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**Thema**

Kommission IV: Bodenfruchtbarkeit und Pflanzenernährung

Biogeochemie gekoppelter Stoffkreisläufe (NPK) unter traditioneller Landnutzung

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Soil properties of bare patches in rangelands of South African´s grasslands

**Abstract**

A loss of grassy cover accompanied by the development of bare soil patches, are the most notable forms of rangeland degradation in grasslands of South Africa. Concerns are growing over the threat of loss of nutritious perennial grass species and the lack of regrowth of the bare patches. Grazing and different rangeland tenure systems -communal and freehold, which is equal to continuous and rotational grazing system - are considered to be of major importance for rangeland degradation.

The continuous grazing system is seen to be more affected, but the development of bare patches is not restricted to communal land. We hypothesized that (1) soil properties of bare patches in South Africa´s grasslands are not different in different tenure systems, and (2) soil properties differ with size of bare patches, where big patches are more degraded.

To test this, we sampled soils at communal and commercial land in the Thaba Nchu area of South Africa with the following design: we selected three farms per tenure system, 6 randomly chosen plots (100x100m) per farm, and within these plots we sampled 5 bare patches of different sizes (0-10 cm) per plot, where the soil sample (3 replicates) were taken out of the middle of the bare patch. Additionally, soils of adjacent grass were sampled. The results showed that in total, there were more bare patches in continuous grazing systems, evaluated by aerial pictures, but we couldn´t find any differences in bulk density and carbon stocks, between the tenure systems. Additionally, and surprisingly, we found no significant differences in soil organic carbon stocks between bare soil samples and grass samples. There was no clear relationship between bare patch size and nutrient contents. Other nutrients like phosphor were significantly enlarged at the bare patch compared to the grass samples. According to our results, we conclude, that the bare patches seem to develop in different pathways: i) along tracks of grazing animals, (ii) around termite hills, where the termite construction seems to be an initial starting point of bare patches and (iii) on staying and lying places of the grazing animals, which also explain the higher nutrient contents at the bare patches.