**Cattle effect on Grass Biomass under a Rotational Grazing Scheme in Mara North Conservancy in Mara North Conservancy, Kenya**

**Background**

In many parts of East African savannas, wildlife roams outside the protected areas and is therefore reliant not only on protected areas, but also on land areas surrounding these. In Maasai Mara Kenya, many wild herbivores occur outside protected areas. They roam in the fully protected Maasai Mara National Reserve (MMNR) and the adjacent semi-protected areas such as Mara North Conservancy (MNC). As part of the conservation plan in MNC, cattle are herded in a rotational grazing scheme sharing the space with wildlife. However, little is known as to how this grazing scheme affects grass biomass on the savanna, and thereby if there is enough grass biomass present to support both cattle and wild herbivores.

**Aim of this study**

To investigate the effect of cattle grazing on grass biomass in a rotational grazing scheme, in a semi-protected savanna ecosystem, Mara North Conservancy. The study tries to answer following two hypotheses:

1. Areas with cattle grazing are expected to have less grass biomass than areas without cattle.
2. Grass biomass increases over time since an area was last grazed by cattle.

The study also investigated whether the combination of two methods 1) ground-truthing and 2) analysis of Sentinel-1 imagery could answer above hypotheses by predicting biomass in pixels not covered by ground truthing, and thereby investigating the possibilities for using remote sensing as a tool to measure grass biomass in the entire rotational grazing scheme area and thereby cover the entire MNC.

**Fieldwork – Mara North Conservancy (MNC)**

The data in this study was collected in September-December 2019 in MNC. With the help from David Noosaron, Louise Vang Sørensen and Emil Ellegaard Thomassen, I obtained a total of 3290 grass biomass measurements throughout MNC in the different rotational grazing scheme blocks. The grass biomass measurements were later analyzed in relation to whether an area was or was not grazed by cattle, and in relation to time since an area was last grazed by cattle. The data was also analyzed to investigate whether Sentinel-1 imagery could predict grass biomass in areas where ground-truthing had not been done.

**Results and discussion**

This study found more biomass present in parts of MNC where livestock grazing was not allowed (no grazing zones) compared to the grazing blocks that were assigned for cattle grazing. It was expected that biomass would increase with increasing time since cattle grazing, however, this study showed that biomass decreased with increasing time since cattle grazing. Drivers of the decrease in biomass could potentially be drought and illegal grazing. Sentinel-1 imagery was used to test whether it could work as an effective tool to measure aboveground biomass remotely and thereby cover the entire MNC. However, because of the drought, and the resulting low biomass, measured biomass could not be used to predict biomass in pixel on Sentinel-1 imagery, where no biomass had been sampled.

In a fast-changing world, where both climate and human disturbance play large roles in the composition of the savanna biome (both floral and faunal), it is important to have flexible and holistic management plans for conservation work. This is what MNC is trying to establish through the many different actions they have implemented, amongst others the rotational grazing scheme for cattle. Because decision-making in conservation planning needs to be based on well-informed studies so as to mitigate long-term impacts on the ecosystem, I believe it is crucial to revisit the functionality and impact of the rotational grazing scheme in MNC regularly. In so doing, can the conservancy manager for MNC make better up-to-date choices and ensure that best practice management plans are created on the basis of the latest knowledge in the field.

Funders: Frands Christian Frantsen's grant