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Article in *World Applied Sciences Journal* · January 2013

DOI: 10.5829/idosi.wasj.2013.27.08.2282

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## Assessment of Ecotourism Potential of Urban Forest Parks Based on Effective Factors in Outdoor Recreation, A Case Study: Sorkhe Hesar Forest Park

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**Submitted:** Nov 1, 2013; **Accepted:** Dec 5, 2013; **Published:** Dec 18, 2013

**Abstract:** Evaluation of ecotourism potential is investigation of land capability for outdoor recreation. In start of this study, we evaluated the suitable places for the intensive and extensive outdoor recreations using five ecological parameters (slope, aspect, height, soil texture and vegetation cover) based on Makhdoum model in Sorkhe Hesar forest park. Results showed that most of park area (297.223 hectares) has the degree 1 extensive outdoor recreation potential and the small area of park (1.126 hectares) has the degree 2 intensive outdoor recreation potential. Further, the field surveys showed that one of the factors that increase the inelegance in the environment of Sorkhe Hesar forest park is the lack attention to all the effective factors (water resources and recreation facilities) in evaluation of the outdoor recreation potential of this park. Therefore we used the written questionnaire and the verbal interview techniques for evaluating the use of visitors of the outdoor recreation places of this park. We recorded the positions of whole places where the questionnaires had been distributed in them in the outdoor recreation classes using *GPS* (Global Position System). In addition we recorded the position of water resources and facilities of park using *GPS* to create the water resources and facilities maps. Results showed that the use of visitors of this park isn't according to the previous outdoor recreation planning based on Makhdoum model. As the outdoor recreation of visitors has the direct correlation with the water resources, recreation facilities and tourism attractions in the park. Therefore we overlaid the maps of these factors (as the positive data layers) on the primary outdoor recreation potential map and we provided the final outdoor recreation potential map based on these factors (water resources, recreation facilities and tourism attractions). Final results showed that other data layers should also be considered in the usual model along with the ecological factors because all of the effective factors in outdoor recreation have not been considered in the usual model.

**Key words:** Evaluation • Makhdoum model • Extensive outdoor recreation • Intensive outdoor recreation • Water resources • Creational facilities • Sorkhe Hesar

### INTRODUCTION

Urban Forest parks are the most important outdoor recreation sources in cities. Thus development and construction of forest parks is necessary to protect of natural resources, to attract the tourists and to relax in environment [1]. outdoor recreation utilizing of these parks must be according to the ecological potential to keep the sustainability of these valuable resources. Thus outdoor recreation Exploitation of these resources should be based on sustainable development and proper management [2]. Obua and Harding [3] investigated the ecotourism effects on Kibal National Park in Uganda and concluded that determination of the carrying capacity and

the ecotourism potential of this park hasn't conflict with the conservation objectives, but visitors' population should be kept at the optimum balance in the camp sites considering to further environmental destruction in these regions. As consideration to the region potential and its coincidence with visitors demands will attract the visitors consent and will maintain the environmental capability of tourism area [4]. Unfortunately, disturbances in nature balance has been increased in some of parks in Iran like Sisangan Forest Park because of the excessive density of recreational equipment in an special location [5].

Sorkhe Hesar Forest Park is one of the best Forest Parks in Tehran. The Current location, the picturesque forest scenes and the easy accessibility of this park are

some of its tourism potentials, but visitor's density has been increased in some of places in this park in recent years because of unknowing of other suitable places for outdoor recreation in this park. In fact environment destruction of this park has been increased because of the excessive density of recreational facilities in some of places of this park. There is a direct relationship between accessibility to Area (roads density) and outdoor recreation utilizing and destruction rate of area [6-8]. The mentioned conditions in Sorkhe Hesar Forest Park require the evaluation of the outdoor recreation potential of this park considering to factors such as the facilities and the water resources to prevent of further destruction. Niazi [9] believes that the main factor in destruction of Jangesar basin is inconsistency between the current use and the optimum use. Many of researchers have emphasized to the visitor demands and socio - economic factors for evaluation of outdoor recreation potential in different areas [6,8,10-12]. Rosa *et al.* [13] concluded that the ecotourism activities should be based on the environmental, social and economic features of forest environments. Gülez and Demirel [14] evaluated the outdoor recreation potential of pine forests in Turkey and concluded that the natural factors (climate and landscape) are determinant of 60 percent of the ecotourism potential and the cultural factors (accessibility and recreational facilities) are determinant of 40 percent of the ecotourism potential. Evaluation of outdoor recreation potential of Vergavij forest park using Makhdom model showed that this area has no potential for class 1 intensive outdoor recreation and 2180 hectares of this area is suitable for class 2 intensive outdoor recreation. Wholly 5200 hectares of this area has the extensive outdoor recreation potential [15]. Aminzade and Ghoreishi [16] studied the ecotourism planning of Sisangan Forest Park based on visitors demands and concluded that the current ecotourism planning of this park has been performed based on the ecological potential and visitors demands haven't had any role in ecotourism planning. As the intensive and extensive outdoor recreation activities are mostly done in the places that they haven't been designed for this purpose. Gholami *et al.* [17] investigated the tourists attraction potential in Haraz basin and they merged the data layers based on importance in the tourists attraction in *GIS* (Geographical Information System). Results showed that the tourists attraction potential is high in the areas where have roads, facilities and natural attractions. Rezvanfar *et al.* [18] considered the outdoor recreation potential of Chitgar forest park using RS and GIS and concluded that this park has

capability for development of outdoor recreation types. In addition the wide area of this park has the class 1 extensive outdoor recreation potential and the little area of this park has the class 1 intensive outdoor recreation potential. Evaluation of the outdoor recreation potential of Monj area in Lordegan forest using parametric evaluation method also showed that the most area of this region has the extensive outdoor recreation potential and the lowest area of this region has the intensive outdoor recreation potential. In addition, outdoor recreation demand is more effective in evaluation of outdoor recreation potential than the ecological factors and outdoor recreation demand affect the environmental factors (climate, slope, soil, etc.) [19].

We can conclude that most of the performed studies in the world have mentioned to optimum use of outdoor recreation resources considering to carrying capacity to prevent of further destruction. some of these studies have emphasized to visitors needs and effective factors in outdoor recreation for evaluation. investigation of similar researches in Iran shows evaluation of outdoor recreation potential has commonly been done based on usual method for ecotourism potential assessment. As different models should be evaluated to select the appropriate model according to study objective and the specific conditions of each region in Iran. But the important subject is the use of effective factors especially socio-economic characteristics in usual model that this notation has been noted in many previous studies. The main objective of this study is the optimum use of all parts of Sorkhe Hesar Forest Park considering to visitor's needs. in addition to evaluation of outdoor recreation potential of Sorkhe Hesar Forest Park, this study has paid to investigate of some effective socio-economic characteristics in outdoor recreation in this park. This study also considers the possibility of efficacy of water resources and recreation facilities factors on visitors' use of the different outdoor recreation places in park.

## MATERIALS AND METHODS

**Materials:** We prepared the Digital topographic maps (scale 1:25000) of National Geodesy Organization of Iran for this study. We also provided the Soil, vegetation, access roads, water resources, facilities and tourism attractions maps of Sorkhe Hesar Forest Park from Municipal council of Tehran city. We used the *GPS*, Compass, clinometers, outdoor recreation potential map and questionnaires in field surveys. The data processing and overlaps of the maps were done using ArcView 3.1

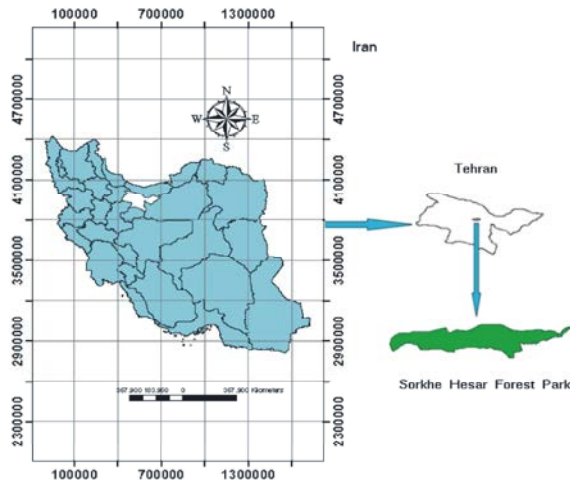


Fig. 1: The Geographical location of the study area in Iran

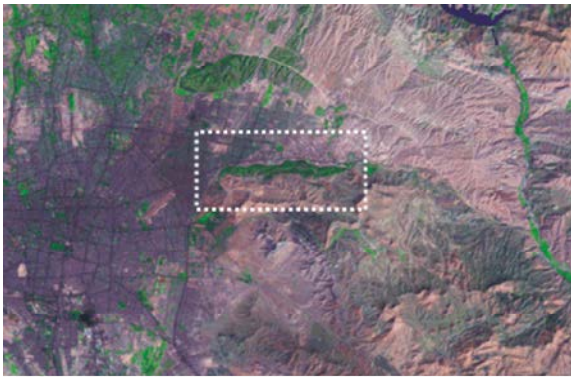


Fig. 2: The Satellite image of the study area

and ArcGIS 9.1 soft wares. Completion of the water resources, facilities and tourism attractions maps were done using *AutoCad* 2008 software. Ecotourism ecological model [20] was used to evaluate the outdoor recreation potential of Sorkhe Hesar Forest Park.

**The Study Area:** Sorkhe Hesar forest park locates in the east of Tehran ( $30^{\circ}51'$  to  $35^{\circ} 51'$  east longitude and  $42^{\circ} 35'$  to  $44^{\circ} 35'$  north latitude) (Fig. 1 and 2). This park stretches over an area of 540 hectares. Minimum height of sea level is 1280 meters and maximum height of sea level is 1493 meters in this park. The major part of Sorkhe Hesar forest park has been covered by the grass cover (natural cover) and the forest cover (plantation). The forest cover consisting mainly of deciduous broadleaves, evergreen coniferous and ornamental flowering species.

### Methodology

**Method of Preparation the Maps:** First we geo-referenced the 1:25000 topographic map in ArcGIS software. Then, we provided the digital evaluation model (DEM) of

this map. DEM was converted to information layers using functions in GIS software [21]. Then the slope map, aspect map and height map were provided using DEM. The merging method was used to provide the landform map [22]. The landform map was provided by merging of slope, aspect and height maps. Then landform map was merged with the soil texture map and the vegetation density map to provide the environmental units map.

Evaluation method of Outdoor recreation potential of Sorkhe Hesar forest park was based on the comparison of the environmental units' characteristics (in the environmental units map) with tourism land use ecological model [20]. Characteristics of each unit in the environmental units map was compared with the characteristics of classes 1 and 2 of intensive outdoor recreation and classes 1 and 2 of extensive outdoor recreation in tourism land use ecological model. Final map of ecotourism potential was provided based on potential of each unit in the environmental units map for outdoor recreation types. Methodology was based on following procedure: units with 0-5 % slope, the eastern and southern aspect, the loam soil texture and the semi dense vegetation were allocated to class 1 of intensive outdoor recreation. Units with 5-15 % slope, the western and northern aspect, the clay-loam soil texture and the semi dense vegetation were classified as class 2 of intensive outdoor recreation. Afterwards, units with 0-5 %, 5-15 % and 15-25 % slope, the loam, clay, the clay-loam and the clay-silt soil texture, all aspects and all vegetation densities were allocated to class 1 of extensive outdoor recreation. The remainder units with 25-50 % slope and all types of soil texture, aspect and vegetation density were classified as class 2 extensive outdoor recreations. Finally, units with over 50 % slope were allocated to class 2 of extensive outdoor recreation (mountain climbing).

### Method of Evaluation of the Visitors' Current Utilizing of Outdoor Recreation Places in the Park:

We used the interview techniques by questionnaires to evaluate the visitors' current utilizing of the outdoor recreation places in the park and we compared visitors' current utilizing with the outdoor recreation potential map. Questionnaires were completed in the spring (April and May months). Three days (two holiday days and one work day) were randomly selected in each month to fill the questionnaires. The various classes of outdoor recreation (classes 1 and 2 of intensive outdoor recreation and class 1 and 2 of extensive outdoor recreation) in the park were recognized using the outdoor recreation potential map, the roads map, clinometers, compass and *GPS* in field survey. Then questionnaires were randomly distributed in each

Table 1: The outdoor recreation criteria for forest park in Forests and Pastures Organization of Iran

Major criteria	Minor criteria	Indicator	Variable	
Bio physical factors	Climate	precipitation	Occurrence possibility of rainstorm and torrent	
		thunder	Percent of Occurrence possibility	
	Water resources	Area or size	high, medium and low	
		quality	Productivity	
		Beach situation	Pure, semi pure, silt-polluted, very silt-polluted Rocky, sandy, hydro morph	
		soil	slope	Low, high
			Depth variation	<30, 30- 120, >120 centimeters
		Distance of outdoor recreation places	<100, 100-300, >300 meters	
		Water supply	For 1 hectare of outdoor recreation area 2.7, 2- 2,7 and < 2 liter in minute	
	Land situation	slope	<10%, 10-15%, 15-20% and >20%	
		Situation of soil surface	Smooth, rough, proper drainage and improper drainage	
		Region area	<200, 200-1000, >1000 hectare	
	Vegetation cover	density	High class	<20%, 20-45%, 45%-60% and >60%
			Low class	30%, 30-50%, 50-75% and >75%
	Wild life	-	-	-
	Natural attractions	Number of natural phenomena (cave, waterfall and etc.)	-	-
			-	-
	landscape	vision depth	<1, 1- 10, >10 kilometers	
		Vision angle	<45, 45- 180, 180-360 degree	
	Lack of vermin and pest	plant	Diversity and density degree	
		animal	Diversity and population	
	Social location	Distance of inter-urban roads	<5, 5- 20, >20 kilometers	
		Distance of residential regions	<150, 150- 200, >200 kilometers	
Distance of general places		<20, 20-50, >50 kilometers		
Economic situation	Credits of performer organization	-		
	Annual income of indigenous people	-		
	Number of visitors	-		
	Land value	-		
Socio-economic factors	Indigenous people view	To performer organization	-	
	Existence of similar park	distance	<30 and >30 kilometers	
	Develop possibility in future	Possibility of increasing the area	-	
	Situation of required material	topography	-	
		Incline places	-	
		Possibility of reach of water	-	
		Possibility of reach of electricity	-	
Access to building material in work season	-			
frequency of worker power	-			

outdoor recreation class. The effectiveness possibility of each environmental factor (such as water sources, facilities and etc.) in outdoor recreation was investigated by asking some questions in the questionnaires. Then visitors' current utilizing of Park was identified by seeing the current outdoor recreation activities. We recorded the Position of all of points which the questionnaires have been distributed in them using *GPS*. Then we prepared the map of these points (Fig.4).

**Method of Recognition the Water Resources, Facilities, Access Roads and Tourist Attractions in Park:** We provided the water resources, facilities, access roads and tourist attractions maps after revealing the importance of these factors in outdoor recreation based on the results of

the Questionnaires and field surveys. We prepared these maps by recording the position of the water resources, facilities and tourist attractions in this park using *GPS*.

**Method of Preparation of Outdoor Recreation Potential Map Based on Effective Factors in Outdoor Recreation:**

The water sources, facilities, access roads and tourist attractions maps of the park (as new data layers) were merged with the primary outdoor recreation potential map (based on ecological tourism model) and the final outdoor recreation potential map of the park was obtained based on these factors. Methodology was according to the outdoor recreation criteria for forest park in Forests and Pastures Organization of Iran [23] (Table 1). According to Table 1, the maximum distance of outdoor recreation

region from the water sources should not be over 300 meters. Therefore, we created 300-meter buffer around the water resources of park (such as eating-water platforms and W.C s), the recreational facilities (such as camping areas, picnic areas or Bowers, small super markets or buffets, etc.) and the tourist attractions of the park (wildlife shelter, waterfront, lake and etc.) using *ArcView* software. Then only regions of the intensive outdoor recreation class which their maximum distance of these factors was 300 meters, were selected as the final intensive outdoor recreation regions. The final outdoor recreation potential map of Park was prepared based on this rule.

### RESULTS

The Outdoor recreation potential map of Sorkhe Hesar Forest Park based on the tourism land use ecological model [20].

The Outdoor recreation potential map of Sorkhe Hesar Forest Park based on the tourism ecological model is shown in "Fig 3". According to this map, 55% (297. 223 hectare) of the forest park area has potential for class 1 of the extensive outdoor recreation, 16% (86. 465 ha) of it has potential for class 2 of the extensive outdoor recreation, 1% (1. 126 ha) of it has potential for class 1 of the intensive outdoor recreation and 25% (137. 417 ha) of it has potential for class 2 of the intensive outdoor recreation and 3% (16. 212 ha) of this park is conservational.

**Results of Questionnaires Completion and Evaluation of Visitors' Current Utilizing of the Outdoor Recreation Places in the Park:** Location of all the points which the questionnaires have been completed in them has been shown in "fig. 4". Wholly, 49 points was recorded using *GPS* that 25 of them were in the intensive outdoor recreation class and 24 of them were in the extensive outdoor recreation class.

**Visitor's Sex:** We obtained the similar results in the intensive and extensive outdoor recreation classes for the visitors' sex according to Figure 6 (53% man and 47% woman). Most of visitors are the married in the intensive and extensive outdoor recreation classes (Fig. 5).

**Visitor's Age:** Considering to "Fig. 6", most of visitors in the intensive outdoor recreation class are in the 15 - 30 year age class (50%) and most of visitors in the extensive outdoor recreation class are in the 45 - 60 year age class (37%).

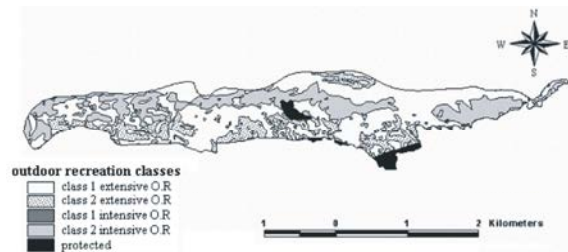


Fig. 3: Outdoor recreation potential map of Sorkhe Hesar Forest Park based on tourism ecological model

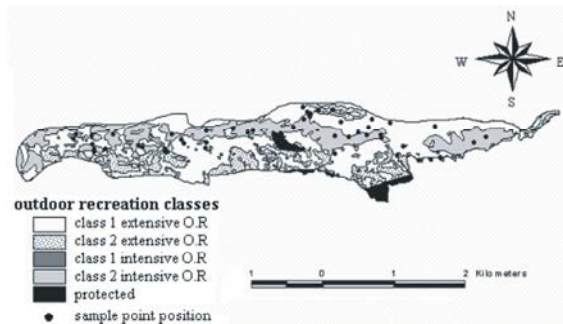


Fig. 4: Position of points which the questionnaires have been completed in them

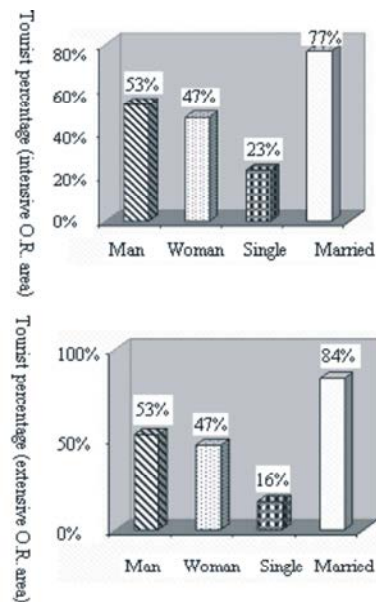


Fig. 5: Visitor's sex of park

**Visitors' Social Pattern for Coming to the Park:** 59% of visitors in the intensive outdoor recreation class and 73% of visitors in the extensive outdoor recreation class have come to the park by family (Fig. 7).

**Distribution of Visitors Based on Spatial Origin:** Most of Visitors have come to the park from East of Tehran in the intensive and extensive outdoor recreation

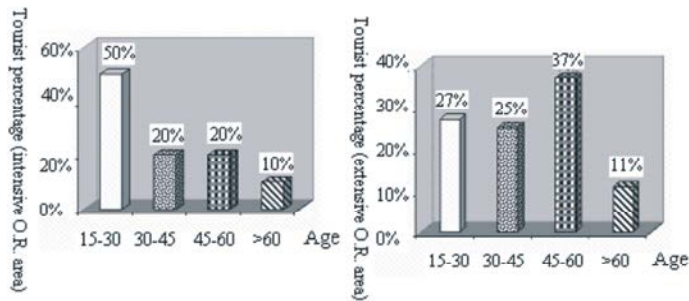


Fig. 6: Visitor's age of park

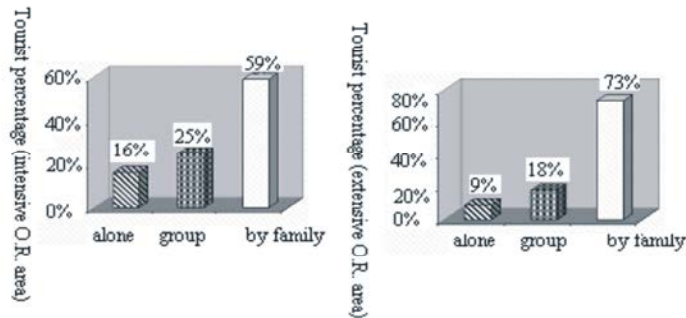


Fig. 7: Visitors' Social pattern for coming to the park

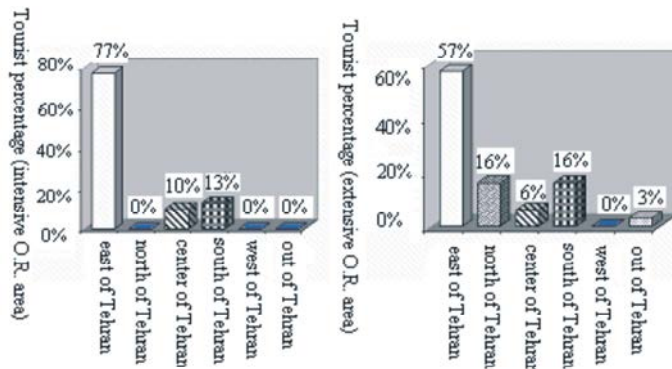


Fig. 8: The distribution of visitors based on spatial origin

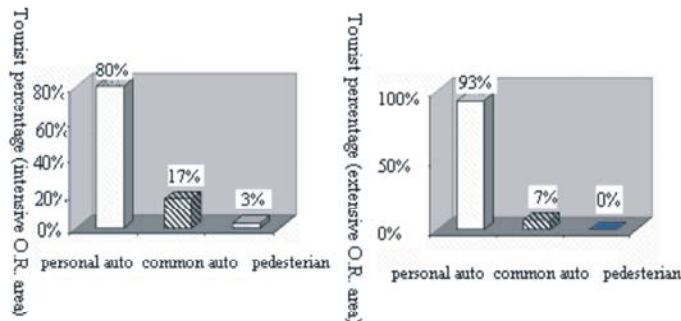


Fig. 9: Method of Access to the park

classes according to Figure 15 (77% in the intensive outdoor recreation class and 57% in the extensive outdoor recreation class) (Fig. 8).

**Method of Access to the Park:** Results show that Most of visitors have come to the park by personal car in the intensive and extensive outdoor recreation classes

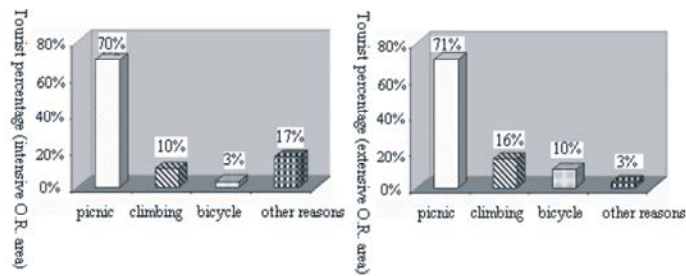


Fig. 10: The reasons of selection the place that visitors attend in it

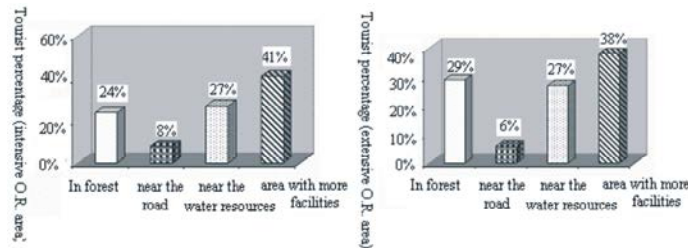


Fig. 11: The Selected place for picnic

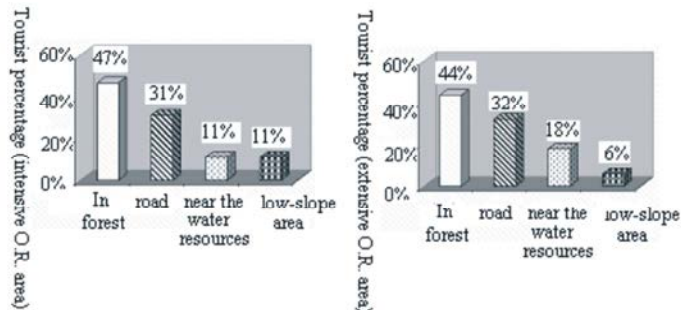


Fig. 12: The Selected place for walking

(80% in the intensive outdoor recreation class and 93% in the extensive outdoor recreation class). Tourists who have come to the park by common car are very little (Fig. 9).

**The Reasons of Selection the Place That Visitors Attend in it:** The reasons of selection the place that visitors attend in it, is picnic (70% of visitors), bicycling (3% of visitors) and climbing (10% of visitors) respectively in the intensive outdoor recreation class. The reasons of selection the place that visitors attend in it is picnic (71% of visitors), bicycling (10% of visitors) and climbing (16% of visitors) respectively in the extensive outdoor recreation class (Fig. 10).

**The Selected Place for Picnic:** Most of visitors have selected the places with more facilities for picnic (41% in the intensive outdoor recreation class and 38% in the extensive outdoor recreation class). Afterward

Most of visitors have selected the places near the water sources for picnic (27% in the intensive and extensive outdoor recreation classes) (Fig. 11).

**The Selected Place for Walking:** The Selected place for walking by visitors was similar in the intensive and extensive outdoor recreation classes (Fig. 12).

**The Preferable Recreation Activity for Visitors in the Park and its Reason:** The Preferable recreation activity for visitors in the park was walking because of beautiful landscape and recreational facilities (65%), cycling because of track cycling (19%), picnic with existence of water resources (16%) respectively in the intensive outdoor recreation class. The Preferable recreation activity for visitors was walking because of beautiful landscape and recreational facilities (60%), cycling because of track cycling (11%), picnic with existence of water resources (23%) respectively in the extensive outdoor recreation class (Fig. 13).



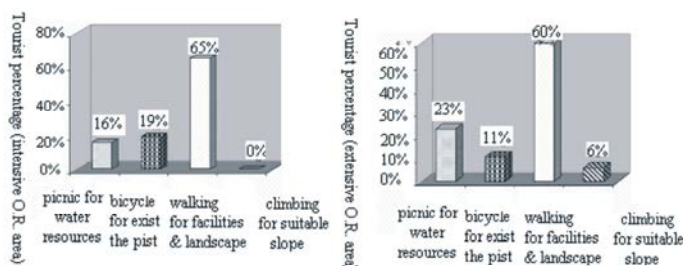


Fig. 13: The Preferable recreation activity for visitors in the park and its reason

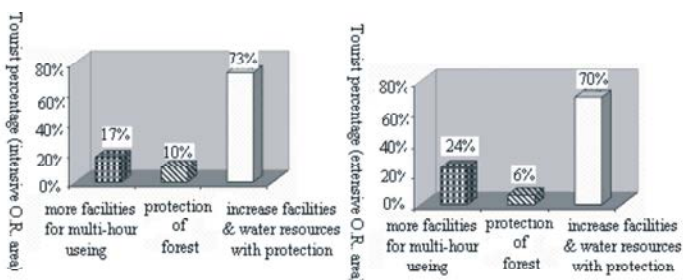


Fig. 14: The Preferable outdoor recreation utilizing for visitors in the park

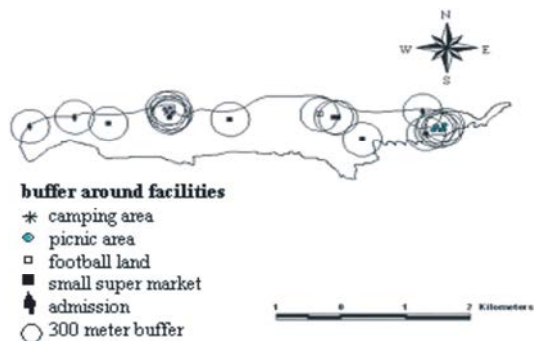


Fig. 15: Map of the 300-meter buffer around the water sources of Park

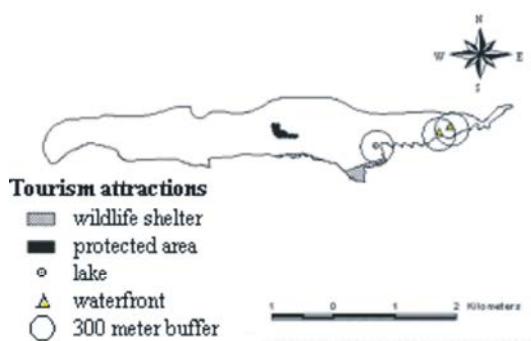


Fig. 17: Map of the 300-meter buffer around the tourist attractions of Park

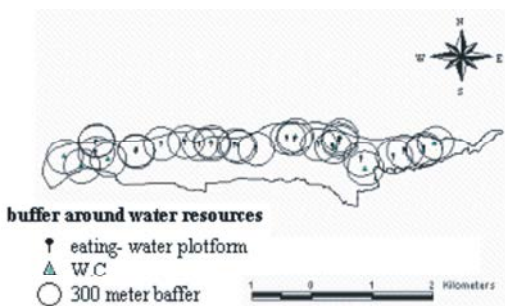


Fig. 16: Map of the 300-meter buffer around the recreational facilities of park

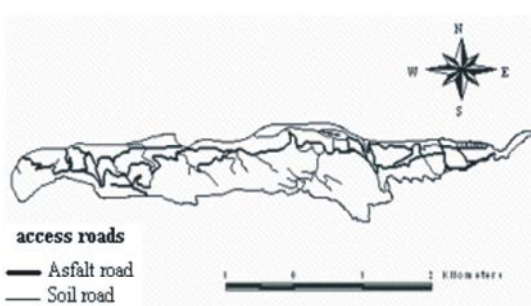


Fig. 18: The Access Roads Map of Park

**The Preferable Outdoor Recreation Utilizing for Visitors in the Park:** The Preferable outdoor recreation utilizing for visitors in the park was relatively similar in the intensive and extensive outdoor recreation classes (Fig. 14).

**The Maps of Water Resources, Facilities, Access Roads and Tourist Attractions of Park:** We provided the maps of the effective factors in outdoor recreation and we created the 300-meter buffer around the component of them. "Fig. 15, 16, 17 and 18" show the maps of these factors.

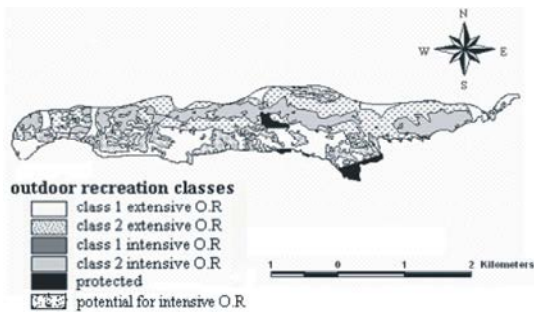


Fig. 19: The final map of outdoor recreation potential of park based on the effective factors in outdoor recreation

**Hesar Forest Park Based on the Water Resources, Recreational Facilities, Tourist Attractions and Access Roads:** We changed the Outdoor recreation classes in the primary outdoor recreation potential map based on the effective factors in outdoor recreation. Thus only places in the intensive outdoor recreation class which their maximum distance of the water resources, recreational facilities, tourist attractions and access roads were 300 meters, were selected as final places of intensive outdoor recreation class. In addition the places that have the suitable slope (in the class 1 of extensive outdoor recreation class) and their maximum distance of these factors was 300 meters, were selected as places that had potential for the intensive outdoor recreation. "Fig. 19" shows the final map of outdoor recreation potential of Sorkhe Hesar Forest Park based on the effective factors in outdoor recreation.

## DISCUSSION

**Evaluation of Outdoor Recreation Potential of Park Based on Tourism Ecological Model:** The results show that most of area of Sorkhe Hesar Forest Park has potential for class 1 of extensive outdoor recreation Based on tourism ecological Model. This result is similar to the results of other studies in forest areas in Iran [15, 18, 19]. Thus we can conclude that the topographic conditions are similar in Iran's forest parks that it is a positive point for the natural outdoor recreation and climbing. The area of class 1 of intensive outdoor recreation is small in Sorkhe Hesar Forest Park because of the sensitivity of selection these units in the ecotourism evaluation process. The results of similar studies in Iran also showed that the area of class 1 of intensive outdoor recreation is small [15, 18, 19]. In addition, most of the area of Sorkhe Hesar Forest Park has potential for the tourism attraction and outdoor recreation utilization. This result conforms to

result of Rezvanfar's research (2007) in Chitgar Forest Park. These results in two large forest parks in Tehran show that these parks will receive the more visitors in the future years. Thus Forests and Pastures Organization of Iran should effort to construct the more forest parks in Iran to prevent of destruction of these parks.

**Evaluation of Visitors' Utilizing of the Outdoor Recreation Places in Forest Park:** Most of visitors in Sorkhe Hesar Forest Park are men. This result conforms to researches results of other researchers [19, 5]. Most of visitors in the intensive outdoor recreation class are in the 15 - 30 year age class (50%) and most of visitors in the extensive outdoor recreation class are in the 45 - 60 year age class (37%). This shows the young visitors of park like the less mobility and more facility; because the recreation activities with more mobility (climbing and walking) has done in the extensive outdoor recreation class and it isn't desirable for the young visitors in the park. Most of tourists come to the park by family. This result conforms to research results of Yakhkeshi [5]. Thus we should note to this point to create the recreational facilities. Most of visitors come to the park from Tehran because Sorkhe Hesar Forest Park is an urban forest park in Tehran. Mahmoudi and Danekar [19] also concluded that most of visitors who come to the Monj forest are the indigenous people. Most of visitors like to come to the park by personal car. Yakhkeshi [5] and Mahmoudi and Danekar [19] also concluded that most of visitors use of the personal car for coming to the park. These results show that most of visitors usually go to park for picnic. Therefore we should note to provide the needful facilities for this outdoor recreation activity especially in the intensive outdoor recreation places. Wholly, 73% of visitors in the intensive outdoor recreation class have done the intensive outdoor recreation activities (picnic and cycling) whereas only 16% of visitors in the extensive outdoor recreation class have preferred the extensive outdoor recreation activities (climbing) and 81% of them of have preferred the intensive outdoor recreation activities (picnic and cycling). Thus visitor's utilizing in the extensive outdoor recreation class of this park isn't according to the previous outdoor recreation planning because there are the picnic facilities in the extensive outdoor recreation class. In addition 65% of visitors in the intensive outdoor recreation class prefer walking (an extensive outdoor recreation activity) to picnic and cycling (intensive outdoor recreation activities). Thus we can conclude that visitor's utilizing in the intensive outdoor recreation class of this park isn't according to the previous outdoor recreation planning. Aminzade and

Ghoreishi [16] also concluded that the intensive and extensive outdoor recreation activities aren't done in the designed places for this purpose. Therefore evaluating of outdoor recreation potential of forest regions should be done based on socio-economic factors. Other researchers also have note to use of the socio-economic factors for evaluating of outdoor recreation potential of forest areas [4,8-12,15,16,19].

Considering to "Fig. 11", picnic (an intensive outdoor recreation activity) depends on the recreational facilities and water resources. Therefore, creation of facilities and water resources is essential in the various places of park especially in flat areas. Considering to "Fig. 12", most of visitors prefer the forest and then roads for walking. This shows that walking (an extensive outdoor recreation activity) don't require to develop of many facilities against of picnic an (intensive outdoor recreation activity), but we should increase the access facilities such as roads for this outdoor recreation activity. Therefore we can conclude that the various outdoor recreation activities depend on the facilities, water resources and access roads of park. Thus these factors are effective in evaluation of outdoor recreation potential of park along with ecological factors. Research Results of Gülez and Demirel [14] also showed that the natural factors (climate and landscape) are determinant of 60 percent of the ecotourism potential and the cultural factors (accessibility and recreational facilities) are determinant of 40 percent of the ecotourism potential in forest areas. Results of other researches also showed that the recreational facilities and access roads influence on outdoor recreation [6, 7, 10, 17].

**Evaluation of Outdoor Recreation Potential of Sorkhe Hesar Forest Park Based on Effective Factors in Outdoor Recreation:** Results show that most of visitors select the places which are near the water sources and recreational facilities for outdoor recreation. In addition, Damavand Street (in northern Side of Park) is one of the most important of access routes to the Sorkhe Hesar Forest Park that it has the important role on public outdoor recreation of park. Therefore, we can conclude that the water resources, recreational facilities and access routes factors have the direct effect on outdoor recreation considering to the results of questionnaires and field surveys. Mahmoudi and Danekar [19] also concluded that the most effective factors in evaluation of outdoor recreation are climatic, accessibility, water resources, slope and aspect of its, forest cover, soil, outdoor recreation attractions and landscape factors respectively. Furthermore the outdoor recreation demand and the

visitors' current utilization have the major role in the evaluation of outdoor recreation potential and they influence the environmental factors.

Finally we can conclude that the visitors utilizing of Sorkhe Hesar Park is not according to tourism ecological Model because the outdoor recreation depends on the recreation facilities, water resources, tourist attractions and access roads in the park. As we observed in field surveys that most of visitors were in class 2 of the intensive outdoor recreation area and class 1 of the extensive outdoor recreation area because of facilities density in these areas. Whereas the wide areas of park had potential for outdoor recreation utilizing; for example there were few visitors in class 1 of the intensive outdoor recreation in spite of the suitable conditions (such as proper slope and geographical aspect and good vegetation) because this area didn't have any facilities, access roads and water resources. Thus the good management based on sustainable development considering to carrying capacity of park is essential to prevent of further destruction in the areas that have a lot of facilities in the park.

Finally we suggest that visitors' outdoor recreation demands will be evaluated using questionnaires in the next researches too. In addition the evaluation of outdoor recreation potential will be done based on the social and economic characteristics. We also recommend that the role of other factors such as the sonic pollution and lack of facilities (as negative factors) will be investigated in the evaluation of outdoor recreation potential of forest parks along with the ecological factors in next researches. In addition, we suggest that the outdoor recreation facilities won't be concentrated in the especial places of parks and visitors will be led to the different attractions of parks because the population density and destruction process is very much around recreational facilities of parks.

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