

# Assessment of the Impact of the Woodcarving Industry on the Environment: A Study of Wamunyu Location, Mwala District, Kenya

Jane Mutinda

School of Environmental Studies, Kenyatta University. P. O Box 43844-00100 Nairobi, Kenya  
[jwanzamutinda@yahoo.com](mailto:jwanzamutinda@yahoo.com)

## Abstract

The wood carving industry in Kenya is highly dependent on indigenous tree species. These hardwood species have other competing uses too: they are preferred for ornate and construction. In construction, they are used as timber for furniture, flooring, and civil works. Over the years, there has been selective harvesting of these preferred tree species, leading to a decline and, locally, to a collapse of the tree population and contribution to the degradation of forests and woodlands. These species take between 100-150 years to mature. The study was on woodcarving handicraft among the Kamba community in Wamunyu location of Mwala District in Kenya. It examined the extent to which the practice has impacted on the raw materials used in the production of the craft. A total of 100 woodcarvers participated in the survey. These were purposively sampled for the reason that in each location, the target respondents were organised into a major association. In Wamunyu the major association is Wamunyu Cooperative Society. Other study respondents included cooperative officials and, programme managers of local non-governmental organisations. Questionnaires, in-depth interview guides, focus group discussions, observation and photography were used in collecting data which revealed certain significant aspects of the handicraft. Wood carving is a major informal industry in Wamunyu. It is a source of livelihood for many families. However, it has been practiced to the detriment of the environment. Witnessed is a complete disappearance of some indigenous trees originally used in the industry due to inactive foresight in replenishing the resource base. Most carvers are blind to environmental concern but monetary gain. Revealed as well, resident NGOs have very little to do with the handicraft industries despite the significance of the crafts as major income earners. Admittedly, the findings suggest a need for woodcarvers to carryout their trade in a sustainable way. Required are afforestation and reforestation programmes and, as relates to leftovers from the craft, adaptation of good waste management practices. For example, use of cut-offs in carving smaller items and making of compost manure rather than setting ablaze the resultant leftovers. The cooperative societies should be in the forefront of ensuring that sustainable wood carving is done. There is need for urgent extensive mobilisation of all stakeholders to start nurseries and plantations with the sole purpose to grow raw materials for use by the craft. Hence conservation education would come in handy in promoting sustainable woodcarving. Suggested as well is a need for resident non-governmental organisations to expand their activities and train and empower the woodcarvers in aspects such as resource conservation, water harvesting techniques and, diversification of income generating activities.

## 1.0 INTRODUCTION

The handicraft industry has for many years been an important source of livelihood to millions of people both in the rural and urban areas, particularly in developing countries. In the rural rain scarce areas and stagnant or slowly growing agricultural areas, it has assumed a primary source of fairly stable source of self-employment, deriving its primary raw materials from the natural environment (UNESCO, 2000). Conversely in agriculturally potential areas, the industry is a secondary source of income diversification (Obunga, 1995). Thus, in observation, access to raw materials for the craft is a significant factor in the dynamism of the industry. Reiterating this, (URT, 2008 ; and, HBF, 2002) explain that limited access to resources, especially in rain scarce areas, has been noted to create pressure on impoverished groups to explore alternatives in exploiting the environment to meet their immediate survival needs. This, therefore, leaves no doubt as to the importance of the natural resource base in the socio-economic development of a community (Homma 1992).

The history of the handicraft industry in the world is, on the one hand, enveloped in mythology while on the other; it is the source of numerous utilitarian products (Braedt and Standa-Gunda, 2000). Developed as an art, the work of the early artist reflected a system of beliefs and the socio-cultural context in which the items were created (Elkan, 1958). In this regard, each community produced handicrafts of high artistic value distinctive to their community - determined by tradition and the availability of raw materials (Ellert, 1984; Balugun, 1979).

In some countries like Persia and Egypt, wood was in use as early as the 7<sup>th</sup> century. This wood was abundant in some areas such as North Persia, Turkey and the Balkans. In Egypt demand was so high that resinous wood products were imported from Turkey and Syria to service local demand. The function of wood in these early countries was primarily architectural. Ottoman houses of Turkey and the Balkans demonstrate the use of wood to

decorate ceilings and panel walls with cupboards and niches essential for storage purposes in the absence of wardrobes, (The Arts Council of Great Britain, 1976).

With respect to woodcarving, the industry was one of the earliest techniques of woodwork. In the Romanian territory, for example, the history of woodcarving goes thousands of years back. As Zdercive *et al.*, 1967 observe, “The decorative beauty and variety of the carved wooden objects seen in the houses of Romanian peasants and the hand-woven fabrics, costumes and pottery demonstrated the people’s inborn sense of beauty and their creative imagination in rendering forms and decorative motifs with great skill.” Wooden objects were widespread throughout the Romanian territory and their link with the everyday life of the people explains their remarkable topologic diversity. People chose to specialize only in certain objects, techniques, decorative motifs and even composition and, this led to a great variety in woodcarving.

In Kenya, communities have since time immemorial practised indigenous technologies such as woodcarving, (Kangethe, 1991). These technologies had basic characteristics in that they were survival based: they were used to support life on a day-to-day basis through harnessing and using local resources. This involved a critical study of how best any local material could be used effectively. Further, the technologies were respectful of nature and creation: everything had a purpose and destruction was not encouraged. Technology was guided by a set of cultural norms describing how affairs of a community were to be conducted. Further, the technologies were not geared towards mass production, but were restricted to satisfying immediate domestic consumption.

In Kenya today, woodcarvings, basketry, Kisii soapstone carvings, jewellery, pottery, gourd decorations, T-shirts and *kikois* (African shawl), are the major handicrafts. Amid these, woodcarving stand out especially in terms of the commercialisation and the number of people supported by this form of handicraft among the Akamba. In particular, and from which this study draws its drive, this latter form of handicraft has gained in popularity and prominence amongst the Akamba from Wamunyu Location of Mwala District of Kenya. This section of the Akamba community has a long-standing history of woodcarving amongst its men. The practice derives its raw materials from the natural physical environment in the form of hardwood.

Traditionally, woodcarving amongst the Akamba was largely utilitarian and was performed with a high sense of appreciation and excellence. Over the years, this sort of craftsmanship has evolved to take a new thematic orientation; one with a commercial dimension. This has not been without an impact on the environment. The consequence is that, with the increasing need for environmental management in Kenya, indigenous technologies such as these have come under scrutiny with a view to harmonizing them with the principles of ecological regeneration.

In tandem and with special reference to the gender roles of woodcarving, the study focused on ascertaining the impact of the Akamba woodcarving handicraft practices on the environment. The purpose of which was to provide new information on natural resource use and community natural resource management strategies. This was with a view to suggesting appropriate ways of ensuring the local communities from the study area derive optimal benefits from their natural resource base and, sustainably manage their environment.

In Wamunyu area of Mwala District, the community has taken up wood carving as a commercial venture to supplement their income without much concern on the impact of their activities on the environment.

Wamunyu location is ecologically fragile rural areas with, according to the government of Kenya (2002-2008), over 85% of their population poor. This is a population that has over the years been on relief food supply almost on a permanent basis. The limited access to resources in the study community has thus resulted in this poor population having limited choices of income-generation. A large number has, therefore, turned to their immediate surrounding environments to meet their immediate survival needs. Understandably, many people have turned to woodcarving as an indigenous handicraft technologies that derive their primary raw materials from the natural resource base. This has had its environmental consequences.

The wood carving industry in Kenya is highly dependent on indigenous tree species. These hardwood species have other competing uses too: they are preferred for ornate and construction. In construction, they are used as timber for furniture, flooring, and civil works. Over the years, there has been selective harvesting of these preferred tree species, leading to a decline and, locally, to a collapse of the tree population and contribution to the degradation of forests and woodlands (UNESCO, 2000). These species take between 100-150 years to mature (Obunga, 1995).

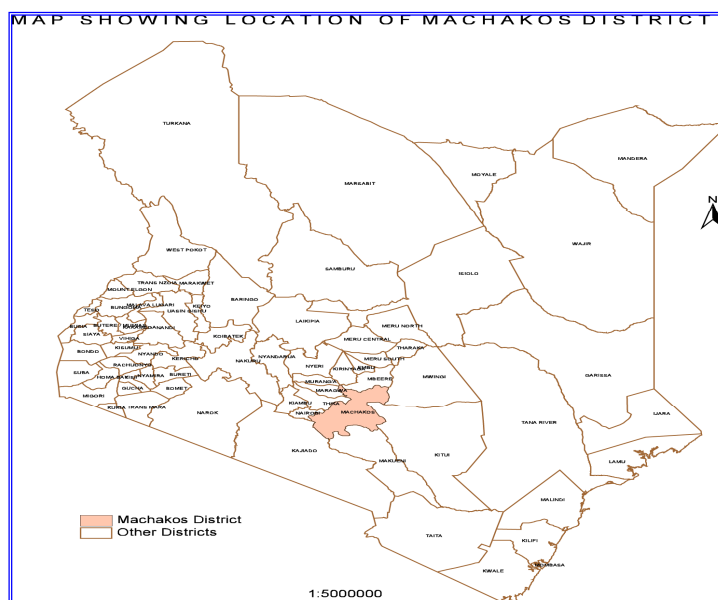
The effects of unsustainable harvesting of these and many other tree species are an ecological threat. It limits species regeneration ability (due to removal of the seed source) and, endangers the survival of small mammals, birds, reptiles and insects that depend on the trees for food or shelter. In addition, it leads to even deeper conditions of poverty in the long run. It is against this background that the researcher found it prudent to carry out a study to investigate the impacts wood carving has on the environment. The researcher also aimed at providing new information on natural resource use and community natural resource management strategies and techniques amongst the woodcarvers.

## 2.0 Materials and methods

### 2.1 Study Area

The study was conducted in Wamunyu location of Mwala District, which is in Machakos county (see map below showing greater Machakos District). In selecting the study sites, the main interest was to focus on the areas with a high concentration of the practice of woodcarving in the district.

**Figure 1: Map showing location of Machakos County (Source: Survey of Kenya)**



Machakos County covers 6,281.4 Km<sup>2</sup>, is located in Eastern Province of Kenya. Administratively, the district is divided into 4 districts and was formerly divided into 12 divisions. According to the 1999 population census, its total population was estimated at 906,644 persons (48.85% men and 51.15% women). Majority of this population (56.3%) was estimated to be persons below 20 years of age. Regarding the poor, most are found in the dry areas, which are characterised by frequent droughts. An expected 70% of the population in the greater Machakos work in the agricultural sector, and 80% in the livestock sector. Agriculture contributes 70% of the household income (GoK, 2002-2008). Further, over 63% of the population is estimated to be poor, contributing to about 4.4% to the national poverty. Poverty within the greater Machakos district is defined as the inability to meet basic needs such as food, clothing, housing, health and education for children. Moreover, the traditional coping mechanisms such as rearing of sheep, goats, and poultry are no longer viable, leaving most of the families destitute. The distribution of this poor, however, is not even throughout the greater district (*ibid*) as shown in Table 3.1 below.

**Table 1: Greater Machakos District Population and Distribution of the Poor by Administrative Division**

Division	Area (Km <sup>2</sup> )	Population (1999 Census)	Density (persons/Km <sup>2</sup> ) (1999)	Density (persons/Km <sup>2</sup> ) (2004)	Estimated Poor	% of Estimated Poor
Central	491.5	143274	292	318	43640	30.5
Kalama	330.2	41000	124	135	36840	90.0
Kangundo	178.2	91238	512	557	50985	55.9
Kathiani	205.8	95096	462	503	62240	65.4
Masinga	1,094.1	74478	68	74	70100	94.1
Matungulu	634.3	99731	157	171	64990	65.2
Athi River	957.0	48936	51	56	32160	65.7
Mwala	481.5	89211	185	201	63270	70.9
Ndithini	316.8	32358	102	111	21130	65.3
Yathui	533.0	65567	123	134	60860	92.8
Yatta	491.0	76748	86	94	51785	67.5
Katangi	568.0	49007	156	170	42140	86.0
<b>Total</b>	<b>6,281.4</b>	<b>906644</b>			<b>600140</b>	<b>66.2</b>

Source: GoK, 2002-2008

The greater Machakos County has a varied topography, largely a plateau rising from 700m above sea level in the

south to 1700m in the west. This is interrupted by an escarpment and a series of hill masses. It is traversed by three permanent rivers: Athi, Tana and Thika rivers. These rivers are part of 5 Km<sup>2</sup> of water mass covering the district. Others are seasonal rivers, streams, boreholes, springs, dams and pans, and to a limited extent roof catchment. This water mass is subjected to high evaporation rates during the dry seasons, affecting their water levels. Moreover, the ground water sources are low and saline, with the degree of salinity ranging from low to high, depending on the rock type. Majority of the population depend on these surface and sub-surface water sources. With the increase in population over the years, these water supply systems are overstretched. Farmers in the district mostly depend on rains for their production (GoK, 1997-2001; GoK, 2002-2008).

On the other hand, the climate varies from highland equatorial on the summit of hills to semi-arid on the plains. This affects vegetation, which varies with altitude

Still on vegetation, gazetted forest in the region covers an area of 7.07 Km<sup>2</sup>, with ungazetted forest covering 17.74 Km<sup>2</sup>. These are to be found on the hill masses in the high potential areas of the larger Machakos County. The gazetted forests are distributed in Iveti Forest block, forest department compound, Uuni Hill, Mango Hill, and Muumandu Hill; while the ungazetted forests amongst Kibauni Hill and Kanzalu Hill. The district has no natural forest (GoK, 1997-2001; GoK, 2002-2008).

### 2.2 Study Community

Wamunyu location is in Yathui division of Mwala District. The Yathui division cover an area of 533.0 Km<sup>2</sup>. According to the 1999 national population census, Yathui had an enumerated population of 65,567 persons. The division is one of the areas mostly affected by drought. It is semi-arid, receiving rainfall that is too low to sustain any meaningful agriculture. Water shortage is very acute and people walk up to 10 kilometres in search of the commodity for both domestic and livestock needs. Over the years, these divisions have been on relief food supply almost on a permanent basis (GoK, 2002-2008). Consequently, the division is amongst the top four poor divisions in the greater Machakos County. Of the enumerated population from the 1999 national census, Yathui had an estimated poor population of 60,860 persons, constituting 92.8% of its.

### 2.3 Target Population

The target population consisted of wood carvers from the Wamunyu Co-operative Society and its environs; officials from these organisations and representatives of non-governmental organisations working within the study area. Farmers from the study location were also included in the sample to give views on whether they engage in tree planting activities in the area.

### 2.4 Wamunyu Woodcarving Cooperative Society

The Wamunyu Woodcarving Cooperative Society, registered in 1965, has a current membership of 1,200 members and a large showroom that acts as the marketing base. Retailers and middlemen visit the showroom to buy finished and semi-finished carvings. The society sells about 5500 pieces per month. Approximately 30 women are involved in the finishing line and in administration. Wamunyu has the highest concentration of wood carvers in Kenya and therefore the largest number of people who virtually depend on wood carving for a living. Wamunyu is important to the wood carving industry; first, because it is the cradle of the art and industry of wood carving in Kenya and also because of the unique way in which the production of wood carving has evolved and is organised in the entire administrative location.

### 2.5 Sample and Sampling Procedure

Sampling procedure used in this study employed several methods. Purposive sampling was used to select the practitioners of woodcarving. The researcher randomly selected practitioners as they worked on their pieces. From this study population one hundred respondents were interviewed. To get information from local as well as government leadership, the researcher purposively identified local leaders for this study. The general sample used in this study is as shown in Table 3.3 below.

**Table 2: Sample Population**

Administrative area	Handicraft practised	Registered Members	Number interviewed
Wamunyu	Wood carvers	1200	100
	Cooperative officials	2	2
	NGO Heads		1
	Focus group discussions		5

### 2.6 Data collection

The questionnaires were administered to cooperative officials and programme managers running non-governmental organisations. Interview schedules were used to collect data from the 100 wood carvers. A total of 10 focus group discussions were conducted – 5 for wood carvers. Furthermore, observation record sheets were used by the researcher to record what was observed during the study. Photographs were used to capture the woodcarvers in their daily routines.

### 2.7 Data Analysis Procedure

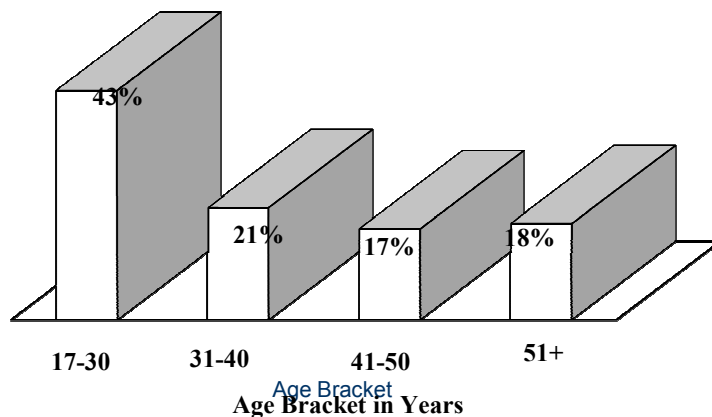
Once the researcher left the field, the data was organised, themes created to categorise the questionnaire items by type of information sought. This was coded and analysed using the Statistical Package for Social Sciences (SPSS)

- frequencies and percentages calculated as per the questions asked.

### 3.0 Results

#### 3.1 Demographic Characteristics

The woodcarvers found on site during the 10 days the researchers spend there ranged from 17 to 65 years of age with the majority (43%), as shown in Figure 4.1, being in the age bracket of (17 to 30) years. Following this age bracket (at 21%) was the (31 to 40) year olds, while 17% were aged between 41-50 years and 18% of the respondents 51 years old and above. High frequencies of the respondents were to be found in the ages 26 (7.1%), 28 (8.1%), 32 (6.1%) and 40 (5.1%) years of age respectively. This could be as a result of the high unemployment rates among the youth as well as high primary and secondary school drop-out rates in the area, owing to monetary returns from the sales.



**Figure 2: Percentage Proportion of Carvers by Age Bracket**

Majority of the respondents (60.8%) had attained primary school level of education and only 38.1% had secondary school education while 1.0% acknowledged having no formal education. More respondents, 85.9% were married with the rest (14.1%) giving their marital status as single. Of the married respondents, only 6.8% had spouses who were in formal employment. About 60.8% had spouses whose main occupation was farming, and an equal percentage of 16.2% had spouses who were either housewives or in self-employment. Of the self-employed spouses, 8.1% were basket weavers.

A larger group of the respondents (57.5%) indicated having spouses who had attained primary school level of education. In comparison, (34.2%) had spouses with secondary school education whereas (8.2%) had those with no formal education.

About 74% of the respondents acknowledged having children. The number of children ranged from one to 16 per respondent, with most respondents (59.5%) having one to four children. Of the respondents with children, 83.8% had children in the age bracket of 0-12 years of age, while 51.4% had in the age bracket 13-24. Only 29.7% had children whose age was above 25 years.

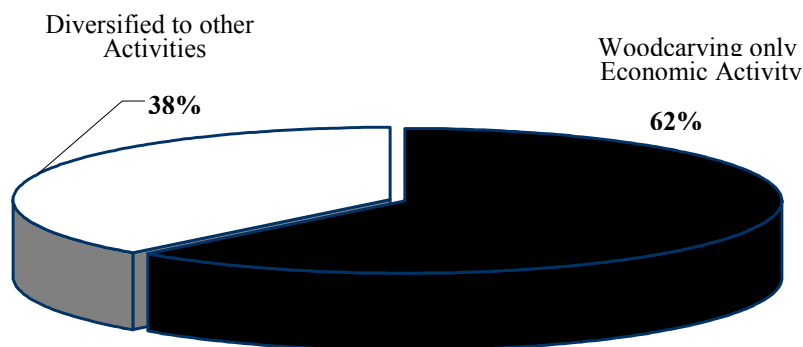
On the children's level of education, only 8% of the respondents indicated having a child who had attained post-secondary education; just a small number of respondents (15%) had children with secondary level of education. Most, though not substantial, (36%), had children with primary school education, while 34% had children with pre-primary education. The rest (7%) had not joined school.

#### 3.2 History of Woodcarving

The oldest respondent in woodcarving has been in the trade since the year 1950 and youngest 2002. The majority (59%), joined between the years 1990 and 2002. The peak years that significantly had many of the respondents joining the trade were 1992 (9%) and 1997 (9%). Others include 1990 (5%), 1993 (6%), 1994 (5%), 1995 (6%), and 1998 (5%). This increase could perhaps be linked to recurrence in droughts as well as increased demand for handicrafts in the international market.

#### 3.3 Economic Engagement of the Woodcarvers

As illustrated by Figure 4.2, most respondents (62%) stated that woodcarving was their only occupation. The rest, (38%) indicated having diversified into other income generating activities, of which the majority (72.5%) were in farming, and 25.0% were casual labourers; only 2.5% engaged in another income generating activities related to woodcarving – i.e. brokering in woodcarvings.



**Figure 3: Carvers Economic Activities**

### 3.4 Carving Production

The number of wood carvings produced in a day was dependent on the design and size of the carving- ranging from 0 to 120 units a day. A reported 27.2% of carvers interviewed indicated that they completed ten (10) units per day; 3.7% took more than a day to complete one (1) unit while 1.2% could produce 120 units but of smaller sizes.

### 3.5 Eligibility for Woodcarving

There were varied opinions as to who qualifies to be a wood carver. Majority (78.1%) of the respondents were of the opinion that anybody could be a wood carver, while 15.6% indicated that only experienced persons qualified. Few (3%) viewed it as a man's job. Some, but very few of the respondents, 1% and 2.1%, deemed the trade to be for primary school dropouts and those above 18 years of age respectively.

The arguments for the various outlooks were just as diverse. Most (80.7%) argued that wood carving was an income-generating activity, and therefore did not see why there should be restrictions as to who joins the trade, especially now that there was a scarcity of formal employment. An estimated 9.7% contended that school dropouts did better in the trade. Others, though small in number (1.6%), were of the opinion that women could not be wood-carvers, as they could not carve. This latter group was supported by 8.1% of the respondents who added that culture did not allow women to carve wood. The women, however, could engage in the finishing stage of carvings (e.g. painting, dying or decorations), a fact that was observed during the study.

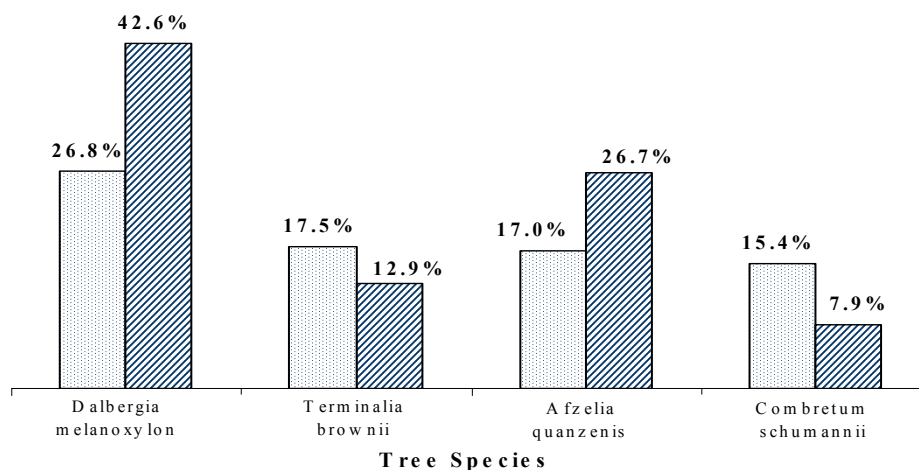
### 3.6 Tree Species Used for Carving

The study established that wood carvers had a preference for ten tree species for carving. The most popular (64.9%) of these was *Dalbergia melanoxylon* (*mpingo* in Swahili; *ebony* in English). Other popular species were: *Terminalia brownii* (*muuku* in Kamba); *Azelia quanzenis* (mahogany in English); Jacaranda; and *Combretum schumannii* (Rosewood in English, *Mwaa wa usi* in Kamba). The table below summarizes the top ten preferred species in order of their preference by the carvers.

**Table 3: Preferred Tree Species for Woodcarvings**

Tree Species	English Name	% of Carvers Using	Status of Tree Species
<i>Dalbergia melanoxylon</i>	Ebony	64.9	Wiped out and not found in Wamunyu
<i>Terminalia brownii</i>	Terminalia	42.3	Wiped out and not found in Wamunyu
<i>Azelia quanzensis</i>	Mahogany	41.2	Wiped out and not found in Wamunyu
<i>Jacaranda</i>	Jacaranda	41.2	Being promoted as “good wood”
<i>Combretum schumannii</i>	Rosewood	37.1	Diminishing
<i>Boscia angustifolia</i>	Boscia	4.1	Diminishing
<i>Balannites aegyptiaca</i>	Desert Date	2.1	Diminishing
<i>Rhamnus staddo</i>	Buffalo Thorne	2.1	Diminishing
<i>Azadirachta indica</i>	Neem tree	1.0	Being promoted as “good wood”
<i>Terminalia spinosa</i>	Terminalia	1.0	Wiped out and not found in Wamunyu
<i>Prunus Africana</i>	Red Stinkwood	1.0	Diminishing
<i>Podocarpus latifolius</i>	Yellow-wood	1.0	Diminishing
<i>Brachyleana huillensis</i>	Silver oak	1.0	Wiped out and not found in Wamunyu
<i>Olea europaea</i>	Olive	1.0	Wiped out and not found in Wamunyu
<i>Spirostachy africana</i>	Tambootie	1.0	Diminishing
<i>Ficus natulensis</i>	Bark cloth fig	1.0	Diminishing
<i>Senna siamea</i>	Siamese senna Senna	1.0	Diminishing
<i>Grevellea robusta</i>	Silky Oak	1.0	Being promoted as “good wood”
<i>Croto megalocarpus</i>	Croton	1.0	Diminishing
<i>Tamarindus indica</i>	Tamarind	1.0	Diminishing
<i>Acacia seyal</i>	White Thorne Acacia	1.0	Diminishing
<i>Adansonia digitata</i>	Baobab	1.0	Diminishing
<i>Lannea schweifurthii</i>	Lannea	1.0	Diminishing

Source: Author, fieldwork 2008



**Figure 4: Selected Preferred Tree Species and their Scarcity**

**Key**

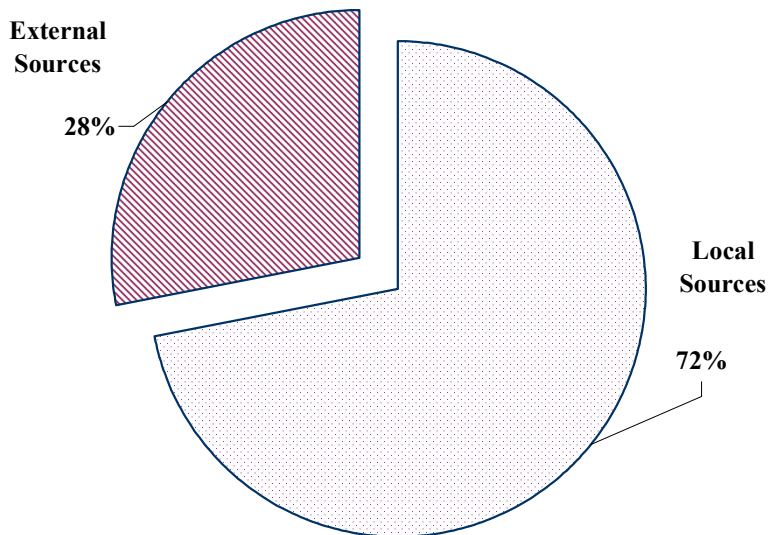
- Preferred Tree Species
- Scarcity of Tree Species

Literature available indicates that *Dalbergia melanoxylon* (Ebony) was wiped out as early as the 1940s, while *Brachyleana huillensis* disappeared in the 1950s. Today, no local supplies remain, and an estimated 200-300 tons per week are trucked from 100 miles away and further. This has even been made worse because the same tree is exported to Europe for the manufacture of clarinets and oboes.

The two carving sites of Mombasa and Malindi use 20,800 wild ‘muhugu’ mahogany (*Brachyleana huillensis*) trees each year, felled from some of the last remaining forest on the Kenyan coast. These forests are home to some of Kenya’s most endangered birds, mammals and reptiles, many of which are at risk due to over-exploitation of the woodcarving trade (Environment News Service, 1998)

### 3.7 Sources of Raw Materials

The researcher noted that the wood carvers had different sources for their raw materials. Comparatively, these sources could be grouped into two: local and external sources. Figure 4.4 shows the proportion of the sources of raw materials. Local sources constituted the largest contributor (at 71.7%) of the raw materials for the carvers. Understandably, all the carvers sourced locally for their raw materials. Most popular of the local sources (53.2%) were the local wood traders (see Plate 8 for example). Other local sources included: local forests (39.3%); and the Cooperative Society (7.4%). On the other hand, 39.5% of the carvers practised direct external sourcing. The most popular of the external sources was Karura Forest (14.9%); Ngong Forest (9.6%) and Nyeri, Maasai land, Narok, Meru, Kitui, and Mbitini which accounted for 15% of the sources.



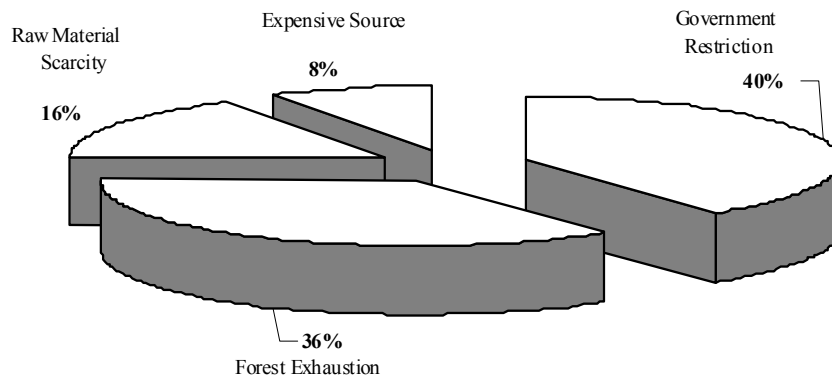
**Figure 5: Sources of Raw Materials**



**Plate 1: Carving Wood for Sale at Wamunyu Cooperative Society (Source: Author, fieldwork 2008)**

The study found that wood carving raw material sources had changed over the years for 93.8% of the carvers. These changes were explained based on four reasons. Ranked in descending order, these reasons were: government restrictions (40%); exhaustion of the raw materials from the indigenous forests (36%); scarcity of the materials (16%); and the raw materials having become expensive (8%). The chart below illustrates the importance of the reason for the change in sources of raw materials as advanced by the carvers.





**Figure 6: Reason for Changing Raw Material Source**

Nonetheless, as Figure 4.6 illustrates, to ensure a continuous supply of the raw materials, the carvers had employed three main methods: direct purchase of the raw materials from dealers (71.1%); planting trees through a society (20.5%); and formation of a co-operative to pool resources for the purpose (8.4%). However, it is important to note that although (20.5%) indicated that they planted trees through the society, no substantial tree nurseries were noted from observation.

### **3.8 Markets for the Finished Products**

In general, the carvers marketed their products either through institutions (such as marketing societies or brokers) or directly as individuals. None directly marketed their products internationally. International markets, accessed by middlemen, included amongst others, U.S. United Kingdom (U.K.), Sweden and Norway.

An estimated 76.8% of the carvers marketed their products within the locality; 20% marketed outside the locality; and 3.2% both within and outside the locality. A significant proportion of the respondents, approximately 22%, sold their products through middlemen. Of the carvers that sold their products within the locality, only about 25% marketed their products through an organised grouping (such as a co-operative or society). The rest preferred otherwise, citing disorganisation and dishonesty as the reasons for not doing so through co-operatives or societies. The dishonesty was explained in terms of the profits gained (where it was claimed that a very small percentage was remitted to the producers).

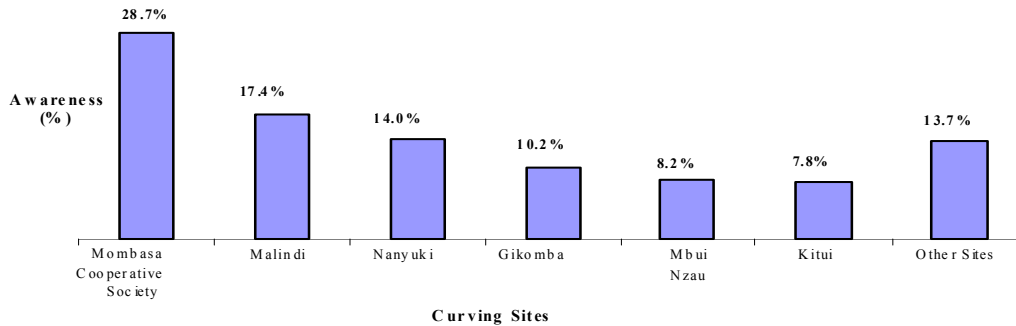
The findings indicate that many woodcarvers are not registered with cooperatives at all, which in turn puts greater pressure on trees.

### **3.9 Competition**

The wood carvers experienced competition for their products. This was from other carvers, both domestic and international. The international carvers were from Tanzania. However, competition was more pronounced (98.7%) from the domestic carvers. The competition experienced was mainly from the lack of creativity amongst the carvers where most of them produced similar products thus negatively affecting the pricing of their goods. Other determinants of competitiveness identified included the numbers of carvings produced and value addition, period in business and location of business of which productivity and location of business were of significance.

### **3.10 Carving Sites in Kenya**

The respondents were aware of other carving sites in the country. Named were over ten sites with Mombasa Co-operative being most familiar to the carvers. Other sites known to the covers were: Malindi (in Coast Province), Nanyuki (in Central Province), Gikomba (in Nairobi Province) and, Kitui and Mbui Nzau (in Eastern Province). Others included Ikombe, Kenyatta, Kisumu, Kisii, Nakuru, Nyeri, Ukanda, Kibwezi, Kalawa, Meru and, Mililuni as shown in the figure 4.7 below.



**Figure 4.1: Awareness of Other Carving Sites in Kenya**

**Figure 7: Business Development Services**

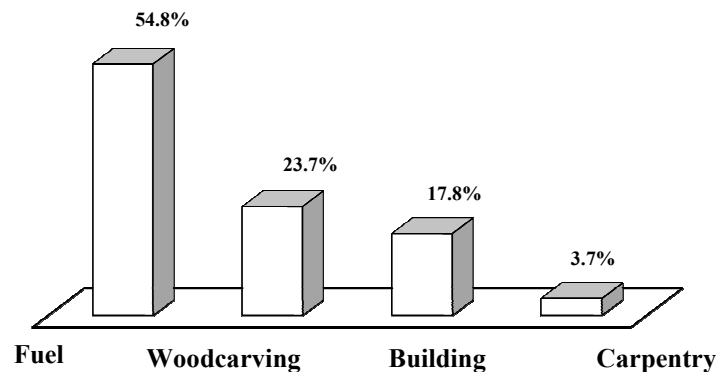
Majority (63.2%) of the carvers had benefited from business development services from various organisations. These organisations included: Small and Micro Enterprise Programme (SMEP); Ministry of Co-operative Development; United Nations Educational, Scientific and Cultural Organisation (UNESCO); and Trade Craft; The Ministry of co-operative had the most beneficiaries (46.0%). Closely following this was SMEP (32.0%) and, UNESCO (14.0%). Trade Craft had the least beneficiaries at 6% and 2% respectively.

**3.11 Uses and Consumption Level of Trees**

Identified from the survey was that trees in the study area were utilised in two main ways: provision of wood and shade respectively. Of the two, exploitation for shade purposes was least, having been mentioned by 3.2% of the respondents.

Expounding on the wood, as Figure 4.8 demonstrates, consumption was at four levels: carving, carpentry, fuel (charcoal and firewood) and building (construction). Of these, use was highest for fuel, followed by carving; carpentry consumed the least.

The wood consumption took into account all tree species. However, it is important to note that for wood carving, particular tree species were preferred.



**Figure 8: Wood Consumption Patterns**

Worth mentioning was that a by-product of wood carving were cuts-off. According to the study, these off-cuts were disposed off in two ways, as: recycled material in the form of fuel and waste that was simply burned away. Recycling as fuel was, however, the more preferred amongst the carvers (at 79.0%).

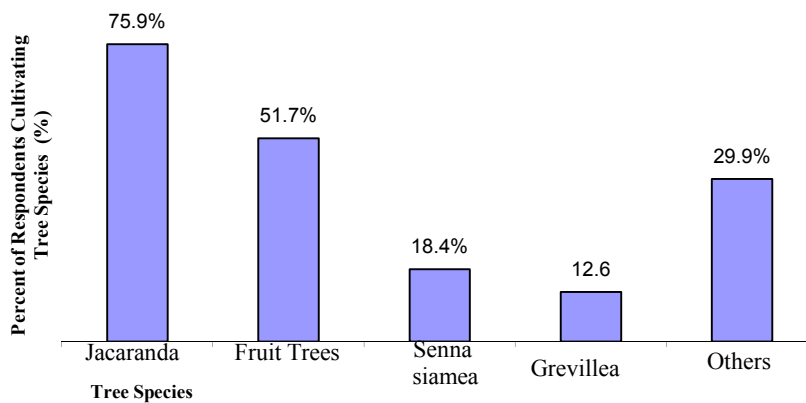
**3.12 Tree Planting Activities**

About 90.7% of the carvers undertook tree planting in their farms. The tree species planted included: *Senna siamea* (*Mukengeta* in Kamba *Siamese senna* in English), jacaranda, fruit trees, *Terminalia brownii* (*Terminalia*), *Azadirachta indica* (*Neem Tree*), *Eucalyptus sp.* (*Msanduku* in Swahili), *Grevillea robusta* (*Silky Oak*), *Croton Megalocarpus* (*Muthulu* in Kamba *Croton* in English), *Azalia quanzenis* (*Mahogany Bean*), *Neem*, and *Tamarindus indica* (*Kithumula* in Kamba, *Tamarind* in English). Of these, the most widely cultivated species was the jacaranda tree. This was from three-quarters of the carvers. Significantly cultivated as well were fruit trees, undertaken by 51.7% of the carvers. Of note too were *Senna siamea* (*Siamese senna*) (18.4%) and *Grevillea robusta* (*Silky Oak*) (12.6%). This is shown in figure 4.9

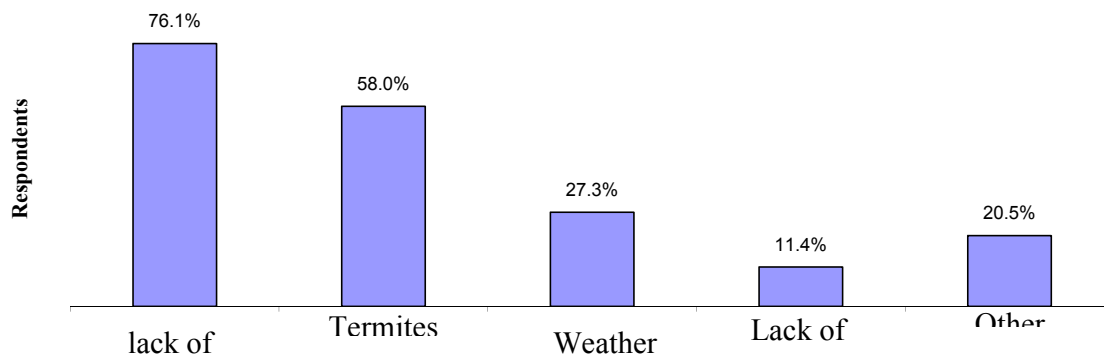


**Plate 2: Tree Planting – Efforts of Wamunyu Co-operative Society**  
 (Source: Author, fieldwork 2008)

Notwithstanding what's cultivated thus far, the carvers expressed desire to plant other tree species. With the exception of *Dalbergia melanoxylon* (Silver Oak), *Terminalia spinosa* (Terminali), *Balannites aegyptiaca* (Desert Date), *Combretum schumannii* (Black Leafwood) and, “*Misewa* (the local language name)”, the desired species were similar to those currently in cultivation. The desire was, however, more for *Terminalia brownii* (Terminalia), *Jacaranda*, *Eucalyptus sp.*, *Fruit Trees* and, *Afzelia quanzenis* (MahoganyBean). Further revealed from the study was that 99.4% of the carvers faced challenges with respect to planting trees in their farms. The identified challenges included: soil type, which limited the tree species planted; land sizes; weather; lack of seedlings; termites; water; technology of planting; theft from woodcarvers; and animal browsing.



**Figure 9: Tree species cultivated**



**Figure: 10: Challenges in Tree Planting**

Worth noting was that to access seedling, the carvers mainly depended on seeds from the trees themselves. 9.3% of the carvers did not undertake tree planting in their farms. The reason given for this was a lack of interest to do so.

### **3.13 Women Woodcarvers in the Area**

There were women wood carvers in the area. This was according to over 50% of the male wood carvers interviewed. Forty-six per cent of the woodcarvers, however, disagreed with this statement.

## **4.0 Discussion**

Wood carving is a major informal industry in Wamunyu, which provides a source of livelihood for major families from the drought-prone area. This being a semi-arid region, dependence on crop production is risky. Wood carvers have traditionally used specific tree species in the industry. These include muhugu (mahogany or *Brychylaena huillensis*), mpingo (African Ebony or *Dalbergi melanoxylon*), Olive (*Olea Africana*), and Rosewood (*Combretum schumannii* or *Spirostacys africana*). As the industry has grown and the demand for these woods increased, carvers have become main forest users contributing to the severe destruction of Kenyan forests, and on these specific tree species. The wood carving industry in Wamunyu area has been practiced to the detriment of the environment as witnessed by the complete disappearance of some indigenous trees that were originally used in the wood carving industry. The challenge that the study found is that the current demand for indigenous hardwoods far outstrips supply. The future of the wood carving industry is therefore threatened if the current products, consumption patterns and use of raw materials does not change. This situation is particularly worrying in such a country as Kenya where employment opportunities are extremely limited and, where 500,000 people enter the labour market each year (<http://www.pnuma.org>).

For a meaningful shift to environmentally sustainable carving, it is essential to create awareness and to educate the carvers and consumers of carved wood products. In order to satisfy current and future demand, efforts must be made to manage and utilise natural resources on a sustainable basis.

To reverse the trend of progressive forest degradation and reduced incomes from sales of carvings, the implementation of a sustainable product development (SPD) strategy is essential. Within the wood carving industry, producers and traders must work together to develop strategies that ensure a sustainable supply of raw materials if there is to be a future for this important sector. Reforestation is urgent and needs to be done on a scale sufficient to ensure a sustainable source of raw materials for future generations in Wamunyu. The reforestation approach will promote a sense of ownership of the trees among the carvers. The distance travelled in the collection of trees for carving has been increasing. Good quality logs were once collected from the local woodlands (usually within a radius of 2-5km) but recent upsurge in the growth of the industry has meant that carvers have to get their wood from outside the district (Karura and Ngong forests, Mt Kenya) etc. Availability, durability and workability seemed to be the most important factors influencing the frequency of use of any tree species. Easy to work woods like *Brachyleana huillensis* (Silver Oak) and *Dalbergia melanoxylon* (Ebony) were still widely used at the time of survey, despite their limited availability. Many logs were at the time of survey being collected from gazetted forests rather than communal areas. The artefacts from hardwood are more attractive to the market while the supply of hardwood has continued to dwindle. As a result, carvers and collectors are increasingly using other tree species that are hard to carve and produce cracked products. In general, there is no effort to replenish the resource base as most carvers view the industry in terms of monetary gain.

The study observed that while most wood carvers were aware of the negative environmental impact of their activities, very few were taking the initiative to reverse the trend. This was more so because they were aware about the disappearance of certain tree species from their farms and their suppliers.

It was observed that there had been an attempt to start tree nurseries to encourage the carvers raise seedlings for planting but these had not succeeded as witnessed at the Wamunyu Co-operative Society. During the interviews, the researcher learnt that most carvers had resorted to stealing wood from people's farms at night.

The data analyzed revealed that wood carving was basically driven by economic gains and no meaningful resource management strategies had been put in place. This, in turn, had resulted into complete depletion of certain tree species which had been used in the past and now had completely disappeared from their farms and environs.

The co-operative society which manages most of the sales for the finished products has no tangible efforts to mobilize the carvers to put in place substantial sources of raw materials. It was noted that there was actually no link between farmers and carvers in as far as the supply of raw materials was concerned. If there was a deliberate effort to link the three actors, farmers would plant the raw materials used for the handicrafts and sell them to the carvers and/or weavers. Development agents in the area were mostly concerned with other sectors of development such as dairy and health and did not seem to have programmes targeting wood carving and basket weaving despite the two being the main income earners in the area.

In relation to the use of left over materials, there was less recycling. It was also observed in Wamunyu that most

of the left-overs from the wood were burnt as a way of disposal.

Although most of the carvers were aware of their industries' impact on the environment, no efforts were being made for the replenishment of the same. Instead, they moved further and further in search of raw materials. They all had started searching for raw materials from as far as Mwingi, Kitui, Ngong and Karura forests. The carvers expressed the desire to learn more about the environment in relation to the impact of their activities. Some admitted that there was very little they could do to solve their current crisis.

The study found that most of the wood carvers were willing to plant indigenous trees used for their trade. However, they cited several challenges to this including: lack of seedlings and seeds, termite menace, water shortage in the area, technology of planting (seed collection, nursery set-up and care, transplanting etc.), theft from wood carvers, challenges of mixed farming where animals normally browse the young trees and Soil type-some tree species thrive on certain soil types which are not in these regions.

As a result of over utilisation of the hardwoods, many wood carvers had changed the type of woods they used. They had moved from using the traditional slow growing hardwoods, to utilizing faster growing woods, termed as "good woods". These included *Grevillia robusta* (Silky Oak), introduced to Kenya as a shade tree for coffee and tea plantations, *Jacaranda mimosifolia* and *Azadirachta indica* or neem. Planting of trees with carving properties on private land may encourage landowners to protect them if they understand the monetary gain.

It was therefore evident that the Kenya wood carving industry was currently facing viability problems associated with wood scarcity.

At Wamunyu, there was evidence that tree species choices for carving had changed, and distances to collect harvestable trees had increased. Wood carvers in the region had acknowledged the difficulty of accessing the appropriate timber. Given that active management of the current tree resources was unlikely, the resources would further be depleted to the point where carvers would switch to other species. Exotic species like the jacaranda had become a common feature in the industry.

The Non-Governmental Organisations (NGOs) and Community-Based Organisations (CBOs) working in the wood carving area of Wamunyu during the study period included the Ukamba Christian Community Services (UCCS) and Wamunyu Children Development Fund (WCDF). The core programmes undertaken by these organisations were in Health, Education and Integrated Food and Security (UCCS). The organisations did not seem to have anything to do with wood carving and basket weaving activities in the area.

## 5.0 Conclusion

From the findings of this study, several conclusions are made. At a rural community level, natural resources management or conservation has most chance of being implemented when three criteria are fulfilled:

- a) When local people value a resource
- b) Realise that it has become scarce
- c) Have local social or political institutions which can enforce restrictions or harvesting which prevent further resource depletion.

Although there is some reasonable level of awareness about the impact of the activities on the environment, this is irrelevant to the wood carvers because their immediate concern is income to meet their basic needs. It is important to note that this is a semi-arid area where rain-fed agriculture is not economically viable and as such the handicraft industry gives the inhabitants of this area an alternative means of survival. To this end, environmental awareness alone is not sufficient to affect sustainable wood carving.

The results also indicate that the wood carvers are aware of the dwindling raw materials used in the trade. This can be a good starting point for the government, especially the forest department and interested stakeholders, to mobilize the carvers and the community at large for conservation, afforestation and reforestation activities. Further, the findings indicate that there is a strong need for training and awareness programmes on various aspects of the environment in this geographical region.

## References

- Adamson, J. 1967. The Peoples of Kenya. London: Collins and Harvill Press.
- Mohammed, A., P. Moll. 1983. Portraits of Africa. London: Harvill Press.
- Arnold, J., Liedholm, C., Mead D., and I. Tawsonson. 1994. Structure and Growth of Small Enterprises in the Forest Sector in Southern and Eastern Africa. OFI Occasional paper No. 47, University of Oxford U.K
- Asiema, J.K. 1992. Towards Sustainable Development Environmental Degradation and the Rural Poor in Kenya. Ph.D. Thesis, University of Nairobi.
- Awiti, A., and F. Nkabo. 2003. Managing Kenya's Forests: The Role of Stakeholders in the Forest Policy and EMCA. Forest Action Network. Nairobi, Kenya.
- Awuonda, C. O. 1994. Quantitative Research Methods: 1 - Introduction. Nairobi: Basic Book (Kenya) Ltd.
- Bailey, K.D. 1982. Methods of Social Research (2<sup>nd</sup> Edition). New York: The Free Press.

- Balogun, O. 1979. Form and Expression in African Arts. Alec Tiranti, London. UK.
- Bascom, W. 1973, African Art in a cultural perspective, WW Norton Publishers, New York, USA.
- Baslom, W.1973. African Art in a Cultural Perspective. New York: W.W. Norton Publishers.
- Beentte, H. (undated) Kenya Trees, Shrubs and Lianans, National Museums of Kenya, Nairobi, Kenya.
- Beier, U. 1968. Contemporary African Art. London: Pall Mall Press.
- Borg, R., and Meredith D. 1983. Educational Research (4<sup>th</sup> Edition). New York: Longman.
- Boserup, P. 1970. Women's Role in Economic Development. London: George Allen and Unwin.
- Braedt, O., and W, Standa-Gunda. 2000. Woodcraft Markets in Zimbabwe. *International Tree Crops Journal*, 2000, Vol. 10. Pp. 367 – 384. A.B Academic Publishers, Great Britain.
- Brown, J. 1972. Traditional Sculpture in Kenya. Africa Arts.
- Burt, E. 1980. Annotated Bibliography of Visual Arts in East Africa. USA: Indiana University Press, Bloomington.
- Chambers, Robert. 2002. Relaxed and Participatory Appraisal: Notes on Practical Approaches and Methods for Participants in PRA/PLA-Related Familiarisation Workshops. Participation Resource Centre, Institute of Development Studies. United Kingdom: University of Sussex.
- Comins, J. 1971. Getting Started in African Crafts. New York: The Bruce Publishing Company.
- Crafter, S., J. Awimbo and A.J. Broekhoven. 1997. Non-Timber Forest Products: Value, Use and Management Issues in Africa, Including Examples from Latin America. International Union for Conservation of Nature and Natural Resources (IUCN). Forest Conservation Programme. IUCN Eastern African Regional Office, Nairobi, Kenya.
- Crowley, J. 1970. Contemporary – Traditional Art Market in Africa. Africa Arts.
- Cunningham, A.B. 1996. People, Park and Plant Use: Recommendations for Multiple-Use Zones and Development Alternatives Around Bwindi Impenetrable National Park, Uganda. People and Plants Working Paper 4. People and Plants Initiative, Division of Ecological Sciences, UNESCO, France.
- Cunningham, A.B., and G. Davis. 1997. Human Use of Plants in R.M Cowling, D.M Richardson and S.M Pierce (eds). Vegetation of Southern Africa. London: Cambridge University Press.
- Detwyler, T.R. 1971. Man's Impact on Environment (ed). New York: McGraw-Hill.
- Elkan, W. 1958, The EAST African Trade in woodcarving. Vol 28, London U.K
- Ellert, H. 1984. The material culture of Zimbabwe. Longman, Harare, Zimbabwe.
- Emerton, L. 2001. *Why Forest Values are Important to East Africa*. Innovation – Special issue on Valuation of Forest Resources in East Africa. African Centre for Technology Studies (ACTS), Vol. 8, No.2 July, 2001. Nairobi: Kenya.
- Encyclopaedia Britannica. 1964. Volume 23. London: Encyclopaedia Britannica Ltd.
- Encyclopaedia Britannica. 1964. Volume 3. London: Encyclopaedia Britannica Ltd.
- Falconer, J. 1990. The Major Significance of 'Minor' Forest Products: The Local Use and Value of Forests in the West African Humid Forest Zone. Food and Agricultural Organisation of the United Nations (FAO), Rome.
- FAO. Gender Analysis for Forestry Development Planning, Why and How. (*An audio-visual tape*)
- FAO. What is a Tree? (*An audio-visual tape*)
- Fedders, A., and C, Salvadori. 1979. Peoples and Cultures of Kenya. 1979. Nairobi: Transafrica Book Distributors.
- Frazer, M.J. and Kornttauser, A. (Eds). 1986. Ethics and Social Responsibility in Science Education. Oxford: Pergamon Press
- Gatundu, C. 2003. Policy and Legislative Framework for Community Based Natural Resource Management in Kenya: A Review of the Existing and Proposed Laws and Policies. Nairobi, Kenya: Forest Action Network.
- Government of Kenya (GoK). 1994. Ministry of Environment and Natural Resources. The Kenya Forest Master Plan Development Programmes. Nairobi: Government Printer.
- Government of Kenya (GoK). 2000. The Environmental Management and Coordination Act, 1999: No. 8 of 1999. Kenya Gazette Supplement Acts, 2000: No. 3 (Acts No. 1). Nairobi: Government Printer.
- Government of Kenya (GoK, 1997-2001). Machakos District Development Plan 1997-2001. Nairobi: Government Printer.
- Government of Kenya (GoK, 2002-2008), Ministry of Finance. Machakos District Development Plan 2002-2008: Effective Management for Sustainable Economic Growth and Poverty Reduction. Nairobi: Government Printer.
- Harrison, P. 2008. Key Issues for Players of Musical Instruments made from African Blackwood (Mpingo) in the UK
- [www.kilimanyika.com](http://www.kilimanyika.com). accessed 17/9/2014
- Heinrich Böll Foundation (HBF). 2002. The Jo'burg Memo. Fairness in a Fragile World. Memorandum For the

- World Summit on Sustainable Development. Heinrich Böll Foundation, World Summit Papers, Special Edition. Heinrich Böll Foundation.
- Hodge, A. 1982. *Nigeria's Traditional Crafts*. London: Ethnographic Limited.
- Homma, A. 1992. The dynamics of Extraction in Amazonia: A historical perspective. *Advances in Economic Botany*.
- Huntingford, G.W.B. 1944. The Nandi. *The Peoples of Kenya No. 11*. Nairobi: Ndia Kuu Press.
- IDRC. 1988. *Women's Role in Natural Resource Management in Africa*. Ottawa.
- IFAD. 1992. *The state of World Rural Poverty: An inquiry into its causes and consequences*. Rome: International Fund for Agricultural Development.
- IUCN/UNEP/WWF. 1991. *Caring for the Earth. A Strategy for Sustainable Living*. Switzerland: Gland.
- Johnstone, R. 2003. *Carving the Last Mahogany*. EcoForum, *Long Rains 2003*. Volume 26, Number 2. Nairobi, Kenya.
- Kang'ethe, L. 1991. Woodcarving in Resources. *Journal for Sustainable Development in Africa, Vol. 2*. Nairobi. Kenya Craft Co-operative Union (KCCU). (Undated). *Kenyan Good Wood Catalogue*. Nairobi, Kenya.
- Kenya Forestry Research Institute (Kefri) Strategic Plan 1999-2004. Nairobi.
- Kenyatta, J. 1961. *Facing Mount Kenya: The Tribal Life of the Gikuyu*. London: The Heinemann Group of Publishers.
- Khasiani, A., Mugenda, O. 1991. *Research Methods*. Working Paper No. 1. AAWORD, Nairobi, Kenya
- Kipkorir, B., and Welbourn, F. 1973. *The Marakwet of Kenya: A Preliminary Study*. Nairobi: Kenya Literature Bureau.
- LEAF.2004. Wisconsin Centre for Environmental Education College of Natural Resources. (NRES 743): *Human Influence on Wisconsin's Forests*. UW-Stevens Point Stevens Point: USA.
- Leticia, S.R. 2005. United Nations Department of Economic and Social Affairs Division for Sustainable Development (UN DESA/DSD).
- Leuzinger E. 1969. *Africa: The Art of the Negro People*. 2<sup>nd</sup> Edition, Crown Publishers, New York.
- Lindblom, G.1934. "Kamba Folklore", *Archives d'etudes orientales*, XX, NO 2 1934, 1-58
- Lindloom. 1920. *The Akamba of British East Africa*. Negro University Press, New York.
- Lsa, A. 1984. *Women in Arts in Africa South of the Sahara*. Edited by Jean, M. and Stichfer, S. London: Longman Group Ltd.,
- Luan, T. 2006. *Forest Protection and Sustainable Livelihoods of People in the Buffer Zone of at Tien National Park, Vietnam Case study Village 4, Ta Lai Commune, Tan Phu District, Dong Nai Province Nong Lam University - Ho Chi Minh City (NLU), Vietnam*. [http://www.sol.slu.se/publications/masters\\_33.pdf](http://www.sol.slu.se/publications/masters_33.pdf) accessed 15/10/2012
- M'Mella, T., and Masinde, J. 2002. *Environmental Issues in Kenya: Environment Information Circulation and Monitoring System on the Internet Regional Workshop for African English Speaking Countries*. 22-26 Sep 2002. Accra, Ghana.
- Machakos District Cooperative Union Ltd (MDCU). Undated. *Catalogue*. Machakos, Kenya.
- Mangret, J. 1979. *Art by Metamorphosis*. African Arts.
- Marchall, C., and Rossman, G. 1995. *Designing Qualitative Research (2<sup>nd</sup> edition.)*. Sage Publications, Thousand Oaks.
- Marshal, C; and, Rossman, G.B. 1989. *Designing Qualitative Research*. Sage Publications, Newbury Park
- Matose, F., Mudhara, M., and Mushore, P. 1996. *The Woodcraft Industry of Bulawayo-Victoria Fall Road*. IES working paper 2, Institute of Environmental Studies, University of Zimbabwe, Harare Zimbabwe.
- Mbiti, J. S. 1969. *African Religions and Philosophy*. Heinemann Kenya Limited. Nairobi, Kenya.
- Michieka, R. W. 2003. *Keep The Kenyan Environment Clean*. National Environment Management Authority (NEMA) Newsletter. Volume 1, Number 1. Nairobi: NEMA.
- Misitu news. 2002. *The newsletter of the Kenya Forests Working Group*, September-December.
- MS Kenya. 2005. *Water a Right for all? MS Kenya Partner News – The Development Journal of MS Kenya 2005 No. 3*. Nairobi: MS Kenya.
- Mugenda, Olive M; and Abel G Mugenda. *Research Methods: Quantitative and Qualitative Approaches*. Nairobi : Acts Press.
- Muhia, N. 2001. *Participatory Monitoring and Evaluation (PM&E) Training in Western Kenya. Natural Resource Problems, Priorities and Policies Programme, Discussion Paper Series. Discussion Paper 2001-9*. World Agroforestry Centre, Nairobi, Kenya.
- Mwenda, N. 2001. *Jacaranda Mimosifolia as an Alternative Woodcarving Species: An Assessment of its Abundance and Utilisation in Machakos and Nairobi, Kenya*. Research Proposal. Kenyatta University, Department of Environmental Sciences.
- Narendra P., S, Reitbergen., Claude R...; and J.Patel. 1994. *A Strategy for the Forest Sector in Sub-Saharan Africa*. Technical Paper No. 251. Africa Technical Department Series. Findings reports on ongoing

- operational, economic and sector work: Africa Region, Number 18. June 1994. Washington, D.C.: World Bank.
- Ndeti, K. 1972. Elements of Akamba Life. Nairobi: English Press.
- Noud, T. (1992) Trees of Kenya, Nairobi, Kenya.
- Nyamongo, A., and Mutoro, H. 1990. Culture and Environment: An Overview in Environment 2000. Conference on Kenya's State of the Environment held on 23<sup>rd</sup> to 27<sup>th</sup> October. Gigiri, Nairobi
- Obunga R. 1995. Sustainable Development of Woodcarving Industry in Kenya: Technical Project Report for the WWF/UMESCO/KEW people and plants initiative. National Museums of Kenya, Nairobi.
- Okafor, J. 1977. Development of forest tree crops for food supplies in Nigeria. Forest Ecology and Management, Ibadan, Nigeria.
- Okidi, C., and P, Mbote-Kameri (eds). 2001. The Making of a Framework Environmental Law in Kenya. Nairobi: Acts Press.
- Oludhe, D.O. 1988. An Investigation into the Traditional Elements of Major Commercial Arts and Crafts in Kenya. MA Thesis.
- Omondi, P. 1984. Wildlife-Human Conflict in Kenya: Integrating Wildlife Conservation with Human Needs Photressess in the Maasai Mara Region. Nairobi.
- Ondiege, P.O. 1992. Local Coping Strategies in Machakos District, Kenya. Development from Within: Survival in Rural. London: Routledge.
- Paton, M.Q. 1990. Qualitative Evaluation and Research Method (2<sup>nd</sup> Edition). Newbury Park: Sage Publications.
- Peil, M. 1995. Social Research Methods: A Handbook for Africa (2<sup>nd</sup> Edition). East African Educational Publishers, Nairobi
- Population Growth and the Environment. 1989. The Professors World Peace Academy of Zambia. Lusaka
- Rene', G. 1969. African Craft and Craftsmen. New York: Van Nostrand Reinhold Company.
- Resources. 1991. *Journal for Sustainable Development in Africa, Vol. 2. No. 1.*
- Rollin, J. 2002. Participatory Rapid Appraisal in Project Planning – pp 37 to 50. *Hands On! A Manual for Working with Youth on SRH, GTZ 2002.*
- Routledge, W., K, Routledge. 1910. With a Prehistoric People: The Akikuyu of British East Africa. . London: Edward Arnold.
- Sady, R. 1969. Perspectives from Anthropology. Columbia: Teachers College Press.
- Gichere, S. 2001. *Why Ministries of Finance and Economic Planning Need to Take Account of Forest Values: The case of Kenya.* Innovation – Special issue on Valuation of Forest Resources in East Africa. African Centre for Technology Studies (ACTS), Vol. 8, No.2 July, 2001. Nairobi, Kenya.
- Silvertown, J., and Sarre, P. (ed). 1987. Environment and Society. London: Hodder and Stroughton.
- Spradley, J. 1980. Participant Observation. New York: Holt, Rinehart and Winston.
- Stamp, P. 1986. Technology, Gender and Power in Africa. International Development Research Centre. Ottawa, Canada
- Stout, A. 1967. The Makonde Art. Kibo Gallery. Moshi, Tanzania.
- Studer, et al. 2008. SMEs and voluntary environmental initiatives: a study of stakeholders perspectives in Hong Kong', *Journal of Environmental Planning and Management*, 51:2, 285 –301 <http://www.informaworld>. accessed on 15/ 05/2013
- Studt, K. 1985. Agricultural Policy Implementation: A Case Study of Western Kenya. West Hartford: Kamarian Press.
- Szymanski, M., L Whitewing, and J, Colletti. 1998. Indigenous Knowledge and Development Monitor. IK Monitor Articles (6-2), IKDM Homepage. Nuffic-CIRAN and Contributors.
- Temu, A., G, Lund., R, Malimbwi., G, Kowero., K, Kleinn., Y, Malende; and I, Kone (eds). 2000. Off-Forest Tree Resources of Africa: Proceedings of a Workshop Held from 12 to 16 July 1999 at Arusha, Tanzania. The African Academy of Sciences (AAS), Nairobi, Kenya.
- The Arts Council of Great Britain. 1976. The Arts of Islam. The Arts Council of Great Britain.
- The World Bank. 2001. Engendering Development: Through Gender Equality in Rights, Resources, and Voice. A World Bank Policy Research Report. Washington D.C and New York: The World Bank and Oxford University Press. United States of America.
- The World Bank Group. 2003. Participatory Rural Appraisal. *Collaborative Decision Making: Community-Based Method.* The World Bank Participation Sourcebook, Appendix I: Methods and Tools. World Bank's Participation Web Page.
- Tiffen, M., M, Mortimore., and F, Gichuki. 1994. More People Less Erosion: Environmental Recovery in Kenya. African Centre for Technology Studies (ACTS), Nairobi, Kenya.
- Trougheat, A 1987. Akamba Carving: art or industry? Kenya past and present. Africa.
- Trowell M., 1960. African Design. London: Faber and Faber Publishers.
- UNCED. 1992. Report of the United Nations Conference on Environment and Development: Annex III – Non-



- legally binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of all types of Forests. A/CONF.151/26 (Vol. III). General District 14: August 1992.
- UNESCO. 2000. Crisis in the Kenyan Woodcarving Industry: Options for Ecological and Economic Sustainability. Report on the Conference of the WWF-UNESCO “People and Plants” Programme held on 18-19 September 2000 at the Kenya College of Communications Technology (KCCT) Mbagathi Campus, Kenya. *Peoples and Plants*. Kenya: UNESCO.
- United Nations Environmental Programme (UNEP). 1995. Poverty and the Environment: Reconciling Short-Term Needs with Long-Term Sustainability Goals. UNEP. Nairobi: Kenya.
- United Nations. 1992. Report of the United Nations Conference on Environment and Development, Held in Rio de Janeiro, 3<sup>rd</sup> to 14<sup>th</sup> June 1992.
- URT .2007. Guideline for sustainable harvesting and business of forest products, Ministry of Natural resources and Tourism, Department of Forests and beekeeping
- URT .2007. The Forest Act (Cap323) Regulations (made under section 106) The forest (Amendment) Regulations, 2007
- URT .2008. Natural Resources Tanzania National website <http://www.tanzania.go.tz/naturalresources.html> accessed 5/8/2010
- URT .2009. Tanzanian National Website <http://www.tanzania.go.tz/> accessed 17/2/2014
- Were, G (ed). 1987. Machakos District: Socio-Cultural Profile. A Joint Research and Training Project of the Ministry of Economic Planning and National Development and the Institute of African Studies. Nairobi.
- Were, G. 1990. Dilemmas of Development in Rural Institutions in Sub-Saharan Africa. *Journal of Eastern African Research and Development*, Vol. 22. Article by Nindi, B.C.
- Wiener, P. 1973. Dictionary of the History of Ideas. Studies of Selected Pivotal Ideas, Vol. II. New York: Charles Scribners Sons,
- Wildlife Clubs of Kenya (undated). Indigenous Tree Index. Nairobi: Wildlife Clubs of Kenya.
- World Bank. Hear our Voices – The Poor on Poverty. (*An audio-visual tape.*)
- WWF – UNESCO. 2000. People and Plants programme. *Crisis in the Kenyan Industry: Conference Report*. 18 – 19, 2000. Kenya.
- WWF, UNESCO, Royal Botanical Gardens (KEN). Saving the Wooden Rhino. Ethobotanical Methods and Kenya’s Woodcarving Industry. (*An audio-visual tape.*)
- Zdercivc, B., and G, Stoica. 1967. Woodcarving in Romanian Folk Art. Bucharest: Meridiane Publishing House.
- Maundu, P. Tengenias, B. 2005, Useful Trees and Shrubs Of For Kenya, World Agro Forestry Centre – Eastern and Central Africa Regional Programme (ICRAF – ECA) Nairobi, Kenya

**Dr. Jane Mutinda** was born in 1959 in Kenya. She graduated with a PhD in Environmental Studies and Community Development from Kenyatta University, Nairobi County, Kenya in 2010, a Master’s Degree in Environmental from Kenyatta University, Nairobi County, Kenya in 1992 and Bachelor in Education from University of Nairobi, Nairobi County, Kenya in 1983. She is a lecturer and the current chairperson in the Department of Environmental Studies and Community Development in the School of Environmental Studies of Kenyatta University in Kenya.