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"Development on the margin"

Soil Properties under the Influence of Different Rangeland Management in the Grassland Biome, South Africa

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Abstract

The grassland biome of South Africa is a major resource for livestock farming; yet, the soils of these rangelands are increasingly threatened by overgrazing. The aim of the present study was to investigate how basic soil properties respond to intensified rangeland management under different property rights. For this purpose we sampled different types of rangeland management systems under communal, trust and commercial farming, and within each of these systems we differentiated good, moderate and poor rangeland conditions along a gradient of increasing grazing pressure with decreasing distance to the drinking points. The analyses comprised the assessment of C, N and inorganic nutrient contents as well as the determination of amino sugars as markers for microbial residues. The results showed that soils from the commercial farms exhibit higher nutrient contents, especially those of C, N and K were enriched, whereas the respective nutrient stocks were depleted in the communal farms. When separating the samples into the different veld conditions (poor, moderate and good) we found that the change in soil properties of communal farms took place mostly in the poor veld. The poor rangeland condition was also depleted in microbial residues, among which fungal residues (glucosamine) dominated the microbial residue pattern. We conclude that soil degradation with intensified rangeland management occurs mainly nearby the watering points, but that the management system has a great impact on the direction of these changes. Under communal management, the soils of the poor rangeland condition degrade, whereas under commercial management the soils even improve, likely as a result of longer soil resting times and additional use of feed additives.

Keywords: Livestock farming, microbial residues, soil nutrients, veld condition

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