

UTILIZATION OF MANGROVE FOREST RESOURCES FOR HUMAN LIVELIHOODS IN UZERE, DELTA STATE, NIGERIA

Ogeh, K. T., Jimoh, S. O. and Ajewole, O. I.
Department of Forest Resources Management
University of Ibadan, Ibadan, Nigeria

Abstract

The study was carried out to assess the various ways Uzere mangrove forest is utilized by the forest edge communities. Data were obtained from 300 residents within the three communities in Uzere Kingdom using systematic random sampling. The study employed questionnaires to elicit information on the uses of the mangrove forest, the socio-economic factors that influence uses. Data obtained were analysed using simple statistics and correlation analysis. All the respondents use the forest for various livelihood activities. These include: logging (5.3%), farming (49.7%), fuel wood gathering (18.3%), fruits gathering (1.0%), hunting (6.0%), fish farming (6.3%), palm wine tapping (0.7%), seeds (0.3%) and medicinal plants (2.7%) collections. Gender and years of residence are the only socio-economic variables that significantly influenced the uses of Uzere mangrove forest. About 70% of the respondents market the products from the mangrove forest as a source of income. The mean annual earnings from mangrove resources marketing is ₦2,920,514.51 (US\$19,470.00). The mangrove forest contributes significantly to human livelihoods in the study area. There is a need for sustainable management of the mangrove forest and valuation of forest goods as a means of preventing forest degradation and deforestation.

Keywords: Utilization, Livelihoods, Resources and Mangrove Forest.
*ogehkesienatina@yahoo.com

Introduction

Forests are one of the most important natural resources and assets for the rural poor to sustain their livelihoods (Nurse and Malla, 2005). An extensive mangrove forest vegetation is found in the Niger Delta area of Nigeria which support the largest area of mangrove occurrence in Africa (Abere and Ekeke, 2011). They are unique ecosystems which combine land, water, trees, animals and humans to provide multiple goods and services (Samina, 1999). Some of these goods and services are sold in markets where they have observable prices; others are consumed only at domestic level.

Mangroves are vital to subsistence economies and provide a commercial base to local and national economies (Patrik, 1999). Mangrove ecosystems are an important source of valuable resources such as timber, fuel wood, charcoals and non-wood forest products (NTFPs) such as food, palm wine, alcohol, medicine, honey, tannin as raw materials in commercial quantities essential for the livelihood and survival of indigenous coastal people (International Union for Conservation of Nature, 2005).

The full value of mangrove products to the local people is not easily recognised, and is, therefore, often neglected in development planning (Frank and Pieter, 1997). As a result, it is often concluded that mangrove forests should be converted to large scale development activities, such as agriculture, aquaculture, salt extraction and infrastructure which generate directly marketable products (Barbier, 1994 and Polidoro *et al.*, 2010). The undervaluation of natural products and ecological services generated by mangrove ecosystems is a major driving force behind the conversion of these systems into alternative uses (Patrik, 1999). Valuation offer a more comprehensive assessment of the many goods and services provided by mangrove ecosystems, and hence may contribute to more informed decision-making and sustainability of the mangrove forests (Frank and Pieter, 1997). Valuating the contributions of mangrove forest to rural livelihoods is important in order to ensure the sustainability of the mangrove ecosystem. There is need for the provision of baseline information on the livelihoods potentials of the Uzere Mangrove Forest in order to ensure sustainable planning and management for the forest. The main objective of this study was to evaluate the contributions of the Uzere mangrove forest to community livelihoods with a view to highlighting its socio-economic significance; thereby garnering supports for its sustainable management.

The Study Area

Uzere Kingdom is located in Isoko South Local Government Area of Delta State, Nigeria. It comprised three communities including: Ezede, Uheri and Uweye. The three communities jointly have a projected population of 18,493 projected in the 1996 Nigerian National Population Census ((NPC, 1996). Uzere lies between latitude $5^{\circ} 33^1$ and $5^{\circ} 37^1$ N and longitude $6^{\circ} 20^1$ and $6^{\circ} 26^1$ E, with a total land area of 20.042km² (Figure 1).

The area is flooded yearly from July to October. The water transports the fishes and the aquatic organisms from the mangrove to the creek where they are caught by fishermen. The water is also used by loggers as a means for transporting logs from the mangrove forest to the roadside. Harvesting of farm produce is done at this period and these are transported from the forest to the roadside by boats. The farm produce are harvested before maturity in order to avoid losses to flood. Planting of crops is done when the flood recedes between November and December and harvesting starts with the onset of the flood from July to October.

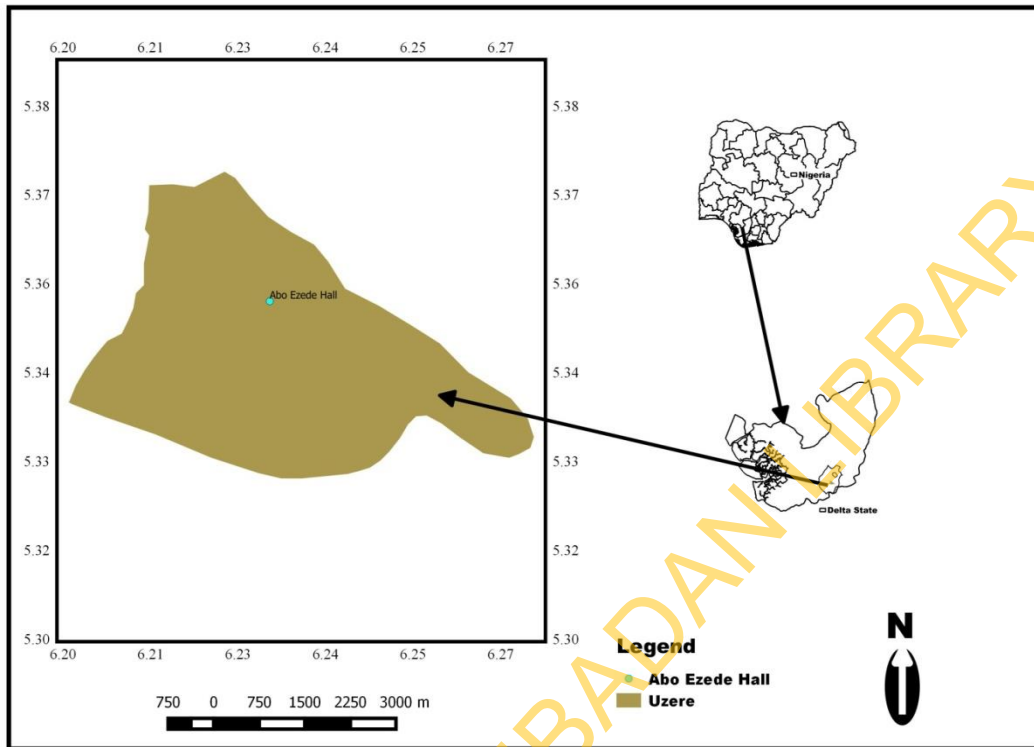


Figure 1: Map of Delta State, Nigeria showing the study area.

Data Collection and Analysis

Sampling procedure

Systematic sampling was adopted to collect the primary data. Thus, every fifth household were selected and questionnaires were administered to each of the selected households. With this, 20% sampling intensity was used at household level.

Data Collection

The data used in this study were obtained in 2014 through a structured questionnaire survey of 300 residents in the three communities. In addition, Focus Group Discussions were held with target groups. The questionnaire was designed to elicit information on respondents' utilization of the mangrove forest in Uzere and its contributions to household income. Data were also collected on respondents' socio-economic background. The 300 questionnaires were successfully retrieved.

Analytical Techniques

The data were subjected to descriptive statistical tools such as frequency distribution, percentages, mean and tabular analysis, to give insight of the mangrove forest uses, the estimate value of goods from the mangrove forest and correlation analysis was also employed to test socio-economic factors that influence the uses of the mangrove forest by the respondents. The population of the study area was projected from the 1996 National Census figures using the formula below:

$$P_x = P_o (1+r)^n \dots\dots\dots \text{Equation (1)}$$

Where, P_x = p estimate, P_o = base year population of the study area, r = population growth rate and n = number of years in between.

Results and Discussion

Uses of the Mangrove Forest by Respondents

The result in Table 1 showed that all the respondents (100%) use the mangrove forest for one purpose or the other. Over five percent (5.3%) of the respondents use the forest for timber production, about fifty percent (49.7%) farm in the forest. 18.3% gather fuel wood. One percent (1.0%) gather fruits, 6.0% hunt, 6.3% are engaged in fish farming, 2.7% harvest medicinal plants, 9.7% are engaged in fishing, 0.7% in palm wine tapping and 0.3% harvest seeds.

The implication of the above is that the mangrove forest provides important livelihood support for the communities in the study area. However, the high farming intensity in the mangrove could lead to deforestation since a lot of trees are felled during farmland preparation. The percentage of fuel wood gathering is also high, and this could also lead to deforestation.

According to Ekeke (2013), pressures resulting from population growth, improved technology in resource exploitation and utilization, economic development and urban expansion seemed to be seriously impacting the mangrove ecosystem. Okpiliya *et al.* (2013) also observed that mangrove exploitation will continue unabated as long as there is generally lack of forest management plan as well as non enforced regulatory and monitoring mechanisms to carry out effective mangrove regeneration and conservation programme. Therefore, there is a need for sustainable management of the mangrove forest to meet the present and future needs of the coastal communities.

Table 1: Distribution of Respondents on the Uses of the Mangrove Forest

Uses	Frequency	Percentage (%)
Logging	16	5.3
Farming	149	49.7
Gathering fuel-wood	55	18.3
Gathering fruits	3	1.0
Hunting	18	6.0
Fish farming	19	6.3
Gathering medicinal plants	8	2.7
Fishing	29	9.7
Palm wine tapping	2	0.7
Gathering seeds	1	0.3
Total	300	100

Estimated Value of the Products Derived from Uzere Mangrove Forest

Four percent of the respondents derived an average of ₦13,420,000 (US\$89,467.00) annually from the marketing of mangrove forest-based construction/building materials (Table 2); About thirty two percent (31.7%) derived an average of ₦18,977,000 (US\$126,513.33) annually from marketing of farm produce, 1.3% derived an average of ₦156,000 (US\$1,040.00) from fruits marketing, 4.3% derived an annual average of ₦10,879,200 (US\$72,528.00) from bush meat marketing. Fish marketing generated an annual average of ₦11,963,000 (US\$79,753.33) for about 16% of the respondents engaged in the business. 9.0% Fuel wood marketing generated an annual average of ₦8,025,000 (US\$53,500.00) for about 9.0% of the respondents, 3.0% medicinal plants marketing derived an annual average of ₦502,000 (US\$3,347.00) while 0.7% palm wine marketing derived an annual average of ₦888,000 (US\$5,920.00).

70% of the respondents engaged in marketing of the mangrove forest and agro-forestry produce from within and around the mangrove forest obtained an annual average of ₦238,000 (US\$1,587.00) and ₦11,744,000 (US\$78,293.33). The total revenue generated from the marketing of products derived from the mangrove forest is sixty four million, eight hundred and ten thousand, two hundred naira (₦64,810,200) (US\$432,068.00) in 2014 with a mean annual value of ₦2,920,514.51 (US\$19,470.00).

Popoola (1995) submitted that the price and or value of forest will take adequate care of the basic conservation themes which include resources scarcity, ecological balance, quality of life and wasteful and destructive use of the forests. Therefore, valuing the contributions of the mangrove forest to community livelihoods is important to prevent deforestation and loss of economic value.

Table 2: Estimated Mean Values (₦) of the Contributions of the Mangrove Forest to Households in the Study Area

Products	Mean	Minimum	Maximum	Sum	Total No.	%
Construction/Building materials	1,032,307	50,000	4,320,000	13,420,000	12	4.0
Farm produce	210,855.56	6,000	2,160,000	18,977,000	95	31.7
Fruits	39,000	6,000	80,000	156,000	4	1.3
Bush meat	679,950,000	24,000	1,680,000	10,879,200	13	4.3
Fish	217,509	15,000	1,176,000	11,963,000	48	16.0
Fuel-wood	382,142.86	12,000	1,680,000	8,025,000	27	9.0
Medicinal plants	62,750	5,000	168,000	502,000	9	3.0
Palm wine	296,000	120,000	480,000	888,000	2	0.7
Total	2,920,514.51	238,000	11,744,000	64,810,200	210	69.9

Note: US\$1 = ₦150

Socio-Economic Factors Affecting Respondents Dependence on Mangrove Forest for Livelihood

Gender and years of residence are the socio-economic factors that influenced the mangrove forest uses (Table 3). Gender has significant negative relationship ($r = -0.27$) on mangrove forest uses. This is due to the fact that women are restricted from entering certain areas of the mangrove forest for cultural reasons. This was similar to the findings of Jimoh *et al.* (2012) in Urban Cross Sector of Cross River National Park, Nigeria which reported that women are restricted from entering certain areas of the forest, they are also forbidden to eat and see certain animals during pregnancy, the men are also forbidden to hunt certain animals in the forest when their wives are pregnant. There is access restriction to strangers from entering the Mgbe forest among the Ejaghams.

There is a significant positive relationship ($r = 0.14$) between years of residence and mangrove uses. This implies that people who have stayed for a long period in the study area still depend highly on the mangrove forest for livelihood sustenance. It is expected

that the longer a person in an environment, he/she becomes commercially stable and depend less on common goods. The strangers in an environment are not expected to have equal access to the resources of the mangrove forest like the indigenes.

This finding is very important to sustainable management of the mangrove forest because there is restriction of access to certain areas of the mangrove forest. This agreed with Walter (1978) that forest maybe zoned into special interest areas (such as historical sites, waterfalls and small lakes) and generalized access areas (such as hiking ground, fishing, hunting, environmental quality and wood) for sustainable forest management. The introduction of zoning system with access arrangements is of great importance in the sustainable management of the mangrove forests.

Table 3: Correlation Matrix for Independent Variables

Gender	Age	Marriage	Years of		Household		Mangrove			
			Education	Origin	Residence	Occupation	Size	Income	Uses	
Gender	1									
Age	0.71	1								
Marriage	0.25**	0.58**	1							
Education	-0.27**	-0.20**	-0.22**	1						
Origin	-0.04	0.06	-0.01	0.058	1					
Years of Residence	0.03	0.46**	0.39*	-0.27**	-0.44**	1				
Occupation	-0.14*	0.07	0.07	0.32**	0.03	0.06	1			
Household size	0.17**	0.42**	0.26**	-0.10	-0.11	0.31**	0.02	1		
Income	0.10	0.17*	0.09	0.21*	0.10	0.07	0.24**	0.18*	1	
Mangrove uses	-0.27**	-0.02	-0.02	-0.06	-0.01	0.14*	-0.11	0.04	-0.14	1

** Correlation is significant at p = 0.01 level

* Correlation is significant at p = 0.05 level

Conclusion

The study has established the various ways the mangrove forest is utilized and placed value on the contributions of the mangrove forest to rural livelihoods. Decision makers can use the information in making choices among alternative uses of the mangrove forest land that meet the needs of the various user groups. The Delta State Government is advised to partner with the Uzere communities to put in place sustainable management programme for Uzere Mangrove Forest.

References

- Abere, S.A and Ekeke B.A. 2011. The Nigerian Mangrove and Wildlife Development. *Proceedings of the 1st International Technology, Education and Environment Conference* (c) African Society for Scientific Research (ASSR). 824-834.
- Barbier, E.B. 1994. Valuing Environmental Functions: Tropical Wetlands. *Land Economics*. 70:155-173.
- Ekeke, B.A. 2013. Analysis of the Rate of Change of Mangrove Forest Ecosystem. *Nigeria Journal of Environment and Earth Science*. www. iiste. Org. ISSN 2224 3216 (Paper) ISSN 225-0948 (online). 3(7):78.
- Frank, S. and Pieter, van Beukering. 1997. Economic Valuation of Mangrove Ecosystems: Potential and Limitations. Collaborative Research in the Economics of Environment and Development (CREED). Working Paper Number 14.1-62.
- International Union for Conservation of Nature (IUCN). 2005. Ecological and Socio Economic Values of Mangrove Ecosystems in Tsunami Affected Areas: Rapid Ecological-Economic-Livelihood Assessment of Ban Naca and Ban Bangman in Ranong Province, Thailand, p. 34.
- Jimoh, S.O., Emmanuel, T.I., Abideen, A.A., Emeka, E.O and Adesoji, A.A. 2012. The Role of Traditional Laws and Taboos in Wildlife Conservation in the Oban Hill Sector of Cross River National Park, Nigeria. *Journal of Human Ecology*. 39(3):209-219.
- National Population Commission (NPC). 1996. Isoko South Local Government Office, Oleh, Delta State.
- Nurse, M. and Malla, Y. 2005. Advances in Community Forestry in Asia. Regional Community Forestry Training Center for Asia and the Pacific Bangkok, Thailand. Retrieved on 7th July, 2014 from <http://www.recoftc.org>. 1-10.
- Okpiliya, F.I., Effiong, E.B., Imoke, I and Eja Eja, I. 2013. Mangrove Forest Ecosystem Utilization and Depletion: Implication for Occupational Changes in Calabar South, Nigeria. *European Journal of Sustainable Development*. ISSN: 2239-5938. 2 (1):149-162.
- Patrik, R. 1999. The Ecological Basis for Economic Value of Seafood Production Supported by Mangrove Ecosystems. *Ecological Economics*, 29:235-252.
- Polidoro, B., Carpenter, K., Collins, L., Duke, N and Ellison, A. 2010. The Loss of Species: Mangrove Extinction Risk and Geographic Areas of Global Concern. *Peer-Reviewed Open Access Journal*. 5(4):1-10.
- Popoola, L. 1995. Valuation of Tropical Forest Resources. Proceedings of UNEP/CIFOR Conference on Intergenerational Maintenance held at FORIG. Kumasi, Ghana. 72-87.
- Samina, K. 1999. Economic Valuation of the Mangrove Ecosystem along the Karachi Coastal Areas. The Economic Value of Environment: Cases from South Asia. Applied Economics Research Institute, Karachi. Published by International Union for Conservation of Nature (IUCN). 1-11.
- Walter, G.R. 1978. Market Methods of Multiple Use Reconciliation. *Journal of Environmental Management*. 13:291-296.