Study on the Outdoor Recreational Capability of Khorma Using (GIS)

By

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Research Article

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ABSTRACT

Since early 1970s, tourism has been mentioned as a "smoke free industry" which mostly is based on using and developing the cultural and natural resources of the countries as tourism attractions. Outdoor recreational exploitation of the forest is among the appropriate strategies to protect them. Since, outdoor recreation issue related to the forests has been intermingled with conservation and has taken a specific status according to the characteristics of each area. If tourism is left uncontrolled, in addition to destroying the environment, it will threaten the identity and cultural bases of local societies.

Taken this important fact into consideration will make inevitable the necessity to manage the effects of the behaviour of visitors to control and adjust the adverse effects of tourism. Also, if the forest areas lack an appropriate pattern for tourism management, the areas will lose their characteristics in a wide range. In this regard, Khorma forest is located in Guilan province, Langeroud city, Otaghvar district, Otaghvar rural district, Khorma village with 2801.5 area. This area is part of lands of Dehjan forestry plan. It is located in parcel 204, series 2, Kooreh rood zone, 1.9 area of Khorma forest was selected as case study in this survey.

This survey aims to define the ecological capability of this area for tourism using Arc GIS 9.2 software (Geographic Information System), zone with 84% intensive use (15387 71), 8% conservation zone (1503) and 6% inappropriate zone (1246) was recognized. Also, defining the effects and consequences of tourism activities in Khorma forest was studied.

Keywords: Khorma forest, ecotourism, tourist, Geographic Information System (GIS).

PREFACE

Nowadays, using the time and place to pass leisure time and recreation has become a wide spread phenomenon. Humans define and select, consciously or unconsciously, their recreation time in such a manner that provide physical and psychological balance for their morale that can become unbalanced due to mandatory work tasks, crowd and exhaustion resulting from excessive restricted urban life. Sport and outdoor recreation are considered as human bodys' rehabilitator and preparing him for further activity and work. Thus, in a general definition it is possible to identify 3 major factors.

For tourism

1. Removing the fatigue;
2. Fun;
3. Pleasure.

To achieve these goals, using the leisure and outdoor recreation can be grouped into:

1. Daily (urban) fun and outdoor recreation such as urban parks, laboratories, cultural complexes etc,
2. Weekly (suburb) funs and recreation such as forest parks, seas, the country regions which exploitation occurs mostly during the weekends as picnic.
3. Seasonal recreations (National and ultra national) occurring as more than one day, weekly or sometimes monthly travels to use the natural, historical, cultural and unique environmental events. In this case, tourists leave dwelling place and enter recreationally suitable cities or areas and reside there for a limited period of time depending on their financial strength.
Adjustment of suitable times to fill citizens leisure times, flourishing the local economy and attaining the cultural credits are major factors for developing and expanding the recreational spaces, and tourism. Also, the tourism industry can now attract external and internal tourists such that the major income index for some countries in the world such as Greek, Italy, France, Spain, Turkey, Cyprus is from tourism industry.

Given the role of this industry in the economic growth and development its ability to raise the income power of people and nations as well as transmission coefficient, tourism is considered as a major activity influencing both on local and regional income. It can impact on macroeconomic policies to achieve foreign exchange income and reduce unemployment problems. Unfortunately, Iran, despite having potential tourism recreational capabilities for all classes including cultural and ecotourism tourist, still has not successfully attained a status more appropriate than the 70th position in the world. Naturally, this is not desirable for a country like Iran with great history and culture and is considered among the foremost countries in respect of natural richness as well as historic monuments and religions/national places. On the other hand, lack of a deep attitude towards this industry and its income also will incur a loss on the economy and credibility of Iran in this respect.

Guilan Province, following the general policies of the country and its attitude towards this industry, despite having beautiful natural attractions and cultural, historical places which are considered as gifts granted by god for ecotourism and tourism industry, unfortunately lacks an appropriate status in the tourism system and this is in contrast to the role it is playing as the tourism pole.

The results of continuation of this trend is that the local people miss out of the income resulting from tourism and travelling, excluding them from jobs pertaining to tourism, which in the past, had flourished. This, in turn, is a major factor in the stagnancy of tourism industry, hence in the migration of native people of this province to other places, and lower employment rate compared to the rest of the country. Fortunately in the third development plan, government has paid reasonable, profuse attention to the tourism industry and provided the funds required for investment in this sector as well as various strategies to attract foreign and domestic tourism and directing them to the desired regions.

Naturally, result of this attitude, will not only revive the eminent estimate of Iranian culture but also, the income obtained from this industry will decrease the reliance of government to unipolar economy of oil, as well it will increase the enthusiasm in the local people's activity in tourism regions for obtaining income and employment.

Study characteristics and geographic area:

Langeroud is located in 49°, 54° to 50° 16 'E longitude and 36° 4' to 37° 23'N latitude. This city is located at an altitude of 21m above sea level. It is located on a green plain and 10 km from Caspian Sea. Its southern parts are surrounded by forest mountain foots. Its distance from the province centre is 60 km. Langeroud city leads from north and west parts to Lahijan city, from eastern part leads to Caspian Sea and in a part to Roodsar city and from southern part leads Amlash. The study area is part of Dehjan forestry plan's lands and its orientation status is as follows:

Parcel 204, series 2, Kooreh Rood catchment area. It is worth mentioning that the land has been designated in the forestry plan for a forest park. Its location in respect of country divisions is as follows: Guilan Province, Langeroud city, Otaghvar District, Otaghvar rural district, Khorma village. And its distance from critical points on its arena is as follows: province centre, Rasht 75 Km²-city centre, Langeroud 25 Km²-Otaghvar town, 10 Km²-Amlash town 18 Km²- Koomleh town 19 Km².

Its general UTM specification has 1.9 h¹ area. Its geographical orientation is: -4,103,125 North, -4,103,125 south, -412, 809 east, 412,537 west. Its four direction limits are from north and East Barkly river with paved road, from the west to Barkly river, from the south to the forest lands.

Mapping in the land form units:

Land form includes natural land units, each unit considered has similar climatic conditions, weathering, erosion, and deposition of transformed masses (wee, 1978). Thus, the soil is formed on a given bed rock in similar conditions. They have similarities and their physical properties are also similar. Basically, the land form defines the soil and vegetations grown on it (Blen buck & Fortado, 1967 and smith, 1982). Its can be stated that each land form unit represent a macro ecosystem.

Land defining parameters are:

- status of natural water ways and their number per unit level;
- slope and its extension;
- micro elevation and macro elevations;
- The rate of relation between crest and peak;
- strength and weakness of primary and secondary dominant geographic directions;
- Altitude from sea level;
- Transverse profile of gullies.
Among the mentioned parameters, slope, altitude from sea level, geographic direction, natural water ways (hydrography), gullies are most important ones, since even by identification of 5 mentioned parameters, it is possible to identify the land form of a unit. Further, to define the land form of a unit, even by identifying the slope, altitude from sea level and geographic direction, this goal can be achieved (companion & kock (1981). But, to recognize the kind of stone and soil in the study area using land form status, knowledge on the natural water ways and gullies status is necessary.

The easiest way to map land form unit and its’ constitute parameters is using Air photo interpretation. Since most aerial images are taken by black and white panchromatic film with yellow filler (Ceibary and Dalaky 1370), these images can't be used easily to recognize the sources. In addition, due to the oldness of aerial photos in Iran and damaged printing of the image and frequently inaccessibility of these photos, recognition of sources in the country using aerial photos has been confronted with difficulties in recent years.

Hence in order to draw the land form unit map, it is required to first map the slope level, secondly map the altitude from sea level, and thirdly to map the geographic direction, separately. Then, the maps are integrated to create a land form unit map.

It is worth mentioning that in above mentioned plan, due to limitation of the arena and few topographic changes, these discussions are explained only for more familiarity to the plan area.

**Drawing the slope strata map**

Contour line characteristics on the topographic maps, which also are demonstrating the slope changes, are used in mapping. It is for decreasing the wide fluctuations as well as easier and clearer reading of the slope on the topographic map, that slope levels maps are provided on the other hand, among the slope level maps features are: First, they distinguish the slopes of a region more rapidly and easier than other places, Secondly, slope strata can be utilised to form the land form units which are the basis to identify the ecologic sources, thirdly, by having the slope strata map accompanied to the map of other parameters, it is possible to more easily evaluate and then to plan the land use.

The number of slope strata and their variations depends directly to:

- Study objective;
- Geomorphologic status and the form of studied land;
- The kind of expected land uses for land evaluation and planning;
- Map scale

In present study, Slope strata are defined in two grade of 0-8 and 30-60% and remaining grades were excluded due to their small size.

<table>
<thead>
<tr>
<th>Slope classes</th>
<th>0-8</th>
<th>30-60</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area(m²)</td>
<td>17000</td>
<td>2000</td>
<td>19000</td>
</tr>
<tr>
<td>%</td>
<td>89/5</td>
<td>10/5</td>
<td>100</td>
</tr>
</tbody>
</table>

**Mapping the altitude from sea level**

Contour lines provide the altitude variations of studied area. However, as is observed on the topographic map, altitude of study area can be directly observed over the topographic map. But since contour lines are confused, observing the variations on it requires attention and time. It is due to easy observation of altitude fluctuations in a region that altitude map is distinguished easier and more rapid, and also it can be used for mapping the land form units which are the basis for recognizing the ecologic sources.

The number of altitude from sea level strata variations of these strata depends on:

- Study objective
- Geomorphologic status and land form in the studied area.
- The type of expected uses for evaluation and planning the land.
- Map scale
- Correlation rate of vegetative populations and altitude from sea level.

Based on the topographic map, altitudinal range of this park is between 162-284 m from sea level which in respect of altitudinal division it is located in altitudinal level 2 (100-200) and 3(200-400) for Northern profile of Alborz.
Table 2. Altitudinal levels

<table>
<thead>
<tr>
<th>Altitudinal classes</th>
<th>177-180</th>
<th>180-189</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area (m²)</td>
<td>17000</td>
<td>2000</td>
<td>19000</td>
</tr>
<tr>
<td>%</td>
<td>89/5</td>
<td>10/5</td>
<td>100</td>
</tr>
</tbody>
</table>

Figure 1. Slope classes of Khorma forest

Figure 2. Altitude classes of Khorma forest.
Figure 3. Direction classes of Khorma forest

Figure 4. Vegetation of Khorma forest.

<table>
<thead>
<tr>
<th>Slope</th>
<th>Vegetation</th>
<th>Direction</th>
<th>Altitude</th>
<th>Area (m²)</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Alnus subcor data-parrotia persica</td>
<td>Without direction</td>
<td>177-80</td>
<td>15287</td>
<td>1.5</td>
</tr>
<tr>
<td>2</td>
<td>Baxaceae hycana</td>
<td>Without direction</td>
<td>177-80</td>
<td>731</td>
<td>0.1</td>
</tr>
<tr>
<td>3</td>
<td>Free space</td>
<td>Without direction</td>
<td>177-80</td>
<td>1212</td>
<td>0.1</td>
</tr>
<tr>
<td>4</td>
<td>Alnus subcor data-parrotia persica</td>
<td>North</td>
<td>180-189</td>
<td>1246</td>
<td>0.1</td>
</tr>
<tr>
<td>5</td>
<td>Baxaceae hycana</td>
<td>North</td>
<td>180-189</td>
<td>772</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td></td>
<td></td>
<td>19247</td>
<td>1.9</td>
</tr>
</tbody>
</table>

Figure 5. Environmental units.
Geographic directions mapping

To map the geographic directions, also contour line features on the topographic map along with other characteristics of these kinds of maps are utilized. Other features of topographic maps utilized for this purpose includes rivers, Streams, water ways, crest lines, the connection between the crests and the connection between the crest and the peak. However observation of geographical directions or range directions on the topographic map is possible but this, like the slope and altitude, requires spending much attention and time. For easier observation of the range as well as using this in the land form units mapping, geographic directions map is drawn.

In geographical directions mapping maximally 9 classes and minimally 5 classes are considered. Adopting maximum and minimum classes for directions depends on:

- Study objective;
- Geomorphologic status and studied land form;
- The kind of expected uses for land evaluation and planning;
- Map scale;
- Correlation of vegetative populations and geographic direction.

Classification of geographic directions of this plan has been summarized in 2 classes: p: without direction and N:north.

<table>
<thead>
<tr>
<th>Geographic directions</th>
<th>P</th>
<th>N</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area(m²)</td>
<td>17000</td>
<td>2000</td>
<td>19000</td>
</tr>
<tr>
<td>Percentage</td>
<td>89/5</td>
<td>10/5</td>
<td>100</td>
</tr>
</tbody>
</table>

METHODOLOGY

Evaluation of ecologic capability:

The technique utilized in present study to analyze and summarize is derived from systematic analysis technique (Makhdum, 1385). According to this technique, resources were identified, analyzed and summed up. For this
purpose, firstly, numerical topographic map of Khorma forest with 1.25000 scale was provided by Guilan Environmental Conservation Organization. In the next step, approximate range of the study area defined on the mentioned map through performing field operations. Then using scan and numerizing technique, this area was entered to the software system.

Then to the precise border area of the study, field harvesting was initiated using GPS. Following, the noted data was entered to the computer using Arc GIS 9.2 software. This way, precise boundary of the studied area was defined and entered into the topographic map. This topographic map was used to draw other maps. Contour lines features were used to map the slope percentage classes indicating various slopes of each area.

Firstly, desired classes were classified by GIS then according to these classes (2 classes), slope percentage classes were mapped. Altitude classes and geographic directions maps which indicate the altitude and direction, respectively, were drawn from the land form unit map. By integrating the base maps, (slope, direction, and altitude) were mapped in Arc GIS 9.2 software.

The soil of this area, which is among the major factors for outdoor recreation planning, was studied. According to the petrologic information available in the natural resources department and the soil properties all over the study area, only clay loam texture is suitable for recreation. Thus, mapping for mentioned feature was not performed due to its similar role on the layer's assembly.

To define the map of vegetation type in the area, in the field study, trees and vegetations area, in the field study, trees and vegetations types were defined using GPS and the vegetation map of the area was identified using the hosted data of this system.

Finally, to make more precise and comprehensive decision for outdoor recreation use by taking the soil texture and vegetation map, this map was integrated to land form map and environmental units map was drawn.

Areas with 15387 m² (84%) were recognized as intensive use zone, 1503 m² (8%) as conservation zone and 1246 (6%) was considered as in appropriate zone and were zoned. This way ecological capability map of the area was achieved.

![Research Flowchart](image-url)
DISCUSSION AND CONCLUSIONS

According to the findings and result of this study and according to the suggested model and beautiful landcaps of Khorma forest, it was confirmed as very appropriate for attracting the tourist and implementing outdoor recreational plans. Tsaur, et al., (2005) suggested that exploitation of resources must be just for sustainable development and outdoor recreational use must be performed in accordance to the environmental capability of the area. Following result are obtained through summation of study findings which is performed to clarify the value of this area and to conclude the study.

Evaluation of ecological capability of Khorma forest in respect of extensive and intensive use identified that Khorma forest with 0-8 slope is appropriate for class 1 intensive use, and 84% of the region is suitable for class 1 intensive recreation.

Of this area of Khorma forest with 2h Dimension which case study was performed on which, 8% has 8-60° slope this part of Khorma forest was designated for conservation due to much density of box tree (Buxus hycranus) and any area was hot considered for extensive recreational use.

Importance of ecological capability evaluation of this area is so that if the region lacks the (potential) appropriate capability to implement various recreation zones, its implementation not only fails to improve the environmental stats but will also lead to greater destruction (Dedar, Dargahy, 1389).

In general, while Khorma zone is of great value, but due to lack of a strict regulatory support and lack of permanent monitoring and surveillance programs in the recreational zones, Khorma forest lacks the appropriate conservation and suffers great damages.

Ecotourism activity is permitted subject to the awareness and responsibility to conserve the ecologic system (Sharify, 1385). In general, in environmental capability evaluation, hillsides with 10% slope are considered lacking geographic direction, because such a mild slope may not provide a considerable geographic direction. Also, in Khorma forest with 2h area, about 1.4h² (16499m²) lacks geographic direction where is of outdoor recreational value. Studies indicated that deep soil and loamy texture is more suitable for outdoor recreation.

As mentioned previously, it is observed that soil properties of the project area are somewhat heavy. The soil is relatively deep to low depth and in some areas it is deep. At the result, Khorma forest has a good condition in respect of texture and soil depth for outdoor recreation planning.

Dominance of high percentage of vegetation by Gramine, Violet (Viola sp), elderberry (sambucus ebulus), cyclamen (cyclamen coum), Primrose (prim ulu sp) in this forest represents that Khorma forest is appropriate for recreational planning in respect of its density.

Hosseiny Naser, et al., (1389) in the study on the recreational capability of Abidar park indicated that taking the dominance of low percentage of vegetation density in to consideration, Abidar park is not suitable for recreational planning. 6% of this area with 8-60° slope and northern direction, having county alder and (Parrotia Persica) which covers 0.1 9h⁺ (1246 m²), is not suitable for tourism. Some areas of Khorma forest with 1.6 h⁺(1499 m²) have intensive recreation capability considering all the indices (Slope, direction , soil texture and vegetation) and outdoor recreation demand is observed intensively in this area.

Berhe (1992) concluded that using Geographic information system (GIS) for land management and planning causes that the planning is performed in such a way that the type of land use designated in each area has greater compatibility to the ecological conditions dominating on that area. Also, in present study, we have used GIS technology to study the Khorma forest recreational capability.

SOURCE


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