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Linking religious tourism and ecotourism with forest trails

Christos Stamatiou[1], Sarantis-Angelos Liampas[2], Vasileios Drosos[3], Dimitrios Lazaris[4]

[1]PhD Forester, Laboratory of Forest Engineering Sciences and Surveying, Department of Forestry and Management of Environment and Natural Resources, Democritus University of Thrace, Orestiada 68200, Greece

[2]PhD Forester, Laboratory of Forest Engineering Sciences and Surveying, Department of Forestry and Management of Environment and Natural Resources, Democritus University of Thrace, Orestiada 68200, Greece

[3]Professor, Laboratory of Forest Engineering Sciences and Surveying, Department of Forestry and Management of Environment and Natural Resources, Democritus University of Thrace, Orestiada 68200, Greece

[4]Postdoctoral candidate, Laboratory of Forest Engineering Sciences and Surveying, Department of Forestry and Management of Environment and Natural Resources, Democritus University of Thrace, Orestiada 68200, Greece

Corresponding author; Christos Stamatiou

ABSTRACT: - This paper aims to promote ecotourism activities to visitors of sacred places so that the combined activities will promote the well-being of a person. Religion plays a key role in people's everyday practices but also in tourism practices, including destination choice and motivations for a visit to a sacred place. Combine a visit to a sacred place with activities to nature is a farther motivation to do both and fell closer to God and nature at the same time and escape from the daily routine. One of the most knowing ecotourism activities is walking on a forest trail and enjoy the nature, the flora, the fauna, the view, the scenery of a place. In this paper, we design forest trails that connect three orthodox monasteries in Paggaio Mountain in northern Greece. In the design of the forest trails, the diverse vegetation and the view from the trail took into consideration so the trail can attract the visitors of the monasteries to use it.

KEYWORDS: - Ecotourism, religious tourism, forest trail, GIS, viewshed analysis.

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I. INTRODUCTION

Evidence of the key role religion plays in people's lives is found not only in everyday practices such as eating, drinking and clothing [1] - [3], but also in tourism practices, including destination choice and motivations [4], [5]. Religious tourism can be considered as cultural sub-category tourism since it is linked to the tour of tourists to religious monuments (churches, monasteries, churches, chapels, events, etc.), which are part of the cultural wealth of an area. "Pilgrimage tourism" or more generally "Religious tourism" is one of the most important and dynamic forms of special or alternative tourism. It can be defined all activities associated with tourist visits to monuments, places of religious significance and similar religious events content [6], [7]. In addition to the spiritual satisfaction guaranteed by religious tourism to the visitors of the monuments, is given to the traveller's a combination with other related activities, such as getting acquainted with important cultural elements (sacred heirlooms, images). Tourism scholars have found that religious tourists may visit sacred places for reasons such as appreciation of nature, and educational and cultural enrichment [8], [9], including relaxation and self-discovery as is the case in Mount Athos, Greece [10]. Also, the opportunity for escape and relaxation, while as an alternative to mass tourism activity, achieves the protection of the natural and human-made environment and the maintaining local culture. For Greece, religious tourism is very important for its contribution to local or regional development, something which is ensured by the spatial dispersion of sacred temples, monuments and the monasteries. Consequently, religious tourism can be strengthened further, if the tourist destination areas except religious monuments have other tourist resources where are located [11].

Before roads, people were often following a specific route to reach their destination, whether it be the field or hunting area, either a village in the area. Thus, the first paths were created in prehistory contributed to people's survival and growth of communication and language. The engraving and construction of a path were based on choosing the shortest and safest route. The knowledge of the landscape was and is essential for environmentally and aesthetically attractive routes. At present people use the paths for recreational purposes,

trails offer outdoor enthusiasts an enjoyable way to view and experience an outdoor setting [12]. Trails provide opportunities to hike, bike, run, ride All-Terrain Vehicles (ATVs), and horseback ride. The design of a walking or hiking trail is based on fine-scale topographic conditions and varied criteria specific to the particular context such as aesthetics, views, construction cost, and environmental sensitivity. As a result, trail planning is typically a product of expert knowledge, field surveys, and creative design decisions often made on site [13]. However, when high-resolution data is available, like one of the newest free of charge global digital surface model (DSM), ALOS World 3D 30m mesh (AW3D30) which is provided by Japan Aerospace Exploration Agency (JAXA), geospatial modelling can be used to identify routes optimized for travel time, suitability, construction cost and scenic beauty.

Our approach for designing a trail network in Paggaio Mountain combines the identification of key waypoints like the three orthodox monasteries, visibility analyses of the route and slope analysis of the trail so we can minimise the contraction cost and impact of the trails in the natural environment. GIS is a powerful tool in visual-resource-assessment research and is widely used for modelling the visual quality of landscapes, from both objective and subjective perspectives of human–landscape interactions [14] - [17]. In this paper we used the open-source GIS software Quantum (www.qgis.org) GIS version 2.12 "Lyon" and the plugin "visibility analysis" available in: https://zoran-cuckovic.github.io/QGIS-visibility-analysis.

II. MATERIALS AND METHODS

The current research is located in Paggaio Mountain (figure 1) of Eastern Macedonia, Greece, a mountain with special, natural beauty and a considerable contribution to Greek culture. The mountain has long history, but some of the most notable facts about it is in the year 356 BC, Philip (the father of Alexander the Great) captured the surrounding area of Paggeo and the mountain itself, and he founded the city of Philippi very close to where, in 42 BC, the battle of Philippi took place, and the abolition of Roman democracy and the beginning of the imperial rule of the Roman state took place. The brightest period of this history, adjacent to the Paggaian city, was as a Roman colony, which he visited in the autumn of 49 AD. The great Apostle of the Nations, Paul, and founded here the first Christian Church of Europe, baptising the first European Christian, Lydia of Philippi.

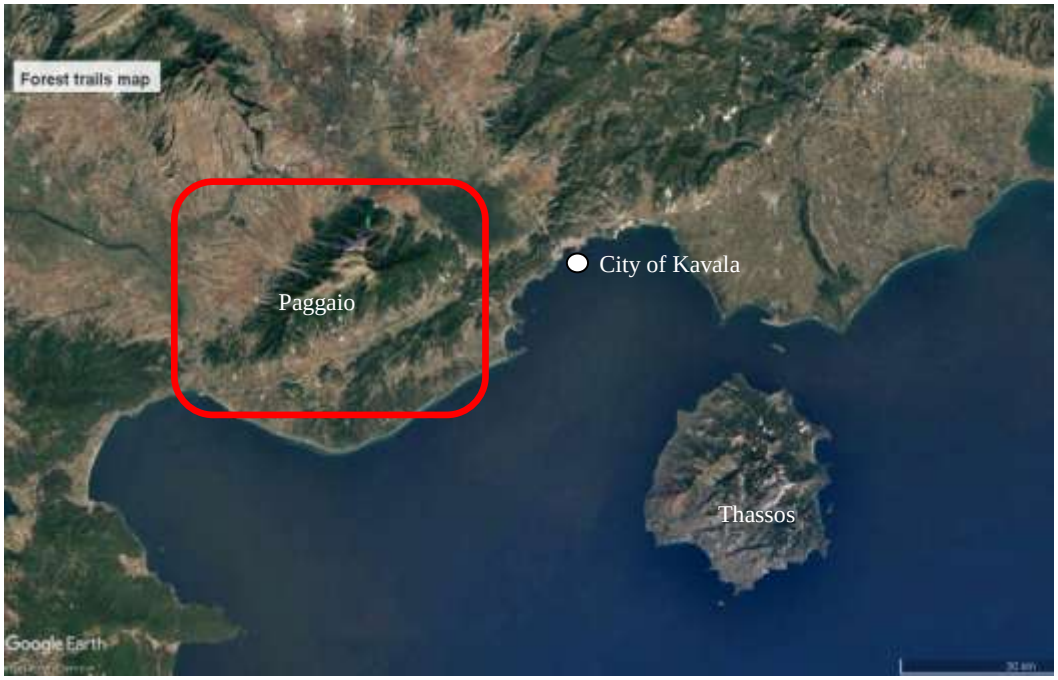

Fig.1: Google Earth image of Paggaio mountain, the city of Kavala and the island of Thassos.

The Paggaio Mountain is an important ecotourism destination as there are already exists a forest-village with the name "Paggaio Forest-Village" and two international trail races take place. The first trail race is called "Akrolithos Paggaio Trail Run" with a distance of 27km and the second is "Akrolithos Paggaio Trail Race" with a distance of 10km. The further ecotourism exploitation of the mountain is a challenge of the local Municipality, and the combination of ecotourism with other forms of tourism is in the priorities of the tourism policy of the Municipality.

The linking of religious tourism and ecotourism is possible with the contraction of the proposed forest trails that use three of the mountains monasteries as the start and end of the trails. The three orthodox monasteries that depicted in figure 2 are:

1) **The Holy Monastery of Panagia Ikosifinisa**, with the Impalpable illustration of Holy Mary, is one of the most significant pilgrimage spots in Macedonia and the oldest active monastery in Greece and indeed Europe! Although it is located in the borderline of Serres and Kavala, in the wooded mountain of Pangeo in 753m altitude, the administration belongs to the Cathedral of Drama. The founding of the monastery is hard to trace over the centuries. A significant number of folk tradition claims that while practising his ascetic life the monastery of Agios Ioannis Prodromos in the river Jordan, Agios Germanos had a vision and left Palestine. The vision, presented to him by an angel, drove him to Vigla site, mount Paggaio in 518 A.C. Once he completed the building of the first chapel, Agios Germanos took a walk in the nearby forest looking for a piece of wood in order to depict the figure of holy Mary, as a gesture of gratitude. As he finished processing the wood and just before he started painting on it, the wood cracked, leaving the holy man disappointed. It was then that bright red light, "finikoun" in ancient Greek, covered the piece of wood and the talking image of Holy Mary and Jesus appeared before him. "Do not despair for I am here for you", said a voice and the figure of Holy Mary was miraculously printed on the wood. So that is how the illustration and thus the monastery took its name (ikon + finisa).
2) **The Holy Monastery of Agios Dimitrios** is located in the prefecture of Kavala, at the foot of Mount Paggaio, near the famous town of Nikissiani. It is hidden in the mountain with the ultimate purpose of quietness and escape from the "fuss" of the world. It is a women's monastery, founded on a hill, at the western edge of the Nikisianis community in the eastern provinces of Pangeo. In the area there existed in 1913 a chapel honoured in the name of St. Demetrius. At the initiative of the metropolitan of Eleftheroupolis Amvrosiou, a new temple was built in 1973 with the contribution of the inhabitants of Nikissiani.
3) **The Holy Monastery of the Ascension.** Seven (7) kilometers from Protis Serres and at an altitude of 930 meters at Mount Paggaio with a panoramic view of the plain of the prefecture, lies the Monastery of Ascension. The old mortuary of the Monastery of Panagia Ikosifinissa, was reconstructed in 1979 at the same place, which from the 18th century was the homonymous but male monastery. Great offer of the Monastery to the Christians of the region. This was the cause of the repeated and repeated destruction of the Turks and the Bulgarian conquerors, with the greatest in 1913, 1917 and 1944. The Katholikon of the Monastery is a rare cruciform rotunda, built in the type of Holy Ascension on the Mount of Olive trees.

Fig.2: Google Earth image of the three monasteries.

For the design of the forest trails that connect the three monasteries the QGIS [18] was used. Quantum GIS (QGIS) is a powerful Open Source GIS software that allows users to design map with custom features (represented by a point, line, and polygon) and perform spatial analysis that uses spatial information to extract new and additional meaning from GIS data [19]. Also, the global digital surface model (DSM), ALOS World 3D 30m mesh (AW3D30) was used to perform the visibility and slope analysis of the trails. The AW3D30 has

30m pixel [20] and it very accurate for use in forest spatial planning [21]. Visibility or viewshed analysis (referred to hereafter as viewshed) is one of the more commonly used functions in GIS systems [22]. Applications of this type of analysis include landscape management and assessment [23] - [26].

III. RESULTS

The proposed trails that connect the three monasteries are three, and they can be divided in threes smaller trails that reach the same waypoint at the ridge "Kentiki" of the mountain. The three parts of the trails described below.

1) The trail part 1 (fig 3), the green line connects the Holy Monastery of Panagia Ikosifinisa with the ridge Kentiki. The length of the trail is 4.2km and starts from an altitude of 550m and ascend to an altitude of 910m. Also, the trail from the start and for 3.2 km follows a forest road, and the average slope is 12.1%.

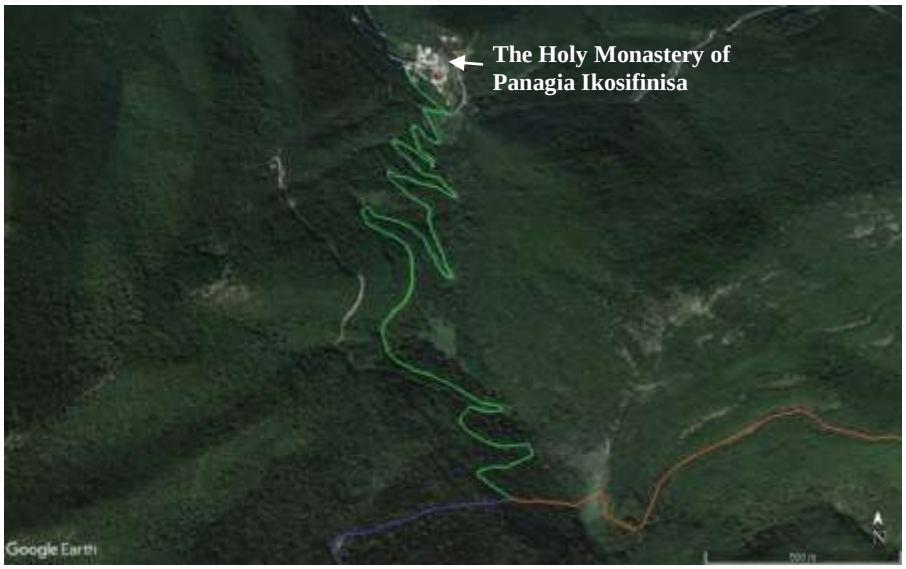

Fig.3: Google Earth image of the trail part 1.

2) The trail part 2 (fig 4), the red line connects the Holy Monastery of Agios Dimitrios with the ridge Kentiki. The length of the trail is 2.1km and start from an altitude of 480m and ascend to an altitude of 910m and the average slope is 11.2%

Fig.4: Google Earth image of the trail part 2.

3) The trail part 3 (fig 5), the purple line connects the Holy Monastery of the ascension with the ridge Kentiki. The length of the trail is 9.5km and starts from an altitude of 820m and climbs to an altitude of 1550m to the peak "trikofo" then a descend starts to the ridge Kentiki at 910m. At the start, the trail follows for 5km a forest road with small segments in the forest, after that the trail leaves the forest road and the vegetation at

1300m and follows the ridge up to the peak at 1550m. Then a descend starts in the barren land until the altitude of 1300m were the forest vegetation starts and the trail pass through the dense forest to the ridge of Kentiki at 910m, the average slope is 15.2%

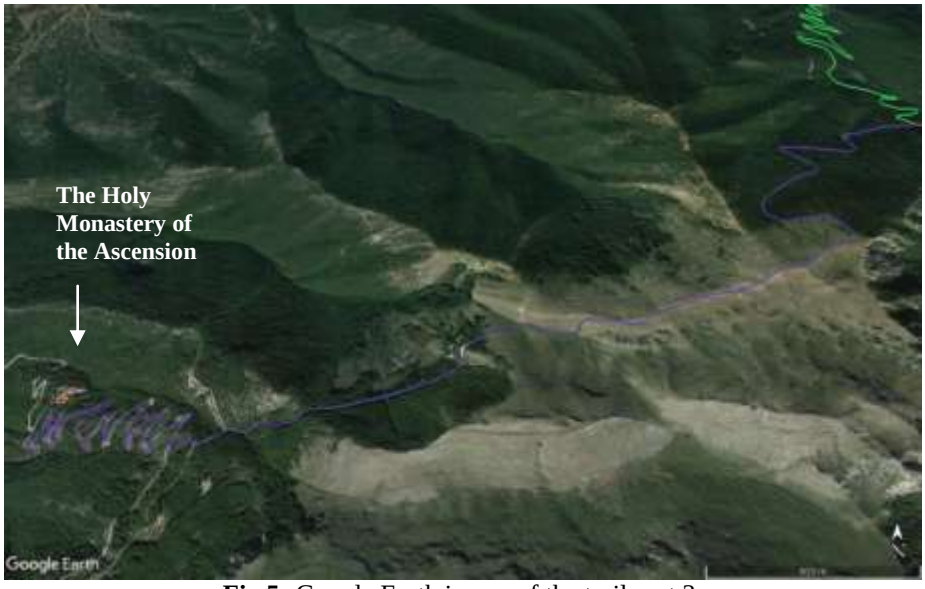

Fig.5: Google Earth image of the trail part 3.

The possible combination of the three trails parts to the three trails that connect the monasteries are presented in the following table I. In figure 6 the altitude of each segment of the trails is depicted, and in figure 7 the vegetation of the area is presented. The primary forest speeches at the area are oak, fir and oak but also there are bushlands and barren land in higher altitudes.

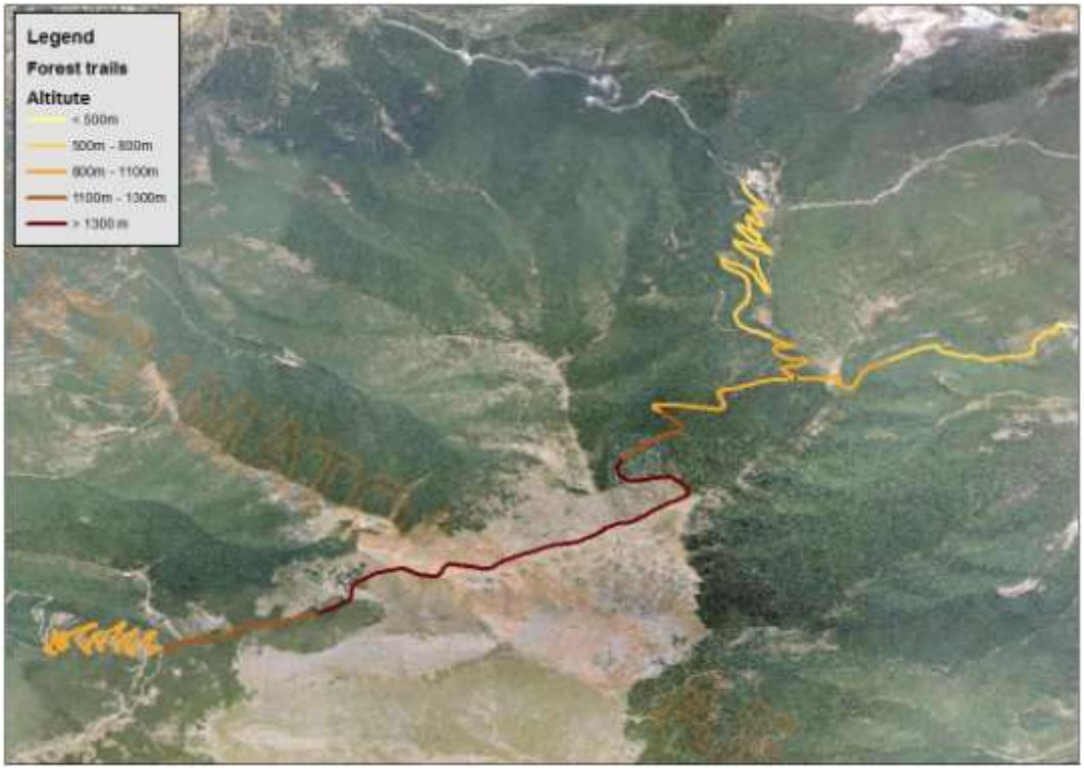

Fig.6: Greek cadastral orthophoto map of the area with the altitude of the forest trails.

Table I: Proposed forest trails

Trail number	From	To	Length	Estimated walking time
1	Panagia Ikosifinisa	Agios Dimitrios	6.3km	1 hour and 30min
2	Ascension	Panagia Ikosifinisa	13.7km	3 hours and 30min
3	Ascension	Agios Dimitrios	11.6km	3 hours

The map in figure 8 shows the average slope of the trails breaks in segments of 20m. With this map we can locate the segments with high slope and where we might need to construct technical works like stairs for easy ascend or descend at the trail. We calculated that the 39% of the length of the trail is under 10% slopes, the 24% of the trail's length is between 10-20% slopes, the 17% of the trail's length is between 20-30% slopes, the 15% of the length of the trail is between 30-45% slopes, and the 6% of the trail's length is over 45% slopes.

The maps in figure 9, 10 and 11 show the visibility of each trail. In figure 9 is the visibility of the trail Panagia Ikosifinisa - Agios Dimitrios, the visibility calculated to an area of 1168km^2. In figure 10 is the visibility of the trail Ascension - Panagia Ikosifinisa, the visibility calculated to an area of 2944km^2. In figure 11 is the visibility of the trail, Ascension - Agios Dimitrios, the visibility calculated to an area of 2961km^2. From all the trails the visitor can see the plains of Philippi but the second and third forest trails have the maximum visibility due to the ascend to high altitude at the peak of "trikorfo" we can even see the island of Thassos.

Fig.7: Land use map of the research area.

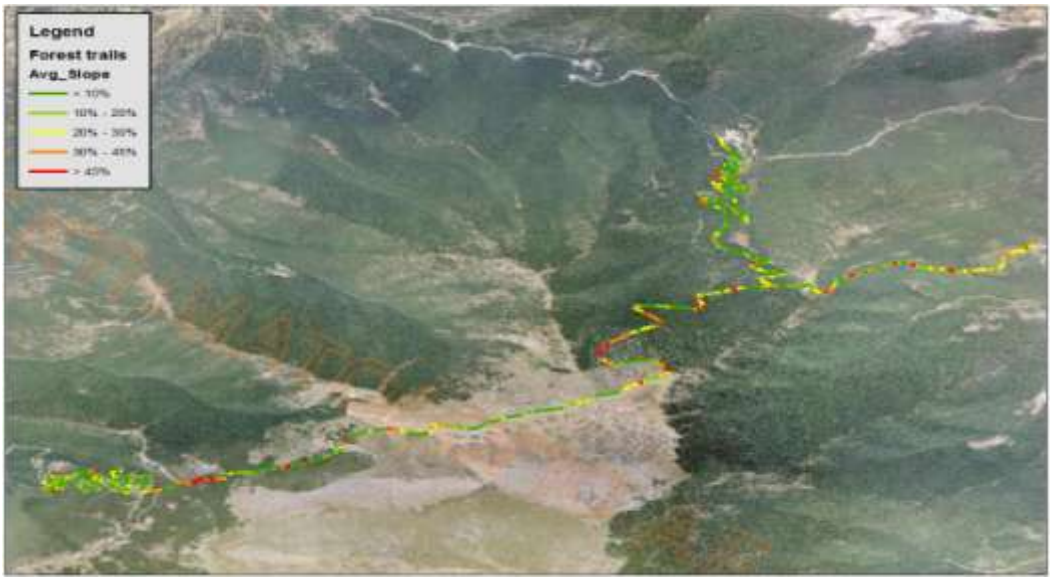

Fig.8: Land use map of the research area.

Fig.9: Visibility from the forest trail 1, Panagia Ikosifinisa - Agios Dimitrios

Fig.10: Visibility from the forest trail 2, Ascension - Panagia Ikosifinisa.

Fig.11: Visibility from the forest trail 3, Ascension - Agios Dimitrios.

IV. CONCLUSIONS

The proposed forest trails are friendly to walkers but also to every visitor of the place and due to the low inclination at the most of the route they meet and respond to all ages and abilities. The design tries to ensure a pleasant hiking experience with a view to historical sites, so the visitors of the three monasteries to be motivated and start walking in nature. With the linking with forest trails important places like the sacred places of the three monasteries, we try to the highlight the nature and culture of the Paggaio Mountain, so that the visitors have options for ecotourism activities when they visit the monasteries. At the stage of design, a forest trail both slope analysis and visibility analysis should be implemented in order to see if changes need it to the engraving of the trail. The visibility and slope maps that presented in this paper will help the policymakers, which are not familiar with forest trails, to understand the features of the trail route and help them to decide to invest or not in the construction of the trails.

The trails need to be carefully clean from the vegetation in order to make the hiking pleasurable, also in view of the safety of the hiker and his comfort in the hiking, technical works such as stairs, support for dry floors and flooring, portals, bridges will be need it in specific places of the routes. A fundamental feature of the forest trails is the signaling of paths with international specifications that inform the hiker correctly, harmonize with the landscape, are durable and have low cost. A part of the proposed forest trails with the appropriate facilities can be used for serving people with disabilities (IDPs). Because we used the forest road in the first part of the trails with the appropriate facilities and technical works the trail could be used from people with disabilities (IDPs).

Infrastructure projects must be constructed in trails where their regular maintenance must be predicted. In particular, non-maintenance of wooden construction makes them dangerous for the safety of visitors and if there is no provision for infrastructure maintenance, then trails must be avoided. The materials that can be used in the phases of construction of a trail must have an excellent quality. Materials that do not blend in harmony with environment should be avoided. The wood that will be used in constructions, should be impregnated with appropriate substances to maximize its service life. The natural environment of the area where construction or rehabilitation will take place of the path, should not be disturbed. Using motorized means, which transport materials from other regions, causes a nuisance and disasters in the local environment, for this reason, maintenance materials and construction should be pulled out of the crossing zone. In conclusion, the maintenance of mountain paths should be carried out once a year and the code for visitors to the forest paths should be at the start of the path so that everyone can be informed. After the first years of use, ancillary works might be needed accordingly to the records for the load of visitors that use the trails.

With the link between the religious tourism and ecotourism, the religious tourism can be strengthened further because the monasteries areas except religious significance have other tourist resources that are compatible with the nature of the monastery.

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