

THE IDENTIFICATION OF THE LOOKOUT POINTS WITH A ROLE IN THE TOURISM VALORISATION OF LANDSCAPE IN THE DISTRICT OF CICEU. VIEWSHED ANALYSIS

Alexandra-Camelia POTRA*

"Babeș-Bolyai" University, Faculty of Geography, 5-7 Clinicilor Street, Cluj-Napoca, Cluj County, Romania Romania,
e-mail: alexandra.potra@gmail.com

Abstract: The increase of the visibility of a territory, in order to highlight the potential of the landscape, seen as a resource which can ensure the performance of various social-economic activities in a territory becomes achievable by arranging lookout points. Conducting the visibility analysis of such points is a common topic in the works of territorial planning, namely in terms of valorisation of landscapes and the visual impact assessment of their characteristics. The natural and the anthropic component of the District of Ciceu work together to create a valuable resource of the landscape, which are most often surprising by the presence of pitoresque valleys preserving the territorial specificities. The present study aims, in a first phase, that by the methods and tools specific to the on-site step (observation, mapping), to identify possible locations, including vestiges and historic buildings, suitable for arranging representative lookout points to present the elements of the landscape in the District of Ciceu. In order to achieve the visibility analysis, in order to highlight the assessment potential of district's "landscape" from the mapped lookout points, was resorted to Viewshed Analysys method of the ArcGIS software. The use of the mapping leads to the materialization of the results of the different cartographic representations, useful for the landscape recovery activities. The results of the study consist in generating the visibility areas of the lookout points, development of tourist routes that integrate the lookout points mapped on-site, namely to capitalize the landscape elements of the District of Ciceu.

Keywords: landscape, panoramic points, DEM, Viewshed Analysis, district, historical buildings, tourism,

* * * * *

INTRODUCTION

The landscape stores, in its meaning, a type of visual and/or picturesque information, which, most often, is assessed in a subjective manner (Lynch, 1960; Litton et al., 1978; Clay & Smidt, 2004). Each landscape is unique, therefore its visual quality depends on the combinations of attributes of the unique landscape and the perception of the person involved in the analysis of the landscape may represent an assessment instrument there of (Dincă et al., 2012; Jancura, 1998; Stefunkova, 2000; Salasova, 1996; Low Michal, 2003). Moreover, ever

* Corresponding Author

since 1929, Grano has defined the landscape as being reflected through the human perception (Sevenant & Antrop, 2006), and starting with the middle of the 20th century, sensory perception is deemed, in the English-American literature, as scientific method used in the assessment of the landscape (Imrich I., Petlus P., 2012).

An important role in the understanding of spatial distribution of landscape elements is represented by viewpoints. In the studies conducted by Fry et al., (2004), Kvamme (1990), Lock and Stancic (1995), Tilley (1994) viewpoints were used as useful instruments in the visualization and assessment of landscape elements, such as the archaeological sites and the edifices of the cultural patrimony. Lookout points are localized depending on the specific of the relief, the latter, through its shapes and heights, provides viable perspectives of landscape visualization. It is found that relief represents both an element which is part of the landscape's structure, as well as a factor limiting or favoring the visual perception on the landscape. Jakab and Petlus (2012), in their study, conducted a visibility analysis, starting precisely from the role of relief in the visual assessment of the landscape. The analysis was considered objective, since it does not imply perception as an assessment method of the landscape, but the visibility area from a given point, was generated based on some measurements on the DEM (digital elevation level), the operation being conducted by recurring to the function Viewshed Analysis of the GIS software.

This research aims to identify locations for placing the lookout points, which, through their areas of visibility, generated with the ArcGis software, are representative for obtaining images surprising the specificity elements of the landscape, and which, moreover, provide an opening as broad as possible on the landscape of the District of Ciceu. The purpose aimed is reached by a series of activities taken into consideration, the main ones being represented by the identification on-site of possible locations for placing the lookout points, including by the identification of historical edifices (with an archaeological value), suitable for arranging the lookout points, creating the areas of visibility of the identified viewpoints, choosing representative lookout points for the valorisation of landscape, proposing touristic routes which integrate the lookout points thus identified, namely by which they capitalize the landscape of the District of Ciceu.

Currently, at national level, there are a series of initiative by which, along with the rehabilitation and restoration of certain historical monuments/ edifices of the cultural patrimony (especially fortresses) and not only, but also the lack of such measures, are aimed, where the relief and the construction of the monument allow it, the arranging of lookout points. This arranging decision comes from the desire and the purpose to enhance the capitalization of the historical monument. Relevant examples in this regard, can be found in the arranging proposals of Poienari Fortress¹, Hațegului Fortress², Devei Fortress, Brașovului Fortress etc. On the other hand, the arranging of lookout points, where the relief allows it, for the tourism valorisation of landscape is saluted in various documents providing strategic directions for the development of tourism (Tudorache, 2009; Tourism Development in the North-West Region, 2007-2013).

STUDY AREA

The District of Ciceu, located on the North, North-West part of Romania, in the area of overlap between Bistrița-Năsăud and Cluj county, is featured by a relief belonging to the steep of terraces and meadows, the low hills, namely the high hills of Someșan Plateau, the altitude increasing from values of 223 m to 974 m. The territory under analysis, in its perimeter, does not fully include the surface of one unit or subunit of relief, but only a certain segment (part) thereof, namely: Breaza Summit (Southern part), Ciceului Hills (the entire Central, Northern and Southern part), Someșului Mare Corridor (the Southern part, near the area of overlap between Someșul Mare and Someșul Mic rivers), Suplaiului Hills (a segment of the Southern-Western part) (figure 1) (Potra, 2015).

¹ <http://www.cjarges.ro/proiect-cetatea-poienari>

² <http://documents.tips/documents/plan-de-dezvoltare-locala-al-microregiunii-th-tp-55cb7c56f2fdf.html>

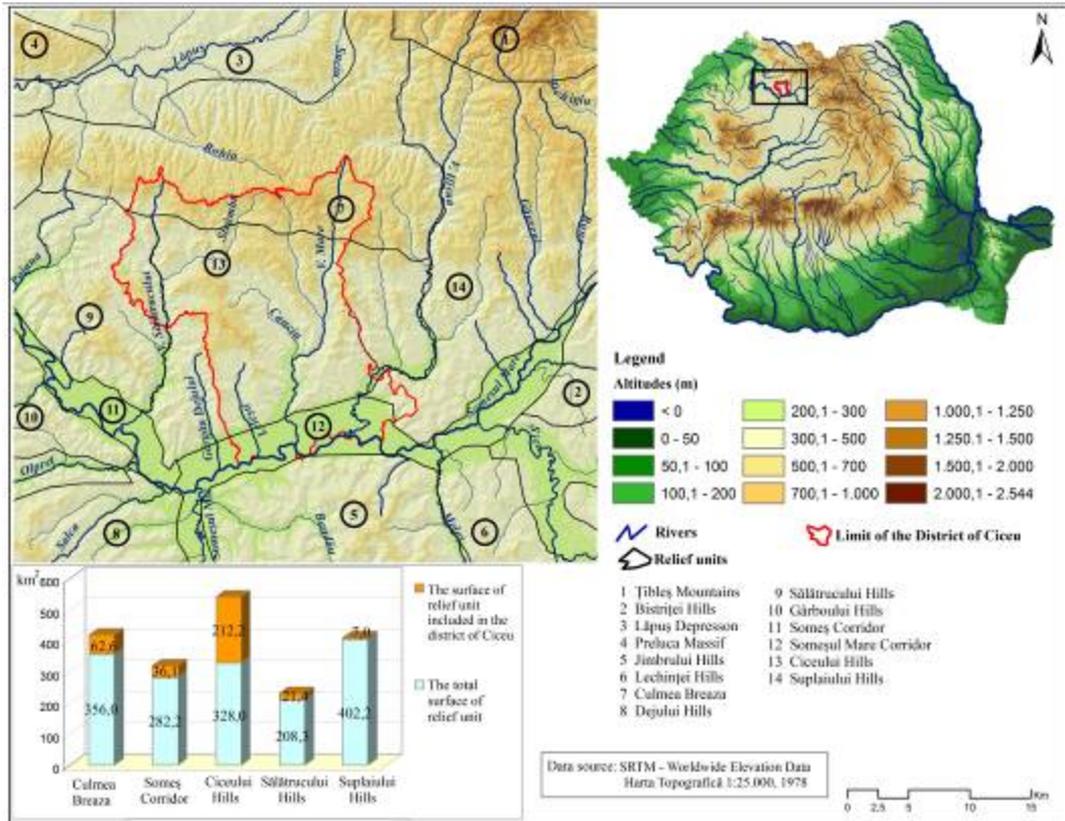


Figure 1. Regional and national localization of the District of Ciceu

METHODOLOGICAL ISSUES

In terms of methodology, this research monitors three fundamental phases, each with its corresponding methods and activities. A first phase implies the identification on-site of the most representative lookout points mapped on-site, another work phase consists in generating the areas if visibility of the lookout points mapped on-site and the last phase is represented by certain recommendations of tourism valorisation of landscape.

During the *on-site stage*, for the identification of possible locations for arranging certain lookout points, two activities were taken into consideration. Thus, using the method of direct observation, through its main instruments, photographing, pentru identificarea posibilelor locații pentru amenajarea unor puncte de belvedere, mapping on the orthophotoplan, were identified, at the level of the District of Ciceu, five areas which in terms of the relief, provide viable perspectives of visualization of the "district's" landscape. The second activity, based on the bibliographic documentation, and materialized on-site through the method of direct observation (mapping on orthophotoplan), consisted in the identification of historical edifices, or of the areas where these were consolidated, and which in the past, through the function they held, were also classified as viewpoints. For this last activity, were taken into consideration, on the one hand, the areas which had Roman towers (currently being discovered only certain archaeological testonies of their existence on the territory of the "district", which during the Daco-Roman period played the role of defense and monitorization of the Northern limes of Roman Dacia, which crossed, in this sector, Ciceului Summit, and on the other hand, Ciceului Fortress was mapped as a lookout point, this being teh nucleus around which the District of Ciceu was consolidated. Moreover, during the Middle Ages, this fortress, erected on Ciceul Spanzului Hill (or Ciceul mic), at the

altitude of approximately 683 m, was recognized for the strategic position it held, and which provided a broad visual opening towards the Corridor of Somesul Mare. The results of this activity were materialized in the identification of certain areas where two Roman towers existed - the Roman tower Ponita, in Ciceu-Corabia locality and the Fortress of Motogna, in Negrilesti locality - namely the ruins of Ciceului Fortress, in Ciceu-Corabia locality.

In this study, the visibility analysis is performed through the *Viewshed Analysis* function, from the menu of the ArcGIS software, and the result thereof consists in generating an area of visibility, in raster format, for each lookout point identified during the on-site phase. For this analysis were used raster data, such as the DEM (digital elevation model) the District of Ciceu, namely vector point data, represented by the viewpoints mapped on-site. Such an analysis is deemed objective, since the areas of visibility on the landscape are created on measurements based on the DEM and the interpolation of the lookout points, basically creating, in the end, a GIS spatial modeling of the territory. Thus, the Viewshed method implies a mathematical representation of the landscape, which takes into account including the altitude of the relief, the height of the observer, the curvature of the land etc. (Connolly & Lake, 2006). The method was successfully used in numerous studies of landscaping and during the assessment of the visual impact of landscape elements. In the study conducted by Llobera (2001), Wheatley & Gillings (2000), the Viewshed method was used to see if the two archaeological sites are inter-visible, or if certain predominant features of the landscape, natural or cultural, may be observed by people placed in various points located within the landscape. Among the studies for which this method was used for the assessment of the various features of the landscape, are included those conducted by Heather & Steven (2006), Gillings (2009), Jakab & Petlus (2012), Andrea de Montis & Caschili Simone (2012), Supernant Kisha (2013), Hognogi (2015) etc.

The last phase of the research was dedicated to creating touristic routes integrating the lookout points mapped on-site and which also capitalize, from the touristic point of view, the landscape of the District of Ciceu. The results of the phase, obtained by using the mapping method and the synthesis, consisted in various mapping representations and punctual analyses.

THE AREAS OF VISIBILITY AND THEIR IMPORTANCE IN THE VALORISATION OF LANDSCAPE IN THE DISTRICT OF CICEU

The tourism valorisation of the picturesque landscape of the District of Ciceu may be increased by arranging certain lookout points. The choice of a suitable location for these implies, from our point of view, as we mentioned, the performance of a visibility analysis on the landscape. Therefore, during the on-site phase, were identified eight possible locations for arranging certain lookout points, but the result obtained following the creation, with the *Viewshed Analysis* function, of the visibility areas for each of these points, shows the fact that only four viewpoints provide a broad image on the landscapes in the District of Ciceu, these being located in Breaza Summit and Ciceului Hills. A strong visual impact on the landscape elements, is held by Ciceului Fortress lookout point, located at approximately 700 m height, since it provides a general image both to the terraces and meadows of Somesul Mare, as well as towards the picturesque valleys of the depression basins formed at the base of Breaza Summit. The viewpoint located North of Hasmasu Ciceului locality provides a spectacular image on Ciceului Fortress, the abrupt rocks and the volcanic relief of Ciceului Summit. The picturesque valleys, expression of the relations existing between the natural and human-made components, and which turn the landscape of the District of Ciceu into a special one, may be observed from the viewpoints located on Saului Hill (North-West from Magoaja locality), namely Secaturii Peak (North-West from Dumbraveni locality).

An important role in the visual capitalization of the landscape in the District of Ciceu is represented by the spatial distribution of the levels of relief. Therefore, the presence in the Central part of Ciceului Hills, with altitudes (over 700 m) similar to those of Breaza Summit, located in the Northern part of the "district", favor the caption of images from distinct points, on

the entire territory of the District of Ciceu, both towards the low altitudes of the Corridor of Somesul mare, towards the depression basins formed along the valleys coming down from the North of the "district", as well as towards the higher altitudes (approximately 900 m) of Breaza Summit (figure 2).

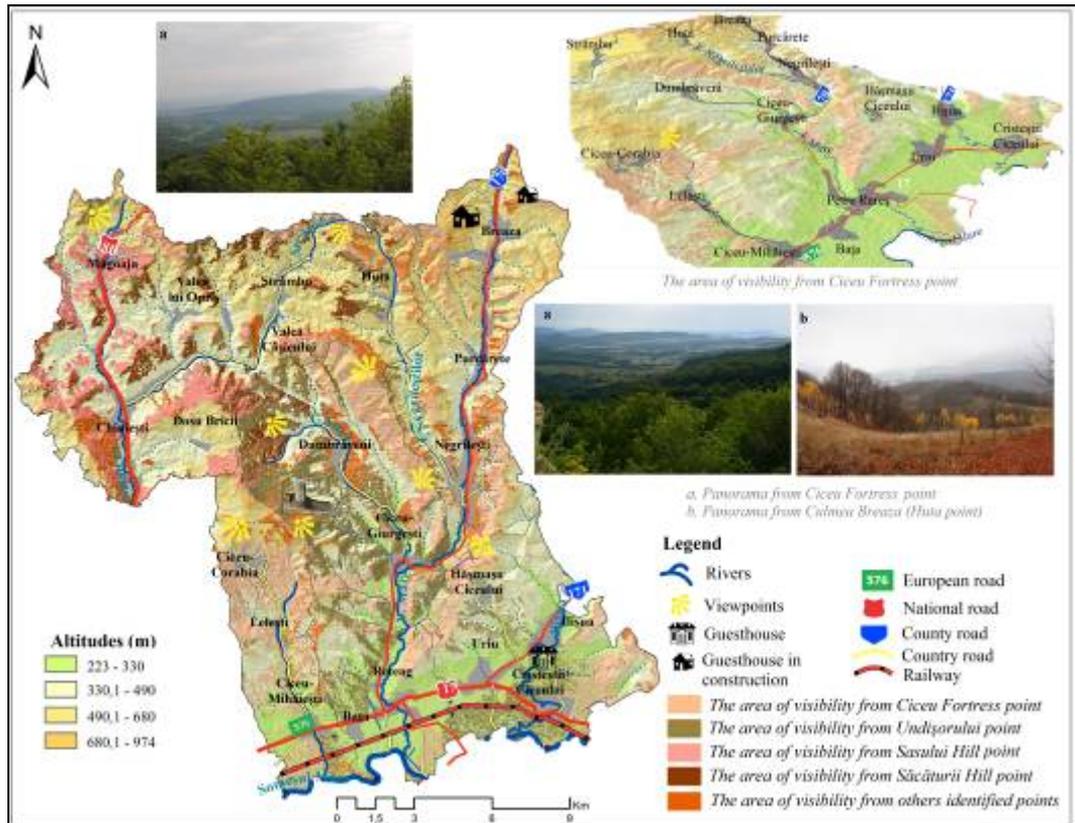


Figure 2. The areas of visibility in the District of Ciceu, Case study: Ciceului Fortress

THE VALORISATION OF THE LANDSCAPE POTENTIAL OF THE DISTRICT OF CICEU. RECOMMENDATIONS

The natural component - relief, hydrous, the climatic and biopedologic - and the anthropic one, namely the result of the interrelations between the two become elements of landscape, often attractive for tourists (Josan, 2010). In the present research, the aim being to increase the visibility of the landscape, it is envisaged primarily the image of those tourism resources of the landscape that can be capitalized by arranging lookout points identified as a significant area of visibility on the landscape. But also to support the activity of landscape valorisation, the study also aims at proposing touristic routes that integrate eight lookout points mapped on-site.

The distribution of the District of Ciceu, in an overwhelming percentage, on a major level of relief, has contributed to the integration of the territory under analysis in the category of hill landscapes. However, the District of Ciceu represents a predominantly rural soace, thus the man-made elements, as well as those of the natural setting work together to create a rural landscape, defined, most often, by the presence of certain picturesque valleys preserving the territorial specific. The rural landscape, in turn, may be differentiated, through the natural, historic, social-economic factors, acting at the level of the "district", in a rural habitational landscape, namely into an agricultural landscape (Cocean & David, 2014).

The fragment relief, developed on mosaic geological formations (the combination of the volcanic rocks with the sedimentary and limestone ones), present in the area of Ciceului Hills - Breaza Summit, namely the *volcanic relief* representative for Ciceului Summit, and which emphasizes on a series of *rocky steeps* (the monumental and landscape area with a length of approximately 2 km - Varful Pietrii Peak 724 m, Magura 753 m, Ciceu Spanzului 733 m), contributed to creating of a landscape potential providing real perspectives regarding the tourism valorisation thereof, by *practicing recreational, lounge, cultural tourism*. The touristic value of the landscape of the District of Ciceu is also given by the image of picturesque valleys, surprising both the spatial location of the hearths of the settlements - the localities developed alongside the rivers, on the North-South direction or on the bottoms of the valleys - by preserving the local specific given by the households and elements of traditional architecture, as well as by the viticultural landscape and mulinologic present in some areas. The picturesque landscape is particularly characteristic for the localities located in the Corridor of Somes Mare and in the depression basins (Măgoaja-Chiuiești, Ciceu-Mihăiești-Lelești-Ciceu-Corabia, Petru-Rareș-Ciceu-Giurgești-Negrilești-Breaza, Uriu-Ilișua) (figure 3).

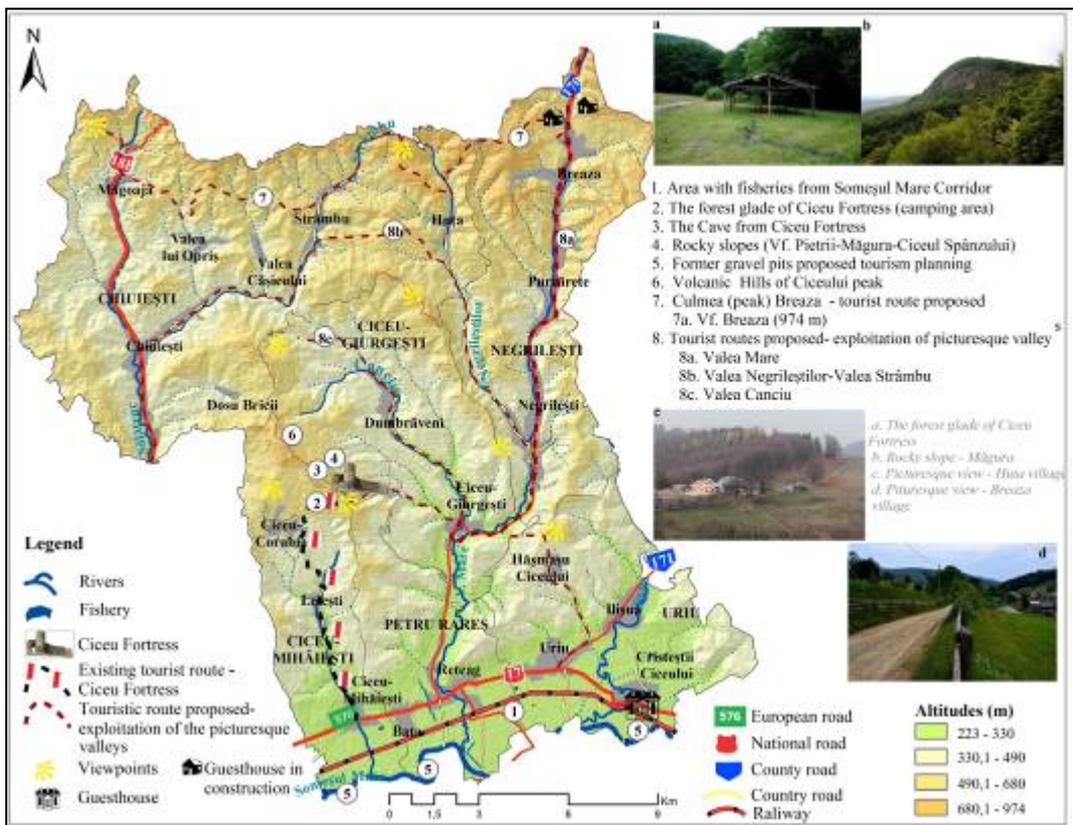


Figure 3. The natural touristic patrimony of the District of Ciceu

We find that the potential natural setting and of the human-made one of the District of Ciceu provide, generally, the conducting of activities (hiking, going through different routes, camping activities) which are conducted, in particular, within weekend tourism. Therefore, following the efficient valorisation of the landscape potential, along with the arranging of some lookout points, we recommend certain touristic routes for the capitalization of picturesque valleys. Along with the resources of the previously mentioned landscape, the touristic routes proposed

facilitate the capitalization of some punctual objective found in the District of Ciceu, such as Ciceului Cave (or the Cave from Ciceului Fortress) - a cavity-cave in volcanic rocks, located at the altitude of approximately 690-710 m in Magura Hill (altitude established by Ionica Pop, May 2008), The Meadow of Ciceului Fortress, the fisheries developed on the streams of certain rivers (such as those in Ciceu-Giurgești commune - fishery Valea lui Ianoș, Valea Fâneții, on Valea Mare in Negrilești, Breaza localities etc.), the area ponds and fisheries in the Corridor of Someșului Mare, Breaza Peak (974 m), the traditional households found especially along the rivers Valea Mare, Valea Negrileștilor, Lelești, Strâmbu, Canciu, the ruins of Ciceului Fortress, the Roman tower Ponita in Ciceu-Corabia localuty, the ruins of the Roman Fort of Ilisua etc.

CONCLUSIONS

The visibility analysis conducted by methods involving the use of specialized software, as well as ArcGis, is required in the assessment of the landscape and mentioned in numerous landscaping studied. The use of the *Viewshed Analysis* method, on one side, removes the subjectivity of perception, another method of conducting the visibility analysis, and on the other side, the areas of visibility are generated precisely based on the relief, element that has a significant role in obtaining an image of the territory. Another positive aspect of this analysis is given by the fact that the areas of visibility materialize on cartographic support, claiming the various acts of exploitation of the landscape through the lookout points. However, the disadvantage of using this method consists, among others, in the fact that it does not account for possible obstacles (vegetation, buildings etc.) that may appear on the viewing direction from a given point.

In this study, the use of a methodology that involves on-site documenting facilitated the identification of representative lookout points for obtaining a broad visibility image on The District of Ciceu. However, the combination of lookout points on Ciceului Fortress and the remains of the two Roman towers, on the one hand, provide a historical dimension of landscape recovery and, on the other hand is a measure of enhancing the historical heritage of The District of Ciceu. Moreover, this recovery operation of historical monuments by arranging lookout points is supported by the fact that Ciceului Fortress, according to the analysis of visibility conducted, is one of the most representative viewpoints that gives a broad visibility image over the entire territory of the District of Ciceu.

The areas of visibility of the eight lookout points mapped in the District of Ciceu enhances the visibility of the territory, offering prospects of recovery and evaluation of its landscape potential. These areas have a particularly strong visual impact, especially on the landscape elements that confer specificity to the "district's" landscape, as well as to the picturesque valleys. The tourism valorisation of landscape by arranging lookout points can be supported by three touristic routes of the picturesque valleys proposed in this study, and provides the opportunity to harness the touristic resources of the landscape that are not observable in the eight viewpoints identified.

REFERENCES

- Andrea de Montis, Caschili Simone (2012), *Nuraghes and landscape planning: Coupling viewshed with complex network analysis*, Landscape and Urban Planning, 105, pp.315-324.
- Clay G. R., Smidt R. K. (2004), *Assessing the validity and reliability of descriptor variables used in scenic highway analysis*, Landscape Urban Planning, 66, pp. 239-255.
- Cocean P., David Nicoleta (2014), *Peisaje culturale*, Editura Risoprint, Cluj-Napoca.
- Connolly J., Lake M. (2006), *Geographical Information Systems in Archaeology*, Cambridge University Press, Cambridge.
- Dincă I., Herman G. V., Sztankovics G. (2012), *Descoperire prin ecoturism si prin turism rural în Comuna Cetariu [Discovery through ecotourism and rural tourism in Cetariu]*, Editura Universității din Oradea, ISBN 978-606-10-0724-0, Oradea.
- Fry G., Skar B., Jerpasen G., Bakkesutuen V., Erikstad L. (2004), *Locating archaeological sites in the landscape: a hierarchical approach based upon landscape indicators*, Landscape Urban Planning, 76, pp. 97-108.

- Gillings M. (2009), *Visual affordance, landscape, and the megaliths of Alderney Oxford*, Journal of Archaeology, 28, pp. 335-356.
- Heather A. S., Steven M. M. (2006), *Heights and locations of artificial structures in viewshed calculation: How close is close enough?*, Landscape and Urban Planning, 82, pp.257-270.
- Hognogi G. G. (2015), *Țara Hațegului. Studiu de geografie regională*, Teză de Doctorat, Facultatea de Geografie, Universitatea Babeș-Bolyai, Cluj-Napoca.
- Imrich I., Petluš P., (2012), *The use of viewshed analysis in creation on maps of potential visual exposure*, GIS Ostrava 2013 - Geoinformatics for City Transformation, Ostrava.
- Jakob I., Petluš P. (2012), *Development of a Program Tool for the Determination of the Landscape Visual Exposure Potential*, Models of the Ecological Hierarchy. Doi, Elsevier B.V., pp. 375-390.
- Jancura P. (1998), *The present and historical landscape structures in landscape formation*, Živoné Prostrredie, 32, Bratislava, Slovakia, pp. 236-240.
- Josan Ioana (2010), The relief – an important factor in the evolution on the human society in Sylvania Land, *Analele Universității din Oradea, Seria Geografie, Year XX, no. 2, pp. 184-190*.
- Kvamme K. L. (1990), *One-simple teste in regional archaeological analysis: new possibilities through computer technology*, American Antiquity. 55, pp. 367-381.
- Litton Jr. B. R., Tetlow R.J. (1978), *A landscape inventory framework: scenic analyses of the northern Great Plains*, USDA Forest Service Research Paper RM, pp. 91.
- Llobera M. (2001), *Building past landscape perception with GIS: understanding topographic prominence*, Journal of Archaeological Science, 28, pp. 1005-1014.
- Lock G., Stancic Z. (1995), *Archaeology and Geographical Information Sistem*, Tayler & Francis, Bistol.
- Low J., Michal I. (2003), *Krajinný raz, Kostelec nad Cernými lesy*, Czech Republic, 552 str.
- Potra Alexandra-Camelia (2015), *Protection and sustainable valorisation of the immovable cultural heritage in the District of Ciceu*, *Analele Universității din Oradea, Seria Geografie, Year XXV, no. 1, pp.25-38*
- Salašová A. (1996), *Village restoration in the Czech Republic*, Int. J. Herit. Stud 2, <http://dx.doi.org/10.1080/13527259608722169>, pp. 160-171;
- Sevenant Marjanne, Antrop M. (2007), *Settlement models, land use and visibility in rural landscapes: two case studies in Greece*. Landscape Urban Plan, 80, pp. 362-374.
- Stefunkova D. (2000), *The possibilities of implementation of landscape visual quality evaluation to the landscape-ecological planning*, Ekologia, Bratislava.
- Supernant K. (2011), *Inscribing Identities on the Landscape: a Spatial Exploration of Archaeological Rock Features in the Lower Fraser River Canyon*, (Ph. D dissertation), Departament of Arthropology, University od British Columbia
- Tilley Christopher Y. (1994), *A phenomenology of landscape: places, paths, and monuments*, Editura Berg, Oxford.
- Tudorache D. coord. (2009), *Strategia națională de dezvoltare a ecosistemului în România*, Institutul Național de Cercetare-Dezvoltare în turism.
- Wheatley D. W., Gillings M. P. (2000), *Vision, perception and GIS: developing enriched approaches to the study of archaeological visibility*, Lock, Beyond the Map: Archaeology and Spatial Technologies, IOS Press, Amsterdamb, pp 1-27.
- *** (2006), *Dezvoltarea turismului în regiunea Nord-Vest, 2007-2013*, http://www.nordvest.ro/Document_Files/Documente-de-Programare-Regionale-Sectoriale/00000127/b00r1_Document%20Regional%20Sectorial%20de%20Programare%20Dezvoltarea%20Turismului%20in%20regiunea%20Nord-Vest%202007-2013_3gi66x.pdf.
- <http://www.cjarges.ro/proiect-cetatea-poienari>
- <http://documents.tips/documents/plan-de-dezvoltare-locala-al-microregiunii-th-tp55cb7c56f2fdf.html>

Submitted:
January 07, 2016

Revised:
October 03, 2016

Accepted and published online
November 16, 2016