



THE INFLUENCE OF SOCIO-ECONOMIC FACTORS ON THE LEVEL OF KNOWLEDGE, DOMESTICATION AND RETENTION OF MEDICINAL PLANTS: THE CASE OF DURU-HAITEMBA VILLAGES, BABATI DISTRICT, TANZANIA

Otieno, J.N¹, Kajembe, G.C², Malimbwi, R.E² and Nduwamungu, J.²

¹*Institute of Traditional Medicine, Muhimbili, Dar es Salaam*

²*Department of Forest Mensuration and Management,
Faculty of Forestry and Nature Conservation,
Sokoine University of Agriculture, P.O.Box 3013 SUA, Morogoro*

ABSTRACT

In developing countries, the majority of local people rely largely on medicinal plants to treat common diseases. This reliance is due to a number of reasons among which economic and cultural backgrounds play important role. This study carried out using PRA and household surveys in 45 randomly selected households from four villages around Duru-Haitemba village forest in Babati, Tanzania. The objective of the study was to investigate the influence of socio-economic factors on the level of knowledge of ethnomedicinal plants, domestication and retention of medicinal plants in home gardens. Socio-economic factors investigated include education level, gender, age, religion, income level and distance to the forest. Among these factors, religion and income level were found to influence significantly the level of knowledge of medicinal plants and domestication efforts. The study argues that medicinal plants are of critical importance in the livelihoods of local people particularly poor households and therefore adequate actions should be taken to preserve them.

Keywords: Domestication- ethnomedicinal plants - indigenous knowledge – society/ forest relationship.

INTRODUCTION

The majority of local people in developing countries still depend on traditional medicine either totally or partially for Medicare (Hamza, 1997). According to Mahunnah and Mshigeni (1991), the World Health Organization (WHO) estimated that 80% of the world population relies on traditional medicine for primary health care.

Mahunnah (1991) pointed out that Tanzania, as one of the countries with rich tropical flora in Africa (estimated at about 10,000 species) is potentially rich in medicinal and aromatic plants. The wealth of the traditional ethnopharmacopoeia of the country's tropical flora is indicated by the high utility of indigenous medicinal plants in the traditional medical system. Since time immemorial, rural African communities have relied upon traditional healers, whose botanical knowledge and insights into the plant's ecology and distribution are invaluable (Cunningham, 1993).

A traditional healer is a person who is respected by the community and is believed and trusted to be competent to provide health care by using plant, animal and mineral substances and certain other methods based on the social, cultural and religious background (Kokwaro, 1993). Hines and Eckman (1994) reported that in Tanzania, there were almost 60,000 traditional healers against 600 western-trained doctors who are concentrated in urban areas. These traditional healers attend about 80% of the rural population. According to Makonda (1997) a household member in Geita district, Mwanza region, Tanzania, had an average frequency of only two visits to a western medical clinic in a year. This means that most of the time local people visit traditional healers. Local people rely heavily on traditional medicines because they are relatively accessible, inexpensive and locally available as compared to conventional medicines (Safowora, 1993). Kayombo (1992) pointed



out that rapidly increasing prices of imported industrial drugs, combined with the removal of Tanzania's free medical services in 1993, have forced many people in rural areas to use local medicines.

The value of forest to local people is determined by what the forest can supply to their daily life. Natural forests have several services to offer, ranging from food, building material, medicinal herbs to socio-cultural aspects. However, many researchers have reported that medicinal plants form the largest use group. In fact, according to Houngnon (1997) forests are traditional pharmacies containing natural medicinal products known to traditional healers (doctors). Makonda (1997) found that 49% of all tree species inventoried in Geita, Mwanza, Tanzania were used for medicine; Ruffo *et al.* (1989) in Hamilton and Bensted-Smith (1989) found that 34% of all forest plant species in East Usambara were used as medicines and O'king'ati *et al.* (1986) found that 30% of all trees in Chagga home gardens were used for medicine.

At small scale, leaf, fruit and flower harvesting for medicinal uses rarely harms the tree. However, bark and root harvesting are more likely to damage plants (Storrs, 1982). In areas of high demand, it is common to find dead medicinal trees due to debarking and root harvesting. Consequently, some medicinal plants are threatened to depletion in their natural environment. As these plants die out, local communities lose the cornerstone of traditional medicine and humankind loses the stuff of which new pharmaceuticals could be made. FAO (1991) reported that there was a growing market in the western world for the use of some specific herbal material in preference to synthetic pharmaceuticals.

Given the importance of herbal medicine, efforts are needed to preserve this natural wealth. The objective of the work reported

here was to assess the influence of some socio-economic factors including education level, age, religion, income level and distance to the forest on the level of knowledge, domestication and retention of medicinal plants in villages surrounding Duru-Haitemba forest in Babati district, Manyara region, Tanzania.

MATERIALS AND METHODS

Study area

The study was carried out in Duru-Haitemba community forest in Babati district. The forest has approximately an area of 90 km² and is situated in the southern part of the district at about 20 km from Babati Town. The forest falls within clearly demarcated boundaries of eight registered village areas; these are Bubu, Endanachan, Gidas, Duru, Riroda, Endagwe, Hoshan and Ayasanda. The forest is situated between and alongside two main gravel roads, which start from Babati Town leading to Kondoa on the eastern side and to Katesh in the Western side (Orgut, 1997).

The annual rainfall varies from 600 to 800 mm (URT, 1976). The soil is loamy with good drainage and the vegetation is typical dry miombo woodland*. Duru-Haitemba forest is located within the rift valley and dominant species include *Brachystegia microphylla*, *Brachystegia spiciformis*, *Julbernardia globiflora* and *Albizia versicolor* (Kajembe and Mgoo, 1999).

The population around Duru-Haitemba forest is mainly agro-pastoralist. The dominant ethnic groups include Fiome, Iraqw, Mbugwe and Rang'i (Orgut, 1997) whose main economic activities are agriculture, livestock keeping and fishing

* Although strictly speaking the terms "woodland" and "forest" have different meanings for an ecologist, in this paper the two terms have been used interchangeably.



from Lake Babati. Major crops include maize, beans and pigeon peas. Cattle husbandry is particularly important in the area and the average number of cattle is about 10 heads per household. There are two secondary schools, one in Riroda village and the other in Gidas village. There are three dispensaries in Gidas, Endagwe and Riroda villages. Services in these dispensaries are free; however, the services are just primary health care for minor diseases. Critical cases are usually referred either to the district hospital in Babati Town or to Dareda missionary hospital in Hanang' district.

Data collection and analysis

Data collection was carried out in two phases, phase one involved Participatory Rural Appraisal (PRA), which aimed at generating information on the community and their perception on medicinal plants knowledge, use and availability in the area. Phase two consisted of socio-economic surveys, which were expected to indicate society - forest relationships. A total of forty-five households were randomly selected (from village registers) in four villages (Ayasanda, Riroda, Endagwe and Duru) bordering with the forest and surveyed using a pre-tested structured questionnaire. Households were stratified into wealth categories using criteria set by villagers themselves during PRA. "Poor" households were those with less than 2 ha of land and less than 5 cattle. "Moderate" households had less than 5 ha of land and not more than 20 cattle. All households with more than 5 ha of land, more than 20 cattle and expensive assets such as motorcycle, shop and bar were considered to be "rich". Five percent of households were taken from each wealth category. Other methods used to gather information about society - forest relationships include participant observation

and checklists for key informants.

The Statistical Program for Social Science (SPSS) was used to analyze data. First variables were arranged in a form suitable for addressing the objectives of the study and were systematically coded. Secondly, data were explored for distribution of responses, central tendency and dispersion. A multiple regression analysis was carried out with emphasis on explanation rather than prediction. Normally when making predictions, the non-standardized equations are used to assess the relative impacts of each independent variable. However, for explanation purposes, standardized partial regression coefficients (beta weights) are compared with one another to work out which variable has the greatest impact (de Vaus, 1986). In this study, beta weights were used to explain relationships between the dependent variable (number of trees planted or retained that are known to have curative value for various diseases) and socio-economic factors including education level, age, religion, income level and distance to the forest.

RESULTS AND DISCUSSION

Socioeconomic factors underlying knowledge of ethnomedicinal plants.

The results revealed that religion and income level had a significant influence on the level of knowledge of medicinal plants as well as domestication efforts (Table 1). As for all the remaining socio-economic factors (i.e. education level, age, and distance to the forest), their influence on the knowledge of medicinal plants and plant domestication was not statistically significant (Table 1).



Table 1 Relationship between some socio-economic factors and plant domestication and knowledge of ethnomedicinal plants in villages around Duru-Haitemba forest.

Independent variables	Y ₁ (R ² =0.91)	Y ₂ (R ² = 0.19)
	β (beta weight coefficient)	β (beta weight coefficient)
Education level	- 0.030 (ns)	0.142 (ns)
Age	- 0.152 (ns)	0.029 (ns)
Religion	0.207 (*)	0.468 (*)
Income level	- 0.847 (*)	0.468 (*)
Distance to the forest	0.032 (ns)	-0.032 (ns)

Key: - All independent variables refer to sampled households.

- Y₁ = Number of known ethnomedicinal plants;
- Y₂ = Other planted trees
- R² = Coefficient of determination
- β = Standardized regression coefficient (beta weight)
- (*) = indicates significance at 0.05 level
- (ns) = indicates non-significance at 0.05 level

Income level of a household

Income level had a negative regression coefficient (Table 1) meaning that the knowledge of ethnomedicinal plants species declines as the income level of the household improves. This suggests that households with better income have less knowledge of ethnomedicinal plants species.

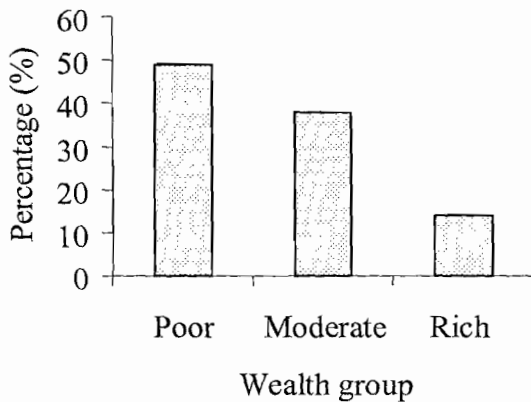


Figure 1: Proportion of people with ethnomedicinal knowledge by wealth category

Figure 1, which illustrates the proportion of people with ethnomedicinal knowledge in the three main wealth categories, also confirms the significance of the impact of income on the level of knowledge of medicinal plants in the study villages around

Duru-Haitemba forest.

Fig. 1 shows that there is greater percentage of poor households with ethnomedicinal knowledge than in other wealth categories. On one hand, this suggests that because of financial constraints poor households rely primarily on local medicines before resorting to modern medical services. On the other hand, good income promotes attendance to western medical services and consequently reduces the chances of knowing medicinal plants. The trend also confirms the significance of the impact of income on the level of knowledge of medicinal plants around Duru-Haitemba forest.

Religious beliefs

Religious beliefs (Religion) have a significant influence on the knowledge and use of indigenous medicinal plants (Table 1). In the study area, Moslems and Traditionalists (traditional religion) were found to be more knowledgeable about medicinal plants than Christians (Figure 2). Plausible explanation is that, the coming of Christianity was accompanied with provision of health centers (e.g. Dareda Mission Hospital, Roman Catholic Hospital in Babati) and this has encouraged

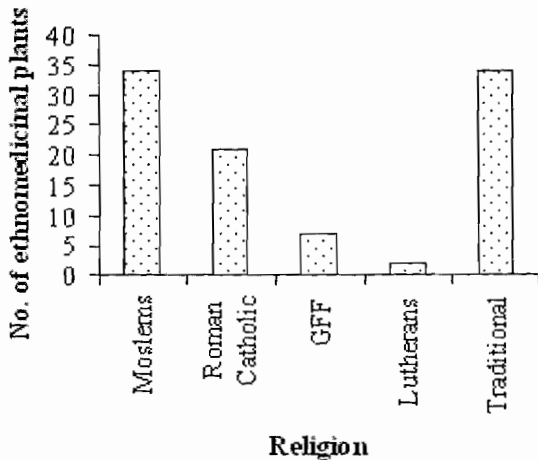


Figure 2: Influence of religion on the knowledge of medicinal plants

Furthermore, Christian dogma often associates traditional medical practitioners with witchcraft. Hence, most converts of Christianity tend to downgrade or pervert the attendance to traditional herbalists and consequently have less knowledge of medicinal plants due to less interest in traditional medicine.

Education level and traditional medicine

Although, the influence of education on ethnomedicinal knowledge and domestication or retention of medicinal plants was not statistically significant, out of 67 medicinal plants identified, those with no formal education identified 57% while those with primary education identified only 42% suggesting that people with no formal education are relatively more knowledgeable about medicinal plants than educated ones.

The government has been discouraging the use of traditional medicines especially for children under 5 years old. Throughout the country, women have been encouraged to attend clinic centers for advice before and after delivery. However, discussion with the rural Medical Aid of Endagwe village

Christians to rely more on modern medicine.

revealed that about 40% of pregnant mothers trust local midwives and only attend dispensaries when the situation is worrisome. The same observation was given for venereal disease cases such as syphilis which is widespread in the area among middle aged people. Those who get infections are attended by traditional healers and only go to the dispensary when the situation is out of control. Cases of venereal diseases are not freely shared because they are considered shameful and confidential. The traditional doctor is trusted to keep secret for his/her patients. For example, one young man among study participants confessed to have suffered from a venereal disease and admitted to have been cured by a traditional herbalist.

Domestication and retention of medicinal plants

Planting of medicinal plants in the study area is not significant maybe because the majority of medicinal plants can still be obtained easily from the forest. Local people mentioned about fourteen planted or retained indigenous tree or shrub species out of which only six were planted in home gardens. Out the six indigenous species planted, five were reported to have medicinal properties (Table 2). *Commiphora africana* was reported to be one of the most useful medicinal plant species but currently very rare in Duru-Haitemba forest and surroundings. When villagers were asked if they think of planting indigenous medicinal plants especially the endangered ones, 72% said these can only grow naturally in the forest, 16% said that they can plant them at home, 2% considered this to be the responsibility of the government.



Table 2 Planted or retained indigenous tree species in the villages around Duru-Haitemba forest, Manyara, Tanzania

Species	No of stems /	Status	Location *	Propagati on	Use
<i>Acacia nilotica</i>	1	Retained	2		Firewood
<i>Azanza garkeana</i>	1	Retained	2		Firewood, medicinal
<i>Commiphora africana</i>	2	Planted	1	Cuttings	Medicinal
<i>Commiphora trochae</i>	>10	Planted	1	Cuttings	Medicinal, fence
<i>Dombeya rotundifolia</i>	1	Retained	2		Poles
<i>Jatropha curcas</i>	<10	Planted	2	Cuttings	Fence & marking
Komamango	3	Planted	1	Seed	Fruits & medicinal
<i>Piliostigma thonningii</i>	1	Retained	2		Medicinal & fruits
<i>Plecranthus barbatus</i>	7	Planted	1	Seed	Medicinal
<i>Rhus natalensis</i>	1	Retained	2		Firewood, fruits
<i>Scolopia zehveri</i>	1	Planted	1	Cuttings	Fodder, medicinal
<i>Vangueria</i>	1	Retained	1		Fruits
<i>Vitex mombasae</i>	1	Retained	2		Fruits
<i>Ziziphus mucronata</i>	1	Retained	2		Firewood, medicinal

* Key for location: 1= Within the home garden
2 = Farm boundary

The propagation methods used to raise useful indigenous tree or shrub species were mentioned to be cuttings (50%), wildings (25%) and seeds (25%). Local people usually domesticate wild plants in their farms and within home gardens (Table 2). However, the observed domestication does not correspond quite well to the conventional biologists' definition. Leakey and Newton (1994) representing the conventional biologists school of thought have defined plant domestication as human-induced changes in the genetics of a plant in order to conform to human agroecosystem. According to this conceptualization, the process of plant domestication results in the plant's "inability to survive" in natural ecosystems.

In this study, domestication of wild plants was categorized into two broad aspects: retaining/planting of wild plants and human-influenced domestication. In the first instance, various wild species are planted or retained when the land is cleared for agriculture; the reason for planting or retaining these wild plant species usually depends on the value of the species to the farmer. Some interviewed farmers could not give specific reasons for retaining trees.

But, the picture obtained is that local people would like to live with trees to improve the microclimate and get various products such as medicines, fruits and fuel wood. Planting and retaining of wild plants in the study area do not fit into the context of scientist's idea of domestication because genetic composition of plants is not changed and plants can still thrive well in their natural ecosystems.

In the second instance, domestication was human-influenced whereby the act of tilling the land by the farmer creates microclimate, which favors growth of some wild plants on arable lands rather than in their natural ecosystems. For example, two medicinal herbs, *Trichodesma zeylanicum* and *Sphaeranthus ukambesis*, and the ritual climber *Peponium vogelii* were found to survive well in farms but they could not be traced in the forest at all. In this context, domestication of some wild species, whether purposeful or not, acts as a guarding mechanism to some species against ever-changing forest ecosystems.

CONCLUSION

Medicinal plants play an important role in



the livelihood of local people particularly those in the poor wealth category. Socio-economic factors such as income level and religious beliefs were found to have statistically significant influence on the level of knowledge of ethnomedicinal plant as well as planting/retaining and domestication of medicinal plants. Education was also observed to exert a negative influence, though not significant, on the knowledge of medicinal plants. It was also noted that planting and domestication of medicinal plants appear to be not significant may be due to closeness to the forest. However, considering the value of ethnomedicinal plants to local community, there is an urgent need to intervene in order to inventory, preserve and safeguard this natural wealth. In order to be successful, any kind of intervention should first take into account socio-economic factors particularly those that have exhibited significant influence on knowledge and domestication of medicinal plants.

The study recommends more investigation on medicinal plants that are threatened by depletion and those which have disappeared from the forest as a result of over-exploitation and chemical screening of most valued medicinal plants. More research on silvicultural treatments of the most proven medicinal plant species is also recommended. The creation of a botanical garden containing these medicinal plant species can also contribute to the conservation of valuable and often threatened medicinal plant species. Moreover, considering the influence of a number of socio-economic factors on knowledge and planting of medicinal plants, the study recommends the involvement of local stakeholders including religious and traditional leaders in the inventory, preservation, development and management of medicinal plants.

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