Keywords: Geomorphosite, Darband Sarab, Sahneh Town, Geo-tourism Assessment

INTRODUCTION

The concepts of geo-tourism and geo-heritage were introduced during the past decade; generally speaking, those areas which have values such as landscape beauty, unspoiled landscapes, or attractive phenomena (Rocha and Ferreira, 2014) and also have high scientific value at their basics (Moufti et al., 2013) and human awareness (Shayan et al., 2012) are called geo-touristic areas. It can be said that the aim of geo-tourism is to protect the geographical identity and character of the tourism destinations (Mokhtari, 2014). In its main and key concept, geo-tourism has been appeared in the form of geomorphosites (Comanescu and Nedelea, 2010) with scientific, cultural, historical, social, and economic values (Feuillet and Sourp, 2011). In fact, geo-tourism is a kind of tourism which emphasizes the right to sustainable use of geo-heritage and resources which can also be related with the concept of sustainable exploitation of the cultural heritage (Rocha and Ferreira, 2014). Besides, it can be said that the concepts of geomorphosite and geo-tourism have been developed in the form of cultural tourism and natural resources (Rocha et al., 2014). In this regard, ecological values must also be taken into consideration which is regarded as important values in geo-tourism from a protective point of view, in addition to their aesthetic aspects. They also play an important role in the development of geomorphosites, especially those which are in glaciers or dry areas. They can be significant in geo-tourism promotion in line with other values (Bollati et al., 2014). Cultural heritage can reinforce geo-touristic values. In general, geo-tourism seeks for the promotion of local areas such as villages and the maintenance of wealth, income, and resources in local societies. New branches of medical geology usage in the field of geo-tourism are also based on this local development approach from a scientific point of view (Rocha and Ferreira, 2014). Geomorphosites are usually assessed in the form of global values and in several and combined states or in the form of simple

© Copyright 2014 | Centre for Info Bio Technology (CIBTech)
and single values (Bollati et al., 2014); therefore, they possess main or scientific values and added or complementary values (Bahrami and Roustaei, 2014). These geo-morphological and geological places are affected by a collection of natural and human factors and their vulnerability amount may increase due to these activities (Bollati et al., 2014). Knowing and protecting geo-heritage and geo-diversity and their management have also been paid attention during history and have been linked with natural conservation strategies in 19th and 20th centuries (Erikstad, 2014). The recent branches in nature protection, touristic activities in nature, and tourism destinations indicate the increase of attention paid to lifeless environments and elements and geo-diversity growth (Solarska et al., 2013). Geo-diversity interprets and explains the nature and is considered as a solid foundation for protecting the geological heritage (Erikstad, 2014); it is the approach linked with bio-tourism and can be a motive for geo-heritage protection and management; generally speaking, it is regarded as part of natural heritage management (Ibid, 713).

Geological heritage protection can be done whether scientifically or through physical protection methods or administratively and through legislation (Joseli, 2011). Merely knowing scientific values, natural, and geological and geo-morphological values cannot guarantee the sustainable development and protection and geo-tourism development; rather, managing geo-touristic areas and geomorphosites and protective and touristic attempts in the form of presenting facilities and education play a deterministic role in the accomplishment of these goals such as popularizing geo-tourism. As a result, one of the important issues in geo-tourism is the issue related to managing and administering geo-tourism areas at local or national levels in a legal and administrative framework in order to promote, support, recycle, conserve, and revitalize the resources and factors of the protected and local areas and tourism destinations (Rocha and Ferreira, 2014). Geo-conservation is related with a collection of supportive strategies of protecting the geological and geomorphological heritage considering its values and also from the vulnerability point of view. These strategies must be accompanied by a collection of management, interpretation, and protection activities (Rocha et al., 2014). The need to future strategies based on the theoretical and practical knowledge presented during different years is an important subject in powerful sustainability in geo-heritage management. The new strategies presented must be in line with sciences’ complexity in terms of scale and the diversity of different sciences (Erikstad, 2014). The scientific community and researchers attempted to use governmental rules and organizations in order to protect natural resources following the framework of cultural tourism and educational functions (Rocha et al., 2014). One of the steps to reach sustainable development is geo-tourism planning and the first step in geo-tourism is geo-tourism assessment. The method of geo-tourism assessment was presented and employed during the recent years aiming to assess scientific, protective, and touristic values of geomorphosites. One of the problems of geo-tourism assessment and geomorphosite selection is personal opinions and judgments; fortunately, the presentation of different and diverse values has reduced this subjectivity (Rocha et al., 2014).

Geo-tourism studies and geomorphosite assessment in geo-touristic areas have been expanded during the recent years; they seem very necessary due to the high geo-tourism potential of the country. The town of Sahneh with its several mirages is one of the valuable destinations of geo-tourism. Darband Sarab is of the most famous mirages of Shaneh town which is the destination of many scientists and tourists due to having geomorphological diversity and high geo-tourism added values. Considering the importance of this mirage in the sustainable development of Sahneh town, this research investigates the geo-tourism potentials and values of this mirage; before starting, however, reviewing the performed studies on the field of geo-tourism at domestic and foreign levels can be helpful. Regarding the theoretical studies on geo-tourism at international levels, the studies conducted by Panniza at the end of the 20th century can be mentioned; besides, in the present century, he authored a book on geo-tourism potentials in the world and its different approaches. Regarding geo-tourism assessment studies, the research done by Bollati (2005) can be mentioned which has introduced different values of geo-tourism. Pralong (2005) and Preira (2007) enriched these methods by adding more touristic values to the area of Chamonix Mont Blanc in Switzerland and taking a protective approach and presenting new scientific and protective methods in Montesinho Geo-park in Portugal, respectively. In his method, Reynard (2008) more emphasized the added values. Feuillet and Sourp (2011) presented an assessment method emphasizing a protective
approach for the Pirin National Park in France. At the end, the author suggests that organizations must try harder to protect and introduce the National Park. Besides, he believes that the non-glacier effects must also be taken into consideration. Conducting two researches, Bollati et al., (2012, 2013) presented a method to select and assess glacier geomorphosites in Alp Mountains in Italy which was based on scientific values, use values, and complementary values. The author also believes that this method can be used in case of single and combined geomorphosites and it is very effective in determining the appropriate trails among the geomorphosites which determine the geo-touristic and educational aspects. Furthermore, this method can investigate the challenges related with vulnerability and hazards. In addition, in their new research, Bollati et al., (2014) considered the ecological value role in geo-tourism assessment, especially in glaciers and regarded its role as very positive. In one of the newest researches, Rocha and Ferreira (2014) investigated the medical geology and its relation with geo-tourism in villages in Cape verde Geo-park in Senegal; they have referred to the fact that medical geology has been able to play an effective role in geo-tourism promotion in Cape verde and the continuance of researches seems necessary. Regarding domestic studies, Amri has performed valuable studies on geo-tourism of which cooperation in authoring the book "Global Geo-tourism" by Dowling and Newsome in 2006 can be mentioned. Additionally, Nekouee (1388) authored a book on the basics of geo-tourism. Mokhtari (2010) authored a book on geo-tourism assessment using Pralong’s method for assessing a destructed windmill. Arouji (2012) used assessment methods of GAM, Fasilitas, Feuillet and Sourp, and Broshi studies for geo-tourism assessment of different areas of Tabas town. The results showed that geo-tourism promotion level was very low and a part of the scientific values was unrecognized and the protection was also weak. Other studies are done by Maqsoudi et al., (2012) for Kavir National Park’s geo-tourism using Preira’s method, Moqimi et al., (2012) for assessing geomorphosites of Qom-Kashan using Prierra's method, Yamani et al., (2012) for comparatively assessing Pralong’s and Preira’s methods for Hormozgan geo-tourism, and Mokhtari (2014) for reviewing the geo-tourism studies.

The geo-tourism studies on Darband Sarab as an important destination for tourists are important due to having bio-touristic attractions and natural potentials. Due to geo-tourism non-promotion and failure in doing so, scientific tourism which could be a part of the area's tourism market has faced a recession. Such an issue can result in negative effects on organized public visits and especially tours and scientific trips. If the scientific aspects of Darband Sarab receive attention in line with its recreational aspects, more scientific visits and researches will occur. Merely emphasizing the recreational aspects and not recognizing scientific values for the tourists gradually increase the pressure on the region and result in unsustainability. If this problem becomes accompanied by the carrying capacity reduction, it will end in more harmful effects from a sustainable point of view. The solution of this problem requires the scientific, public, and administrative protection and conservation. The prerequisite to such a protection is the promotion of Darband Sarab from a scientific aspect between the mirage's tourism requests and people. Developing geo-tourism and promoting its values will be an important step in this regard. Another important point on the necessity of conducting geo-tourism studies on this mirage is its effectiveness on the economy of Sahneh town and the public participation in this process. Considering the economic recession and the reduction of service and industrial employment rates, geo-tourism development can play the role of an alternative economy and gradually become the dominant economy of the town. Public participation in geo-tourism processes such as tourism services can affect the town's sustainable economy development. Planning must be done in order to reach this kind of sustainable development for Sahneh town and the prerequisite to this kind of planning is to assess the potentials and limitations of geo-tourism of Darband Sarab and also those of mirages on a total scale. Therefore, the aim of this research is to recognize these potentials, assess the amount of the mirage's geo-tourism sustainability, detect the role of geo-touristic values in the town's sustainable development, and appropriately plan for sustainable development in the future.

**Research Methodology**

This research is an applied research; in order to collect the required data, library and field studies were performed and descriptive-analytical methods were used to eventually assess the data. The research
population in terms of location includes all the mirages of Sahneh town among which Darband Sarab was selected as the research sample due to having received more attention and having attractive indices. Regarding assessment, the statistical population is made up of all the people and experts who were familiar with geo-tourism subjects and have already performed researches in this regard and were also familiar with the geo-tourism of the mirages in Sahneh town. Besides, local people of this area and the authorities were included, too. As a result, several experts in the fields of tourism and geology or geomorphology who had conducted researches in this field were selected as the research sample. In this research, Darband Sarab geo-tourism is assessed from the perspective of several geo-touristic values and benchmarks. In general, in order to collect and assess the data, the two methods were followed.

Library Studies: In this section, several values are assessed both through considering several scientific resources and conducted studies in the field of Darband Sarab or Sahneh town and some data in virtual environments and mass media. Besides, some parts of other values are also assessed this way. Field Studies: Through this method, most information of the research are prepared and assessed. In this method, the required information was collected through field visits of Darband Sarab and its different parts. This process included scientific investigation, observation, photography, and demographic studies. Another part of the information was collected through interviews with local people of that area. Eventually, the final assessment of Darband Sarab geo-tourism was done combining the information yielded from library and field studies. Darband Sarab geo-tourism assessment was performed based on several scientific values and standards which could be generalized to different points; these values have been formulated by international geo-tourism researchers in the shape of geomorphosite and geo-tourism assessment methods in the last decade which can be applied to other areas with slight differences. One of these methods is geo-tourism assessment method which was designed by Feuillet and Sourp (2011) in order to investigate geo-tourism in France’s National Parks. In this method, 30 geomorphosites and landforms of this National Park were selected to be studied and assessed considering 4 criteria of the formation source, geographical expansion, tourism, and the total status of accessibility and facilitation (Arouji, 2012). The total geo-tourism and geomorphosite assessment is done based on two main ratios.

1-Management Ratio: This ratio is obtained by considering the scientific and educational value of the geomorphosites. Management ratio supports decision making which can include cases such as scientific plans, designs, and methods (such as controlling and timing processes), special environmental protection projects and plans, data management, visual information, etc. (Feuillet & Sourp; 2011, 152). The reason of selecting this assessment method out of the other geo-tourism assessment methods is the similarity and closeness of Darband Sarab features with those of the National Park. Due to the closeness of this mirage with Sahneh town and also several tourists' visits to this place, this mirage has not been remained intact and it can be considered as a phenomenon between an urban park and a forested park with geo-touristic values due to having beautiful nature and geo-touristic values. Regarding the protective viewpoint towards parks when assessing, it was necessary to more emphasize the scientific and protective values; one of the flaws of this method, however, is its lack of attention to the issue of administrative protection, since formal and administrative protection is one of the requirements of parks and its similar areas such as Darband Sarab. The carrying capacity and vulnerability have not been explicitly mentioned in this method and since this method has been formulated in an area whose natural features are not dominant, the ecological effects in geo-tourism assessment have also been ignored. On the account that the methods used for each area must be consistent with their conditions, in this research, three values of "administrative protection", "carrying capacity", and "ecological effects" were added to the management ratio part in the form of protective values based on considering the current conditions of Darband Sarab and through previously performed studies and investigating different methods; they can truly affect the real results of the research.

2-Tourism Ratio: This ratio is usually obtained in order to promote and develop tourism. To calculate this ratio, the complementary values must be investigated. The complementary values in this method include the use value and the cultural value (Feuillet and Sourp, 2011). One of the positive and important points of this method is to pay attention to the issue of cultural indices in developing geo-tourism and also the
beauty of the landscape and use from a protective point of view in tourism discussion, which is correct and principal in this regard for an area of a geo-touristic park. Consequently, based on this approach, other touristic values such as advertisement, tour visits, touristic service level, infrastructures, and economic activities have not been correctly taken into account.

The criteria of the tourism and management ratios receive scores from zero to 1 based on their influence on the area. Tables 1 and 2 demonstrate tourism and management ratios, their value domains, and the required explanations for each index.

Table 1: Management Ratio Domains and Values

<table>
<thead>
<tr>
<th>Index</th>
<th>0</th>
<th>0.25</th>
<th>0.5</th>
<th>0.75</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rarity</td>
<td>More than 7 Types</td>
<td>Between 5 to 7 Types</td>
<td>Between 3 to 4 Types</td>
<td>Between 1 to 2 Types</td>
<td>Only 1 Type</td>
</tr>
</tbody>
</table>

Rarity refers to the existence of places and geomorphosites similar to the geomorphosite being assessed. In other words, it means how many similar places exist in the area under the study. It is clear that the fewer the number of similar places, the more will be the value of this geomorphosite.

The Attractions of the Ancient Geography

The ancient geography is related to the occurred events and processes in the far past. Here, ancient geography attractions refer to the role of geomorphosites in morphoclimatic restructuring and the ancient climate; it also helps timing and determining the past phenomena and events' time.

Representativeness

Representativeness means to what extent a geomorphosite can represent the creating processes and effective factors in the formation of a land form. In fact, it shows how much it represents a main feature of a land form.

Texture, Pattern, Sample

A geomorphosite sample and pattern are related to its inherent and surface qualities. These qualities include the size of a geomorphosite, its geometric figure, its beauty, its perception potential, etc. This sub index is related to the educational potential of a geomorphosite.

Scientific Perception

This refers to the number of articles and theses which have been published on a geomorphosite in different publications. Here, the level of publication and development of this geomorphosite in scientific communities are concerned, whether they have been published at local, national, or international levels.

Protective Values

Administrative Protection Level

Administrative protection level is related to the municipality, environment, or other related organizations.

Carrying Capacity

An area's carrying capacity is yielded by considering its environmental potentials, the area's use level, sensitivity, and vulnerability of that area.

Ecological Effects

Ecological effects are the effects of a natural environment on an area's geotourism sustainability and conservation

Table 2: Tourism Ratio Domains and Values

<table>
<thead>
<tr>
<th>Index</th>
<th>0</th>
<th>0.25</th>
<th>0.5</th>
<th>0.75</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cultural Value Symbol and Religious Importance</td>
<td>No Relation</td>
<td>Weak Relation</td>
<td>Relative Relation</td>
<td>High Relation</td>
<td>Very High Relation</td>
</tr>
<tr>
<td>Historical Importance</td>
<td>With No Historical Effect or Symbol</td>
<td>Weak Symbol</td>
<td>Several Historical Samples and Effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Artistic Importance</td>
<td>With No Source</td>
<td>Between 1 to 5</td>
<td>Between 6 to 20</td>
<td>Between 20 to 5</td>
<td>More than 50 Types</td>
</tr>
<tr>
<td>Use Value</td>
<td>With No Point of View</td>
<td>1 Point</td>
<td>2 to 3 Points</td>
<td>Between 4 to 6 Points</td>
<td>More than 6 Points</td>
</tr>
<tr>
<td>Color Contrast</td>
<td>Environmentally Consistent Colors</td>
<td>Different Colors</td>
<td>Environmentally Contrasting Colors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accessibility</td>
<td>More than 1 km from a Road</td>
<td>Less than 1 km from a Road</td>
<td>Near to the Local Road</td>
<td>Near to the Regional Road</td>
<td>Near to the National Road</td>
</tr>
<tr>
<td>Intactness</td>
<td>Spoiled</td>
<td>Very Spoiled</td>
<td>Spoiled to an Extent</td>
<td>A Little Spoiled</td>
<td>Un-spoiled</td>
</tr>
</tbody>
</table>


As was mentioned, the present research is on the field of geo-tourism in Darband Sarab, which is one of the main mirages of Sahneh town. Sahneh town is located at the north-east of Kermanshah province at the height of 2001 meters. This town reaches Sanqar Koliae from north, Harsin town from south, Kangavar town from east, and Bistoon from west and its area is about 1000 square km (Mohamadi, 2007). This town is considered as a part of Zagros zone and is located at its western side. Zagros’ heights and depths have created a collection of parallel mountains and high lands among them; besides, the existence of specific features and proper climate and the richness of the natural environmental resources such as water
and soil have caused plant and wild life environments which have created the ecosystem diversity. There are a lot of points in Sahneh town's heights in mountainous areas which are non-forested, of which many parts of Dalahoo heights can be named. In terms of ecology, Sahneh town is considered as a part of Zagros zone and Kermanshah province is mainly covered by radiolarites formations of Kermanshah, ophiolites of Sahneh and Harsin, and sedimentations and quartz. Sahneh's ophiolite collection is considered as a part of ophiolite subsequences in Zagros zone. This area is vulnerable to earthquakes and has several faults such as Sahneh fault. In terms of climate, it has relatively hot summers and the temperature reduces since autumn; in terms of rainfall, its relative humidity is ideal. In general, it has country climate. Water resources of Sahneh town include surface waters (in the form of rivers and mirages) and groundwater resources. Darband, Dinvar, and Gamasiab Rivers are regarded as the most important rivers of this town (Kermanshah's Governorship Website, 2014). In terms of economy, most activities are agricultural. Agriculture in this area is mostly done by dry and water farming and also gardening. Water farming and gardening is very common in this area and they are used in plain fertilized areas. Dry farming is scatteredly seen in south-west, east-west, and south of Sahneh town. Based on statistics, the employment rate in service and industrial sections in Sahneh town has been reduced in comparison with the past and it is still reducing. In this town, industrial and service section's employment rates have been reduced; agricultural activities have become more prevalent and dominated other economic activities due to the existence of broad lands, relatively desired water resources, lack of equipments, poverty, etc. Although service activities are still significant in Sahneh town, the employment rate in this section has been decreased (Taqdisi et al., 2012). Mirages are of the most important water resources and tourism capitals of Sahneh town; they are considered as the tourist attractions of this area, in addition to supplying the town's water needs and they can play a significant role in economic changes of the town. Of the important mirages of this town, Darband Sarab, Bid-e Sorkh, and Souri Jan can be named. Darband Sarab is one of the most important mirages which is located at the height of 1400 m at the north-east of Sahneh town. Having geomorphological, bio-touristic, and natural attractions and also relatively ideal tourism services, this mirage is a proper place for tourists; it hosts a great number of tourists especially in holidays (Field Studies, 2014). Considering the conservation and sustainable development viewpoint, this mirage and its deterministic role in the sustainable development of Sahneh town have been investigated in terms of geo-tourism indices.

Figure 1: The Map of Darband Sarab Location in Sahneh Town, Kermanshah Province (Source: Authors, 2014)

Research Findings
After investigating the research basics and selecting the values and criteria in the form of geo-tourism assessment method, these values were assessed through library and field studies on Darband area and its mirage. These studies were first started by reviewing the library studies and the required maps and information were obtained. Then, after visiting the location, the research experts investigated their selected values for Darband Sarab by conducting field studies. These investigations were first in the form of observation and then, they turned into separate investigations for each value. Based on the results, Darband Sarab has relatively great potentials in terms of scientific values which can be planned. The most important strength of this section is the mirage's high potential and attraction in terms of ancient
geography and paleontology. Regarding the erosive activities of Zagros zone, several floods, and powerful rivers in Quaternary era in cold and watery eras, these floods have caused the creation of deep valleys, rocks, mirages, and ponds. Darband Sarab can be regarded as a sample of these geological-historical processes. The location of Darband Sarab in a deep valley is the indicator of Zagros’ activities in cold eras and the formation of rivers and springs. On the other hand, the existence of Darband waterfall and huge rocks and cliffs in and around the mirage and the formation of ponds inside it are indicators of water erosive activities of Quaternary era in the region. This means that Darband Sarab can be a proper scientific sample to indicate the paleontological features of Zagros area in scientific fields and educational classes. On the other hand, a phenomenon can express more scientific value which can be understood by public and tourists and be a proper sample for geological introduction of the region for the public, since geo-tourism can multiply its influence due to popularization and generalization. In this regard, Darband Sarab is an ideal sample since the processes forming this mirage have been remained, in addition to the phenomenon simplicity. In fact, these processes can be observed by the public and their explanation to unscientific tourists is not that difficult. One of the reasons of this simplicity is the simple texture and patterns of this geo-touristic event's formation. This mirage’s size and its surrounding and its current texture are such that each person interested in geology, even armature ones, can become familiar with its formation fields by quick studies. On the account that geo-tourism goal is the penetration of geo-science among the public, this index becomes more important. Aside from these positive features, the scientific limitations of Darband Sarab must also be mentioned, the most important of which is the non-intactness and the lack of unique features. The primary factor which attracted the attention of tourists and the public to a natural or human phenomenon is the uniqueness or the rarity of that phenomenon. These rare features in the field of geo-tourism can be a particular geological process at least at a regional level, a particular and different landforms, the indicator of a particular geological history, the existence of intact areas, etc. It must be said that at least at the national level, Darband Sarab lacks such features and the processes, landforms, and geological history at the regional level is not unique, either; examples of such a mirage can be seen in Kermanshah province. In fact, the existence of a beautiful nature, beauty values, and tourism services have helped the introduction of Darband Sarab. Besides, the non-desired level of promoting the scientific values of this mirage in scientific communities is considered as another weakness. This phenomenon has not attracted much attention at the level of research and scientific journals, national seminars, and also national visual media; rather, it has been mainly investigated and promoted in the virtual environment and at regional level. In terms of protective indices, the situation of Darband Sarab is relatively ideal; it can, however, be improved. The positive protective point of this mirage is the area's low vulnerability and relative intactness. Due to the activities and attempts of Sahneh's municipality especially creating special paths for tourists’ visits and proper locations for visiting the mirage, building bridges over the width of the mirage, and also installing signs and properly organizing hosting services in this area and approximately maintaining the mirage margin, few harms have been done to the area; the existence of dangerous processes in the area such as earth movement, floods which can destroy the mirage environment, too much extended tourism services and most of all, the high entrance rate of tourists to the area can increase the vulnerability and reduce tourism carrying capacity of the mirage. Tourists irregularly come to visit the mirage; while there may be times with no tourists, there are times especially in spring and summer that a huge number of tourists travel to this area; lack of attention and correct management of such a matter can result in negative effects. If not much protective preparation is ready when tourists' entrance to the area is increased, the mirage environment and margin will be ruined at the cost of tourism service development; this will gradually decrease tourist carrying capacity of the area. However, currently, the mirage's tourism carrying capacity is average and normal, considering the combination of all the indices. In this regard, the role of ecological aspects in protecting the mirage must also be taken into account. An important part of these touristic values is related to the attractive and natural features inside and around the mirage. The existence of a forested area, wild trees and fruit gardens, walnut, pear, and fig trees with different types and sizes around the mirage in the valley are of the region's natural beauties. Besides, different types of
rocks were entered to the mirage due to falling from the hills near the mirage or through floods which have added to the beauty of the mirage. In fact, it must be said that in the area, geo-tourism has been combined with biodiversity and in a part of the mirage, natural features have also been combined with geological features such as springs and waterfalls. This nature has played an important role in protecting the mirage, since the index to choose Darband area as a park is its nature and this issue is an important factor in Sahneh's municipality attention to protecting it, formulating some regulations, public cooperation, and protection; paying attention to the ecological value has created a positive view to its geo-touristic value, too. However, one of the protective weaknesses of Darband Sarab is its weakness in administrative protection. Administrative protection is performed merely by the municipality and limited cooperation of general public; at provincial and state levels of the department of environment; however, not much attention is paid to this area; in fact, administrative protection is performed at a local level. The intactness of the area might be one of the reasons of lack of attention to its administrative protection at national and international levels.

Table 3: The Assessment of Management Values of Darband Sarab

<table>
<thead>
<tr>
<th>Scientific Value</th>
<th>Situation</th>
<th>Value Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rarity</td>
<td>Between 5 to 7 Types</td>
<td>0.25</td>
</tr>
<tr>
<td>The Attractions of the Ancient Geography</td>
<td>High</td>
<td>0.75</td>
</tr>
<tr>
<td>Representativeness</td>
<td>High</td>
<td>0.75</td>
</tr>
<tr>
<td>Texture, Pattern, Sample</td>
<td>High</td>
<td>0.75</td>
</tr>
<tr>
<td>Scientific Perception</td>
<td>Average</td>
<td>0.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Protection Value</strong></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative Protection Level</td>
<td>Local</td>
<td>0.25</td>
</tr>
<tr>
<td>Carrying Capacity</td>
<td>Average</td>
<td>0.5</td>
</tr>
<tr>
<td>Ecological Effects</td>
<td>High</td>
<td>0.75</td>
</tr>
</tbody>
</table>

(Source: Research Findings, 2014).

The tourism section includes cultural and use values. In the section of cultural values, which can also be introduced as a part of protective values, too, the role of cultural and local elements in protecting and developing Darband Sarab tourism is emphasized. The combination and relation of a geo-touristic phenomenon with cultural and local features can result in more attention of local people to the region, the increase of tourists' entrance trend to the area, and protection and development of tourism services. In this regard, Darband Sarab is not that much significant; historically speaking, it merely has several catacombs from Medes’ era which are related to Medes’ kings which are known as the grave of Shirin and Farhad among local people. These catacombs can attract a lot of tourists and complete Darband Sarab tourism. Besides, as local people believe, Keykavous’ grave is one of these catacombs, too. Furthermore, in the ancient times, this region was the residence of some kings of Medes and Achaemenid eras. Regarding religion and art, not significant amount of value can be imagined. Only the shrines of Shoq-e Ali and Takht-e Teymour beside the mirage can be regarded as the religious symbols related with this area. Considering art and literature, Darband Sarab has not found its proper place in artistic and literary works and also scientific publications. Contrary to the cultural values, Darbrand Sarab possesses a high place in terms of use values. This phenomenon’s viewpoint has caused a significant difference in the landscape due to having different valleys with clearly green color and environment of the area's nature, such that it is seen as a green curve among a huge volume of yellow color from a distance. Such an issue has significantly affected the mirage’s view and field of view. This mirage's points of view can be seen from high distances of more than one kilometer through the main road and the paths from the southeast, east, and north-east. It must be noted, however, that since the mirage is covered by the area's green vegetation,
the waterfall and the mirage can be seen from the north east. Combined with high landscape difference, this issue has gained a high score for Darband Sarab geo-tourism. In this regard, communication facilitations can increase the effects of these two values and play an important role in attracting tourists. Darband Sarab is located near Kermanshah-Hamedan road which is regarded as a road at a national level. This is important in attracting tourists and tourism development in the area. Moreover, Sahneh-Saqez road is near the mirage. The use values in tourism are important, since they can affect the amount of protection of the area and also increase its carrying capacity. Vulnerability is also one of these values. As was mentioned, Darband Sarab seems to be a vulnerable geomorphosite. The probable dangers such as erosion and flood threaten this area. Considering the development of tourism services and the increase of tourists' visits, any violation of the mirage margin, improper establishment of tourism services, and environmental pollutions by tourism equipments and tourists can increase this vulnerability, if they are not accompanied by legal and protective attempts; however, the vulnerability of the current situation is at a relatively acceptable level. In terms of intactness, Darband Sarab has a proper condition and its formation processes, landforms, and related flaws have been remained; besides, the area has been less harmed due to the protective attempts.

Table 4: The Assessment of Touristic values of Darband Sarab

<table>
<thead>
<tr>
<th>Cultural Value</th>
<th>Situation</th>
<th>Value Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symbol and Religious Importance</td>
<td>Weak Relation</td>
<td>0.25</td>
</tr>
<tr>
<td>Historical Importance</td>
<td>Weak Symbol</td>
<td>0.5</td>
</tr>
<tr>
<td>Artistic Importance</td>
<td>Between 6 to 20 Samples</td>
<td>0.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Use Value</th>
<th>Situation</th>
<th>Value Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Point of View Numbers</td>
<td>2 to 3 Points</td>
<td>0.5</td>
</tr>
<tr>
<td>Color Contrast</td>
<td>Environmentally Contrasting Colors</td>
<td>1</td>
</tr>
<tr>
<td>Accessibility</td>
<td>Near to the National Road</td>
<td>1</td>
</tr>
<tr>
<td>Intactness</td>
<td>A Little Damaged</td>
<td>0.75</td>
</tr>
<tr>
<td>Vulnerability</td>
<td>Average</td>
<td>0.5</td>
</tr>
</tbody>
</table>

(Source: Research Findings, 2014).

After separately assessing the values, the final values of scientific, protective, cultural, and use values were calculated. Then, based on the final assessment method of this research, the final values of management and tourism ratios of Darband Sarab were also determined.

Table 5: The Final Value of the Geo-tourism Main Branches of Darband Sarab

<table>
<thead>
<tr>
<th>Criterion and Value</th>
<th>Total Values</th>
<th>Mean Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scientific</td>
<td>3</td>
<td>0.6</td>
</tr>
<tr>
<td>Protective</td>
<td>1.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Cultural</td>
<td>1.25</td>
<td>0.41</td>
</tr>
<tr>
<td>Use</td>
<td>3.75</td>
<td>0.75</td>
</tr>
</tbody>
</table>

(Source: Research Findings, 2014).

Table 6: The Final Assessment of the Management and Tourism Ratios of Darband Sarab Geo-tourism

<table>
<thead>
<tr>
<th>Criterion and Value</th>
<th>Total Values</th>
<th>Mean Values</th>
<th>Final Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management</td>
<td>4.5</td>
<td>0.56</td>
<td>7</td>
</tr>
<tr>
<td>Tourism</td>
<td>5</td>
<td>0.62</td>
<td>7.25</td>
</tr>
</tbody>
</table>

(Source: Research Findings, 2014).

The results show that among the main 4 values under the study, use value was the most ideal, which was due to the mirage's high landscape, accessibility, and its high intactness which resulted in too much using the mirage; this, itself, is a factor for the current sustainability in this area. The mirage's scientific values

© Copyright 2014 | Centre for Info Bio Technology (CIBTech)
were also ideal on the account of being highly geo-touristic and having easy educational potential and interpretation. Here, protective values are at an average level; although they are acceptable regarding the situation of the current mirage, they require more attention. The cultural section had the least value. In totally assessing management and tourism ratios, the results showed the equal importance of the both ratios in the mirage; it also seems that the main and complementary values grew simultaneously. In order to analyze the combination of the two ratio’s values, Diagram 1 can be used. Combining two ratios of management and tourism, this diagram shows the current status of Darband Sarab geo-tourism. This diagram demonstrates that Darband Sarab geo-tourism is at a balanced and relatively ideal level. The location of this mirage at the mean of the diagram confirms the relatively ideal status.

Diagram 1: Darband Sarab Geo-touristic situation (Source: Research Findings, 2014; Diagram Source: Fuiellet & Sourp, 2011)

Darband Sarab geo-tourism can be analyzed from another perspective, too. As was mentioned earlier, scientific and protective values are regarded as the main values and touristic values are regarded as the complementary values in geo-tourism. In a research on geo-tourism of Tabas town, Arouji designed a diagram taking a scientific and protective approach. This diagram is based on the matter that protective and scientific values are given priority in geo-tourism and they cannot be used in tourism processes by developing touristic values unless scientific and protective values are ideal. In this diagram, the combination of scientific, protective, and touristic values demonstrates an area’s geo-touristic situation. Each part of this diagram is an indicator of a geo-touristic situation.

A- Very Much Desired for Tourism;
B- Much Desired for Tourism;
C- Proper for Tourism, but Tourism Infrastructures Must be Improved;
D- Relatively Desired for Tourism;
E- Relatively Desired for Tourism, but Tourism Indices Must be Improved;
F- In Case of Improving Tourism Infrastructures, It Can Affect Tourism;
G- It Requires Protective Indices' Improvement for Tourism Use;
H- It Requires to Pay Attention to the Issue of Protection and Also the Improvement of Tourism Indices for Tourism Use;
I- Its Scientific Value Must be Determined and Its Protective Requirement Must be Taken into Consideration; Tourism Indices Must Also be relatively Taken into Account;
J- Recognized Scientific Values and Protective Values must be Improved; Touristic Values Must Also be Reinforced, Otherwise, They Will Not be Appropriate for Touristic Use.
K- All Scientific, Protective, and Touristic Indices of the Site Must be Improved, Otherwise, They Will Lack Value for Tourism Use.

Based on the calculations, the mean of scientific, protective, and touristic (the combination of cultural and use values) values are 0.6, 0.5, and 0.62, respectively. Diagram 2 demonstrates the geo-touristic situation in a scientific and protective approach.

![Diagram 2: Darband Sarab Geo-touristic Situation from Scientific and Protective Point of Views (Source: Research Findings, 2014; Diagram Source: Arouji, 2012)](image)

As the diagram demonstrates, Darband Sarab geo-touristic situation is located in H area which indicates that Darband Sarab requires reinforcement of some touristic and protective indices to be programmed for sustainable use for tourism.

CONCLUSION

In this research, Darband Sarab geo-tourism was considered in terms of scientific, protective, and sustainable investigations; to this aim, methods were used which emphasized these indices and approach. Investigating all the values showed that among geo-tourism principles and standard values’ perspective, Darband Sarab is considered as a geomorphosite with an average status which has high potential for promotion and improvement at its field. This shows the calculations of management and tourism values, their sub values, and also scientific, protective, and touristic values; values’ amounts are often at an average level and the mirage's geo-tourism diagram also shows the mean status of the geo-tourism. Under current conditions, the mirage’s non-intactness, low-level of promotion, cultural relations’ weakness, site vulnerability, and the low level of administrative protection have caused some limitations for geo-tourism development; however, since the rate of tourists’ visit to the area is high and the area has a high carrying capacity if protective principles are respected, the area's geo-tourism level can improve by the necessary planning on weak points and removing limitations. On the other hand, regarding sustainable development and sustainability, this area can be considered as a relatively sustainable geo-touristic area, since the scientific, protective, and touristic values are not that much different from each other. When geo-touristic values grow in line with each other, sustainability will be created and the weakness of each of these values against each other will cause unsustainability. This coordination of values' growth is clear in comparison with management and tourism values and also in comparison with scientific, protective, and touristic values. This means that Darband Sarab can play a significant role in economically and culturally sustainable development of Sahneh town. However, the future might be different from the present. In other words, when it is said that it is relatively sustainable, it is because Darband Sarab is investigated by
a scientific and protective approach, it cannot be considered as a sustainable and optimum geomorphosite. Again, one can refer to the results of the scientific and protective approach diagram which show that this mirage requires to be improved in terms of protective values and then, its touristic values must be more taken into consideration. This way, one can hope for sustainable development. Sustainable development is a generative and constant development which takes a look at the future; in order to make the role of Darband Sarab in the area's sustainable development more significant, these values must grow and improve in line with the region's needs, in addition to improving geo-touristic values; among these values, scientific and protective values are given priority. This research investigated the mirage geo-tourism more in terms of protective values and has presented cultural and use values as the touristic value with a protective approach; it does not emphasize tourism infrastructures, since the prerequisite of sustainable development is the improvement of geo-tourism’s main values (scientific and protective values). In total, Darband Sarab geo-tourism planning must be done by simultaneous emphasis on weaknesses and strengths and eventually, the planning must involve the local people in the mirage's geo-touristic process to be able to result in generative development, especially since mirage geo-tourism can be regarded as a proper solution to solve this crisis due to the economic problems of Sahneh town. In order to improve the values and continue the relative sustainability and turning it into an acceptable sustainability, several solutions can be used at different times:
- Running scientific tours aiming to increase the mirage's scientific level and promote its educational potential among ordinary people and tourists in order to scientifically protect and accomplish the goals of popularizing the earth sciences;
- Creating a research project of Darband Sarab bio-touristic potentials in order to improve the geo-tourism’s scientific level and protect the mirage by people and through administrative processes;
- Creating a plan to use human resources of Sahneh town in the form of touristic services in the information provision section and tour leaders and introducing the area's scientific potentials in order to improve the mirage’s promotion level;
- Implementing the plan of tourism carrying capacity assessment of geo-tourism and bio-tourism in the area;
- Increasing service activities in Sahneh town through presenting tourism services to the tourists inside the cities and towns via increasing tourism conservation aiming to restructure the economy of Sahneh town; and
- Formulating a plan to create a logical relation between Darband Sarab and other tourism potentials of the area and linking the needs and services and also their weaknesses and strengths in order to prepare a comprehensive and sustainable plan for Darband Sarab geo-tourism.

REFERENCES
Bollati Irene, Leonelli Giovanni, Vezzola Laura, Pelfini Manuela (2014). The role of Ecological Value in Geomorphosite assessment for the Debris-Covered Mirage Glacier (Western Italian Alps) based on a review of 2.5 centuries of scientific study; Geo-heritage.
Research Article


Pereira P, Pereira D and Caetano A (2007). Geomorphosite assessment in Montesinho Natural Park (Portugal); Geographica Helvetica 62 159-168.


Solarska Anna, Hose A Thomas, Vasiljevi A Djordijje, Mroczek Przemys, Jary Zdzis1aw, Markovi B Slobodan and Widawski Krzysztof (2013). Geo-diversity of the loess regions in Poland: Inventory, geo-conservation issues, and geo-tourism potential; Quaternary International 296 68e81.
