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CONTRIBUTION OF SUPPORT ZONE COMMUNITY FORESTS TO LOCAL LIVELIHOOD IN OBAN DIVISION OF CROSS RIVER NATIONAL PARK, NIGERIA

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ABSTRACT

The extents to which community forests contribute to local livelihood in the Support Zones Communities (SZC) of Cross River National Park (CRNP) were explored in this study. Fields survey was conducted in eleven (11) Support Zone villages through questionnaire administration, Focus Group Discussion (FGD) and direct observation to identify provisioning and cultural resources of economic values in the selected community forests were adopted A sample size of 377 respondents was randomly selected. Descriptive and inferential (t-test) statistics were used for data analysis. Result from the study showed that majority of the respondents were men, married, age group distribution was between 21-40 years old, high percentage attained primary and secondary school levels and household sizes were between 1-5 and 6-10. Local residents' main livelihood activities were farming and highest monthly income earning range between 10,000 and 50,000 naira. The community forest provided provisioning services in form of wild plants (food/vegetables), wild animals (bush meat), water (stream, river), fish, timber products (construction and craft materials, medicinal plants, cultivated plants) and Cultural services (spiritual and tourism values). Ecosystem economic activities has improved the living condition of residents by meeting their basic household needs, paying their children school fees, food availability, access to medicinal plants that has improved their health condition as well as employment opportunities. However, over-exploitation, forest degradation, conflict and seasonal variation were some problems of ecosystem dependent livelihood. Provisioning and cultural services between Oban East and West community forests were significantly different. Sensitization on sustainable utilization of the forest resources is essential to enhance continued ecosystem services provision for residents in the support zone communities.

Keywords: ecosystem, provisioning, cultural, livelihood, forest.

INTRODUCTION

Ecosystem services are the conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfil human life. These services are crucial to sustaining human wellbeing (Wilson *et al*., 2002). They maintain biodiversity and the production of ecosystem goods, such as seafood, forage timber, biomass fuels, natural fiber, and many pharmaceuticals, industrial products, and their precursors (Daily *et al*., 1997). Human therefore rely on these natural resources base for survival as well as for higher degree of well-being (Turner and Daily, 2008). The ecosystem services include provisioning, regulating, supporting and cultural services. Local people often rely on products, services, or land from nearby natural areas to meet their livelihood needs. Their use constitutes one demand on biological resources of these areas (Salafsky and Wollenberg 2000).

In developing countries, majority of population depends on traditional energy sources such as firewood and charcoal, subsistence farming, generally free-ranging livestock and the products harvested from the surrounding natural resources (Petheram *et al*., 2006). For millions household in these region daily depend on free access of available resources around them for subsistence and also as a source of income, thus offers the only option for survival (Petheram *et al*., 2006). With growing recognition of the importance of biodiversity in providing these services, biodiversity conservation activities are often justified as being beneficial to people (Mooney, 2010; Mace *et al*., 2012). Protected areas are increasingly being managed for conservation purposes to deliver continuous ecosystem service flows from ecosystems to beneficiaries (Egoh *et al*., 2007; Ten 2011). Accordingly, the concept of ecosystem services can be applied not only as a new way to justify conservation but also as a tool for delivering ecosystem service flows fairly (Tallis *et al*., 2008; Mooney 2010).

The forest in Cross River National Park, Nigeria remains largely untouched in the less accessible areas, but around the margins it has been considerably affected by human activity. In some places, secondary regrowth has occurred, but other areas contain plantations of oil-palm and rubber. Illegal logging is a serious threat, and has been increasing. The population of villages in the buffer zone is growing, and farmers are starting to encroach. Levels of hunting, fishing and transitory cultivation are increasing, and damaging the ecosystem. Chemicals used for fishing have affected fish stocks (Birdlife International, 2010). Local people around the protected areas are blunt and unknowledgeable about ecosystem services

and sustainable use of these services. However, these services are increasingly threatened by human activities (MEA, 2005). Unknowingly these people continue to destroy and use the resources unsustainably as a revenge to protected areas for being restricted and limited in the use and accessibility of the natural resources found within it. Taking into consideration the current threats to natural resources in this biodiversity hotspot, the community forest around the park is considered a viable option to provide livelihood support for residents in the park Support Zone Communities. It is therefore essential to understand ecosystem service flows from the local perspective.

Community forestry is referred to as the management of forestlands and natural resources by local people, for commercial and non-commercial purposes (RECOFTC, 2004). It is divided into two. (i) the use of forest resources by local people, on an individual or household basis, for consumption and sale; and (ii) the community management of forests, which refers to a collaborative enterprise conducted by a group of local people who manage forest either independently or with outside support for the production of resources for consumption and sale. It is thus critical to evaluate the extent to which the current conservation strategies capture ecosystem services, in order to ensure their provision in the future.

METHODOLOGY

The Study Area

Cross River National Park was established by Federal Government in 1991 with the Cross River Gorilla chosen as the theme animal. The park is located in Cross River State of Nigeria, straddling two non-contiguous ecological divisions (Oban and Okwangwo divisions), and occupying a total land area of about 4,424 sq. km. The Oban Division is in the southern part of Cross River State, covering an area of about 3,424 sq km within the Cross River loop, and sharing a common boundary with the Korup National Park in Cameroon. The Okwangwo Division occupies about 1,000 sq. km, lies in the north of Cross River State, and shares a common boundary with the Takamanda Forest Reserve in Cameroon (Figure 1). The creation of CRNP culminated in 105 Support Zone Villages (39 in Oban Division and 66 in Okwangwo Division) being stripped of their rights to use ‘their forest’ for various activities, including hunting?? and gathering (Oliver and Enuoh 2014).The study focused on the provisioning/ cultural services and was limited to the community forests in Oban division of the park, which has Oban East and West sectors.

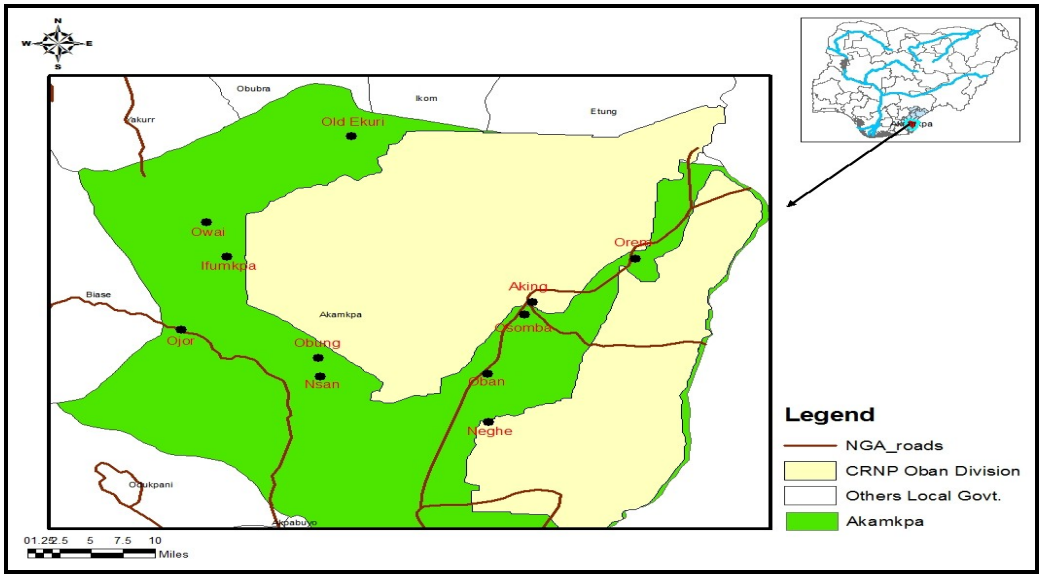

Figure 1: The Map of Cross River National Park showing the selected Support Zone Communities in Oban Division.

Data Collection

This study made use of primary and secondary data. The primary data were obtained through the use of questionnaires administered to residents of the support zone community with community forests as well as focused group discussion with community leaders, hunters, farmers, fishermen and the youth to elicit information on the main uses and users of the ecosystem provisioning and cultural services, as well as the contribution to their livelihood. The secondary data obtained from the management of Cross River National Park include information on support zone with community forest. Resources of economic values (fauna, flora and cultural) were identified in the community forests.

Sample Technique and Sample Size

There are 39 support zone communities in Oban Division of Cross River National Park. Nine (9) villages with community forest in Oban East and 11 villages in Oban West. A 50% sampling fraction was used to select community forest to be sampled in each division. Eleven (11) villages with communities' forests namely Oban, Aking Neghe, Orem, Osomba, Ifumkpa, Obung, Nsan, Owai, Ojor and Old Ekuri within the distance of 0 – 5km to the community forests were selected through a simple random sampling technique for the study. A sample size of 377 respondents were randomly selected for questionnaire administration

from 20,590 total populations of all the selected communities using the published table of (Krejcie and Morgan, 1970) as shown in Table 1. Data obtained were subjected to descriptive (percentages, charts) and inferential (Independent-samples t-test) analysis.

Table 1: Population of villages/communities Selected for the study

Study Area		Year 1991	Year 1996 Projection (3.0%)	Year 2016 Projection (3.0%)	Sample size
OBAN EAST	Oban	1574	1810	2896	53
	Aking	829	953	1525	28
	Neghe	421	484	774	14
	Orem	415	428	685	13
	Osomba	710	817	1307	24
OBAN WEST	Ifumkpa	1184	1362	2179	40
	Obung	1910	2196	3514	63
	Nsan	1678	1930	3088	57
	Owai	1215	1397	2235	41
	Ojor	563	614	982	18
	Old Ekuri	763	878	1405	26
	Total			**20590**	**377**

Source: Adopted and modified from National Population Commission Census Result of 1991.

RESULTS

Socio-Demographic Characteristic of Respondents in the Support Zone Community of Cross River National Park

The socio-demographic profiles of the respondents in Table 2 revealed 57.6% male and 42.4% female in Oban West while 62.0% and 38.0% were male and female respectively, in Oban West. The age distribution reveals that in Oban East, only 3.8% falls between age distribution of less than 20years, 20.5% of the respondents were between 21-30 years, 31-40 years respectively, 15% were between 41-50 years, 19.7% were 51-60years, and also 20.5% were above 60 years, whereas in Oban West, 13.5% were less than 20years, 35.9% were between 21-30 years, 21.2% were 31-40 years, 11.4% fall between 41-50 years, 9.8% were 51-60 years and only 8.2% were above 60 years. Also 17.4% were single, 65.2% of the respondents were married and 17.4% widow/widower in Oban East, while in Oban West, 30.6% were single, 62.5% were married, while only 6.9% were widow/widower. Educational level of respondents in Oban East reveals that 23.5% had no formal education, 35.6% had primary school education, 28.0% had secondary school level education and 12.9% had Tertiary level of education. Whereas in Oban West respondents show that 17.1% had no

formal education, 29.8% had primary school leaving certificate, 34.7% have Secondary school education and 18.4% had tertiary educational level.

Household size was highest (39.4%) between 6 and10 in Oban East and family size of between 1 and5 had 42.1% respondents in Oban West. Also, 54.5% were farmers, 15.9% were students, 14.4% were Business owners while 11.4% were civil servant and only 3.8% were traders in Oban East, whereas in Oban West, 45.3% were farmer, 19.6% were student, 16.3% were business owners while 9.8% were trader and only 9% were civil servant. Moreover, 90.9% and 77.6% have been residents of Oban East and West communities for over 10 years.

Table 2: Socio-Demographic Characteristic of the Respondents in the Support zone Community of Cross River National Park.

Variable	**Oban East**		**Oban West**	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Gender				
Male	76	57.6	152	62
Female	56	42.4	93	38
Age(Years)				
<20	5	3.8	33	13.5
21-30	27	20.5	88	35.9
31-40	27	20.5	52	21.2
41-50	20	15	28	11.4
51-60	26	19.7	24	9.8
above60	27	20.5	20	8.2
Marital Status				
Single	23	17.4	75	30.6
Married	86	65.2	153	62.5
Widow/widower	23	17.4	17	6.9
Educational Level				
No Formal Education	31	23.5	42	17.1
Primary	47	35.6	73	29.8
Secondary	37	28	85	34.7
Tertiary	17	12.9	45	18.4
House Hold Size				
1-5	24	18.2	101	42.1
6-10	52	39.4	84	35.0

11-15	41	31.1	35	14.6
above15	15	11.4	20	8.3
Occupation				
Farmer	72	54.5	111	45.3
Business (Private)	19	14.4	40	16.3
Civil Servant	15	11.4	22	9
Trader	5	3.8	24	9.8
Student	21	15.9	48	19.6

Source: Field Survey, 2016

Ecosystem Dependent Livelihood Activities in Oban East and West

Among the livelihood activities that are ecosystem dependent, farming was higest as reported by 84.8% and 73.5% respondents in Oban East and West, 5.3% and 6.1 were fishing, 3.0% and 2.9% plam wine tappers, 0.8% and 5.3% were artisans, 2.3% and 0.8%w ere fuelwood seller respectively (Figure 2). Moreover, as shown in figure 3, 32.8%, of the respondents in Oban East earned less than ₦10,000, 59.5% earned between ₦10,000₦50,000, ₦50,000-₦100,000 (6.1%), only 1.5% earned income above ₦100,000 while in Oban West, 47.1% earned less than ₦10,000, ₦10,000-₦50,000 (47.5%), ₦50,000-₦100,000 (2.9%) while 2.5% earned income above ₦100,000 on monthly basis.

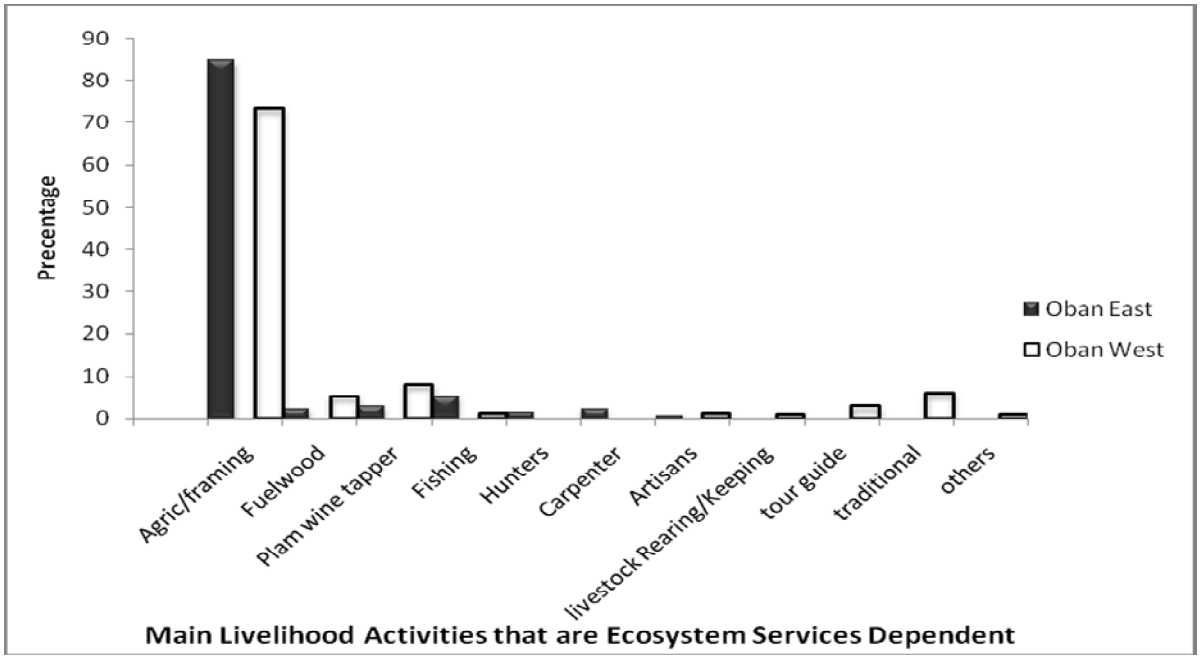

Figure 2: EcosystemLivelihood Activities of the residents in Oban East and West Division

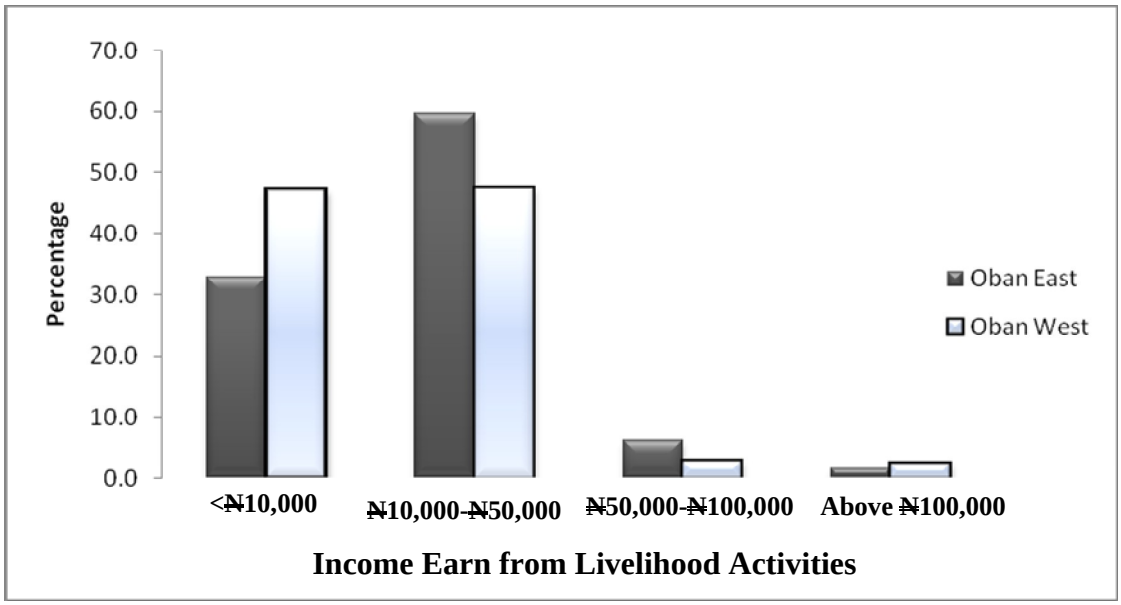

Figure 3: Monthly Income Earn from Ecosystem dependent Livelihood Activities by residents in Oban East and West division of Cross River National Park.

Ecosystem Provisioning and Cultural Services Identified in the Support Zone forests of CRNP Oban Division.

Finding in Table 3 and Plates (2,3,4,5) revealed various ecosystem provisioning services that is used as food and vegetable (bush mango, kola-nut, salad, otase, hot pepper leaf,), Source of protein (monkeys, porcupine, bush-pig, tilapia, mud-fish, snake-fish), Timber Products (iroko, cedar, ebony, achi, mimusops), Medicinal plants (dogoyaro, chewing sticks), Construction and Craft Materials (cane-robe, raffia palm, bamboo) and Cultural Value (Etem-mbey, Okombo, Ekpe-etam), Cultural Heritage (Obeche Tree, tabort-hill), Recreation and Tourism (Monikim, Akamkpa Oran, Ayi, Akchak festival) in the community forests.

Table 3. Ecosystem Provisioning and Cultural Services in the selected community forests of Oban division Cross River National Park.

Ecosystem Services	Types	Name
Wild Plants	Food	Bush Mango (*Irvingia gabonensis*), Kola nut (*Cola nitida*), Pear (*Pyrus saliafolia*), Wild yam (*Dioscorea villosa*), Walnut (*Juglans regia*), Poga-nut (*Oleosa spp*), Bitter Kola (*Garcinia kola*) and Garden-Egg (*Solanum melongene*).
	Vegetable	Salad (*Lactuca sativa*), Hot Leaf (*Pipers guinenses*), Mushroom (*Agaricus bisporus*), Otasi (*Gongrunema*

		lalifolium), Atama (*Hensia crinite*), Bitter Leaf (*Vernonia amygdalina*), Editan (*Lasianthera africana*) and Afang Leaf (*Gnetum africanum*).
Water	Sources of Water	Stream, River, Lake/Spring
Source of Protein	Wild Animals	Monkeys), Porcupine (*Erethizon dorsaum*), Red deer (*Cervus elaphus*), Bush pig (*Potamochoerus larvatus*), Pangolins (*Phataginus tricuspis*),Grass cutter (*Thryonomys swinderianus*), Antelope (*Antilocapra americana*), Wild rabbit (*Sylvitagus bachmani*), Squirrel (*Sciurus carolinensis*), Snake (*Serpentes spp*), Duiker (*Sylvicapra grimmia*), Hunting dog (*Lycaon pictus*) and Tortoise (*Testudo graela*).
	Fish	Tilapia (*Oreochromis niloticus*), Electric fish (*Malapterurus electicus*), Mud fish (*Neochama apoda*), Cat fish (*Clarias gariepinus*), Snake fish (*Channa striata*) and Dog fish (*Squalus acenthias*).
Timber Product	Hard Wood	Iroko (*Milicia excelsa*), Cedar (*Lovoa trichilioides*), Obeche (*Tripolochiton sleroxylon*), Ebony (*Diospyros crassiflora*), Achi (*Brachystegia spp*), Black and White Afara (*Terminalia spp.*), Opepe (*Nauclea diderrichil*), Rubber tree (*Ficus elastic*), Mahogany (*Swietenia macrophylla*) and Mimusops (*Baillonella toxisperma*).
	Construction and Craft Material	Cane-Rope (*Calamus acenthospathatus*), Raffia Palm (*Raphia vinifera*) and Bamboo (*Bambusa vulgaris*).
	Medicinal Plants	Independent Leaf (*Chromolaena odorata*), Pawpaw Leaf (*Carica papaya*), Lemon Grass (), Dogoyaro (Exotic Spp) (*Cymbopogon citratus*), Chewing Stick (*Garcinia mannii*) and Palm Tree (*Elaea guinenses*)
	Cultivated Plants	Cocoa (*Theobroma cacao*), Orange (*Citrus sinensis*) and Banana/Plantain (*Musa acuminate*).
Cultural Services	Cultural Value	Ekpe-Etam, Mgbe, Ebit-Ambit, Okombo, Oban and Ancestral.
	Recreation and Tourism	Akchak Festival, Monikim, Akamkpa Oran, Mimusop Shell and Ayi.
	Cultural Heritage	Tabort-Hill, Obeche Tree and Achi Tree

Field Survey 2016

Plate 2: Bush mango (*Irvingia wombulu)*

Plate 3: Logs of wood for fuel

Plate 4: Snake fish (*Channa striata)*

Plate 5: Cane-rope (*Calamus acenthospathatus)*

Although, majority of the respondents (53.8% and 64.9%) obtained forest resources for domestic/consumption while 46.2% and 35.1% extract the resources for commercial purpose in Oban East and West divisions respectively (Table 4). Highest percentage (60.7% and 55.6%) of respondents from Oban East and West respectively have been financially empowered, 34.5% and 24.5% have obtained food supply, improved health condition was observed by 3.6% and 11.9%, while enlightenment about natural resources conservation had 1.2% and 7.9% in Oban East and West divisions respectively (Table5).

Table 4: Purpose of Resources Collection from community forest in Oban East and West division of CRNP.

Values of Community Forest Resources	Oban East (%)	Oban West (%)
Domestic/consumption Value	53.8	64.9
Commercial Value	46.2	35.1

Source: Field Survey, 2016.

Table 5: Significance of Ecosystem Economic activities in Oban East and West of CRNP Support Zone Communities.

Improvement through Ecosystem Economic Activities	Oban East (%)	Oban West (%)
Financial Empowerment	60.7	55.6
Food Supply (Domestic)	34.5	24.5
Improved Health Condition	3.6	11.9
Enlightenment on Natural Resources Conservation	1.2	7.9

Source: Field Survey, 2016.

Constraints to Livelihood Enhancement from on Ecosystem Services in Oban East and West Community Forests.

Major constraint is over-exploitation as reported by 32.6% and 39.2% respondents in Oban East and West respectively while forest degradation(29.5% and 34.6%), seasonal variation (36.4% and 20.3%), conflict among the people for the use of land and forest products (1.6% and 5.9%) were other constraints identified in Oban East and West community forests (Figure 4).

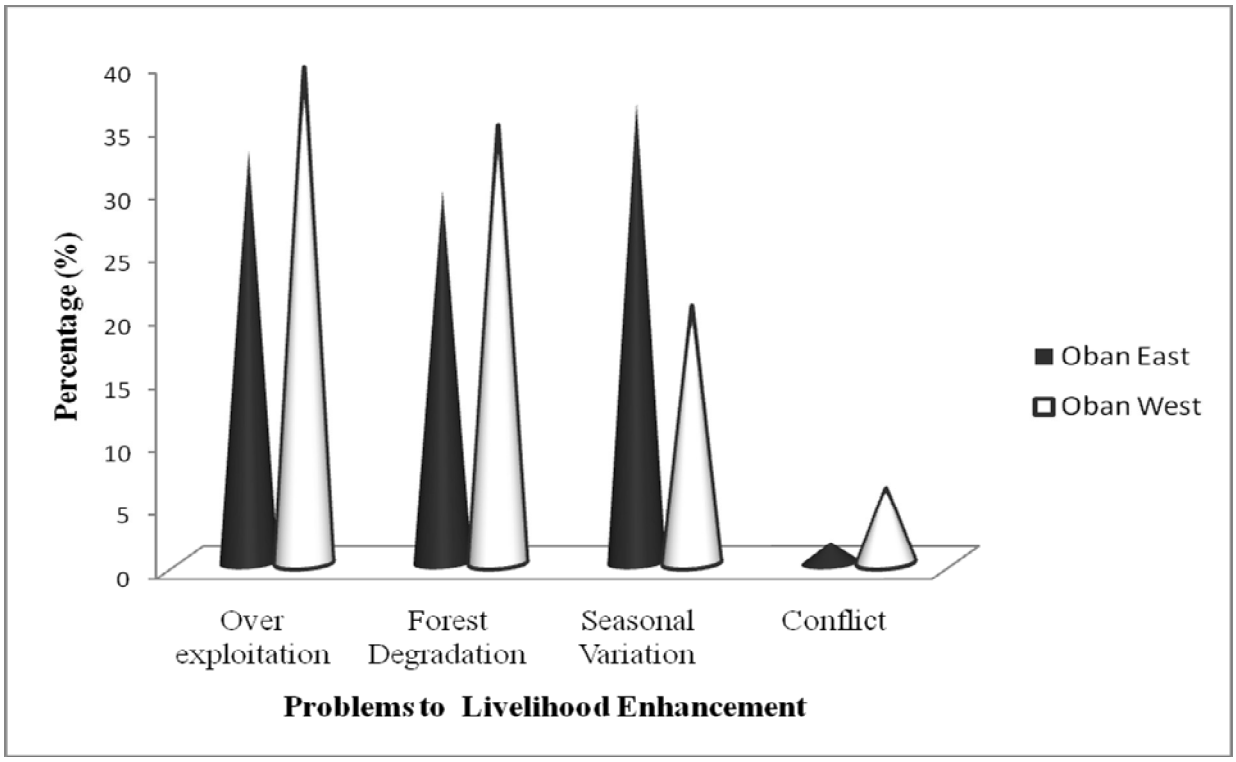

Figure 4: Constraints to Livelihood Enhancement from on Ecosystem Services in Oban East and West Community Forests.

Differences in the ecosystem provision and cultural services between Oban East and West Community Forests in Table 6 revealed that there was significant difference in the fuel-wood (t=4.374, p=0.000); Non-Timber product (t=3.753, p=0.000); Fibers (t=-4.907, p=0.000); Bees farming (t=-5.714, p=0.000); Medicinal plants (t=2.799, p=0.005); Ornamental resources (t=-6.928, p=0.000); Cultural value (t=-6.814, p=0.000); Recreation & Tourism (t=-5.024, p=0.000); Cultural heritage (t=-4.392, p=0.000); Education and Scientific value (t=-7.334, p=0.000); Spiritual and Religious experience (t=-6.623, p=0.000) benefits between the Oban East and West community forests. Also, the study shows that there was no significant difference between Oban East and West community forests in terms of Food Supply (wild-plants), Timber product, Water, Charcoal, Farming (Cultivate crop), Source of protein (wild animals and fishes), other plants material (fodder) and Construction and craft

Materials (p>0.05)

Table 6: T-test analysis on the differences in the ecosystem provision and cultural services benefits between Oban East and West community forests.

Variable	Mean					
	Oban East	**Oban West**	**Mean Difference**	**T**	**df.**	**Sig (2-tailed)**
Food (Wild plants)	2.98	2.98	0.00	0.061	375	0.951
Fuel wood	2.98	2.81	0.17	4.374	318	0.000*
Timber product	2.94	2.95	-0.01	-0.214	375	0.830
Non-Timber product	2.90	2.68	0.22	3.753	371	0.000*
Water	2.95	2.98	-0.03	-0.809	275	0.419
Fibers	1.84	2.33	-0.49	-4.907	257	0.000*
Charcoal	2.86	2.79	0.07	1.114	296	0.266
Farming (Cultivate crops)	2.97	2.91	0.06	1.688	366	0.092
Bees farming	1.95	2.52	-0.57	-5.714	232	0.000*
Source of protein (Wild animals and fishes)	2.95	2.96	-0.01	-0.154	375	0.878

Medicinal plants	2.90	2.75	0.15	2.799	359	0.005*
Ornamental resources	1.70	2.37	-0.67	-6.928	375	0.000*
Others plant material	2.61	2.64	-0.03	-0.342	375	0.733
Cultural value(Sacred area)	1.98	2.64	-0.66	-6.814	215	0.000*
Recreation and Tourism	2.10	2.59	-0.49	-5.024	218	0.000*
Cultural heritage	2.20	2.62	-0.42	-4.392	218	0.000*
Construction and Craft material	2.92	2.89	0.03	0.838	375	0.403
Education and Scientific value	2.15	2.81	-0.66	-7.334	175	0.000*
Spiritual and Religious experience	1.97	2.60	-0.63	-6.623	214	0.000*

*Significant at $p<0.05$

DISCUSSION

Socio-Demographic Characteristic

Majority of the respondents in both Oban East and Oban West were male, this in line with Kikoti (2009) finding in livelihood and ecosystem services in Ugalla ecosystem that 82% of the genders were male. This is because of the traditional attitude that men are the main speaker of their respective families. Finding of Furze *et al*. (1996) indicated that many members particularly women and minorities may not participate in decision making carried out by individual household. Also in this study, majority of the respondents were educated, married with large family size which indicated the need to provide for their families. Large proportion were within 21-40years, an active working age groups in the society whose total dependent on forest product for livelihood could lead to pressure on the forest resources as opined by Adekunle and Agbaje (2012).

Analysis of occupation of respondents in the study area indicated that large percentage of the local respondents were farmers, since the areas were villages, it is normal to find more farmers than others activities because farming is the main livelihood activity of local residents. Details obtained in the Cross River National Park report indicated that 10,000 assorted tree-crop seedlings such as cocoa, oil palm, coco yam, rubbers, citrus, banana, cassava, plantain and bush mango were distributed to interested farmers in many support

zone villages (CRNP 2008). This was used to empower the farmers to intensify their production as well as diversify their attention from total dependence on the park resources.

Ecosystem Provision and Cultural Services of the Community Forest.

It is clearly seen that Oban East and Oban West community forests provide varieties of ecosystem provisioning and cultural benefits for its residents, which contribute considerably to their livelihood and well-being as they used the resources on a regular basis and times of need, which is in agreement with Osofsky *et al*. (2005) that many residents of protected areas are poor and highly dependent on the ecosystem services provided by the community forest to meet their daily needs. Ecosystem services obtainable by residents include: water (stream, river, lake), energy (fuel-wood, charcoal), wild plant foods (bush mango (*Irvingia gabonensis)*, kola-nut (*Cola nitida)*, salad (*Lactuca sativa*), otasi (*Gongrunema lalifoliu)*, hot pepper leaf (*Piper guinenses)*, atama (*Hensia crinite*), wild-yam (*Dioscorea villosa*), pear (*Pyrus saliafolia*), mushrooms (*Agaricus bisporus)*, bitter leave (*Vernonia amygdalina*)). Wild animal foods (monkeys, porcupine (*Erethizon dorsaum*), red deer (*Cervus elaphus*), Bush pig (*Potamochoerus larvatus*), pangolins (*Phataginus tricuspis*), grasscutter (*Thryonomys swinderianus*), antelope, wild rabbit (*Sylvitagus bachmani*), squirrel (*Sciurus carolinensis*), snake (*Serpentes spp*), duiker (*Sylvicapra grimmia*), hunting dog (*Lycaon pictus*), tortoise (*Testudo graela*), tilapia (*Oreochromis niloticus*), electric fish (*Malapterurus electicus*), mud fish (*Neochama apoda*), cat fish (*Clarias gariepinus*), snake fish (*Channa striata*) and dog fish (*Squalus acenthias*). Timber, iroko (*Milicia excelsa*), cedar (*Lovoa trichilioides*), ebony (*Diospyros crassiflora*), achi (*Brachystegia spp*), black and white afara (*Terminalia spp.*), achi (*Brachystegia spp*),, rubber tree (*Ficus elastic*), mahogany (*Swietenia macrophylla)*, obeche (*Tripolochiton sleroxylon*), mimusops (*Baillonella toxisperma*), chewing sticks (*Garcinia mannii*), etc.). Construction and craft materials (cane-robe *Calamus acenthospathatus*), Raffia Palm (*Raphia vinifera*) and Bamboo (*Bambusa vulgaris*).), cultural value (etem-mbey, okombo, ekpe-etam). Cultural heritage (obeche tree, tabort-hill); recreation and tourism (monikim, akamkpa oran, ayi, akchak festival). This is consistent with Fisher *et al.* (2009) that provisioning services are the products obtained from ecosystem services. Also Campell (1996) reported that ecosystem products and services are been supplied from Miombo woodlands ecosystem to sustain the people. Lowore (2006) noted that firewood, construction materials, thatching and medicines were considered as the most basic

domestic needs that are met by Miombo woodlands in Malawi. This also in line with the finding of World Resources Institute (2008) in millennium ecosystem assessment document that benefits are in the form of goods and services such food, water, wood and so on.

The study showed a high overall dependent on ecosystem services at the household level and monthly income earned varied accordingly and was directly obtained through communities' forest ecosystem services. This is consistent with Fisher (2004) that income from the sale of Forest Product Ecosystem Services (FPES) is an important contribution to overall household income for rural residents. According Cambodia Development Research Institute (2010) 85-90 percent of primary sources of income of the household are based on local ecosystem services and dependent on the continued supply of these services. The main major livelihood ecosystem economic activities of the local residents in Oban East and Oban West division are Agricultural/farming, fishing, palm wine tapping, livestock keeping, hunting amongst others and agricultural/farming was the dominant livelihood source in the villages. This is also consistent with the findings of MEA (2005) report that agriculture is a highly valuable provisioning service.

Forest resources that were collected for different purpose had high general importance to the livelihood in the studies communities. Many households collected these resources for consumption and commercial value. This is in line with Mamo *et al*. (2007); Shackleton and Shackleton (2006); Sunderlin *et al*. (2005) and Tesfaye *et al*. (2011), that the direct use value of forest provisioning ecosystem services (FPES) in household is a key determinant of their value, both in consumption and as a source of income. In most of the communities, the collection of these provisioning services constituted a substantial contribution to their livelihood situation. According to Shackleton and Shackleton (2006), forest provides a number of products that underpin many rural livelihood strategies.

The study also showed that large percentages of the local respondents living condition were improved through the ecosystem economic activities as it has resulted in their ability to pay their children school fees, access to medicinal plants improved their health condition as well as employment opportunities, food availability, appreciation and enlightenment in terms of provisioning services, education and scientific values of their forests. This is in line with Kikoti (2009) that local people anywhere need money for their survival to meet daily needs including paying school fees for their children, getting food and so on. Studies by

Agbenyega *et al.* 2009 and Martín-López *et al*. 2012 revealed that rural communities show high appreciation towards provisioning ecosystem services.

The study also shows that many of the local residents that are ecosystem services dependent are facing different challenges such as over-exploitation of the resources, degradation of the forest for others development and also conflict between one and another land user. The focused group discussion with the chiefs and elders in the communities indicated that cutting down of the forest trees by loggers, forest clearance, bush burning and for infrastructural development such as (road construction) had led to over-exploitation of the resources because people need more resources for their needs, this is in line with Butler and Oluoch-Kosura (2006) that limited availability of important resource means they do not support livelihood and well-being so the people tend to over harvest the available resources.

The result also indicated that conflict between land users for agricultural/farming activities have been the problem because major percentage of the community forest land have been taken by the federal government for enlargement of the National Park which thereby caused the local residents to have access to limited land to practices their main livelihood activities such as farming. Ferraro (2008) pointed out that the expected outcomes of establishing protected area (National Park) have restricted the supply of agricultural land and ecosystem material products.

There was significant difference in the fuel-wood, non-timber product, fibers, bees farming, medicinal plants, ornamental resources, cultural value, recreation and tourism, cultural heritage, education and scientific value, spiritual and religious experience benefits between the Oban East and Oban West Community forests.

CONCLUSION

This study has provided insight into the contribution of ecosystem provisioning and cultural services to rural livelihood in the community forests of Cross River National Park Support Zone. It has been observed that the major sources of livelihood of local resident within the community forest in Oban East and Oban West remain at the hand of the ecosystem services available within the community forests.

Findings from the study show that agriculture/farming was the main livelihood activities of the local residents and majority earn monthly income between ₦10,000-₦50,000 from their

main livelihood activities that were ecosystem dependent. Livelihood enhancement through the ecosystem economic activities have been in the form of paying their children school fees, access to medicinal plants improved their health condition as well as employment opportunities, food availability, appreciation and enlightenment in terms of provisioning services, education and scientific values of their forests. Constraints to ecosystem services livelihood enhancement were overexploitation, forest degradation, seasonal variation and conflicts. Efforts should therefore be intensified to sensitize the people on the need to conserve the community forest in order to properly manage and sustainably utilize the resources as well as intensify its production while training in alternative livelihood option should be heightened for residents in the support zone communities.

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