

# Back to the roots – do traditional Maasai management strategies work towards resilience against unpredictable rainfall and grazing pressure in northern Tanzania?

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## Background and objectives of the study

Semi-arid African savannas are often prone to heavy degradation due to overutilization and increased climate variability. Rangeland management can tremendously affect the rangeland quality. Transhumance, traditionally practiced by the Maasai ethnic group in eastern Africa, has been a successful approach for decades to maintain a high pasture quality. Moreover the pastoralists practice seasonal exclosures, as calf-pasture and forage reserve during dry season. The objective of this study is to evaluate the resilience of rangelands in northern Tanzania towards simulated high grazing pressure and different resting time between grazing events.

## Study region

The study was conducted in the Maasai Steppe, Simanjiro district, Tanzania, a semi-arid savanna landscape receiving bi-modal rainfall of around 600 mm per annum. The communal grazing land of the studied community was separated into rainy season grazing land (RSGL), dry season grazing land (DSGL), and seasonal exclosures (exclosure).



## Data collection

- Clipping experiments in the RSGL, DSGL and Exclosures;
- For two consecutive growing periods: March – June 2019 (GP1, low rainfall) and Nov 2019 – Feb 2020 (GP2, high rainfall).
- Experimental plots were cut every month (month) or only once after the growing period (season).
- Half of the plots were fenced, to protect them from grazing (fenced). The other half was open for additional grazing by herbivores (open).
- Drymass of cut grasses and forbs was measured.

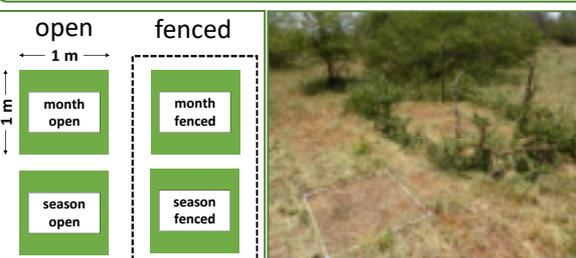


Figure 1: Experimental plots established to measure the biomass after different resting time (month vs. season) and different accessibility for herbivores (fenced vs open)

## Results

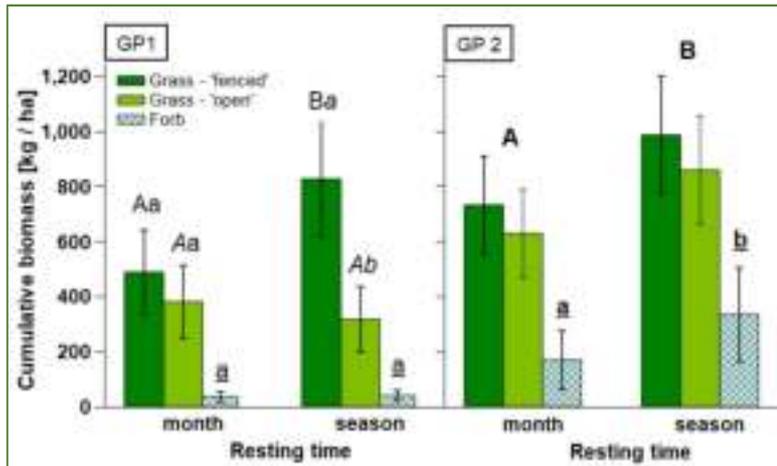


Figure 2 – Cumulative mean grass and forb biomass [kg/ha] in experimental plots that were resting for one month ('month') or one season ('season') between clipping events. Half of the plots was fenced to fully exclude grazers ('fenced'), the other half was open for continuous grazing ('open').

- Biomass was significantly higher in plots with seasonal resting time
- During dry conditions in growing period 1, biomass was equally low in plots with monthly and seasonal resting time, when plots were open for additional grazing
- Additional grazing influenced grass biomass of experimental plots during dry conditions in growing period 1, but not when rainfall was plenty in growing period 2
- Mean forb regrowth rate during growing season 2 was around five times higher compared to growing season 1, whereas grass biomass increased by less than two times.
- We found similar results for RSGL, DSGL and Exclosures

## Conclusion and Recommendations

Seasonal resting time leads to increased provision of grass forage

- **Grazing cycles should consider sufficiently long resting periods**

Additional grazing reduces forage provision only during dry periods

- **Grazing plans need to be implemented and controlled, particularly during water limited times**

Forbs benefit from increased availability of rainwater

- **Risk of dominant forbs under current climate scenarios**
- **Sustainable rangeland management needs to include further restoration measures**



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