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Maasai Indigenous Knowledge on Range Vegetation Analysis, Utilization and Management

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INTRODUCTION AND BACKGROUND

The variety of genes, species and ecosystems on the earth determine the variety of goods and services available to man, such as clothing, medicines and spiritual nourishment. Despite their importance, man has over the centuries increasingly manipulated and modified the assemblages of species found in different regions of the earth. As a result, there has been change in the distribution and abundance of species and the nature of ecological interactions between them. As a consequence, natural vegetation is disappearing from many biomes, thus altering the structure and reducing the ecosystem biodiversity (McNeely et al., 1990; Urban et al., 1987; West, 1993).

During the past quarter of a century, there has been mounting efforts to conserve plant biodiversity all over the world. However using sub-Saharan Africa as an example, there is scientific consensus that the biodiversity is being eroded at an increasing rate. This has mainly been linked to habitat destruction, over- harvesting and the introduction of foreign plants and animals.

Until recently, scientists and resource managers did not acknowledge the role and significance of indigenous knowledge in biodiversity conservation and resource management in general. This knowledge system was seen as primitive, backward and of no value in the present-day development models (Lykke, 2000). Within the past ten or so years however, there has occurred a rethinking, and consequently indigenous knowledge has increasingly been recognized in natural resource management. During the 1992 earth summit in Rio de Janeiro, the congregation well articulated that traditional practices and knowledge of local communities relevant to conservation of biodiversity and sustainable use of biological resources must be recognized and fostered to augment the conventional and scientific efforts. This realization has helped bring into sharp focus the fact that knowledge, participation and support of local communities remain essential elements to successful conservation of biological resources.

Pastoral communities all around the world possess practical knowledge on use, management and conservation of their biodiversity resources. This knowledge is based on generations-long knowledge and experience with the local vegetation types.

In any development-oriented rangeland vegetation research, it is necessary to capture pastoral indigenous knowledge and experiences during data collection. This participation ensures that the indigenous knowledge is captured by scientists during formulation of research strategies and interventions. Indigenous knowledge is increasingly being recognized as crucial in agricultural research, extension and development in general (Guarino, 1995). This is because the pastoralists being everyday users of vegetation resources in their locality have information on vernacular names of plants, the appearance, properties, environmental preferences and uses of those plants, the places and habitats where they may be found, agricultural and management practices with which they are associated and their role and relationship with other species. A classic case of this is medicinal plants, where ethnobotany has provided a valuable shortcut to the identification of those plants that are likely to be of interest to medicine (Idle, 1996; Munyua et al., 1998; Nalule, 2000).

Local people have knowledge not only of the distribution of particular wild plants, but also of the existence and location of "sanctuaries" of high diversity. These are often actively protected by communities, who may regard niches of plant and animal abundance as sacred groves. Use of these areas may be under strict control. People will also know which trees in their area are good firewood sources, which produce palatable fodder, which are suitable for building and so on. It therefore is justified and rational to integrate indigenous knowledge into conservation and management given that it is also less expensive, readily

available, environmentally appropriate and familiar, and most importantly, it has proven record of effectiveness.

Kajiado district of Kenya is home to the Maasai community who are a well-known, culturally rich pastoral community. Their herding history, dependence on animals, and interaction with their environment has been phenomenal. The need to capture and document this indigenous knowledge cannot be over-emphasized. Previously, land resource inventories and research were conducted through conventional methods without involving end users and other clients including pastoralists. It was then realized that the conventional methodology yielded results which had questionable relevance regarding the type of information produced, the way it was presented and the approach to the production of the information (ICRA, 1998). In view of these, a participatory vegetation inventory and research study was conducted among the Maasai pastoralists and extension personnel in Mashuuru division with the following objectives;

- to document important plant species in terms of livestock feed, human food, medicinal value to both humans and livestock, wood fuel, building, poisonous to livestock and humans, and environmental indicators,
- to document indigenous knowledge relevant to woody vegetation analysis and utilization,
- to determine the constraints related to vegetation use and management.

METHODOLOGY

This study was conducted in Mashuuru division of Kajiado district, Kenya. The area is classified as arid and semi-arid rangeland. The mainstay of the economy in the area is livestock production based on natural vegetation. Information was collected using 150 questionnaires, 3 community workshops and meetings, 20 focus group discussions, and 50 key informants who included local administration personnel, frontline extension staff and church leaders. These groups of people was crucial because the pastoralists were familiar with these people and so they would exude confidence in them and as a result volunteer information freely. The workshops provided a forum for the pastoralists to give their knowledge, experiences and problems regarding the use and management of vegetation resources in the division while at the same time consulting with each other. Representative pastoralists were also engaged during the actual field data collection to assist with the types, location, naming and uses of the plant species encountered.

RESULTS

Local Perceptions on Vegetation Degradation

There was consensus among the pastoralists that vegetation resources in the division has been on a declining trend over the last ten years. They agreed that there was a marked qualitative and quantitative decrease of trees and grasses in terms of density, cover and species types, especially along river banks. The following information was volunteered regarding evidence of degradation, perceived causes, and possible solutions and benefits of reversing the degradation trend.

Evidence of Vegetation Degradation

- Numerous visible tree stumps where trees have been cut down (e.g. for charcoal production).
- Several charcoal production sites with many off-road truck routes.
- Many bare lands where vegetation has been depleted, yet had vegetation cover previously.
- Decline in honey production, associated with the destruction of flower-bearing trees.
- Several cattle tracks which have no grass cover.
- Increasing frequency and distance of movement by pastoralists and their animals in search of pasture to as far places as Nairobi's central business district.
- Increased occurrences of dust balls.

Causes of Vegetation Degradation

- Increased charcoal burning and dealing both by pastoralists and middlemen, aimed at diversification of livelihoods due to declining production from the pastoral economy.
- Increase in the population of both humans and livestock leading to increased demand for woody vegetation for homestead/housing construction, wood fuel, fencing of cultivated plots with thorny bushes.
- Individualization and fencing of land, thus

interfering with livestock movement routes, wildlife corridors, and dispersal areas. Restricted movement has increased pressure on land resources, especially vegetation, thus inducing degradation trends.
- Overstocking leading to overgrazing.
- Drought due to unreliable and decreased rainfall after environmental destruction.
- Poor forage seed germination due to soil erosion and compaction.
- Poor seedling regeneration due to interference by livestock and humans.
- Plant community changes resulting in undesirable plant species such as those poisonous to livestock.
- Some shrubs do not allow grasses to grow under them (e.g. *Ipomoea kituiensis*).
- Heavy loss of vegetation due to army worm invasions (usually when it rains).
- Increased wildlife grazing under restricted movement (especially wildebeest).
- Fire occurrences that wipe out vegetation and seeds. Regeneration becomes difficult due to poor soil conditions.
- Mining activities.
- Increased crop cultivation by resident pastoralists and expanding agricultural communities.

Suggestions for Reversing Vegetation Degradation

- Planting of trees especially around homesteads and river banks (for one felled, two to be planted).
- Control of the wanton charcoal production through policies and law enforcement especially along the major seasonal rivers.
- Control of sand harvesting along rivers so as to conserve the underground water sources thus enabling better riverine vegetation growth.
- Reduction of overall livestock numbers through diversification of livelihoods.
- Creation of awareness on the consequences of vegetation degradation, and hence the need for vegetation conservation.
- Reforestation and rehabilitation of excavated areas.

Benefits of Reversing Vegetation Degradation

- Improved vegetation cover improves soil properties such as water retention capacity and infiltration rates, thus increasing both grass quality and quantity for the livestock.
- Improved tree cover and hence availability of construction and fencing materials.
- Improved environmental quality in terms of scenery, habitation and other indirect products.
- A reduction in soil loss through wind and rain water.
- Reduced siltation of sources of surface water.

Traditional Uses of Woody Vegetation

Just as is the case with many other pastoral communities in Africa, vegetation represents a multiple purpose resource, upon which Maasai livelihoods are based. The various species of plants that provide different utilities are presented below. Each utility category consists of those species identified by more than 80% (n=200) of the respondents. The species were not ranked in any order of importance.

Medicinal Value (Human and Livestock)

- *Solanum incanum*
- *Acacia mellifera*
- *Salvadora persica*
- *Carrisa edulis*
- *Harrisonia abyssinica*
- *Albizia amara*
- *Terminalia brownii*
- *Lannea stuhlmanii*
- *Acacia nilotica*
- *Albizia anthemintica*

Grazing and Fodder Value

- *Themeda triandra*
- *Bothriochloa insculpta*
- *Panicum maximum*
- *Cynodon dactylon*
- *Pennisetum mezianum*
- *Digitaria macroblephara*
- *Acacia tortilis*
- *Acacia seyal*
- *Acacia brevispica*
- *Grewia bicolor*
- *Albizia amara*
- *Balanites glabra*
- *Balanites aegyptiaca*

Household Economic Value

- *Acacia mellifera* (fencing, walking sticks/ clubs)
- *Grewia temberensis* (house construction)
- *Grewia biolor* (house construction)
- *Rhus natalensis* (tool handles)
- *Acacia senegal* (fencing)
- *Acacia nilotica* (house construction/fencing)
- *Combretum molle* (wood fuel)
- *Commiphora africana* (live fencing)
- *Olea europaea* (calabash cleaning)
- *Pterolobium stellatum* (fibre)

Environmental Indicators

- *Microcloa kunthii* (range degradation)
- *Acacia drepanolobium* (poor soil drainage)
- *Acacia xanthophloea* (high water table)
- *Sporobolus ioclados* (saline / alkaline soils)
- *Acacia stuhlmanii* (invader species)

Poisonous Plants (Human and Livestock)

- *Gnidia latifolia*
- *Datura stramonium*
- *Acokanthera schimperi*

Human Food

- *Grewia bicolor*
- *Rhus natalensis*
- *Terminalia brownii*
- *Lannea alata*
- *Ximenia americana*

Scenting of Beehives

- *Ocimum americanum*
- *Premna resinosa*
- *Salvadora persica*

Threatened Plant Species

The Maasai pastoralists classified a number of plant species as threatened by complete disappearance from Mashuuru division. The threat was mainly attributed to over-harvesting of these species by charcoal dealers from outside the division, in combination with increased clearing of land for cultivation and settlement. The identified plants include the following;

- *Faurea saligna*
- *Strychnos henningsii*
- *Croton dichogamus*
- *Zanthozylum chalybeaum*
- *Terminalia brownii*

DISCUSSION

A number of authors (Guarino, 1995; Martin, 1995; Guchteneire et al., 1999) converge in thought that ethnobotany being part of indigenous knowledge, is dynamic as a result of a continuous process of experimentation, innovation and adaptation. It has the capacity to blend with knowledge based on science and technology and should therefore be considered complementary to scientific and technological efforts to solve problems in social and economic development. Guarino (1995) concludes that it is often the abandonment of traditional management practices and tenure systems, sometimes as a result of misguided development efforts that is threatening rangeland vegetation in many arid semi-arid areas of the world.

Direct links between researchers and farmers are viewed as exceptions rather than the norms (KARI, 1998). But with the onset of participatory agricultural research, the necessity to bring pastoralists and researchers together is clear. The sharing of information and appreciation of each others' knowledge underscores the fact that both rural communities and researchers need each other. With increasing recognition of the fundamental role that pastoralists continue to play in maintaining the plant diversity through the many uses, it is important that they must be involved much more profoundly than has perhaps been the case in the past.

The pastoralist knows in detail the vegetation types present, their uses and management due to their close interaction with those resources for a long period. The scientist on the other hand acquires knowledge on the vegetation resources in a relatively short time through survey, sampling and classification of the vegetation types using defined national or international standards. The analytical information generated by scientists complements indigenous knowledge on aspects that pastoralists cannot interpret.

Some lessons learnt from the participatory involvement of pastoralists during the vegetation inventory and research in the division include the following;

(i) Early involvement of the pastoralists

(during the planning phase) ensured well-planned research activities and therefore efficient collection of data.

(ii) The active participation of the field extension personnel gave them extra confidence in dissemination of the research results to other pastoralists since they were also involved in the process.

(iii) Once the pastoralists understood the objectives and benefits of the research work, they freely gave information during the workshops and even during individual encounters in the course of fieldwork.

(iv) This research was demand driven from the pastoralist community and therefore the community easily identified itself with the results.

(v) More useful information relevant to management of vegetation resources was generated, in contrast to the amount of information previously collected during conventional surveys which did not involve pastoralists.

KEY WORDS Indigenous Knowledge. Woody Vegetation. Utilization. Community Involvement. Resource Management.

ABSTRACT A participatory vegetation inventory and research was conducted in Mashuuru Division, Kajiado District of Kenya, with an overall objective of capturing the indigenous knowledge of the Maasai pastoralist community on vegetation resources. Data collection was done through questionnaires, community workshops and meetings whereby the pastoralist, administration and extension personnel, and prominent leaders were invited. Representative pastoralists were engaged during the actual field data collection to assist in naming of vegetation types and uses of plant species encountered. The pastoralists gave detailed information on the status of vegetation degradation, which they considered as a major threat to their sources of livelihood. The information included indicators of vegetation degradation, the possible approaches, and benefits of reversing the degradation trend. The pastoralists also named and categorized plants into those that provide fodder and food for livestock and humans respectively; medicinal value to livestock and humans; woodfuel; construction, poisonous to livestock and humans; and as environmental quality indicators. Finally, they named five plant species which they considered threatened with extinction due to over-harvesting for medicinal and other uses. The study showed that both indigenous knowledge held by farmers and technical knowledge held by researchers are complimentary and they need each other for more responsive research activities. The data collected from such participatory involvement of pastoralists is demand driven and therefore guides the researchers on the type of research interventions for enhanced natural resource management.

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