

Bark Extravivism and Health Maintenance among Ijaw Tribal Community of Bayelsa State, Nigeria

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Abstract: The study examined plant species whose barks were being extracted and used for health maintenance by the Ijaw tribal community of Bayelsa State of Nigeria. 150 respondents, randomly selected, were interviewed with the aid of a semi-structured questionnaire guide. All the interviewed were focused, conversational and two-way in communication. Plant species with medicinally valued barks were identified and information on them were obtained and documented. The results obtained revealed that the socio-economic status of the respondents were not prerequisites to their consciousness on the medicinal values of plants in their vicinities. Despite the availability of most of the species in the respondents' environment, market patronage was still the preferred source as many of them could not recognize the species even with their vernacular names. Also a declining rate in the passage of ethno-botanical knowledge from one generation to another now abounds in the study area. Trading in medicinal barks was prominent and was dominated by the females who sourced their stocks from diverse areas. A total of 62 plant species, belonging to 38 families, were observed to have their barks valued for medicine for diverse diseases. The methods of preparations and utilizations of the plant-based medicine were simple and easily adoptable by the respondents. The extraction methods utilized sourcing for barks were mostly predatory and annihilative. Most of the identified species were indigenous, uncultivated with poor regenerative abilities thus most of them were presently not abundant in the study area. Conservation measures that could enhance their sustainability were prescribed.

Keywords: Barks, extraction, annihilation, conservation, sustainable.

INTRODUCTION

The Ijaw people Nigeria predominantly occupy the Niger Delta Region of Nigeria. They are scattered in six states of the federation, namely Rivers, Bayelsa, Delta, Edo, Ondo and Akwa Ibom states [1]. They are mostly migrant fishermen and are found in camps as far west as Sierra Leone and as far east as Gabon [2]. The Ijaws constituted the major tribe in Bayelsa State of Nigeria. The state has a riverine and estuarine setting; many communities are almost completely surrounded by water, making them inaccessible by road. The state is home to the Edumanom Forest Reserve, which is reputed to be the last known site for chimpanzees in the Niger Delta [3].

Previous studies have chronicled the dependency of the tribal communities in Nigeria on the use of plants for health maintenance. Estimates have continued to suggest that over 70% of Nigerians reside in the rural areas where their health maintenance mostly depended on the biological resources available in their vegetation [4]. However, in the recent times, the attentions of plant ecologists and vegetation scientists in the country were skewed toward bark extravivism which

is being considered as a recipient of blame for biodiversity loss in the country [5].

The recent economy recession being experienced in the economy is equally affecting health maintenance and management in the country. The cost of orthodox medicine has skyrocketed beyond the reach of resource-poor [6] thus restricting their dependence to the use of plant-derived medicine. Similarly, the vegetation of the Niger Delta is undergoing intensive threat from oil-pollution thus endangering the continuous existence of most indigenous plant species in the state. Consequent on the above, the study being reported here examined the species being extracted and used for health maintenance by the Ijaw tribal community of Bayelsa State of Nigeria.

MATERIALS AND METHODS

Kayode *et al.*, [7] had provided the detailed description of the study area and the delineation of the state into three zones of Bayelsa Central, Bayelsa West and Bayelsa East. The Bayelsa Central zone, which comprised of Southern Ijaw, Yenagoa and Kolokuma/Opokuma LGAs, was used for this study.

In each of these LGAs, five rural communities were selected randomly and used for the study, 10 respondents were randomly selected in each community and interviewed with the aid of a semi-structured questionnaire guide [7, 8]. All the interviews were focused, conversational and two-way in communication. Plant species whose stem and / or root barks were extracted were identified. Information on their medicinal values were obtained and documented. Also in each LGA, a major market was identified and 5 botanical vendors, in each of the identified markets, were interviewed on the plant barks sold in the market and their medicinal values.

Voucher specimens of the identified plant species were obtained and later identified by the Curator of the Herbarium of the Department of Biological Science of the Niger Delta University, Wilberforce Island, Bayelsa State, Nigeria and were later deposited at the Herbarium of the Department of Plant Science and Biotechnology, Ekiti State University, Ado-Ekiti, Ekiti State, Nigeria.

The economic status of the respondents was determined based on the cumulative economic returns

from the assets and production declared by the respondents during the interviews. Hence respondents were classified into two groups of resource-poor and resource-rich.

Group interviews were conducted in each community to established group consensus on the individual responses provided. In each community, four groups, each consisting of at least three respondents, were interviewed. Key informants made up of health, forestry and community development officials were identified in each LGA and interviewed.

RESULTS AND DISCUSSION

The socio-economic classification (Table-1) revealed that the respondents were diverse and transcends sex, age and literacy and economic status. Most of them were females (87% Vendors, 69% Clients), adults (of 20-50 years age class, 67% and 88% of vendors and clients respectively), illiterates (85%) and resource-poor (100%). This observation supports the assertion that socio-economic factors were not pre-requisites to the consciousness of the respondents on the medicinal values of plants in their vicinities.

Table-1: Socio-economic Classification of Respondents in the Bayelsa Central, Bayelsa State, Nigeria

Feature	Description	Proportion (%) of Respondent*		
		Herbal Vendor	Clients and Resident	Average Total
Sex	Male	13	31	22
	Female	87	69	78
Age	<20yrs	0	1	1
	20-50yrs	67	88	78
	>50yrs	33	11	22
Literacy	Literate	13	17	15
	Illiterate	87	83	85
Economic Status	Resource Rich	0	0	0
	Resource Poor	100	100	100
Occupation	Agricultural	73	92	83
	Non – Agricultural	27	8	17

* Figures calculated to the nearest whole numbers

Field observation revealed that despite the availability of most of the species in the respondents' environment, market patronage was still preferred. Many respondents could not recognize the species even with their vernacular names. Also a declining rate in the passage of ethno-botanical knowledge from one generation to another now abounds in the study area. The botanical vendors are fast becoming professionals that are saddle with prescription of the plant species suitable for the treatment of specified illness.

The use of barks was found to be an important aspect of the medicinal utilization of plants in the state. Previous studies have revealed that residents in inaccessible and / or rural areas were often hindered from the use of modern medicine hence were restricted to depend on nature [9]. Medicinal plants are now

increasingly being recognized worldwide as an alternative source of efficacious and inexpensive medications compared to synthetic chemo-therapeutic compounds [10].

Trading in medicinal plant barks was prominent in the study area and was dominated by the females who sourced them from within and outside their communities. Indeed, a marketing chain of supply abounds in the state and wholesale and retail vendors exist. Previous study by Ekanem and Udoh [11] asserted that medicinal plants now constitute a major economic item in many countries including Nigeria.

A total of 62 plant species, belonging to 38 families, were observed to have their barks valued for medicine and health maintenance (Table-2). While 5 of

these species were members of the family Rutaceae, 4 were Annonaceae, 3 each were members of the families Anacardiaceae, Poacea and Rubiaceae. The families Amaranthaceae, Apocynaceae, Asteraceae, Caesapiniaceae, Clusiaceae, Combretaceae, Cucurbitaceae, Euphorbiaceae, Meliaceae and Piperaceae have 2 members each while in other families, each has one member each. The vegetation of the study area is mangrove swamp forest. Precious studies have revealed that the species diversity of this vegetation is high. FAO [12], Mmom and Arokoyu [13] asserted that the Nigerian mangrove constituted the

third largest mangrove in the world, covering an area of approximately 105,000 hectares [14].

These species were used to manage diverse diseases (Table-3). The methods of preparations and utilizations were simple and easily adoptable by the respondents. Kayode *et al.*, [15] observed that preparations of plant-based medicine do not require technology that was beyond the capability of indigenous people. Thus these constituted positive incentives that enhanced the acceptance of plant-based medicine in the study area.

Table-2: List of plant species whose barks were extracted in the Balyesa Central Zone of Bayelsa State, Nigeria

S/N	Local name	Scientific name	Family
1	Abga	<i>Lagenaria siceraria</i>	Cucurbitaceae
2	Abogointa	<i>Pistia stratiotes</i>	Araceae
3	Akain	<i>Garcina kola</i>	Clusiaceae
4	Akpakpa	<i>Irvingia gabonensis</i>	Irvingiaceae
5	(a) Beke- ogboin (b) Bou- Ogboin (c) Beke- piri	<i>Mangifera indica</i>	Anacardiaceae
6	Bibibilemo tin	<i>Thaumatococcus danielli</i>	Marantaceae
7	Biefro	<i>Sida cordifolia</i>	Malvaceae
8	Buopulo	<i>Harungana medagascariensis</i>	Clusiaceae
9	Derebiya	<i>Macrolobium macrophyllum</i>	Caesapiniaceae
10	Digi tin	<i>Khaya ivorensis</i>	Meliaceae
11	Diri-esen, kiri-ologbo	<i>Vernonia amygdalina</i>	Asteraceae
12	Dongoyaro	<i>Azadirachta indica</i>	Meliaceae
13	Egena	<i>Murraya koenigii</i>	Rutaceae
14	Ekpesekepese	<i>Commelina benghalensis</i>	Commelinaceae
15	Enge	<i>Xylopia aethiopica</i>	Annonaceae
16	Ere ininain	<i>Amaranthus spinosus</i>	Amaranthaceae
17	Etitiri	<i>Diodia scandens</i>	Rubiaceae
18	Flaba	<i>Thevetia neriifolia</i>	Apocynaceae
19	Frutu tin	<i>Terminalia catappa</i>	Combretaceae
20	Furu kana, karan	<i>Ocimum gratissimum</i>	Lamiaceae
21	Furutuo	<i>Chromolaena odorata</i>	Asteraceae
22	Gbologi	<i>Baselle alba</i>	Basellaceae
23	Guava	<i>Psidium guajava</i>	Myrtaceae
24	Loi (Palm wine)	<i>Elaeis guineensis</i>	Arecaceae
25	Iginiga	<i>Newbouldia laevis</i>	Bignoniaceae
26	Ile	<i>Uapaca heudelotii</i>	Euphorbiaceae
27	Imbafuila	<i>Coix lachrymal</i>	Poaceae
28	Indu	<i>Carica papaya</i>	Caricaceae
29	Iyoro ile	<i>Gardenia imperialis</i>	Rubiaceae
30	Iyoro- ininain	<i>Amaranthus spinosus</i>	Amaranthaceae
31	Kalalila	<i>Citrus aurantifolia</i>	Rutaceae
32	Kalawomo-igainia	<i>Peperomia pellucid</i>	Piperraceae
33	Kasu	<i>Anacardium occidentale</i>	Anacardiaceae
34	Kingbou	<i>Alstonia boonei</i>	Apocynaceae
35	Korokuma	<i>Zanthoxylum zanthoxyloides</i>	Rutaceae
36	Kuru	<i>Lophira alata</i>	Ochnaceae
37	Lakwa	<i>Eicchornia crassipes</i>	Pontederiaceae
38	Lila	<i>Citrus sinensis</i>	Rutaceae
39	(a) Man power (b) Poroporo	<i>Sorghum vulgare</i>	Poaceae
40	Never die	<i>Kalanchoe pinnata</i>	Crassulaceae

41	Obirigia	<i>Panda oleosa</i>	Pandaceae
42	Obori indu	<i>Dioscoreophyllum cumminsii</i>	Menispermaceae
43	Ogbodo ibolo	<i>Erythrasenegalensis</i>	Papilionaceae
44	Ogborodi	<i>Smilax kraussinia</i>	Smilacaceae
45	Ogu	<i>Telfaria occidentalis</i>	Cucurbitaceae
46	Okogolo	<i>Monodora myristica</i>	Annonaceae
47	Omungula ibuluba	<i>Nephrolepsis biserrata</i>	Nephrolepidaceae
48	Opakipaki, Obugotandigha tin	<i>Zanthoxylum gilletii</i>	Rutaceae
49	Opepe, owoso	<i>Nauclea diderrichii</i>	Rubiaceae
50	Orke	<i>Laguncularia Racemosa</i>	Combretaceae
51	Osunga	<i>Panicum maximum</i>	Poaceae
52	Osuo	<i>Brassica oleracea</i>	Brassicaceae
53	Oziza, uziza	<i>Piper guineense</i>	Piperaceae
54	Piriagbaka tin	<i>Pentaclethra macrophylla</i>	Mimosaceae
55	Piriri-tin	<i>Dennettia trippetala</i>	Annonaceae
56	Pulumu	<i>Spondias mombin</i>	Anacardiaceae
57	Roba tin	<i>Hevea brasiliensis</i>	Euphorbiaceae
58	Sanga	<i>Piptadeniastrum africanum</i>	Caesalpinaceae
59	Sikaka, Ido-undu	<i>Bombax buonopozense</i>	Bombacaceae
60	Toro-bein	<i>Ipomoea aquatic</i>	Convolvulaceae
61	Udara-tin	<i>Chrysophyllum albidum</i>	Sapotaceae
62	Upe	<i>Enantia chlorantia</i>	Annonaceae

Table-3: List of Species, Diseases cured, Method of Preparation and Method of Utilization

S/N	Scientific name	Disease(s) cured	Method of preparation	Method of utilization
1	<i>Alstonia boonei</i>	Malaria, typhoid fever, gonorrhoea, asthma and dysentery	Infusion in water, boil in water	Oral administration
2	<i>Amaranthus spinosus</i>	(a). Recurrent miscarriage, habitual abortion (b) Fever in children and malaria in adult (c). Immune booster, intestinal bleeding	(a). Pounding the barks to remove the extract (b). decoction of the plant	Oral administration of the extract.
3	<i>Anacardium occidentale</i>	Miscarriage during pregnancy	The bark is boil in water and allowed to cool	The extract administered orally
4	<i>Azadirachta indica</i>	(a). Malaria (b). Hypertension (c). Fever	(a). Soak in water or alcohol (b). Decoction of the barks	Oral administration
5	<i>Baselle alba</i>	Diarrhea	Boiled in water	Administered orally, cook as vegetable
6	<i>Bombax buonopozense</i>	Disturbance by evil spirit	The bark is burnt to produce a smoke which is believe to chase away evil spirit	The bark is burnt
7	<i>Brassica oleracea</i>	Hernia	Decoction of the part of the plant	Oral administration
8	<i>Carica papaya</i>	(a).Malaria and typhoid fever (b). Fever	(a). Infuse in palm wine or boil in water (b). Decoction of the stem and root bark in water	(a). Oral administration (b). Bathing and oral administration.
9	<i>Chromolaena odorata</i>	(a). Skin infection, malaria, dysentery, diarrhea. (b). Wound healing and fever in children	Infusion of the barks in water, boiled in water it is use externally on the skin to treat skin infection.	(a). Oral administration (b). it is use to bath
10	<i>Chrysophyllum albidum</i>	Gastro-intestinal diseases, wound healing	Decoction in water, the leaves and root bark is pound into powder and applied externally	Oral administration, applied externally on the surface of the wound

			to the surface of the wound	
11	<i>Citrus aurantifolia</i>	Malaria, excess worm	Decoction in water	Oral administration
12	<i>Citrus sinensis</i>	Malaria	Decoction in water	Oral administration
13	<i>Coix lachrymal</i>	Arthritis, high cholesterol	Decoction in water	Oral administration
14	<i>Commelina benghalensis</i>	Malaria and fever	Decoction of the stem and root bark	Oral administration
15	<i>Dennettia trippetala</i>	Cough, fever and loss of appetite	Decoction of the plant.	Oral administration
16	<i>Diodia scandens</i>	Hypertension	Decoction of the bark	Oral administration
17	<i>Dioscoreophyllum cumminsii</i>	Venerable diseases	Infusion of the stem is use to treat venerable diseases while the infusion of the root bark has sexual stimulant.	Oral administration
18	<i>Eicchornia crassipes</i>	Malaria, fever and diarrhea	Infusion of the leaves and the stem	Oral administration
19	<i>Elaeis guineensis</i>	Fever	Pounding the unripe palm fruit and breaking the kernel to eat the fruit inside	Oral administration of the palm wine
20	<i>Enantia chlorantia</i>	Malaria and fever	Soak in water or Alcohol	Administered orally
21	<i>Erythrina senegalensis</i>	Yellow fever, malaria, wounds, gastro- intestinal disorders	The leaves are squeeze to remove the extract, decoction of the stem and root bark is used in treating malaria and fever.	(a). External application of the juice in the leaves is used in treating wounds.(b). Oral administration of the decoction of the stem and root bark.
22	<i>Garcina kola</i>	(a). Cough, chest pain (b). Sore throat, cough treatment	(a).The stem bark was chewed and the extract is swallowed (b). Pounding the bark with seven alligator pepper and infusion in water.	Oral administration
23	<i>Gardenia imperialis</i>	Bladder infection, urinary dysfunction	Decoction in water	Oral administration
24	<i>Harungana medagascariensis</i>	Scabies, malaria	The stem and root barks are burnt and applied on the surface of the skin that is infected by scabies. Decoction of the root bark is used in the treatment of malaria	It is applied externally on the skin infection and administered orally to treat malaria.
25	<i>Hevea brasiliensis</i>	Wounds, cut and sores	Applied externally on the injured surface.	The extract is placed on the surface of the wound.
26	<i>Ipomoea aquatica</i>	Fever	Cooking of the whole plant to get the extract	The extract of the bark taken orally, the whole plant can be eaten as vegetable.
27	<i>Irvingia gabonensis</i>	Hernia, constipation, diabetes, yellow fever	Decoction of the bark in water	Oral administration
28	<i>Kalanchoe pinnata</i>	(a). Children navel problem, stomach disorder, arrest bleeding from wounds (b) Ear problem, unhealed baby navel	Boil in water, the stem and root barks are placed on a heat source to soften it and these is later squeeze to remove the extract.	(a). The plant is squeeze to remove the extract and place on the baby navel, oral administration. (b). The extract is added in drops into the ear.
29	<i>Khaya ivorensis</i>	Back pains, body ache, cough and rheumatism	Decoction of the bark in water, the leaves is pound	Oral administration, the extract obtained from the leaves is applied to treat rheumatism.
30	<i>Lagenaria siceraria</i>	Antidote to poison,	Decoction of the stem and root bark	Oral administration

31	<i>Laguncularia Racemosa</i>	Dysentery, scurvy and fever	Infusion of the bark	Oral administration
32	<i>Lophira alata</i>	Kidney and stomach problem	Decoction of the bark in water	Oral administration
33	<i>Macrobium macrophyllum</i>	Malaria	Decoction of the bark	Oral administration
34	<i>Mangifera indica</i>	(a). Malaria (b). Fever	Stem barks are boiled in water and the extract is allowed to cool	They are administered orally
35	<i>Mitragyna stipulosa</i>	Cough, headache and colic	Decoction of the bark	Oral administration
36	<i>Monodora myristica</i>	Sores, wounds, rheumatism, and arthritis	Infusion or decoction of the bark.	The extract of the decoction of the bark is taken orally.
37	<i>Murraya koenigii</i>	Dysentery, Diarrhea fever and herpes	Stem and root barks are boil in water and sometimes soak in water	Oral administration
38	<i>Nauclea diderrichii</i>	Anemia, Stomach- ache, gonorrhea and jaundice	Decoction of the part of the plant	Oral administration
39	<i>Nephrolepis biserrata</i>	Cough, wound healing and goiter	Decoction of the bark	Oral administration
40	<i>Newbouldia laevis</i>	Cough, diarrhea, chest pains and dysentery	Decoction of the stem and root bark	Oral administration
41	<i>Ocimum gratissimum</i>	(a). feverish illness, poor digestion, migraine, acne and skin infections (b). Stomach ache	Infusion or decoction of barks in water	It is administered orally to treat fever, poor digestion, migraine and applied externally to treat acne and skin infections.
42	<i>Panda oleosa</i>	Abdominal troubles, abortion and rheumatism	The stem and root barks are pound to remove the extract	The extract is administered internally to treat abdominal troubles and abortions and it is administered externally to treat rheumatism
43	<i>Panicum maximum</i>	Sore Wound	The plant is squeezed to remove the extract	The extract is applied directly on the wound
44	<i>Pentaclethra macrophylla</i>	Diarrhea	Decoction in water	Oral administration
45	<i>Peperomia pellucid</i>	(a) Waist pain (b) Intestinal problem (c) Stomach ache	(a). The stem and root barks are pound to extract the active component (b). The plant is soak in water or alcohol	(a).The plant extract is rubbed on the surface of the affected skin area externally (b). Oral administration
46	<i>Piper guineense</i>	(a). Stomach ache or disorder (b) Diarrhoea and stomach ache	(a). Squeeze in water, cook has vegetable (b). Chewing the plant raw	(a). Eaten has a vegetable (b). Oral administration of the extract.
47	<i>Piptadeniastrum africanum</i>	Cough, headache, mental disorder, haemorrhoids	Decoction of bark in water	Oral administration
48	<i>Pistia stratiotes</i>	Stomach problem, gonorrhoea, skin infections	Infusion and decoction of the bark in water	It is use externally to bath, oral administration.
49	<i>Psidium guajava</i>	Stomach ache	Decoction in water	Oral administration of the extract of the bark chewed with seven alligator pepper
50	<i>Sida cordifolia</i>	(a). Bone dislocation (b). Fever, treatment of bone fracture	(a). The stem and root barks are pounded and the extract is removed (b). infusion of the bark plant	(a).The extract is applied or rub over the dislocated bone joint. (b). Oral administration

51	<i>Smilax kraussinia</i>	Gonorrhoea and sexually transmitted diseases	Decoction of the stem and root barks	Oral administration
52	<i>Sorghum vulgare</i>	(a) Low infertility (b) Anaemia (c) Malaria (d) Typhoid fever	(a) Soak in water or alcohol, boil in water (b) Boil in water and the extract is allowed to cool after which is taken	Oral administration
53	<i>Spondias mombin</i>	Diarrhea, dysentery, cold, fever and gonorrhoea	Decoction of the bark	Oral administration
54	<i>Telfaria occidentalis</i>	Diabetes, malaria and low infertility	Cook as vegetable	Eaten as vegetable
55	<i>Terminalia catappa</i>	Cough, jaundice, fever, diarrhea	Decoction of the bark is used to treat fever and diarrhea.	Oral administration
56	<i>Thaumatococcus danielli</i>	Infections from venoms, stings and bites	The extract of the stem is applied on the surface of the bite	Oral administration
57	<i>Thevetia neriifolia</i>	Snake bites, toothache, jaundice, fever, chronic sores and ulcers	Decoction of the stem bark	Oral administration
58	<i>Uapaca heudelotii</i>	Female sterility, rheumatism and hemorrhoids	Decoction of the bark	Oral administration
59	<i>Venonia amygdalina</i>	(a). Malaria (b). Measles (c). High temperature in children. (d). High body temperature	(a). Infusion in water and alcohol (b). The stem and root bark is pound and infuse in water to get the extract (c). The plant is squeezed to remove the extract and palm oil is added to it (d). Squeeze in cold water or alcohol	(a). Oral administration (b). The extract of the plant that is mixed with palm oil is rubbed on the skin of the child infected with measles. extract (c). The extract is rubbed on the body.
60	<i>Xylopiya aethiopyca</i>	Asthma, stomach ache and rheumatism	Infusion of the bark in palm wine	Oral administration
61	<i>Zanthoxylum gillettii</i>	Bone fracture, rheumatism, diarrhea, gonorrhoea	Decoction of the part of the plant	Oral administration
62	<i>Zanthoxylum zanthoxyloides</i>	Rheumatism, elephantiasis, malaria and sexual impotence	Infusion of the seeds and bark	Oral administration

Table-4 revealed the types of the plant barks used. The stem barks of 23% of the identified species were being used, the root barks of 2% of the identified species was used and both the stem and root barks of 76% of the identified species were being used. The extraction methods utilized in these species were mostly predatory and annihilative. Most of the identified plant species were indigenous, uncultivated with poor regenerative abilities thus confirming the previous assertions of Momma [16], Kayode and Ogunleye [17] that debarking of these species will not guarantee extraction *ad infinitum*. Most of the species were habitat specific, slow growing and destructively harvested for their barks [18]. Previous studies, such as Kayode *et al.*, [7] revealed that these species reproduced poorly and were sparsely populated in the sapling stage.

Table-5 revealed that only 5% of the identified species were very abundant, 37% were abundant, 55% were frequent and 23% of them were rare in the abundance scale used in this study. Thus most of the species were presently scarce in the study area. Field observation revealed that human disturbances on the vegetation of the study area were on the increase due to the explorative activities of the oil companies in the area. Mmom [19] asserted that the Nigerian mangrove has witness serious depletion due to human population, economic activities, social and political factors [13]. Indeed, estimate ranked Nigeria as second among ten countries with highest deforestation rates in the world [20]. The continuous erosion of the vegetation at this rate will endanger some of the identified species in this study. Bisong [21] had earlier predicted that deforestation in the mangrove would lead to species extinction in the region.

This study revealed that *A.boonei*, *C. dependence* and *E. chlorantha* were rare on the abundant scale used in this study. Thus there is the need to conserve them as such will enhance their sustainability and availability for the present and future generations. The respondents were familiar with the rare species hence the examination of the respondents' indigenous knowledge on the species and this revealed that while *A. boonei* and *C. dependence* were trees, *E. chlorantha* was a climber. The indigenous tribal group was familiar with trees as climbers. All of them thrive

well in different vegetations hence they are suitable for cultivation in the study area. They can be propagated from seeds; wildlings of *C. dependence* could also be propagated. Also cuttings of *E. chlorantha* can be propagated. The respondents were familiar with these methods of propagations. Similarly the species have multipurpose utilizations in the study area. These could constitute positive incentives to their domestications in the study area. Previous study by Kayode *et al.*, [15] advocated this position.

Table-4: Types of barks used in the identified plant species in Balyesa Central Zone of Bayelsa State, Nigeria

Bark	Identified Species
Stem Proportion of the identified species: 23%	<i>A.boonei</i> , <i>B. alba</i> , <i>B. buonopozense</i> , <i>E. crassipes</i> , <i>E. guineensis</i> , <i>G. kola</i> , <i>I. aquatica</i> , <i>O. gratissimum</i> , <i>P. guineense</i> , <i>P. macrophylla</i> , <i>P. stratiotes</i> , <i>T. danielli</i> , <i>T. nerifolia</i> , <i>T. occidentalis</i> .
Root Proportion of the identified species: 2%	<i>C. lachrymal</i>
Stem & Root Proportion of the identified species: 76%	<i>A.indica</i> , <i>A. occidentale</i> , <i>A. spinosus</i> , <i>B. oleracea</i> , <i>C. albidum</i> , <i>C. aurantifolia</i> , <i>C. benghalensis</i> , <i>C. odorata</i> , <i>C. papaya</i> , <i>C. sinensis</i> , <i>D. cumminsii</i> , <i>D. scandens</i> , <i>D. trippetala</i> , <i>E. chlorantha</i> , <i>E. senegalensis</i> , <i>G. imperialis</i> , <i>H. brasiliensis</i> , <i>H. medagascariensis</i> , <i>I. gaboneensis</i> , <i>K. ivorensis</i> , <i>K. pinnata</i> , <i>L. alata</i> , <i>L. racemosa</i> , <i>L. siceraria</i> , <i>M. indica</i> , <i>M. koenigii</i> , <i>M. macrophyllum</i> , <i>M. myristica</i> , <i>M. stipulosa</i> , <i>N. biserrata</i> , <i>N. diderrichii</i> , <i>N. laevis</i> , <i>P. africanum</i> , <i>P. guajava</i> , <i>P. maximum</i> , <i>P. oleosa</i> , <i>P. pellucida</i> , <i>S. cordifolia</i> , <i>S. kraussinia</i> , <i>S. mombin</i> , <i>S. vulgare</i> , <i>T. catappa</i> , <i>U. heudelotii</i> , <i>V. amygdalina</i> , <i>X. aethiopica</i> , <i>Z. gillettii</i> , <i>Z. zanthoxyloides</i> .

Table-5: Abundance status of the identified plant species in Bayelsa Central Zone of Bayelsa State, Nigeria

Avialability Status	Identified Species
Very Abundant Proportion of the identified species: 5%	<i>E. guineensis</i> , <i>O. gratissimum</i> , <i>P. maximum</i>
Abundant Proportion of the identified species: 37%	<i>A.occidentale</i> , <i>A. spinosus</i> , <i>C. aurantifolia</i> , <i>C. benghalensis</i> , <i>C. odorata</i> , <i>C. papaya</i> , <i>C. Sinensis</i> , <i>D. trippetala</i> , <i>E. crassipes</i> , <i>I. aquatic</i> , <i>I. gaboneensis</i> , <i>K. pinnata</i> , <i>M. koenigii</i> , <i>N. laevis</i> , <i>P. guajava</i> , <i>P. guineensis</i> , <i>P. pellucida</i> , <i>P. stratiotes</i> , <i>S. cordifolia</i> , <i>S. mombbin</i> , <i>S. vulgare</i> , <i>T. occidentalis</i> , <i>V. amygdalina</i>
Frequent Proportion of the identified species: 55%	<i>A.indica</i> , <i>B. alba</i> , <i>B. buonopozense</i> , <i>B. oleracea</i> , <i>C. albidum</i> , <i>C. lachrymal</i> , <i>D. cumminsii</i> , <i>D. scandens</i> , <i>E. senegalensis</i> , <i>G. imperialis</i> , <i>G. kola</i> , <i>H. brasiliensis</i> , <i>H. medagascariensis</i> , <i>K. ivorensis</i> , <i>L. alata</i> , <i>L. racemosa</i> , <i>L. siceraria</i> , <i>M. indica</i> , <i>M. macrophyllum</i> , <i>M. myristica</i> , <i>M. stipulosa</i> , <i>N. biserrata</i> , <i>N. diderrichii</i> , <i>P. africanum</i> , <i>P. macrophylla</i> , <i>P. oleosa</i> , <i>S. kraussinia</i> , <i>T. catappa</i> , <i>T. danielli</i> , <i>T. nerifolia</i> , <i>U. heudelotii</i> , <i>X. aethiopica</i> , <i>Z. gillettii</i> , <i>Z. zanthoxyloides</i> .
Rare Proportion of the identified species: 3%	<i>A.boonei</i> , <i>C.dependence</i> , <i>E. chlorantha</i>

Table-6: Respondents' indigenous knowledge on identified rare species and their conservation potentials

FEATURE	SPECIES	INDIGINEOUS KNOWLEDGE	CONSERVATION INFERENCE
Habit	<i>A.boonei</i> <i>E. chlorantha</i> <i>C. dependens</i>	Tree Tree Climber	Indigenes are familiar with trees as well climbers
Ecology	<i>A.boonei</i> , <i>C. dependens</i> , <i>E. chlorantha</i>	They grows in the Swamp and riverine forest, semi- deciduous and savanna.	The plant species thrives well in the riverine area
Reproduction	<i>A.boonei</i> <i>C. dependens</i> <i>E. chlorantha</i>	Seeds Wildlings and seeds Stem cuttings and seeds	The indigenes are familiar with planting of the tree through the seeds The indigenes are familiar with propagating the species through the wildlings and seeds They familiar with propagating the species through stem cuttings
Utility	<i>A.boonei</i> <i>C. dependens</i> <i>E. chlorantha</i>	(a). it has medicinal value such as treating malaria, venereal diseases, Rheumatic pains, impotence and asthma (b). the wood is used has firewood (c). The latex coagulate and used to adulterate better rubbers. (d). it also function as a shade tree in the community. (a). The fibrous stem is beaten and used has sponge (b). The wood is used for furniture. (c). the plant serves medicinal purposes such as treating venereal discharges, eye infections, cough, diuretic sprains and bruises. The species serves medicinal purposes to the community such has healing wounds treating malaria, fever, hepatitis, and jaundice.	The indigenes use it frequently to cure malaria, rheumatic pains, venereal diseases and asthma. The indigenes are familiar with their uses The indigenes use these species mostly for medicinal purposes.

CONCLUSION

This study revealed that the use of barks in health maintenance is widely practiced in the study area thus the conservation of the identified plant species would enhance their sustainability and availability for the use of several generations. Hence, there is the need to encourage the dwellers to domesticate some of these species by planting them around their farms, gardens and household areas. Communities should be encouraged to cultivate these species in large number, especially in plantations, so as to make their barks readily available in the study area. It is also expected that their availability will help in the control of numerous diseases in the study area. The enlightenment of the populace, previously advocated by Kayode [22], on the dangers inherent in biodiversity loss is equally relevant.

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