



University of Zabol
Graduate school
Faculty of Water and Soil
Department of Rangeland

**The Thesis Submitted for the Degree of M.Sc (in the field of
Natural Resources)**

**Investigation the relationship between
provisioning and regulating services in arid
shrublands (Bam city, kvaruyyh area)**

Supervisors:
Dr. S. Noori

Advisors:
Dr. A. Khosravi

By:
F. Roshani

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Abstract

Forage production and carbon sequestration are considered as the most important productive and regulatory services of rangelands. Carbon sequestration by rangeland ecosystems is a potential strategy to neutralize greenhouse gas emissions. The main purpose of this study was to investigate the relationship between productive and regulatory services in arid areas shrubs (Case study: Bam city; Kovaruiyeh region). For this purpose, after determining three critical centers, the plots were located in 4 main geographical directions at distinct distances from these centers. At next phase, forage production was measured by double sampling method within the plots. Soil samples were collected from a depth of 0-30 cm, transferred to the laboratory, and then soil carbon content was estimated using the Walkley-Black method. The results showed that in shrubs of Derijan and Jazin, at further distances from the watering place by reducing livestock grazing, inferior species with palatable grade 3 has been increased ($P = 0.045$ and $P < 0.0001$, respectively). Therefore, near the watering place, the vegetation composition has been changed; resulting in a structural threshold has been happened. DCA results showed that with increasing grazing intensity, plant species of *Achilla millefolium*, *Acantholimon Horrida*, *Launaea Spinosa*, *Echinops Vilasisimus*, *Peganum Haranta* and *Daphne Mucranta* has been increased. Low to medium grazing intensity of livestock has caused the growth of *Astagalus Gossypinus* species followed by it species of *Thymus vulgaris*, *Zygophyllum eurypterum* Boiss and *Amigdalus Scoparia*. In all shrubs, increasing the distance from the center of crisis has a significant effect on the total forage production amount of the villages ($P < 0.0001$); Less grazing was observed. With increasing distance from the critical center due to the decrease in livestock grazing amount, plant production is increased and the highest production was observed at distances less than watering place where livestock grazing was less. Also, the distance where is shown between threshold in the watering place of three villages of Jazine, Tavakolabad and Daryjan, it has not been the same. Although forage carbon content was high near the critical center, but with increasing distance from the critical center, forage carbon content had not significant change ($P < 0.05$). Therefore, although the structural threshold has an effect on performance of forage production, but it has no effect on soil carbon and no performance threshold was not observed for soil carbon. The results showed that there is no significant relationship between soil carbon and forage in all three villages (95% confidence level) ($P > 0.05$). Therefore, Soil carbon do not cross of the performance threshold and soil fertility did not decrease drastically in the studied villages. Therefore, the results of this study, considering the importance of rangelands especially in forage production at Kovaruiyeh region, it is suggested that by increasing the number of watering place and appropriate distribution of livestock, etc., the grazing pressure of livestock will be reduced, especially near the watering place. Also, because soil carbon has not yet crossed the performance threshold, it can be improved by properly managing considered ecosystems.

Keywords: Ecosystem services, Kovaruiyeh, performance threshold, Forage production, Livestock grazing, Carbon sequestration.