Seed ball technology for restoration of degraded rangelands: A socioecological approach in Enduimet Wildlife Management Area, Tanzania

Introduction

Rangelands play a crucial ecological, environmental and economic role, protecting soil profiles, storing carbon, providing habitat for wildlife and serving as catchments for large river systems. The natural plant resources of rangelands are crucial for global, national, local food security and poverty alleviation, hence, they require proper management (Treydte et al., 2017). Pastoralists have lost livestock due to the drought that has devastated most of the Arusha Region in Tanzania, where I plan to work (Magita & Sangeda, 2014) This area faces challenges such as unreliable rainfall, water scarcity and pastures and land use changes that have negatively impacted grazing land and native vegetation (Mpondo et al., 2021). As a result, livestock and wildlife habitats suffer, leading to weakened livestock, decreased market value, and food scarcity for pastoralist families.

I obtained small grant fund from Rufford Foundation to assist in conducting a research to evaluate Seed ball technology for restoration of degraded rangelands in Northern Tanzania. Social survey vegetation survey, seed bank assessments and seedball development are completed. The remaining activities include, soil analysis, screen house, field demonstration, compilation and data analysis, writing manuscript and publishing of results. Data collection are expected to be completed in March, 2026.

Activity one

To determine pastoralists' awareness, willingness and preferred grass species for rangeland restoration the following activities were involved; household surveys, Key Informants Interviews and Participatory mapping.

A total of 320 pastoralists were interviewed and five participatory mapping were conducted. Key informants interviews information were obtained from Village leaders and Village game scouts, district officers, wildlife authority officers, ward rangelands officer and district rangeland officer. In addition, two elders from each villages were consulted for further information.

Above: The project leader conducting social survey to determine pastoralist's preferred grass species for restoration in Longido district. A Village leaders, B participatory mapping in Karao and C participatory mapping in Lopoloseki villages. ©Gladys Lendii (2024)

Activity two.

Vegetation surveys were conducted where 70 grids were strategically set up and a total of 285 quadrats were used to determine the distribution of preferred grass species in Kimokouwa, Karao, Tingatinga, Engikaret and Lopoloseki villages in Longido district.

Above: The project leader, botanist and rangeland expert conducting vegetation survey and their distribution in Longido district. ©Gladys Lendii (2024)

Activity three

Soil seed bank is completed and soil analysis for nutrients is still going on.

Above: Seedbank assessment on the screen house at the Nelson Mandela Institute of Science and Technology. ©Gladys Lendii (2025)

Activity four

Seed ball development is completed and the experiments is still going on.

Above: Experiments: A soil sterilization, B Seedball in pots C, preparation for seedball D materials for seedball development. ©Gladys Lendii (2025)

Ongoing activities

- To determine factors influencing preferred native grass species occurrence, soil samples were collected and soil analysis is still pending as I have encountered shortage of fund to determine soil physico- chemical properties that influences the preferred grass species occurrence in the rangelands
- Seed ball development and screen house experiments activities are still on going at the Nelson Mandela Institute of Science and Technology and it is expected to complete in September 2025.
- Survey for plots that will be used as field demonstrations plot is completed and I expect to start to develop fence in October 2025. Data collection of this activity will start in November 2025 until March 2026 since I will assess seedball performance for two seasons. Short rains in November, 2025 and long rains from end of January, 2026

References

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