IDENTIFICATION OF THE GEOTOURISM POTENTIAL
OF AFGHANISTAN, A CASE STUDY: BAMIYAN COUNTY

Morteza ESMAELNEJAD[*]

University of Birjand, Faculty of Literature and Humanities, South Khorasan, Iran, e-mail: Esmailnejad.m@birjand.ac.ir

Abstract: Afghanistan is a wilderness and varied country in the geo-tourism sector. The aim of this study was to investigate the capabilities of geotourism and also to identify the capacities of geotourism development in Bamiyn province. In this area model Hadžić et al (2010) has been used, the survey was conducted using 20 tourists and 5 experts. Geographic information system were effectively used for identification of the potential ecotourism sites. It is the indicator of a vast range of geological and geomorphic forms in Bamyan state. The result indicates that the study area has strengths and opportunities for the development of geotourism that are not well identified and introduced.

Key words: Afghanistan, Geotourism, Dynamic Model, Local Development

* * * * * *

INTRODUCTION

Tourism is typically associated with certain economic benefits, including income, employment and, in the case of international tourism, foreign exchange earnings, which then stimulate wider economic growth (Sharpley, 2009). In fact, the tourism structure of a place can affect the tourist's demand (Law, 2002) and the organization of tourism in one place begins with a plan to understand the behavior of tourists in that place (Bansal et al., 2004). The natural landscapes have structured attractions in themselves which make people more motivated to demand tourism and visit them. Geomorphologic, climatic, mineral water, vegetation, and animal species attractions along with underground waterways, with or without water, are among the most important factors in economic tourism studies and policies (Fennel, 1999). The basic disciplines associated with geotourism include science, economics, social science, education, and media (Olafsdóttir et al., 2018). Visiting natural places with scenic beauty is a traditional practice. However, the concept of geotuorism taken shape in recent times (Singhand and Ghosh, 2021). Geotourism is often defined by researchers in the general context of tourism in geological prospects of geomorphology (Hadžić et al., 2010; Coratza and Giusti, 2005; Nemanj, 2011; Gordon, 2018; Maghsoudi, and Rahmati, 2018). While geotourism is not mere tourism in geological, geomorphological prospects, but geotourism inclusion is very grate (Dowling, 2008). Thus, geotourism means the tourism that maintains or enhances the geographic identity of a place, encompasses not only the environment, but also the heritage of the culture and aesthetics of the place, and most importantly the welfare of the locals (Pereira and Dias, 2008). Geotourism targets are often geosites or geographical phenomena that can be used as geopolitical heritage in the form of a geopark as a tool for tourism development (Abdi et al., 2005). Geomorphologic tourist places are defined as geomorphologic forms and processes. Therefore, human perception of the geological, geomorphological, historical, and social influences of these places has aesthetic, scientific, historical, or socio-economic values (Mokhtari et al., 2012). These geomorphological attractive geological locations are defined as geomorphosites (Panizza, 2001).

Geomorphosites are one of the new concepts that have entered the tourism literature with an emphasis on recognizing special places (Ielenicz, 2009). Geomorphosites refer to the geomorphological assets of geological heritage, the term being a contraction of 'geomorphological sites' (Panizza, 2001). According to human perception, geomorphosites can be said to have two principal values, sciences and value added (Reynard, 2007; cited in Shayan et al., 2014). Today, Geomorphosites have a high value among scientists and the general public which causes cultural syncretism and increased interactions between different places while helping the local economy of neighborhoods of Geomorphosites. These places have a huge potential for attracting tourists, according to which most countries and organizations are planning to introduce and promote such areas to attract tourists from all over of the world. The geopark information system of Iran was created in 2009 with the assistance of the Geological Survey of Iran, based on the model of the UNESCO international geopark network by geoscience databases (Koshraftar, 2007). The UNESCO Organization identifies the most important tourist potentials of these places as follow. Caves, valleys, faults, waterfalls, springs, synclines and anticlines, volcanoes, exterior igneous materials, stalactite and stalagmite within caves, canyons and man-made forms related to geomorphologic factors. For example, inscriptions on the steep walls are among the most important sources of tourism land (Rahimpour, 1991). Anna and Zadzillo consider geotourism to be of four main perspectives: scientific research, education and training, access to geotourism and conservation. The typology of site classification includes the following domains: geochemistry, geomorphology, soil science, history, hydrogeology, mineralogy, palaeogeology, paleontology, petrography, sedimentation, stratigraphy, structural tectonics, mineral

---

[*] Corresponding author

deposits science (Solarska and Zdzisław, 2010). Assessing the geotourist capability of areas is a process to identify and predict the potential of the regions in such a way that the findings from its implementation are used to plan for the improvement or approval of areas (Coratza and Giusti, 2005). The main methods for conducting environmental assessments in the world are the matrix, anatomical checklist, integration and system analysis (Canter, 1992). On the global level, there has been a great deal of research on the assessment of the potential of geotourism in different regions, the most important of which are the following. Pralong (2005) introduced the method of using an identification card as a document for evaluating and managing geomorphologic locations that was widely researched by researchers. Brilha (2009) examined European geological heritage, including the Portuguese geoparks, and developed the necessary strategies to protect the geoparks. Hadzik et al. (2010) determined the value of geoparks using a dynamic model. In this study, the criteria for geotouristic attraction of areas were determined and then evaluated. Nemanj (2011) examined the Geotourist potential of the Lazar Canyon.

In this research, using the questionnaire of geotourism features of the area, the tourist value of the Lanzar canyon was evaluated. Comanescu (2011) studied the capability of the Ponoare protected geomorphosites. In this research, five scientific, aesthetic, cultural, economic and management indicators were introduced for evaluating of geomorphosites. Due to the increase in geoconservation studies, several methods of qualitative and quantitative assessment of geosites have been published since the 1990s (Mucivuna et al., 2019). The recognition of geological structures and geomorphological landforms as heritage, however, is relatively ancient (Reynard et al., 2016). In Afghanistan, with its geological potentials, little effort has been made to introduce them to tourists and the public and to interpret their scientific value. Due to the lack of familiarity with dealing with land heritage and its capacity, it has caused damage to sites and environmental degradation. Therefore, this study was conducted to identify the geotourism potentials of Bamyan region.

STUDY AREA

Most of the mountains in Afghanistan are located in the center, east and northeastern parts of the country. The Bamiyan province (Figure 1, 2) is an intramountainous basin, subsequently filled with debris material originating from the surrounding mountain ranges. Bamiyan is located at 2,540m elevation on the N edge of the 600-km-long EW valley along the Herat fault, at the confluence of three different rivers (Reineke, 2006). Where most of these areas are cold in the winter and more precipitation is in the form of snow. Mountainous areas of Afghanistan have many fertile fields where people are farming and livestock raising.
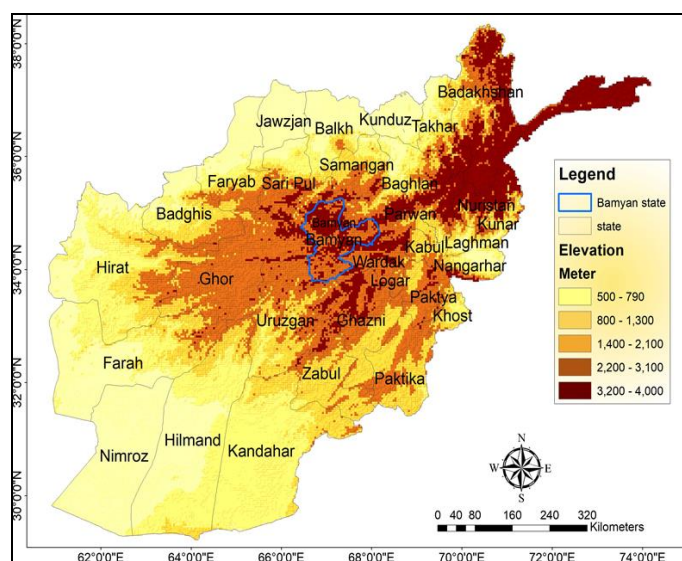

Figure 1. Location of Bamyan state and its topography (DEM)   Figure 2. Bamyan state and its Landuse
(Source: National Renewable Energy Laboratory, 2020)

MATERIALS AND METHODS

Research methodology is based on literature review, taking advantage of the valuable experiences of other countries and researchers in the field of tourism. In this study, by examining geological maps, topography and field Study, the characteristics of geotourism in the study area were investigated. Geomorphological and geological data in GIS were used to locate areas potential to geotourism (figure 1, 3). Geological map of the region (Figure 3) was used to determine the type of formations and faults in the region. The research methodology is an applied analytical study that evaluates the research from a geotourism location based on the research model and data available in the model. In this research, Hadzik et al. (2010) model was used. There are many models for assessing the tourist value of a region. However, the present model has a preference, compatibility and greater flexibility with the realities and the amount of tourist value of the place, due to the opinions of the experts and tourists of that area. In this model, the word "land heritage" is a combination of several elements including cultural, social, historical, beauty landscape, archaeological, educational, scientific, entertainment, physiological and artistic elements. The value and importance of any geotourism location in this method are estimated by 3 scientific value indicators (Table 1) sub-values (Table 2) and the vulnerability of that geotourism location. The scientific value is estimated based on the following equation (Hadzik et al., 2010) the signification each term indicate in table 1 and 2.
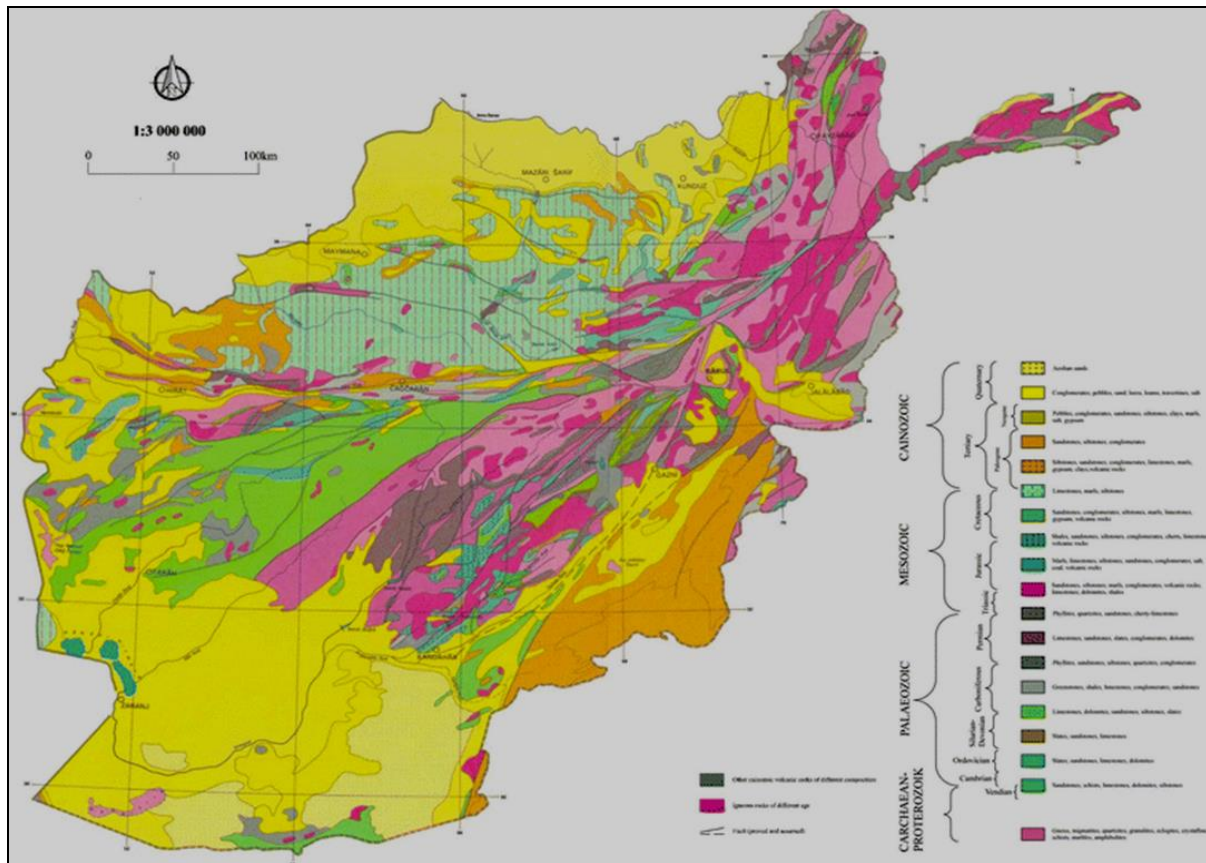
Figure 3. Geology map sheet of Afghanistan (Source: USGS, 2007)

Table 1. Sub-indicators of
of a geotourist location scientific value

Evaluation indicators	Sub-indicators	Symbol
Indicators of scientific value	Rareness at the regional level	Ra
	Integrity (unfair)	In
	Representative of Geomorphological Processes	Rp
	Variety in geomorphic forms	Dv
	Other geological features along with cultural heritage value	Ge
	Scientific knowledge	Kn
	Educational benefits	Ed
	Rarity at the national level	Rn

Table 2. Sub-indicators of the surplus value of a geotourist location (Nemanj, 2011)

Evaluation indicators	Subindicators	Symbol
Index of surplus value	The value of the landscape	ScV
	Ecological value	Ec
	Indicator at destination	Ex
	The experimental components of the product of geotourism	ReD
	The amount of communication with some artworks	AW
	The rate of communication with the social development of local settlements	DLC
	Possibility to organize for certain cultural events	OCE
	Interpretative value (related to good stories)	In
	The presence of natural elements and cultural heritage	Com
	Quality of geosite management	Qu
	Supportive facilities and services	Ess
	Accessibility	Acc
	Visibility	Vi

$$ScV = Im(Ra)xRa + Im(In)xIn + Im(Rp)xRp + Im(Dv)xDv + Im(Ge)xGe + Im(Kn)xKn + Im(Ed)xEd + Im(Rn)xRn \qquad (1)$$

In this model, weight values of the opinion of the experts are different from the view of tourists, on the basis that the importance of each of the subcategories (Im) is assessed by tourists from zero to one. While experts' opinions are evaluated for each of the subcategories from one to five, then by summing up each of the subcategories the scientific value of the geotourism location is determined according to the equation one. The next index is the Research Model, whose indicators are presented in Table 2 below. This indicator is also exactly the same as the scientific index.

$$AdV = Im(ScV)xScV + Im(Ec)xEc + Im(Ex)xEx + Im(ReD)xReD + Im(AW)xAW + Im(DLC)xDLC + Im(OCE)xOCE + Im(In)xIn + Im(Com)xCom + Im(Qu)xQu + Im(Ess)x Ess + Im(Acc)xAcc + Im(Vi)xVi \qquad (2)$$

The last indicator is the geosite vulnerability index, which has no sub-indicator and is evaluated solely by experts. It is between 1 and 5, where 1 represents the maximum vulnerability, and the number 5 represents the maximum strength of the geosite against the vulnerability. The final result of the tourist evaluation (TE) is obtained by aggregating the scientific indicator, sub-indicators and geosite vulnerability as following equation (Hadzik et al., 2010):

$$TE = ScV + AdV + Vu. \qquad (3)$$

The present model is more preferred, adaptive, and flexible with the realities and the amount of tourist value of the place because of both the opinion of both experts and visitors of the area. Some of the sub-indicators are thematic (for example, the value of the landscape), which explores the views of tourists and visitors from that area. In this method, there are many indicators that examine scientific and historical values, outlook, ecological, cultural and other factors (Figure 4). Considering that geotouristic locations require at least the necessary knowledge regarding the formation of geological and geomorphological forms.
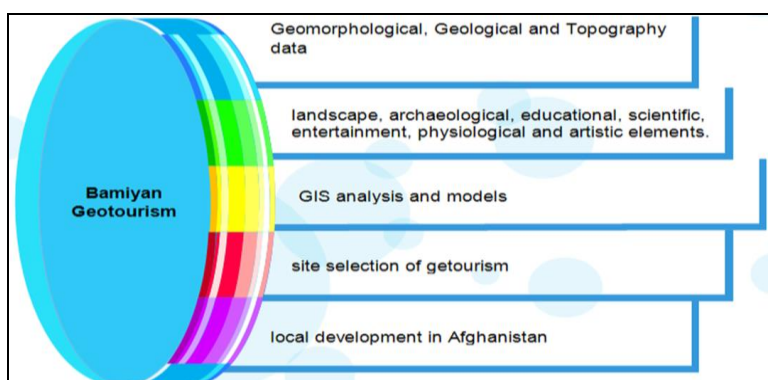

Figure 4. Process of geotourism analysis in Bamiyan, Afghanistan

Table 3. Final evaluation of the geotourism value of the study area

assessment of tourist value of Geopark	Obtained score
Excellent	100-130
Very good	70-100
Good	40-70
Average	20-40
Low	0-20

And given the fact that most tourists are not from the scientific community and do not know the exact geomorphological form and geomorphological processes in the site, experts' opinions will be higher than that of tourists. If all the tourists and experts give the highest score to a geopark, based on this index, its score will be 130. Therefore, based on the final result of the score, experts and tourists can provide an assessment as shown in the table below.

DISCUSSION AND RESULTS

Afghanistan has a wide range of geomorphic elements and processes to attract tourists interested in earth sciences. Many river processes including the formation of sandy sculptures, a variety of meanders) free meanders and valley meanders (cutting the banks of the river walls and other forms are visible (Figure 3). Also, there are wide variations of mass wasting including slopes, stones, landslides, falls and creeps in the area (Figure 4). Due to the existence of almost soluble formations including gypsum in some parts of the region there is capacity of creating caves of different sizes and caves have been created in different shapes. There are more than 2,000 large and small caves in Afghanistan. Regarding the tectonic activation of the area due to the presence of various faults visible in the valleys and steep walls (Figure 5).

The study area with regard to natural features, such as national parks and unique protected regions, like Band-e Amir national park (figure 6), Wakhan protected national park, visual water falls along with the acquisition of valuable cultural assets can have a special place in south Asia (Movahed and Aman, 2019). for example: Band -e- Amir: it is a national park and one of natural heritages is the world that has 4200- hectares area it was shelter birds to different kinds of fish in 1973 (Aman, 2016). These factors have led to the creation of unique geosites in the region:

1- Existence of carbonate and carbonate dolomite formations.
2- Expansion of gap systems (due to mechanical and chemical weathering).
3- Relatively suitable rainfall and water circulation inside the limestone.
4- Suitable height and predominance of acidic waters.
5- Solubility process in carbonate and dolomite rocks

Figure 5. The mountain pattern of the Bamyan

Figure 6. Types of slopes overlooking the lake (National park of Amir)

The shape created in this area is influenced by fiction karst including cave, Dolin, spring, natural bridge (Figure 7). Weathering processes have led to the massive destruction of bare and naked stones, and the result of this process is the formation of very large debris cones in favorable slopes. Almost all active geomorphologic elements in semi-humid areas can be identified in this area. In Afghanistan, from the east to the west, the height of the mountains is reduced, and the high mountains gradually move to deep valleys, deserted and windy plains. But in the center of the country as far as the eye can reach there are mountains and mountains, and deep valleys have clear days and extremely cold nights. This region is considered to be the most structurally complex part of Afghanistan (Shareq, 1981). The study area has a wide range of geomorphic elements and processes to attract tourists interested in earth sciences. More than river processes, including the formation of sand benches, different types of meander. Even the passageways of this land are in some areas with an altitude of over 2000 meters above sea level. Indeed, Afghanistan, with its immense masses, is a wonderful world of beauties. This rugged highland is interspersed with valleys and basins, all of which have a general northeast trend (Treloar and Izatt, 1993)

The melting of glaciers in "Badakhshan" and the Hindu Kush mountains is associated with flooding and rivers rage, and in many snowy areas sliding glaciers also occur. In the vast region of Jaghatu to Jaghori, there are about 2,500 historical caves of the Paleolithic, Paleolithic, Medieval, Neolithic, Historical and Indigenous Periods of the Buddhist period, and in the period of the Kings of the region, in which there are many works of mixed Indian, Greek, Roman, and Sassanid arts (Azimi, 2015).
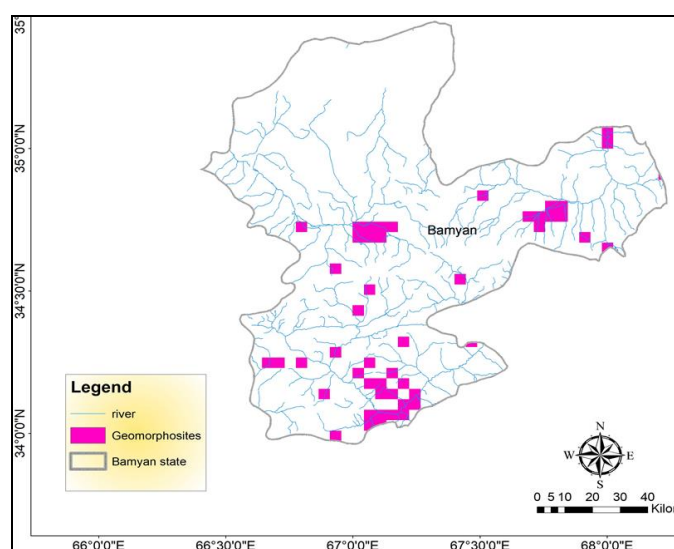

Figure 7. Site selection of getourism in Bamyan

Table 4. Evaluation of Bamyan State Value Indicators with Visitor's and Experts' Views

Evaluation indicator	Sub-indicators	Score of visitors	Score of experts
Scientific value indicators	Rareness at the regional level	81%	4.2
	Integrity (indisputable)	92%	4.3
	Representative of Geomorphological Process	91%	4.1
	Variety in geomorphic forms	95%	4.3
	Other geological features along with valuable cultural heritage	89%	3.9
	Scientific knowledge	83%	3.9
	Educational profit	90%	4
	Rareness in national level	53%	3

Table 5. Evaluation of sub-value indicators with Visitor's and Experts' Views about Bamyan Area

Evaluation indicator	Sub-indicator	Visitors scores	Experts scores
Surplus value indicator	Landscape value	0.92	4.5
	Ecological value	0.84	4.2
	Indicator at destination	0.79	4.3
	The experimental components of the product of geotourism	0.74	3.9
	The amount of communication with some artworks	0.45	2
	The rate of communication with the social development of local settlements	0.75	2.1
	Possibility to organize for certain cultural events	0.40	1.4
	Interpretative value (related to good stories)	0.45	1
	The presence of natural elements and cultural heritage	0.96	5
	Quality of geosite management	0.10	1
	Supportive facilities and services	0.10	1
	Accessibility	0.20	1
	Visibility	0.52	1.9

In order to assess the geotourism potential of the study area, based on the research model, on September 11, 2017, 20 tourists were surveyed who came to visit the area. According to specialized research questions and questionnaire, the questionnaire was described generally before the completion of the questionnaire by tourists regarding the questions (Table 4, 5). In order to assess the opinion of experts, 4 specialists who had master's degree and Ph.D. degree in geography, geology and tourism were used. In evaluating the opinions of specialists, people were firstly familiarized with the studied area and at least once went to the area, and they had acquaintance with the concepts of tourism science. For this reason, the number of experts was reduced in terms of the criteria. The results of the evaluation of the scientific value indicators by tourists and specialists are presented in Table 1. According to the table of geological characteristics along with the cultural heritage has obtained the highest score among specialists and tourists, which indicates a very wide range of geological and geomorphic forms in the area. The rareness index at the national level has the lowest score and it is quite logical. The main point in Table 1 is the disagreement between the two groups in geomorphological indicators and the index of diversity in geomorphologic forms.

As tourists rated the two indexes higher, while the experts gave the two indexes a near average rating. Considering the specialized nature of the two indicators, it can be said that the region is in the medium of two indicators. In this regard, experts can be considered superior to tourists, because the answer to this question requires familiarity with a wide range of Earth science phenomena. In other indicators, the opinions of the experts and the views of tourists are similar. The relationship between the two groups was evaluated and the score below the scientific value indices was 21.752.

$$ScV = 0.81 \ (Ra)x \ 4.2 + 0.92 \ (In)x \ 4.3 + 0.91 \ (Rp)x \ 4.1 + 0.95 \ .(Dv)x \ 4.3 + 0.89.(Ge)x \ 3.9 + 0.83.(Kn)x \ 3.9 + 0.90 \ (Ed)x \ 4 + 0.57 \ (Rn)x \ 3 = 27/22 \qquad (4)$$

Source: (Hadžić et al., 2010) components of the formula has been explained in Table 2

The results of the evaluation of the sub-indicators are shown in Table 2. It needs to be explained that the answer to the indicators of scientific values does not require much scientific and specialized knowledge in the subject matter of the research. Therefore, the comments of each questioner can be cited. Based on the table below, the index of the presence of natural elements and cultural heritage has earned the highest score. The presence of cultural elements related to historical periods in most parts of the studied area along with the natural and active elements of the region caused the region to become a tourist site and this factor has been found by experts and tourists. The landscape indicator has earned a very high score. The region has a fantastic beauty effect that gives it more points. The interpretive value index has earned the lowest score for both groups. A very noticeable point in this table is that the indicators that are related to the management of geosites, facilities and supportive services, and accessibility due to the availability of reliable and good ways in terms of both groups have received the lowest score which indicates that the study area has a major management weakness that failed to provide the necessary infrastructure for the development of geotourism and tourism in the region despite the availability of the potential which was found typically in experts' views. Therefore, it is necessary to provide integrated management and facilities for better development and attraction of domestic and foreign tourists. This is due to the fact that in the studied area there is no suitable accommodation for tourists. By providing the conditions, cultural programs can provide educational programs for students or geoscientists interested in the potential of almost the entire region. The amount of vulnerability assessment was 3, due to the fact that one of the main criteria for attracting tourists in this region is the existence of historical monuments. Due to the long history, these highly weathered works are very vulnerable to natural destructive factors. These historic monuments are also beside headlands or hillsides that sharpen the vulnerability. On the other hand, geotouristic forms of this region are located in exacerbated geological formations and are dominated with sharp hillsides, so vulnerability of natural forms with geotourist values increases by natural disasters. Major landslides and riverbeds in loose formations every year have caused geotourism to be eroded or sometimes create other forms. One of the major criteria for vulnerability is the amount of attention, support, and protection of related organizations from geosite. According to the data obtained from the questionnaire and field surveys, the level of protection from the historical and geotouristic forms of the region is low (Hadžić et al., 2010).

$$AdV = 0.92 \ (ScV) \ x \ 4.5 + 0.84 \ (Ec)x \ 4.2 + 0.79 \ (Ex)x \ 4.3 + 0.74(ReD)x \ 3.9 + 0.45 \ (AW)x \ 2 + 0.75 \ (DLC)x \ 2.1 + 0.40 \ (OCE)x1.4 + 0.45 \ (In)x \ 1 + 0.96 \ (Com)x \ 5 + 0.10 \ (Qu)x1 + 0.10.(Ess)x \ 1 + 0.10 \ (Acc)x \ 1 + 0.52(Vi)x \ 1.9 = 24/475 \qquad (5)$$

Final evaluation of the geotourism value of the region

Finally, with the sum of the indicators of scientific values, secondary values and vulnerability of the geosite, the final score of the geosite is estimated. The final value of the site was 53 as shown in equation (6). According to Table 3, the tourist value of the area is good. It should be noted that factors that reduce the tourist value of the study area are mostly the indicators related to the management and welfare facilities available in site, whose improvement will increase significantly in terms of amenities in the region's tourism value. The dynamic model, studied in this study shows the potential and capability of the region to attract tourists especially in the field of earth tourism, which, in case of providing the weaknesses in this research, it will be one of the active tourist hubs.

$$TE = 24.4 + 27.22 + 3 = 54.62 \qquad (6)$$

CONCLUSION

Tourism, which emphasizes the maintenance and protection of the five key dimensions of the graphic features of a region - the environment, culture, beauty, science, education, and the well-being of local people, can play a special role in preserving the capacities of local communities. In this study has been discussed about tourism capability of Bamyan province. This area has a wide range of elements and geomorphic processes to attract tourists interested in earth sciences. It is one of the most important historical centers of Afghanistan culturally and historically. Considering the nature of tourism which in addition to assessing the tourism features of its regions and its attractiveness, also addresses the structure and functioning of the -site management, so one should use a model to cover all -tourist aspects of the areas.

On the other hand, according to a highly specialized tourism discussion, it is not merely possible to estimate the value of a -site with the reliance of tourists' opinions. Accordingly, we should use tourist and morphology specialists' view. In this research, we have used the dynamic model to consider the above considerations to a large extent. Many of the river processes, the types of slopes, the existence of almost pure soluble formations including Gypsum in the parts of the area and the ability to form caves in different sizes and shapes, and existing of visible tectonic activation in valleys and steep walls and the creation of very beautiful scenes with different types of faults and fault elements, high temperature difference during seasons, and performance of weathering processes there are special -tourist attractions in this place which has a scientific value for earth scientist and educational value for students of the Earth sciences. Therefore, assessing the tourism

value of the region will provide significant assistance in terms of economic, cultural, tourist, ecological and sustainable development of the region. On the other hand, whether the lack of knowing these capabilities or believing that they are not attractive tourist attractions by the relevant authorities, the lack of appropriate communication paths, the lack of suitable accommodation facilities for tourists, the lack of a tour guide aware of tourism capabilities and historical value of the region are of most important problems and weaknesses of the region for developing of tourism.

REFERENCES

Abdi, M., Nick Siri, M., & Nasiri, S. (2021). *Introduction of Damavand Park, National sciences Database*. Quantities morphological research, 9(2), 18-33, (in Persian).

Aman, S. (2016). *Environmental Protection*, First Edition, Jalalabad Publishing House, Kabul, Afghanistan

Azimi, M. (2012). *Ecotourism in Afghanistan,* Sobh Omid Publication, Kabul, Afghanistan, (in Persian).

Bansal, P., Arnold. J., Elberg, M.A., Kalda, J., Soesoo, A., & Van Milligen, B.P. (.2004). Melt extraction and accumulation from partially molten rocks. *Lithos*, 78(1), 25-42. https://doi:10.1016/j.lithos.2004.04.041

Brilha, J. (2009). *Geological heritage and European parks in Portugal, Proceedings of the VIII European parks.* Conference, Idanha-a-Nova, Portugal.

Canter, L.W. (1996). *Environmental impact assessment*, McGraw-Hill Publication. Baltmore, USA.

Comanescu, L.A., Nedelea, R., & Dobre, L. (2012). *The* Evaluation of Morphosits from the Ponoare protected area. *Journal of Geography*, 5(1), 54-61. https://doi:10.5775/FG.2067-4635.2012.037.I

Coratza, P., Giusti, C. (2005). Methodological proposal for the assessment of the scientific quality of morphosites. *Géomorphologie Relief Processus Environnement,* 18(1) 307- 313. https://doi: 10.4000/ 7942

Dowling, R. (2008). The emergence of tourism and parks. *Journal of Tourism*, 9(2), 227- 236.

Dowling, R., & Newsome, D. (2017). *Handbook of Geotourism*, Edward elgar publishing Inc, Northampton, Massachuset, USA.

Fennel, D. (1998). Ecotourism in Canada. *Annals of Tourism Research,* 25 (1), 231-234. https://doi:10.1177/004728759803700143

Gordon, J. (2018). Heritage, tourism and the Cultural Landscape: Enhancing the Visitor Experience and Promoting conservation. *Geosciences,* 8, (4), 136. https://doi.org/10.3390/sciences8040136

Hadžić, O., Marković, S.B., Vasiljević, Dj.A., & Nedeljković, M. (2010). *A Dynamical Model for Assessing Tourism Market Attractiveness of a site.* 1st International Conference on heritage & tourism Research TRENDS 2010, Novi Sad, Serbia.

Ielenicz, M. (2009). Geotope, Geosite, Geomorphosites. *The Annals of Valahia University of Targoviste*, Geographical series,Tome 9.

Koshraftar, R. (2007). *Parks, Earth Sciences and Economic Growth*, Proceedings of the park *Conference of Qeshm*, Qeshm Island, (in Persian).

Law, C. (2002). *Urban Tourism, the visitor economy and the growth of large cities*, Continuum, London, UK.

Maghsoudi, M., Rahmati, M., (2018). *Morphosites assessment of lorestan province in Iran by comparing of Zouros and Comanescu's methods (case study: Poldokhtar Area, Iran).* Journal of Tourism and Geosites, 21(1), 226–238. https://doi: 10.30892/gtg.21118-283

Mokhtari, D., Karami, F., & Bayati Khatibi, M. (2011). Identification of active morphogenetic forms in Payam pass with the aim of planning tourism. *Geographical Research Quarterly,* 26 (4), 67-92, (in Persian). https://doi:10.22059/jphgr.2016.60824

Movahed, A., & Aman, S. (2019). *The examining of strategies for ecotourism development in Afghanistan*, International Congress on Future of Tourism: Innovation, Entrepreneurship and Sustainability, Tehran, Iran, (in Persian).

Mucivuna, V.C., Reynard, E., & Garcia, M. (2019). Morphsites Assessment Methods: Comparative Analysis and Typology. *Heritage* 11, 1799–1815. https://doi: 10.1007/s12371-019-00394-x

Nemanj, T. (2011). The Potential of Lazar Canyon (Serbia) as a tourism Destination: Inventory and Evaluation. *Geographica Pannonica*, 15(3), 103-112. https://doi: 10. 0354-87241103103T

Olafsdóttir, R., & Tverijonaite, E. (2018). *Tourism a Systematic Literature Review.* Sciences, 8, 234. https://doi.org/10.3390/sciences8070234

Panizza, M. (2001). Morphosites, Concepts, Methods and Examples of morphological Survey. *Chinese Science Bulletin*, 46(3), 4-6. https://doi:10.1007/BF03187227

Pereira, D., & Dias, G. (2008). Master's course on logical Heritage and conservation. *European logistics*, 26-31.

Pralong, J.P. (2005). A method for assessing the tourist potential and use of morphological sites. Morphology, Relief. *Processes, Environment*, (4)3, 189-196.

Rahimpour, A. (2007). *Tourism, a Journey through the Wonders of the Earth,* Iranian Publication, Tehran, Iran, (in Persian).

Reineke, T. (2006). *Environmental Assessment of the Bamiyan Valley in the Central Highlands of Afghanistan*. In: University of Aachen, Bamiyan Masterplan Campaign 2005. Aachen.

Reynard, E., Coratza, P., & Hobléa, F. (2016). Current research on geomorphosites. *Geoheritage,* 8(1), 1–3. https://doi.org/10.1007/s12371-016-0174-3

Reynard, E., Fontana, G., Kozlik, L., & Scapozza, C.A. (2007). Method for assessing scientific and additional values of morphosites. *Geographica Helvetica*, 62(3), 148–158. https://doi.org/10.5194/gh-62-148

Shareq, A. (1981). Geological and geophysical investigations carried out in Afghanistan over the period 1972–1979, in Gupta, H.K., and Delany, F.M., eds., Zagros, Hindu Kush, Himalaya—Geodynamic evolution: *American Geophysical Union Geodynamics*, 3(1) 75–86.

Sharply, R. (2009). *Tourism, Environment and Development Series,* Earthscan Pub, London, UK.

Shayan, S., Bani S, Zare, M., & Nafiseh, F. (2013). Assessing the Capacity of Sustainable Tourism Development of morphosites with Emphasis on the Comansco Method (Case Study: morphosites of Karaj-Chalous to Kandovan Tunnel). *Journal of Tourism Planning and Development*, 2(5) 93-78, (in Persian). https://doi.org/10.22080/jtpd.2018.1762

Singhand, R.S., Ghosh, P. (2021).Tourism potential of coal mines: An appraisal of Sonepur-Bazari open cast project, India. *International Journal of heritage and Parks*, In Press, Corrected Proof. https://doi.org/10.1016/j.ijp.2021.02.007

Solarska, A., & Zdzisław, J. (2010). Heritage and tourism Potential of the Strzelin Hills (Sudetic Foreland, SW Poland). *Geographica Pannonica*, 14 (4), 118-125.

Treloar, P.J., & Izatt C.N. (1993). Tectonics of the Himalayan collision between the Indian Plate and the Afghan Block: a synthesis, eds., Himalayan. *Logical Society, London, Special Publications*, 74, 69-87. https://doi.org/10.1144/GSL.SP.1993.074.01.06

*** NREL International Activities Website (2020). *National Renewable Energy Laboratory,* Afghanistan Resources Maps and Toolkits. www.nrel.gov/applying_technologies/geospatial_toolkits.html

*** USGS (2007). Geological map of Afghanistan, Environmental Monitoring and Assessment, USA.