

Identifying, weighting and prioritization of desert and semi-desert sustainable ecotourism criteria in central regions of Iran by method of AHP (Case study of Yazd deserts)

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Abstract

Demand for tourism in the nature caused the holistic planning and attention to the environment and preventing from its destruction to be essential. The desert regions generally as the natural original resources have been known, if we want to expand and develop ecotourism in these regions, these regions also like the other natural places are not excepted from the principle of sustainable development. The principles of ecotourism in desert regions due to their special properties of these regions and fragile ecosystems, include main distinctive factors and criteria that are more focused on the effects of natural environment for the ecotourists. The study area of Yazd province in the center of Iran with an area of 131,000 km², is the third great province of Iran that 65 percent of it includes the desert lands. And in order to ecotourism planning in the arid and desert regions , after investigating and collecting the external and internal references , 10 main criteria and 36 sub-criteria were achieved. The obtained criteria to determine the most appropriate criteria of locating the nature-tourism areas in the central desert and semi-desert regions of Iran were weighted and prioritized.

For this, AHP questionnaire was prepared for the environment and tourism experts and 25 cases of individuals were selected. The results of questionnaires in the EXPERT choice software were weighted. The results showed that the main criteria include management factors , tourism , wildlife of region , water resources , limiting factors , climate , social aspects , vegetation , economical aspects and soil characteristics with inconsistency rate of 0.01, respectively have the highest priority and the sub criteria of infrastructure and fundamental factors , recreation resources , diversity of wildlife species, water quality and seismicity are the first 5 priorities and the sub-criteria of agricultural activities , chemical and physical properties of soil , land usage and population also are the last 5 priorities for planning the ecotourism in the desert and semi desert ecosystems of central deserts of Iran with the inconsistency rate of 0.05 ,have been selected .

Keywords: ecotourism, location, desert and semi –desert ecosystem, criteria, AHP, central deserts of Iran.

1. Introduction:

Ecotourism is converted to the important activities in the natural regions across the world. This activity provides opportunities for visitors to experience aspects of nature and culture and learn about the importance of biodiversity conservation and local cultures, simultaneously the nature -tourism provides income for protection and economic benefits of communities living in remote and rural locations. (Drumm & Moore, 2002)

the importance of the Ecotourism in international perspective reached to the extent that the United Nations named 2002 the International Year of Ecotourism (Weaver, 2007)., the principles of sustainable tourism can be defined as (defined by World Tourism Organization in 1988):The strategic management of all renewable resources, in a way that economic, social and aesthetic needs to meet with a form that cultural integrity, essential ecological processes, ecological diversity and life- preserving systems to be maintained (UNEP / WTO, 2002). Ecotourism as a form of sustainable tourism, which helps to protect and develop ,is well known Unfortunately, due to inadequate environmental assessment, many tourist places proceed to instability and self-destruct (Tsaour & Lin 2006). Therefore, selection of appropriate places of ecotourism with particular attention to the environmental conditions of each region appears to be necessary.

Deserts due to low production and simple structure compared to other ecosystems, are among the most fragile ecosystems (Tremblay, 2006). Iran has a considerable extent of the desert and semi-desert climate and these areas have no way than development in the progress times. Precipitous development regardless of environmental issues in these areas, will has non-compensable results. Tourism development in these areas, especially nature-tourism compared to other industries which needs to be developed less, is one of the ways to use the potential capabilities of these regions.

1.1 Theoretical principles

Tourism in its place will has adverse effects on the natural environment , Thus, a comprehensive and scientific look is the essentials needs of nature - tourism planning in these areas. The development of selection criteria in these areas and their prioritization in each ecosystem is an important step in this direction. Several criteria by the relevant organizations to identify the appropriate areas for nature-tourism were developed that despite the high value is only in a general guidance level and for each region depending on the its ecosystem conditions and the target should be removed from the general state and adapted with the environment .Selecting the suitable ecotourism areas as well as any other choice, It is essential to use of criteria which determine the different angles of given conditions and long-term impact of the choice . With this perspective during the comparative studies, suitable criteria for locating the ecotourism areas have been identified and then collected in a new format.

Kitsiou, et al, (2002), used 10 criteria kit, including the number of stores, fallow agricultural areas, the number of beds in hotels, Sandy beaches, the concentration of phosphate, nitrate and ammonium and phytoplankton concentration for this purpose (Kitsiou, et al, 2002). Brown, et al (2002) used of the three main criteria (e.g. economic, social and ecological) (Brown, et al, 2001). Bhattacharya & Kumari, (2004) also used of criteria such as preserving the cultural legacies, Ability of the environment in the development of the ecotourism , ecosystem health preservation ,the created awareness , public participation and entrepreneurship in local communities, tourist satisfaction and winning capacity(Bhattacharya & Kumari, 2004).

Fletcher prepared the criteria such as the area, accessibility, land shape, physical and applied properties of adjacent lands, adjacent to the natural regions, Quality of vision, vegetation and water for the ecotourism development (Fletcher, 2001).

Sheng-Hshiang identified and introduced the Environmental Management indices for ecotourism in natural reserves of china. In this research, ecotourism administrative indices in natural reserves based on the pressure - state – response model were implemented. In this research environmental indices (such as number of rare species , population of rare species , reserve quality) , social indices (such as local population associated in the ecotourism activity) , economical indices (such as Annual revenue of reserve , Annual income of the local community) were accounted and addressed. (Sheng-Hshiang Tsaurt 2006) .Weinjun Li, 2004 have addressed the environmental management indexes in the natural resources of Tianmushan (located in China). In this study, he investigated 12 indexes in three ecological, economical-social and infrastructural categories (Wenjun Li, 2004). Tremblay have noted the criteria for specific geological profiles, climate, desert flora and wild flowers, old, large or unusual plants, Caravans or other desert migrations, native residents, oases and protected areas. WTO/UNEP/IUCN. For this purpose, have taken into account the criteria for environmental, social, psychological, legal and administrative factors (WTO / IUCN / UNEP, 1992). Numerous studies in Iran in relation to identify the criteria and indicators of tourism in different ecosystems were done , for example , Noori et al used the three main criteria of conservation history , recreation and threat factors to assess the ecotourism potency (Nouri, et al, 2007).M. Makhdoom, identified the priority of criteria such as the slope, rocks and soil, the geographical direction , water, vegetation, climate and weather for focused-tourism and in this application (Makhdoom, 2003).

Iran's national tourism document has divided the criteria in 11 categories, including the main criteria including climate, physical features, water resources, environmental quality, vegetation, wildlife, economic, social and cultural-historical and administrative features and the management of historic (Danehkar et al, 2006).

Ardekani used of the criteria such as the height of the open sea, slope and direction of land, comfort climate, geology, Soil, vegetation, land use, outing demand, , landscape, security and distance from surface-waters, roads, historical and cultural centers, human settlements, faults, mines, sea, ports, airport, specific facilities for selecting ecotourism hotspots (Ardekani, 1386). According to all of these studies, criteria of selecting the ecosystem fields in Iran , In a new context and used for all regions and local ecosystems, , including 12 major criteria and 41 sub- criteria were collected and organized (Sepasi et al.) which are shown in Table(1).

This study for selection and prioritization of appropriate criteria for ecotourism and determining their importance to select suitable areas of ecotourism in the desert and semi-desert ecosystems in AHP method was performed.

The process of hierarchical analysis (Analytical Hierarchy process-AHP) was invented by Saaty in 70s (decade of 70) (saaty 1980). Analytical Hierarchy Process is used to extract the relative scales from pair-wise comparison of discrete and continuous data . These comparisons may be used for actual measurements or may reflect the relative weight of priorities. (Saaty, 2004:415)The characteristic weights are assigned to the map layer and are processed in a GIS environment. This method is defined as the spatial analytical of hierarchy process (SAHP) (Malzewski, 1999).

This study is place in this group. SAHP by analyzing the complex issues and problems, Converts them to a simple form and solves them, Then, it were used in the evaluation and planning by different researchers.

Among the last things that were done using this method, is the study of Bojorquez et al (2001). They used of this method in evaluating the appropriateness of Land use in Mexico. Nudson (2006) analyzed the land suitability with AHP for Florence city in southeastern part of Minnesota (placed at United States) by agricultural factors , natural and water resources . (K. NUDSON, 2006).

Yang et al (2008) also use the AHP method and remote sensing in GIS, has offered the land-usage management system in the city of Changsha, China. (YANG et al , 2008)

Table 1 : Selection criteria for the nature- tourism places

Criterion	Sub-criterion	Description
Climate	Rain	
	Temperature	
	Sunlight	
	Wind	
	Relative Humidity	
Wildlife	Diversity	
	Population	
	Distribution	
	Sensitivity of species	According to the classification of list (IUCN, 1994)
Economical aspects	Macroeconomic benefits	The amount of foreign income and the amount of efforts to promote ecotourism ,the number of new job opportunities produced from tourism, increased public and private revenue and gross profit for the tourism of region
	Economic - local benefits	All economic benefits produced from tourists visiting the area for local people
	Agricultural activities	
	Land usage	Usage compatibility with tourism

sensitivity Environment	Habitat quality	Friability and sensitivity of environment , increase of the wildlife population , Revitalization of the nature, Native species and migratory birds , amount of the soil erosion, conservation projects, Threatened and endangered species
	Environmental hazards	
Management	Protection History	Quartet protected areas, Hunting Banned region , international lagoons
	Infrastructure	Roads, power transmission network, water, medical units etc... and the distance between them
	Threat factors	Decreasing factors of the values of integrity, authenticity, fertility, biodiversity and wildlife potential
	Support activities	Support units in the field of policy making and policy development of ecotourism for the region

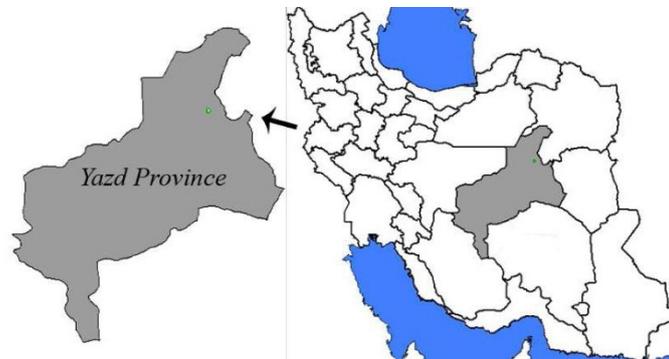
Promenade importance	Outing resources	
	Tourists' Ideas	Satisfaction of tourists' visiting, accommodation, facilities and accommodations, local products and..
Social properties	Population	
	Public participation	The motivation of local community for the reception of tourists in the region
	security	
Water resources	Resource Type	
	Amount of resource	
	Water quality	
Soil properties	Physical characteristics	
	Chemical properties	
	Biological characteristics	
Vegetation	Density	
	Diversity	
	Extent	
	Combination	

2. Methodology

Yazd province in terms of geographical coordination was placed in 29° degree and 35 minute to 35° degrees and 7 minutes in north latitude and 52° degree and 50 minute to 58° degree and 16 minute in eastern latitude. Figure (1)

Yazd province with an area of about 131,551 square kilometers (third largest province of country in terms of area) and its population is about 880,000 people and located in the Central Plateau of Iran. It has an average rainfall of 107 mm per year, annual average temperature of 18 ° C and relative humidity between 30 to 35 percent. Yazd province is one of the areas with arid climate, natural attractions, historical and cultural potential of attracting tourists. 86 % of its land area to the extent of 110000 km² is composed of desert and plain lands. The important desert areas of Yazd includes Anjir valley desert (East and West), Siakhkoo desert (North and East), Abarkoo Desert (East), Marvast (center) where have been developed in the province. Figure (1)

Figure 1: Geographical location of Yazd province in Iran map



For identifying the appropriate criteria to choose the ecotourism places (that using the similar ideas in Iran and world have been extracted and in Table (1) were shown all these issues) was used , in this stage for using in desert and semi desert regions using the AHP method were weighted and prioritized. AHP method is one of the comprehensive designed methods for multi-criteria decision making. Because makes it possible to order the issue hierarchically. Also , it takes into the consideration the various quantitative and qualitative criteria. Various options involved in the decision making process and provides the sensitivity analysis on the following criteria and sub criteria. Furthermore, it is based on the pair-wise comparison which facilitates the calculations judgments . Also it shows the amount of consistency or inconsistency of the decision that is one of the superior advantages of this process in the multi-criteria decision making. On the other hand , it has a strong theoretical basis and established based on the axioms principle , this process are described during the steps :

- 1- Making an hierarchical one
- 2- Comparing the decision making elements in the pair-wise comparison model form for determining the criteria and sub criteria importance coefficients.
- 3- Weight calculating
- 4- System consistency

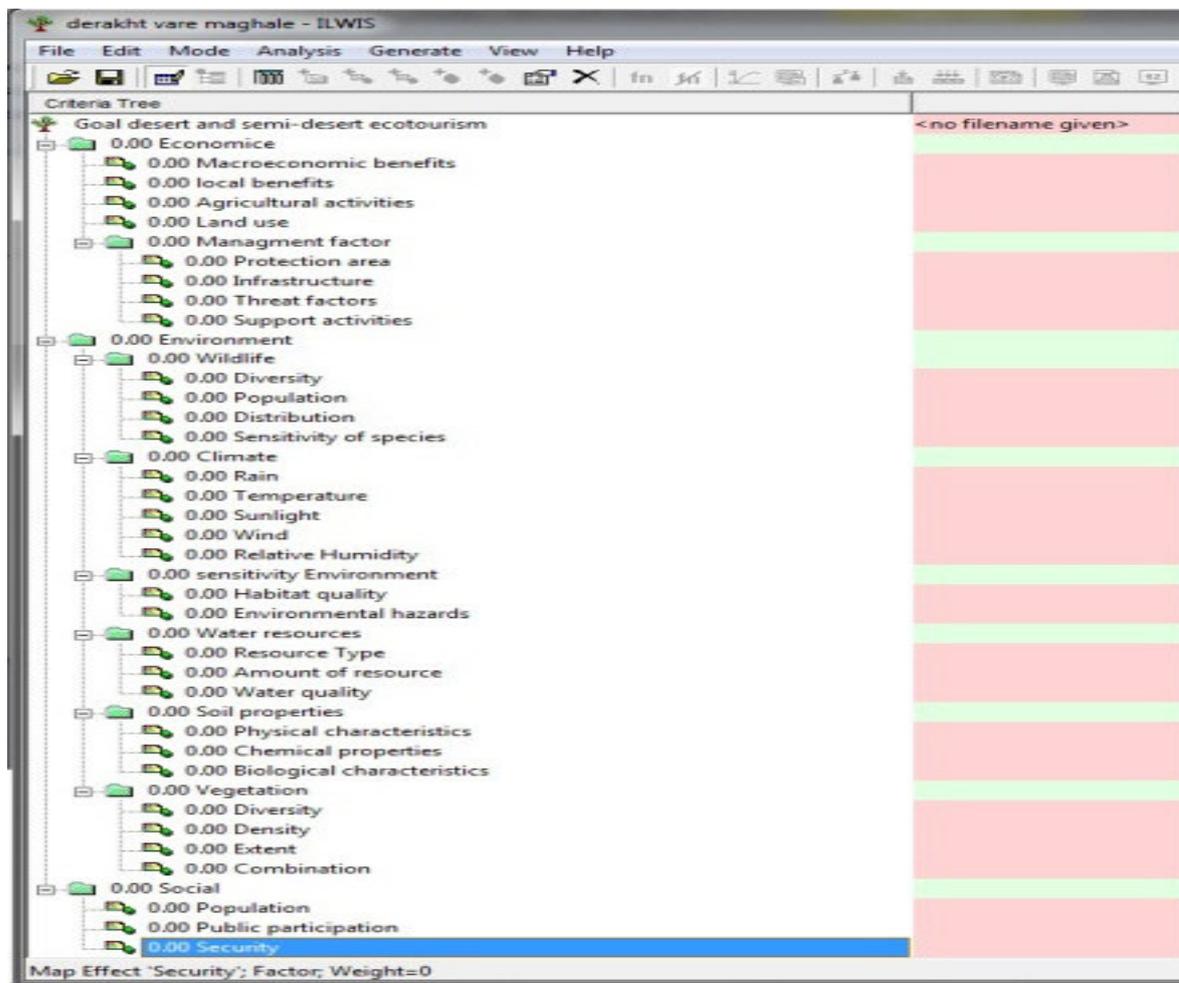
2.1 Building the hierarchy

First step of AHP is *drawing* of a graphical representation from the issue that in it our goal is obtaining the appropriate criteria for achieving the purpose and desired devices to be showed in it too. In fact in this stage , different levels of analysis are illustrated hierarchically and graphically. In the first level , there is the goal that is identifying the *ecotourism criteria* in this research .In the second level, the criteria which can by them our purposes be achieved , should be diagnosed . In this paper to reach this purpose , we used of 10 natural criteria . In the third level, related indices to each

one of these criteria were written that total number of these indices is 42.

Figure(2) is the graphical representation and hierarchical graph in the AHP method that is related to this research .

Figure 2 : Hierarchical tree



2.2 Comparing the decision elements pair-wise

AHP elements in each level are compared together and weighted pair-wise. Comparing the weighting the elements is recorded in a $K \times K$ matrix . Paired-wise comparison in the form of valuating the element of column compared to the row element will be done, for the valuation, also was used of a distance scale from 1 to 9 . If the given value is more, indicates the more importance and priority of

the row element to the column element. Such that the value of 9 indicates more importance or priority and value of 1 indicates the same priority and importance Table (2). It should be mentioned that the pair-wise matrix is an inverse matrix. This means that if the compared value of **row element (a)** compared to the Column element (**b**) is equivalent to 9, then the **Compared value of Column element (b)** compared to (**a**) is equal to $\frac{1}{9}$.

Table 2 : The way of preference weighting in pare-wise-comparison matrix

Identical importance	1
Relatively prioritized/preferred	3
High preference/priority	5
Very much preference/priority	7
Extraordinary preference/priority	9
Interstitial values	2,4,6,8

2.3 Calculating the weight in the Analytical Hierarchy Process

Calculating the weight in the analytical hierarchy process separately in two parts is discussed below:

- 1- Local priority
- 2- Overall priority

Calculating the local priority by Least Squares Method

In the mode of consistency (generally per every I and j)

$$a_{ij} = \frac{W_i}{W_j} \quad \text{OR} \quad W_i = a_{ij} W_j$$

Equation 1

$$MINZ = \sum_{i=1}^n \sum_{j=1}^n (a_{ij} W_j - W_i)^2$$

2.4 Calculating the consistency rate (CR3)

The consistency rate in the AHP method is an index that shows the compatibility between them. This rate indicates the degree of accuracy in the valuation of pair-wise comparisons, if the rate is equal to or less than 0.1, the valuation and comparisons of scan are good and proper, otherwise, valuation and pair-wise comparisons should be redone or modified.

The consistency rate by calculating the consistency index (CI4) and the following equations is obtained:

$$CI = \frac{\lambda_{max} - n}{n - 1} \tag{Equation 2}$$

In above equation λ_{max} is the eigenvector element and n is the number of criteria. The eigenvector is obtained by the following equation:

$$\lambda_{max} = \frac{\sum (\text{weights column} \times \text{Valuation matrix row})}{\text{criteria weight}} \tag{Equation 3}$$

λ_{max} should be calculated for all of criteria and then CI can be obtained in relation to their total in equation (2). Other required index is the random index (RI¹) that is proportional to the number of criteria which is obtained from Table (3) and finally the inconsistency rate is calculated from the equation (3):

$$CR = CI / RI \tag{Equation 4}$$

Table 3: Random index (RI) for a number of different criteria

Number of Criteria	10	9	8	7	6	5	4	3	2	1
RI	1.45	1.45	1.41	1.32	1.24	1.12	0.9	0.58	0	0

In this research considering that we used of the EXPERT Choice 11 software, all the calculation in above methodology were calculated by this software that the results of calculations in the section of

research findings were proposed. For this purpose, the survey questionnaire of experts (AHP questionnaire) including the criteria and sub criteria was prepared and offered to 20 persons of experts. The selected experts were simultaneously dominant to the environmental Sciences, ecotourism and desert and semi-desert regions, with at least 5 years experiences. therefore, preferred value of criteria and sub-criteria was determined through pare-wise comparing of them. The determined values were entered in Expert Choice 11 software and inconsistency coefficient of criteria and sub-criteria was calculated by it. Only when the inconsistency coefficient was lower than 0.1, used in the process of decision.

3. Results

Using the criteria of ecotourism to develop the sustainable ecotourism in the central semi-desert and desert region of Iran, we have the following results :

From the perspective of main criteria of administrative factors with the weight of 0.179, tourism with the weight of 0.174 and wildlife the with weight of 0.152, have occupied the first to third priorities and the criteria of soil with the weight of 0.02, economical aspects with the weight of 0.056 and vegetation with the weight of 0.61, have filled the final priorities.

Water resources criteria, with the weight of 0.105, restrictive with the weight of 0.102, Climate with the weight of 0.079 and the social aspects with weight of 0.070 were in the middle positions. Table (4) show the prioritization of main criteria with the inconsistency of 0.01.

Table 4 - Pair-wise comparison of the main criteria

	climate	water	soil	Wildlife	Vegetation	Economical aspects	Social aspects	Administrative factors	Tourism	Restrictive
Climate	1	-	-	-	-	-	-	-	-	-
Water	1	1	-	-	-	-	-	-	-	-
Soil	0.231481	0.18622	1	-	-	-	-	-	-	-
wildlife	0.555556	0.980392	0.141443	1	-	-	-	-	-	-
vegetation	1	0.617284	0.321543	0.350877	1	-	-	-	-	-
Economical aspects	0.862069	0.512821	0.362319	0.3125	1	1	-	-	-	-
Social aspects	1	0.840336	0.275482	0.423729	1	1	1	-	-	-
Administrative aspects	0.434783	0.666667	0.127065	1	0.292398	0.27027	0.344828	1	-	-
tourism	0.416667	0.641026	0.125945	1	0.285714	0.25641	0.334448	1	1	-
Restrictive	1	1	0.195695	0.833333	0.694444	0.625	0.980392	0.546448	1	1

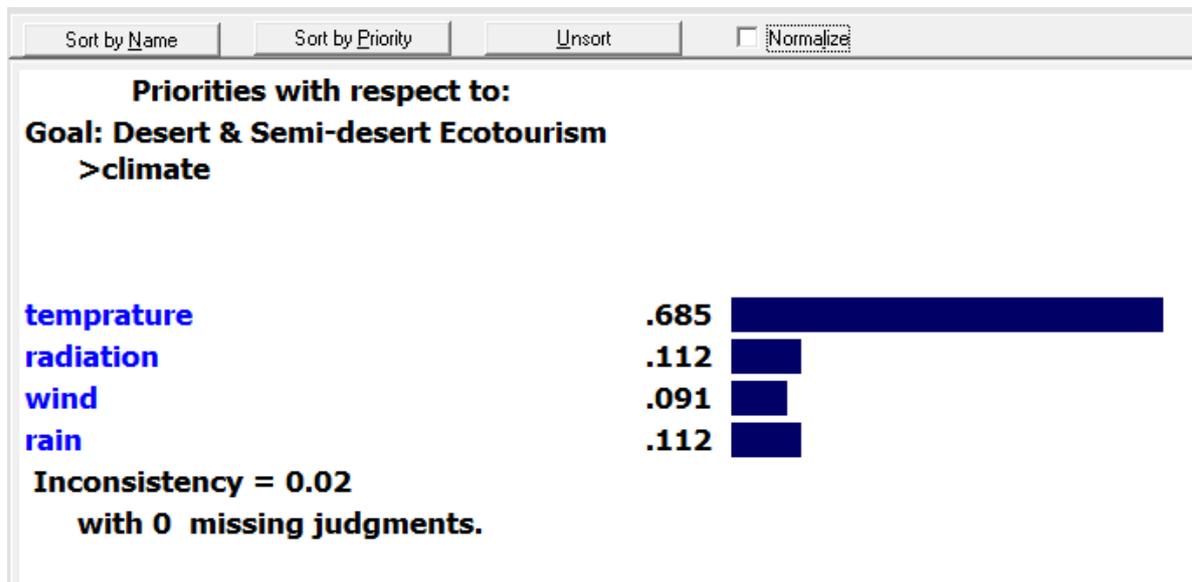
Reference : Research Results

Climate parameters include temperature with a weight below 0.685, radiation (direct sunlight) and precipitation (rain) with a weight of 0.112 and wind with a weight of 0.091 and inconsistency level of 0.02 with respect to the target, so were prioritized. Table 5 and Figure 4 indicate the weights and ranks of these criteria.

Table 5 – Paire-wise Comparison of Climate sub-criteria

Climate	temperature	sunlight	Wind	rain
temperature	1	-	-	-
sunlight	0.133333	1	-	-
wind	0.133333	0.666667	1	-
rain	0.2	1	1	1

Figure 4 – weighting and prioritization of climate sub-criteria

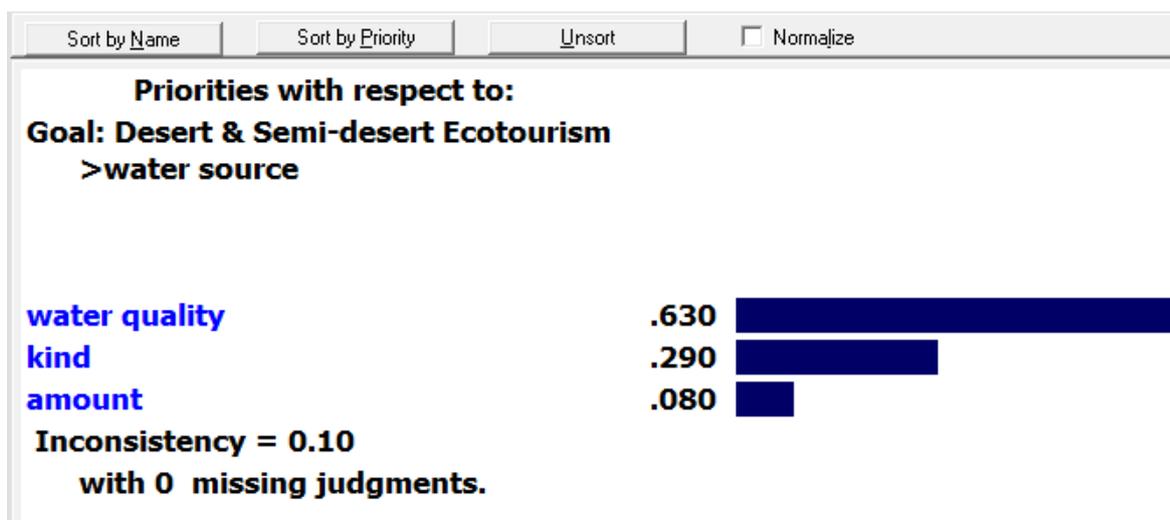


According to Figure 5 and table 6, sub-criteria of water sources with the inconsistency ratio of 0.10, respectively water resources quality with a weight of 0.63, the type of water source with the weight of 0.29 and the amount of water resource with the weight of 0.080, finally had the weight and priority.

Table 6 – Pair-wise Comparison of Water resources Sub-criteria

Water	Water quality	Source rate	Source type
Water quality	1	-	-
Source rate	0.33333 3	1	-
Source type	0.17543 9	0.2	1

Figure 5 - Weighting and prioritization of water resources sub- criteria

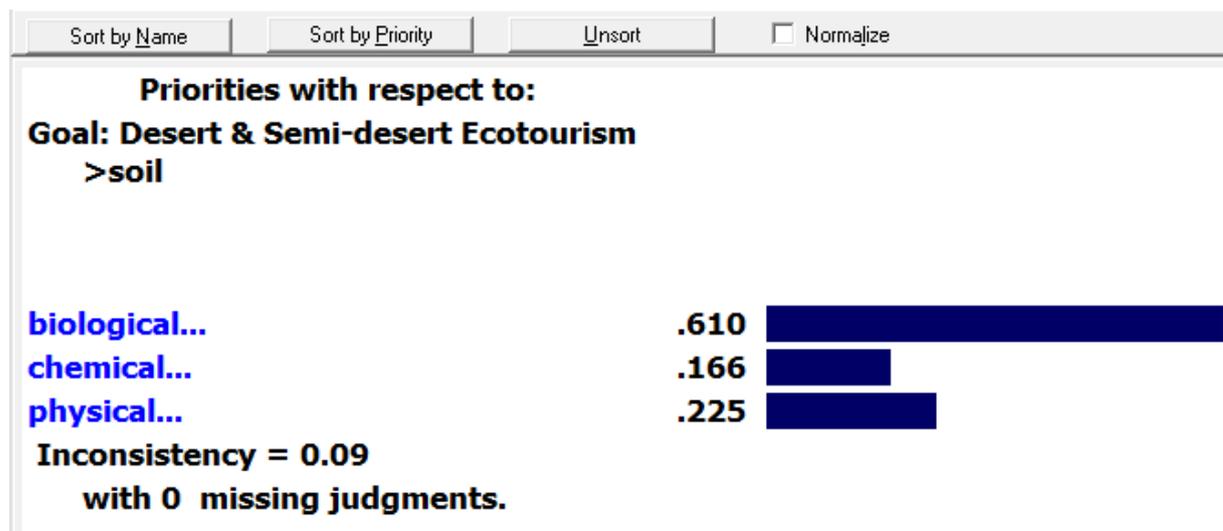


The biological properties of soil with the weight of 0.61 , physical properties of soil with the weight of 0.225 and chemical properties with the weight of 0.166 with inconsistency rate of 0.09 have been arranged. Table 7 and Figure 6 indicate the weighting and prioritization of soil sub-criteria.

Table 7 – Pair-wise Comparison of the Soil Sub-criteria

Soil	Physical properties	Chemical properties	Biological properties
Physical properties	1	-	-
Chemical properties	0.2	1	-
Biological properties	0.5	1	1

Figure 6 – Weighting and prioritization of the soil sub-criteria



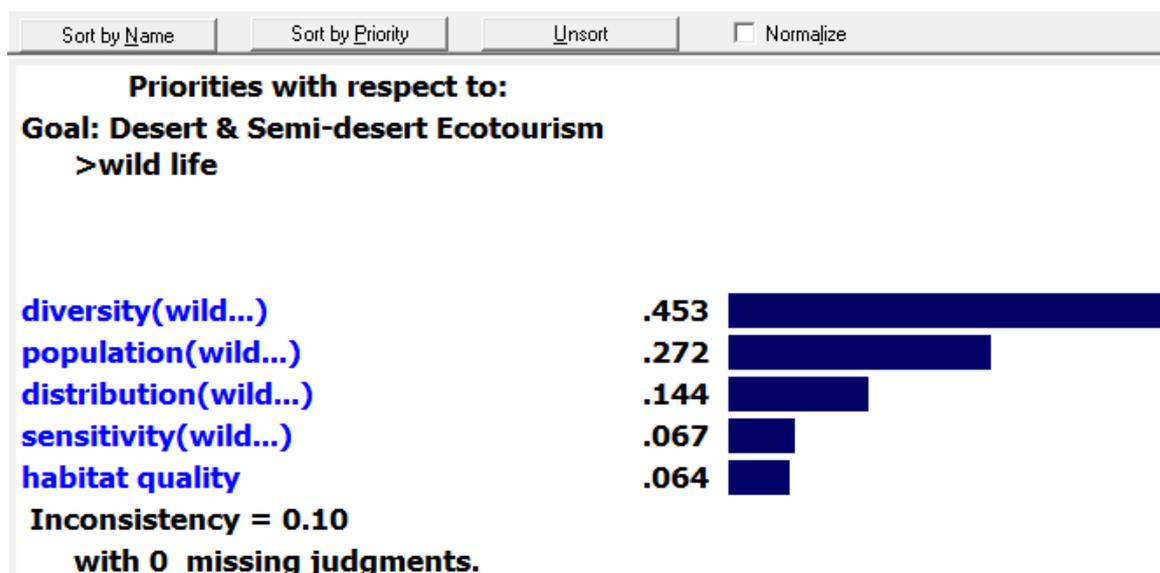
After weighting and prioritizing the sub-criteria of wildlife area ,the inconsistency ratio was 0.10 and the orders of priorities are as follow:

Diversity with a weight of 0.453 , population with a weight of 0.172, distribution with a weight of 0.244, sensitivity of wildlife species with a weight of 0.067 and habitat quality with the weight of 0.064 which Table 8and Figure7 indicates it .

Table 8 – Pair-wise Comparison of Wildlife Sub-criteria

Area Wildlife	Diversity	Population	Distribution	Sensitivity of species	Habitat quality
Diversity	1	-	-	-	-
Population	0.285714	1	-	-	-
Distribution	0.25	0.333333	1	-	-
Sensitivity of species	0.235294	0.266667	0.285714	1	-
Habitat quality	0.3125	0.16129	0.3125	0.8	1

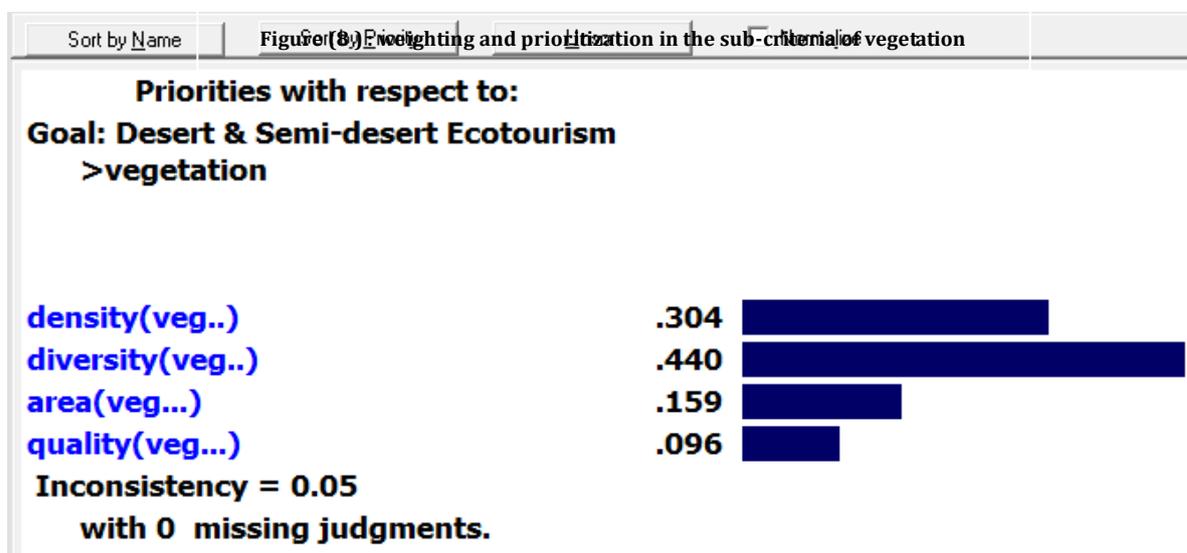
Figure 7 – weighting and prioritization of the wildlife sub-criteria



Diversity with the weight of 0/3.4 , density of the vegetation with the weight of 0.409, vegetation extent with the weight of 0.159 , habitat quality with the weight of 0.06 and with the inconsistency ratio of 0.05, respectively were the priorities of the vegetation sub-criteria in the region that Table 9 and Figure 8 show them .

Table 9: Pair-wise comparison of Vegetation Sub-criteria

Vegetation	Density	Diversity	Area	Habitat quality
Density	-	1	-	-
Diversity	1	1	-	-
Area	0.22222 2	0.625	1	-
Habitat quality	0.26666 7	0.37037 0	0.45454 5	1



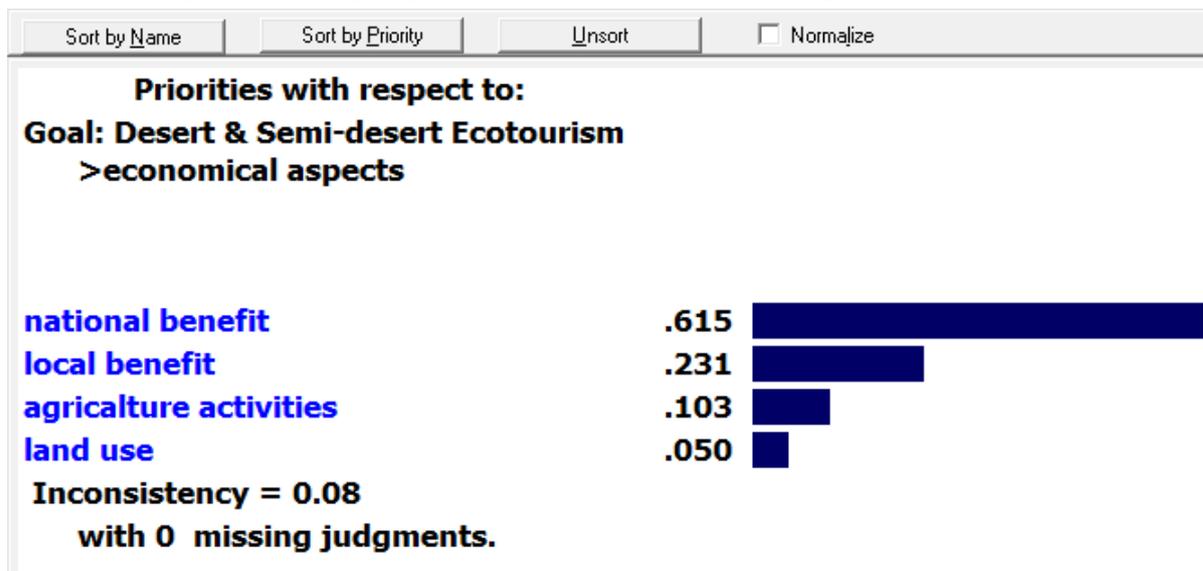
Priorities of economic aspects sub-criteria with the inconsistency ratio of 0.08 in accordance with Table 10 and Figure 9 are determined as follows:

National economic interests with the weight of 0.65, local economic interests with the weight of 0.231, agricultural activities with the weight of 0.13 and Land use with the weight of 0.050.

Table 10 - Paired comparison in the economic aspects of the sub-criteria

Economic aspects	Macro-economic and national interests	Economic - local interests	Agricultural activities	Land usage
Economic - national interests	1	-	-	-
Economic - local interests	0.210526	1	-	-
Agricultural activities	0.222222	0.4	1	-
Land Usage	0.125	0.142857	0.5	1

Figure (9) – Weighting and Prioritization of Economic aspects sub-criteria



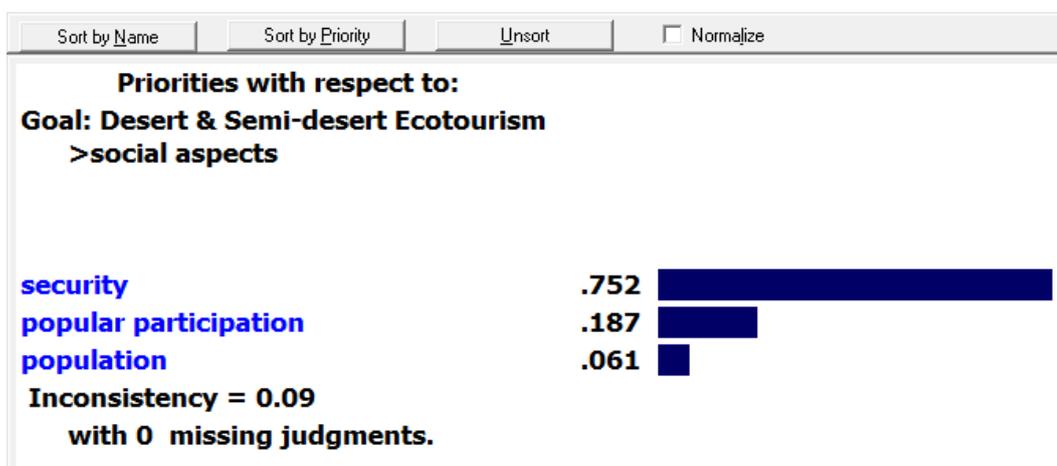
As Table (11) and Figure (10) show , sub-criteria of social aspects, respectively are prioritized as follow :

Security, public participation, and population with the weights of 0.752 , 0.187 and 0.051 with inconsistency ratio of 0.09.

Table 11 - Pair wise Comparison of Social aspects sub-criteria

Social features	Safety/Security	Public participation	Public participation
safety/Security	1	-	-
Public participation	0.181818	1	-
Population	0.111111	0.238095	1

Figure 10 – Weighting and Prioritization of *social aspects sub criteria*

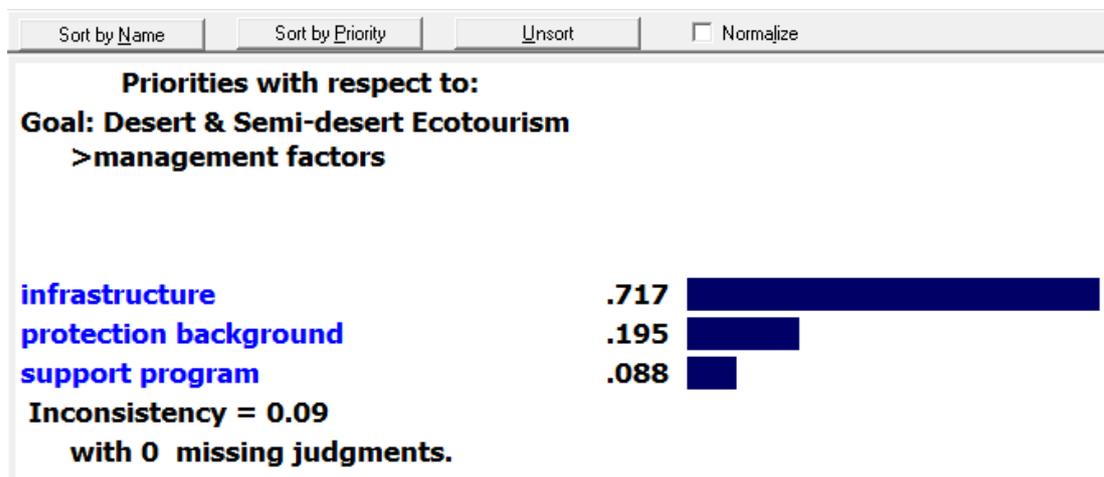


Prioritizing the administrative sub criteria with the inconsistency ratio of 0.09 was done and infrastructure and fundamental structures sub criteria with the weight of 0.717 was in the first place and the protection history with the weight of 0.195, and support activities with the weight of 0.088 allocated the next positions to themselves. Table 12 and Figure 11 show this issue.

Table 12 – Pair-wise Comparison of *Management factors Sub-criteria*

Management factors	Infrastructures	Protection History	Support activities
Infrastructures	1	-	-
Protection History	0.181818	1	-
Support activities	0.166666	0.333333	1

Figure 11: Weighting and prioritization of *administrative factors* sub-criteria

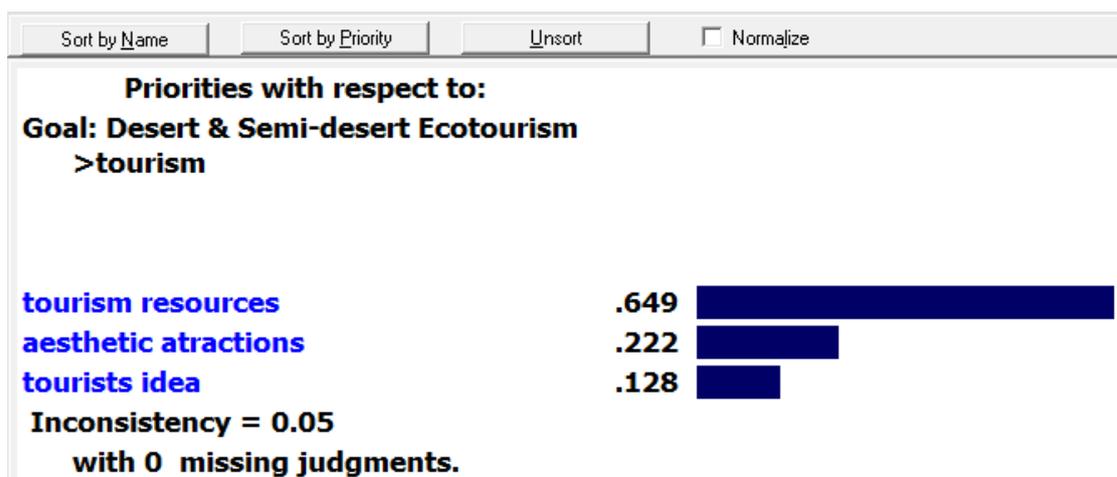


Outing resources, aesthetic attractions and tourists' votes are sub-criteria of tourism that with the weights of 0.649 ,0. 222 and 0.128, the inconsistency ratio of 0.05 , so were prioritized. Table 13 and Figure 12 show the same results.

Table 13 - Paired comparison of Tourism sub-criteria

Tourism	Recreation sources	Aesthetic appeals/Attractions	Tourists' votes/comments
Recreation sources	1	-	-
Aesthetic appeals/Attractions	0.270270	1	-
Tourists' votes/comments	0.25	0.454545	1

Figure 12 – Weighting and Prioritization of tourism sub criteria

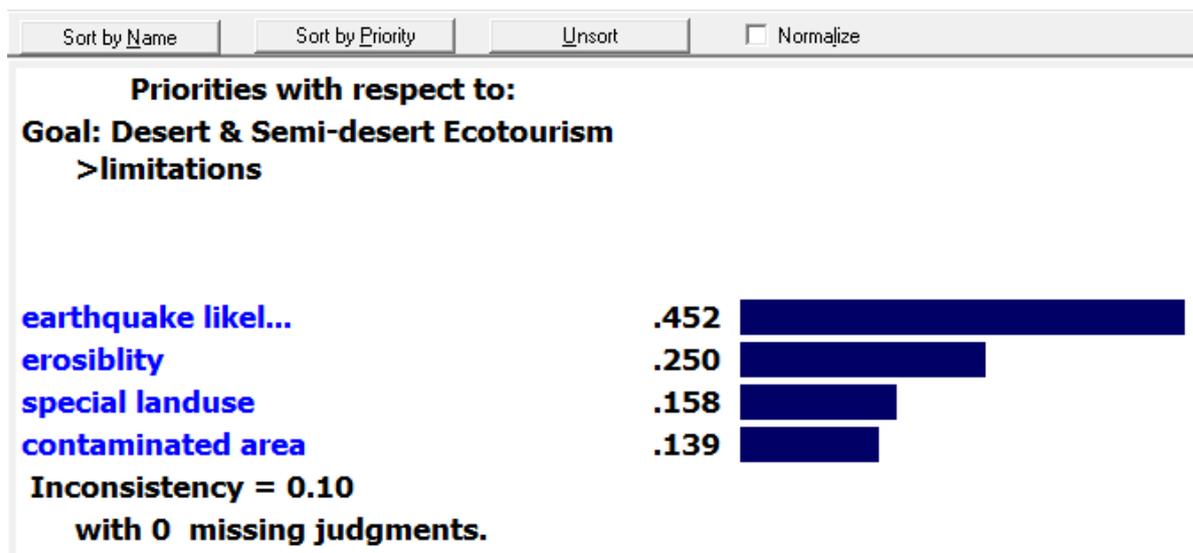


limiting sub criteria with the inconsistency coefficient of 0.10 were performed and seismicity with the weight of 0.452 and credibility with a weight of 0.250 were in the first and second place of priorities, and specific applications with the weight of 0.158 and unsanitary areas with the weight of 0.139 were in the third and fourth place of priorities that in table 14 and Figure 13 are shown.

Table 14 - Paired comparison of the restrictive criteria

restrictive	Seismicity	Credibility	Special usages	Contaminated areas and....
Seismicity	1	-	-	-
Erodibility	0.384615	1	-	-
Specific usages	0.333333	1	1	-
Contaminated and unsanitary areas	0.5	0.285714	1	1

Figure (13) - Weighting and prioritization of Restrictive Sub-criteria



Finally , after applying the criteria coefficients in the criteria which are associated with the purpose that the desert and semi-desert ecosystem is in the central regions of Iran , by obtaining the inconsistency rate equivalent with 0.03 , the sub-criterion of sub-structure with the weight of 0.128 , the recreation sources with the weight of 0.113 , diversity of the wildlife with the weight of 0.069 , water quality with the weight of 0.066 and the seismicity with the weight of 0.054 assigned the first and fifth priorities to themselves and the wildlife population , the temperature , security, diversity of vegetation and aesthetic appeals respectively with the weight of 0.053 , 0.046 , 0.041 , 0.035 were placed in the 6th to

10th places .

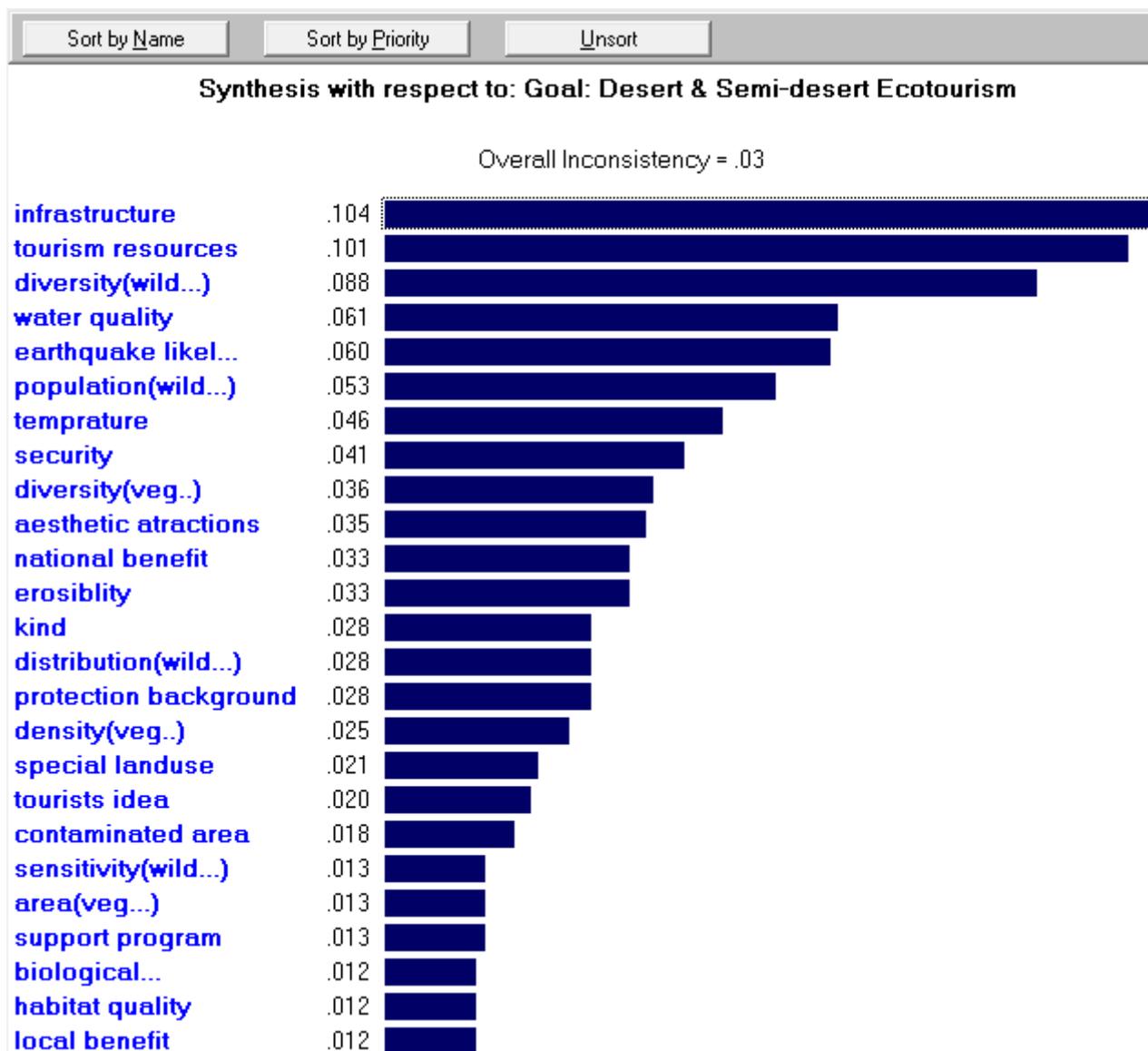
Sub-criterion of Sun light and rain with the weight of 0.009 , the amount of water source with the weight of 0.008 , the wind with the weight of 0.007, the quality of vegetation habitat and the agricultural activities with the weight of 0.006 , the physical properties of soil with the weight of 0.005 , the population with the weight of 0.004 and the chemical properties of soil and land usage with the weight of 0.003 , occupied 10 positions. The national economic interests , security background , the type of water source , the diversity of vegetation , erodibility , the wild life distribution, the tourists' votes (comments), support specific and specific applications , unsanitary areas, local-economic benefits, public participation, biological characteristics of soil , sensitivity of species and wildlife habitat quality and extent of vegetation with the weights of 0.035 to 0.01 , allocated the intermediate priorities to themselves. Figure 14 and Table 15 show these results.

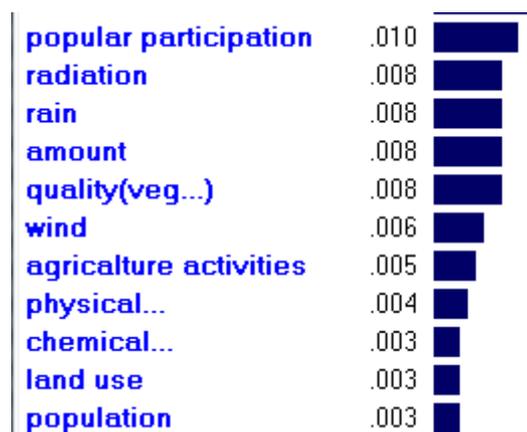
Table (15) : Weighting and prioritization of sub-criteria regarding the purpose

prioritize	sub-criteria	Weighting	prioritize	sub-criteria	Weighting
1	Infrastructures	0.128	20	Specific usages	0.016
2	Recreation Resources	0.113	21	Contaminated and unsanitary areas	0.013
3	Diversity of wildlife	0.069	22	Economic - local interests	0.013
4	Water quality	0.066	23	Public participation	0.012
5	Temperature	0.054	24	Biological characteristics of soil	0.012
6	Safety/security	0.053	25	Sensitivity of wildlife species	0.010
7	Seismicity	0.046	26	Settlement quality	0.010
8	Population of wildlife	0.041	27	The extent of vegetation	0.010

9	Aesthetic appeal/attractions	0.039	28	Sun light	0.009
10	Macro-economic and national interests	0.035	29	Rain	0.009
11	Protection history	0.035	30	Rate of water resource	0.008
12	Type of water resource	0.031	31	Wind	0.007
13	Diversity of vegetation	0.027	32	Habitat quality	0.006
14	Erodibility	0.026	33	Agricultural activities	0.006
15	Distribution of wildlife	0.022	34	Physical characteristics of soil	0.005
16	Tourists' votes / comments	0.022	35	Population	0.004
17	Density of vegetation	0.019	36	Chemical characteristics of soil	0.004
19	Support activities	0.016	37	Land usages	0.003

Figure (14) – weighting and prioritizing the sub-criteria for the purpose





4. Conclusion

Iran has the considerable extent of desert and semi-desert climate and development in these areas is inevitable. Requirement to the special management in the desert as a fragile ecosystem on the one hand and industrial development, water scarcity and droughts on the other hand, will increase the necessity of a comprehensive planning in these areas. Such planning would allow the researcher and decision maker knows the effects of pressures on the environment without awareness of the environment details . Using the criteria is a manner that now used in several studies. Fang and Wong also use several criteria to assess the tourism planning of marine park in Hong Kong (Fung &Wong, 2007). This study only for introducing the prioritization of selection criteria of ecotourism in desert and semi desert areas has been done and ecotourism criteria usages in other natural ecosystems and such as forests, mountains, steppe, islands, coastal and wetlands ecosystems need some independent investigation . Danehkar and Haddadiniya have weighted and prioritized the Nature-based tourism criteria in arid areas using the Delphi method and concluded that the sub-criteria of aesthetic appeals, social security, sensitivity of wildlife species, recreation sources, water source quality, infrastructure , local economic interests, cultural - historic resources And the amount of water source, are first ten priorities of planning (Danehkar and Haddadiniya, 1388).

Much proximity is seen among these priorities with the results of this study and can be said that some small differences are based on the differences between two studies and natural-tourism or ecotourism. Makhdoom know the ecological resource as the base of assessing the ecological capability and states that these resources are for usage in the intensive and extensive tourism.

In this model , land slope was in the first place of priority , soil and rock properties in second place and third place is for the geographical location. Water resources, vegetation and climate are the next category (Makhdoom, 1385).

In the criterion of physical properties of land ,land slope and direction of slope are in the first to third

priority places and sub criteria of distance from the sea , distance from the Urban Residential Centers and distance from the road are the first three priorities of the distances and privacies criteria. (Ardekani 2007 , Wenjun li , 2004).

In this study , soil properties were in in the lowest place . from the viewpoint of sub-criteria , also the social security , sensitivity of wildlife species , aesthetic appeals , outing sources , ups and downs , Environmental hazards, water quality , infrastructure , tourists' votes and habitat quality , were identified as top 10 priorities. (Sepasi , 2008. David B.Weaver 2007)

Mahmoodi for identifying the outing capability of Jungles in Lordegan city , believes that the climate and weather are the most important environmental factors affecting the outing and recreation and in the next step accessibility , availability and water resources quality , slope and its direction , jungle vegetation percentage , soil , outing attraction and landscape respectively have the most effect on the process of evaluating the outing capability.

Promenade demand and present land use have the determining role in the process of evaluating the promenade capability such that all the environmental conditions were affected by it . (Mahmoodi2008) . theses comparisons showed that despite the similarities and even equality of the used criteria in the different projects , due to the differences in the studied ecosystem , the different criteria were considered and used .

Criteria adaptation with regard to the ecosystem should be emphasized by various scholars. M. Makhdoom in the book of land logistics infrastructure explicitly refers to the application of ecological models to assess environment, Models mentioned for Iran a general guide and Depending on the location of the study , data identification and the use of land, it is necessary a special model for the issue of evaluation within the framework of Iran ecological models to be built (Makhdoom, 2006). Rykiel had also clearly mentioned that for the environmental assessment model , the model parameters and model structure and target, should carefully be considered (Rykiel, 1996).

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