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The Influence of Socio-Cultural Aspects of Ethnobotany on Tree Species Propagation in Home Gardens: A Case Study in Miwani Division, Kisumu County, Western Kenya

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Abstract: *This study was done to establish if the people's choice of tree species propagated in their home gardens is influenced by Ethnobotanical knowledge. It was carried out in Miwani Division in Kisumu County, Western Kenya between January 2014 and April 2014. Structured questionnaires/schedules, key informant and focused group interviews and secondary sources of data were used to collect the relevant data. The collected data were analyzed using the SPSS version 17. The study provided data on different tree species propagated in home gardens, their locations and also established values attached to them.Traditional knowledge systems count when it comes to deciding on what species to plant and where to plant them. This especially applies to indigenous species. It is apparent that planted species or species natured and the specific sites where they are found in the farm are determined by the knowledge and experience with them - the knowledge that is derived from ethnobotany of the local area. The sitting of planting of any species is also closely related to the purpose for planting. Ethnobotanical knowledge can thus be used to predict the choice of tree species to be propagated in home gardens in this community.We recommend that in agroforestry, species choice and planting site consider both biophysical and appreciate socio-cultural values attached to the species, the latter being the consideration of the influences that culture has on society and, which can, in part, determine the social acceptability of agroforestry at the farmer's level. There is need to further research and establish the basis for the superstitious views on tree species not just in this community but also in other communities in Kenya.*

Keywords: *Ethnobotany; Home gardens; Community; Socio-culture; Luo.*

I. Introduction

Ethnobotany is the study of the relationship between plants and people. It is derived from two words, "Ethno", meaning the study of people and "Botany", meaning the study of plants. Ethnobotany studies the complex relationship between (uses of) plants and human cultures. The focus is on how plants have been or are used, managed and perceived in human societies (Staff, 2007). The history of Ethnobotany goes back to the beginning of civilization when people relied on plants for survival. It explores how plants are used for food, shelter, medicine, clothing, hunting, magico-religious concepts, conservation techniques and general economic and sociological importance of plants in different societies. It begun when man first out of necessity, classified plants; those of little or no utility, those which were useful in many practical ways, those alleviating illness and those that made him ill and killed him. To others were attached spiritual powers from supernatural sources (Evans, 1994).

In Kenya the indigenous people have used traditional medicine which they got from trees and shrubs growing around them. Besides, curing of sickness and disease was associated with supernatural powers which were believed to be living among the people. Some of these powers were associated with trees, and the presence of a tree in a particular site signified the presence of a spirit of some kind, or, it was believed the tree housed the spirit (Odak, 1990). Different ethnic communities in Kenya have had their own ways of forest and tree conservation. In some communities the groves and valleys are homes to the spirits, medicinal herbs and sacred plants and also serve as water catchment sites. No one is allowed to cut down sacred trees, medicinal plants and trees near homesteads, springs and along rivers (Chepkwony, 2014). Reports from some regions have indicated destruction of some tree species because of people's perception about them. A case in Casamance Senegal where the forestry service encouraged planting of cashew nut, rural people burned the trees to evict the evil spirits which these trees were believed to shelter (FAO, 1986).

Among the shona tribe of Zambia religious traditions prohibit them from cutting certain tree species which are associated with guardian spirits of the land. While still in Zambia it is perceived that only God can plant forest trees and thus planting of indigenous tree species is culturally discouraged. In Zambia planting trees

implies ownership of a resource e.g. the land on which it is planted and the women in the area are usually recognized as users not owners of the resource (Warner, 1993).

In many rural areas, the local populations still depend on traditional ways of life and rely on wood products for survival purposes. They know the usefulness of trees from previous generations.

The questions that are pertinent here include: What species of trees are planted and/or natured? What particular human needs do they serve? Where are the trees planted? Or why are they planted in particular sites and not in some other sites? Also relevant are questions such as: are the trees planted in fields or around homesteads? Are they planted in blocks or are they dispersed? The enquirer may also want to know if people prefer to plant certain tree species and are unwilling to plant others, or who cares for the trees after they have been planted (FAO, 1986).

Agroforestry has to consider both biophysical and socio-cultural aspects of the practice, the latter being the consideration of the influences that agroforestry has on society and culture, which can, in part, be determined by its social acceptability at the farmer's level, as farmers are considered to be the primary beneficiaries of agroforestry practices. The social acceptability of agroforestry is influenced by heterogeneity in village structure, land and tree tenure arrangements, division of gender roles, and local perceptions and attitudes towards trees. Important socio-cultural factors to be considered in agroforestry include land tenure, labor requirement, and marketing of products, local knowledge, local organization, cultural and eating habits, gender, and well-being and age of landowners (Atangana et al. 2014).

Miwani division lies at the foot-hills of Nandi escarpment and is prone to flooding during the long rains with a lot of alluvial soil being brought from the Nandi escarpments.

The Luos who are the dominant ethnic community living in the area harbour both Christian and traditional beliefs. The community is known for its bold approach to tradition and customary beliefs. The community attaches socio-cultural values and symbolisms to trees and such values influence the acceptability of the trees. Propagation of certain tree species, for example, Terminalia mantaly (Figure 4) has faced serious challenges in some parts of luo land where it has been held with suspicion. There are reasons for planting, not planting and for planting specific tree species in specific sites on farms and in homesteads.

The context in which the term home garden is used here is as explained in Nair, 1993; Tropical homegardens consist of an assemblage of plants, which may include trees, shrubs, vines, and herbaceous plants, growing in or adjacent to a homestead or home compound. These gardens are planted and-maintained by members of the household and their products are intended primarily for household consumption; the gardens also have considerable ornamental value, and they provide shade to people and animals. It involves intimate association of multipurpose trees and shrubs with annual and perennial crops and, invariably livestock within and adjacent to the compounds of individual houses, with the whole crop-tree-animal unit being managed by family labor. It was thus necessary to investigate if the people's choice of tree species propagated or natured in their home gardens is influenced by their experience with and knowledge about the plants. The study provides data on different tree species propagated in home gardens, their locations, and establish values attached to them. The findings could open debate on different approaches to improve tree cover in the county (Kisumu), given that the county was recently ranked second last in tree cover in the country with 0.04% tree cover (Kenya Water Towers Task Force, 2013). It is the objectives of this paper to:

1. Establish a list of tree species growing in home gardens for various purposes.
2. Establish the specific locations where the tree species are grown in the farms/homesteads.
3. Determine the socio economic and cultural values attached to the woody plants in home gardens.
4. Determine if ethno botanical knowledge can be used to predict the choice of tree species to be propagated in home gardens.

II. Materials And Method

The study area

The study was carried out in Miwani division of Muhoroni sub county, Kisumu county. It lies within latitudes 0 00' and 0 21' south and between longitudes 34 45' and 32 21' East, and covers a total area of 225.7 km^2, with a population of 69,683 persons (Nyando District Development Plan, 2009). The division is divided into three administrative locations, and fourteen sub locations.

The population distribution by sub location is as shown in table 1.

Table 1: Population distribution in Miwani division.

Locations	Sub locations	Population
N.E. Kano	Kabar cental	3050
	Kabar east	6217
	Kabar west	4029
	Sidho east	2864
	Kamswar north	2851
	Wangaya II	5490

Ombeyi	Ramula Kango Kore Obumba Irrigation scheme	6058 4583 6551 4691 4424
Nyangoma	Wangaya I Kamswar south Sidho east II	6174 6251 6450.

Source: Nyando District Development Plan (2009).

Study design and method.

The study adopted a survey exercise involving interviews and direct observations.

Field techniques

Simplified multistage cluster random sampling technique was adopted using proportional allocation of samples. The target population involved adults both male and female heads of households from sub locations in the locations and were chosen using stratified random sampling, with sub locations constituting sampling strata.

The survey was spread across the whole division cutting across the locations. From each of the sub locations, ten households (irrespective of socio economic conditions) were selected at random for the comprehensive study. Thus a total of 140 households were sampled. Before the household survey, reconnaissance field visits were arranged within the sub locations with village elders, Assistant chiefs, Chiefs and religious leaders, to get their opinion about the status of tree species propagation in the area, during which time different tree species growing in the area was recorded.

Data collection methods

The following data collection methods were used:

Interviews

Informal meetings were held in the interviewees' homes, conducting interviews in the local language. The household heads were the key respondents, with the help of other family members when necessary. In addition fourteen focus group discussions (FGD), one in each sub location, were arranged at the Assistant chief's office at every sub location. Information on the kind of trees which are planted and natured in the homesteads, those tree species which are not recommended to grow in the homesteads, uses of trees and tree products and reasons for planting trees and other cultural issues associated with tree planting were discussed. The respondents were interviewed using semi structured questionnaires and focalized interviews to ascertain the tree species growing or grown on the family land, specific sites where they are grown and the socio economic and cultural values attached to them.

Data analysis and presentation

The data was analyzed using the statistical package for social sciences (SPSS). Presentation is in the form of tables, graphs and charts as appropriate.

III. Results

Table 2: The sex of household heads interviewed

Location	**Sub location**	**Female**	**Male**	**Total**
North East Kano	Kabar central	2	8	10
	Kabar East	4	6	10
	Kabar West	3	7	10
	Sidho East	2	8	10
	Kamswar North	5	5	10
	Wangaya II	3	7	10
Ombeyi	Ramula	2	8	10
	Kango	3	7	10
	Kore	3	7	10
	Obumba	4	6	10
	irrigation scheme	3	7	10
Nyang'oma	Wangaya I	3	7	10
	Kamswar south	4	6	10
	Sidho east II	3	7	10
Total		**44** **31.4%**	**96** **68.6%**	**140** **100%**

Table 3: Tree species growing in home gardens and their reported use

S/NO	Botanical name	Common name	Local name	Method of propagation	Indigenous or exotic	Reported use.
1	Grevillea robusta	Grevillea, (Silky oak)	Rais	Artificial	Exotic (Naturalised)	Agroforestry, timber & Boundary mark.
2	Markhamia lutea	Markhamia	Siala	Natural & artificial	Indigenous	Agroforestry, timber, poles & shade.
3	Terminalia mantaly	Terminalia	Umbrella tree	Artificial	Exotic	Shade, ornamental.
4	Mangifera indica	Mango	Maembe	Artificial & natural	Exotic (Naturalised)	Fruit, charcoal & shade
5	Thevetia peruviana	Thevetia	Chamama	Natural & artificial	Exotic	Live fence, ornamental.
6	Croton megalocarpus	Croton	Tindri	Natural and artificial	Indigenous	Shade, charcoal, windbreak, fuel wood, tool handles.
7	Senna siamea (Cassia siamea)	Cassia	Obino	Natural & artificial	Exotic (Naturalized)	Poles, fuel wood, windbreak, shade.
8	Warburgia ugadensis	East African Green heart	Abaki	Artificial	Indigenous	Medicinal & ornamental
9	Grewia bicolor	Grewia	Powo	Natural	Indigenous	Medicinal, fodder & shade
10	Balanites aegyptiaca	Desert date	Othoo	Natural	Indigenous	Shade, medicinal & charcoal
11	Sesbania sesban	Sesbania (River bean)	Asao (Osao)	Natural	Indigenous	Agroforestry & fodder
12	Euphorbia tirucali	Finger euphorbia, milk bush.	Ojuok	Artificial	Indigenous	Fencing & fuel wood
13	Teclea nobilis (Vebris nobilis)	Teclea	Madat	Natural	Indigenous	Shade, walking sticks, tool handles
14	Diospyros abyssinica	Giant diospyros	Ochol	Natural	Indigenous	Shade, medicine, tool handles
15	Albizia coriaria	Albizia	Ober	Natural	Indigenous	Shade, timber, charcoal (woodfuel)
15	Ficus capense	Ficus	Ng'ou	Natural	Indigenous	Conservation of water catchment, oxen yoke
16	Tamarindus indica	Tamarind	Ochwa(chwaa)	Natural	Indigenous	Fruits, fire wood & charcoal & shade
17	Terminalia brownie	Red pod terminalia	Manera	Natural	Indigenous	Poles, shade, wind break
18	Terminalia catapa	Indian almond, Bastard almond		Artificial	Exotic	Ornamental, fruit
19	Eucalyptus citriodora	Lemon-scented gum	Ndege	Artificial	Exotic	Timber, posts, poles, medicine
20	Eucalyptus camaldulensis	Blue gum	Mti mbao (bao)	Artificial	Exotic	Timber, poles, posts, charcoal
21	Eucalyptus saligna	Sydney blue gum	Nyar maragoli	Artificial	Exotic	Timber, poles, posts, charcoal
22	Casuarina equisetifolia	Whistling pine, Swamp she oak	Liyo	Artificial	Exotic	Ornamental, poles, fuel wood, boundary mark,
23	Melia azadaracht	Persian lilac	Dwele	Artificial	Indigenous	Medicinal, ornamental
24	Azadirachta indica	Neem	Muarobaine	Artificial	Exotic	Medicinal, shade, ornamental
25	Euphorbia candelabrum	Tree euphorbia, Candelabra euphorbia	Bondo	Natural	Indigenous	Used to perform cultural rituals
26	Kigelia Africana	Sausage tree	Yago	Natural	Indigenous	Used in performing cultural rituals
27	Ficus capense	Fig tree	Ng'ou	Natural	Indigenous	Making oxen yoke
28	Erythrina tomentosa	Flame tree,	Orembe	Natural	Indigenous	Used in performing cultural rituals
29	Acacia gerrardii	Gerrard's acacia	Sae	Natural	Indigenous	Shade, charcoal
30	Acacia polyacantha	Falcon's claw acacia	Ogongo	Natural	Indigenous	Timber, shade & wind break

31	Calliandra calothyrsus	Caliandra	Caliandra	Artificial	Exotic	Fodder, agroforestry & fire wood
32	Leucaena leucocephala	Leucaena	Leucaena	Artificial	Exotic	Fodder & fire wood
33	Lannea schweinfurthii	Lannea	Kwogo	Natural	Indigenous	Fuel wood, medicinal
34	Moringa oleifera	Drumstick tree	Moringa	Artificial	Indigenous	Food & medicine
35	Ficus benjamina	Ficus	Ficus	Artificial	Exotic	Shade & ornamental

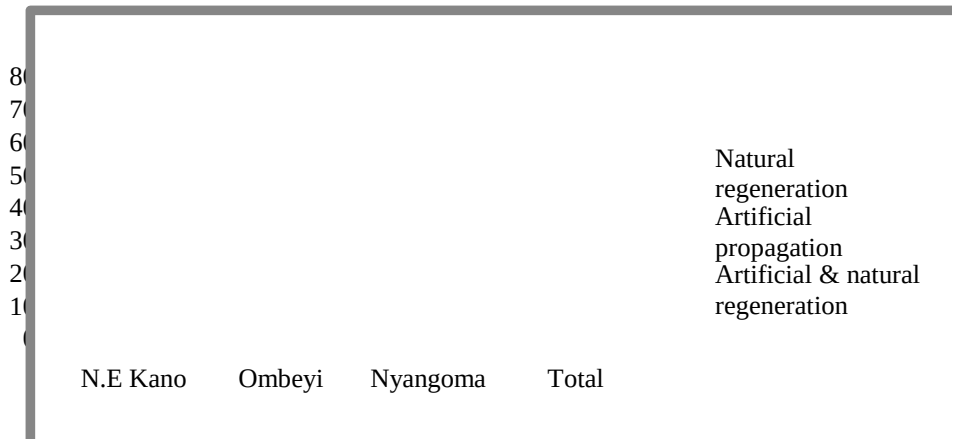


Figure 1: Propagation methods by sub locations

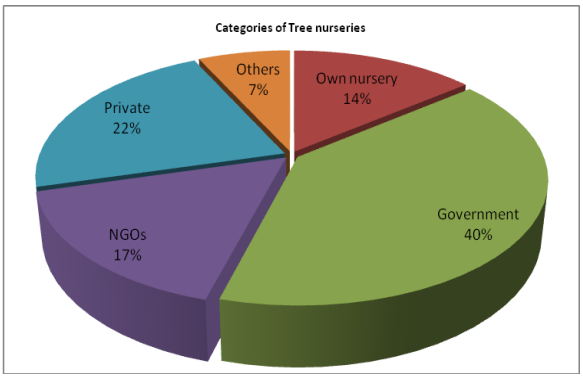


Figure 2: Category of nursery depended upon (Sources of Seedlings for propagation)

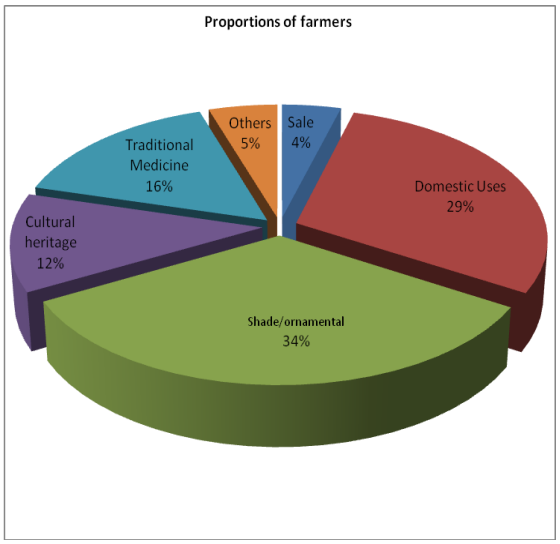
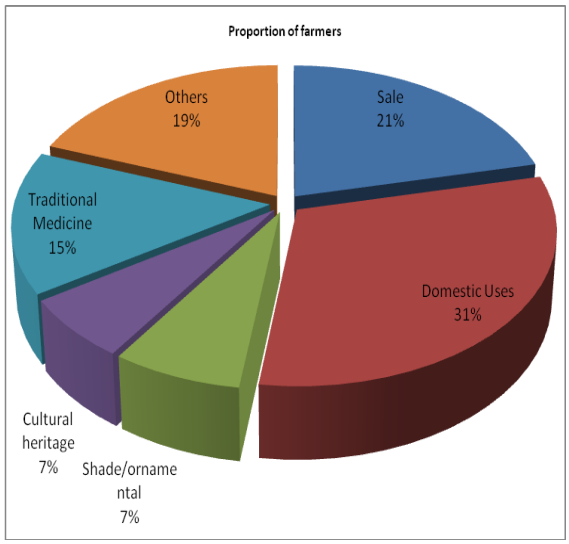


Figure 3: Purpose of planting within homestead



Purpose for tree propagation outside the homesteads

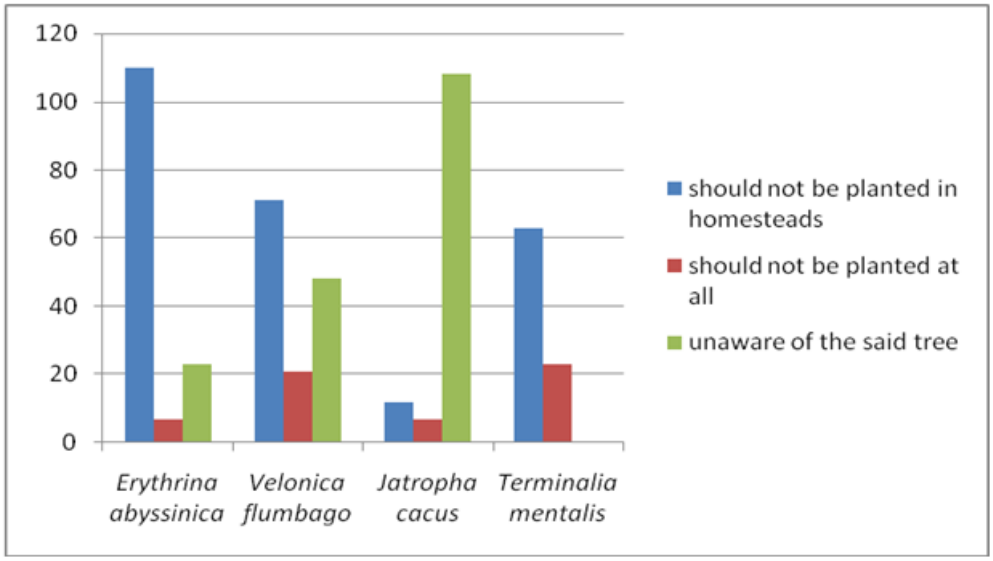


Figure 4: Some tree species which the community has strong reservations against

Table 7: Specific tree species and preferred planting sites

		Preferred site				
Species botanical name	**Local name**	**Within homestead**	**Outside the homestead**	**Anywhere in the home garden**	**Those who do not know the tree**	**Purpose for propagation**
Markhamia lutea	Siala			140	0	Timber, building materials
Terminalia mentalis	Umbrella tree	10	94	26	10	Ornamental & shade
Terminalia brownie	Manera	27	26	87	-	Fodder, shade, & poles
Balanites aegyptiaca	Othoo	29	46	65	-	Shade, charcoal
Acacia gerrardii	Sae	52	18	70	-	Shade, charcoal, fencing
Terminalia catapa	-	18	7	28	87	Beauty, shade
Albizia coriaria	Ober	48	27	65	-	Shade, beauty, timber, charcoal
Kigelia Africana	Yago	0	121	19	0	Traditional medicine, cultural rituals
Erythrina tomentosa	Orembe	0	127	13	0	Traditional medicine, oath taking. Treatment of mumps culturally.
Ficus capensis	Ng'owo/Ng'ou	0	123	17	0	-
Croton megalocarpus	Tindri	16	102	22	0	Shade, charcoal, aesthetics
Melia azadaracht	Dwele	41	46	53	0	Herbal medicine
Euphorbia candelabrum	Bondo	0	131	9	0	-
Tamarindus indica	Ochwa (chwaa)	17	61	62	0	Fruits, shade
Teclea nobilis	Madat	84	45	11	0	Walking sticks
Euphorbia tirucali	Ojwok	95	0	55	0	Fencing
Grewia bicolor	Powo	43	8	89	-	Basket weaving materials Fodder
Warburgia ugandensis	Abaki	34	9	97	-	Medicine, ornamental
Thevetia peruviana	Chamama	103	1	26	0	Fencing
Casuarina equisetifolia	Liyo	21	5	114	0	Beauty, shade, wind break
Moringa oleifera	Moringa	8	5	126	1	Food, herbal medicine

IV. Discussion

About 69% of respondents were male while about 31% were female (Table 2). This is important because this is one of the communities in which tree planting and ownership is mainly a male's affair. Culturally, the only activities women are allowed to do in tree growing without asking for consent from men are watering and weeding. All other activities required in tree growing are a preserve of men (Oloo, 2013). Where

female respondents were used as household heads the female was either widowed or the male household head was away. This has more to do with cultural dimensions on land and tree tenure. Planting trees would amount to assertion of ownership of the land on which the tree is grown, yet women, in this community, 'do not own land'. It is appreciated, however, that tree uses are well known by both males and females alike. Elderly people, male or female, are much informed about medicinal and other special values and uses of the various plants. Therefore the purposes for tree planting and decisions on planting sites are likely to be known both to males and females alike. What is likely to differ is prioritization of what specific species to plant. These findings concur with those of Oloo (2013) in the neighbouring Siaya County in which according to the Luo Council of Elders it is a taboo in the society for women to grow Euphorbia triculli, Agave sisalana, Albizia coriaria, and Tamarindus indica. Euphorbia triculli and Agave sisalana are used as land boundary markers and it would only be land owners, which in this community are men, who can plant them.

Tree species growing in home gardens for various purposes

Thirty five (35) species of trees were recorded to be growing on the farmlands. Twenty one (21) were indigenous and fourteen (14) exotic (Table 3). Most (> 70%) of the indigenous species regenerated naturally and only six (< 30%) were artificially propagated. Those that were artificially propagated included the very highly valued medicinal species such as Warburgia ugandensis, Melia azadaracht and Moringa oleifera and valuable and respected fencing species such as Euphorbia tirucali. It is a curse in this community to uproot, in a bid to interfere with the boundary, Euphorbia tirucali that mark property boundary between neighbours. This socio-cultural value, meant to enhance respect and harmonious coexistence between neighbours, gives this species a special and definite physical niche within the farming landscape. Markhamia lutea is among the indigenous species that will be artificially propagated because of its value in traditional house construction, furniture materials and its relative fast growth. Over 71% of indigenous species were recorded to be regenerating naturally in the study area. There could be a number of reasons for this. Many indigenous trees are associated with the presence of spirits, some of which are not friendly. Trees that attain very large mature sizes are feared for this apart from the fact that they are also associated with attracting "feared birds" such as owls. Owls, in this community are associated with bad spirits and trees that would encourage their presence or visits are not liked. Relative slow growth is characteristic of many indigenous species and not many farmers are encouraged by this. However, naturally regenerated seedlings of these species will be protected as long as they are in the "right site". Alternatively they would just be left to grow on their own, untended, especially if they grow outside the homestead. In Zambia it is perceived that only God can plant forest trees and thus planting of indigenous tree species is culturally discouraged (Warner, 1993). This is a similar attitude as in the study area.

A high proportion of farmers (40%) depend on government tree nurseries for seedlings to plant (Figure 2). Reasons for this high dependency on government nurseries may include price of seedlings in other nurseries, labour and other resource shortages as also found out by Sikuku et al (2014) among farmers in Lugari, Western Kenya. All the recorded fourteen (14) exotic species are propagated artificially. Their relative fast growth and almost immediate economic returns are a major incentive to their propagation. Sikuku et.al (2014) has demonstrated that famers recognize the commercial value of trees and as such target specific species (Eucalyptus spp., Cupressus spp and Grevillea robusta) to be raised for cash. The same situation applies in this study area.

Locations where the tree species are grown in the home garden

The sitting of planting of any species is closely related to the purpose for planting (Figure 3). Within the homestead 34% (highest) of the farmers planted for shade and ornamental purposes compared to only 7% who planted for the same purpose outside the homestead. Trees for domestic use would find almost equal consideration for space within and outside the homestead (29% and 31% of farmers respectively). In this case space for planting would likely determine whether it is planted within or outside the homestead. Medicinal plants would be planted almost equally as much within and outside the homestead (16% and 15% of farmers respectively). Trees purposed for sale would find their place mainly outside the homestead. The consideration for this would most likely be space availability for raising commercial scale plantations – compare 4% for within homestead and 21% of farmers for outside the homestead (Figure 3). Accessibility to products and services provided by the planted species, apart from other socio-cultural considerations, seem to play important roles in determining planting sites of the species (Figure 3 and Table 7). Figure 4 shows some species which the community has serious reservations on planting because of superstitious views. The species are therefore either not to be planted within homesteads or not recommended for planting at all. Erythrina abyssinica is not preferred for planting within the homestead and it will hardly be regenerated artificially because it is a species with many myths and superstitions around it. Oaths are taken using it, thus is not favoured for planting. Velonica flumbago (**Rachier**) is associated with witchcraft and a home in which it grows, whether planted or

naturally regenerated, is associated with witchcraft because the tree is used for witchcraft (**Nawi** in the local dialect). Terminalia mentaly, though a beautiful ornamental and shade tree is not a favourite in most homes and very few homes would have it planted in the homestead (Table 7). It is associated with death, such that as it grows up and puts up its layered branching characteristic, members of the home would be dying, one after another. The values and symbolisms attached to the various species by the farmers are a result of either experience with the species or information passed on from older generations. Socio-economic values are experienced while the spiritual and cultural values are mainly information passed on from older generations and believed as such. Ethnobotanical knowledge encompasses both wild and domesticated species, and is rooted in observation, relationship, needs, and traditional ways of knowing. Such knowledge evolves over time, and is therefore always changing and adding new discoveries, ingenuity and methods (www.botanicaldimensions.org/).

V. Conclusions

Traditional knowledge systems seem to count when it comes to deciding on what species to plant and where to plant them. This especially applies to indigenous species. Exotic species rarely have any spiritual attachments but mainly socio-economic. Species would thus be planted or not planted, nurtured or not depending on the values and symbolisms attached to them. The planting site apart from being related to the use and even space availability will be influenced by the cultural values attached to the species. It is apparent that planted species or species natured and the specific sites where they are found in the farm are determined by the knowledge and experience with them - the knowledge is derived from ethnobotany of the local area. Ethnobotanical knowledge can therefore be used to predict the choice of tree species to be propagated in home gardens in this community.

VI. Recommendations

Species choice and planting site has to consider both biophysical and appreciate socio-cultural values attached to the species, the latter being the consideration of the influences that culture has on society and, which can, in part, determine the social acceptability of agroforestry at the farmer's level, as farmers are considered to be the primary beneficiaries of agroforestry and social forestry practices.

There is real need to deeply research and establish the basis for the superstitious views on tree species not just in this community but also in other communities in Kenya.

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