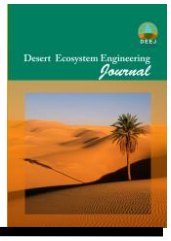
DEEJ (2021) 10 (32) 113-124

University of Kashan

Desert Ecosystem Engineering Journal

Journal homepage: http://deej.kashanu.ac.ir



Assessing the Rangeland Potentials for Income Diversification: A Case Study of Cheshmeh Khan Rangeland, Jajarm

Ladan Asgharnezhad[1], Ghodratullah Heydari[2]*, Hossein Barani[3], Esmaeil Sheidai-Karkaj[4], Ali Hosseini Yekani[5]

Received: 05/01/2021 Accepted: 18/05/2021

Extended Abstract

Introduction: In recent decades, considering merely the fodder production in dealing with rangeland ecosystems has led to the destruction of fields and reduced rangeland capacity for direct usages such as forage production. Therefore, proper and stable utilization of rangelands with the aim of improving the rancher's quality of life and stability in such kind of exploitation are among the major goals of Iran's social and economic development programs. Most development scholars have proposed the application of a diversification approach to economic activities within the framework of a stable development model to reduce the negative effects of mono-functional use of rangelands, considering the fact that this approach guarantees rangelands and economic stability of gainers, as the diversity of subsistence can be a replacement for unfavorable living conditions and poverty in such areas.

Materials and methods: The present study was conducted in Cheshmekhan rangelands in Jajarm city in North Khorasan province. In this study, the beneficiaries were interviewed to check the capacity of the income sources, and those sources that were capable to be applied in the region were listed to prepare a suitability map and optimally combine the income sources. In addition to determining the suitability of rangelands for multi-purpose usages (livestock grazing, apiculture, and medicinal plants), the optimal combination of income sources for representative gainers was determined using the Linear Mathematical Planning Model in LINDO software. Moreover, the instructions proposed by Arzani et al (2008) were used to determine the suitability of exploitation, according to which all the relevant factors were identified and scored in each model, and finally, the suitability of different utilizations (livestock grazing, apiculture, and medicinal plants) was categorized in classes S1, S2, S3, and N based on the total obtained scores.

On the other hand, to determine the optimal patterns of income sources for representative beneficiaries, the beneficiaries were interviewed in-person to check the capacity of NGOs' income sources. Then, those income sources that could be operationalized in terms of NGOs were listed to prepare a suitability map and develop their optimal patterns. Then, the required information regarding each NGO was obtained through interviews and questionnaires, based on which, a number of representative beneficiaries were defined in terms of the amount of capital available for each NGO, and their optimal income sources' patterns were determined individually, followed

1 PhD in Rangeland Science Department of Watershed and Range Management, Faculty of Natural Resources, Sari University of Agricultural Sciences and Natural Resources - - Department of Watershed and Range Management

2 Assistant professor Department of Watershed and Range Management, Faculty of Natural Resources, Sari University of Agricultural Sciences and Natural Resources, Iran; q-heydari@yahoo.com

3 Assistant professor Department of Watershed and Range Management, Faculty of Natural Resources, Gorgan University of Agricultural Sciences and Natural Resources, Iran

4 Assistant professor Department of Watershed and Range Management, Faculty of Natural Resources, Orumieh University, Iran

5 Assistant professor Department of Economy, Faculty of Economy, Sari University of Agricultural Sciences and Natural Resources, Iran

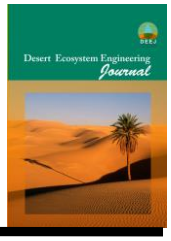
DOI: 10.22052/deej.2021.10.32.59

DEEJ (2021) 10 (32) 113-124

University of Kashan

Desert Ecosystem Engineering Journal

Journal homepage: http://deej.kashanu.ac.ir



by a comparison between the optimal patterns and the current ones. It should be noted that this study used a linear planning model, which is solved by LINDO software.

Results: the study's results indicated that 44.7% of the area was moderately suitable, 43.66% of the area was hardly suitable, and 11.54% of the area was not suitable for livestock grazing. Moreover, 14.23% of the area was very suitable, 49.38% of the area was moderately suitable, and 24.84% of the area was hardly suitable for apiculture. It was also found that 7.22%, 71.62%, and 9.6% were very, moderately, and hardly suitable for harvesting medicinal plants, respectively, and 11.5% of the region was not suitable for this purpose at all.
The best exploitation pattern for different plant types was determined according to the ecological potentials of the region by identifying the optimal pattern of income sources, the results of which suggested that the efficiency of the optimal patterns increased by 1.01%, 2.11%, 3.18%, and 30.25%, respectively, compared to the efficiency of the current pattern for the representative gainer 1, 2, 3, and 4.

Discussion and Conclusion: rangeland managers are required to manage and maintain the health of the rangeland's ecosystem, which is only possible when plant communities are used according to their suitable potential. The results of suitability studies showed that it was possible to reduce the number of livestock and restrict the use of medicinal plants and apiculture. Therefore, it could be argued that the knowledge concerning the suitability of multi-purpose usage and the economic desirability of any type of utilization could be applied in prioritizing the utilization and conservation of resources by identifying the utilization method as an alternative or complementary option. Therefore, this study determined the best utilization pattern for different plant types according to the ecological potentials of the region by identifying the optimal pattern of income sources.

Keywords: Optimal pattern, Linear planning, The suitability of rangeland, LINDO software.