# WATERWAY TRANSPORTATION OF TIMBER IN NWANIBA BEACH, URUAN LOCAL GOVERNMENT AREA, AKWA IBOM STATE

**Okon, K. E., Udofia, S., Nwanjah, M. O., Daniel, K. S.**

*Department of Forestry and Wildlife, Faculty of Agriculture, University of Uyo, Uyo, Nigeria*
*CorrespondingEmail: kufreokon@uniuyo.edu.ng*

## Abstract

*The importance of water transportation cannot be overemphasized. The flow of forest products from harvesting sites to the processing facilities or market is a combined effort of different stakeholders. The objective of this study was to access waterway transportation of timber in Nwaniba beach, Uruan Local Government Area of Akwa Ibom State. Structured questionnaires were randomly distributed to timber merchants to collect the data used in this study and the data were analysed using descriptive statistics (frequency and percentage) and factor analysis. The results obtained from the study showed that timber trade was dominated by male between the ages 34 – 41 (51.1%) who had attained some level of formal education. The work experience of the merchants ranged between 12-19 years (48.9%) and it is the only business they operate to sustain their livelihood. Termineliasuperba(81.3%) and Naucleadiderrichii (68.8%) were the predominant species imported and the major source of the timber was Cameroun. Wood rafting (45.8%) and loading unto canoes (37.5%) are the two water transportation methodsbeen used by timber merchants. Piracy (89.4%) and wavedisturbance (77.1%) are the major challenges encountered in waterway transportation of timber.*

**Keywords:** *Waterways transportation, Timber, wood harvesting, rafting, and wave disturbance*

## Introduction

Forests are major sources of renewable products, annually contributing some 3.5 billion cubic meters of wood to the world economy and thus making the forest industry a potentially important part of the economy of the future (Swedish Forest Agency, 2014). The flow of forest products from harvesting sites to the processing facilities or market is a combined effort of different stakeholders. The supply chain of the forest products generally starts with foresters laying out harvest plans for forest landowners i.e., small woodlot owners, industrial land owners and public lands.

Logging operators with the direction of foresters and logging contractors take responsibilities of delivering logs from the harvesting sites and piling the logs at the log landings. As shown in Figure 1, with guidance of a procurement manager and trucking contractor, the forest products are transported from landings to processing facilities (Koirala*et al*. 2017). Transportation is important because of its essential function of moving products from one place to another. It is also one of the expensive phases and can be crucial in fixing prices of delivered forest products (Pan *et al*., 2008; Han *et al*., 2015; Kizha*et al*., 2015; Koira*et al*.,2016).

Despite the prevalence of road transportation, waterways transportation is the most common method to deliver wood products particular from the felling sites. Its popularity can be associated with the closeness of the felling sites to water bodies, under- developed road networks, limited access to railway lines and embargos in timber exploitation in some states in Nigeria, so waterway transports system becomes the only option.
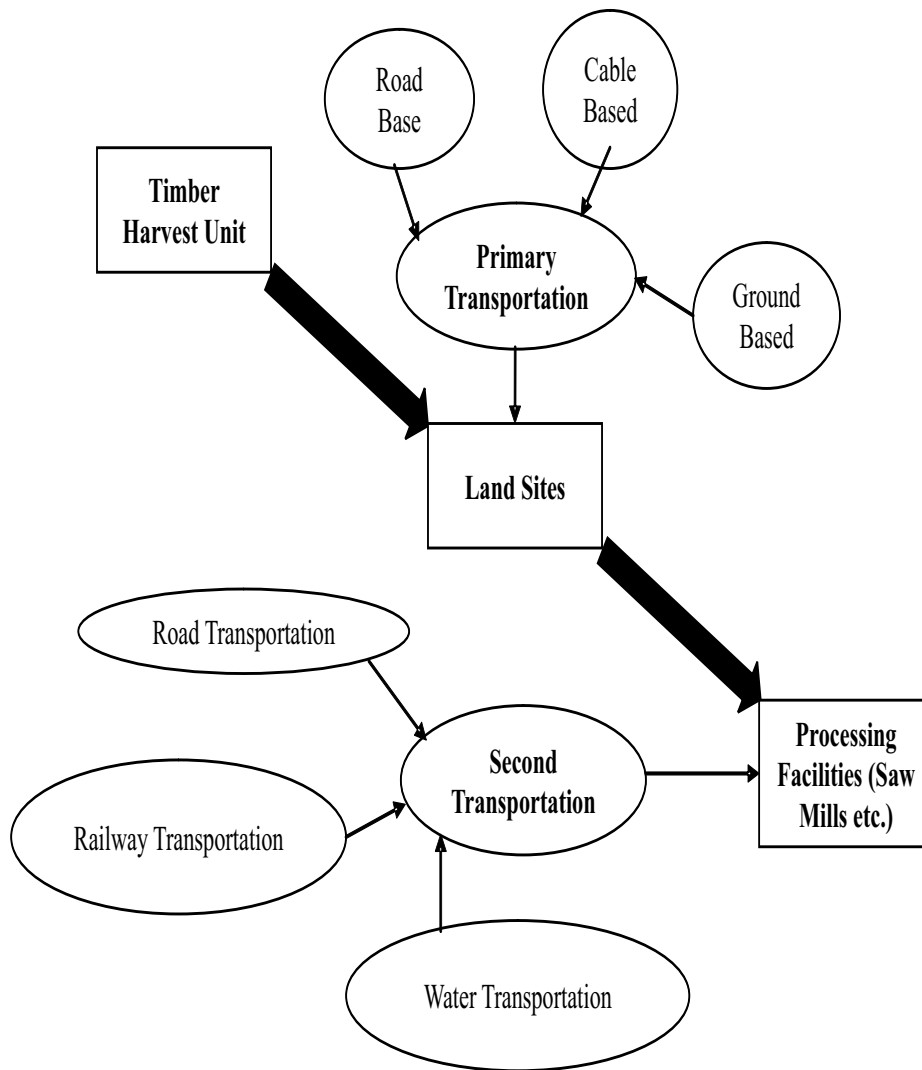
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*Held at University of Uyo, Uyo, Nigeria. 26th - 30th April, 2021*

259

**Figure 1: The flow of forest products from harvesting sites to the processing facilities**

 The different methods of timber transportation by water includes: timber rafting, log driving, barge transport and ferry. In timber rafting, logs are transported when tied together into rafts and drifted or pulled across water-body or down a river. It is the second cheapest method of timber transportation after log driving (Casson, 1995). Log driving is a means of moving (sawn tree trunks) from a forest to saw and pulp mills downstream using the river current. The transportation of timbers in Nwaniba beach, Uruan Local Government Area in Akwa Ibom State, Nigeria has predominantly been performed by floating and loading using canoes. On the arrival of the timbers at the sea port, they are transported by roads to the processing mills and the markets using trucks. The logs or sawn timbers vary in quantities, qualities, sizes and species types and are transported according to its demand and utility.  According Koirala*et al*., (2017) even with the inherent need to transport forest products, there are various challenges in this sector that needs to be addressed for its efficient operations. These challenges can be specific to the region and thereby require a local level understanding of constraints and potential mitigation strategies including policy formulation.

Concerns regarding higher costs associated with forest products transportation have led to several  studies  in forest operations including analysis of wood products transportation costs ( Grebner*et al*., 2005; Yoshoka*et al*., 2006;Möller and Nielsen 2007;;Acuna *et al*., 2012),  increasing efficiency in transportation (Sikanen*et al*., 2005; Greene *et al*., 2007; Holzleitner*et al*., 2011; Montgomery *et al*., 2016) and survey analysis of logging and transportation sectors (Egan and Taggart 2004; Egan and Taggart 2009; Leon and Benjamin 2012;  Abbas *et al*., 2014; Malinen*et al*., 2014).  Similarly, there are research studies utilizing qualitative methods, such as semi-structured interviews to extract information on timber harvesting and transportation (Fielding*et al*. 2012;

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*Held at University of Uyo, Uyo, Nigeria. 26th - 30th April, 2021*

260

Silver*et al.* 2015). To this end qualitative research approach was used to get in-depth information on waterway timber transportation in Nwaniba beach, Uruan LGA of Akwa Ibom State.

**Materials and Method**
**Study Area**
This study was carried out in Nwaniba Beach, Uruan LGA., Akwa Ibom State, Nigeria. It is located between latitudes 5° 02′ 0″ North and longitudes 8° 03′ 0″ East in the South of Nigeria (Wikipedia, 2016). It has an estimated population of 164,000 (National Population Census, 2006) with about 40 villages and 7 clans. It is bounded in the east by Odukpani LGA. in Cross River State, but in south by Okobo LGA, while in the west by NsitAttai and Ibesikpo Asutan LGA and north by Itu LGA. The climate of the State is characterized by two seasons; the wet season which is between March to November of every year and the dry season between December to March. The total annual average rainfall is about 2500mm and temperatures are uniformly high throughout the year with slight variation between 26°C and 28°C (Udofia, 2011). The high relative humidity is between 75% and 95%, though common across the length and breadth of the state (Peters *et al*., 1989).

**Data Collection**
Data for this study were collected using structured questionnaire supplemented with oral interview and direct observation and these was used in obtaining information for this study. The target population for this study was timber merchants in Nwaniba Beach. The structured questionnaires were randomlyadministered to the timber merchants at Nwaniba Beach.

**Data Analysis**
The questionnaire was pretested before final administration to respondents. Descriptive statistics such as tables and percentages and factor analysis were used to analyse the data obtained.

**Results and Discussion**
**Demographic Characteristics of the Respondents**
**Table 1** shows the distribution of respondents based on their demographic characteristics. All the 47 respondents were male and no female was involved in timber merchandise (Table 1). This is because the business is tedious in nature and requires physical strength, therefore women find it extremely strenuous to get involved in the business. Timber merchants between age 34 – 41(51.1%) were highly involved in the business, followed by those between the age 27-33 (31.9%) (Table 1, S/N 2). The high involvement of respondents within this age group may be as a result of their youthful strength and ability to withstand the tedious nature of the job. Merchants between this age brackets are at their prime age and are full of energy.

Majority of the timber merchants (57.4%) were married and 38.3% were single out of the administered questionnaires. Most of the married timber merchants asserted that they started timber business before they got married.

Most of the respondents (Table 1) had primary school education (48.9%) and 48.9% of the respondents obtained Senior School Certificate (SSC).

The proportion of the respondents that had worked as timber merchants for 12-19 years is 48.9%,while 27.7% stated that they had worked for 4-11 years. The majority of the respondents have no other occupation apart from timber business. This is because of the high rate of returns from timber merchandise that is sufficient to take care of their financial responsibilities.

*Proceedings of the 7th Biennial Conference of the Forests & Forest Products Society,*
*Held at University of Uyo, Uyo, Nigeria. 26th - 30th April, 2021*

261

**Table 1: Distribution of Respondents Based on Demographic Characteristics**

| Variables | Demographic Characteristics | Frequency (n=47) | Percentage |
|---|---|---|---|
| **Gender** | | | |
| | Male | 47 | 100 |
| | Female | 0 | 0 |
| | **Total** | | **100** |
| **Age** | | | |
| | 27-33 | 15 | 31.9 |
| | 34-41 | 24 | 51.1 |
| | 42-48 | 8 | 17 |
| | **Total** | **47** | **100** |
| **Marital status** | | | |
| | Single | 18 | 38.3 |
| | Married | 27 | 57.4 |
| | Widow/Widower | 2 | 4.3 |
| | **Total** | **47** | **100** |
| **Educational qualification** | | | |
| | FLSC | 23 | 48.9 |
| | SSCE | 23 | 48.9 |
| | OND | 1 | 2.1 |
| | **Total** | **47** | **100** |
| **Years of work experience** | | | |
| | | 13 | 27.7 |
| | 12 – 19 | 23 | 48.9 |
| | 20-27 | 11 | 23.4 |
| | **Total** | **47** | **100** |
| **Other occupations** | | | |
| | None | 33 | 70.2 |
| | Driver | 1 | 2.1 |
| | Driver/Electrician | 3 | 6.4 |
| | Farming | 1 | 2.1 |
| | Trading/Business | 4 | 8.5 |
| | Fisherman | 2 | 4.3 |
| | Plumber | 1 | 2.1 |
| | Electrician | 2 | 4.3 |
| | **Total** | **47** | **100** |

**Common Wood Species Transported**

Table 2 shows the common wood species that transported by the timber merchants from Nwaniba Beach. The most transported wood species are; *Terminalia superba*(81.3%) (Table 2), followed by *Naucleadiderrichii* (68.8%) and *Diospyros ebenum, Triplochitonsleroxylon, Tectonagrandisand Miliciaexcelsa*(64.6%) respectively. This is as a result of the prevalence of these species in the regions where they are sourced from and their demand and utilization by consumers is high. The least transported wood species were *Plantanusacerifolia, Maesobortyadusenii, Symphonia globulifera, Xylomelum, marcarangabatelii, Staudtiastipitata, Carapaprocera,Triplochitonscloroxylon, Stercullatragacantha, Cresentiacujete, Uapacaguinensis, Klaninedoxagabonensis* (2.1%).

*Proceedings of the 7th Biennial Conference of the Forests & Forest Products Society, Held at University of Uyo, Uyo, Nigeria. 26th - 30th April, 2021*

262

**Table 2: Common Wood Species Transported from Nwaniba Beach.**

| S/N | Wood species | Common names | Local names | No | Yes | % Total |
|---|---|---|---|---|---|---|
| 1 | *Brachystegiaeurycoma* | Achi | Akpa | 47.9 | 52.1 | 100 |
| 2 | *Terminelasuperba* | Afara | Afiaeto | 18.8 | 81.3 | 100 |
| 3 | *Xylopiaethiopica* | African grains of selim | Atek | 58.3 | 41.7 | 100 |
| 4 | *Mitragynastipulosa* | Abura | Uwen | 43.8 | 56.3 | 100 |
| 5 | *Plukenetiaconophora* | African walnut | Ukpa | 60.4 | 39.6 | 100 |
| 6 | *Cerdusatlantica* | Cedar | Cedar | 37.5 | 62.5 | 100 |
| 7 | *Triplochotonsleroxylon* | Obeche | Obeche | 35.4 | 64.6 | 100 |
| 8 | *Naucleadiderrichii* | Opepe | Ikon Inyang | 31.3 | 68.8 | 100 |
| 9 | *Diospyrossebenum* | Ebony | Obubiteto | 35.4 | 64.6 | 100 |
| 10 | *Gmelina arborea* | Gmelina | Etoudatikang | 43.8 | 56.3 | 100 |
| 11 | *Tectonagrandis* | Teak | Tiik | 35.4 | 64.6 | 100 |
| 12 | *Milicia excels* | Iroko | Ofriyo | 35.4 | 64.6 | 100 |
| 13 | *Priorabasalmifera* | Agba | - | 75.0 | 25.0 | 100 |
| 14 | *Oxystigmamannii* | Tchitola | Ntufiak | 62.5 | 37.5 | 100 |
| 15 | *Baphianitida* | Camwood | Ofuo | 58.3 | 41.7 | 100 |
| 16 | *Heveabrasilensis* | Rubber | Okpo | 83.3 | 16.7 | 100 |
| 17 | *Cordia millenii* | Drum tree | - | 87.5 | 12.5 | 100 |
| 18 | *Diospyros mespiloformis* | African Ebony | Obubiteto | 91.7 | 8.3 | 100 |
| 19 | *Albezialebbeck* | Flea tree | Etek | 95.8 | 4.2 | 100 |
| 20 | *Ceidapentadra* | Silk cotton tree | Ukim | 91.7 | 8.3 | 100 |
| 21 | *Khaya senegalensis* | African Mahogany | Achimkprok | 75.0 | 25.0 | 100 |
| 22 | *Plantanusacerifolia* | London Plate | Ndon | 97.9 | 2.1 | 100 |
| 23 | *Kigeliaafricanna* | Sausage tree | Atahaban | 89.6 | 10.4 | 100 |
| 24 | *Phthonatusangolensis* | African nutmeg | Abakani | 95.8 | 4.2 | 100 |
| 25 | *Maesobortyadusenii* | - | Ekpontimenyen | 97.9 | 2.1 | 100 |
| 26 | *Symphonia globulifera* | Chestick | Efianduan | 97.9 | 2.1 | 100 |
| 27 | *Macaranga barteri* | Macaranga | Akpab | 97.9 | 2.1 | 100 |
| 28 | *Staudtiastipitata* | Bokopi | Iyibokoyo | 97.9 | 2.1 | 100 |
| 29 | *Carapaprocera* | Andiroba | Asakabraenton | 97.9 | 2.1 | 100 |
| 30 | *Afzeliaafricanna* | Mahogany | Achimontoto | 93.8 | 6.3 | 100 |
| 31 | *Stercullatragacantha* | Streculia | Udot | 97.9 | 2.1 | 100 |
| 32 | *Cresentiacujete* | Calabash tree | Ibu | 97.9 | 2.1 | 100 |
| 33 | *Uapacaguinensis* | Sugar plum | Mkpenek | 97.9 | 2.1 | 100 |
| 34 | *Irvengiagabonensis* | Wild Mango | Uyo | 97.9 | 2.1 | 100 |
| 35 | *Pseudotsugamenziesii* | Douglass fir | - | 93.8 | 6.3 | 100 |
| 36 | *Pinus spp* | Pine | Etoofim | 72.9 | 27.1 | 100 |
| 37 | *Juniperus virginiana* | Cypress | - | 91.7 | 8.3 | 100 |

*Proceedings of the 7th Biennial Conference of the Forests & Forest Products Society,*
*Held at University of Uyo, Uyo, Nigeria. 26th - 30th April, 2021*

263

**Timber Rafting and Canoeing Methods**
The two water transportation methodsused by the timber merchants were rafting and canoeing methods. About 45.8% of the respondents preferred to use rafts in transporting timbers to the landing and 37.5% of the respondents used canoes while16.7% of the respondent used both rafts and canoes to transport timbers to landing (Table 3). Timber merchants preferred raft method because many logscan be conveyed at the same time and it is cheaper compared to road transport which access may be disrupted in event of natural disaster like excessive rainfall and flood. The disadvantage of waterway transportation of timber is the slow speed, it takes a longer time to arrive at the intended destination

**Table 3:Type of Water Transportation**

| S/N | Type | Frequency | Percent |
|-----|------|-----------|---------|
| **1** | Rafting | 22 | 45.8 |
| **2** | Canoe (boat) | 18 | 37.5 |
| **3** | Canoeing/rafting | 8 | 16.7 |
| | Total | 48 | 100.0 |

**Challenges Encountered in Waterway Transportation of Timber**
Table 4 highlights the challenges encountered during water way transportation of timber by the merchants. The major challenge is incident of attacks by pirates (89.4%)(Table 8), followed by wave current disturbance and galloping (77.1%) and others.

**Table 4:Challenges Encountered in Water ways Transportation of Timber**

| S/N | Challenge encounter | No | Yes | Total (%) | Relative order of position and incidence index |
|-----|---------------------|-----|------|-----------|-----------------------------------------------|
| 1 | Not all woods can float | 52.1 | 47.9 | 100 | 0.047 |
| 2 | Criminality on waterways(piracy) | 10.4 | 89.4 | 100 | 0.894 |
| 3 | Waves disturbance/galloping | 22.9 | 77.1 | 100 | 0.771 |
| 4 | It takes longer time to deliver | 62.5 | 37.5 | 100 | 0.375 |
| 5 | Sawn woods get very wet on delivery | 60.4 | 39.6 | 100 | 0.396 |
| 6 | Transportation by waterways is tedious | 97.9 | 2.1 | 100 | 0.210 |
| 7 | Disturbance by Cameroonian security force | 97.9 | 2.1 | 100 | 0.210 |
| 8 | Manual boat usually develops fault | 87.5 | 12.5 | 100 | 0.120 |
| 9 | Illegal charges by security agencies | 97.9 | 2.1 | 100 | 0.021 |
| 10 | Accident | 97.9 | 2.1 | 100 | 0.021 |
| 11 | Water police | 97.9 | 2.1 | 100 | 0.021 |
| 12 | Floating of wood is risky | 68.8 | 31.3 | 100 | 0.313 |
| 13 | Navigational difficulties due to sand | 81.3 | 18.8 | 100 | 0.188 |
| 14 | High revenue payment | 97.9 | 2.1 | 100 | 0.021 |
| 15 | Restricted to forest close to water bodies | 93.8 | 6.3 | 100 | 0.063 |
| 16 | Wood decays due to long stay | 93.8 | 6.3 | 100 | 0.063 |
| 17 | poor mobile communication signals or services | 97.9 | 2.1 | 100 | 0.021 |

**Conclusion**
Waterways transportation of timber has over the years proven to be a veritable means of timber/logs haulage. From the results obtained in this study, only maleswereinvolved in timber merchandise and they are in their youthful ages. The majority are married and therefore are breadwinners. Most of them rely solely on timber trade as their source of income.The common wood species transported from the beach are the tropical hardwood species. Wood raftingand loading unto canoes were the two water transportation methods used by the timber merchants. Incident of attacks by pirates was the major challenge transportation of timber by water.

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264

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265