

INVESTIGATING THE CHALLENGES OF BIODIVERSITY MANAGEMENT OF SEFIDKUH KHORAMABAD PROTECTED AREA BY USING THE DELPHI METHOD

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ABSTRACT

The main source of economic and agricultural development of all countries is natural resources. The dependency of local communities on natural resources and protected areas, and the excessive exploitation of forests and pastures and wildlife, has led to the destruction and degradation of biodiversity. The basis of managing protected areas in Iran is based on protection, research, training and entertaining, but in reality, protection is only limited to one fifth of these areas, which are safe. There is no management on the surrounding lands (the danger of islandization). Therefore, the purpose of this study is to identify and investigate the challenges of biodiversity management of Sefidkuh Khoramabad Protected Area by using Delphi method. This is a descriptive-analytic study. Thus, after identifying the available biodiversity and field visits and scale and were given to experts and specialists.

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The questions were answered by the experts and were analyzed by SPSS Software, the answers were prioritized by regression and descriptive analysis of existing threats and explained its relationship with four research variables (academic degree, familiarity with the region, job and employee of the organization). Then, this priority was organized as a questionnaire, and was given to the expert for final approval and identification of the main threats. Finally, some suggestions and recommendations are given.

Keywords: Biodiversity, Challenges, Protected Areas, Sefidkouh, Prioritization

1. INTRODUCTION

Protecting the environment for present and future generations to experience a healthy social life in it is considered as a public duty in Iran, thus, the economic and other activities that are lead to environmental pollution, or irretrievable degradation of natural resources is prohibited (Article 50 of the Constitution). Some parts of the country that have environmental aspects are determined as protected areas to preserve and protect the environment of the country with the help of law, in order to prevent the humankind from utilizing and exploiting these areas. These areas are governed by their own rules and regulations, which are defined in the framework of laws such as the Environmental Protection and Enforcement Act, the Hunting Act (Nejat, 2012).

Protected areas and national parks remained as the main centers of biodiversity in the world. Nowadays, with the increasing spread of contamination, excessive grazing of livestock, over-hunting and insecurity in wildlife habitats, the international community has been considering the creation of organs to protect these national and natural resources. Unfortunately, in Iran until now, the protected areas have not been able to adequately respond to these devastations due to the over-exploitation of the current era. Because these areas are managed as separate islands, and there are no specific conservation classifications based on the principles of classification of nature conservation and natural resources (Majnounian, 2003). In this regard, the region of Sefidkouh Khorramabad Protected Area as one of the most valuable habitats in the western part of the country faces various challenges and threats. If these threats are not systematically managed and controlled, this region, they will be destroyed and destructed like other habitats and natural resources of Lorestan province. We can observe better and growing situation and pristine

natural stability in this protected area only if these challenges and threats are managed and specific strategies and management solutions are applied to deal with these threats.

2. THEORETICAL FRAMEWORKS

Biodiversity

Biodiversity is the diversity of living organisms and ecological components and collections encompassing these creatures. Biodiversity includes all plant species, animals, microorganisms, ecosystems and ecological processes. Biodiversity is usually presented at three different levels: genetic variation, species diversity, ecosystem diversity (Salmas Mahini, 2009).

Protected area

The protected area is one of the four areas of Iran's environmental protection. The Environmental Protection Organization has defined the "Protected Area" as follows:

Large-scale, high-value lands that are selected to preserve and restore plant and animal habitats. Protected areas are an appropriate environment for conducting academic degree and environmental studies. Tourism activities and utilizing economic resources is allowed based on the areas of each region and based on the comprehensive management plan of the regions (Majnounian, 2000).

Threatening Factors of Protected Areas

- The conflict between extra livestock and wildlife
- The conflict between domestic and nomad livestock
- The conflict between legal and illegal ranchers
- The conflict between cutting trees and deforestation with the reduction of habitat values
- The conflict between the needs of local people for fuel (in dry and semi-dry areas) and the preservation of biological values
- The conflict between unauthorized hunting and conservation of wildlife diversity and density
- The conflict between the construction of high-access roads and the integration of areas
- The conflict between the establishment of unauthorized production units and the management of areas
- The conflict between exploiting mines by preserving the values of the regions
- The conflict between plant cleansing to convert land into farm and maintain the existence of areas

- The conflict between excessive exploitation of water resources and the drying wetlands with biodiversity (Majnounian, 2000)

Managing Protected Areas

A proper management and planning is required to achieve all objectives of protected areas and using their desirable multiple values. Managing and planning areas is not possible without guaranteeing the protection, deployment and continuous activity of control and monitoring agents, the main protection needs are:

- Efficient manpower
- Access and control factors
- Human resource deployment factors

Protected areas must be managed and organized, like any service center (academic degree, research, etc.), in order to provide their services. Unfortunately, multilateral operation management organization has not yet been conducted in areas and the planning is not based on the recognition of their capabilities. A variety of destructive human activities, the effects of development and unauthorized occupation are now facing these areas with threatening issues. Primary assessment of the areas in terms of different factors of control and monitoring shows that all areas are deficient in many aspects (Majnounian, 1999).

3. UNDERSTUDY REGION

The protected area of Sefidkough Khorramabad is located in Lorestan province with an area of about 70,000 hectares. It was first protected in 1968 as a prohibited hunting ground and then upgraded to the protected area in 1990. Sefidkough (Sefidkough) region has many mountains and peaks and it is mountainous. The highest altitude of the area is 3083 meters high and the lowest point is about 1060 meters in the western part of the region. The average rainfall is about 600 ml, and most of its precipitation occurs during the winter and the average annual temperature is around 11 ° C, with the Mediterranean climate. Sefidkough is one of the most valuable habitats in the western part of the country, with its special topography and rivers like Kashkan and Kakareza, which form the hydrographic network of the region, and the Kashkan River forms the drainage of the region. Sefidkough has 272 plant species and 138 animal species of wildlife. One of the most important plant species in the region is oak, Astragalus, wild cherry, wild pear, hawthorn, almond, and Fritillaria. These are the most important species of the region; wild goat,

leopard, brown bear, Iranian squirrel, wild cat, wolf, fox, vulture, Darya Partridge, Ordinary Partridge, golden eagle, spittoon tortoise (Tokem Consulting Engineers, 2002).

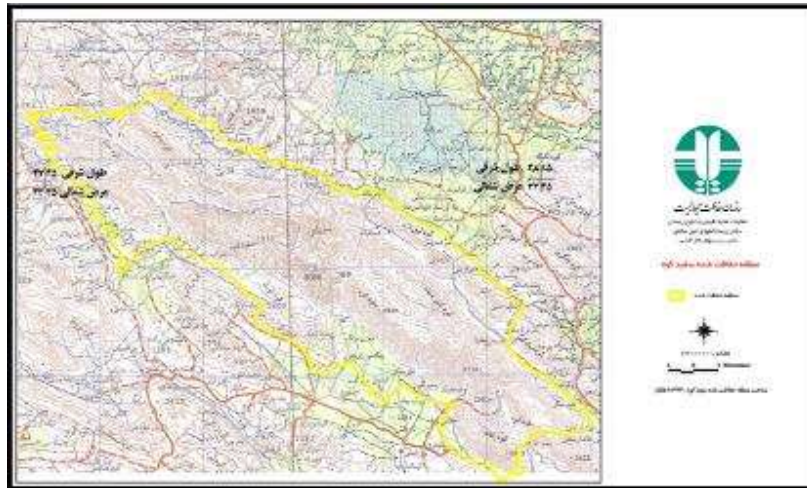


Fig.1. The map of Sefidkouh Khorramabad protected area

4- METHOD

The research method in term of objective is applied and, is a descriptive, analytical survey (Delphi method) in terms of collecting data. This research identifies the biodiversity and challenges and threats in the Sefidkouh Khorram protected area. Delphi method was used to design the questionnaires and then to distribute the questionnaire among the experts and analyze the results of the questionnaire using SPSS software to prioritize the threats by descriptive, inferential analysis.

A questionnaire was designed using a Likert scale with the help of experts and specialists in management and biodiversity and conservation areas after visiting the region and identifying the biodiversity of the area and challenges and threats in the Sefidkouh Khorramabad. Twenty questionnaires were given to the experts to respond. According to our respondents, we were able to prioritize the factors affecting the region's threat. This prioritization was done by SPSS software in two stages of descriptive analysis (frequency and histogram) and inferential analysis (regression). Friedman frequency analysis and regression of threats were prioritized. Then, we investigated the threats with 4 variables (academic degree and staffing, and job title and familiar with the environment) that according to experts had the greatest impact on the destruction of the

area, more than 90%, using inferential analysis regression. We examined and demonstrated how these four variables relate to this prioritization. The Likert scale is used for all analyzes in this research, I strongly agree with the five options of all questions from the option, to the exact opposite of numbers 1 to 5 (Strongly disagree 1, Disagree 2, neither agree nor disagree 3, Agree 4, Strongly agree 5) and all analyzes were performed with this scale.

5. FINDINGS AND DISCUSSION

Four variables of academic degree, an employee of the organization, a job title and familiarity with the region were used in this research. In term of academic degree, one had associate degree, 11 had bachelor's degree and 8 had post graduate studies. In organizational employee variable, 19 employees were the staff of organization, and one was not an employee. In the variable of the job title, 7 were experts in the natural environment, 7 were administrative experts, and 6 were experts in the human environment. In the variable of familiarity with the region, 5 knew it very well, 10 are quite familiar, 4 were a little familiar and one with almost no familiarity.

Questionnaire Analysis

We were able to prioritize the threats of biodiversity of the Sefidkouh protected area and the percentage of the impact of each factor according to the respondents' questions and answers. Each question was prioritized based on its percent. In the table below, we analyzed 20 questionnaires containing 27 questions or the threat factors, separately and based on the Likert scale. And according to the statistics of this table, for example, Question 2, with 9 people who strongly agree and 11 agree and with 100% of all experts agree is one of the main threats to the region. Table 1, shows the analysis of the questionnaire.

Table 1. Analyzing the questionnaire

Question Number	Strongly agree Number-percent	Agree Number-percent	No idea Number-percent	Disagree Number-percent	Strongly disagree Number-percent	Total Number-percent
1	6-30	13-65	-	-	1-5	20-100
2	9-45	11-55	-	-	-	20-100
3	11-55	7-35	-	2-10	-	20-100
4	11-55	6-30	1-5	2-10	-	20-100
5	10-50	9-45	1-5	-	-	20-100
6	3-15	3-15	5-25	9-45	-	20-100
7	11-55	7-35	2-10	-	-	20-100
8	14-70	4-20	1-5	1-5	-	20-100
9	9-45	9-45	-	2-10	-	20-100
10	12-60	5-25	1-5	2-10	-	20-100
11	6-30	6-30	-	8-40	-	20-100
12	12-60	6-30	1-5	1-5	-	20-100
13	12-60	7-35	1-5	-	-	20-100
14	12-60	7-35	-	1-5	-	20-100
15	12-60	5-25	3-15	-	-	20-100
16	8-40	11-55	1-5	-	-	20-100
17	11-55	8-40	-	1-5	-	20-100
18	9-45	11-55	-	-	-	20-100
19	6-30	10-50	3-15	1-5	-	20-100
20	7-35	4-20	4-20	4-20	1-5	20-100
21	8-40	7-35	3-15	2-10	-	20-100
22	5-25	3-15	1-5	11-55	-	20-100
23	9-45	9-45	1-5	1-5	-	20-100
24	7-35	11-55	2-10	-	-	20-100
25	10-50	10-50	-	-	-	20-100
26	7-35	8-40	-	5-25	-	20-100
27	7-35	6-30	2-10	4-20	1-5	20-100

According to the results of the questionnaire and the statistics obtained from SPSS analysis in the region, the results are presented in table (2).

Table 2. Prioritizing the threats based on the percentage of expert approvals

First priority	1. Failure to implement a comprehensive management plan in the region
	2. Subsequent droughts
	3. The existence of rock mines in the area
Second priority	4. The lack of conservation objectives in the area
	5. Lack of coordination between economic development and environmental protection programs in the region.
	6- Converting forest into farm
	7. Lack of enough park rangers
	8- Dust and fine particles
	9. Occasional Fire in the area
Third priority	10. Management weakness in the participation of local people
	11. Absence of sufficient equipment in preservation and many villages in the region
	12. Destruction of national and natural resources and constructing roads
	13. Inadequate and unprofessional punishment
	14. Overgrazing in the area
	15. Relying park rangers on local reports
	16. Constructing communicative roads
Fourth priority	17. Non-cooperation between decision-making government agencies
	18. The absence of special environmental judiciary courts and the lack of consideration of high environmental values by judges.
	19. Longitude of the area
Fifth priority	20. Traveling Nomads
Sixth priority	21. Failure to support park rangers by judges
	22. The absence of artificial water ponds in the area

Therefore, according to Table (2), it can be said that 22 threatening factors out of the 27 mentioned factors in the questionnaire exceeded 75% of the experts' agreement with their threats in the region, accounting for about 82% of the total factors and challenges proposed in the questionnaire. Among the other priorities, with the exception of the two top priorities, it was more than 50% of the experts' agreement, indicating that 93% of the experts agreed with the threats identified in the region as threats. Given this conclusion, it can be said that there is no significant difference in research hypothesis (is there a significant difference between the primary threat factors identified by the researcher and the factors that the experts agree or strongly agree?).

Table 3 shows the correlation between the research variables (academic degree, organization employee, familiarity with the region and the job of respondents to the questionnaire) with factors that exceed 95% of the experts' consent with their threats in the region (first and second priorities). After analyzing, it was determined that the job title had a good and strong correlation coefficient with priorities, that is, the job title had a significant relationship with prioritization and was effective in determining these priorities and then, in order of familiarity with region was an employee of the organization and, ultimately, an effective academic degree.

Table 3. Correlation of the relationship between the threats of biodiversity above 90% of the threat agreement with 4 dependent variables

Question Number	Degree	Official job	Job	Knowing the region	Total
1	0/512	0/240	0/185	0/554	1/491
2	0/126	0/454	0/637	0/395	1/612
5	0/230	0/436	0/532	0/348	1/546
13	0/222	0/375	0/514	0/365	1/474
14	0/159	0/255	0/526	0/491	1/431
16	0/265	0/361	0/184	0/138	0/852
17	0/414	0/387	0/211	0/291	1/303
18	0/370	0/436	0/632	0/422	1/86
25	0/187	0/329	0/442	0/152	1/110
Mean of columns	0/276	0/363	0/429	0/350	

If the correlation coefficient is between 0 and 0.50, the correlation is weak, if it is between 0.50 and 1, the correlation is strong. If the correlation coefficient is equal to one, it is completely correlated and if the correlation is zero, then there is no correlation, and if the correlation coefficient is negative, there is a reverse inversion.

The relationship between the priority of the biodiversity threats of the Khorramabad Sefidkouh region and the dependent variables (here as the sample tables on the relationship between questions of two questionnaires and the variable of the title of the job have been presented) is mentioned in the following three ways: correlation table (4), statistic table (5), and linear regression model table (6). Similarly, for all the factors of this relationship, the following three methods have been performed. Finally, in this test, it was determined that the title of the job had the greatest impact and relationship With prioritization, and then, respectively, familiar with the region, an employee of the organization and academic degree have been effective.

Table 4. Correlation table of question 2 with job variable

Type	Correlation	Determining factor	Adjusted Determining Factor	Estimated criterion error
1	0/637	0/231	0/246	1/17637

In correlation table, the correlation value of question 2 with job title is equal to 0.637. The value of determining factor is 0.231 and the adjusted determining factor is 0.241.

This table generally shows the effects of dependent variable on independent variable. In question 2, the job title variable indicates how job variable (dependent variable) of the respondents has affected the choice of question 2 as one of the main threats to the destruction of the region (independent variable). This table expresses this relation with respect to the correlation degree and determining factor.

Table 5. The relationship table between job title variable with question 2 of ANOVA Table

Type	Sum	DF	Mean	F-statistic	Sig Level
Control group changes	5/891	1	5/891	4/257	0/045
Error group changes	24/909	18	1/384		
Sum	30/800	19			

ANOVA table

In this table, we have determined the amount of treatment or regression and error or residual.

(Squats of treatment) sst in this table= 5.891 ⇒ Degree of freedom = 1df

(square error) SSE = 24.909 ⇒ 18

SST (total) = 6.550 ⇒ 19 F- statistic = 4.257

mst (mean squat treatment) = 5.891

msE (mean squat error) = 1.384

And the F-statistic (1.18) is equal to 4.3807, that is, the critical test area is equal to

$F > F(1, 18) \Rightarrow 4.257 > 4.3807$

Since it is not bigger then the hypothesis is not rejected, i.e. the job title variable has been effective in prioritizing threats.

Also, through the level of significance, as it is closer to (0/005), therefore, the hypothesis is confirmed and the job title variable in determining question 2 has been affected as one of the threats of the region.

Table 6. Relationship between the job title and question 2 through the linear regression model

Variable	Non-standardized factor	Standard deviation	Standardized factor	t-statistic	Sig level
Fixed value	0/909	0/861		1/056	0/005
Independent variable coefficient (X2)	1/091	0/529	0/637	2/063	0/045

The purpose of regression is to predict the value of a dependent variable from the values of the variable or independent variables.

In this table, we fit the second column (non-standardized coefficient) using the method $\hat{y}_i = 3.303 + 0.30 x_i$. The third column shows the standard deviation (std. error), the column 4, the amount of beta (the standardized coefficient), the value close to one is better. The next column shows the value of t-statistic, which is obtained by dividing the values of the second column into the third column (STD.ERROR). In the last column, the SIG column (P-VALUE) or the meaningful level shows a value: the smallest value of the alpha (test level) that denies the zero hypothesis is the value of P-VALUE. The alpha value is equal to 0.05, where the alpha value is greater than the SIG value of (P-VALUE). The hypothesis is rejected, and if not more, the hypothesis is not rejected.

The rejection of the hypothesis shows that the fitted regression model is appropriate, and if the hypothesis is not rejected, it indicates that the model is not suitable.

In this table, we have fitted the regression model according to the second column. In this table, we fit the regression model between two independent variables (question 2) and a dependent (job title), and express the created relationship through the regression between the two variables (we show that the job title is determined by the definition Question 2 is effective as one of the main threats). Each of these two variables is higher than beta, meaningful, and by showing the regression diagram, we show the relation between the dependent variable and the independent one.

The same effects and the relationship between priorities and variables are expressed through the normal regression diagram and the point graph (distribution diagram) of figure (2), which revealed that the job title had the most relationship and impact. Then familiarity with the area, the organization employee and academic degree have been effective in prioritizing, respectively. In these charts, the less data with deviation than the regression line, it shows that there is a meaningful relationship between the job title. Thus, we conclude that the job title of respondent experts has the greatest impact on prioritizing threats, and the level of academic degree of respondents to prioritize threats has the least impact.

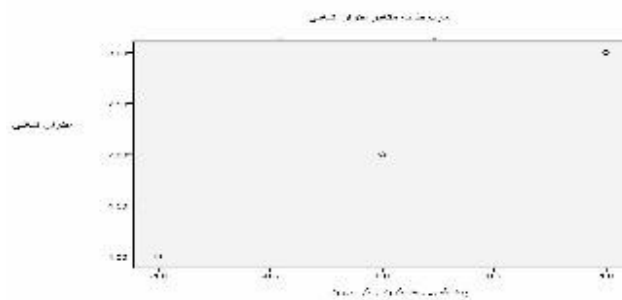


Fig.2. Spot diagram (distribution) of job title variable with prioritization of threats

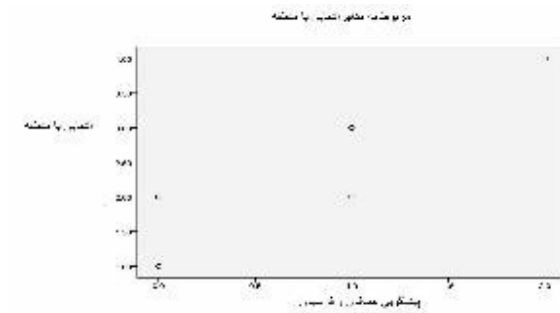


Fig.3. Spot diagram (distribution) of region familiarity variable with prioritization of threats

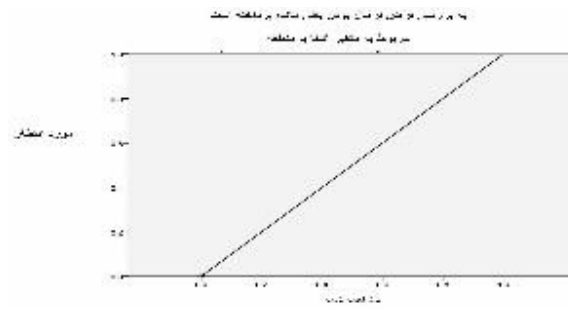


Fig.4. Regression diagram of the region familiarity variable with the prioritization of threats

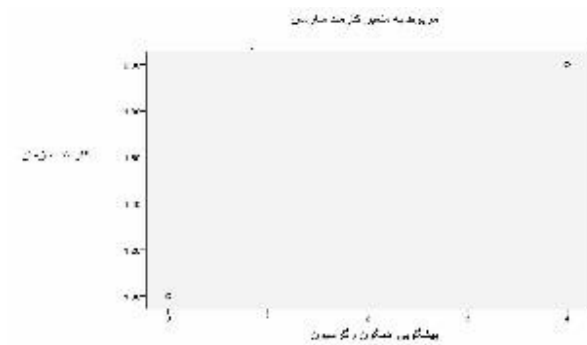


Fig.5. Spot diagram (distribution) organizational employee variable with prioritization of threats

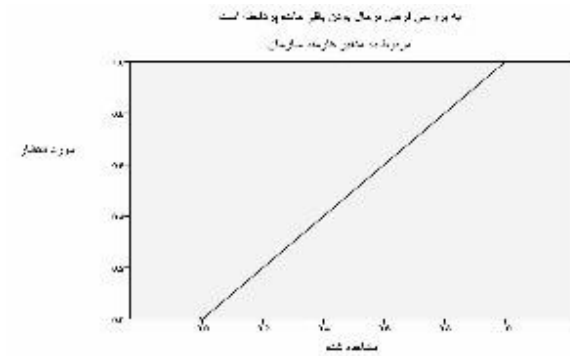


Fig.6. Regression diagram of organizational employee variable with prioritization of threats

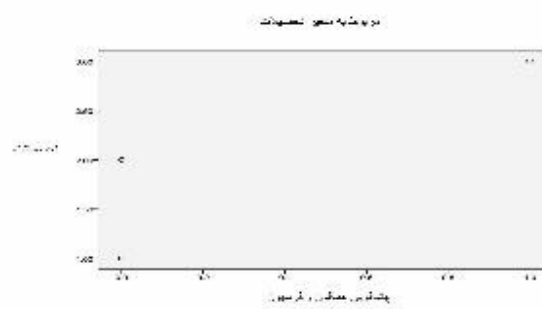


Fig.7. Spot diagram (Spread) Academic degree variable with prioritization of threats

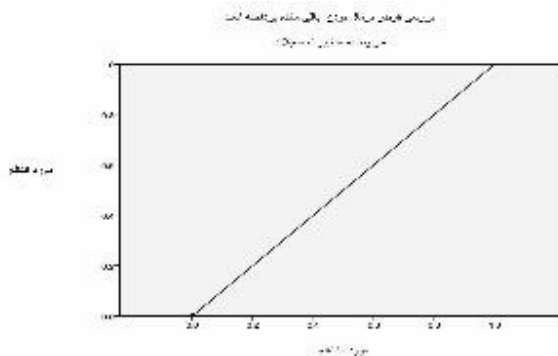


Fig.8. Normal regression diagram of academic degree variable with prioritization of threats

6. CONCLUSION

In terms of objective, this applied research identifies and resolves the management problems of Sefidkouh Khorramabad Protected Area. It is a simple, but at the same time accurate, research to recognize the environmental management issues and improve the quality and management of the environment in all sectors. It can be a unique and special domestic pattern to use by researchers, students, organizations, and departments to identify managerial issues, and thus provide basic strategies to cover existing threats, and better management to improve environmental ideals.

Finally, we identified and prioritized the factors affecting biodiversity threat in the Sefidkouh region and identified the impact of factors such as academic degree, employee, job title and familiarity with the region on prioritizing, so that we can measure the impact of these factors on identifying regional threats and evaluate the obtained results of this study. Therefore, according to the assumption of the research, (there is no significant difference between the primary threat factors identified by the researcher with which the experts agree or strongly agree), according to the agreement of over 93% of the experts with the initial threats identified by the researcher as a threat. There can be no significant difference in the region; therefore, the research hypothesis was confirmed. Then, the threats in the region were prioritized according to the percentage of expert approvals based on the source of the threats, namely, managerial, human, and naturalness of the research (Table 7). Eventually, we reached our objective of identifying the threats of biodiversity in the protected area of the Sefidkouh based on descriptive, analytical and field and library studies.

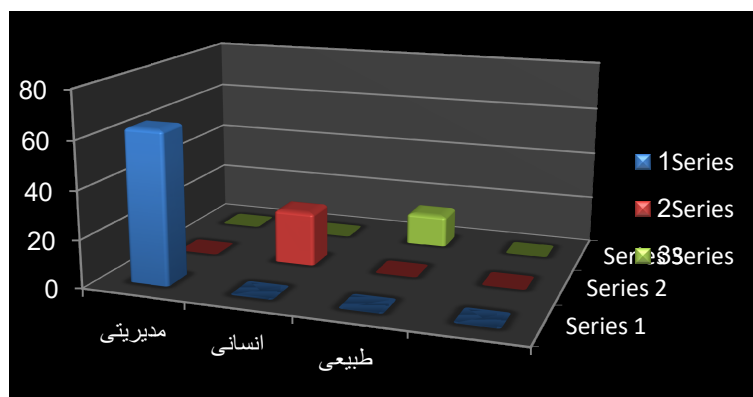


Fig.9. Prioritization of threats based on the source

Table 7. Prioritizing the most important threats based on the source - management, human and natural threat

Origin of threat	Type of threat
Management	1. Failure to implement a comprehensive management plan in the region
	2- The existence of rock mines in the region
	3. The lack of conservation objectives in the area
	4. Lack of coordination between economic development and environmental protection programs in the region.
	5. Lack of enough park rangers
	6. Management weakness in the participation of local people
	7- Absence of sufficient equipment in preservation and many villages in the region
	8. Inadequate and unprofessional punishment
	9. Relying park rangers on local reports
	10. Constructing communicative roads
	11. Noncooperation between decision makers
	12. The absence of special environmental judiciary courts and the lack of consideration of high environmental values by judges.
	13. Failure to support park rangers by judges
	14. The absence of artificial water ponds in the area
Natural	15. Subsequent droughts
	16. Thin rounded
	17. Longitude of the area
Human	18. Converting forest to agricultural land
	19. Fire in the area
	20. Overgrazing in the area

	21- Traveling the Nomads
	22. Destruction of national and natural resources and constructing roads

7. RECOMMENDATIONS

1. Proposing development and protection in vulnerable and fragile habitats that are difficult to reverse and repair.
- 2- Implementing the planning process that identifies all physical, biological, economic, social and cultural resources of the region, and determines the characteristics, function, values and capabilities of each sector, based on its management plan and its objectives, each one is assigned a special use. The realization of multilateral use only depends on designing and equipping the region from a variety of aspects based on the results of the design process.
- 3- Implementing the zoning, which is one of the main sections of the design basis, is part of the development phase of the planning process.
4. Establishing legal and juridical grounds through the adoption of comprehensive and laws as a support for the conservation and enhancement of protected areas.
5. Popular participation in regional management and the development of an open system of protection and access to environmental information for citizens and natives of the region.
6. Identification, reproduction, protection and cultivation of important, endemic and vulnerable species.
7. Establishing a balance between livestock and pasture through the establishment of livestock centers and settling the ranchers and determining the pasture capacity
8. To equip and strengthen the park rangers for the full protection and control of the area and the establishment of environmental protecting centers
9. Implementing of nomadic settlement programs in terms of socio-economic problems and environmental regulations.
10. Complete implementation of animal husbandry laws in cooperation with the Nomad Affairs, Agriculture Jihad, Natural Resources, Environment and Provinces.

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