AGROFORESTRY: AN ALTERNATIVE FARMING SYSTEM WHICH REQUIRES SERIOUS VETERINARY ATTENTION IN ORDER TO ENHANCE ENVIRONMENTAL REHABILITATION AND PROTECTION

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SUMMARY

Protection and management of the environment are one of the leading issues occupying Man's attention today. In Tanzania it is so important that it has led to changes in agricultural methods. An example is the introduction of agroforestry. Agroforestry is a sustainable land use and land management system, which involves the growing of cultivation of woody plants, agricultural crops and the keeping of livestock (animals) on the same piece of land. The aspects of this farming system may be easily integrated into livestock production, veterinary preventive medicine and herd health schemes. This farming system can be used to save the arid and semi-arid areas in Tanzania from desertification. Strategic use of trees may have benefits beyond that of soil rehabilitation and conservation; the provision of shelter (from rain, wind and sun), fodder and medicinal compounds may enhance rangeland production and management. This paper highlights the role and position of agroforestry and advocates increased attention by the veterinary profession.

INTRODUCTION

In rural Tanzania, especially in arid and semi-arid areas, the fundamental importance of the quality and quantity of land available to farmers / peasants is well known. The environment in this country has reached an alarming state (Mgumia 1991). Land which used to be productive is no longer so. Most of the early beauties of nature including wildlife and thick forests are no longer there. The rate of deforestation in Tanzania Mainland is between 300,000 and 400,000 hectares per year (Lugandu 1991). The same paper reported severe deforestation in 11 regions, namely; Dodoma, Tanga, Coast, Dar es Salaam, Mbeya, Iringa, Tabora, Kigoma, Shinyanga, Mwanza, and Mara regions. In Tanzania, the nature of environmental degradation problems are felt both in rural and urban areas. In rural areas they encompass most notably land degradation due to inappropriate agricultural practices, overgrazing, bushfires and other irrational actions on nature which endanger regenerative capacity of soils, vegetation, forests, waters and animals.

Bearing in mind the emphasis now given to environment protection issues, it is of prime importance that the veterinary profession in the 21st century addresses itself to livestock farming (husbandry) systems which rehabilitate and sustain the environment. The farming system of choice is AGROFORESTRY. This is simply the practice of growing woody plants

(trees) together with agricultural crops and/or livestock on the same piece of land. In more precise (formal)terms, the system may be defined as sustainable land management which may increase the overall yield of the land; combine the production of crops, forestplants, and/or livestock sequentially or simultaneously, on the same piece of land; and use management practices that are agreeable with cultural practices of the local population (King and Chandler, 1982).

MATERIALS AND METHODS

The data were collected from veterinarians, animal nutritionists, livestock keepers, foresters, farmers and by literature retrievals.

Interviews and questionnaires were the two important methods used to obtain information. Questions asked were based on the following basic questions:

1. Traditional medicine is said to be important both in human and veterinary medicine. What do you say about this issue?
2. Do you know any tree used in livestock disease treatment?
3. May you kindly tell me names of the trees and the disease referred to in no. 2 above?
4. Which part of the plant is used to prepare the medicine?
5. How is the medicine prepared?
6. Which plants do you use as fodder in this area?

RESULTS

The results are presented in Table 1 and 2.

DISCUSSION:

VETERINARY AND AGRICULTURAL USES OF TREES

Veterinary uses of trees include: (1) medicinal, (2) fodder production and (3) shelter for livestock. Tables 1, and 2 list medicinal and fodder trees in Tanzania. Medicinal use of trees has been known and recognized for thousands of years (Storrs 1982). These plants have been highly reputed in traditional medicine throughout the world (Minja 1989). However, many of their uses have been forgotten if not disregarded. Therefore, it needs sacrificed and devoted efforts to obtain the relevant information from knowledgeable local personalities and put the information in publications. Some efforts have been geared towards this direction in Tanzania by Minja (1989), who noted that Tanzania is rich in veterinary medicinal and fodder trees.

In Tanzania, more than 65 species of plants may be of use to veterinarians (Minja, 1989). Azadirachita indica [Neem tree (E), Muarobaini (S)] is an example. The leaves of the Neem tree are thought to have an excellent insecticidal/acaricidal effect. Either the leaves should be boiled in water, or crushed and soaked in water; then the animal is washed. The same leaves have been reported to have disinfectant properties (Balthazar Mbalilaki, 1990; Personal communication). Similarly, the leaves of *Eucalyptus globulus* tree [Eucalyptus (E), Mkaratusi (S), Omukaritusi (H)] have been reported to have significant molluscicidal properties which may be of use in the control of schistosomiasis by killing the intermediate host of the schistosoma (*Bulinus truncatus, B. globosus* and *B. africanus*). Planting the trees on the banks of water areas infested by these snails, allowing

Table 1: Trees considered important in traditional veterinary medicine indigenous to Tanzania

Botanical Name	English/Local/ Vernacular Name	Part of the Plant used	Veterinary Medicime use
Ficus thonningii	Mtenza (N) Mfumu (C)	Bark	Heat production
Azadirachta indica	Neem (E), Muarobaini (S)	Leaves & Bark	Insecticide, Nematocide & Disinfectant
Alangium chinease	Mring'onu (C)	Bark	Anaplasmosis
Commiphora zimmermannii	Mfifina (C)	Bark	Anaplasmosis
Aloe volkensii	Sale lya njofu (C)	Leaves	Oxytocic effect & Wound treatment
Cordia africana	Mringa ringa (C,P,M)	Leaves	Wound treatment
Ricinus comunis	Nyonyo(S) Omujuna(H) Iwonu (C,M)	Seeds	Laxative
Briddelia micrantha	Maarie (C)	Bark	Anaplasmosis
Croton macrostachsy	Mfurufuru (C)	Leaves	Anthelmintic, Laxative
Pentas Sp.	Mosereka (C)	Leaves	Laxative
Rawolfia caffra	Msesewe (C,M)	Leaves Bark	Wound treatment Infertility treatment
Cussus sp. (Ampelidaceae)	Omununa (H)	Bark,Purgative	Anaplasmosis
Psidium guajava	Mpera (S), Omupera (H)	Leaves	Antidiarrhoea. & dysentry
Syzygium cuminii (Myrtaceae)	Omushamako (H)	Leaves,	Ophthalmia
Syzygium guineense (Myrtaceae)	Omuchwezi (H)	Leaves, Bark, Roots	Sedative/ Tranquilliser
Vernonia amygadina (Compositae)	Omubilizi (H)	Leaves	Indigestion & Stomach ache

KEY: S:SWAHILI; H:HAYA; E:ENGLISH; C:CHAGGA; M:MERU; P:PARE; N:NYAMBO.

Table 2: Fodder Trees Available in Tanzania

Botanical Name	English/Local/Vernacular Name
Maesopsis eminii (Rhamnaceae)	Omuhumula(H)
Acacia albida	Winter thorn(E), Omuranda(H)
Sapium elipticum (Euphorbiaceae)	Omushasha(H)
Leucaena leucocephala	-
Ficus natalensis (Maraceae)	Omutoma(H)
Ficus orata (Maraceae)	Omuserere(H)
Lonchocarpus capassa	Lilac tree, Rain tree(E), Omuhiga njura(H)
Ficus thonningii	Mtenza(N), Mfumu(C), Mfumu(P)
Mangifera indica	Mango tree(E), Mwembe(S), Omunembe(H)
Acacia giraffe	Camel thorn(E), Omuhoto(H)
Commiphora zimmermannii	Mfifina (C)
Ricinus comunis	Iwonu(C), Iwonu(P)
Pseyalospondia microcapa (Anacardiceae)	Mzambarau(S), Omuziru(H)
Acanthus pubescens (Acanthacease)	Amatoju(H)
Acasia sp. (Mimosaceae)	Omunyinya(H), Omukasia(H), Omukuku(H)
Acasia campylacantha (Mimosaceae)	Mkuku(H)

KEY; S:SWAHILI; H:HAYA; E:ENGLISH C:CHAGGA; M:MERU; P:PARE; N: NYAMBO.

the leaves to fall into the water, may carry out natural treatment (Storrs, 1982). Also, the leaves from the same tree have been reported to kill *Lymnaea natalensis* snails and thus may be used in the control of fascioliasis (Cheruioyot and Wamae, 1988).

Fodder tree use as drought reserves is receiving significant attention and it is well documented (Torres, 1983), but the role of fodder trees in the management of grazing lands has not received a significant share of attention to date.

Incorporation of fodder trees, may be particularly relevant in animal production systems in rangelands in the arid and semi-arid areas. In these areas, protein content in the diet has been shown to be the limiting factor affecting live weight gains
(Pratchett et al., 1977).
The introduction of fodder trees and shrubs which are known for their high protein content may increase the availability of crude protein to the browsing/grazing ruminants.

Trees do provide shelter which may benefit animal production in the following ways:

(1) Providing relief from excessive solar radiation.
(2) Tree wind breaks reduces the wind chill factor in cold,windy areas (Torres, 1983).

Such moderation of extremes of temperatures have a direct effect on neonatal survival rates. Lynch et al. (1980), reported improved productivity of grassland through a decrease in water loss by tree shelter under grazing conditions. Improved productivity, by trees shelter lessening the mechanical damage of grass by wind was also reported by Russel and Grace (1978). The effect of temperature on the quality of forage grasses may lead to a beneficial effect of shading under tropical conditions (Torres, 1983) unlike in the temperate regions, where shading is reported to reduce the proportion of soluble carbohydrates, calcium and phosphorus and to increase the proportion of cellulose and lignin, thus reducing digestibility (McEwen and Dietz, 1965; Hight et al., 1968).

The importance of tree planting to control soil erosion is well established (Rocheleau *et al.*, 1988). However, trees may benefit the soil by improving its fertility Examples includes leguminous trees (e.g. *Leucaena leucocephala, Gliricidia sepium*) which increase the nitrogen content of the soil. Another example is *Acacia albida* (Winter thorn(E), Omuranda (H) which can increase carbon, nitrogen, available phosphorus and a total exchangeable cations by 93%, 94%, 134% and 90% respectively (Charreau and Vidal, 1965; Torres, 1983.

The positive influence of trees on soil moisture content by cutting down the drying effect of sun and wind, and where forests (large number of trees) are involved, the redistribution of rainfall, can not be ignored.

CONCLUSION

Desertification claims an estimated million hectares worldwide every year. This is a vast amount of land, and it is destroyed beyond practical hope of land reclamation. Postel (1989) reported an additional 20 million hectares which become so impoverished that they were unprofitable to graze or farm. Therefore, this trend has to be reversed. Agroforestry is a farming system of choice which could fulfil this important objective.

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