based on the idea that the tourism activities will be durable and the fragile areas must be preserved (*http://www.mtnforum.org/oldocs/1012.pdf*).

During the last few years, tourism in Romania made great steps towards a durable capitalization of the natural and anthropogenic tourism potential which was done both by promoting it and through the development and modernization of the tourism infrastructure. The massive investments made in the country had the goal of aligning Romania's tourism infrastructure to the European quality norms. As such by incorporating certain areas to the urban landscape has allowed for accommodation units (hotels and BBs units) and summer residences to be built inside established tourism areas (Bucegi Mountains, Postăvaru Mountains, Rucăr-Bran Corridor) (NTDMP, 2007-2026; RAPFT, 2008-2013).

Accessibility towards and inside tourism areas has constantly improved by modernizing a series of roads (Gârda de Sus – Valea Ordâncuşa – Scărișoara in Apuseni

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Mountains) and by constructing new modern roads that generated and stimulated tourism flows in the mountain areas (Transalpina in Parâng Mountains, Transbucegi in Bucegi Mountains).

The excessive development of the tourism infrastructure may have negative effects on attracting tourism flows and maintaining the naturalness of an area, for example the alpine area from Italy and France (Val d'Aosta, Vallee de Maurienne) where the development of motorways or large capacity accommodation units resulted in a decrease of tourists. As such tourism planning must be done carefully and to aim to maintain harmony between the landscape elements and the important tourism attraction areas. The correct capitalization of natural tourism objectives by evaluating the existing geomorphosites is another important action meant to generate and control new tourism flows (Godde, P., Price M., Zimmerman F. M., 2000).

Postăvaru Mountains is a top rank Romanian tourism attraction area due both to its rich and varied natural potential and to the developed tourism infrastructure. The high valuing of the morphology has allowed for the development of the biggest and most complex ski area which has led to the establishment of Poiana Brașov resort, which holds a central position inside the Mountains.

The purpose of our approach is to identify solutions for the accessibility issues to Postăvaru Mountains in order to include in the tourism circuit those areas that are currently poorly exploited in spite of having tourism potential. The approach has the ultimate goal of diminishing tourism flow seasonality and implicitly increasing financial return. Both of these reach a peak point during the winter season when the accommodation capacity is overwhelmed by the number of tourists especially during the winter holidays and most weekends.

2. CASE STUDY

Postăvaru Mountains are located in the north-western part of the Curvature Carpathians and stand out for their varied natural and anthropogenic objectives, and a relatively good accessibility (modernized roads: in the West the national road connects Braşov, Cristian and Râşnov and continues through Bran-Rucăr, Râşnov-Pârâul Rece-Predeal corridor; forest roads and railways: Braşov - Zărneşti) and for its well-developed tourism infrastructure (best equipment for winter sports and cableways).

Postăvaru Mountains combine in a limited area a large variety of landforms as this is the major element in the structure of the tourism potential, the material support for the unfolding of tourism activities. They are predominantly made out of conglomerates and limestones as well as sandstones, marl and gravel. Its maximum altitude is of 1799m, in the homonymous peak, located in the central ridge that has a SW-NE orientation. Out of the other ridges span out peaks such as: Ruia (1659 m), Crucuru Mare (1435 m), Varna (1428 m), Crucuru Mic (1050 m) with the northern parts reaching 800 m in extended ramifications that border Braşov Depression. The north-western slope of the main ridge (that dominates over Poiana Braşov) is steeper and as such it is here that a ski area was developed. Among the natural landscape tourism objectives one names: Râşnoavei Gorges (with a length of 250m, steep slopes of 160-170m, covered by climbing routes), the Laptelui Cave (at an altitude of 1350m, with a length of 175m, and a level oscillation of 10m), Pintenul din Schei, Pietrele lui Solomon (M. Ielenicz, L. Comănescu, 2006). The anthropogenic tourism potential mostly relates to Poiana Braşov. The resort is located at 13km from Braşov, at an altitude of 1030m, it covers 150ha, contains 25 accommodation units and 30 catering facilities. It is located on a surface levelling area, with a low relief fragmentation of 1-2km/kmp, the energy relief is lower than 100m, and slopes are lower than 5°. During winter there are few days with fog and the snow layer is stable, which favours winter sports.

The first chalet was built in 1907, in the northern part of the resort known as Poiana de Jos. In 1909 the first ski contest took place, on a trajectory that nowadays follows the modern road towards Braşov. Between the two world wars several chalets and villas were built in Poaina de Sus. The resort's maximum development moment was 1951 when the World Winter University Games were held here. For this event, ski jumping hills, a lift, a bobsledding course (later decommissioned), a chair lift and a hotel were built here (Ielenicz M., Comănescu L., 2006). Presently it is the mountain resort with the highest degree of equipment in the Carpathians, most of which is winter sports related (table 1).

Name	Difficulty level	Length (m)	Level difference (m)		
DrumulRoşu	Easy	3821	630		
Bradul	Easy	458	77		
Slalom Poiana	Medium	575	217		
Camelia	Easy	450	28		
Stadion	Very easy	300	32		
Lupului	Difficult	2860	775		
Sulinar	Medium	2441	645		
Kanzel 1,2	Difficult	350	134		
Ruia 1,2	Difficult	540	198		
Subteleferic	Difficult	1000	280		

Ski	slo	pes	in	Poia	na l	Brașo	ov r	esort
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Source: www.poianabrasov.org; M. Ielenicz, L. Comănescu, 2006, modified)

3. METHODOLOGY

In order to establish the landscape accessibility for tourism activities the authors intended to perform two types of analysis: the proximity of accessibility to geomorphosites and to determine the servicing areas of tourism structures with accommodation functions.

3.1. Proximity of Accessibility to Geomorphosites Analysis

The proximity analysis is conducted through geo-processing that allows for solving issues or finding out spatial relations (in this case the relation between geomorphosites and accessibility in Postăvaru Mountains) (fig. 1).

Table 1.



Fig. 1. Proximity analysis

Two methods were used for the proximity analysis:

- Creating *Buffers* from the proximity instruments set of ArcMap, that is areas of 1.5km around spatial objects, in our case geomorphosites, resulting circles with a radius of 1.5km, around the selected geomorphosites.

- Creating *Multiple Ring Buffer* from the proximity instruments set used around liniar spatial objects, in our case a single stratum 300m long.

A data base containing geomorphosites and accommodation units and their accessibility was thus created. The analysis shows which of the accommodation units are located inside the *attractiveness* area of a geomorphosite and can thus serve as reference for tourists in choosing tourism structures according to their accommodation; also by observing the accessibility degree for each geomorphosite different types and forms of tourism can result: visits, hikes, ecotourism.

Proximity areas result from creating *buffers* of 300m along the accessibility route and shows the distance between different interest points to a specific type of road, which in turn can become a decision factor for tourists. Tourists can choose between accommodation units located close to a tourism objective or geomorphosite and a national road in case they want to travel there by car or a country road or trail in case they want to hike.

In order to establish the values of the geomorphosites (M. Panizza, 2001; E. Reynard, 2005) located within the analysed area the authors used the geomorphosite tourism evaluation method, introduced in the specialized literature by J. P. Pralong (2005).

The tourism value is calculated as an average of the four values, according to the formula: *Vtour =(Vsce +Vsci +Vcult +Veco)/4*, where *Vtour* represents the tourism value, *Vsce* the aesthetic one, *Vsci* the scientific one, *Vcult* the cultural-historical one, and *Veco* the socio-economic one (table 2).

The following criteria were used for the four values:

- for the aesthetic value: number of lookout points, average distance between lookout points, area of the site (km²) compared to other sites in the same area, slope, colour impact against the surroundings

- for the scientific value (which includes the ecological value): paleogeographic interest, representativeness, surface (%), rarity, integrity, ecological interest

- for the cultural one: cultural and historical features, as presented in iconographic representations and/or in different writings, historical and archaeological relevance, religious and symbolic relevance, art and cultural events

- for the economic one: accessibility, natural hazards, annual number of visitors, official level of protection, attractiveness.

Name	Code	Туре	Scientific value	Aesthetic value	Cultural value	Economic value	Global value
Cetatea Râsnovului Peak	BVed1	punctual	0.5	0.75	0.75	0.5	0.625
Râșnoavei Cave	BVkar2	punctual	0.25	0.5	0.25	0.25	0.312
Râșnoavei Gorges	BVflu3	linear	0.5	0.75	0.25	0.25	0.437
Postăvaru Peak	BVm4	punctual	0.25	0.5	0.25	0	0.25
Laptelui Cave	BVkar5	punctual	0.25	0.5	0.25	0	0.25
Răcădău Valley	BVkar6	linear	0.25	0.25	0	0	0.125
Solomon Rocks	BVed7	punctual	0.5	0.75	0.25	0	0.375
Schei Rocks	BVkar8	areal	0.25	0.25	0.50	0	0.25
Tâmpa Peak	BVm9	punctual	0.25	0.5	0.50	0.25	0.375

Global evaluation of the geomorphosites from Postăvaru Mountains

3.2. Establishing the Servicing Areas of Tourism Structures with Accommodation Functions

The servicing areas are those located around any given location (in our case the accommodation units). They include all roads / accessible trails (which fall under a series of pre-established parameters). For example, a five minutes serving area for a certain objective that is located within a network includes all accessible points that can be reached in a five minutes trip from that objective.

The actual accessibility of Postăvaru Mountains is offered by national roads, forest roads and trails. Each of these three types of accessibility has specific features that provide a travel speed, a time travel and hence a distance. Interest points are then introduced, which in our case are represented by accommodation units and geomorphosites.

Table 2

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An accessibility network is built by using the *Network Analyst* extension in ArcMap. Once this network is built the *New Service Area* function is used in order to start building the servicing areas. From this network window, facilities (accommodation units) are added as they constitute the points on our built-in network. A tolerance scale is chosen for establishing interest points, preferably higher, and in our case 5km.

Starting from the properties of the *Service Area* function, the optimal analysis rules are chosen:

- The line generator is chosen (it must contain data about the considered parameters: length and time which must differ according to the different values). The lines must not overlap.

- The analysis parameters are chosen, in our case *length* and *time* for which the servicing areas will be created (fig. 2, 3). Apart from the lines that will determine servicing according to the established parameters, we need also to thick the option to generate polygons that will constitute serving areas.

- In the window for analysis settings the breaks of the two parameters are chosen: 1, 2, 3, and 5km for length; respectively 5, 10, 15, 20 and 30 minutes for time.

- For direction the option *from facility* is preferred rather than the *towards facility* one.

After validating all these parameters, lines and polygons are generated. Data must be however exported in shapefile format in order to become separated vectors. After exporting the lines and polygons these *shps* are loaded and viewed in the *Table of contents* as *layers*. A classification is made according to the chosen rules in the analysis settings window. In the layers properties, a classification is chosen for their viewing according to a specific symbology in our case according to *quantities*. Five classes are chosen (the previously selected *breaks*) specifically: 1, 2, 3, and 5 km for length and 5, 10, 15, 20 and 30 minutes for time, each with a different colour to emphasize the differences.



Fig. 2. Service area based on length analysis

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Fig. 3. Service area based on time analysis

4. RESULTS AND DISCUSSIONS

Poiana Braşov resort, well known as a winter sport destination, is trying to diversify its tourism offer range in order to maintain and strengthen its tourism profile in this area. With the reduction of the number of days in which the ski slopes can be used for winter sports (due to global warming) the resort's administrators started looking for alternative ways to attract tourists and rationally employ the natural potential of Postăvaru Mountains.

As such, for the low season time slots and the ones when the snow layer is insufficient for ski, using the values of various geomorphosites located in Postăvaru Mountains can constitute a viable alternative.

The main component for a successful capitalization and management of a geomorphosite is given by effortless accessibility and direct and quick routes between geomorphosites and the available accommodation units.

The analysis the authors made based on GIS tools and techniques underline an inhomogeneous image in terms of tourists' accessibility to the identified geomorphosites (fig. 4, 5):

-Geomorphosites with easy access to accommodation units. Are those geomorphosites located along a modernized road or close (as far as 1.5 km) or close to a cable installation point: *Cetatea Râsnov, Postăvaru Peak, Tâmpa Peak*. Proposed actions and/or interventions: promoting and durable capitalization of these geomorphosites.

-Geomorphosites with difficult accessibility. Are those geomorphosites where the access is provided solely by tourism trails, some of them having increased slopes or difficult fragments, farther than 1.5 km from a modernized road: *Râşnoavei Cave, Laptelui Forest, Racădau Valley.* Proposed actions and/or interventions: improving accessibility by developing forest roads or by building cableways installations. The promotion and durable capitalization of these geomorphosites is recommended.



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Fig. 4. The synthesis map

-Geomorphosites without any accommodation possibilities close by. Are those geomorphosites that have good accessibility but the accommodation possibilities are limited: *Schei Rocks, Râşnoavei Gorges, Solomon Rocks.* Proposed actions and/or interventions: increasing the accommodation capacity by building small hotels or BBs and respectively promoting and durable valuing these geomorphosites.

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Fig. 5. A. Modernized access road in Poiana Braşov, B. Geo-themed forest road, C. Capra Neagră cable used for access to Postăvaru Peak, D. Accommodation units in Poiana Braşov (Aurelius Hotel, 5 stars)

In terms of distance from different areas to accommodation units, an obvious imbalance can also be seen between the central parts of the mountains (Poiana Braşov – Postăvaru Peak) and the peripheral areas. In the central area, the accommodation units are generally dense (numerous hotels and BBs) and have better standards compared to the peripheral areas where the number of accommodation units is small and there are three stars BBs.

The time of servicing can differ from a few minutes for areas situated in Poiana Brasov and Valea Cetății, up to 30 minutes for mountain areas located in the eastern and respectively southern parts of the range.

In the present day context, when diversifying tourism attractions and developing the accommodation and transport infrastructure is the main stake of tourism agents, this type of analysis can constitute a viable starting base in realizing local feasibility studies aiming to attract more and more tourists all year long and thus fulfilling the definition of viable and educational tourism.

The results and recommendations standing out from this study include the following actions:

- The judicious capitalization of the natural tourism potential by developing new access routes between modernized roads and geomorphosites;

- Capitalizing of the geomorphosites by developing new smaller accommodation units in their close proximity;

- Promoting geomorphosites and creating educational materials for a judicious development of an eco-educational tourism;

- Diversifying the interest points network that do not depend on the weather conditions in order to use the tourism infrastructure all year long (accommodation units with spa centres, or conference centres, equitation centres, adventure parks, eco-parks),

- Diversifying and decentralization of the accommodation units (constructing new accommodation spaces in other parts of the mountains rather than Poiana Brasov).

5. CONCLUSION

The superior capitalization of the landforms allowed for the development of the biggest and most complex ski domain, which in turn has led to the emergence of Poiana Braşov resort, but tourism activities are still conditioned by the existence of a sufficient snow layer for practicing winter sports. The existence of highly attractive geomorphosites within the area of Postăvaru Mountains creates the premises for a well-balanced developed tourism practice throughout the entire year. Developing new accommodation units and modernizing access routes for other areas rather than the central one (Poiana Braşov) may constitute interventions and actions that will lead to an increase in tourist flows. Recreational as well as eco-educational activities represent a new trend useful for obtaining the desideratum of a durable tourism practice in Postăvaru Mountains.

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