

Assessment of the Ecological Potential of Ecotourism Kulqan for Use by SMITH

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ABSTRACT

What is considered in assessment process of ecological capability is the interaction of sustainable and unsustainable ecology which have effects on each other and on environment like the characteristics of a polygon. One of the parts in the tourism industry that attracted the attention of tourists is ecotourism industry. Ecotourism is introduced as hiking in nature in Persian. In this study, the ecological potential of Kulqan in Bandar Abbas has been determined for ecotourism application. Kulqan region with an area of 89571/571 hectare is located in East of Bandar Abbas city. It possesses features like mangrove forests, religious places and the beautiful beach of Oman. This potential feature of region and it's approximate with the tourist town of Bandar Abbas led to its selection to assess the ecological potential for tourism use. In this context and considering the ecological characteristics of the area Kulqan, assessment of the area was performed with the help of SMITH method. To provide the necessary maps, first identifying, providing and producing the stable and unstable sources was performed and criteria and variables for evaluating the Kulqan were determined. Following the regional map was divided into square grids (pixels) and then the ecological resources associated with the specified usage was identified in the network and it was scored based on several parameters to assign area for ecotourism use and finally the average scores related to different factors was calculated in each pixel and the degree of ecological potential of the area for ecotourism was determined. The results showed that the mean percentage of the total area was less than 50 and the entire region was in an improper class for tourism, i.e. the Class 5. As a result, at the end of evaluation process and determining the area potential for the use (the resulting map) indicated improper conditions for ecotourism.

KEYWORDS: Evaluation ecotourism, Network method, Kulqan, Smith Method

INTRODUCTION

Ecotourism is a specific form of tourism with two specific objectives: a) supporting conservation efforts to protect natural/cultural heritage in specific areas and b) developing economic conditions for the benefit of local communities. Accordingly, the success and room for improvement of ecotourism activities should be measured according to the three main criteria of sustainable development: social, economic and ecological. Bazrpash (2006) has carried out a research entitled with Environmental-climatic potential assessment in ecotourism in Babolsar city. The results of this study showed that Babolsar city has suitable conditions in the spring and summer; in climatic terms for the hiking the second major type of tourism that can attract many people on the basis of their market demand orientations to tourism destinations in foreign tourists' levels is called ecotourism. On the other hand, today ecotourism is commonly practiced in world as a concept that is based on the environmental protection and sustainable development ideas. Although human intervention in nature eliminates many ecosystems that play a larger role than normal conditions (Makhdoom, 1991), the concern remains for nature due to tourism, as MC Kreachter emphasized the vulnerability without stability (phenol, 2006). Technology development, progress and industrialization are an inevitable matter somehow that the inevitability of this rapid change result in numerous negative consequences in cultural, social, economic sectors and so on. Bedding of cultural, social - economic indicators of different communities in order to cope and consistent with the moral and material aspects of human needs is the approach to this problem and among which natural environment organization and planning with special public applications, and its combination with the tourism flow in some of its branch which it called natural tourism is considered as one of the most constructive approaches. Jozi and Moradi Majd (2011) assessed the ecological potential of Bolhasan Dezful region in order to tourism application in SMITH method which results of this study showed that about 118 pixels, i.e., about 31% of the region is located in middle class, and 262 pixels about 69% in weak class. As a result, at the end of the evaluation process and after maps compilation and determining the potential of the region for this application, the results (Map results) indicate weak to moderate of region conditions for eco-tourism (Jozi and

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Moradi Majd, 2011). Shamsaei (2011) in his master's thesis determined the potential and ecological potential of the Khamir port city for ecotourism application using multi attribute decision making (MADM), which results from this study showed that the most of the city with an area of 3/275090 hectares, equivalent to 8/74% of the total land have the weak potential degree for tourism and 57/1% of the total area of the city including 2/5777 acres have high potential for tourism and 6/42239 acres of city-wide equivalent to 4 / 11% have an average power and about 44 520 ha, equivalent to 1/12 of the lands have no potential to develop ecotourism (Shamsaei, 2011). Parisa Fouladvand (2008) in her master thesis titled with developing prioritizing of evaluation criteria for Lorestan Oshtorankoo ecotourism studied the ecological potential of the area by the help of RUPERT. This method is based on the grids approach. (Foladvand, 2008). Mahini et al (2009) in a paper evaluated the hiking potential of Behshahr city using multi-attribute evaluation method by the help of geographical information system. The results showed that of total area, approximately 82,400 acres of city have the tourism limitations, and about 4,500 acres have high power, about 55,000 acres have average potential and about 2,600 acres have weak potential for extensive hiking (Mahini et al, 2009).

Soltani and Nouri (2008) in a study assessed the environmental potential of Khansar city using GIS to develop tourism which results of this study indicate that all the area levels have high potential for developing recreation or focused recreation and most of villages have a high potential to develop some forms of tourism (Sultani and Nouri, 2008). The area under study with an area of 571/89571 hectares, in terms of geographical coordinates has east longitude of 13 (31) ° 56 to 51 (45) ° 56 north latitude and 55 (09) ° 27 to 54 (35) ° 27 is located in East of Bandar Abbas city. Kolqan area in Bandar Abbas have 42 villages and two parts called Takht and Qale Qazi and its population is 14,200 people, of which 7017 are constituted of female and 7183 male (official statistics of management and planning organization of the province). Kolqan area has a hot and humid climate and its soil is often salinity and alkalinity due to proximity to the sea. Excluding highlands and mountain ranges, the remaining soils have a relatively good depth. Generally in the domain under study 56/5966 hectares of lands have brackish soils and salt marsh with heavy to medium texture. In the area of study, there are two vegetation areas of Iran-Touran and the Gulf of Oman in terms of vegetation cover which the most important vegetation types in the area are as following:

- | | |
|--------------------------|-------------------------|
| 1- Prosopis. cineraria | 10- Amygdulus lycioides |
| 2-- Tamarix.spp | 11-Euphorbia larica |
| 3-Prosopis juliflora | 12-Acer cinerascens |
| 4-Acacia ehrenbergiana | 13-Pistacia atlantica |
| 5-Acacia oerfota | 14-Dodonaea viscosa |
| 6-Salvadora persica | 15-Olea.spp |
| 7-Ziziphus spina-christi | 16-Periploea aphyla |
| 8-Avicennia marina | |
| | 9-Amygdulus scoparia |

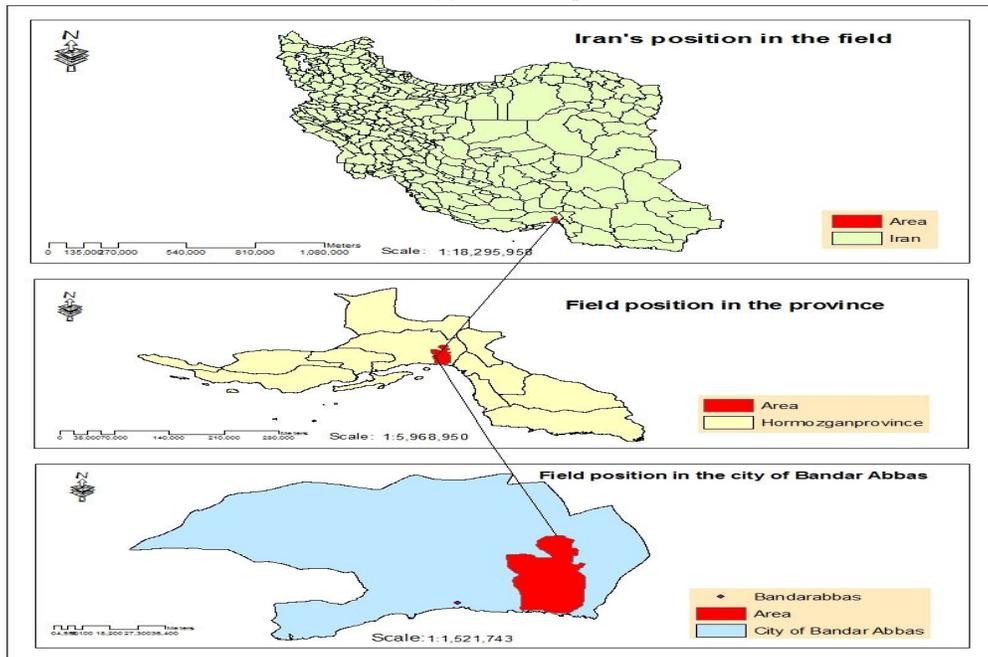


Figure (1): positions Kulqan

2. RESEARCH METHODOLOGY

Ecotourism is a specific form of tourism with two specific objectives: a) supporting conservation efforts to protect natural/cultural heritage in specific areas and b) developing economic conditions for the benefit of local communities. Accordingly, the success and room for improvement of ecotourism activities should be measured according to the three main criteria of sustainable development: social, economic and ecological. (IUCN 2010)

Although the concept of ecotourism as the ideal of Environmental Protection and Sustainable Development is based on the global current, eliminating many ecosystems, the role of human interference in the nature is more than that of natural conditions. (Movahed 2010)

In order to assess the ecological potential of Kolqan, initially using topographic and basic maps at a scale of 1:25000 the area of study were determined with the help of Geographical Information System (Gis9.3 Arc) and then data and information were collected through library studies including studying books, reports, articles and dissertations. In order to prepare the necessary maps, initially identification, acquisition and production of stable and unstable sources were performed and criteria and variables of interest to evaluate Kolqan region were identified. Regarding the time-consuming nature and process of the production of maps and potential assessment to access and supply some data in the form of backup tables and maps from available data from departments such as the environmental Protection Agency, departments of Natural Resources and Meteorology in Hormozgan Province and deputy of governor's planning were used. Then, topological relations were provided for each of the maps and then after scaling them up, the same UTM coordinate system was intended for them.

Table (1): the potential degree for ecotourism divided up in SMITH method

Degree	capability develop ecotourism	The final score
1	Excellent	85-100
2	Good	75-85
3	Average	60-75
4	poor	50-60
5	Inappropriate	50>

2.1 - SMITH Method:

In this method, the area studied will divide into a grid of squares (pixels) by 9.3 Arcgis Software that whatever smaller networks are, the result will be more careful, the size of these networks can change from one square kilometer to 10 kilometers. However, the size chosen for the grid (square) depends on total extent of the studied area, diversity of land form and ecosystem diversity and type of its application. The way it works is that initially topographic map 25000: 1 Aquiverous Basin should be provided and based on grid method, maps should be split into square pieces (Barzeh Kar, 2005) and then ecological resources associated with the specified usage should be identified in the network and based on multiple parameters should be graded for land dedicated to ecotourism Usage according to table 2. In continue, sum of scores of different factors in each pixel is calculated, followed by taking the average, pixels which get more scores are more appropriate for ecotourism application.

In this method, major sources are divided into seven parameters of land shape, the coasts length, water resources, vegetation coverage, landscape, access roads and weather conditions, which is scored for each of them and finally the sum of total scores for the seven parameters would be score of 100. If the final score obtained for each pixel is equivalent to 100-85 the degree in ecotourism region can be 1 or higher and if the final score is 85-75 the area potential is considered 2 or good potential. If the final score is between 75-60 represents 3 potential degree or average power in the region, if the final score is between 60-50 the degree of region potential is 4 or weak and eventually if the final score is less than 50, the potential degree for ecotourism application is inappropriate.

Table (2): A scoring system to SMITH method(joze\$ morade majd, 2011)

Row	Criterion	Standard features	Score
1	The Earth (Height)	0 -50	4
		50 -100	7
		100 -200	10
		200 -400	13
		400 -600	15
		600 -800	17
		> 800m	18
2	Along the coast	500 m	2
		5 00 m - 1/5 Km	4
		1/5- 2 Km	6
		2- 2/ 5 Km	7
		2/5 -3 Km	8

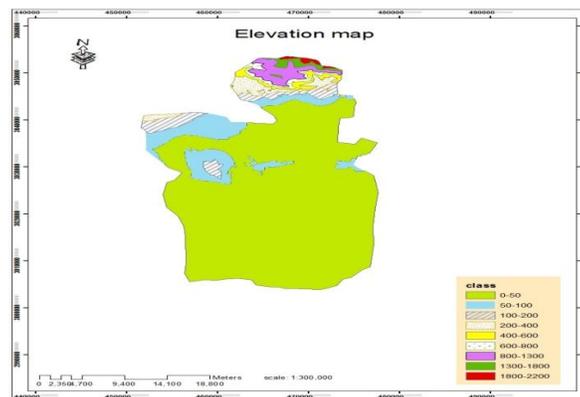
		3 -4 Km	9	
		>4 Km	10	
3	Water resources	1 -2	4	
		3 -5	8	
		6 -8	12	
		> 8	15	
4	Vegetation	0 -50	4	
		50 -100	7	
		100 -200	10	
		200 -400	15	
		400 -600	21	
		600 -800	27	
		> 800 m	22	
5	Landscape	Angle	<45	3
			45-90	6
			90-180	10
			>180	15
		Sight distance	<1km	3
1 -5 Km	6			
5 -10 Km	10			
		>10km	15	
6	Access road	<500m	1	
		500 M -1 Km	2	
		1 -1/5 Km	3	
		1/5 -2/5 Km	3/5	
		2/5 -3/ 5 Km	4	
		3/5 -4/5 K m	4/5	
		> 4/ 5 Km	5	
7	Climate	Hot and humid and Sultry	0-4	
		Moderate		
		Temperate mountain	7	
			10	

RESULTS

Environmental planning for a land includes a quality assessment of the land for required uses (for ecotourism) to determine the management requirements. The present study compared the ecological characteristics of the study area with the ecological model for ecotourism and Makhdoum's network model. Finally, it can be concluded that according to the capacity of regional tourism, including historical monuments, archaeological areas and natural attractions and architecture, the scope of the study is suitable for tourism development and has a moderate square.

To determine the ecological potential of Kolqan first the map of elevation was produced under ArcGis9.3. To generate the above map from the map scale lines (topography) and height ground (SPOT) of study area raster map in DEMs (Digital Elevation Model) model was extracted. Using these maps, DEMs maps, elevation fluctuations (Hypsometer) and slope map of the area was prepared for class 9 and 8, respectively.

Figure 2 shows the maps of elevation fluctuations with classes intended. Elevation represents the climatic fluctuations changes. Due to the height difference, the amount of energy that each point of the Earth receives from the Sun varies, also height change in every region impact on the on rainfall, temperature and humidity of the region. Using the digital model maps, plans and prospective region maps were also prepared.



Figure(2): the maps of elevation fluctuations with classes intended.

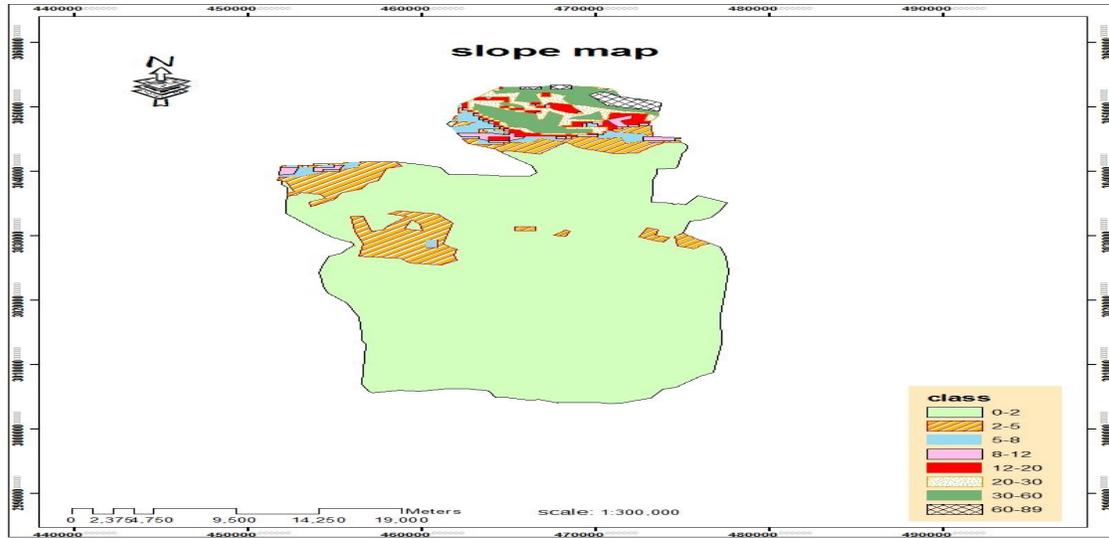


Figure (3): Tilt Floor Plan

According to the network approach, the entire region was divided into square pieces (pixels) by Arcgis9.3 software. Since whatever these networks are smaller, the result will be more careful, these networks sizes in Kolqan was considered 4 square kilometers in area of 400 acres in 200 pixels. Then ecological resources associated with the specified usage were identified in the networks depending on the circumstances of each square (pixel), for each of seven criteria, a related score was considered. Then these layers based on determined potential were converted into raster format and were reclassified. The by command of Raster Calculator, the above layers can be merged and the final value was calculated for each pixel. The results showed that the total area were not located in any of the categories of excellent, good, average, poor, and all areas by receiving a score less than 50 in the name of an inappropriate class, and in 5th class. Therefore, each 200 pixels were in inappropriate category and the region potential was not recognized as an area suitable for tourism usage. Table (3) showed the ecotourism potential of the area and figure (4) had displayed the final map of ecological potential of Kolqan area for ecotourism application.

Table (3): percent in the area of ecotourism areas can Kulqan for ecotourism application

The final score	Potential for ecotourism	Degree	Number of pixels	Area (ha)	Percent
50>	Inappropriate	5	200	80400	100

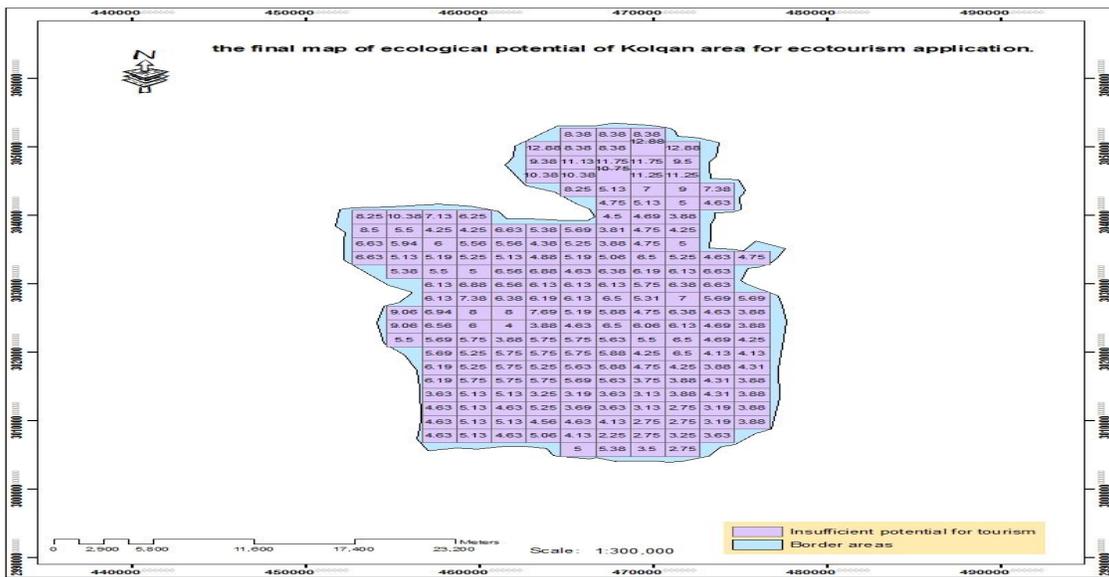


Figure (4):) had displayed the final map of ecological potential of Kolqan area for ecotourism application.

DISCUSSION AND CONCLUSION

The natural environment of the world has a limited ecological potential for human use, in some environments, nature is with minimal degradation for the most development and in some other less development in it will lead to more environmental degradation, this means that for the development in environment, before planning to use it one must assess the ecological potential within a reasonable plan framework. Environmental planning includes prediction or assessment of the quality of the land for required applications (ecotourism usage) and determining its management requirements.

The potential features of the Kolqan region like mangrove forests, religious places and beautiful coast of the Sea of Oman, its proximity to the tourist city of Bandar Abbas leads to its selection to assess the ecological potential of tourism application. In this study, using SMITH method and based on network approach, Kolqan area was studied. Ecotourism evaluation process, the map designing of based resources, the way of identifying ecological resources, and scoring the sources through network method similar to studies carried out through the method of networks by Movahed and Zade Dabbaq (2010) entitled with evaluation of ecological potential in the range of river between regulatory dam and pitch dam for ecotourism, as well as setting up a study by Jozie and Moradi Majd (2011) to assess the ecological potential of Dezful Bolhasan to establish recreational use.

Apart from the aforementioned studies, other studies have been conducted to determine the ecotourism usage, including Pirmoradi (2007) and Mahmoodi (2007) who evaluated the ecotourism potential in the area of Saman Orfi Kakak Reza in Lorestan and Saman Orfi Menj allotments in the province of Chahar Mahal Bakhtiari, which both study has used GIS methods. In Pir moradi study (2007) by underlying ecological model of ecotourism and considering the specific conditions of the region, the weighting or valuation of criteria were carried out according to their importance. This was done in order to facilitate this operation in compilation of maps in GIS and getting outputs in accordance with the intended goal. Providing map of ecological resources in the two above-mentioned studies is similar with the method of scoring and valuation of criteria with the method of SMITH is different from the approach studied in this article.

According to the above potential features of the field of study, and assuming that the area has the potential of tourism, with the aim of understanding and evaluation of the potential and actual climatic capacity of Kolqan in Bandar Abbas to take suitable advantage of them in ecotourism scheduling, the areas were evaluated, according to the results of this study, an attempts was done to review the criteria experienced in the world and in Iran with the aim of localizing to use place selection or ecotourism of area of Kolqan city of Bandar Abbas. After the networking of region and the identification of 7 parameters of water resources, altitude, landscape, climate, access roads, vegetation cover and the coast length in each pixel and assigning related scores, the entire area with scores less than 50, in the grade of 5 and unsuitable tourism for ecotourism use. The results of this study indicate that these areas have no high potential for development of recreational activities for ecotourism. Since in Kolqan area no study for determining land application has been done and this is the first study to determine the tourism potential in Aquarius area of Kolqan in Bandar Abbas, so to compare these results with other studies conducted, we must review the results of other studies in different regions of the country in the field of determining tourism potential, the following can be mentioned:

Jozie and Moradi Majd (2011) assessed the ecological potential for the area of Bolhasan Dezful for Tourism application using SMITH method which the results (unlike the present study) showed moderate to weak conditions in the area for ecotourism usage.

Khalili et al (2009) assessed the ecological potential of Forest allotments Qori Qalein in Kermanshah province, according to the results obtained in this study (unlike the present study) the maximum surface area is dedicated to the centered recreation.

Fani Sani (2003) in his master's thesis investigates the potential of ecotourism in protected areas in the province (Case study Khoshkedaran owners), which results (similar findings) indicate lack of suitable conditions for tourism.

Pir Moradi et al (2008) reviewed the ecological potential of Kaka Reza forest in Lorestan for tourism application in three phases of identifying resources, analyzing and summarizing data using the GIS. Based on the results obtained in this study (unlike the present study), more than half of the area studied is suitable for a wide promenade.

Soltani and Nouri (2008) evaluated the environmental potential of Khansar city to develop tourism using GIS which results (unlike the present study) indicate favorable conditions for eco-tourism application.

One of the reasons of the results in this research which led to the absence of the region's potential for tourism is the very important and effective role of three criteria of vegetation, access roads and weather conditions of 7 criteria reviewed in Kolqan region which based on these results, the region in terms of coverage have a good density and distribution due to a lack of fertile soil (saline and alkaline) it lacks precipitation conditions and suitable infrastructure cannot be enabled for transportation. Due to the advantages of SMITH method including high accuracy in calculating the values of each criterion, convenience, speed and capability of doing again, so

using this model than other models to determine the tourism potential of the study area shows superior performance.

Among the strengths points of the region for tourism potential one can refer to mangrove forests and beautiful beaches and among weak points of the region one can refer to the lack of proper tourism infrastructure (access roads, amenities, etc.), low vegetation density, climatic conditions, etc. So considering the mentioned items and obtained results in this research, before any planning in order to create a region as hiking and tourism region, compliance with proposed items in this study as follows is of great importance.

1 According to the mangrove forests in the region, it is recommended to protect, restore and develop them more seriously.

2 - Due to the region potential to desertification of lands, executing biological operations in order to increase the level of vegetation through management of runoff is suggested.

3 – Protection of brackish and freshwater wetlands ecosystem in Kolqan area.

4 - Sightseeing and critical and intensive care of Kolqan shoreline according to fishing activities of locals, in order to prevent coastal pollution.

REFERENCES

- 1-Barzeh Kar, Ghodratolesh, 2005, Parks and recreational forests (positioning and projection), first edition. , Tehran, Council of Agriculture and Natural Resources, 231.
- 2-Bazrpash, Rahim2006, the environmental assessment of climate ecotourism BABOLSAR city, MS Thesis physical geography (climatology trends in environmental planning), Department of Earth Sciences martyr Beheshti University.
- 3-Josie, Ali, Moradi Majd, N., 2011, Evaluation of the ecological potential area –recreational uses to determine Boalhasan Dezfu L the method SMITH, Journal of Environment and Development, No. 3, pp: 7-14.
- 4- Fani Sani, F, 2003, Evaluation of ecotourism in protected areas in the province Khoshkedar owners Case Study, Master Thesis, School of Natural Resources and Environment Department of Marine Sciences, Tarbiat Modarres University, No. 47 ,pp: 115-126.
- 5-Fennell, D. 2008. Ecotourism and the myth of indigenous stewardship. Journal of Sustainable Tourism, 16 (2), 129–149.
- 6-Foladvand, P. 2008. Evaluation criteria developed prioritize ecotourism Ashtrankvh Lorestan method AHP, Master Thesis, "Evaluation and land preparation, Science and Research Branch, Islamic Azad University Khouzesan, Pp: 65-78
- 7-IUCN, Assessment of Ecotourism Potential in Georgia, V. Vashakmadze as part of the IUCN Programme Office for the Southern Caucasus project “Halting the Loss of Biodiversity: Regional Implementation of the Countdown 2010 Initiative” funded by the Norwegian Ministry of Foreign Affairs
- 8- Khalili, Zainab, oladi, J., Hossein Nasr, Seyyed Mohammad, Zangene, H., 2009, to determine potential areas of ecotourism projects using technology and GIS (Case Study allotments pot Castle province) National Conference on GIS ,p10.
- 9- Mahini, Salman, riazzi, A, Naimi',b, Babaei, Babak, kafkaei, S,Larijani, A., 2009, Assessing the nature Behshahr city based on multi-criteria evaluation using GIS, Environmental Science and Technology, Period 11, No. 1, pp. 187-198.
- 10- Makhdoom, M., 1991, Assessing the ecological capacities of Gilan and Mazandaran area for urban development, rural, industrial and tourism, Journal of Ecology special issue .No. 16, pp:81 -99.
- 11-Movahed, A., zade dabagh,N, 2010, Assessing ecological potential range between Dez River Dam Section pitch for setting up ecotourism, Journal of Environmental Studies, No. 55, pp: 13-24.
- 12- Phenol, David, 2006, Introduction to ecotourism, translate oladi,jafarr, printing ,BABOLSAR, Mazandaran University Press, 392 pages.
- 13-Pir Morad, Z, 2007, for use in ecological modeling and evaluation of ecotourism -in forest Kakareza the province using GIS, Geomatics Conference, Tehran, P 73.
- 14- Shamsaei, Zainab, 2011, in order to determine the potential ecological potentialbandar khamer city Memberships ecotourism, Payanamh MS, Islamic Azad University ,Bandar Abbas, page 99.
- 15- Soltani, Z., Noori, Sydhdayt R., 2008, city environmental evaluation Khoansar In order to develop Tourism, Geographical Research Quarterly, No. 99, No. 802, pp-16675- 167090.