IMPACT OF ENCLOSURES ON RANGE PRODUCTIVITY IN CHEPARERIA WEST POKOT COUNTY KENYA

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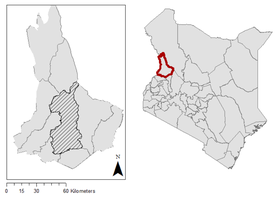
INTRODUCTION

- Overgrazing and deforestation continues to affect the productivity and genetic diversity of forests, woodland and grassland resources in dry lands areas
- In Kenya in the last three decades, there have been notable changes in vegetation in parts of West Pokot specifically Chepareria Ward (Triple L, 2013; Karmeback *et al*., 2015; Wairore *et al*., 2015).
- These changes can be attributed to many factors especially related to land use and management (Wairore *et al*., 2015).
- In West Pokot there have been efforts to improve range productivity and rehabilitate degraded areas. The key management interventions in this area include use of enclosures (Makokha *et al.,* 1999).
- Use of enclosures, which is one of the key interventions, by the Vi Agro- forestry a Non-Governmental Organisation, enhancing with many ecological processes such as disturbance, is a method of rehabilitating degraded rangeland, which in turn affects vegetation dynamics.
- The aim of this study was to evaluate the effects of enclosures on range productivity in the semi-arid rangeland in West Pokot

OBJECTIVES

- To determine the impact of enclosures on plant cover, biomass, frequency and tree density within enclosures and in the adjacent open areas of Chepareria, West Pokot.
- To evaluate the indigenous knowledge, on range monitoring and rehabilitation in Chepareria, West Pokot.
- To determine the effect of enclosure on soil seed bank and soil nutrients in Chepareria, West Pokot

METHODS

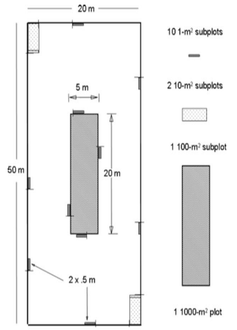


Inside enclosure chepareria

Open area

Modified whittaker plot

Data collected
- •Biomass;
- •Herbaceous Cover;
- •Tree density;
- •Soil nutrient analysis;
- •Soil seed bank analysis;
- •In open and enclosures



RESULTS

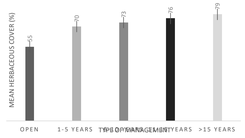


Figure 1.Herbaceous cover in % at different ages of enclosures

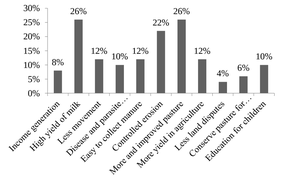


Figure 4. Significance of fencing

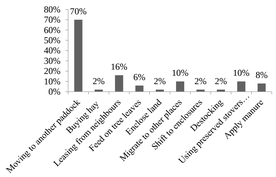


Figure 2. Grazing preference/ when land is too poor for grazing

Table 1: Comparison of soil nutrient levels in enclosures versus in open areas in Chepareria

	Enclosure			Open			P value
Soil parameter	Mean	±se	Class	Mean	±se	Class	
Soil pH	6.16	0.09	Acidic	6.03	0.12	Acidic	0.200
SOC (%)	1.90	1.41	Moderate*	0.32	0.05	Low	0.134
N_{tot} (%)	0.09	0.02	Low	0.05	0.00	Low	0.040
P (ppm)	26.95	11.74	Adequate	5.60	1.11	Low	0.030
K^+ (Cmol (+) kg^{-1}	1.03	0.23	Adequate	6.36	4.23	Excess*	0.120
Na^+(me %)	0.29	0.11	Adequate	0.67	0.19	Adequate	0.050
Mn^{2+} (me %)	0.48	0.18	Adequate	1.18	0.38	Adequate	0.050
Fe^{2+}(ppm)	30.04	2.89	Adequate	25.18	4.80	Adequate	0.200
Ca^{2+} (me %)	2.32	0.15	Adequate	1.75	0.19	Low	0.010
Cu^{2+} (ppm)	6.16	2.78	Adequate	2.30	0.35	Adequate	0.090
Zn^+ (ppm)	4.96	3.23	Low*	18.69	7.51	Adequate*	0.050
Mg^{2+} (me %)	2.50	0.24	High	2.81	0.27	High	0.200

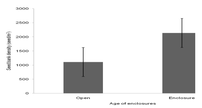


Figure 3: Seed bank density in the open and enclosed areas in Chepareria, West Pokot Kenya

a) Fig 1. open grazing area had a significantly low mean herbaceous cover compared to the enclosed areas (t_{40}=4.043, P<0.001).
b) Herbaceous plant cover increased with enclosures age.
c) Fig 2. When the land condition changes, the pastoralists responds in many different ways. Majority who have enclosures move to other paddocks
d) The seeds collected in the enclosures were twice than in the open areas (t_{40}=-3.21, P<0.001) (Figure 5.1). On average, about 2141 seedlings were in the enclosures and 1112 in the open areas respectively.
e) Fig 4 Enclosing land has many benefits and has led to settlement

a) From table 1 Phosphorus there is a statistically significant difference in open and enclosure since the significance value is at 0.03 which is below 0.05.
b) For calcium we can see from the table that there is a statistically significant difference in open and enclosure since the significance value is at 0.01 which is below 0.05.
c) For Zn p =0.05, Na p= 0.05, Mn p =0.05 and N total p= 0.04 from the table there is a statistically significant difference in open and enclosure since the significance values is below or at 0.05.
d) PH, (p=0.2), SOC, (p=0.134) K, (p=0.12) Fe, (p=0.2) ,Cu (p=0.09) and Mg (p=0.2) there is no statistically significant difference in open and enclosure since the significance (p) value was higher than 0.05.

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CONCLUSION

- The enclosed areas are more productive as a result of having more cover, biomass, tree density and species richness and rich soil seed bank and nutrients
- Enclosures are an important factor in the protection and vegetation recovery process.
- They are effective for rehabilitation if well managed
- This knowledge can be shared with policy makers and agricultural development planners and can be shared during open forums like “barazas” and agricultural events like shows which can be beneficial to people living in arid and semi arid areas

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