Middle-East Journal of Scientific Research 17 (5): 633-640, 2013
ISSN 1990-9233

DOI: 10.5829/idosi.mejsr.2013.17.05.12226

An Approach for Forage Proper Use Planning in Roudan Region, Hormozgan-Iran

[1]Elham Mostafaee, [2]Hossein Arzani and [3]Seyed Akbar Javadi

[1]Science and Research Branch, Islamic Azad University, Tehran, Iran
[2]Faculty Member of Tehran University, Tehran, Iran
[3]Faculty Member of Science and Research Brunch,
Islamic Azad University, Tehran, Iran

Abstract: One of the most important goals of fundamental management in range lands is the continuous utilization without any damage to resources. There are various productions and utilizations in range lands such as, medicine plants, recreation, forage yield, wild life habitats and etc. The purpose of this paper is to determine the level of utilization for forage yield to determine grazing capacity. To achieve this goal, it is necessary to determine that amount of utilization by which there would not be any damage to vegetation, which is proper level of utilization. The case study was some Roudan range lands. After considering the factors affecting proper level of forage utilization, final results were created by using suggested method of FAO (1999). The practical units were selected 6 vegetation types. Range condition, trend and soil erodibility were noticed as effective parameters, according to these parameters and the theories of forage harvesting, 50% to use and 50% to conserve, proper use or a proper level of forage utilization was determined for ranges in under study region with annual average of rainfall 180.2 millimeters. Among 6 vegetation types the most and the minimum level utilizations respectfully were 25% and 10%.

Key words: FAO · Range Condition · Range Trend · Erodibility

INTRODUCTION

According to the fact that the most important utilization of range land is significantly livestock feeding and livestock production is the principal economic activity throughout the Iran, obviously it is necessary to achieve consistency and conservation in the producing resources, through an optimum planning and management seems necessary [1]. Iranian rangeland were used only as a source for animal grazing in the past [2]. The scientific evidence and collective knowledge of the public and range managers show a wide variety of grazing effects on plants, animal and watershed [3]. Recently, in Iran many winter range lands have been degraded due to overgrazing and over stocking. This is a serious challenge in some ranges of Hormozgan province in the southern Iran, since grazing capacity is not determined [4]. One of the main factors to determine grazing capacity is determining the utilization level and proper use for forage yield. Determining the utilization level is one important tool to manage a range [5]. The utilization level is a proportion of the current year's forage yield by each plant, that livestock can graze without any damage to the health and competition ability of the plant [6]. The utilization level and forage residue measurements are useful tools in monitoring a range land and when used with other monitoring information it can be employed to make and evaluate management decisions [SRM, 1999]. Important factors to determine utilization level of forage yield are erosion, soil conservation, topography, range condition and trend and climate conditions [7]. To determine the grazing capacity of a range, it is not possible to use the total amount of forage because of the utilization level and the different preference values of forage among various animals. Therefore, it is essential to determine the utilization level for forage yield [6]. There is a significant difference in determining stocking rate in a range, due to the level of forage utilization and allowable use. It is less

Corresponding Aurthor: Elham Mostafaee, Science and Research Branch,
Islamic Azad University, Tehran, Iran.

than total forage. But it can not be emphasized enough because; it can be raised by enough rain and more soil fertility. The forage production of a range changes annually as the amount of rain changes [8]. Determining the level of utilization depends on the searches in the under study area [9]. Range condition is one of the most important factors to determine the amount of utilization in range lands [5]. The level of utilization is not the same in different areas and different vegetation types, depending on the effective factors it achieves in different amounts. Therefore, it seems necessary to be awre of the effective parameters and determine the level utilization based on them. To determine the level utilization the most effective factors are erosion, range condition and trend [10]. The sensitiveness of soil to erosion, range condition and trend are the criteria which affect the level utilization [1]. There is a direct relationship between rainfall and forage production. The maximum of allowable use increases as an increase in rainy and good climate condition happens since it provides better conditions for the growth and regeneration of plant species.

The other climatic factor influencing the plant production is temperature. The plant species are capable to grow well in the suitable presence of the moisture, temperature and soil fertility at the growing season [11]. To determining the stocking rate in a range, it is not enough to take attendance only to the forage production, but also it is important and vital to take care of the plant healthy and the ability of competing in the plant society. So according to climatic situation, vegetation health and relationships, forage production and the allowable use are not as the same in different years and is necessary to be determined each year. Hormozgan province is one of provinces in the south of Iran that includes about 0.0425% of total ranges. Ranges in Hormozgan are used as winter ranges. About 2740000 animal units feed in these rangelands, but forage production has been estimated about 2425000 ton per hectares while this amount can feed only 542851 animal units. Therefore there are about an extra 2000000 animal units above the capacity in the mentioned ranges. So the herders provide their livestock needs and shortages by buying from the outside the province or by excessive pressure on the ranges. Roudan ranges are not exceptional to this problem. There are about 244132 hectares ranges around Roudan in which 120000 animal units are feeded, while the grazing capacity is 41936 animal units [4]. Therefore as it seems there is exceeded livestock feeding in Roudan ranges and it causes a serious reduce in producing biological potential and land degradation. To prevent more damages to producing resources, it is necessary to determine the proper level of utilization and correct grazing capacity. Because proper use for forage in the area has not been determined, so it seems necessary to determine a suitable level of utilization for forage. The purpose of this study is to determine a correct proper level of utilization to determine grazing capacity, in the area under study, for the study year 2011-2012.

MATERIALS AND METHODS

The Experimental Site: Roudan ranges are located in Hormozgan province, Iran. The ranges are located about 30 kilometers far from Roudan city. The ecological conditions during the year of study were as follow; according to the rainfall statistics from the nearest meteology sites, the mean of rainfall in the study year (20011-20012) was 180.2 millimeters. The mean of minimum and maximum temperatures per year were respectfully 22.9 and 35.1 degree centigrade. According to the Amberje method (1951-1955) for classifying climate condition. In this classification those areas with humidity coefficient 5-20 percent and mean of annual rainfall 100-200 millimeters are classified in arid regions. Roudan is located in a region with arid climatic class with the mean of annual rainfall of 108.2 millimeters and humidity coefficient of 18.6. According to FAO climatic classification Roudan ranges are located in Ommanian Gulf -Balouchian zone. It's climate is nearly the same as semi Equatorial and Sahara-Sandi climate. In these areas the mean of annual rainfall is less than 300 millimeters and generally about 100-200 millimeters. Almost all the rainfall happens in winter while there is 6-8 months without any rainfall, but rational humidity is 60-80 percent with warm temperature [12]. In under study region, the mean of maximum and minimum temperatures are respectfully 43.2 and 13.3 degree centigrade. Due to vase of rangelands in Roudan area with Khalij Ommanian and Balouchian climatic, feasibility to achieve and rangeland conditions this region was suitable for the goal of research.

Methodology: The goal of the research was to determine a proper level of utilization for forage yield. So to achieve the goal after selecting suitable criteria, it was necessary to determine effective parameters and suitable time for land evaluation. According to climatic conditions, especially rainfall and temperature changes and also

Factor	Score
litho logy	0-10
Topography and land form	0-10
The speed and condition of Wind	0-20
Soil cover and related factors	-5-15
Canopy cover	-5-15
Soil erosion	-5-20
Soil moisture	0-10
Kind and distribution of windy deposits	-5-15
Land use management	-5-15

Table 1: Scoring to the ersion factors in Ahmadi-Ekhtesasi method (1990)

Erosion class	The amount of erosion	Total estimated score	Utilization capacity
I	Very little	25›	S_1
II	little	25-50	S_1
III	Average	50-75	S_2
IV	Much	75-100	S_3
V	Very much	100›	N

Table 2: Classification soil sensitiveness in Ahmadi-Elkhtesasi

Table 3: Determining the level utilization by range condition, range trend and soil sensitiveness in arid and semi arid region [5]

The level of utilization of forage (%)	Range trend	Range condition	The class of sensibility to erosion
35	Positive or constant	Excellent or good	S_1 or S_2
225	Negative	Excellent or good	S_1 or S_2
225	Positive or constant	Fair	S_1
20	Positive or constant	Fair	S_2
15*	Negative	Fair	S^2
15*	Positive or constant	Fair	S_3
10*	Negative	Fair	S_3
15*	Positive or constant	Poor	S_2
10*	Negative	Poor	S_2
10*	Positive or constant	Poor	S_3
0*	Negative	Poor	S_3

*Indicates the rangelands advised not to be used.

vegetation characteristics, the best time for land evaluation was from the end of January to the end of April. Topography map with 1:50000 scale and software such as Arc GIS 9.3 and also land evaluation were employed. The method was suggested by FAO (1991); according to that two orders of range suitability to determine soil sensitiveness to erosion were considered: suitable (S) and not suitable (N). Three classes of suitability were determined including highly suitable (S1), moderately suitable (S2) and marginally suitable (S3) [13].

Gathering the Basic and Primary Information: 6 vegetation types were recognized over 4 rangelands. Sampling for forage yield and recognizing flora of types started in January (2011). Primary maps such as topography 1:50000, geology, soil were provided. The field notes were taken by application of GPS instrument along with an altitude meter and taking four square meter quadrate sample. The forage yield was calculated by using clipping method for each species separately. The range condition was determined by using 4 factors

method which was adjusted to the area condition. In this method kind of erosion and canopy crop percent were adjusted to the existing situation in the area. In this study windy erosion was scaled by using Ahmadi - Ekhtesesi method (Tables 1, 2), which included litho logy, the speed and condition of winds in the area, vegetation condition, soil cover, soil moisture, land use management, kind and distribution of windy erosion factors. According to the climatic condition, maximum percent of canopy crop was noticed as 30-35%. Range trend was determined by scale method. Maps of condition, trend vegetation types and erosion sensitiveness were determined in Arc GIS 9.3 soft ware. Finally by intercrossing the resulted maps and the suggested table by Arzani (2006), (Table 3), for level of utilization in different climatic conditions the level utilization map was achieved. In the study area the level of utilization was determined by adjusting for Ommanian Gulf and Balouchian region.

RESULTS AND DISCUSSION

Since determining the level of utilization in a range is part of aims to improve favorite plant conditions in plant composition and maintaining the other components of ecosystem, therefore to achieve these aims paying attention to environmental factors such as climate and soil condition is necessary. Climate and soil are influencing factors on vegetation composition and characteristics such as plant variety, density, frequency, biomass and forage production by plant species so a kind of criteria is needed which includes all affective factors. In this research the level of utilization of forage was determined by using the table of classification utilization level in areas with different climate, suggested by Arzani (2006). In this classification the highest recorded level of utilization in humid and semi humid areas is 50%, 40%in dry and semi dry areas, 30%in desert areas and 20 % in areas for ecological studies [7]. As the rain and humid increases the percentage of utilization level increases too, because there is a direct relationship between forage production and rain amount and following humidity. Although there could be more production by more humidity and subsequently more harvesting capability, it is necessary to consider the health and competing capability of favorite plants. According to the mentioned reasons and climate condition of the under study Roudan rangelands, maximum of the recorded level of utilization is 30%. Although these ranges are in an area with arid conditions climatically, but due to high level of humidity which provides the needed moisture for plants, the maximum of the suggested level of utilization is 35%. But it was not applied in all vegetation types as the same, because 35% is suitable for those vegetation types with excellent or good condition without or with a little erosion and positive or static range trend. Considering the affecting criteria on the level of utilization such as range trend, range condition and soil sensitiveness to erosion, obviously it was different. Based o these criteria which included environmental factors especially climate, soil and vegetation conditions (canopy cover percent, forage production and plant composition) the percentage of the level of utilization was applied according to Table 6. In 6 vegetation types the maximum and minimum suggested level of utilizations were respectfully 25% and 10%. In 1 of the 6 vegetation types the level of utilization was determined as 10%. In *S. capensis, C. oliviery* vegetation type, located in Hoz e Rahdar rangeland, the range condition and soil sensitiveness were limiting criteria, additionally the characteristics of dominant species were noticed as limiting factors for utilizing forage, because one of the dominant species was *Stipa capensis*,which is an annual grass with little palatability in winter rangelands in the south of Iran. This species provide forage for about 3 weeks a year in the region under study. As the grain of this species, has long and sharp spits, so it annoys livestock when grazing. Therefore to prevent livestock injury, it is necessary to determine a suitable time for livestock arrival. According field evaluating in range with poor condition both soil and vegetation condition were degraded. With the aim of improving the range health in soil characteristics, plant composition and density over the vegetation type, it is suggested that the level of forage utilization be considered at a low level or no level utilization. In fact for these kinds of rangelands no level utilization is advised to determine, but due to socio-economic situation of native utilizers it is advised at the minimum amount.. In 2 vegetation types the level of utilization was 25%. The 2 vegetation types which located in Ziarat e Seied Soltan and Kharbajgan(II) ranges with the same name types as *C. spinosous, C. oliviery*. In these types limiting criteria were different. In the first range trend and soil sensitiveness are as limiting factors. Range trend was negative and erodibility was in average condition. But in the second type, range condition and range erodibility were limiting factors. Range condition was fair and the other factor was in average condition. According field evaluating in fair condition, degradation in vegetation properties has been occurred more than soil characteristics. In the mentioned vegetation type the level of utilization was determined as 25%, which was 10% less

than an excellent or good condition. This was due to vegetation condition, in this type the percentage of I class species were little but II class species were as dominant plants and had devoted the most percent of canopy cover, while soil situation was not in critical and severe condition. So, to provide an opportunity for I class species to rehabitate and regrow a lower percent of utilization was determined. In *G. decander, P. aucheri* vegetation type located in Kharbajgan –I type range the level of utilization was determined 15%. In this vegetation type limiting factors were range condition and soil sensitiveness to erosion. The range condition of this type was in fair condition, according field evaluating windy erosion effects were observed and soil surface was significantly covered with stone and gravel also parts of soil surface were bare of plant or vegetation residues were scattered. The palatable species had little growth and freshness, their regeneration was little, they were low in different age class, unfavoriet plants like the perennial species like *Euphorbia larica* were in good condition and high freshness, but the annual species like *S.capensis* were observed more in areas with lower altitude, the II class species regeneration were well and had frequent twigs. Plant composition significantly included II class or invaluable species while favorite plants were in low frequency in the other side considering soil properties.

And according to the scoring table of sensitiveness to windy erosion and relative factors, the erosion quality was in average condition with III class and the ability of deposit producing about 500-1500 tons per square kilometers per year [12]. Therefore it is essential to use the less amount of forage to create time and opportunity for favorite plants to regrow more. Through paying attention to result research in ranges with different geographic and climatic, the effects of these factors would be obvious. Hurd & et al (2008) [14] during a research about the value of soil moisture in range management pointed out that an acre of arid rangeland in fair to good condition with 10-12 inches of precipitation might be expected to produce approximately 600 lbs of standing forage. During the same year of range experts suggest, that only 20% - 50% should be utilized by livestock in order to leave sufficient vegetation for regeneration and wildlife use. Following the conservative utilization rate of 25% suggested for many arid areas with high precipitation variability. Azhdari (2009) [1] stated that the minimum and maximum utilization levels of forage yield in Taleghan rangelands with humid and semi humid climate respectfully 20% and 50%, but based on under study criteria it differs in each vegetation type. Hurd *et al.* [14] pointed out that resiliency of the forage vegetation and hence level of desired forage utilization, varies by many factors, including vegetation type, climate and climate variability, soil and terrain, slope, aspect and wildlife pressure. Sustain productivity over time requires a range-appropriate stocking strategy that leaves sufficient post grazing vegetation, usually between 50% and 75%, for the subsequent year's regrowth. Jaramillo, (2010) [15] found that allowable use for Pinon Juniper woodland and grasslands is as 20-40%, also he noticed that adjustments in numbers, rotation schedule or season of use will be made if allowable use standards are met or exceeded. To achieve desirable allowable use, it is important to have proper livestock distribution. Redfearn and Bidwell (2005) [8] In order to achieve a proper utilization level of forage production to determine stocking rate, suggested the level of utilization based on plant species and residue height, they pointed out that minimum and maximum levels of utilization in Oklahama ranges were respectfully 50% and 75%. Baca (2000), [3] Founding that the plan for grazing on any allotment must consider other uses (recreation, wildlife, mineral resource development,..) and it should be coordinated with other users of public lands, as well as the level of forage utilization, based on the difference in rainfall amount, different plant community and topography would not be as the same. (SRM) The society of range managers in U.S.A advised for 60% utilization level in rangelands with a rotational grazing system. One objective of determining the level of utilization is to determine stocking rate and a correct grazing management. Holechek & pieper, (1992), [16] Galt *et al*. [17] announced that an acre of arid rangeland in fair to good condition might be expected to produce 600 lbs of standing forage during the year, of which 25%-50% was suggested to consume by the livestock in order to leave sufficient vegetation for wildlife and regeneration. Following the conservative utilization rate of 25% suggested for many arid areas with high precipitation variability. Smith *et al*. [5] pointed out that a grazing management plan describes the resource and other objective to be achieved for the management of unit. The plan outlines the practices to be implemented in order to meet objectives while it is not certainly predictable due to specific site conditions, climate or other factor conditions. One of the considered criteria in this research was range condition which was studied based on four factors. This method was applied because it includes one of the important and influencing criterion such as plant condition (canopy cover, plant composition and freshness and the ability of plants). In fact the quality and the quantity of these vegetation characteristics depend

Table 4: Scoring the sensibility of soil to erosion in 6 vegetation types

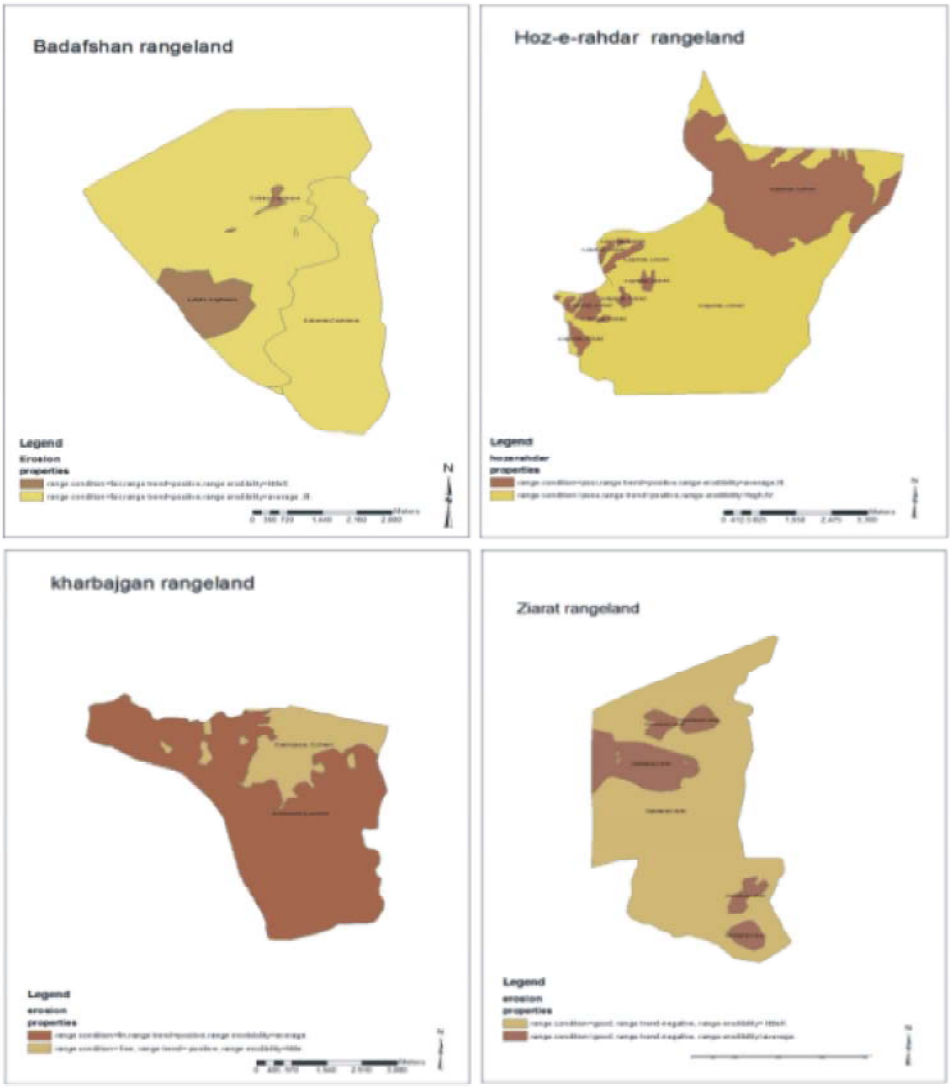
	Range name					
Factors rank	Hoz e rahdar	Kharbajgan type 1	Kharbajgan type 2	Ziarat e seied soltan	Badafshan-type 1	Badafshan type 2
Litho logy	7	5	4.5	5	1	3
Topography and geomorphplogy	7	1	2	4	5.5	3
Wind speed and condition	12.5	12.5	12.5	12.5	12.5	12.5
Soil factor and soil cover	5	3	5	5	4	7
Vegetation cover?	10	6	7.5	5	6	7.5
Soil surface erosion effects	10	5	4	5	11	1
Soil moisture	9	8	6	10	7	7
The kind and distribution of windy deposits	3	3	3	3	3	2
Land use management	10	5	5	5	2.5	2.5
Total score	75.5	54.5	46.5	54.5	50	45.5
Severity of erosion and deposits	High,IV	Average, III	Little, II	Average, III	Average, III	Little, II

Table 5: The table of forage utilization level and effective criteria

Level of utilization (%)	Range sensitiveness to erosion	Range trend	Range condition	Range name	The number of vegetation type in map	The name of vegetation type
20	Average, III	Constant	Fair	Bad afshan(I)	1	*Convolvolus spinosous, Cymbopogon oliviery*
20	Little, II	Positive	Fair	Bad fshan(II)	2	*Gymnocarpus decander, Convolvolus spinosous*
25	Average, III and Little, II	Negative	Good	Ziarat e seied soltan	3	*Convolvolus spinosous, Cymbopogon oliviery*
*15	Average, III and Little, II	Positive	Fair	Kharbajgan(I)	4	*Gymnocarpus decander, Platoshed aucheri*
25	Little, II and Little, II	Positive	Fair	Kharbajgan(II)	5	*Convolvolus spinosous, Cymbopogon oliviery*
*10	High,IV	Positive	Poor	Hoz e rahdar	6	*Stipa capensis Cymbopogon olivieri*

*Indicates the rangelands advised not to be used.

on climatic and soil condition. Based on the direct relationship between rainfall and forage production it would be logical to say the more rainfall and moisture, the more forage production. Because of the variable characteristics of rainfall in dry and semi dry climates, such as unpredictable rainfall, variety in the rainfall amount and distribution during several years and months, destructive floods) the characteristic of vegetation changes. Therefore it would not be possible to apply the results of an assessment for one year with specific climate condition to many years. So, it is advised to measure, determine and apply any vegetation characteristics just for that year with specific ecological condition. Amiri (2009) [2] pointed out that the level of utilization would not be as the same in regions with different climatic conditions and also different vegetation types. Also soil is another ecological effective factor on range productions. As Hurd *et al*. [14] noticed that livestock production is the principal economic activity on private and public rangelands in U.S.A and soil moisture is a central factor in the economic livelihood of these ranchers and rangeland managers. Soil moisture is the primary limiting factor to forage growth and productivity and underpins all the range livestock producer's economic decisions related to grazing, stocking rates and livestock weight gain. Vegetation productivity is highly correlated with both climate and soil and is affected by the existing vegetation stock (through reproductive potential) as well as competition from non grazing types of vegetation. Climatic factors that are typically observed as functional inputs into vegetation growth include solar radiation, temperature, precipitation and wind speed (especially as a factor determining evapotranspiration rates). Over the course of the normal growing season in southwestern rangeland the dominant climatic factor limiting vegetation growth is soil water availability. As such soil moisture is a key indicator of vegetation production potential. Holcheck and Galt (2000) noticed a ten years time to develop a guideline of utilization level. Their results indicated that utilization level would change by changes in other factors such as sampling method and plant growth characteristics [18]. Determining the level of utilization would be possible in all over a rangeland or in key areas. Based on these reasons it would not seem to point out the guideline of utilization level as a stable limitation to determine the time of livestock movement from one rangeland to the other or among seasonal rangelands. If at the end of any grazing season and in a specific part of range for several years, the amount of usage by livestock is more than determined amount, an improvement and correction in guideline of utilization level would be needed, as a result of the application of these guidelines and standard will emphasize using the best information for a site- specific situation [19-21].



The maps of rangelands under study

CI The practical units were selected 6 vegetation types. Range condition, trend and soil erodibility were noticed as effective parameters, according to these parameters and the theories of forage harvesting, 50% to use and 50% to conserve, proper use or a proper level of forage utilization was determined for ranges in under study region with annual average of rainfall 180.2 millimeters. Among 6 vegetation types the most and the minimum level utilizations respectfully were 25% and 10%

CONCLUSION

The practical units were selected 6 vegetation types. Range condition, trend and soil erodibility were noticed as effective parameters, according to these parameters and the theories of forage harvesting, 50% to use and 50% to conserve, proper use or a proper level of forage utilization was determined for ranges in under study region with annual average of rainfall 180.2 millimeters. Among 6 vegetation types the most and the minimum level utilizations respectfully were 25% and 10%.

REFERENCES

1. Azhdari, G.H., H. Arzani, A. Tavili and G. Feghhi, 2009. Determining Criteria of Utilization level in Different Types of Taleghan Rangelands. Journal of Range and Watershed Management, Iranian Journal of Natural Resources, 62(3): 329-340.

2. Amiri, F., 2011. An approach for range land suitability analysis to apiculture planning in Ghara Aghach region, Isfahan, Iran. Journal of World Applied Science, 12(7): 962.
3. Baca, S., 2000. Bureau of land management. Standards for Rangeland Health and Guidelines for Livestock Grazing Management. Central California. U.S. 1999-2000, pp: 10.
4. Planning of Range Management of Ziarat range, 2008. Natural Resources Department of Hormozgan province, Iran. In Persian.
5. Smith, L., G. Ruiley, J. Maynard, S. Barker, W. Meyer, D. Stewart, B. Coulloudon, S. Williams and J. Deyess, 2007. Principles of Obtaining and Interpreting Utilization Data on Rangelands. The University of Arizona Cooperative Extension, College of Agricultural and Life science, AZ1375, 05/07.
6. Moghaddam, M.R., 1999. Range and Range management. Tehran University Press, pp: 218-260. In Persian.
7. Arzani, H., 2004. Booklet of assessment and analysis of Rangeland Natural Resources Faculty. University of Tehran. Unpublished.
8. Redfearn, D. and T. Bidwell, 2005. Stocking rate: The key to successful livestock production, OKLAHOMA COOPERATIVE EXTENSION SERVICE. PSS: 2871. http://osufacts.okstate.edu.
9. Amiri, F. and H. Arzani, 2010. Rangeland Management based on capacity and vegetation Index (case study: Semi arid Ghareh Aghach region), Iranian Rangeland Journal, 3(4): 680-698. (In Persian language).
10. Amiri, F., 2009. A GIS Model for classification of Rangeland Suitability for Sheep Grazing in arid and semi- arid regions of Iran. Livestock Research for Rural Development, 21(5): 68-82.
11. Arzani, H., 2006. Booklet of animal and rangeland relation. Natural Resources Faculty, University of Tehran. Unpublished.
12. Ahmadi, H., 1999. Applied Geology: Windy Erosion. Tehran University press, pp: 386-393. In Persian.
13. FAO, 1991. Guidelines: Land evaluation for extensive grazing, soil resource management and conservation service. Soil Bulletine No: 58, Rom, Italy, ISBN: 92-5-103028-6, pp: 158. www.fao.org.
14. Hurd, B., A. Torell and K. Mcdaniel, 2008. Prespective on Rangeland Management: Stocking Rate, Seasonal Forecaste and the Value of Weathew Information to New Mexico Ranchers, NM State university, Research Report, 759: 2.
15. Jaramillo, A. and R. Jaramillo, 2010. U. S. 2010 Annual Operating Instructions Mogotito Allotment, pp: 3-4.
16. Holechek, J.L. and R.D. Pieper, 1992. Stimation of stocking rate on New Mexico Rangelands. Journal of Soil and Water Conservation, 47(1): 116-119.
17. Galt, D., F. Molinar, J. Navarro and J. Holechek, 2000. Grazing capacity and stocking rate. Journal of Rangeland, 22(6): 7-11.
18. Society for Range Management, 1989. Glossary of terms used in range management. Fourth edition. Society for Range Management. Denver.
19. Abou-Deif, M.H., M.A. Rashed, M.A.A.Sallam, E.A.H. Mostafa and W.A. Ramadan, 2013, Characterization of Twenty Wheat Varieties by ISSR Markers, Middle-East Journal of Scientific Research, 15(2): 168-175.
20. Kabiru Jinjiri Ringim, 2013. Understanding of Account Holder in Conventional Bank Toward Islamic Banking Products, Middle-East Journal of Scientific Research, 15(2): 176-183.
21. Muhammad Azam, Sallahuddin Hassan and Khairuzzaman, 2013. Corruption, Workers Remittances, Fdi and Economic Growth in Five South and South East Asian Countries: A Panel Data Approach Middle-East Journal of Scientific Research, 15(2): 184-190.