



## Socio- Economic Importance of Mangrove Forests In Akassa Island of Niger Delta, Nigeria

<sup>1</sup>Eleanya, K., <sup>2</sup>Agbeja, B. O. and <sup>3</sup>Ijeomah, H.M.

<sup>1</sup>Department of Forestry and Wildlife Management, Federal University Dutsin-Ma, Katsina State, Nigeria  
kelechieleanya@gmail.com

<sup>2</sup>Department of Forest Resources Management, University of Ibadan, Ibadan, Nigeria

<sup>3</sup>Department of Forestry and Wildlife Management, University of Port Harcourt, Port Harcourt, Nigeria

### Abstract

Mangrove forests are increasingly recognized as crucial ecosystems in sustaining the livelihoods of households, who dwell in and around them; but the roles of the mangrove forest in Akassa island is yet to be ascertained. This study provided a critical assessment of household livelihood opportunities derivable from the Mangrove forest in Akassa in the Niger Delta region of Nigeria. Structured questionnaires were used to gather information from the households. Information from questionnaires were augmented using participatory rural appraisal techniques. Data obtained were analysed descriptive statistics while associations were tested using Chi square. Households from the study area benefit from many livelihood opportunities created by the mangrove forest. Among the livelihood opportunities were speedboat driving, canoe carving, logging/chain saw rental, thatch weaving, periwinkle picking, fuelwood collection and mat weaving. The three highest average source of monthly income values for livelihoods in Naira (₦) were speedboat driving (₦38,952.38), canoe carving (₦36,823.67) and logging/chain saw rental (₦31,075.25) respectively. Weaving of hat was the least contributor (₦3,750) to households' annual income. The trend of mangrove forest exploitation in the study area is unsustainable as indicated by wanton. Awareness should be created on approaches towards adopting sustainable mangrove forest management to ensure sustainable livelihoods in the study area.

**Key words:** Mangrove forests, household livelihoods, Akassa island, Niger Delta

### Introduction

Mangrove forests are increasingly recognized as crucial ecosystems in sustaining the livelihoods of households who dwell within and around them. Mangrove ecosystems are unique, highly productive areas, and important from social, economic and biological points of view (Spalding *et al.*, 2010). Tens of millions of people in the tropics and subtropics depend on mangrove forests for a variety of wood and non wood forest products, as well as other resources such as dyes, medicines, livestock feed and honey. Mangrove forests contribute to livelihoods locally and globally by providing forest resources such as timber, firewood and thatching materials as well as non-timber forest products. Mangrove forests provide possibly the most direct and essential connection between life in the ocean and life on land. Mangrove ecosystems are a very valuable source of timber and income for local communities, and perform valuable protective functions; absorbing the energy from waves and wind as well as regulates the estuarine coastal water quality through sedimentation and nutrient uptake (Gasana *et al.*, 2004). FAO (1992) stated that forests are not only

a source of food for rural people, but they also contribute to food security by supplying raw materials and fuelwood for many income generating activities. For instance rattan, bamboo, fibres and wood are used for furniture and implement – making, and fuelwood is essential for food processing, fish smoking, brick making and brewing beer. Honey production is also an important forest industry in many parts of the world; Indian villagers are thought to produce more than 37,000 tonnes of honey per year, for sale (FAO, 1992).

Mangroves have traditionally been widely used and exploited in the past in many countries where they exist. Knowledge of their current and past condition and uses is essential for forest managers, policy and decision makers (FAO, 1997). The Caribbean Natural Resources Institute, CANARI (2010) reported that people in the Caribbean Islands have made wide use of forest resources for subsistence and commercial purposes. These include uses for edible plant and animal products, animal fodder, medicines/tonics, wood fuel, fencing and construction, implements and tools, and craft materials. Forests also play a key role in Caribbean culture and recreation, as well as in providing ecosystem services such as: soil and water conservation in the watersheds; coastal protection and links with marine ecosystems from mangrove forests; and conservation of biological diversity. According to Arnold *et al.* (2011) forests provide a diversity of healthy foods, high in micronutrients and fibre and low in sodium, refined sugar and fat; these forest products are often culturally valued, integral to local food systems and food sovereignty, and help households fill seasonal and other cyclical food gaps and act as a ‘safety net’ or ‘buffer’ in times of shortages due to drought, crop failure, illness or other kinds of emergency or external shock. Forest products serve as a major source of income for rural households, who use income derived from it to purchase foods or inputs needed for agricultural production. Wells *et al.* (2006) estimated the annual economic value of mangroves as \$200,000-\$900,000 per hectare.

Mangroves act as important filters to purify water and arable land, help prevent coastal degradation and sea grass beds from siltation; act as protective buffers against dangerous storms and wave action, preventing serious land loss, minimize erosion and flooding. They act as carbon sinks and thereby lessen the impact of global warming. Mangrove poles are used for communication lines, foundation piles, local sign posts, the saplings and twigs are used for mud and thatch house construction because the wood is highly resistant to fungi and insect attack. Mangroves also serve as habitat for marine animals, spawning nursery, breeding and feeding ground for fish (Kinako, 1986). According to Nwosu (2005) Nigeria’s mangrove ecosystem is one of the largest and richest biodiversity reserves of the world, it comprises mangrove trees and shrubs, ferns and palms, in addition to a rich faunal diversity including microorganisms, crustaceans, molluscs, amphibians, fishes, reptiles, birds and mammals. It has the highest biodiversity in the sea, contributing about 25% of biological productions, and more than 2,145 species of plants and animals (Oyieke, 1996). No wonder Onofeghera (1986) emphasised that

mangrove swamps have great potentials ranging from swamp rice cultivation, fishing and fish culture, shrimps culture, crabs culture, mangrove oyster culture, wood exploitation, mat and other craft products. The socio-economic activities of mangrove forests such as small scale fisheries can contribute positively to the quality of life of those who depend directly or indirectly on it for part or totality of their livelihoods (Bene, 2006). These activities have a measurable contribution to rural development even beyond the geographical areas within which they are operated. It is vital to study these impacts because of their spread. This study therefore assesses household livelihood opportunities derivable from the Mangrove forest in Akassaisland of the Niger Delta, Nigeria.

## Materials and Methods

### Study Area

Akassa Mangrove forests is located in Bayelsa State in Southern Nigeria. It is geographically on Latitude 04<sup>0</sup> 21' N and Longitude 05<sup>0</sup>59' E. As part of the area known as the Niger Delta Wetlands, they are a component element of the West African sub- region of the Afro-tropical region, and consists of moist tropical lowland alluvial forest (rain forest), much of it seasonal freshwater swamp forest, with the remaining (and largest- proportion of the land) making up part of possibly the largest single remaining area of mangroves (*Rhizophoraracemosa* and *Avicenniaafricana*) swamp left in the world (approximately 4,500 square kilometers) (Weeks and Claude-Eze ,1997).

### Data Collection

Nineteen communities in the Akassa kingdom were purposively selected for the study. Using simple random sampling fifty households were selected from each community, giving a total of 950 households. Access to the study communities was mainly by water transportation to the southernmost tip of the Niger Delta Wetlands in Bayelsa State, Nigeria. Speed boats and wooden boats were employed for movements across the communities at different times depending on the location to be accessed. Structured questionnaires were used to gather information from the households which were complemented within-depth interview of informants knowledgeable about mangrove utilisation in the study area

### Data Analysis

Data collected from the study were analysed using descriptive in the form of tables, graphs, and percentages while Chi-square test was used to determine the relationship between respondents' demographic characteristics and their perceived contribution of forest resources to household annual income. Chi square was calculated as:

$$\chi^2 = \sum \frac{(O_{ij} - E_{ij})^2}{E_{ij}}$$

Where  $\chi^2$  = Chi square value

$\Sigma$  = Sum

$O_{ij}$  = Observed cell frequency

$E_{ij}$  = Expected cell frequency  
Degree of freedom (df) =  $(r-1)(c-1)$   
Where r= number of rows and c= number of columns

## **Results and Discussions**

### **Demographic Characteristics of Respondents**

Demographic characteristics of respondents showed that there were more male headed households than female headed households in the study area (Table 1). This fact is corroborated by findings of earlier studies (FGN, 2007; UNDP, 2006) which stated that there are more male headed households in the Niger Delta area. The prevalent age categories in the study area, (41 and 60 years) and (31 and 40 years) implies that there will likely be an increasing use of forest resources for survival to meet household and family needs. This will continue to grow and thus impact more negatively on Akassa forest resources. This may be related to Shepherd *et al.* (1999) who pointed out that poor people will be faced with diminishing forest resources due to factors such as population growth. The prevalence of households with 6-10 members in the study area is typical of a poor rural community, where literacy level is low, early marriages persistent as family planning is considered an alien culture. Ijeomah and Emodi (2012) obtained a similar result in rural communities bordering Pandam Wildlife Park of Plateau State. This also agrees with the findings of FGN (2007). Most respondents had lived in the community for over ten years and this could directly account for the long relationship the people have built with use of forest and wildlife resources for their sustenance. This agrees with Ijeomah (2012).

### **Main and secondary occupation of respondents**

Most respondents were involved in more than one livelihood activity (Table 2). This fact is consistent with earlier findings (Ellis, 2000; Carney, 1999) that rural people engage in several livelihood activities to earn income for survival. Households use a variety of resources as inputs into their production processes as they attempt to meet and extend their livelihood needs. This agrees with study by IFAD (2001) that the livelihoods of poor rural households are diverse across regions and countries and within countries; and that while some households rely primarily on one type of activity most seek to diversify their livelihood base as a way to reduce risk. The main and secondary occupations of respondents are presented in Table 2.

**Table 1: Demographic characteristics of respondents**

Variables	Frequency	Percentage
<b>SEX</b>		
Female	256	26.95
Male	694	73.05
Total	950	100.0
<b>Age Distribution (years)</b>		
< 40	359	37.79
41-60	550	57.89
Above 60	41	4.32
<b>Total</b>	<b>950</b>	<b>100.0</b>
<b>Marital Status</b>		
Single	15	1.58
Married	927	97.58
Widowed	5	0.52
Divorced	3	0.31
<b>Total</b>	<b>950</b>	<b>100.0</b>
<b>Educational Status</b>		
No formal Education	161	16.95
Primary School	304	32.00
Secondary School	463	48.74
Tertiary Education	22	2.31
<b>Total</b>	<b>950</b>	<b>100.0</b>
<b>Household Size</b>		
1-2	15	1.58
3-5	300	31.58
6-10	623	65.58
11-14	10	1.05
18-30	2	0.21
<b>Total</b>	<b>950</b>	<b>100.0</b>

**Table 2: Respondents main and secondary occupation in the study area**

Type of Occupation	Main Occupation		Secondary Occupation	
	Frequency	Percentage	Frequency	Percentage
Fishing	372	39.15	129	13.57
Trading/ Household Business	138	14.52	83	8.73
Civil service	62	6.52	2	0.21
Fuelwood collection	42	4.42	10	1.05
Fishcard weaving	40	4.21	32	3.36
Motor bike riding	38	4.00	10	1.05
Basket weaving	37	3.89	9	0.94
Logging/ Chain saw rentals	32	3.36	4	0.42
Speed boat driving	23	2.42	6	0.63
Canoe carving	22	2.31	0	0
Farming	17	1.78	6	0.63
Carpentry	17	1.78	1	0.10
Bricklaying/ building	16	1.68	3	0.31
Traditional medicine	15	1.57	0	0
Hunting	15	1.57	0	0
Thatch weaving	12	1.26	7	0.73
Wine tapping	10	1.05	7	0.73
Tailoring	9	0.94	2	0.21
Wood carving	6	0.63	3	0.31
Periwinkle picking	5	0.52	8	0.84
Snail collection	5	0.52	13	1.36
Student	4	0.42	0	0
Timber harvesting	4	0.42	0	0
Saw milling	3	0.32	0	0
Engine fixing	2	0.21	1	0.10
Mat weaving	2	0.21	1	0.10
Hat weaving	1	0.10	2	0.21
Hair dressing	1	0.10	3	0.31
Beekeeping	0	0	0	0
Hired labour	0	0	0	0
Oyster picking	0	0	2	0.21
Carpentry & fishing	0	0	1	0.10
Fishing and snail collection	0	0	2	0.21
Wine tapping & basket weaving	0	0	1	0.10
Civil service and fishing	0	0	1	0.10
Brick laying & fishing	0	0	1	0.10
Thatch weaving & fishing	0	0	1	0.10
Trading and thatch weaving	0	0	1	0.10

**Table 3: Average monthly income from household livelihood activities in the study area**

<b>Livelihood activity</b>	<b>Average monthly income in Naira (₦)</b>
Speed boat driving	38,952.38
Canoe carving	36,823.67
Logging/ Chain saw rentals	31,075.25
Timber harvesting	27,525.25
Bricklaying / building	24,801.58
Fishing	22,703.92
Sawmilling	22,404.76
Civil service	21,764.10
Traditional medicine/ healer	20,694.44
Trading	20,555.21
Carpentry	18,859.65
Wood carving	18,125
Hair dressing	16,400
Fuelwood collection	15,925.92
Motorbike riding	15,621.52
Basket weaving	12,693.33
Engine fixing	11,666.67
Fish card weaving	10,478.26
Tailoring/ Dressmaking	9,880.95
Thatch weaving	9,190.48
Farming	7,539.68
Oyster picking	6,041.67
Wine tapping	5,728.07
Hunting	5,447.36
Mat weaving	4,777.70
Periwinkle picking	4,463.54
Snail collection	4,462.12
Hat weaving	3,750

**Contribution of forest resources to annual income**

There is no doubt that forests contribute directly and indirectly to livelihoods of people living in and around forests and even beyond. Some of the respondents’ main livelihood activities may not have been primarily based on extraction of forest resources; however, they all depend on forest resources for fuelwood, spices, medicine, wood and thatch for construction of houses. This confirms (Falconer and

Arnold, 1991)'s view that forest resources contribute to household food security, by supplying fuelwood, food, medicine, meat and other useful plants. According to table 3, the three highest average monthly income values for livelihoods in Naira (₦) were speedboat driving (₦38,952.38), canoe carving (₦36,823.67) and logging/chain saw rental (₦31,075.25) respectively. Local women have free access to an array of natural fibres and mangroves that they exploit for basketry, weaving and fuelwood used for cooking and fish drying. Activities of men and women differ within the forest, while males are involved in logging activities by the use of chain saw, more women engage in snail picking and collection of rattan for basket weaving and fish card weaving. This confirms the role rattan industry plays as a major source of income for both rural and urban livelihoods (Falconer, 1994; Townson, 1995). Men also use wood for canoe paddle carving.

**Table 3: Average monthly income from household livelihood activities in the study area**

<b>Livelihood activity</b>	<b>Average monthly income in Naira(₦)</b>
Carpentry	18,859.65
Timber harvesting	27,525.25
Saw milling	22,404.76
Wine tapping	5,728.07
Farming	7,539.68
Logging/ Chain saw rentals	31,075.25
Canoe carving	36,823.67
Basket weaving	12,693.33
Fish card weaving	10,478.26
Hunting	5,447.36
Snail collection	4,462.12
Traditional medicine	20,694.44
Fishing	22,703.92
Trading	20,555.21
Civil service	21,764.10
Bricklaying/ builder	24,801.58
Tailoring/ Dressmaking	9,880.95
Hair dressing	16,400
Engine fixing	11,666.67
Speedboat driving	38,952.38
Oyster picking	6,041.67
Periwinkle picking	4,463.54
Motorbike riding	15,621.52
Fuelwood collection	15,925.92
Wood carving	18,125
Mat weaving	4,777.7
Hat weaving	3,750
Thatch weaving	9,190.48

Chi square tests showed that the location in terms of community, nativity (being an indigene or non indigene), sex, as marital status, educational status, length of stay in the community and access to land affects the contribution of forest resources to households' annual income (Table 4).

**Table 4: Results of Chi Square test of respondents' demographic characteristics on contribution of forest resources to household annual income**

Variables	df	Chi square Cal.	Chi Square Tab
<b>Remark</b>			
Sex	1	42.373	3.841
Sig.			
Age	2	2.445	5.991
Sig.			
Marital Status	3	2.906	7.815
Sig.			
Educational Status	3	3.688	7.815
Sig.			
Nativity	1	0.1159	3.841
Sig.			
Length of stay	2	2.550	5.991
Sig.			
Location	18	65.25342	28.869
Sig.			
Access to land	1	0.006	3.841
Sig.			

\* Significant (p < 0.05).

### Conclusion

People's survival still depends largely on the use of forest resources in the study area. Households are involved in many activities that require either forest products as raw materials or that are forest- based. These include logging or chain saw rental, canoe carving, basket weaving, fishcard weaving, hunting, snail collection, crab collection, traditional medicine, fishing, trading or business, fuelwood harvesting and collection of sharp sand. The forests which have been a major support of households are currently under serious threats of over exploitation aggravate by deforestation.

Devising a means for sustainable use of mangrove forest resources is therefore very necessary in order to secure the livelihoods of many forest dependent people. This move will also impact positively on maintaining the ecological and economic potentials of the Akassa mangrove forests, in the southernmost tip of Nigeria's Niger Delta wetlands.

## References

- Arnold, M., Powell, B., Shanley, P and Sunderland, T.C.H. (2011). Forests, biodiversity and food security. *International Forestry Review* 13(3) 1-3.
- Bene, C. (2006). Small scale fisheries: assessing their contributions to rural livelihoods in developing countries. FAO fisheries circular No. 1008 (available at <ftp://ftp.fao.org/docrep/fao/009/j7551e/j7551e00.pdf>) sourced 24/08/2012
- Carney, D. I. (1999). Approaches to sustainable livelihoods for the rural poor. ODI Poverty briefing, London, Pp.2.
- Caribbean Natural Resources Institute- CANARI (2010). Assessing the impacts of climate change on community- based sustainable use of forest resources in the Caribbean. Final project report to the United Nations Development Programme, Barbados and OECS. Pp. 5.
- Ellis, F. (2000). *Rural livelihoods and diversity in developing countries*. Oxford University Press.
- Falconer, J. and Arnold, J.E.M. (1991) Household Food Security and Forestry: An Analysis of Socio-Economic Issues. Pp. 11- 25.
- Falconer, J. (1994). Non-timber forest products in Southern Ghana. Main report, Natural Resource Institute/ Overseas Development Administration.
- FAO. (1992). *Forest, trees and food*. FAO, Rome, Pp. 7-10.
- FAO (1997). World Mangroves: 1980 – 2005 FAO Forestry Paper 153. Food and Agricultural Organization of the United Nations, Rome, Italy.
- FGN. (2007). Niger Delta regional master plan. Federal Government of Nigeria. Available at <http://www.nddc.gov.ng/NDRMP%20Chapter%201.pdf>. Accessed: 16/09/2012
- Gasana, J.K. and Borobia, M. (2004). ITTO projects in Columbia,, Panama, Thailand, India and Japan: the course of mangrove conservation and sustainable management. *Tropical Forest Update* 14(4):14.
- IFAD (2001). *Rural poverty report: The challenge of Ending Rural Poverty, International Fund for Agricultural Development*. Oxford University Press. Pp.2-45.
- Ijeomah, H.M. (2012). Challenges of Game Reserves in Nigeria: A Case Study of Pai River Wildlife Park of Plateau State, Nigeria In: Ijeomah, H.M. and Aiyeloja, A.A. (eds.). *Challenges to Sustainable Production in Agriculture and the Environment: Nigeria in Perspective*. TopBase Nigeria Limited, Lagos, in Conjunction with Green Canopy Consultants, Port Harcourt, Rivers State.
- Ijeomah, H.M. and Emodi, I.A. (2012). Socioeconomic Characteristics and Needs Assessment of Households Adjoining Ecotourism Centres in Plateau State,

- Nigeria. *Nigerian Journal of Agriculture, Food and Environment* 8(4): 16 – 25, <http://www.agri.ruh.ac.lk/tare/Online.htm>
- Kinako, P.D.S. (1986). Structure and functions of Nigerian Wetland Ecosystems(Pp. 48-50). In: Akpata, T.V.I and Okali, D.U.U. Eds.NigerianWetlands.MAB,UNESCO.
- Nwosu, F.M. (2005). An overview of Nigeria’s mangrove ecosystem: problem and prospects. Pp. 4
- Onofeghara, F.A. (1986). Nigerian Wetlands: An overview(Pp. 14-22).In: AkpataT.V.I andOkali D.U.U Eds. Nigerian wetlands: Man and biosphere national committee, Nigeria.
- Oyieke, H.A. (1996). The impact of coastal changes on biological resources of Kenyan coastal waters.UNESCO 1996.Assessed 17/08/2012.
- Spalding, M., Kainuma, M., and Collins, L. (2010).World Atlas of Mangroves. Earth Scan,London. Pp. 1-257.
- Townson, I.M.(1995). Incomes from non-timber forest products in Southern Ghana. Main report.National resource Institute/Overseas Development Administration.
- United Nations Development Programme UNDP.2006. Niger Delta Human Development Report Available at <http://www.ng.undp.org/publications/nigeria-delta-hdr.pdf>. sourced. 05/12/2008
- Weeks, M., and Claude-Eze, J. (1997). The forest of Akassa: An Interim report submitted to the Akassa Community Development Project. Pp 4-9.
- Wells, S. C. Ravalous, E., Corcoran,(2006). In the frontline: shoreline protection and other ecosystem services from mangrove and coral reefs. United Nations Programme World Conservation Monitoring Centre, Cambridge.Pp. 33.