

RESERVING PASTURES IN COMMUNAL GRASSLANDS BY AGROPASTORALISTS OF TANZANIA

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ABSTRACT

Studies were conducted in “Maasai” and “Gogo” tribal communities to gain understanding of traditional management of reserved pastures. Survey techniques were used and forage production and chemical composition were estimated. Household heads were invariably old men who had no formal education. Household size averaged 14 and 11, in Maasai and Gogo tribes respectively. Most reserved pastures were privately owned. Over 90% of pastoralists preferred individual ownership of reserved grazing. Herbage production was 2510 kg DM/ha in Maasai and 3680 kg DM/ha in Gogo locations. Pastures and low protein content (5.1-6.5% CP). Constraints to reserve grazing strategies were land and water shortages. It was concluded that opportunity existed for developing sustainable silvo-pastoral systems and that land ownership policy be reviewed to improve security of tenure. Research was recommended to improve reserved grazing by adopting selected species and protecting available fodder trees and shrubs.

KEY WORDS

Agropastoralists, communal grasslands, pastoralists, reserved grazing, Tanzania, Tropical

INTRODUCTION

Rangelands cover 74% of the total land area of 88 million hectares. Over 99% of all cattle, sheep and goats are kept by rural people in these rangelands producing meat and milk for the fast growing population. Natural pastures are of low nutritive value. Although they provide sustenance to livestock throughout the year, their dry matter yields are low thus leading to low livestock production. To counteract forage shortage, pastoralists rest some areas to allow recovery. “Alalili” (Maasai) and “Milaga” (Gogo) are reserved pastures for use during periods of forage scarcity. They are governed by social norms and indigenous knowledge. Information on the socio-economic aspects of such traditional practices of livestock keeping communities is scanty and thus necessitated this study.

MATERIALS AND METHODS

The study focused on the “Maasai and Gogo” pastoral tribes. Monduli District, home of the Maasai, is situated between longitude 36° and 37° East and latitudes 3° and 4°. The district has an arid to semi-arid climate, with an average annual rainfall of less than 500mm. The Gogo are found in Dodoma region, which lies between latitudes 4° and 7° 30' South and longitudes 35° and 37° East. Average annual rainfall is 500mm. Two studies were conducted in each location, a social study and a vegetation inventory. The first part involved collection of primary and secondary data. A sample size was chosen such that the sampling fraction was equal to 5% of the total livestock keepers in the selected village. A non-random (purposeful) procedure was used in selecting the districts and villages for this study, while respondents were picked at random. The data were coded and analyzed using SPSS/PC to obtain descriptive statistics.

The second study estimated forage production. Average dry weight of quadrat samples was used to calculate the production of dry matter per hectare. Chemical composition of forage samples was determined by the methods of Goering and Van Soest (1970) and as described by A.O.A.C. (1980). Dry matter digestibility and organic matter digestibility (OMD) were determined by the two stage in vitro method

(Tilley and Terry 1963). Energy (ME MJ/Kg DM) was estimated as per MAFF, 1975 (ME MJ/Kg DM = 0.5% OMD).

RESULTS AND DISCUSSION

Characteristics of the study population: Table 1 shows the characteristics of households in the study areas. All the household heads studied were men, possibly due to traditional customs that require heads of household to be men. In all cases household heads had long valuable experiences in livestock keeping. The household size varied from 5 to 32 members, with average size of 12 members. The large household sizes reflected extended family practices. Age category and gender influenced roles and responsibilities in the family.

Grassland Utilization: Grassland utilization is governed by the type of land ownership. Communal ownership is widely practised. This system has contributed to deterioration and low investment in this resource. The uplands are usually grazed first, while the low land areas are reserved for dry season grazing. On average 83% of the respondents suggested that every livestock keeper should own reserve grazing pastures. Pastoralists were faced with problems caused mainly by removal of land resources from their reach, changing market structures and environmental degradation. In mitigating this situation, agropastoralists and pastoralists are becoming more interested in private ownership of grazing lands for enhanced development of the resource.

Cultivated areas and reserve grazing land: Land ownership, use and mode of acquisition are shown in Table 2. At Makang'wa, agropastoralists had highly fragmented and scattered plots. The number of plots varied from 1 to 7 per household, with an average size of 0.5ha. At Tingatinga most land owned was used for reserve grazing purposes. The significant difference observed in size of land under cultivation and reserved grazing between the two locations, implies that the pastoralists of Tingatinga attached greater importance to reserve grazing pastures.

Management of reserve pastures: Major constraints to land management and utilization at Makang'wa and Tingatinga were land and water shortages, trespassing, uncontrolled fires and bush encroachment. Low forage yields and their poor quality were not listed. Reserve pastures were earmarked in the wet season and fenced off using thorn bushes. In the present study 68% of Maasai had permanent reserve pastures while 62% of Gogo agropastoralists rotated the land for pastures to include croplands. Monitoring of individual reserve pastures was a household responsibility, while communal reserve pastures, like the “Lowindo” practised by the Gogo, were governed by village elders and by-laws. At Tingatinga 25% of the respondents practised rain water spreading on reserve pastures and 32% of the Gogo practised range pitting.

Forage production in reserve pastures: There was no significant difference in average dry matter production between the two locations. Significant differences were detected when different sites were compared within site ($P < 0.05$). The average yields at Tingatinga and Makang'wa were 2510 kg DM/ha and 3680 kg DM/ha, respectively.

Twenty seven useful woody species were identified. Pastoralists kept these for shade and for provision of green leaves and pods to livestock. The most useful multipurpose trees observed were *Acacia tortilis*, *A. senegal*, *A. drapanolobium*, *Faidherbia albida* and *Delonix elata*.

Chemical composition of forage species: Chemical composition of range forage samples from the two locations ranged from 88.7 to 91.5% Dry Matter, 8.3 to 9.3% Total Ash, and CP was 5.1 to 6.5%. Acid Detergent Fibre was 42.7 to 45.3% and Neutral Detergent Fibre 65.4 to 74.4%. Estimated Dry Matter Digestibility ranged from 46.3 to 48.7, and Organic Matter Digestibility 45.4 to 46.1%, while estimated metabolizable energy was 6.81 to 6.92 MJ/kg DM.

Concluding remarks: Most household heads are old people, who still hold to traditions and customs and have difficulty perceiving technological advances. However, they are willing to own reserve pastures. Reserve pastures provide an opportunity and basis for development of sustainable silvo-pastoral systems in Gogo and Maasai areas. It is suggested that policy reviews on land tenure should promote individual land ownership, improve security of tenure and attract investment. Research is to look into exploiting the potential of reserve grazing areas, introduce productive forage species and protect suitable indigenous trees and shrubs. Methods of rain water harvesting for irrigation and livestock should also be studied.

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Oven drying caused EP to be over estimated when determined using the *in situ* technique. However, magnitude of this error was greatly affected by drying temperature. Escape protein percentages for samples oven dried at 38° C were 2.4 percentage units higher ($P < 0.05$) than freeze-dried samples after 16 h of fermentation. The recommended ruminal digestion time for the standard NC-189 Dacron Bag Technique is 16 h (Wilkerson et al., 1990). While freeze drying would be the preferable method, oven drying at 38° C seems to be an acceptable alternative in situations where freeze drying facilities are either unavailable, or not capable of handling the sample volume.

Characteristics	Tingatinga	Makang'wa	Average
Age of Household head (HHh)			
<40	29.2	14.3	22.2
40 - 50	29.2	38.1	33.3
> 50	41.7	47.6	44.4
Education of HHh			
None	50.0	52.4	51.1
Some primary	37.5	19.0	28.9
Primary	8.3	19.0	13.3
Some secondary	4.2	9.5	6.7
Household size			
<10	25.0	14.3	20.0
10 - 20	62.5	57.1	60.0
>20	12.5	28.6	20.0

	Tingatinga	Makang'wa
Category and area:		
Under cultivation		
< 1 hectares	79.1%	-
2 - 3 hectares	12.5%	28.6%
4 - 6 hectares	8.3%	38.1%
> 7 hectares	-	33.3%
Under reserve grazing		
< 2 hectares	29.2%	58.1%
3 - 5 hectares	33.3%	41.9%
< 6 hectares	37.5%	-
Mode of acquisition		
Inherited	33.4%	38.1%
By law	50.0%	33.3%
Others	16.6%	28.6%

