

## Dry Matter Production and Carbon Sequestration Potential of Selected Indigenous and Introduced Grasses under Rangeland Ecosystems of South Eastern Kenya

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### Abstract

This study determined dry matter production and carbon sequestration potential of three indigenous and two introduced grass species under rangeland ecosystems. The indigenous grasses were: - Masai love grass (*Eragrostis superba*), Foxtail (*Cenchrus ciliaris*), Bushrye (*Entropogon macrostachyus*) and the introduced grasses were: - Boma rhodes and Extozi rhodes. The study was in South eastern rangeland of Kenya and data was collected during peak growing period of short and long rain seasons from established pasture plots. Plant samples (above ground, below ground and litter) were harvested by randomly placing 1m<sup>2</sup> quadrats in each plot in triplicate. Soil samples were randomly collected from each plot at a depth of 0-20 cm, air-dried and analysed for carbon content using Chromic acid digestion method from each plot under selected grasses, bulk density was determined. Harvested plant samples were oven-dried for 48 hours to stable mass at 65°C, ground ( $\pm$  2mm size) and combusted in a muffle furnace at 550°C for 4 hours to determine organic matter concentration. The results revealed that indigenous grasses were 24% higher in dry matter production (17.3 vs 14.0 tons/ha) and 23% higher in carbon stock (11.3 vs 9.2 tons) ( $p < 0.05$ ). The implication of the results is that indigenous grasses would offer co benefit of higher dry matter production for livestock feeding and higher carbon sink capacity contributing to minimising emission and global warming potential. This is beneficial to mitigating climate change when increasing ruminant production under often degraded rangeland ecosystems. With this evidence, utilisation of indigenous grass species is highly recommended for sustainable rangeland livestock production supporting increased productivity while minimising carbon emissions.

**Keywords:** Biomass, Carbon Sequestration, Grass Species, Ruminants, Rangelands