

GIS-BASED MODELLING OF ECO-TOURIST ROUTES IN ACCORDANCE WITH THE PROTECTED AREAS IN THE ZEMEN GORGE REGION

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ABSTRACT

The combination of various natural and historical sites of different historical periods is a great potential for the territory of Zemen gorge and its surroundings. The presence of favorable natural and anthropogenic conditions for its development in the study area can be beneficial for its economic development. Development of tourist routes in the studied region was an interactive process of selection of the most attractive segments of roads and trails in their combination to serve the tourist needs. The geographic, cultural and historical information about the objects of interest in the area and analysis made with GIS were the base on which the author offered seven tourist routes. For the purposes of this particular text will be shown one example of the set of analysis, performed for the execution of the task. The establishment of tourist routes in accordance with the protected areas and the Bulgarian legislation could be managed by using GIS so the region can start to get benefits from its unique geographic, cultural and historical background.

Keywords: *tourist routes, GIS, analysis*

INTRODUCTION

The territory of the Republic of Bulgaria has rich natural diversity. The historical development of our country has contributed to the presence of extremely diverse cultural and historical sites from different periods. In the recent years, increasingly popular tourist destinations are rural areas with wild nature and those sites that offer extreme experiences.

The combination of various natural and historical sites of different historical periods is a great potential for the territory. The preparation of a comprehensive assessment of the territory and its potential recreational use and the development of potential tourist routes and attractions is the first step in the process of absorption of its tourist potential.

The area of study includes part of the middle valley of the Struma River, between the influx of the rivers Blateshnitsa and Dragovishtitsa (Zemen Gorge), the eastern parts of Zemen Mountain and western parts of Konyavska Mountain. The area of study falls on the border between Kyustendil, Pernik, Zemen and Treklyano municipalities, and small parts of Radomir and Kovachevci Municipalities. There passes the motor road connecting Sofia with Skopje as well as the railway for Kyustendil - which is still part of the non-constructed railway between Sofia and Skopje.

In recent years there has been an increased interest in less popular areas, rural areas and places that offer opportunities for unusual and extreme tourism. Tourism can also be called “the rescue industry” for many rural and underdeveloped areas in the country. Therefore, the presence of favorable natural and anthropogenic conditions for its development in the study area can be beneficial for its economic development.

According to the Association for Alternative Tourism in Bulgaria [1] from the beginning of June 2011, only 0.1% of tourists practice rural tourism. However, they generate revenue of 0.5% of the total revenues for tourism in the country.

In comparison with Bulgaria, rural tourism in Europe generates annual revenues in amount of 1 to 1.2 billion. Also, rural tourism represents 22-23% of the total share of tourism in Europe [1]. These data indicate that it is necessary investments to be made in this type of tourism in our country as Bulgaria has excellent conditions for its development.

Tourism planning and management requires continuous collection, maintenance and updating of spatial data. It can describe and identify all elements of tourist infrastructure - geometrical,

topological and thematic. In addition, by using GIS users can describe discrete objects (visitor centers, trails, etc.) as well as continua objects (humidity, altitude etc.) and these two kinds of objects respectively can be visualized by vector or raster data model [2].

GIS ANALYSIS

Development of tourist routes in the studied region was an interactive process of selection of the most attractive segments of roads and trails in their combination. Each route consists of a series of segments of the road or trails network.

Based on the input (topographic maps) was created all digitized data, in projection Gauss-Krueger, coordinate system Pulkovo 1942 (Pulkovo 1942 datum, spheroid Krasovski 1940).

Layers organized in the geodatabase were drawn by the Russian military topographic maps, with the exception of the layer Objects that was created on the basis of gathered by the author text information about the studied area.

The study area includes parts of the areas of Natura 2000 Zemen and Konyavska Mountain, some parts of area Karshalevo and the whole area Choklyovo swamp (Fig. 1). All are areas designated under the Habitats Directive [3].



Fig. 1

Choklyovo swamp is a protected area declared by Order No.1022 of 30.12.1992 year. The objectives are to protect the natural habitats of rare and endangered birds and peat [4].

Protected area Zemen Rocks is located in the Zemen mountain. It is 13 hectares and was launched in 1968 [4].

In the study area there is a wide variety of natural, cultural and historical sites. In order to be more easily accessible to tourists there could be performed various events for their cultivation

and structures to be built to help better familiarize tourists with the area. One of those could be a metal bird observatory, where tourists can watch the marsh and its surroundings.

In the village Baykalsko, on the fencing slopes (north and east of the swamp) can be build visitor center from which to be seen the whole Choklyovsko march (this idea was inspired by Srebarna lake in northeast Bulgaria). Tourists can get more information there about birds and the wildlife in the area as Choklyovo marsh is a birds stop on the road Via Aristotelis.

Information boards can be placed at key locations along the routes. Such places are Roni Krast peak, Shegava valley; Elenova glava peak, etc.

For tourists interested in extreme sports there can be offered a trolley (descending rope between two points at different altitudes) in the most exclusive parts of the Zemen gorge or Shegava valley.

RESULTS

Based on the previous texts, the geographic, cultural and historical information about the objects of interest in the area and analyzes made with GIS the author offered seven routes. For the purposes of this particular text will be shown one example of the set of analysis, performed for the execution of the task.

Route: Zemen – Zemen monastery – Elenova glava peak – Ivan Rilski cave – Sacral water spring – Garbino village – Church in Razhdavitsa village (Fig. 2)

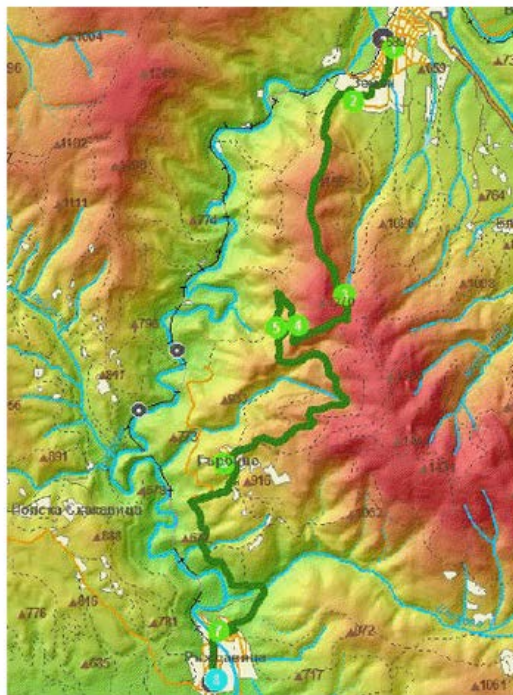


Fig. 2: Route 1

This route has a length of 20 km. It offers an introduction to various points of interest. After reaching the highest points of Konyavska Mountain there is a beautiful view of the surrounding areas. On Elenova glava peak it is possible to be placed information boards that contain interesting information for tourists. From cave Ivan Rilski and springs Holy water can be done a small walk to the near placed Zemlangrad fortress located in the river valley. The route ends at the village Razhdavitsa with its church. The relief and slope analysis of the route show that it is suitable for well-prepared tourists and for those who are physically in a good condition (Fig. 3 and 4).



Fig. 3: Relief profile



Fig. 4: Slope analysis

For the needs of this study a viewshed analysis was created in order to be analyzed the possibility to be seen different types of interesting places while walking (Fig. 5).

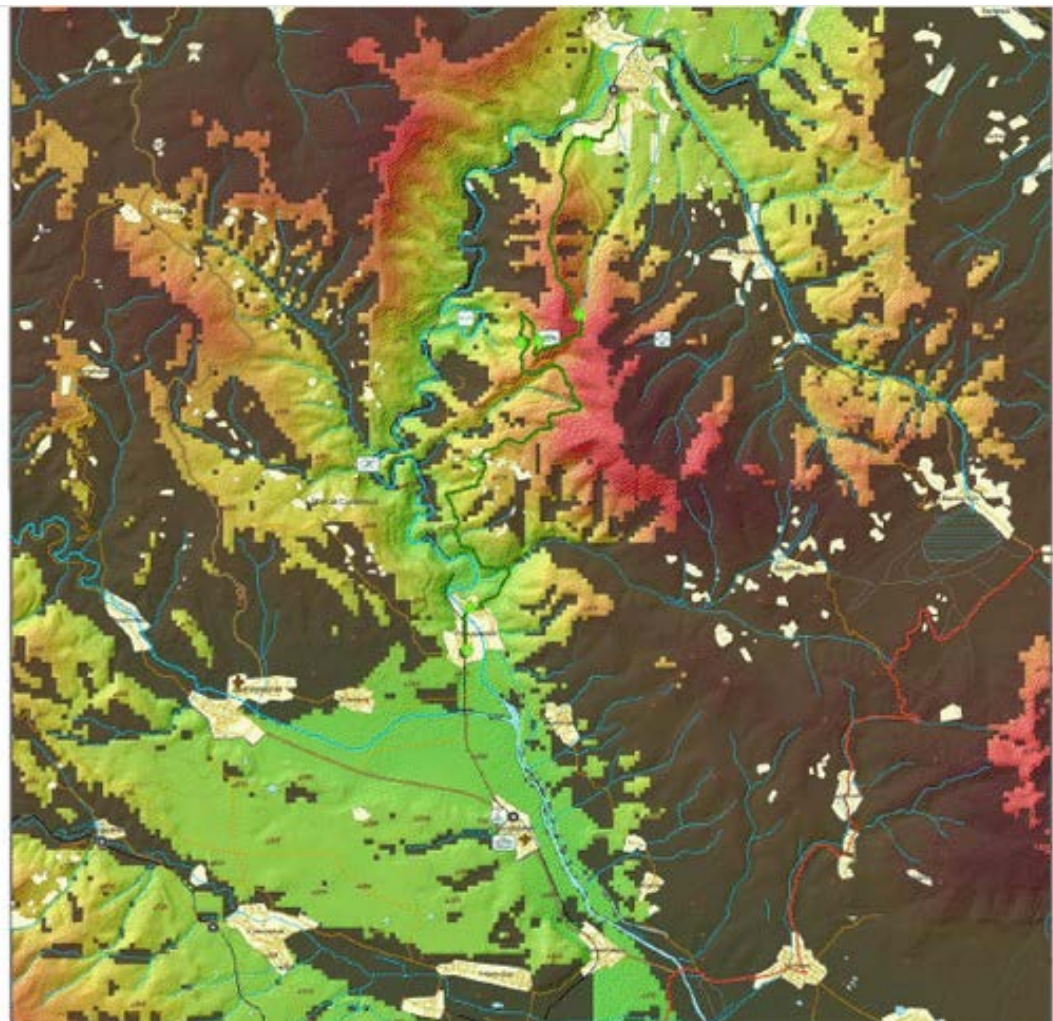


Fig. 5: Viewshed analysis

All the routes were created based on these different types of analysis, aimed to serve different types of tourist needs.

At the time of the survey (2011) there was no well-developed tourist infrastructure, incl. tourist sites, road infrastructure, signs, markings, etc. Many interesting places were almost inaccessible and there was a big lack of information about them – even now Zemen region is unknown territory for most of the population of Bulgaria.

CONCLUSION

There could be conducted an information campaign to promote the territory and objects of interest for tourists. Nevertheless the establishment of tourist routes in accordance with the protected areas and the Bulgarian legislation could be managed and the region can start to get benefits from its unique geographic, cultural and historical background.

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