



Conservation of Botanicals Used for Carving by the Ijaw Ethnic Group of Bayelsa State Nigeria

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Abstract: A survey of wood used for carving in Bayelsa State, Nigeria was carried out using a rapid appraisal method. The state was divided into three zones and in each zone; three prominent wood carvers were identified and interviewed with the aid of semi-structured questionnaire guide. Also, five communities were randomly selected from each of the eight local government areas of the state. In each community, ten respondents that have maintained continuous domicile for a minimum of ten years in the community were selected and interviewed with respect to their indigenous knowledge on woodcarving. Group interviewed were equally conducted. A total of 39 botanicals belonging to 23 different families were being used to carve 12 different items. Botanicals commonly used for such craft were identified and were mostly timber species. They ranged from hard to soft wood and the species used depended on the item to be carved. The methods use for harvesting the wood was annihilative. Increasing decline in the availability of the species was reported hence strategies that would enhance the continuous supply of the species were proposed.

Keywords: Carving, Botanicals, Indigenous Species, Conservation, Bayelsa State

1. Introduction

Wood carving is still a common craft among the indigenous people of Nigeria. The skills are passed on from father to son through inheritance or by apprenticeship system [2, 3, 5, 11]. Wood carving involves shaping statues, ornaments, utensil, canoes etc out of wood is a common craft among the Ijaw people of Bayelsa State, Nigeria who are well known for adhering to their rich culture. Apart from being Nigeria oil hub, the State is crisscross by numerous creeks and ponds which serve as means of fishing to the indigenous people. Its enormous forest and riparian vegetation create avenue for hunting, wild fruit gathering, wood carving etc.

At present, problem of wood diversity loss is taking its toll on the forest yield in the region; this is not without the knowledge of the indigenous people as they confirmed the continual scarcity of hitherto abundant forest and wildlife

resources in the area [1]. Yet, there abounds the constant pressure on the remaining forest. Previous observation revealed that continual timber felling without replacement has been one of the factors responsible for biodiversity loss [8]. Deforestation is gradually scaling down species richness of the forest estate.

In Nigeria, a gross dearth of studies abounds on wood used for carving by the various ethnic groups in the country. Therefore, the study being reported aimed at documenting information on the botanicals used for carving by the Ijaw ethnic group of Bayelsa State, Nigeria as this could serve as the basis for conservation and management planning of useful but endangered species in the State.

2. Materials and Methods

Kayode et. al. [12] had provided the detailed description of the study area and the delineation of the state into three

zones. This was maintained in this study. In each zone, three prominent woodcarvers were identified and interviewed with the aid of semi-structured questionnaire guide (after Kayode et. al. [11]). The interviews were carried out with fairly open framework that allowed for focus, conversational and two way communication. Information obtained, with regards to the botanical(s) used for carving, abundance of the botanical(s), carvers' indigenous knowledge on the species, was documented.

Also, five communities were randomly selected from each of the eight local government areas of the state. In each community, ten respondents that have maintained continuous domicile for a minimum of ten years in the community, were selected and interviewed with respect to their indigenous knowledge on woodcarving. Group interviews, with the intention to determine group consensus on the information provided, were also conducted among the respondents. Three groups, with each consisting of not less than three respondents, were conducted in each community. Key informants consisting of Officials of Forestry Department were identified and interviewed.

The abundant of the species identified was determined within 2 kilometer radius from the centre of each the community sampled by using the time taken to physically encounter the species. Species encountered in < 1hour were considered as very abundant, those encountered between 1 and 24hours as abundant, 24hours to 3days as frequent, those between 3days and 1week as occasional, and those species that were not encountered after 1week of search as rare. Similarity measures in the occurrence of the species in the sampling zone were determined as follow:

1. Index of Similarity (IS)

$$IS = 2C \times 100 / (A + B)$$

2. Jaccard Index (S_j)

$$S_j = C / (A+B+C)$$

3. Sorenson-Dice Index (S_{SD})

$$S_{SD} = 2C / (A+B+2C)$$

4. Ochoi Index (S_o)

$$S_o = C / \sqrt{(A+C)} + \sqrt{(B+C)}$$

5. Asymmetrical Similarity (S_{AS})

$$S_{AS} = B / (B+2C)$$

Where A is the number of species in the first zone

B is the number of species in the second zone, and

C is the number of species common to both first and second zones

3. Results and Discussion

Table 1 revealed that respondents used in this study cut across sex, age, religion, occupation, literacy and economic status. All the respondents were familiar with the natural resources in their environment. They were quite familiar with carved wood products in their aboriginal communities. Previous study by Kayode et. al. [9] has observed that rural inhabitants were usually conscious of the resources in their environment.

A total of 39 botanicals belonging to 22 different families were observed to be used for carving in the study area (Table 2). The respondents' perceptions on each of the species are also stated in Table 1. 12 carved items were observed (Table 3). The results revealed that dugout canoe and paddle sticks were the dominant items carved from wood in the study area. Durability of the wood species was the major quality required for caving canoe as water permeation could result to canoe wood deterioration. Species utilized for this purpose included *B. nigerica*, *C. pentandra*, *C. procera*, *E. excelsium*, *E. cylindricum*, *E. ivorensis*, *G. angulicarpa*, *K. anthotheca*, *L. alata*, *M. africana*, *M. stipulosa*, *N. diderrichii*, *P. brevipe*, *P. butryacea*, *P. oleosa*, *R. heudelotii*, *S. gabonensis*, *T. acuminata*, *T. ivorensis* and *T. scleroxylon* (Table 2). Paddle sticks were carved using *A. boonei*, *C. englerianus*, *M. Africana*, *S. gabonensis*, *S. globulifera*, *T. ivorensis* and *U. heulotii*.

Table 1. Socio-economic classification of Respondents in Bayelsa State, Nigeria.

Feature	Description	Proportion (%) of Respondents			Average Total
		BW	BC	BE	
Sex	Male	76	65	67	69
	Female	24	35	33	31
	< 20	20	25	23	23
Age	20- 65	70	53	56	60
	> 65	10	22	21	18
Religion	Christian	80	87	92	86
	Others	20	13	8	14
Literacy Status	Literate	52	51	68	57
	Illiterate	48	49	32	43
	Small	70	67	71	69
Economic Status	Medium	28	31	23	27
	Large	2	2	6	3
	Agriculture	96	76	79	84
Occupation	Non-Agriculture	4	24	21	16

Table 2. Botanicals used for carving by the Ijaws of Bayelsa State, Nigeria.

S/n	Botanical names	Family	Vernacular names	Respondents' Perception about the Species
1	<i>Albizia adianthifolia</i>	Mimosaceae	Poo, uya	Soft wood, easy to work.
2	<i>Alstonia boonei</i>	Apocynaceae	Kigbo	Easy to work, and a good alternative for carving
3	<i>Alstonia microphylla</i>	Apocynaceae	Obori	It is durable, less liable to attack by boring insect
4	<i>Anthocleista djalensis</i>	Loganiaceae	Sokoroko, Osunwa, Alala	Moderately hardwood wood, termites proof and durable.
5	<i>Aubrevillea platycarpa</i>	Mimosaceae	Piri agbaka	It is a strong wood not easily attack by insect.
6	<i>Brachystegia nigerica</i>	Caesalpiniaceae	Okolodo	Hardwood, resist soft rot and decay.
7	<i>Carapa procera</i>	Meliaceae	Ofoo	It is a hard and durable
8	<i>Casuarina equisetifolia</i>	Casuarinaceae	Krisimasitiin	Soft rot resistance, termites proof, repel moths and fleas.
9	<i>Ceiba pentandra</i>	Bombacaceae	Talar	Light weight easy to work and good for carving of all types.
10	<i>Ctenolophon englerianus</i>	Ctenolophonaceae	Yowe tin	Strong wood, workable
11	<i>Entandrophragma cylindricum</i>	Meliaceae	Aboudikor	Hardwood, workable and easy to carve, fair resistance to insects
12	<i>Entandrophragma excelsium</i>	Meliaceae	Ohor	Heavy weight wood, durable but susceptible to insect attack.
13	<i>Erythrina senegalensis</i>	Papilionaceae	Ogbolo ibolo	Hard wood, durable
14	<i>Erythrophleum ivorense</i>	Caesalpiniaceae	Eren	It is easy to work, resist insect attack
15	<i>Gmelina arborea</i>	Verbenaceae	Epele	Light weight, hard wood. Respond well to carving operations.
16	<i>Gossampinus angulicarpa</i>	Bombacaceae	Esisaga, Sikaka, Ido undu.	Durable, suitable for carving.
17	<i>Khaya anthotheca</i>	Meliaceae	Ipelemu	It is a fairly strong wood, Workable.
18	<i>Khaya ivorensis</i>	Meliaceae	Digi tin, Kow	Soft, easy to work
19	<i>Lophira alata</i>	Ochnaceae	Kuru	Hardwood, resist soft rot yield strong dugout canoe.
20	<i>Mammea Africana</i>	Clusiaceae	Bolou	Durable, respond to carving operations
21	<i>Mansonia altissima</i>	Sterculiaceae	Ozon	It makes carved items attractive.
22	<i>Milicia excels</i>	Moraceae	Alagba tin, Olokpata	Stable, strong and durable workable
23	<i>Mitragyna stipulosa</i>	Rubiaceae	Bau	Workable, carving characteristics are very good.
24	<i>Nauclea diderrichii</i>	Rubiaceae	Owoso	Durable, resist insects attack, respond well to carving operations
25	<i>Pachystela brevipe</i>	Sapotaceae	Nyanya, Adayan	Rot resistance, suitable for carving.
26	<i>Pando oleosa</i>	Pandaceae	Akuu	Easy to work on, can be manipulated in shapes.
27	<i>Pentadesma butryacea</i>	Clusiaceae	Akanti	Heavy wood, resist termites attack, durable and
28	<i>Piptandeniastrum Africana</i>	Mimosaceae	Sanga	Hard wood, respond well to ordinary tools in carving
29	<i>Pycnanthus angolensis</i>	Myristicaceae	Abbo, Bapulo	Soft wood, availability and workable
30	<i>Ricinodendron heudelotii</i>	Euphorbiaceae	Eke	Light, soft wood easy to work on
31	<i>Sacoglottis gabonensis</i>	Humiriaceae	Tala	Workable
32	<i>Symphonia globulifera</i>	Clusiaceae	Akololo	Easy to work, durable
33	<i>Terminalia acuminata</i>	Combretaceae	Owei balaa, Balaa	Workable, suitable for dugout canoes and paddles.
34	<i>Terminalia ivorensis</i>	Combretaceae	Dii	Soft, easy to work, insects and fungi resistance, durable
35	<i>Triplochiton scleroxylon</i>	Sterculiaceae	Phar	Strong wood, respond well to carving operation.
36	<i>Uapaca heudelotii</i>	Uapacaceae	Iyoro ile	Hardwood, durable
37	<i>Uapaca staudtii</i>	Uapacaceae	Okoruba ile	Easy to work
38	<i>Vitex doniana</i>	Verbenaceae	Moron	Strong wood, durable and workable.
39	<i>Vitex grandifolia</i>	Verbenaceae	Buron	Strong wood, workable

Table 3. List of wooden items carved in Bayelsa State.

S/N List of items carved	Vernacular names	Most preferred botanicals
1. Axe handle	Ogoufo	<i>C. procera</i> , <i>P. butryacea</i> , <i>S. globulifera</i> , <i>V. grandifolia</i> , <i>B. nigerica</i> , <i>C. pentandra</i> , <i>C. procera</i> , <i>E. excelsium</i> , <i>E. cylindricum</i> , <i>E. ivorensis</i> , <i>G. angulicarpa</i> , <i>K. anthotheca</i> , <i>L. alata</i> , <i>M. africana</i> , <i>M. stipulosa</i> , <i>N. diderrichii</i> , <i>P. brevipe</i> , <i>P. butryacea</i> , <i>P.</i> <i>oleosa</i> , <i>R. heudelotii</i> , <i>S. gabonensis</i> , <i>T. acuminata</i> , <i>T. ivorensis</i> , <i>T. scleroxylon</i> ,
2. Canoe	Aru, Aro	<i>A. platycarpa</i> , <i>G. angulicarpa</i> , <i>L. alata</i> , <i>M. stipulosa</i> , <i>C. pentandra</i> , <i>L. alata</i> , <i>M. excelsa</i> , <i>M.</i> <i>altissima</i> , <i>M. africana</i> , <i>S. gabonensis</i> , <i>T. scleroxylon</i> ,
3. Decorative items	Yotolomoyeama	<i>A. adianthifolia</i> , <i>A. boonei</i> , <i>P. oleosa</i> , <i>P. butryacea</i> , <i>V. grandifolia</i>
4. Hoe handles	Asubaifu, Asibai	<i>C. procera</i> , <i>T. acuminata</i> , <i>T. scleroxylon</i> , <i>T. ivorensis</i> , <i>P. africana</i>
5. Local board game	Ikiyokoto, Obrige	<i>C. procera</i> , <i>T. scleroxylon</i> , <i>P. brevipe</i> , <i>P. butryacea</i>
6. Local gun	Barasuboi, Alagba	<i>A. adianthifolia</i> , <i>A. boonei</i> , <i>M. africana</i> , <i>R. heudelotii</i> , <i>T. ivorensis</i> , <i>T. acuminata</i> , <i>S. gabonensis</i> , <i>S.</i> <i>globulifera</i> , <i>T. scleroxylon</i> , <i>V. grandifolia</i> ,.
7. Mask	Ou, Awu	<i>A. platycarpa</i> , <i>E. cylindricum</i> , <i>E. enegalensis</i> , <i>I. staudii</i> <i>L. alata</i> , <i>M. africana</i> , <i>M. excels</i> , <i>M.</i> <i>stipulosa</i> , <i>N. diderrichii</i> , <i>M. africana</i> , <i>T. scleroxylon</i> ,
8. Mortar and pestle	Odo and Odo bara	<i>A. boonei</i> , <i>C. englerianus</i> , <i>M. Africana</i> , <i>S. gabonensis</i> , <i>S. globulifera</i> , <i>T. ivorensis</i> <i>U. heulotii</i>
9. Paddle stick	Yowe	<i>M. excelsa</i> , <i>N. diderrichii</i> , <i>S. gabonensis</i> , <i>T. scleroxylon</i> .
10. Small mortar & pestle	Okuna & okun bara	<i>A. platycarpa</i> , <i>E. cylindricum</i> , <i>M. excelsa</i> , <i>P. butryacea</i> , <i>R. heudelotii</i> , <i>S. gabonensis</i> , <i>T.</i> <i>acuminata</i> , <i>T. scleroxylon</i> , <i>V. grandifolia</i> .
11. Statues	Karatiemonimi keme, Teme	<i>T. scleroxylon</i> , <i>S. globulifera</i> , <i>S. gabonensis</i> , <i>U. staudtii</i> ,
12. Walking stick	Ugbele, Alor	

Other carving products in the study area were axe and hoe handles, local board game, local gun handle, masquerades' masks, decoration materials, mortar and pestle, statues and walking sticks. While the carving of canoes, paddle sticks, axe and hoe handles, mortar and pestle were constantly worked upon by the carvers, carving of other carving products were often based on demand.

Field observation revealed that two kinds of mortar and pestle are carved in the study area, a large type commonly used for pounding yam and *Loi loi* (squashed cassava), and the small type usually for milling soup condiments/ spices into pulp. The two types are both household food processing instruments. Local board game (*Ikiyokoto*, *obrige*) is a leisure game play among people of all age groups in the State. Walking stick (*Alor*, *ugbele*) is a supporting and walking aid instrument commonly used by the elderly and also served as traditional fashion during chieftaincy, marriage rite and ritualistic acculturation. Masks and statues are kinds of items scarcely carved in the study area, mask is a symbolic costumed usually wore by masquerades reputed to be sprites of the gods / goddess. Masquerades displays are still common feature of festivals and rites of passage of the King and Chiefs in the study area. Table 4 shows the list of masquerades with carved wood as masks in the study area. Most of these masquerades were concentrated in Bayelsa central zone.

The results also revealed that species preference abounds for carving a specific item, thus supporting the previous assertions of Hawthorne [6], Melissa [13], Kayode [7] and Gordian and Ekiye [5]. Preferences demonstrated were attributed to differences in wood texture, ease of carving (especially when damp), and resistant to rot. 38 of the

identified botanicals (that is, 97%) were indigenous species sourced from forests in the study area. Only *G. arborea* was foreign in origin. Previous study by Kayode and Ogunleye [10] revealed that indigenous species played diverse roles in the livelihood of rural dwellers. Carvers and respondents were conscious of increasing decline in the abundance of the species. The abundance test used in this study revealed 10% and 15% of the identified botanicals were occasional and rare status respectively (Table 5). The similarity indices (Table 6) revealed that the species occurrences in Bayelsa East (BE) and Bayelsa South (BS) as well as Bayelsa West (BW) and BS were quite similar than those of BW and BE. However the values of Asymmetrical Similarity of 0.4 in the three zones used tend to suggest that occurrence of the species was similar in the state.

Information by the respondents revealed that reduction was being observed in the number of mature wood in the study area. Field observation revealed that the increasing scarcity of the species has resulted in the use of immature wood especially in the carving of dugout canoes hence many of the dugout canoes currently in production were plywood-constructed-boat. Many other carved items were easily susceptible to attacks by insects. The depletion in the forest estate of the study area has been a subject of concern in the recent years. Residents of the study area depended heavily on their environment for their livelihood hence deforestation rate had been rapid and unprecedented [4]. This is further complicated by degradation brought about due to the crude oil exploration and exploitation [14]. The mangrove forest of the study area which is reputed to be the third largest in the world and is now equally the most exploited in the world [15].

Table 4. Checklist of Masquerades with Carved wood in Bayelsa State.

S/n	Zone	Masquerade
1	Bayelsa Central	1. Abadiugubari, 2. Angelapele, 3. Bulo-bulo bele-beni, 4. Edendenyan, 5. Eferumoweni, 6. Imboli-gbiri- gbiri, 7. Kabi, 8. Kpa-kpai, 9. Ofuo, 10. Ogbobiriyai, 11. Ogidimalu, 12. Ogori, 13. Okii, 14. Okporumadede, 15. Uguberi
2	Bayelsa East	1. Agiri, 2. Alamadu, 3. Imgbila, 4. Kpepupele, 5. Ofirima, 6. Okii, 7. Omoya
3	Bayelsa West	1. Angalapele

Table 5. Abundance of the identified botanicals used for carving by the Ijaw in Bayelsa State, Nigeria.

Abundance Scale	Identified Species	Proportion (%) of the Species
Abundant	<i>A. adantifolia</i> , <i>A. boonei</i> , <i>A. djalonsensis</i> , <i>E. senegalensis</i> , <i>K. ivorensis</i> , <i>P. oleosa</i> , <i>P. angolensis</i> , <i>S. gabonensis</i> , <i>S. globulifera</i> , <i>T. ivorensis</i> , <i>V. doniana</i>	28%
Frequent	<i>A. microphylla</i> , <i>A. platycarpa</i> , <i>B. nigerica</i> , <i>C. procera</i> , <i>C. equisitifolia</i> , <i>E. ivorensis</i> , <i>G. arborea</i> , <i>G. angulicarpa</i> , <i>K. anthotheca</i> , <i>M. stipulosa</i> , <i>P. africana</i> , <i>P. brevipe</i> , <i>P. butryacea</i> , <i>P. heudelotii</i> , <i>T. acuminata</i> , <i>U. heudelotii</i> , <i>U. staudtii</i> , <i>V. grandifolia</i>	41%
Occasional	<i>C. pentandra</i> , <i>C. englerianus</i> , <i>E. excelsium</i> , <i>L. alata</i>	10%
Rare	<i>E. cylindricum</i> , <i>M. Africana</i> , <i>M. altissima</i> , <i>M. excelsa</i> , <i>N. diderrichii</i> , <i>T. scleroxylon</i>	15%

Table 6. Similarities in species occurrence in the three zones of in Bayelsa State, Nigeria.

Zones	Indices of Similarity*				
	IS	S _J	S _{SD}	S _O	S _{AS}
BW-BE	60.5	0.2	0.4	1.1	0.4
BW-BS	82.6	0.3	0.5	1.5	0.4
BE-BS	87.8	0.2	0.5	1.5	0.4

Field observation also revealed that the mangrove forest of the study area was mostly populated by the indigenous species. Previous observations by Kayode and Ogunleye [9] and Adu- Agyem *et al.* [3] revealed that these species reproduced poorly, as most of them are often high light demanders and poorly represented in the sapling stage. Similarly, the methods of harvesting trees to be carved are

mostly annihilative. It was also observed that other tree species around a desired species to be harvested for carving purposes are negatively affected during extraction, as such are hew down. Thus supply *ad infinitum* would be difficult to guarantee. The need to preserve the integrity of the mother plants is now imperative.

4. Conclusion

The mangrove should be conserved through effective legislation and implementation, particularly on the activities of the oil companies. The enlightenment of the populace on the dangers of biodiversity loss should be intensified. Perhaps, some of the mangrove should be gazetted as reserves. These would ensure the continuity of wood supply for carving activities among the indigenous people of the study area.

Conflict of Interest

No conflict of interest involved in the study being reported in this paper.

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