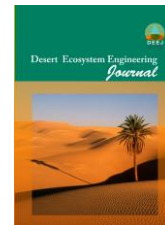




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Investigation of the Effect of Constructing Small Arc Basins System on Vegetation Composition and Biodiversity in Aridland Ecosystems in the East of Iran (Case study: Rangelands of Sarbisheh, South Khorasan Province)

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Extended Abstract

Introduction: One of the ways of restoration and reclamation of damaged rangeland is to use different methods of rain harvesting such as pitting, counter furrowing, flood spreading, small arc basins system and etc., along with the reduction of runoff, it increases the soil moisture content and thus increases vegetation cover. Biodiversity is most commonly used to describe the number of species. It is studied in 3 levels, including genes, species, and ecosystems. However, species diversity is a major issue of biodiversity on a local and regional scale. Species composition and biodiversity are among the fastest and most important indicators for determining rangeland ecosystems condition. Due to the new construction of this structure in the rangelands of Iran, so far, little research has been done on the effect of small arc basins system on vegetation and forage production. Particularly, there is limited research on the variation of richness and species diversity by Construction of this structure. Abdollahi et al. (2016) investigated the effects of crescent pond structure on vegetation and soil parameters in Saravan rangelands of Sistan and Baluchestan province. The results of their research showed that, significant differences were found for all vegetation parameters between the crescent structure and control treatment, indicating the positive effect of crescent structure on vegetation parameters. The purpose of this study was to investigate the effect of constructing small arc basins system has been investigated on the composition of vegetation and biodiversity in the rangelands of South Khorasan province.

Materials and methods: Sampling in the rangelands of Sarbisheh, South Khorasan Province, was carried out in small arc basins area. Vegetation sampling was carried out in the rangelands by systematic-random method at the flowering stage of the dominant plant species in the spring of 2014. vegetation characteristics such as density, composition, cover percentage, and species richness indices (Margalef and Menhinick), species diversity indices (Simpson, Shannon - Wiener and Fisher's alpha) and species evenness (Pielou) were investigated in two areas (small arc basins area and the control area). The all biodiversity indices were

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calculated using PAST software. To compare the vegetation characteristics including density, composition, vegetation percentage, species richness, diversity and evenness, independent samples t-test were used.

Results: In general, 30 plant species were identified in two areas (small arc basins area and the control area), which belong to 17 families and 27 genera. The results showed that the number of plant species in the control area is 9 and in the small arc basins area is 30 species. The results of comparing the total vegetation cover percentage in both areas showed that the percentage of total coverage is very significant ($p < 0.01$). The effect of construction of the small arc basins area system on the density of rangeland plants was very significant ($p < 0.01$) and this system has significantly increased the density of rangeland plants., there is a significant difference in species diversity between the two regions in terms of Simpson diversity index and Shannon-Wiener's diversity index, but this difference is not significant in the alpha-Fisher's index. The results of the data on the study of richness indices also show that the Margalaf's richness index shows a very significant difference in the comparison of species richness in the two study areas, but this difference was not significant in terms of the Menhinick's index.

Discussion and Conclusion: The results showed that the construction of small arc basins in the study area increased the number of plant species, species density and vegetation percentage compared to the control area, which indicates the positive effect of this structure on improving the ecosystem conditions. Research in this area also confirms this result. The results of this study indicate that the number of annual and perennial species in the control area (totally nine species) from 4 and 5 species in the control area has increased to 15 species for both species (a total of 30 species) in the small arc basins area. As well as, the results indicate that the vegetation cover percentage and frequency of perennial species is more than annual species. Several studies have indicated that species diversity has a significant relationship with soil texture and soil moisture. Since the construction of small arc basins leads to changes in soil moisture content and soil texture. Therefore, it has a significant effect on species diversity. Finally, according to the results of this research as well as previous researches, we can say that the effect of small arc basins system was positive on the ecological characteristics of vegetation in the study small arc basins treatment. Therefore, it can be considered as one of the most effective methods for the restoration of degraded rangelands.

Keywords: Density, Vegetation Cover, Species Diversity, Species Richness, Small Arc Basin.