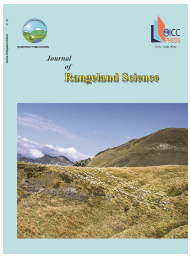

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Prioritizing impact of economic, social and ecological factors on sustainable range management (Case study: semi-arid rangelands of Kerman Province, Iran)

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Abstract:
Economic, social, and ecological factors in rangelands affect range management. By integrating and studying these factors, a more appropriate method can be applied to assess the sustainability of rangelands. In the present study, Analytical Hierarchy Process (AHP) as well as the experiences and views of rangeland exploiters and nomadic and natural resources experts in Kerman province were used to compare and prioritize the economic, social, and ecological factors affecting sustainable range management in semi-arid rangelands of Kerman province in 2017. Then, the means comparisons were made between priorities of rangeland exploiters and experts. Using AHP weight data, our results showed that ecological capital had the most impact of 0.71 and 0.61 from the viewpoints of rangeland exploiters and experts, on sustainable range management in the study area, and the two other factors including economic ones with 0.17 and 0.19 and social ones with 0.09 and 0.19 capital were ranked, respectively. Furthermore, according to the results of comparing the views of rangeland exploiters and experts, significant differences were found between the views of the two mentioned groups for 14 indicators including plant species diversity, soil erosion, groundwater, unity and solidarity at the range allotment level, trusting the experts and promoters, the presence of people in decision making and planning, the presence and role of women in livestock and non-livestock products, living cost, and livestock number. Overall, the results indicate the inconsistency between the views of these two groups. Therefore, prior to policy making for sustainable range management, more consistency is required between the views of rangeland exploiters and experts in each of the related organizations for greater participation of range managers.

Keywords: Rangeland exploiters; AHP; Erosion; Species diversity; Under ground water

1. Introduction

Rangelands are considered as one of the main sources of life for economic, social and environmental development. Rangeland preservation, rehabilitation, and improvement provide an important part of the livestock forage and play a key role in preserving the country's water and soil and ecosystem sustainability [1]. The determinant role of these resources in the economic and social system is to provide an environmental basis and prevent the occurrence of major changes in various ecosystems, ultimately leading to the creation of a safe environment for living organisms including human beings [2]. Unfortunately, over harvesting surplus on the capacity of rangelands, which results from an increase in the number of livestock and rangeland exploiters as well as early grazing, shrub cutting, and converting rangelands to low-productive dry land farming system regardless of the ecological capabilities of rangelands have all caused

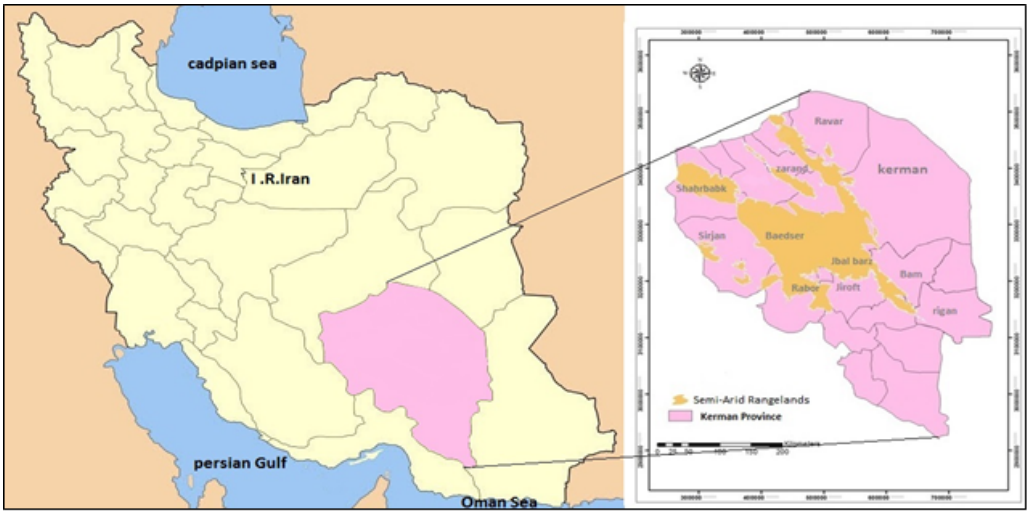

Figure 1. Geographical map of semi-arid rangelands of Kerman province.

the reduced vegetation and subsequently reduced forage production. Thus, in the last few decades, the area of rangelands and vegetation cover has undergone a lot of changes. This has proven the necessity of implementing a principal management in rangelands in line with sustainable development more than ever [3–6].

Achieving sustainable production in rangelands is not possible without grazing management and scientific exploitation [7]. Sustainable range management is defined as the establishment of a balance between livestock, forage, and other inputs with the land, human, and financial resources so that the optimum use of all resources is achieved without damage to vegetation and soil [8]. On the other hand, for proper management and rangeland conservation as well as sustainable exploitation, the government assigns rangelands to the beneficiaries in the form of range management plans. Currently, implantation of range management plans is one of the strategies to prevent rangeland degradation and improve its potential to achieve sustainability [9]. A range management plan (RMP) is compiled for rangeland restoration and improvement to be implemented by rangeland exploiters, in which the exploitation method is presented [10]. Rangeland exploitation pattern indicates the method of range management through range management plans provided to the rangeland exploiters. The socio economic factors of Utilizers often affect rangeland management [11]. Since human factor is one of the most important parameters of rangeland degradation or restoration, people's participation can socially play an important role in preventing the increasing degradation of natural resources as well as conservation and restoration of the country's rangelands to achieve a sustainable range management. Tanaka et al. stated that social acceptance of a new plan or program in rangeland management should be considered as a key objective [12]. Furthermore, economic criteria need be integrated with social, cultural and ecological indicators in order to achieve the methods more suitable to assess the sustainability of rangelands. In another study, Bosworth, and Atterton showed that social, economic and environmental factors are interconnected in rural areas [13]. In this regard, local business in rural areas can bring a significant amount of money to these areas and improve the environmental landscape and business prosperity. In the present study, Analytical Hierarchy Process (AHP) as well as the experiences and views of rangeland exploiters and experts were used to prioritize the economic, social, and ecological factors affecting sustainable range management in Kerman province, Iran.

2. Materials and methods

2.1 The study area

Kerman province is located in southeastern Iran with an area of 180,725 square kilometers, lying between northern latitudes 26°29′ and 59°24′, and eastern longitudes 53°26′ and 59°29′. The present research was conducted in the semi-arid rangelands of this province. The average slope of the study area is 6.10%, the maximum and minimum altitude is 820 and 2280 meters above sea level, respectively, and the average rainfall is 170 mm. The utilization method was collective and council, and the Raini goat breed is the dominant grazing livestock in the study area. However, other breeds of livestock including Baluchi goat breed and Kermani sheep breed are found in the study area. The Image below shows the geographical location of the study site (Semi-arid rangelands, Kerman, Figure 1).

2.2 Research method

In this research, to prioritize the impact of economic, social and ecological factors on sustainable range management, the AHP method, introduced by Saaty, was applied [14]. The process of hierarchical analysis can be used when decision-making is faced with several competing options and decision criteria. The criteria can be quantitative or qualitative. This decision making method is based on paired comparisons. The decision maker begins with the process of bringing the hierarchical tree to the decision. The hierarchy decision tree represents the comparison factors and competing options evaluated in the decision. Then, a series of paired comparisons were made. These comparisons show the weight of each of the factors in line with the competing

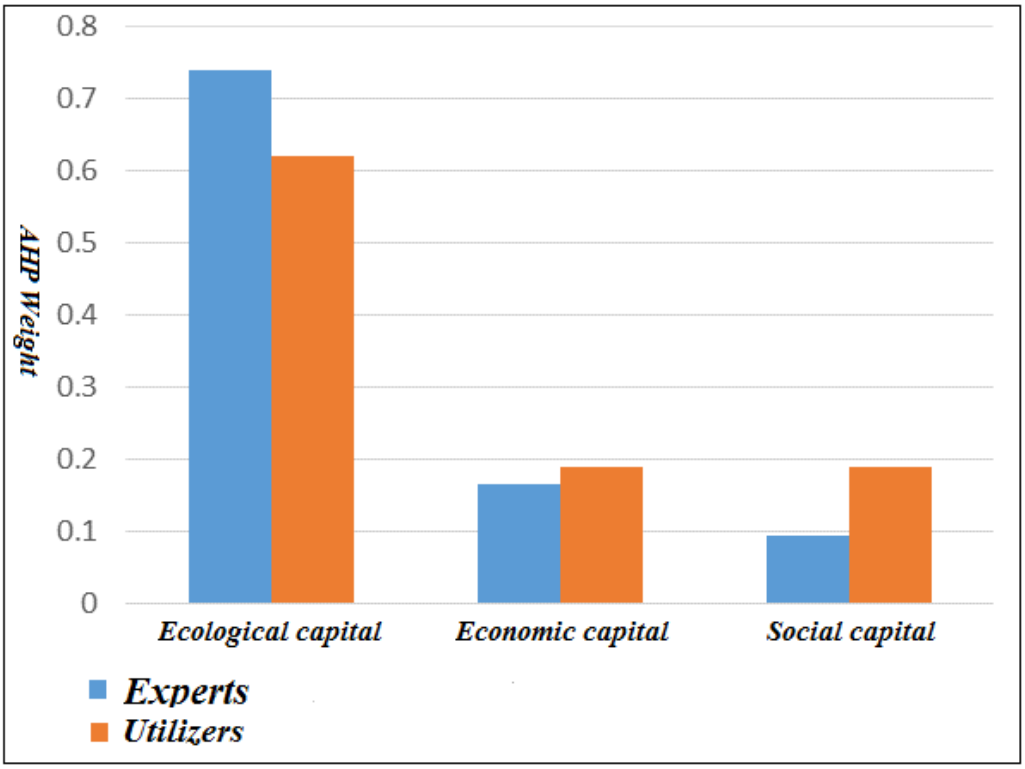

Figure 2. Comparison of priorities for the criteria of sustainable livelihoods from the viewpoint of Utilizers and experts.

options evaluated in the decision. Finally, the logic of the AHP combines the matrices derived from paired comparisons in such a way that the optimal decision is made [15]. The following four principles described by Saaty are the principles of AHP [14]:

a) The principle of inverse condition or the mutual conditions principle:

If the element A is preferred to element B with a priority value of n, the element B preference to A will be equal to the inverse of such a preference. b) Principle of Homogeneity: the element A must be homogenous and comparable with the element B.

In other words, the preference of element A to element B cannot be infinite or zero.

c) Dependency: each hierarchy element can be related to its higher element and this dependency can be continued up to the highest level.

d) Expectations: whenever any change occurs in the hierarchy structure, evaluation process should be done again.

2.3 Data collection and analysis

The exploiters of semi-arid rangelands of Kerman province with a population of about 11,700, of these, 136 rangeland exploiters were selected as samples using the Cochran formula.

The experts of the Natural Resources and Nomads Offices of Kerman province completed the questionnaire using the census method (due to the low number of experts specializing in the field of research). The number of these experts was 31 people.

The research tool was a questionnaire and a direct interview with the Utilizers and experts. To prioritize the impact of economic, social and ecological factors on sustainable range management, the expert Choice 11 software was applied. To predict variations of the dependent variable (sustainable rangeland) through three independent variables (economic, social and ecological factors) and determining the contribution of each of them, the Multiple Regression Analysis (enter method) was used. The SPSS-20 software was used for statistical analysis.

3. Results

3.1 Respondent characteristics

The socioeconomic characteristics of selected nomads including age, number of livestock and income are presented in Table 1. The average age of respondents was 51.1 years old. The minimum and maximum number of livestock in the region was 30 and 300 animal units (including goats and sheep). The average annual income of nomads is equal to 720.4$ (Study of 2019).

Frequency distribution of rangeland exploiters and experst gender, education and age is presented in Table 2. About 5.89% of the respondents were female and the rest were male. In terms of education, 35.29% of rangeland exploiters were illiterate, and only 16.66% had university education. The age of 32.3% of respondents was less than 35 years old, 41.9% were 35 to 45 years old, and 25.8% of respondents were over the age of 45 years. In addition, the results of this research show that 16.1% of respondents were bachelor degree holders, but about 67.7% of respondents had M.Sc. degrees or higher education, of which 16.1% of respondents are Ph.D. graduates (Table 2).

Table 1. Socioeconomic characteristics of the study rangeland exploiters.

Variables	Minimum	Maximum	Average	STD	Distribution coefficient
Age of respondents (year)	29	78	51.1	11.6	0.2
Number of livestock (animal unit)	30	300	106.1	32.8	0.3
Annual income from livestock breeding ($)	60	600	720.4	60.5	0.3

3.2 Factors prioritizing on sustainable range management

The results of the comparison of three economic, social and ecological factors on sustainable range management in semi-arid nomadic regions of Kerman province from the viewpoints of rangeland exploiters and experts of departments of natural resources and watershed management are presented in Table 3. Results showed that ecological capital had the most impact from the viewpoints of rangeland exploiters and experts on sustainable range management in study area, and the two other factors including economic and social capital were ranked in the following order, respectively (Table 3).

3.3 Paired comparison of prioritizing economic, social and ecological factors

The results of the effects of three economic, social and ecological factors on sustainable range management are prioritized and compared. The inconsistency coefficient for both groups was equal to 0.001. According to the viewpoints of rangeland exploiters and experts, the ecological factor had the most impact on sustainable range management in this region (Fig. 2).

3.4 Prioritization of economic, social and ecological factors

The prioritization and comparison of economic, social and ecological factors from the viewpoint of Utilizers and experts are presented in Table 4. From the viewpoint of experts in the ecological capital section, the two criteria including soil erosion and ground water had the highest impact on sustainable range management in the study area while the lowest impact was recorded for the two indicators of environmental pollution and plant species diversity. In addition, for the social capital, the highest impact was recorded for the presence of people in decision making and planning with an AHP weight of 0.231 and unity and solidity at range allotment with an AHP weight of 0.226 while the presence and role of women in producing livestock and non-livestock products with an AHP weight of 0.016, and education and extension services with an AHP weight of 0.044 had the lowest impact. The results of prioritizing the economic capital from the viewpoint of experts indicate that the two criteria, living cost and livestock breeding cost, had the most impact on sustainable range management in the study area while rangeland and livestock insurance and livestock number had the lowest impact.

Table 2. Frequency distribution of rangeland exploiters and experst gender, education and ages.

Variables	Classification	Number	Percentage
Gender of rangeland exploiters	Male	128	94.1
	Female	8	5.8
Rangeland exploiters Education	Illiterate	48	35.2
	Elementary	13	9.5
	Middle and high school	31	24.6
	Diploma	23	18.2
	Higher education	21	16.6
Expert Age	Less than 35 years old	10	32.3
	Between 35-45	13	41.9
	More than 45 years	8	25.8
Experts Education level	B.Sc.	5	16.1
	M.Sc.	21	67.7
	Ph.D.	5	16.1

Table 3. Comparison of three economic, social and ecological factors from the viewpoint of rangeland exploiters and experts.

Comparison betweeb factors	rangeland exploiters		Experts		Mode
	Compliants%	Dissident%	Compliants%	Dissident%	
Ecological capital vs. social capital	77.7	22.3	83.3	16.7	5
Ecological capital vs.financial and economic capital	77.7	22.3	83.3	16.7	5
Financial and economic capital vs.social capital	50.0	50.0	72.1	27.9	2

As shown in Table 4, from the viewpoint of rangeland exploiters in the ecological capital sector; the two criteria of forage production and ground water had the most impact on sustainable range management in the study area while the lowest impact was recorded for soil erosion. In the social capital sector, the two criteria including the presence and role of women in producing livestock and non-livestock products and the unity and solidity at range allotment had the most impact while the lowest impact was recorded for the awareness level of rangeland reclamation and improvement and education and extension services. According to the results of prioritizing the economic capital criteria from the viewpoint of Utilizers, it was shown that the youth employment level in the livestock breeding and the income from livestock products had the most impact on the sustainable range management in the study area.

In the next section, the viewpoints of rangeland Utilizers and experts about the effects of three economic, social and ecological factors on sustainable range management in the study area had been compared. The results of T-test showed that there was no significant difference between the two groups in the ecological capital for environmental pollution while significant differences were found for the other criteria. Moreover, significant differences were observed for the four social capital criteria including unity and solidarity at range allotment, trusting experts and promoters, the presence of people in decision-making and planning, and the presence and role of women in the production of livestock and non-livestock products between the viewpoints of rangeland exploiters and experts. The youth employment level in the livestock breeding sector, income from production of non-livestock products, income from tourism, living cost, and the number of livestock are the five economic capital criteria, showing significant differences between the viewpoints of rangeland exploiters and experts (Table 4).

3.5 Regression analysis

Multiple linear regression (MLR) analyses was made between sustainable rangeland as the dependent variable (Y) and three economic, social and ecological factors as independent variables separately for rangeland Utilizers and experts (Table 5). The coefficient of determination (R^2) indicates the correlation between the dependent variable and predicted value from the regression model was significantly high (R^2=100%).

The result obtained from rangeland exploiters indicated all three independent variables (economic, social and ecological) were effective sustainable rangeland. The economic variable had a greater effect on rangeland improvement ($b2 = 0.69$) than that for economic and ecological variables. According to the estimation of standardized regression coefficient, with one unit of increase in ecological variables, the probability of rangeland will increase by 0.69 units.

According to the results of the expert view, it was found that ecological variable had greater impact on rangeland sustainability than to economic and social variables ($b2 = 0.69$), indicating that by one unit increase in ecological indicators, the rangeland improvement will be increased by 0.67 units (Table 5).

4. Discussion

Despite the expansion of the concepts of sustainable range management in recent years, achieving its real condition is considered as a challenge, especially in nomadic areas. In this case, the use of new approaches to solve these complex problems is important. Methods based on group decision-making can be used as a new method of decision making. Because in addition to considering and evaluating different criteria, these methods use the knowledge and skills of experts as well as indigenous knowledge of local people as a management dimension of the issue in the decision-making process. Multi-criteria decision-making methods have found significant applications since they represent human behavior and are able to take into account the conditions of the qualitative and quantitative variables of the problem (issue) simultaneously [16]. The efficiency of AHP in solving the complex management problems of natural resources has been proved by several researchers [7, 17–20].

Regarding the comparison and prioritization of three economic, social and ecological factors on sustainable range management of the study area, the ecological factor was in the top priority from the perspective of rangeland exploiters and experts. This result shows that ecological components and socio economic issues should receive more attention for sustainable range management.

From the perspective of experts in ecological capital, two indicators of soil erosion and underground water have the most effect on sustainable range management in nomadic areas. Experts believe that in the study area, due to the severe climatic conditions and droughts of the past years, ground water and soil will play a very important role in sustainable range management due to direct impact on forage quantity and quality. In the social capital section, experts believe that the presence of people in decision making and planning has the most impact on sustainable

Table 4. Comparison and prioritization of economic, social and ecological factors between Experts of departments of natural resources and watershed management and Rangeland exploiters.
(Index= Inconsistency coefficient)

Criteria / Sub criteria	Rangeland exploiters			Experts			P	T
	Index *	AHP weight	Priority	Index *	AHP weight	Priority	Value	Value
Ecological capital								
Environmental pollution	0.01	0.068	4	0.04	0.035	6	0.40	0.81
Plant species diversity		0.129	3		0.068	5	0.001	8.94
Soil erosion		0.035	6		0.167	2	0.001	22.91
Groundwater		0.297	2		0.403	1	0.001	29.12
Rangeland quality (forage palatability)		0.068	4		0.165	3	0.001	12.84
Rangeland quantity (forage production)		0.403	1		0.165	3	0.001	52.32
Social capital								
Level of awareness of rangeland reclamation and improvement	0.03	0.029	9	0.02	0.048	6	0.18	1.59
Unity and solidarity at range allotment		0.171	2		0.226	2	0.04	2.81
Trusting experts and promoters		0.066	5		0.111	4	0.001	22.13
The presence of people in decision-making and planning		0.081	4		0.231	1	0.001	69.3
Participation in the implementing range management plans		0.061	6		0.048	6	0.43	0.88
Participation in the implementation of watershed management projects		0.061	6		0.051	5	0.38	0.98
Nomad's trust in each other		0.162	3		0.225	3	0.2	1.51
The presence and role of women in the production of livestock and non-livestock products		0.328	1		0.016	9	0.001	74.73
Education and extension services		0.328	8		0.044	8	0.38	0.98
Economic capital								
The youth employment level in the livestock breeding sector	0.02	0.24	1	0.04	0.054	6	0.001	22
Income from production of livestock products		0.189	2		0.164	3	0.48	0.89
Income from production of non-livestock products		0.049	7		0.101	4	0.02	3.53
Income from tourism		0.059	6		0.101	4	0.03	3.01
Livestock breeding costs		0.103	5		0.183	2	0.44	0.85
Living cost		0.187	3		0.331	1	0.001	20.57
Bank facilities		0.025	8		0.032	7	0.84	0.25
Rangelands and livestock insurance		0.016	9		0.013	9	0.89	0.21
Number of livestock		0.132	4		0.02	8	0.001	29.5

range management because of increased participation (contribution) and motivation among them. Moreover, the results of comparing and prioritizing financial and economic capital indicators also indicate that living cost and livestock activities have the most impact on sustainable range management. According to experts, due to the current inflation of goods and livestock inputs, this can be a serious limiting factor for sustainable range management and spiritual and financial contribution. This section of the result corresponds to the findings reported by Saeidi Goraghani (2017), Raufi Rad (2017), and Azadi et al. (2009) stating that attention to the economic issues of Utilizers is the most important factor in rangeland sustainability [1,5,7]. Furthermore, it is necessary to reduce the cost of living and increase the income of beneficiaries by utilizing the technology.

From the point of view of Utilizers in the ecological capital, the comparison of prioritization of indicators shows that the groundwater and vegetation cover affect sustainable range management. It seems that in this regard, Utilizers like experts believe that the climatic factors of the region are the main factors limiting the sustainable range management due to the reduction of water and vegetation cover percent. According to the results of prioritization of the social capital indicators from the viewpoint of beneficiaries, the presence and role of women in producing livestock products had the most impact on improving the implementation conditions of sustainable range management in these regions. This could be attributed to the improved economic conditions of beneficiaries and reduced need of human resources outside the family. This result was in agreement with the studies conducted by Ghasemi [2] and Azadi et al. [3] stating that attention to the beneficiaries' social issues affect sustainable range management. Among the economic

Table 5. Standardized regression coefficients (b1, b2 and b3) between sustainable rangeland as the dependent variable (Y) and three economic, social and ecological factors as independent variables.

Groups	Variables	Standardized β	R^2	P values	MLR Equation
Rangeland exploiters	X1= Ecological capital	0.48			
	X2= Economic capital	0.69	100	0.001	Y=0.48X1+0.69X2+0.39X3
	X3=Social capital	0.39			
Experts	X1= Ecological capital	0.67			
	X2= Economic capital	0.44	100	0.001	Y=0.67X1+0.44X2+0.43X3
	X3=Social capital	0.43			

capital indicators, youth employment level and income from livestock production had the most impact. It seems that as the youth employment level and income in these areas increase, the willingness of beneficiaries to participate in range management plans increases.

Furthermore, a comparison was made between the viewpoint of beneficiaries and experts of nomadic affairs and natural resources on the study subject. According to the results of comparing the views of beneficiaries and experts, significant differences were found between the views of the two mentioned groups for 14 indicators including plant species diversity, soil erosion, groundwater, unity and solidarity at the range allotment level, trusting the experts and promoters, the presence of people in decision making and planning, the presence and role of women in producing livestock and non-livestock products, youth employment level in the animal husbandry section, income from production of non-livestock products, income from tourism, living cost, and livestock number. This indicates that the viewpoints of rangeland exploiters and experts are different on the effects of economic, social, and ecological factors on sustainable range management indicators. This difference could be related to various reasons such as different experience and specialties on natural resources and nomads.

Generally, considering the results of this study, to achieve sustainability, all three economic, social and ecological factors should be considered in range management plans as well as attention to the interrelationship among the three mentioned factors and modifying the project guidelines. To increase the rangeland exploiters' participation in preparing and implementing range management plans, the viewpoint of rangeland exploiters and experts should get closer to each other. In this regard, in addition to ecological issues, economic and social aspects of local communities' participation should also be taken into account, and the participation motivation should be improved by increasing exploiters' income.

Conflict of interest statement:
The authors declare that they have no conflict of interest.

References

[1] V. Raufi Rad. "Assessment of social and economic vulnerability, a strategy for sustainable management of rangelands. Case study: Aran and Bidgol rangelands of Isfahan province". *PhD Thesis. University of Agricultural Sciences and Natural Resources, Sari, Iran*, , 2017.

[2] F. Ghasemi. "Feasibility of establishing and development local marketing (case study: Taleghan county)". *MSc Thesis. Tehran University, Karaj, Iran*, , 2017.

[3] H. Azadi and G. Filson. "Comparative study of agricultural extension systems: a systemic view". *Outlook on Agriculture*, **38**:337–347, 2009.

[4] H. Azadi, M. Shahvali, J. van den Berg, and N. Faghih. "Sustainable rangeland management using a multi-fuzzy model: how to deal with heterogeneous experts' knowledge)". *Journal of Environmental Management*, **83**:236–249, 2007.

[5] H. Azadi, J. van den Berg, P. Ho, and G. Hosseininia. "Sustainability in rangeland systems: introduction of fuzzy multi objective decision making". *Current World Environment*, **16**:19–32, 2009.

[6] H. Eakin and A. L. Luers. "Assessing the vulnerability of social-environmental systems". *Annual Review of Environment and Resources*, **31**:365–394, 2006.

[7] H. R. Saeidi Goraghani. "Feasibility of establishing local marketing and its effect on sustainable livelihood of rangeland ranchers". *PhD Thesis. Tehran University, Karaj, Iran*, , 2017.

[8] M. R. Moghadam. *Range and Range management*. Tehran University Press, 1th edition, 2008.

[9] S. Dehdari. "Investigation of social factors affecting rangeland projects case study Semirom". *PhD Thesis.Tehran University. Iran*, , 2013.

[10] J. L. Holechek, R. D. Pieper, and C. H. Herbel. *Range management. Principles and practices.* Prentice Hall Pub., 4th edition, 2004.

[11] J. W. Walker and K. C. Hodgkinson. "Grazing management: new technologies for old problems". *VIth International Rangeland Congress Proceedings, Townsville, Australia*, **1**:424–430, 1999.

[12] J. A. Tanaka, N. Rimbey, and L. A. Torell. "Rangeland economics, ecology and sustainability: implications for policy and economic research". *Western Economics Forum, New Mexico State University*, **3**:15–22, 2005.

[13] G. Bosworth and A. Atterton. "Neo-endogenous development and the rural economy". *Journal of Rural Sociology*, **77**:254–279, 2012.

[14] T. L. Saaty. *The analytic hierarchy process: planning, priority setting, resource allocation (decision making series)*. McGraw-Hill, 1th edition, 1980.

[15] B. Zarei and N. Bagheri Moghadam. "Application and comparison of ELECTRE, TOPSIS and AHP techniques in the transfer of technology for the production of dry resin transformers". *Journal of Industrial Management*, **1**:31–41, 2007.

[16] W. Tsai, P. Lee, Y. Shen, and E. Y. Hwang. "A combined evaluation model for encouraging entrepreneurship policies". *Journal of Annals of Operation Research*, **211**:449–468, 2014.

[17] Z. Bagher Amiri, M.S. Rasooly, and J. Azizi. "Study of optimal utilization of rangeland in Ardabil province by using analytic hierarchy process". *Journal of Agricultural Economics*, **5**:23–40, 2013.

[18] S. Dehdari, H. Arzani, H. Movahed, M. A. Zare Chahouki, and H. Shaban Ali fami. "Comparison of rangelands with/without range management plan (RMP) using application of analytical hierarchy process (AHP) in Semirom". *Iranian Journal of Range and Desert Research*, **21**:383–393, 2014.

[19] N. Naderi, M. Mohseni Saravi, A. Malakian, and D. Ghasemian. "AHP technique for decision-making in watersheds". *Journal of Environment and Development*, **2**:41–50, 2012.

[20] S. H. Kaboli, H. Azarnivand, A. A. Mehrabi, H. Arzani, and S. M. Heshmat Alvaezin. "Determine the factors affecting the performance of range with use of AHP (case study: part of the winter rangelands of Semnan province)". *Journal of range and watershed*, **68**:675–689, 2016.