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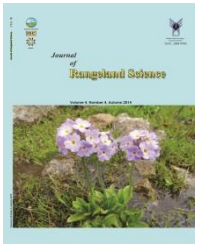

Research and Full Length Article:

Identification and Comparison of Components Influencing Rangeland Exploitation from Pastorals and Experts' Viewpoints Using SWOT and AHP

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Abstract. Over the past decades, range managers have devoted extensive efforts to conserve and restore rangelands and sustain their exploitation but these efforts are more focused on the classic sciences and the exploiters' knowledge and experience have been neglected in the process. Therefore, current study was done to deal with the prioritizing and comparing factors affecting rangeland exploitation based on four criteria involving the strengths, weaknesses, opportunities and threats to determine the degree of consistency and difference between the experts and pastorals' viewpoints. To assess the factors affecting rangeland exploitation, SWOT analysis was used. Factors identified using the questionnaire set based on Likert spectrum items and AHP analysis were prioritized and compared by the pastorals and experts. Results of comparing the factors' prioritization showed that three factors including the lack of coordination and trust between experts and pastorals, existence of feudalism in husbandry system, opportunities for revenue expansion from livestock production had the same prioritization from the experts and pastorals' viewpoints. Also, comparisons of weighted mean differences revealed that the factors' regional rangeland potential for forage species planting of strength criteria, salt affected and swampy rangelands with weakness criteria, greater use of the expertized capacity and specialized knowledge and opportunities for revenue expansion from livestock production in the opportunity criteria and dual ownership of the rangelands by pastorals and government in the threat criteria had the highest weighted mean differences. So, it can be inferred that there is a vast gap between pastorals and experts' viewpoints in prioritizing the factors affecting the rangeland exploitation. Results emphasized the importance of pastorals and local communities' knowledge and experience in the rangeland management and their exploitation improvement.

Key words: Prioritization, Exploitations, Experts, Pastorals, SWOT

Introduction

Husbandry is one of the traditional ways of rangeland exploitation that is based on livestock grazing in wild rangelands to produce animal production and considered as economic and cultural sources for a population about 100 to 200 million all around the world. Based on the area, pastoralism covers about 25 percent of the world lands (SCBD, 2004). Generally, it must be mentioned that rangeland based husbandry plays an important role in income and welfare of many rural and rangeland residents such as nomads and gypsies (Azkia, 1996; SWAC-OECD/ECOWAS, 2008; Janssen *et al.*, 2000).

With regard to the roles of rangelands in the social and economic backgrounds of exploiters and country, it is essential to foresight the prospective planning to maintain the rangelands and sustain the presence of exploiters. In the past half-century, exploitation and management of rangelands in Iran have undergone considerable changes because of the fragile social and economic conditions of exploiters (Barani, 2004; Heidari, 2010). These changes are due to a series of factors that have been overcome in the rangelands and their exploitation. Natural resources policy makers and implementers are trying to identify various aspects affecting rangeland exploitation and different instructions have been approved and implemented to conserve and improve rangeland conditions after nationalizing rangelands, but there is a retrogressive trend in natural resources. Several studies have also been conducted with regard to Iranian rangelands with the same goal of the improvement of rangeland conditions and have examined different aspects of problem (Eskandari *et al.*, 2008). However, it seems that the quality and quantity of studies based on rangeland exploiters' knowledge and experience are not suitable and status of local knowledge and experience of rangeland exploiters that have used natural areas in different styles for centuries is not preserved in the framework of sustainable development objectives in relation to the exploitation of pastures. Experience and knowledge can be served in order to examine the factors associated with the exploitation of rangelands and new approaches in line with the increasing development of rangeland conditions can be attained through relying on these sources (Razavi, 2005).

One of the decision making and planning methods is the group decision-making that is one of the knowledge oriented studies' branches (Bonham-Carter, 1994). In fact, attention to the knowledge and experience of individuals to make the best decision given the current situation can be considered as a suitable approach to improve the management. In addition to the importance of knowledge-based decision making, government's attention to society involvement and decisions is also important (Gholipoor *et al.*, 2008). Reasons of this can also show the status and roles of democracy. In fact, attention to referendum and society involvement can extract the ability, purpose and dynamics from the needs, dutifulness, experience and public knowledge (Chandler, 2000). Another aspect of the importance of public intervention in decision making is participation. Actually, through the participation of society, it is possible to generate more dependence sense and resources control (Barstin, 1991; Papaioannou, 2007) and government can also achieve a new source of information, ideas and resources (OECD, 2001).

Based on materials provided, this study explores and prioritizes factors in four parts of strengths, weaknesses, opportunities and threats of rangeland-based exploitation through relying on rangeland exploiters' experience and knowledge. Also through comparing the prioritization of identified factors from exploiters and experts' viewpoints, the agreement and disagreement levels

in attitude measurement in conjunction with the priorities of identified factors were evaluated.

Materials and Methods

Study area

Studied rangelands are located in south eastern part of Caspian Lake and northern part of Aq Qala, Iran (Fig. 1). Area latitudes and longitudes are 37°09'41"-37°23'14" N and 54°14'53"-54°39'124" E. These rangelands share a border in the north with Turkmenistan and are limited to the farmland in the south, pond in the east and salt affected lands in the west. Aq Qala generally includes eight public rangelands that are examined in the study. These rangelands are exploited in common under transhumance pastoralism (Anonymous, 2013).

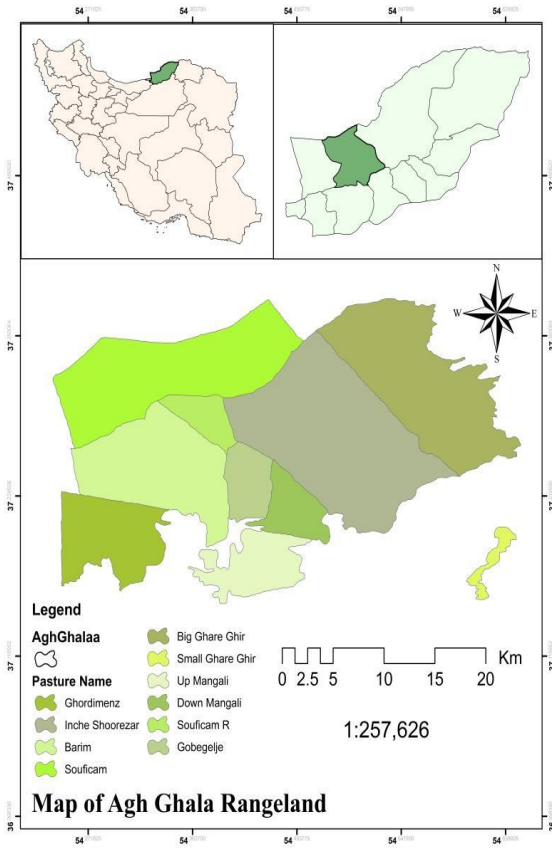

Fig. 1. Location map showing the Aq Qala rangelands involved in the study, northern Golestan province, Iran

Data collection

To determine the factors affecting different parts of SWOT (Strengths, Weaknesses, Opportunities and Threats) (Kajanus *et al.*, 2004; Xingang *et al.*, 2013; Zhang, 2012), brainstorming (Jonsson *et al.*, 2001) and individual interviews (Hesse-Biber and Levy, 2006; Rubin and Rubin, 2005) were conducted. Internal factors of SOWT (Strengths and Weaknesses) were assessed through asking questions about limitations and potentials of regional rangeland exploitation. Also, PEST analysis (Pour Jafar *et al.*, 2012) was used for identifying external factors (Opportunities and Threats). Through this analysis, various aspects of political, economic, social and technological changes externally affecting regional rangeland exploitation were queried. All the extracted factors were then analyzed using the concept analysis. After separating and classifying the identified factors, a questionnaire was designed to prioritize different factors by the exploiters and experts. So, the exploiters' questionnaire has been set based on Likert spectrum items with five options: too high, high, medium, low, too low. AHP questionnaire was prepared for the experts who included pairwise comparisons.

To determine the sample size, Cochran (1977) method was used (Equation 1):

$$n = \frac{N(t.s)^2}{Nd^2 + (t.s)^2} \qquad \text{(Equation 1)}$$

Where n is the sample size. s is the standard deviation. N is population size. d is the desired level of precision and t is t-value at 0.95 probability level. Population includes 91 pastorals exploiting public rangelands of Aq Qala putting into the Cochran's equation giving the sample size of 76.

The questionnaires were assessed after completion and 7 of them were rejected because of being incomplete and factor analysis was done through 69 remained questionnaires using SPSS software

version 21 (Bihamta and Zare Chahouki, 2011). Ten questionnaires were also filled by range management service experts and used to determine factors' priorities. Obtained data from AHP questionnaires were analyzed by the help of Expert Choice software version 11 (EXPERT CHOICE, 2001). In some cases, inconsistency ratio that is used to test the consistency between judgments of experts in the pairwise comparison was more than 0.1. In these cases, the questionnaires were refilled by the experts. After improving inconsistency ratio "R<0.1" (Saaty, 1988), prioritization of factors was done.

Results

Identification of factors in main parts of SOWT

Internal factors (strengths and weaknesses)

Twenty four factors were determined as internal factors affecting regional rangeland exploitation through questionnaires and content analysis results (Table 1).

Table 1. Results of content analysis of SWOT internal factors for Aq Qala rangeland exploiters

SWOT Factors	Factors
Strengths (S)	S1: The possibility of prolonging grazing season (lengthening the time of departure from the rangeland)
	S2: Apparent potential for planting forage species
	S3: The possibility of hand feeding (use of cereal for animal diet)
	S4: Matching animal type and breed with rangelands vegetation
	S5: Health and organic products of rangelands
	S6: Favorable weather conditions in the exploitation season
	S7: Diversity of income sources (farming as second occupation)
	S8: Participation of pastoralists in range management plans and projects
	S9: The role of rangelands and their exploitation in the country livelihood and economy from pastoralists points of view
	S10: Rangelands potential for increasing stocking rate with relying on hand feeding
	S11: Acceptance of the cooperation and range management cooperatives by pastoralists
Weaknesses (W)	W1: Problems related to the lack of appropriate and specific roads
	W2: Inexperience of shepherds on distributing livestock grazing
	W3: Salty and marsh rangelands
	W4: The lack of coordination and lack of trust between technicians and pastoralists
	W5: Non-rangeland and non-normative exploitations such as mining, military maneuvers
	W6: The presence of illegal pastoralists in the rangelands
	W7: Lack of rangelands insurance
	W8: Lack of extension-educative programs
	W9: Extreme obsession of experts regarding shrubs planting
	W10: Resignation of experienced pastoralists
	W11: Presence of lord-shepherd system in rangelands husbandry
	W12: Unavailability and inappropriate distribution of watering points and sources
	W13: Failure to take advantage of the knowledge and labor of pastoralists

External factors (opportunities and threats)

Questionnaires and content analysis were based on PEST model to determine the external factors affecting regional rangeland exploitation. So, eight factors were specified that three of them belonged to the opportunity criterion and five remained factors belonged to threat criterion (Table 2).

Table 2. Results of content analysis of SWOT external factors for Aq Qala rangeland exploiters

SWOT Factors	Factors
Opportunities	O1: More use of the expertise capacity and specialized knowledge (including government forces, engineering organization and academic communities)
	O2: Chance of income generating from animal productions (e.g. animal fattening, development of agriculture)
	O3: Increasing scientific studies about rangelands in the research centers, academic institutes, and natural resources services
Threats (T)	T1: Fluctuations in the animal market (such as the husbandry inputs costs)
	T2: Excessive governmental interventions in relation to pastures
	T3: Drought and the its consequences on the rangelands exploitation
	T4: Floods caused by seasonal rainfall in the region
	T5: Dual ownership of rangelands by government (public) and pastoralists (private)

Comparison of factor prioritization based on exploiters and experts' viewpoints

Factors related to strength criterion

Results show that exploiters and experts are of different opinions in all the items related to the strengths criterion (Table 3). For example, in experts' viewpoint, the acceptance of cooperation in range management and rangeland cooperative by the exploiters was the first prioritization but in exploiters' viewpoint, rangeland importance and its roles in the country economy and livelihood had the first prioritization (Table 3).

Table 3. Comparing prioritization of identified factors related to the strength criterion based on exploiters and experts' viewpoints

Factor	Experts		Difference between the Weights	Pastoralists	
	Weighted Average	Priority		Weighted Average	Priority
Acceptance of cooperation and range management cooperatives by pastoralists	0.127	1	0.045	0.082	7
Apparent potential for planting forage species	0.121	2	0.055	0.066	10
Participation of pastoralists in range management plans and projects	0.110	3	0.014	0.096	4
Favorable weather conditions in the exploitation season	0.110	3	0.025	0.085	6
The role of rangelands and their exploitation in the country livelihood and economy from pastoralists' points of view	0.106	4	0.008	0.114	1
Diversity of income sources (farming as second occupation)	0.104	5	0.012	0.092	5
Rangelands potential for increasing stocking rate with relying on hand feeding	0.096	6	0.030	0.066	9
The possibility of hand feeding (use of cereal for animal diet)	0.064	7	0.038	0.102	3
Matching animal type and breed with rangelands vegetation	0.061	8	0.043	0.104	2
The possibility of prolonging grazing season (lengthening the time of departure from the rangeland)	0.056	9	0.036	0.092	5
Health and organic products of rangelands	0.046	10	0.022	0.068	8

Different levels in the prioritization of factors related to the strength criterion based on exploiters and experts' viewpoints are presented (Fig. 2). Results of this part indicated that the highest difference in factor weighting was related to the rangeland potential for planting forage species. Experts introduce this factor as strength as compared to the exploiters. The lowest difference was

related to the roles of rangelands and their exploitation in the country livelihood and economy from pastoralists' points of view. Experts recognize this factor to a greater extent as strengthen. The difference level in the prioritization of this factor for the exploiters and experts was less than the other factors.

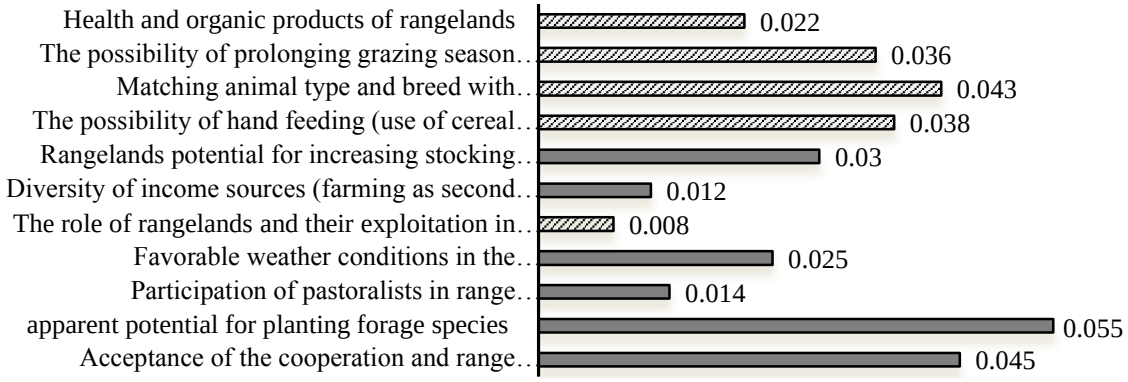

Fig. 2. The level of difference between ranks mean of the factors related to the strengths criterion based on exploiters and experts viewpoints (hatched color shows higher prioritization by experts and solid color shows higher prioritization by exploiters)

Factors related to weakness criterion

There were differences between the exploiters and experts' viewpoints in the prioritization of all factors related to the weakness criterion except two of them; in other words, factors involving the lack of coordination and trust between experts and pastorals with the score 8 and the existence of feudalism in husbandry system with the score 13 had the same prioritization (Table 4).

Table 4. Comparing prioritization of identified factors related to the weakness criterion based on exploiters and experts' viewpoints

Factor	Experts		Difference between the Weights	Pastoralists	
	Weighted Average	Priority		Weighted Average	Priority
Salty and marsh rangelands	0.168	1	0.105	0.063	7
Unavailability and inappropriate distribution of watering points	0.153	2	0.027	0.126	1
Lack of extension-educative programs	0.108	3	0.023	0.085	6
Non-rangeland and Non-normative exploitations such as mining, military maneuvers	0.090	4	0.011	0.101	3
Problems related to the lack of appropriate and specific roads	0.081	5	0.022	0.103	2
Extreme obsession of experts regarding shrubs planting	0.079	6	0.025	0.054	11
Failure to take advantage of the knowledge and labor of pastoralists	0.060	7	0.001	0.059	10
The lack of coordination and lack of trust between technicians and pastoralists	0.056	8	0.006	0.062	8
Resignation of experienced pastoralists	0.048	9	0.049	0.097	4
Inexperience of shepherds in distributing livestock grazing	0.047	10	0.004	0.051	12
Lack of rangelands insurance	0.042	11	0.048	0.090	5
The presence of illegal pastoralists in the rangelands	0.037	12	0.023	0.060	9
Presence of lord-shepherd system in rangelands husbandry	0.032	13	0.013	0.048	13

Among the weakness criterion factors, failure to take the advantages of the exploiters' knowledge and human resources with the mean difference of

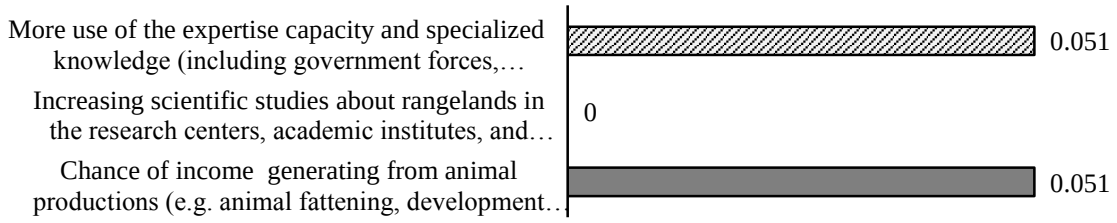

Fig. 4. Level of difference between rank mean of factors related to the opportunity criterion based on exploiters and experts' viewpoints (hatched color shows higher prioritization by experts and solid color shows higher prioritization by exploiters)

Factors related to threat criterion

In the threat criterion, five factors were prioritized by the exploiters and experts. Results showed that all five factors were differently prioritized and as a result, the gap is substantial (Table 6).

Table 6. Comparing prioritization of identified factors related to the threat criterion based on exploiters and experts' viewpoints

Factor	Experts		Difference between the weights	Pastoralists	
	Weighted average	Priority		Weighted average	Priority
Dual ownership of rangelands by government (public) and pastoralists (private)	0.127	1	0.045	0.082	4
Drought and the its consequences on the rangelands exploitation	0.121	2	0.055	0.066	5
Fluctuations in the animal market (such as the husbandry inputs costs)	0.110	3	0.014	0.096	2
Excessive governmental interventions in relation to pastures	0.110	3	0.025	0.085	3
Floods caused by seasonal rainfall in the region	0.106	4	0.008	0.114	1

Among five factors, the dual ownership of the rangelands by pastorals and government had the highest level of rank mean difference (Fig. 5). It means that the experts consider this factor to a greater extent as a threat for exploiting the regional rangelands. In contrast, pastoralists ranked this factor as a threat for exploiting the regional rangelands to a much less extent.

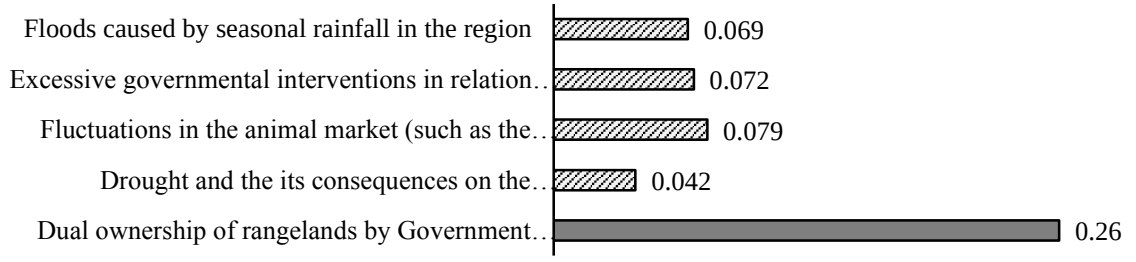

Fig. 5. Level of difference between rank mean of factors related to the threat criterion based on exploiters and experts' viewpoints (hatched color shows higher prioritization by experts and solid color shows higher prioritization by exploiters)

Results clearly revealed that exploiters and experts had different views on prioritizing the strengths, weaknesses, opportunities and threats of rangeland exploitation. In some cases, there was a substantial gap between the exploiters and experts' viewpoints. For example, salt affected and swampy rangelands and the

acceptance of cooperation in range management and rangeland cooperative by the exploiters had the first prioritization from the expert viewpoint but the seventh prioritization from the exploiter viewpoint and the dual ownership of the rangelands by pastorals and government in threat criteria had the first prioritization from the expert viewpoint but the fifth prioritization from the exploiter viewpoint. This can be explained as the exploiters stated that rangelands were salt affected and swampy from the earliest times while the exploitation of rangelands has not been faced to the current problems in the past. In relation to the dual ownership of the rangelands, the exploiters emphasized the necessity of governmental management of rangelands and did not consider this factor as a serious threat for rangeland exploitation.

However, results showed that experts and exploiters' viewpoints are compatible in some cases. Between factors related to strength criterion, rangeland importance and its roles in the country economy and livelihood had the lowest level of difference. Between factors related to weakness criterion, the lack of coordination and trust between experts and pastorals had the same prioritization from the exploiters and experts' viewpoint in terms of final ranking. Three factors including failure to take advantages of the exploiters' knowledge and human resources, lack of experience in the distribution of pastoral livestock by ranchers and the lack of coordination and trust between experts and pastorals with the difference means of 0.001, 0.004 and 0.006 had the lowest level of difference respectively indicating the relative agreement on the priorities of these three factors by the experts and exploiters.

It should be mentioned that inaccessibility to water resources and their poor distribution had the final ranks of 1 and 2 from the exploiters and experts' viewpoint respectively indicating the same priority of the factor in weakness criterion.

Of opportunity criterion factors, the increasing scientific studies about regional rangelands had zero mean rank from the viewpoint of both examined sides. Between factors related to threat criterion, drought and its effects on rangeland exploitations with the mean difference of 0.042 had the first and second priorities from the exploiters and experts' viewpoints. It should be noted that drought and its effects on rangeland exploitations and inaccessibility to water resources and their poor distribution were ranked as the most important factors because of their low mean difference and the highest priorities from experts and exploiters' viewpoints because not only the rank mean difference between exploiters and experts were insignificant but also these factors were specified as the first and second priorities from the both sides' viewpoints, respectively.

Discussion and Conclusion

Today, in the management process, ignoring the beneficiaries may reduce the reliability, effectiveness and level of participation (Hahn Alan, 1987). Also, the achievement of sustainable development objectives in relation to rangelands requires the full participation of rangeland exploiters in the stages of defining problem or necessary decision-making, implementation, operation, maintenance, review and evaluation. Therefore, maintaining and restoring natural resources, especially soil and water is not possible without the active participation of the local communities. First, because these are people (exploiters) who are more associated with these resources and second, their lives depend on these resources (Heidari *et al.*, 2009). So, researches such as current studies are essential to emphasize the important roles of local communities' knowledge and experience in the exploitation of natural resources and identify the differences and

matters of difference in the exploiters and experts' attitudes.

Participatory management becomes important when the need to decision making and developing management principles moves towards natural resources. This is because of the roles of both important forces, namely people (exploiters) and government (executive, natural resource experts) in influencing natural resources. In this regard, we need to provide the required strategies for rangeland management by balancing and homogenizing the experts and exploiters' views. Nowadays, connoisseurs believe that achieving sustainable development in the natural resources field requires the use of integrative management based on the interactive and participatory management of natural resources. This management creates a situation where natural resources dealers recognize the issues through considering different aspects of the development and creating conditions for dialogue; thereby, results will be presented according to all natural resources dealers. The implementation of this type of management requires the establishment of rapport between the dealers in the field of range management to achieve the greater effectiveness and productivity in this section based on the established mutual understanding because nowadays, the most important problems in sustainable management of natural resources should not be explored in the field of technology and management hardware but should be explored in the scope of system dealers (Hosseineynia and Malekmohamadey, 2003).

About factors identified in different parts of SWOT, the level of inconsistency was high. The difference in views between the experts and exploiters has been reported by the other studies, too (Rashtian and Karimian, 2011; Ansari and Seiyed Akhlaghi, 2009; Shahraki and Barani, 2012; Arayesh *et al.*, 2010). So, it seems that despite the importance of rangelands and management of these ecosystems, there is still no consensus on the views among experts and exploiters. With regard to rangeland management that is dependent on policy, executive factors and exploiters, attention to the enjoyment and participation of the local community will play an essential role in improving the current and future status of rangelands. In the past years, one of the reasons for the rangeland degradation has been proposed to be the overgrazing caused by inattention to the exploiters' community. It seems that the current management of rangelands considers the exploiters and their uses from rangelands as a threat to the future of these natural resources. However, studies have shown that the government through using, participating and attracting public can convert threats posed by this section to an excellent opportunity to progress the goals (Gholipoor, 2008). In this regard, the concept of community-based management becomes relevant. Community-based management is a pluralist and multi-sectorial approach for natural resource management that involves different beneficiaries with different roles to achieve the ultimate goal of the conservation and sustainable use of natural resources and a fair share of the exploitation and responsibility for natural resources. This method is a social, economic and cultural process that seeks social justice and democracy in natural resource management and in most of the cases, it is a complex, long-term and sometimes confusing process with frequent changes and inconsistent information; however, it is necessary to note that people are always potential resources for natural resources conservation, not an obstacle (Borini *et al.*, 2000). A potential resource, if correctly handled during the conservation project, will guarantee the conservation sustainability and if placed in the margin, very good planed conservation programs may fail (Taylor, 1998).

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شناسایی و مقایسه مؤلفه‌های تأثیرگذار بر بهره برداری از مراتع آق قلا با استفاده از مدل SWOT و AHP از دیدگاه بهره‌برداران و کارشناسان

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چکیده. طی دهه‌های گذشته مدیریت مراتع کشور تلاش‌های گسترده‌ای در جهت حفظ، احیاء و بهره‌برداری پایدار از مراتع داشته است. با این حال به نظر می‌رسد جایگاه دانش و تجربه بهره‌برداران عرصه‌های مرتعی در مدیریت مراتع حفظ نشده و مدیریت بیشتر تکیه بر مبانی علم رسمی دارد. در همین راستا این مطالعه در نظر دارد جهت تعیین میزان همسانی و اختلاف نگرش‌ها بین کارشناسان و بهره‌برداران به بررسی و مقایسه اولویت عوامل موثر بر بهره‌برداری از مراتع در چهار معیار قوت، ضعف، فرصت و تهدید بپردازد. بدین منظور از آنالیز SWOT برای تحلیل عوامل موثر بر موضوع بهره‌برداری از مراتع استفاده گردید. عوامل شناسایی‌شده از طریق تنظیم و تکمیل پرسشنامه به روش‌های طیف لیکرت و آنالیز AHP به ترتیب توسط بهره‌برداران و کارشناسان اولویت‌بندی و مقایسه شد. نتایج حاصل از مقایسه اولویت‌بندی عوامل از دیدگاه بهره‌برداران و کارشناسان نشان داد که فقط ۳ عامل "عدم هماهنگی و نبود اعتماد بین کارشناسان و بهره‌برداران مراتع"، "وجود نظام ارباب‌ـ چوپانی در دامداری مراتع" و "فرصت گسترش درآمد از تولیدات دامی" اولویت یکسانی از دیدگاه کارشناسان و بهره‌برداران دارند. همچنین نتایج مقایسه اختلاف میانگین وزنی عوامل از دیدگاه کارشناسان و بهره‌برداران نشان داد عوامل "توان مراتع منطقه برای کشت گونه‌های مرتعی" در معیار قوت‌ها، "شور و باتلاقی بودن مراتع آق‌قلا" در معیار ضعف‌ها، "بهره‌گیری بیشتر از ظرفیت کارشناسی و دانش تخصصی" و "فرصت گسترش درآمد از تولیدات دامی" در معیار فرصت‌ها و "وجود مالکیت دوگانه مراتع بوسیله دولت و بهره‌بردار" در معیار تهدیدها دارای بیشترین میزان اختلاف میانگین وزنی می‌باشند. به طور کلی نتایج این مطالعه نشان داد اختلاف زیادی در اولویت‌بندی عوامل موثر بر بهره‌برداری از مراتع شهرستان آق‌قلا از دیدگاه کارشناسان و بهره‌برداران وجود دارد. نتایج این مطالعه در راستای تاکید بر اهمیت نقش دانش و تجربه بهره‌برداران و جامعه محلی در مدیریت مراتع و بهبود وضعیت بهره‌برداری از مراتع حائز اهمیت می‌باشد.