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Impact of Water Point on Rangeland Condition and Spatial Distribution of Vegetation and Soil Nutrients

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Abstract

The impact of livestock grazing on rangeland condition, woody plants encroachment, spatial distribution of soil nutrients and herbage mass change along the grazing gradient was investigated. The study was conducted using non-permanent plots established at regular interval on line transects radiating from Dambi Pond in Dida Hara Pastoral Association of Yaballo district, Borana, Ethiopia. Effects of distance from the Pond were analysed using linear regression, Detrended Correspondence Analysis (DCA), and Redundancy Analysis (RDA). Results showed that the composition of herbaceous vegetation changed from a community of *Eleusine intermedia*-*Cynodon dactylon* close to the Pond to *Chrysopogon aucheri*-*Sporobolus pellucidus* farther away from the Pond. Three distinct zones were determined. The zone closest to the Pond was characterised by unpalatable forbs, least desirable/undesirable grasses and grass species associated with disturbance, bare soil, high density of woody plants, soils with higher proportion of silt, higher concentration of P, N, OM, and K. The intermediate zone was characterised by clay soil associated with CEC, Ca, Mg, high proportions of least desirable and intermediate grass species, high herbage mass, and high proportion of woody plants cover. Highly palatable grasses, high score of rangeland condition and sand soil characterised the third zone farthest away from the Pond. It was concluded that distance from the Pond had a significant impact on soil nutrients and, consequently, spatial distribution of herbaceous species and rangeland condition. As proximity to the Pond increased, scores of rangeland condition decreased implying that the Pond contributed to rangeland deterioration. Rangeland degradation may result in local extinction of some plant species and low animal production, finally challenging the livelihood of the pastoral community.

Keywords: Dambi Pond, degradation, distance, soil nutrients, vegetation distribution