

Milicia Excelsa Timber Species for Wood Works In Eastern Uganda: Perspectives from Nabitende Township, Iganga District

OTIENO, A. Charles¹

ABSTRACT

Milicia excelsa (Muvule) tree species, Busoga region's pride, was decreasing given its indiscriminate use in Eastern Uganda. A study of 197 residents of Nabitende township revealed that; Muvule timber was used in construction and carpentry for its being; a hard wood (93.4%), on high demand (89.3%), and attractive when varnished (87.3%). The products' market was ranked as; Far Eastern Ugandan towns, South Sudan, Kampala city, and Kenya border towns respectively. A strong correlation ($r=0.61$) existed between the perceptions of both carpenters and other wood processors on the market. There was a willingness to adopt sustainability strategies for timber users to be in business. Recommendations therefore entail; massive sensitization, empowerment of conservationists to both arrest and prosecute their culprits.

Key words: Muvule, carpenters, sustainability, furniture, wood species, Nabitende

¹ Department of Geography and Social Development, School of Humanities and Social Sciences
Jaramogi Oginga Odinga University of Science & Technology, P.O.Box 210-40601, Bondo. (Kenya)

INTRODUCTION

The pre-independence scale of woodworking and furniture production in Uganda was limited to the plantation sector. The wood workings were mainly concentrated on the production of railway slippers necessary for laying rail for Uganda railway connecting the plantations to the Indian ocean port of Mombasa for export. Besides that the woodworking sector was to satisfy the then increasing demands of the settlers. Wood crafters who came from Gujarati, India and South Asian Muslims were instrumental in importing the wood working skills and technology in the country (Ministry of Information and Tourism, 1964 cited by Yoshida, 2008). Yoshida (2008) continues to assert that the Indians dominated the woodworking sector, only to be discontinued by the then dictator president Iddi Amin with a claim of being unethical to the native workers in August, 1972. This led to the Africanization of the sectors manned by the then British passport holders in the country. This affected every aspect of the country, including the present day Nabitende Township, which housed Associated Sawmills specialized in milling Muvule timber (Wood Industries Corporation Act, 1974).

Globally Muvule is commonly known by a trade name of “Iroko” with a botanical name of *Milicia excelsa* previously *Chlorophora excelsa* belonging to the Moraceae family thus closely related to the figs (Acworth, 2012). This tree species is popular due to the high quality and natural durability of its wood. It is taken to be both decay and termite resistant without any chemical treatment. Thus locally in Uganda, with special attention to Busoga region-Eastern Uganda it is used in furniture and general building purposes (Ibid, 2012). Due to restrictions in the natural forest reserves in

Uganda highly valued timber species such as Muvule and mahogany “*Khaya anthotheca*” have been largely harvested from public and private lands (National Environment Management Authority- NEMA, 2001).

The process of getting Muvule timber in Uganda has been dominated by pit sawing, especially after the 1972 exodus of the Indians who dominated the saw milling industry. This was a resumption after pit sawing had been introduced in the country by 1900s. The foresters claim that pit sawyers are a menace in both monitoring and control, thus no statistics about them is available despite the licensing of some of them (NEMA, 1994). Observation and interviews from the field has it that the advent of chain power saws in the Eastern region of Uganda intensified both legal and illegal harvesting of the remaining Muvule trees in the region.

There has been the excessive commercialization of lodging worldwide where Uganda could not be isolated (D’Silva and Appanah, 1993 cited by Otieno, 2003). De Blij (1988) adds that the developed world consumption of tropical hardwoods has risen 15 times since 1950 hence market. Local in Uganda with an increase in urbanization since 1986 there has been an increase in demand for both fuel and timber for furniture and construction industry where Muvule was the most favorite (Otieno, 2003). Observation and interview have it that the number of workshops at Nabitende township increased tremendously since 1986 since there was market both within Uganda and outside especially Kenya through Busia and Malaba border towns. The external market by the time of this research had been extended to South Sudan especially in Juba and Bor. Interviews with South Sudanese traders showed that the products access the Ethiopian markets through Bor. NEMA (1996) reported that between 1986-1996



the construction sector generated a high demand with an increase in Gross Domestic Product (GDP) contribution from 9.4% to 13.5%.

For long the Ugandan forestry policies capitalized mainly on gazetted forest reserves, leaving forests outside these protected areas at the mercy of the masses hence their heavy deforestation. This was attested to by both the Forestry Policy 1988 and the Forests Act 1964 Chapter 246. Further issues of reserved tree species like Muvule and mahogany belonging to government was a disincentive to their being grown by individual Ugandans (NEMA, 2001). The current 2001 Forestry Policy which is very comprehensive has no political will to be effectively enforced (Otieno et al, 2011). This has therefore meant continued deforestation in private lands under the docket of ill financed district forest office. Timber exploitation of the ungazetted forest lands has always been selective where in Eastern Uganda the most valuable species being Muvule with Nabitende township being a collecting center.

For a long timber selection has been based on the customer's preference where the yardstick has always been availability, cost, strength and appearance (Zziwa et al, 2009). The given perception ignored the history of a particular timber species such as Muvule in the Busoga region hence a customer's preferences. Statistics for the private forest sector where much of the Muvule timber is extracted are not readily available due to limited funding for research in this area. However, observation has it that due to the shift in policy, most of the timber harvesting, both illegal and legal, occurs widely in this forest category. This fact is attested to by the fact that there are massive fuel wood deficits throughout the country, mostly sourced from the private forest estate. Ministry of Water, Lands and Environment (MWLE) the mother ministry indicated that Uganda had moved into a net national fuel wood deficit by 2000 (Muhumuza et al, 2007). Regulation of timber extraction

suffers from poor law enforcement and as such the proportion of illegally extracted timber on the market is substantial in Uganda.

In Uganda like in any other developing country harvesting illegalities are manifested by extraction without permit, harvesting more than the authorized quantity, ring-barking of live trees, document forgery or duplication, legalizing illicit timber by forging hammer marks and politician's direct and indirect support (Marshall & Jenkins, 1994; Otieno et al, 2012). Marshall and Jenkins (1994) continues to assert that the Kenyan forestry department by then lacked the capacity to effectively enforce the forestry legislation and was hampered by insufficient penalties and fines for offenders besides the inadequate implementation of the Forests Act by prosecutors and others involved at various stages of the procedures. This therefore encouraged indiscriminate harvesting of timber in the private lands where extraction of a higher market demanded, Muvule timber was imbued in. Eastern Uganda automatically followed suit where some Muvule timber were both illegally legally exported to a hardwood deficit Kenya through Malabo and Busia border posts (Ibid, 1994). Nabitende effectively established herself as collecting center for both domestic and internal utilities besides external use.

The researcher had the following specific objectives; to establish the uses of Muvule wood species at Nabitende Township, Iganga district; to find out the local users' perceptions towards the sustainability of the Muvule wood species at Nabitende Township, Iganga district; and to assess the strategies adopted for the sustainability of Muvule wood species at Nabitende Township, Iganga district.



DESCRIPTION OF THE AREA OF STUDY:

Nabitende township is located within Nambale sub-county, Iganga district. The district is in Eastern Uganda at latitudes $1^{\circ} 00' - 1^{\circ} 06' N$ and longitudes $33^{\circ} 51' E - 33^{\circ} 12' E$. The district is relatively located as follows; Kaliro district to its north, Namutumba district to the northeast, Bugiri district to the east, the Mayuge district to the south, Jinja to the south west and Luuka district to the west. It is 117 km from Kampala; the capital city of Uganda (<http://www.fao.org>, 2007). The township where the research was carried out is about 27 km north of Iganga municipality and about 5 km south of Kaliro town along Kaliro road.

The district has a mean annual rainfall of about 1250mm received within 100-130 days per annum in reflection of the Equatorial troughs viz. April-May and September-November. The vegetation is predominantly forest/savannah mosaic, which is a mixture of isolated forest remnants and colonizing savannah trees integrated with grasses and shrubs (Iganga District Farmers Association-IDFA, 2013; Ibid, 2007). This area rhymes with the ecological requirements necessary for the growth of Muvule trees, especially low forested areas and wet savannahs of Africa (Acworth, 2012). Hence the natural growth of Muvule trees in this region.

MATERIALS AND METHODS

This was a case study conducted through a cross-sectional survey research design. It was concerned with establishing the local communities' perceptions towards sustainable use of Muvule wood species in the woodworks at Nabitende Township, Iganga district Eastern Uganda. The design enabled the researcher to

obtain information that described existing phenomena with respect to one or more variables (Mugenda & Mugenda, 2003). Given its nature as viewed by many authors, including the researcher, triangulation was used (Gay *et al*, 2009; Bailey, 2007; Morse & Richards, 2002; Nachmias & Nachmias, 1987). A total of 197 respondents participated randomly selected from the stratified households in terms of residences within Nabitende Township. There was also triangulation of sampling techniques, thus both probability and non-probability sampling techniques were concurrently used (Bailey, 2007). The techniques applied for both sampling and data collection were; stratified sampling; snowballing, purposive and convenience techniques.

The researcher used; questionnaires, interviews, observation, and document analysis as the main tools for collecting data. He was mainly concerned with views, perceptions, opinions, attitudes and behaviors of the respondents. Most authors, including the researcher agree that such information could be best collected using the given tools (Bell, 1999; Cauvery *et al*, 2007). The percentage distribution technique was used to show the particular frequencies of respondents preferring a particular alternative to give the face value implications of use of the Muvule timber, perceptions towards and strategies adopted for sustainable use of Muvule timber species. Statistical Package for the Social Sciences Version 10 was used given the number of respondents to establish both frequencies and percentages, but tabulations were manually done as presented in the results and discussion section (Fisher, 2007; Freankel & Wallen, 2008). Non-parametric measures such as chi-square tests (χ^2 test) and Spearman Rank correlation were used to determine the significance of the local communities' activities and sustainability strategies (Kothari, 2004).



RESULTS AND DISCUSSIONS

The results of the field work were presented in tables determined by the specific objectives of the study. They were topically arranged as follows, beginning with socio-demographic characteristics of the respondents.

This was presented and discussed as in Table: 1 below

SOCIO-DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS AT NABITENDE TOWNSHIP, IGANGA DISTRICT

Table: 1: Socio-demographic characteristics of respondents at Nabitende Township, Iganga district (n=197)

Household Characteristics	n	%	Household Characteristics	n	%
Sex			Formal educational Background		
Male	146	(74.1%)	Uneducated	17	(08.6%)
Female	51	(25.9%)	Elementary	09	(04.6%)
Age			Primary	50	(25.4%)
<18	01	(00.5%)	Secondary	93	(47.2%)
18-30	99	(50.3%)	Post secondary	28	(14.2%)
31-41	51	(25.9%)	Residence at Nabitende Township		
42-52	28	(14.2%)	Bukose	41	(20.8%)
53-63	11	(05.6%)	Bulisa	68	(34.5%)
64-74	05	(02.5%)	Buyale	54	(27.4%)
>74	02	(01.0%)	Non-residents	34	(17.3%)
Marital Status			Place of origin		
Married	118	(59.9%)	Busoga region	192	(97.5%)
Single	59	(29.9%)	Outside Busoga region	03	(01.5%)
Divorced	08	(04.1%)	Outside Uganda	02	(01.0%)
Separated	12	(06.1%)	Occupation		
Dependants			Carpenters	123	(62.4%)
0	34	(17.3%)	Other wood processors	74	(37.6%)
1-5	94	(47.7%)	Duration at Nabitende Township		
6-10	38	(19.3%)	1-5 years	41	(20.8%)
>10	31	(15.7%)	6-10 years	61	(31.0%)
			>10 years	95	(48.2%)

Source: Researcher’s field data

Table 1 shows that most respondents were male (74.1%). This reflected the status of women in the in Uganda’s rural areas where they don’t actively engage in income generating activities as their male counterparts (Uganda Bureau Of Statistics-UBOS, 2007 cited in NEMA, 2008). From observation the activities study was masculine in nature, thus could not take many of the female folk. The few females effectively participated in both managerial, sales and other business transactions which required less masculine energy. The same could be envisaged in the ages of 18-52 year dominance amongst the respondents (Table.1.). This is a very active age group as a work force, especially in wood works.

About six out of ten respondents were married, thus given the domestic responsibilities associated with the marriage institution were

obliged to work (Table. 1).This could also be manifested in the dependency rate where only about two out of ten households had no dependants. It also portrayed the African dependency syndrome exemplified by the tallying failure of the data on unmarried (29.9%) and no dependants (17.3%). This justified the fact that in Uganda for every adult, there is a dependent child despite marriage (Ministry of Finance, Planning and Economic Development-MFPED, 2001 cited in NEMA, 2005). This was therefore a driving force to the exploitation of the resources within the respondents’ proximity especially the marketable Muvule species. Through observation the workshops at Nabitende Township could extend working hours to night using electric lighting system.

Table 1 show that most of the respondents were formally educated (93.4%), thus had attended

within the range of elementary and post secondary education. Observation and interviews indicated that despite the formal education these respondents were technically unskilled and at most semi-skilled. Many of the interviewed were carpenters (62.4%) while others engaged in other wood fabrication artisan jobs as in Table 1. They attained the skills through apprenticeship and it was also evident that even both efficient and effective workshop management was lacking. This also reflected the general negligence on technical education, yet a very important part of the strategy for “Education for Sustainable Development” developed in 2006 in Uganda (NEMA, 2008).

It was apparent that the wood fabrication activities where Muvule species was mostly used reversed rural to urban migration making it rural to rural migration. This was exemplified by the participants originating from the mostly Table 2. Chi square tabulation of Muvule timber utilization at Nabitende Township, Iganga

Busoga region (97.5%) (Table.1). Busoga region in this case comprised the following districts from Eastern Uganda; Iganga, Kaliro, Namutumba, Luuka, Jinja, Mayuge, Kamuli, Bugiri and Buyende. The percentage of immigrant respondents of (49.8%) that is a less than ten years duration at Nabitende Township attested to this. Besides about two out of ten of the respondents were commuting to the township (Table.1). This contradicted the notion that, with much anticipated city growths in developing countries, the rural area’s population would stagnate (Getis et al, 2008).

USES OF MUVULE TREE SPECIES AT NABITENDE TOWNSHIP, IGANGA DISTRICT

The topic given dwelt with the first objectives of the study where tables to that effect were presented and discussed as follows:-

Items	Respondents’ observations			
	Observed	Expected	χ^2 Calculated	χ^2 Tabulated
Household furniture				
Set of uncushioned chairs	160	197	06.95	11.34
Sofa sets	101	197	46.78	11.34
Coffee sets	164	197	05.53	11.34
Beds	165	197	05.20	11.34
Dinning sets	165	197	05.20	11.34
School furniture				
Office desks	168	197	04.27	11.34
Learners’ desks	170	197	03.70	11.34
Table chairs	171	197	03.43	11.34
Building & Construction				
Roofing houses	173	197	02.92	11.34
Construction of shades	126	197	25.59	11.34
Windows	169	197	03.98	11.34
Doors	170	197	03.70	11.34
Others				
Firewood	117	197	32.49	11.34
Coffins	102	197	45.81	11.34

$df=3$ at 0.01 Source: Researcher’s field data

Roofing houses, especially the use of wood roof tresses ($02.92 < 11.34$ where $df=3$ at 0.01) the major use of Muvule timber at Nabitende

township (Table.2.). This has a bearing on the dramatic increase in construction of residential, commercial and institutional buildings in the

country (NEMA, 2005). Construction of doors was rated at $(03.70 < 11.34$ where $df=3$ at 0.01) while the making of windows was in $(03.98 < 11.34$ where $df=3$ at 0.01). This could be attributed to availability, security and conscious of the user. It was a common belief that a permanent build should be constructed using strong and durable materials as per the interviews. This was despite the observable weight of Muvule timber as a tress. Most furniture workshops were constructed using Muvule timber, especially on both the stands and roof trusses. Despite the insignificance $(25.59 > 11.34$ where $df=3$ at 0.01) observation so the dominance of temporary shades constructed using both Muvule poles and timber (Table.2.).

The supplies for education were the dominant items in most workshops at the time of this research. Table 2 depicts the sector to be very significant as follows; table chairs at $(03.43 < 11.34$ where $df=3$ at 0.01), learners' desks at $(03.70 < 11.34$ where $df=3$ at 0.01) and office desks at $(04.27 < 11.34$ where $df=3$ at 0.01). This could be attributed to the introduction of Universal Primary Education in 1997 where the pupils enrollments drastically more than doubled to 5.3 million in that year compared to 2.6 million in 1995. The enrollment in primary schools by the year 2000 had reached 6.6 million pupils according to the Ministry of

Education (MFPED, 2001 cited in NEMA, 2005). Therefore, through decentralization school furniture could be purchased through district tenders where Muvule timber was preferred.

The following household furniture significantly used Muvule timber at Nabitende township; beds and dinning sets each rated at $(05.20 < 11.34$ where $df=3$ at 0.01), coffee sets $(05.53 < 11.34$ where $df=3$ at 0.01) and sets of uncushioned chairs $(06.95 < 11.34$ where $df=3$ at 0.01) (Table. 2). The observation had it that this furniture was crudely made in parts to ease transportation. This was then sold to middlemen who transported it to the markets where it was refinished, assembled and sold. Other items produced were cupboards and side boards. The sofa sets were statistically insignificant at $(46.78 > 11.34$ where $df=3$ at 0.01) possibly due to the fact that the timber was covered besides the cost of transporting to the market. Therefore, with the covering any timber species could be used. Firewood and coffin construction were of secondary significance, but not negligible given the responses on their docket at $(32.49 > 11.34$ where $df=3$ at 0.01) and $(45.81 > 11.34$ where $df=3$ at 0.01) respectively (Table. 2). Fire wood gained a dismal importance compared to coffin construction basically due to its being applied as utilization of the waste interviews and observation could reveal.

Table. 3: Other uses of Muvule species in the neighborhood of Nabitende Township, Iganga district

Activity	n	%age
Charcoal burning	105	53.3
Fences	73	37.1
Bridges	75	38.1
Bricks baking	75	38.1
Fire wood	124	62.9
Space for cultivation	113	57.4
Pit latrine construction	110	55.8

Source: Researcher's field data

Fire wood extraction was a very important activity in the area where six out of ten respondents (62.9%) agreed that Muvule tree

species were a source of wood fuel (Table.3). This was in line with the woody biomass for energy per capita daily consumption, which

stood at 4kg by 1994 (NEMA, 2001). Mwebesa (2000) adds that in Uganda wood fuel, especially fire wood accounts for 90% of the natural energy consumed mostly in the rural households. This therefore gives a justification of a 53.3% acknowledgement of Muvule being used for charcoal burning (Table.3). Surprisingly, according to table 3, very few responses acknowledged bricks baking (38.1%) contradicting the perception that with the demand for burnt bricks has translated into increased use of firewood (NEMA, 2005).

There was a struggle for space between forests on private lands and arable farming. Table 3 just depicts this by 57.4% of the respondents claiming that the Muvule tree species like others were being cut to give way for crop farming. This could be attributed to the fact that by 1969 Uganda's arable land supported 53 persons per km², increasing to 88 in 1994 and currently over one hundred per km² (NEMA, 2001).

Contradictorily using the premise of population pressure on land as a result of both population increase and promotion of non-traditional agricultural export crops (NEMA, 2001), China would be a desert despite its current increase in forest cover (Agrawal, 2007).

Table 3 also shows that Muvule tree species was being used as sledges in the construction of pit latrines floors (55.8%). Besides some pit latrines observed were wooden both on the walls and floor using Muvule timber. Local streams were also bridged using Muvule tree species logs (38.1%) (Table.3). through interviews and observations the use of Muvule species was attributed to the strong nature and durability of Muvule tree species. The same assumption was brought on the issue of using Muvule tree species on fencing, hedges (37.1%) (Table.3). The low response on fencing was attributed to the then high price of Muvule tree species in the area and declining supply of the species.

Table 4: Percentage distribution of household responses on the reasons for using Muvule timber species in the furniture works at Nabitende Township (n=197)

Reason	Household responses			
	Agreed	Undecided	Disagreed	Total
Availability of Muvule tree species	68.5	08.1	23.4	100
History of use of Muvule at Nabitende	74.6	10.7	14.7	100
Varnished Muvule furniture attractive	87.3	07.1	05.6	100
Ease of working on Muvule timber	70.1	05.1	24.9	100
Muvule tree species are hard wood	93.4	01.5	05.1	100
There is high demand for Muvule furniture	89.3	02.0	08.6	100
Muvule furniture is not attacked by insects	75.1	07.1	17.8	100

Source: Researcher's field data

Table 4 shows that at least nine out of ten respondents (93.4%) agreed that Muvule is a hard wood. This therefore meant a high demand for Muvule furniture (89.3%). Interviews results had it that market was in major towns within Uganda such as Kampala, Jinja, Mbale, Iganga,

Kumi etc. the furniture was also going outside Uganda through Busia and Malaba to Kenya and directly to South Sudan to Juba. The commodities sold in these places were mainly household furniture and processed timber. It was also agreed that Muvule furniture was very

attractive when varnished accepted by almost nine out of ten respondents (87.3%) (Table.4). From the carpenters perspective, this highly depended on what varnish was applied and the customer’s choice, but light oak varnish would show the attraction on Muvule furniture.

About eight out of ten respondents (75.1%) agreed that Muvule furniture is not attacked by insects, especially the boring ones (Table 4). However, about two out of ten respondents disagreed (17.8%). This disagreement could be attributed to nature of workmanship at Nabitende where sharp wood was mixed with pure timber. Despite that, termites could be observed on both window and door frames in some houses within Nabitende Township. History of Nabitende’s Muvule wood processing was by the time of this research over jubilee in Busoga region, since the first sawmill was established, 1949 as per the interview, hence the 74.6% acknowledgement (Table 4). This history has made Nabitende furniture work a household name within the region for Muvule furniture.

Most respondents (70.1%) agreed that working on Muvule timber is easy compared to other species of timber accessible to Nabitende township carpenters (Table 4). Muvule timber is characterized by the grains generally running more or less straight along the length of the wood except where a knot occurs to distort it (Lye, 1985). Much as many respondents (68.5%) agreed that the availability of Muvule species makes it accessible, the proportion of thus negating the idea (23.4%) should not be underrated (Table 4). Through observation and interview there was every reason to show a decline in the supply of Muvule species attested by processing, timber from the fruit trees such as mangoes and jack fruits.

THE LOCAL USERS PERCEPTIONS TOWARDS THE SUSTAINABILITY OF THE MUVULE WOOD SPECIES AT NABITENDE TOWNSHIP, IGANGA DISTRICT

This formed the second objective of the study it was presented and discussed as follows:-

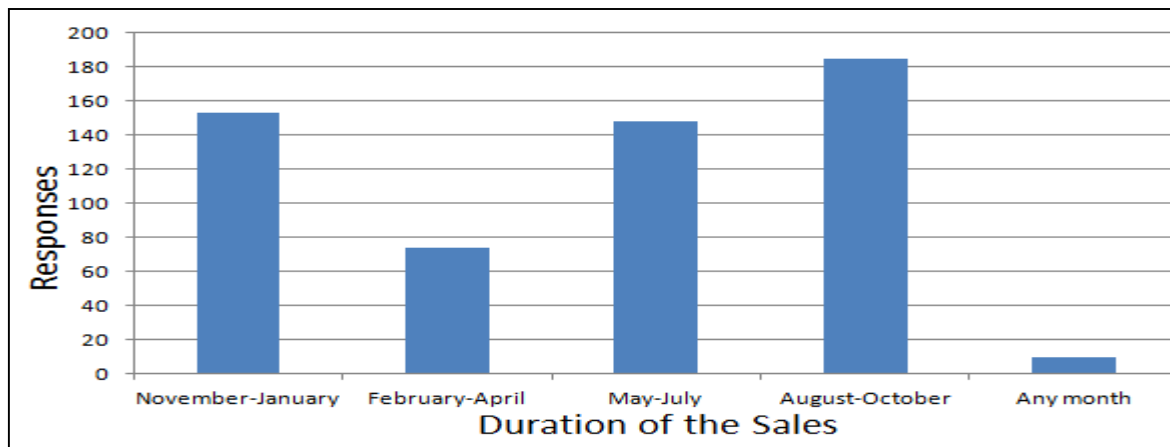


Fig 1: Muvule timber sales per season in Nabitende Township, Iganga district

Source: Researchers’ field data

Most respondents agreed that the months of August- October were the peak periods for the sales of Muvule timber in Nabitende township in the worst months being February- April annually (Fig. 1). This could be attributed to the agrarian nature of Uganda which basically depends on rain fed farming where February to April

basically presents growing and weeding seasons (NEMA, 2001). Interviews also had it that during this period most people pay school fees for beginners who are very expensive, hence low demand for furniture in the urban markets. All these combined to present nature of Muvule timber sales as in Fig. 1.

Table 5: Household responses on means of transporting timber to Nabitende Township, Iganga district

Means of transport/Expected tonnage	Household responses		Total (n=197)
	Carpenters (n=123)	Other wood processors (n=74)	
A bicycle (100 kgs)	073 (59.3%)	028 (37.8%)	101 (51.2%)
A cart (300 kgs)	071 (57.7%)	032 (43.2%)	103 (52.3%)
A 1.2 tones pick up	066 (53.7%)	042 (56.8%)	108 (54.8%)
A 2 tones lorry	097 (78.9%)	053 (71.6%)	150 (76.1%)
A 2.5 tones lorry	108 (87.8%)	053 (71.6%)	161 (81.7%)
A 3.5 tones lorry	111 (90.2%)	062 (83.8%)	173 (87.8%)
A 7 tones lorry	100 (81.3%)	063 (85.1%)	163 (82.7%)

Source: Researcher’s field data

Table 5 shows that about nine out of ten households agreed that a 3.5 tonne lorry was a common means of ferrying Muvule timber from the source to Nabitende township. An almost equal number also agreed on a range of 2-7 tones lorries as the timber transporting means to Nabitende. The was highly dependent on the capital of wood processors. Observably either a bicycle or a cart was used to transport timber

from closely accessible sources or inter Nabitende links viz. from; buying points, timber processing machines and to the workshops. This was also highly dependent on the capital of the workshop proprietor. The vehicles were used for accessing long distance timber thus correlated with the tonnage to make timber acquisition cost effective.

Table 6: The households’ perception on Muvule timber depletion at source

Source	Carpenters		Other wood processors		Total		
	Yes	No	Yes	No	Yes	Neutral	No
Bulamogi	037	071	035	031	072 (36.5%)	023 (11.6%)	102 (51.8%)
Busiki	041	071	035	031	076 (38.6%)	019 (9.6%)	102 (51.8%)
Bunyole	041	071	032	034	072 (36.5%)	020 (10.2%)	105 (53.3%)
Luuka	045	067	035	034	080 (40.6%)	016 (8.1%)	101 (51.3%)
Budiopie	039	075	038	030	077 (39.1%)	014 (7.1%)	105 (53.3%)
Bugabula	039	070	041	027	080 (40.6%)	020 (10.2%)	097 (49.2%)
Nambaale	042	069	046	021	088 (44.7%)	019 (9.6%)	090 (45.7%)
Namungalwe	039	071	035	030	074 (37.6%)	022 (11.2%)	101 (51.3%)
Nawandala	036	072	035	030	071 (36.0%)	024 (12.2%)	102 (51.8%)
Nabitende	040	068	041	025	081 (41.1%)	023 (11.6%)	093 (47.2%)
Bugweri	032	077	034	031	066 (33.5%)	023 (11.6%)	108 (54.8%)

Source: Researcher’s field data

The households' perception on depletion of Muvule tree species is negative exemplified by a majority negation of the species' exhaustion from the source where at least more than five respondents out of ten (>50%) disagreed (Table 6). The table also shows that in the proximity of Nabitende township especially Nambaale; where it is located and Nabitende which is in its immediate neighborhood were getting exhausted accepted by 44.7% and 41.1% respectively (Table 6). The results also show that proximity may not be a strong factor manifested in

apparent depletion of Luuka (40.6%) and Bugabula (40.6%) compared with both Bulamogi (36.5%) and Nawandala (36.0%) which were very close to Nabitende township. This contradicted proximity phenomenon exhilarated in studies of deforestation in both West Bugwe and South Busoga central forest reserves in Uganda (Otieno & Buyinza, 2010; Otieno et al, 2012). Thus, in this case quality and size of timber counteracts the proximity phenomenon.

Table. 7 A Spearman Rank Correlation of perceptions on market for Muvule products from Nabitende Township

Market	Carpenters (n=123)		Other wood processors (n=74)		D	d ²
	Response	Rank	Response	Rank		
Busoga regional towns	108	5	60	4.5	0.5	0.25
Kenyan Border towns	109	4	64	1	3	9
South Sudan	112	2	62	3	-1	1
Far Eastern Ugandan towns	113	1	63	2	-1	1
Kampala city & environs	111	3	60	4.5	-1.5	2.25
Nabitende & environs	099	6	51	6	0	0
						$\sum d^2=13.5$

Source: Researcher's field data

In this study the Busoga regional towns included the following towns; Jinja, Kamuli, Iganga and Kaliro; Kenya border towns referred to Busia and Malaba; the far Eastern Ugandan towns were; Mbale, Kumi and Tororo; the environs of Kampala city here mainly included Mukono, and Wakiso districts engulfing the city while the environs of Nabitende where the sub-counties in the neighborhood of Nabitende township which were; Nabitende, Nambaale, Namungalwe and Nawandala. Table 7 shows that Nabitende and its environs had the least perceptions amongst the market for furniture. It is apparent that Muvule products were either legally or illegally exported to the neighboring countries of both Kenya and South Sudan (Table 7). The results

showed that there was a strong correlation between the perceptions of both carpenters and other wood processors on market for Muvule products at $r=0.61$ (Table 7; Gay et al, 2009). The products were included in both furniture and processed timber.

ASSESSMENT OF THE STRATEGIES ADOPTED FOR THE SUSTAINABILITY OF MUVULE WOOD SPECIES AT NABITENDE TOWNSHIP, IGANGA DISTRICT

This was the third and last objective of the study, it was presented and discussed as follows:-

Table. 8 Users’ willingness strategies towards sustainability of Muvule tree species utility

Sustainability strategy	Willing	Undecided	Unwilling
Replanting Muvule trees	131(66.5%)	046(23.4%)	020(10.2%)
Reporting unauthorized felling of Muvule trees	126(64.0%)	040(20.3%)	031(15.7%)
Collaborating with conservationists in conserving Muvule trees	130(66.0%)	031(15.7%)	036(18.3%)
Stop using immature Muvule trees	141(71.6%)	029(14.7%)	027(13.7%)
The use of Uganda Police force to arrest illegalities	157(79.7%)	008(04.1%)	032(16.4%)
Mobilization against illegalities by politicians	123(62.4%)	042(21.3%)	032(16.4%)

Source: Researcher’s field data

The trust accorded to the Ugandan Police force contradicted the National Integrity Surveys which held both the police and judiciary as the most highly corrupt institutions in Uganda (Kazooru & Carvalho, 2005). Despite that, it’s the responsibility of the Ugandan police force to keep law and order besides detecting crimes where environmental crimes are part and parcel (Otieno, 2012). Therefore the response on Table 8 using the Ugandan police force (79.7%) as a strategy to maintain environmental justice by arresting illegalities on Muvule tree species’ usage was justifiable.

Table 8 contradicted the legal role of the conservationists, especially the National Forestry Authority by accord the police force more powers. In Uganda Muvule is legally defined as a “reserve species” where permission to cut must be sort from a forest officer. This failure to acquire permission means confiscation the timber and later auctioning by the NFA officials (Acworth, 2012). Therefore the respondent’s acceptance of the police force could be out of ignorance or NFA’s negligence of their duties as the lead agencies on forestry in Uganda.

It was unfortunate that politicians got the least response as mobilizing agents to conservation at 62.4% (Table 8). The politicians here reflected the country’s five tiered system of elective mini-governments (local) and national government (Sanginga et al, 2004; Banana et al, 2007). Observations and interviews revealed that the

local politicians were active participants in exploitation of Muvule specific products, hence had no moral authority to conserve the species. Generally table 8 presents a positive response towards sustainability of usage of Muvule species in the wood works at Nabitende township.

Conclusion & Recommendations

Muvule tree species were largely used in the wood works at Nabitende Township due to the species’ being a hardwood (89.3%) and highly on demand (89.3%). The utility was majorly in both construction and furniture works. The products from Nabitende Township were sold mainly outside both Busoga region and the country. They were illegally taken to South Sudan; Ethiopia via Bor in South Sudan and Kenya. The Muvule tree species sustainability’s diminishing trend started with the Nambaale sub - county where Nabitende township is located oozing to its neighborhood, especially the following districts; Luuka, Kamuli, Budioppe, and Namutumba. The town dwellers believed that the Uganda police force would be instrumental in curbing the diminishing trend (79.7%).

The researcher therefore recommended that massive sensitization by the conservationists to reignite the already existing need for conservation by the Nabitende town dwellers. The positivity of the residents on conservation could be manifested on their willingness to;



replant the Muvule tree species, report unauthorized felling of Muvule trees, and collaboration with conservationists to sustainably manage the remaining Muvule trees. The District Forestry Services should take the leading role in the sensitization so as to gain the locals confidence on forestry issues not the Uganda Police force. Thus the government should vest the powers of both arresting and prosecutions of illegalities in the forestry docket to foresters. The Uganda Police force was ostensibly overwhelmed with social crimes, thus adding them environmental crimes would

compromise both their effectiveness and efficiency contrary to the wishes of Nabitende town dwellers.

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