

Rehabilitation of degraded grassland systems through reseeding improved forage legumes using ecologically-sound techniques for enhancing productivity

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Banana plantation found at one of the arms

Introduction (Cont'd)

- ❖ Thus crops are grown to supplement the dwindling milk and its products
- ❖ Farmers rear the Ankole x Friesian crosses with higher milk production potential
- ❖ But their nutritional demands are higher
- ❖ Yet, natural pastures (main feed resource) do not adequately supply the needed nutrients due to lack of legume component.
- ❖ Herbage availability is also seasonal
- ❖ Serious feed shortage occurs during drought when the quantity & quality of forage drop



Cattle in search of herbage during drought period

Introduction (Cont'd)

- Nutritional problem is worsened by overgrazing due to overstocking
- Drought and overgrazing have led to rangeland degradation
- Ecological sound rehabilitation techniques are needed to reverse this trend



Cattle grazing a degraded pasture with vegetation dominated by *Sporobolus* sp.

Introduction (Cont'd)

- Adoption of innovative technologies that can enhance productivity would be the solution
- The integration of improved forage legumes into the natural pastures would improve pasture productivity, and in turn milk yields

Specific objectives

1. To determine the effect of oversowing improved forage legumes into natural pastures within degraded rangelands on rangeland productivity
2. To assess the economic profitability of integrating forage legumes into natural pastures found in degraded rangelands

Materials and methods

- ❖ The study was carried out on two sites in Kiruhura district
- ❖ Two participants were selected from each site basing on their willingness to participate
- ❖ They were required to provide at least one acre of pasture and labour for improvement activities
- ❖ Activities were: fencing, bush clearing, digging strips in the pasture and planting legume seeds in the strips
- ❖ Participants were given fencing materials and seeds of Centro, Desmodium, Siratro and Stylo



Training farmers how to oversow legumes into pastures using strip planting technique

Oversowing and management of pastures

- ✿ Strips (0.3 metres wide) were dug in pastures using hand hoes
- ✿ Legume seeds were sown in the cultivated strips at the rate of 3 kg/ha
- ✿ Hand weeding was carried out one month after sowing
- ✿ Grasses were topped 2 months from sowing to reduce intra-specific competition with legumes
- ✿ Light grazing was carried out four months from sowing date

Measurement of forage yields & chemical analysis

- ✿ Five sample areas each 4m², were randomly selected on each farm and herbage enclosed was harvested using a slasher.
- ✿ Fresh weight measurements and botanical composition of the cut were determined
- ✿ Samples were then oven dried to obtain DM weight per hectare
- ✿ Chemical analysis was also done to determine crude protein (CP) content and neutral detergent fibre (NDF) as measures of pasture quality



Cutting forage samples for analysis from improved pasture



Cutting forage samples for analysis from unimproved degraded pasture

RESULTS

Germination & establishment of legumes

- ✘ On all farms, germination was fairly good (60-70%) despite prolonged drought
- ✘ Siratro was the best in germination followed by Desmodium
- ✘ Poor germination of Centro was attributed to soil nutrient problem
- ✘ Performance of Stylo was good (75%), though it was planted on only 2 farms due to lack of enough seeds

Persistence and sward characteristics

- ❖ Siratro and Desmodium were persistent, thus rated best legumes for over-sowing in pastures in the study area
- ❖ Legume incorporation improved the quantity and quality of forage available to the animals
- ❖ Forage DM yields in the improved plots were higher ($p \leq 0.001$) than in unimproved pastures
- ❖ Crude protein of forage in improved plots was higher ($p \leq 0.05$) than that of forage in the unimproved pastures

Table 1. Mean forage DM yields & CP contents of improved and unimproved pastures

Farmer / Farm No.	Type of pasture	DM yield (kg/ha)	% CP content	CP yield (kg/ha)
1	Improved	4963	7.71	382
	Unimproved	2803	6.97	195
2	Improved	4302	8.37	360
	Unimproved	1916	7.63	146
3	Improved	3202	8.53	273
	Unimproved	1032	8.21	85
4	Improved	3744	9.49	355
	Unimproved	1911	8.59	164

Table 2. DM yields and composition of forage from improved & unimproved pastures

Type of pasture	Mean DM (kg/ha)	Legume content (%)	Mean % CP	Mean CP yield (kg/ha)
Improved	4053	7.35	8.53	343
Unimproved	1916	2.27	7.85	148

Table 3. Cattle productivity in relation to type of pasture

Type of pasture	Milk yield (L/cow/day)	Body condition score	Calf mortality (%)
Improved	3.8	5.8	7.2
Unimproved	2.4	4.2	15.0

Table 4. Age at first calving in heifers grazing on the two types of pastures

Age (Months)	Improved pastures	Unimproved pastures
Less than 2 years (%)	40	1
2-3 years (%)	60	59
More than 3 years (%)	-	40
Total (%)	100	100



Calves grazing on improved pasture on one of the farms

Table 5. Analysis of farm profitability: Mean annual gross margin per cow of farms

ITEM	Improved pastures	Unimproved pastures
Income	Uganda Shillings	
Milk and cattle sales	45,393	23,351
Gross Income (TR)	45,393	23,351
Variable Costs		
Shrub control	8,696	4,915
Seeds and oversowing	6,500	----
Cattle drugs	8,463	5,969
Fencing and fence repairs	5,007	4,268
Veterinary consultancy	729	348
Farm labour	7,764	3,921
Calf losses / mortality	750	1,125
Total Variable Costs (TVC)	37,909	20,546
Gross Margins	7,484	2,805
TR/TVC Ratio	1.20	1.14

Conclusions

- ✿ Incorporating legumes into natural pastures improved the quantity & quality of forage, and in turn increased animal production in terms of growth rates, body condition, and milk yields.
- ✿ Improved pastures had better gross margins than unimproved pastures. But the financial efficiency (TR/TVC ratio) of improved pastures was low due to high variable costs

Recommendations

There is need to address the following in tackling the problem of rangeland degradation:

- (i) facilitating the agro-pastoralists financially or materially so that they can improve their pastures through oversowing with improved forages so as to increase the quality and quantity of forage, and
- (ii) training / equipping them with knowledge and skills in pasture management, forage conservation, and livestock feeding.

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