

# TRADITIONAL GRASSLAND AND FODDER MANAGEMENT SYSTEMS IN TANZANIA AND POTENTIAL FOR IMPROVEMENT

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## ABSTRACT.

The “*Ngitiri*” fodder conservation system was developed by the Sukuma agro-pastoralists as a strategy to alleviate acute dry season fodder constraints. This traditional agroforestry system provides the basis and opportunities for development of improved silvipastoral systems.

*Ngitiri* is a major source of dry season fodder supply for livestock and thatch for roofing. The system is widespread in the Sukuma landuse system in central Tanzania. This paper presents the scope and importance of the *Ngitiri* system, management aspects, constraints, and farmers’ perceptions on improvement. Implications for agroforestry technology development in the Sukuma agropastoral system are also discussed.

## KEYWORDS

*Ngitiri*, Indigenous knowledge, Sukuma, Tanzania

## INTRODUCTION

“*Ngitiri*” is an indigenous natural resource management system which involves conservation of fallow and rangelands through vegetation regeneration and controlled livestock grazing for use in the dry seasons in response to acute animal feed shortages (Bradstrom, 1985; Malcolm, 1953). The system *Ngitiri* has been influenced by social and political factors which led to a sharp decline in its popularity.

A good understanding of the traditional ecological concepts and characteristics which influence ownership and management of *Ngitiris* would contribute to the revival of the system and development of more productive and adoptable agroforestry technologies.

## MATERIALS AND METHODS

**The study area.** The Sukuma people are an agropastoral tribe found in Shinyanga and Mwanza Regions of Central Tanzania. The area is predominantly semi-arid receiving an annual rainfall of about 600-800 mm. The natural vegetation is predominantly open woodland savanna dominated by acacia species. The major food and cash crops include maize, sorghum, millet, cassava, cotton and rice.

Over 80% of the population own and manage on natural communal rangelands. Livestock production is limited by low dry season fodder supply and poor quality (Hendry 1980).

**Data collection.** Two hundred and forty farmers were interviewed through individual questionnaires. Information collected included; (i) the historical perspectives and evolution of *Ngitiris*, (ii) ownership patterns, (iii) establishment and management concepts, (iv) problems and constraints associated with the system, and (v) perceptions on possible improvements.

**Data analysis.** Questionnaire data was analysed using the Abstat 6 statistical package.

## RESULTS AND DISCUSSION

**Extent and scope of the *Ngitiri* system.** The survey revealed that

the *Ngitiri* system is equally widespread in all districts of the Region. Most respondents (90%) have access to an *Ngitiri* during the dry season (Table 1). Although individual ownership of *Ngitiris* was prohibited in some districts due to local conflicts (Amare 1992), over 7% of the farmers in the study area still own private *Ngitiris*. Ownership of *Ngitiris* is limited by scarcity of land, insecurity of tenure and fear of prosecution by local authorities. Only 35% of the owners said they have enough land to expand existing *Ngitiris*. Both individual and communal *Ngitiris* exist in all villages. These vary considerably in size depending on availability of land. Private *Ngitiris* range from 0.2 to 20 ha with an average of 4 hectares while communal reserves are often large ranging from 10 to 500 hectares.

***Ngitiri* management.** New *Ngitiris* are normally established on degraded croplands and rangelands, but site selection is influenced by land availability, proximity to homesteads, production potentials and ease of protection. Very little or no management is provided during the rainy season other than protection from livestock through the use of landmarks and by-laws which are enforced by the local scouts “Sungusungu” or “Wasalama” with heavy penalties to offenders.

*Ngitiris* are grazed during the dry season after crop residues, fallows and other grazing areas have been depleted. Various rotational grazing management strategies have been developed by the Sukuma to ensure prolonged availability of fodder (Malcolm 1953). The most common system is in the form of deferred grazing rotation through the use of temporary paddocks. Duration of grazing in each paddock depends on its size, availability of fodder and number of animals. Due to high stock pressures and severe overgrazing, fodder production on *Ngitiris* is low ranging between 1 - 1.5 tons of DM per hectare. Similarly, fodder quality is usually low with crude protein contents ranging between 3 to 4%.

**Constraints to management and utilization.** The main constraints limiting *Ngitiri* ownership and use include, land scarcity, insecurity of tenure and encroachment by other pastoralists. Other problems include scarcity of stock water, low quality and quantity of fodder supply.

**Farmer perceptions on *Ngitiri* improvement.** Survey results and discussions with farmers clearly indicate *Ngitiri* as a valuable practice for fodder production and land conservation. Farmers would like the system renewed and improved. Major improvements indicated by farmers include the introduction of more productive fodder trees and grasses (Table 2). The most preferred fodder trees include: *Leucaena leucocephala*, *Acacia polyacantha*, *Acacia nilotica* and *Acacia tortilis*.

In addition to fodder improvement, farmers suggested policy changes in land tenure laws to improve security of tenure.

**Implications for agroforestry development.** The traditional *Ngitiri* system provides a valuable opportunity and basis for development of sustainable silvo-pastoral agroforestry systems in Sukumaland.

The extensive traditional knowledge base, already existing among

farmers regarding the values of trees and grasses, ecological basis of Ngitiri location and management, and general acceptance of the system provide valuable tools for developing parallel agroforestry technologies such as fodder banks and improved fallow systems.

In addition to the development of sustainable silvopastoral systems, it is also possible that the Ngitiri analogy could be valuable for developing agroforestry technologies on croplands which would combine fodder production as well as soil fertility restoration in space and time.

**Research and development needs.** In order to improve the Ngitiri system, research will need to focus on improving productivity and efficiency of management as well as policy issues which limit Ngitiri ownership.

Specific research should focus on:

- introducing and managing more productive and higher quality tree/grass species in rangelands and Ngitiris.
- better grazing management strategies .
- policy research to explore and promote individual land ownership for private Ngitiri development.

## CONCLUSIONS

The Ngitiri is still a major source of dry season fodder supply for livestock in Sukumaland. In addition to fodder, fuelwood, poles and thatch could be produced from Ngitiris. The system as currently practised is unsustainable and highly susceptible to over grazing and subsequent degradation hence the need for further research to improve both species quality and management aspects of the system. The valuable traditional knowledge of ecological and management principles underlying the Ngitiri System and the great enthusiasm of farmers to improve Ngitiris provide opportunities for the development of adoptable agroforestry technologies.

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**Table 1**

Ngitiri ownership and distribution expressed as percent of farmers.

Attribute	District				Average
	Maswa	Bariadi	Meatu	Shinyanga	
Own Ngitiri	62.0	74.0	53.0	80.0	67.3
Have access and use	13.3	15.4	47.0	18.4	
No access	24.7	10.6	0.0	1.6	9.3

**Table 2**

Perceived Methods of Ngitiri Improvement

Method of Improvement	% of Respondents
Introduce improved fodder grasses	35.8
Plant fodder trees	37.0
Close <i>Ngitiris</i> for longer periods	5.1
Provide technical advice	4.8
Apply fertilizers	3.2
Improve water infiltration	3.2
Rotational grazing	2.7
Expand <i>Ngitiris</i>	2.2
Improve availability of water	1.6
Introduce by laws to protect <i>Ngitiris</i>	1.9
Thin existing trees to encourage grass growth	1.2
Reduce stock numbers (destocking)	1.5