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Community Perception towards Forest Resources Management in Afi and Mbe Mountains, Cross River State

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ABSTRACT

Perceptions of local people are important for sustainable forest resources management of protected areas. This study examined perception of community inhabitants on forest resources management in Afi and Mbe mountains, Cross River State, Nigeria. Eight (8) communities in Afi and four (4) communities in Mbe, constituting 50% of the communitiesin Afi and Mbe mountains were purposively selected for the study based on their proximity to the forest. Semi-structured questionnaire was used to obtain information from household heads and key stakeholders made up of community chiefs, leaders of community associations, women and youth groups in each of the study communities. A total of 313 questionnaires were administered to 255 household heads and 58 key stakeholders in Afi mountain and 167 questionnaire administered in Mbe mountain, consisting of 137 household heads and 30 key stakeholders. Household heads in each community were systematically sampled due to their linear settlement fashion, beginning with the first household in each community and followed by every other third household until the total number of respondents per community were exhausted. Leaders of key stakeholder groups were randomly selected for the study in each community. Data collected was analyzed using descriptive statistics and likert scale rating, which rated the perception of respondents to forest resources management in the study area. Findings revealed that 98% of household heads were males, married with a mean household size of 8 people in both mountains. Most of the people were farmers (85%), having a mean age of 50years and earning between #500,000 - #1,000,000 per annum. The key stakeholders in both communities had a similar trend but most farmers earned below #500,000 per annum. The community people had good perception of forest management, with those in Afi mountain having higher mean perception (4.92) compared to the residents around Mbe mountain (4.85). Ninety percent of people around Mbe mountain believed that better management of the forest will be possible if forest dependent communities and NGOs alone were involved in the management while those in Afi mountain (40.6) believed that all stakeholders should be involved for better management of the forest. The perception of the people on impact of local laws on forest management was strong and their compliance to local laws was rated high in Afi and Mbe mountains. The study concludes that the good perception of the local people is essential for sustainable management of forest resources in the area. It is recommended that the enforcement of local and state laws be strengthened in each community for improved management of the forest resources in the mountains. Also, farmers in the adjourning communities be trained in sustainable intensive farming practices and supported with farm inputs/incentives to improve productivity and reduce pressure on forest resources.

Key words: Community perception, Forest resources management, Adjourning communities, Afi and Mbe mountains

INTRODUCTION

Protected areas (PAs) are cornerstones for biodiversity conservation (Allendorf, 2007; Walpole and Goodwin, 2001) and are a major means of reducing deforestation (Andam et al., 2008). PAs management often includes strict regulations that exclude local people from areas where they may have previously used to gather resources such as fuelwood, materials for shelter, farming, fodder and non-timber forest products (Alkan, et al., 2009; Shrestha and Alavalapati, 2006). Biodiversity loss in tropical forests has led to the creation of protected areas in many developing countries (Masoze and Alavalapata, 2006). Thus, the management of PAs may conflict with the economic interest of local people (Khan and Bhagwat, 2010; Shrestha and Alavalapati 2006) and without local support, the long-term existence of PAs will not be assured (Wells and McShane, 2004). Local people are unlikely to support PAs if they have negative perceptions and attitudes toward them (Alkan et al., 2009). Over the years, degradation and deforestation have reduced forest cover due to perception of forests as a space that must be cleared to pave way for development activities (Purity, 2011). Africa is one of the continents that have suffered huge forest loss, accounting

for the second largest net forest loss after South America with 4.0 million forest cover cleared annually (Borokini et al., 2012). Between 2000 and 2005, Nigeria and Sudan were the two largest losers of natural forests, which was attributed to activities like logging, fuelwood harvesting, poaching and expansion of agricultural lands (Borokini et al., 2012; Purity, 2011). The need for communities to invest in natural resources conservation and reduce the effect of environmental degradation is indisputable in Nigeria and Boki Local Government Area of Cross River State (Takon and Titus, 2013). According to the authors, the people of Boki are highly dependent on forest ecosystems due to its diverse and abundant wildlife, land, food, water, etc resources. Few studies on community perception on forest conservation and management have focused on multiple study areas (Marcus 2001; Törn et al., 2007). Snyman (2012) noted that many perception studies have focused on one study area and did not compare community perceptions between different conservation areas. The present study compares community perception of forest resources management in two protected areas with two different management regimes.

METHODOLOGY

Study area

The study was conducted in Afi and Mbe mountains in Cross River State, South Eastern Nigeria. The Afi-Mbe landscape in Boki Local Government Area lies between Latitudes 06°10'N and 06°30'N, and Longitudes 08°50'E and 09°30E (Lateef et al., 2015) as shown in Figure 1. The Afi mountain occupies approximately 100 km2 of lowland, and sub-montane forest with rocky peaks rising to altitudes of 1,300m above sea level in the North-Western part of the Afi River Forest Reserve (ARFR), which has a total area of about 380 km2 (Edet, 2011; WCS, 2016). With a population of approximately 27,000 people distributed in sixteen (16) communities, the Afi mountain is managed by Cross River State Forestry Commission (CRSFC) with support from Wildlife Conservation Society (WCS) and other partners such as North Carolina Zoo and Pandrillus (WCS, 2016). Mbe mountain is an important habitat corridor between Afi mountain to the West and Okwangwo Division of Cross River National Park to the East. Since 2007, Mbe mountain inhabited by nine (9) communities and covering an area of 85 km2, has being managed by Conservation Association of Mbe Mountains (CAMM) communities. Similarly, Mbe mountain is being managed as a community wildlife sanctuary by CAMM, with support from Wildlife Conservation Society (WCS) and Cross River State Forestry Commission (WCS, 2016).

Sampling Techniques

Fifty percent of communities surrounding Afi (8 communities) and Mbe (4 communities) mountains were purposively selected based on their proximity to the reserve boundary. A total of 255 household heads and 58 key stakeholders were selected in Afi mountain with 137 household heads and 30 key stakeholders in Mbe mountain (Table 1).

Figure 1: Map showing Afi and Mbe Mountains, Cross River State, Nigeria (Source: WCS, 2016)

The number of households and stakeholders selected was determined based on 50% of a 2016 projection of the National Population Census figures in the respective communities by applying the Taro Yamane formula (Yamane, 1973). Systematic sampling of household heads was adopted due to the linear settlement fashion of households in the communities with a selection of the first household in each community, followed by every other third household until the total number of respondents per community was exhausted. Two sets of semi-structured questionnaire, modified from Ajake and Anyandike (2012) were administered differently to household heads and selected key stakeholders (made up of community chiefs, leaders of associations, women and youth groups) in each of the study communities. The questionnaire were used to elicit information on the perception of community members on the management of Afi and Mbe mountain forests. Data collected was analyzed using descriptive statistics and likert scale rating.

RESULTS AND DISCUSSION

Socio-economic characteristics of household heads in Afi and Mbe mountains

Majority of household heads were males in both Afi (99.3%) and Mbe (98.5%) communities, signifying a typical African community. Most of the respondents (atleast 98%) were married in Afi and Mbe mountains, while about 2% widowed. This explains why about 2% of household heads were females. The mean age in Mbe and Afi communities was 53 and 50 years respectively, with

Table 1: Distribution of Respondents in Afi and Mbe Mountains, Cross River State

Site	Communities	Household heads	Stakeholders	GPS Coordinate
Mbe	Bamba	34	8	$N06^0$ 27' $E09^0$ 12'
	Wulla II	62	10	$N06^0$ 37' $E09^0$ 11'
	Kanyang II	17	6	$N06^0$ 27' $E09^0$ 05'
	Abo Mkpang	24	6	$N06^0$ 15' $E09^0$ 05'
Total		**137**	**30**	
Afi	Olum	62	10	$N06^0$ 37' $E09^0$ 04'
	Buanchor	57	10	$N06^0$ 33' $E09^0$ 00'
	Enyi	34	8	$N06^0$ 27' $E08^0$ 92'
	Ebranta	22	6	$N06^0$ 21' $E08^0$ 79'
	Katchie	19	6	$N06^0$ 25' $E08^0$ 93'
	Ebok	22	6	$N06^0$ 35' $E08^0$ 95'
	Esekwe	27	6	$N06^0$ 46' $E08^0$ 98'
	Ndemenchang	12	6	$N06^0$ 46' $E08^0$ 99'
Total		**255**	**58**	

majority of the people in Afi within the ages of 36-45years (31.7%) and between 46-55 years (28.5%) in Mbe communities (Table 2). The mean household size was 8 persons in both mountain communities, consistent with the study of Njandome (2014) who stated that an average dependence range of 1-8 persons is characteristic of a typical African family. Most households in the communities have between 6-10 members, which could translate to more demand for natural resources in the area. The annual income for household heads in both mountains ranged between #500,000.00 - #1,000,000.00, with the most successful farmers earning as high as atleast #2,000,000.00. The high income was attributed to the lucrative cocoa business and banana sales in the communities since majority of the farmers were known for cocoa and banana production. Most residents have lived around Afi and Mbe mountains for between 41-60years, indicating a long time association with the forest resources in the area.

Socio-economic characteristics of key stakeholders in Afi and Mbe mountains

Majority (76.7%) of key stakeholders in the communities were males, between the ages of 35-45 years (Table 3). Eighty-six percent of key stakeholders were married, having between 6-10 family members, mainly farmers (82.8% and 76% in Afi and Mbe mountains respectively). The major occupation of the local people in both mountains was farming, in consonance with the agrarian lifestyle in rural settings in Africa (Abimbola et al., 2011 and Emulue and Ukandu, 2014). Many of the stakeholders in Afi (69.2%) and Mbe (53%) had lived between 41-80 years around the mountain forests.

Community perception on forest management in Afi and Mbe mountains

Community people in Afi and Mbe mountains demonstrated positive perception towards forest management in the study areas. The result was in line with the findings of Ratsimbazafy et al (2012) and Tesfaye (2017), who opined that respondents who had a more favorable attitude were more likely to be involved in forest management. The result also showed that a greater proportion of respondents indicated that participation in decision making and extraction of some resources (index mean = 5.00) will ensure commitment to conservation in Afi mountain and Mbe mountain (index mean = 4.94). The community people agreed to all the perceptive statements which touched on their conservation-related needs (Table 4). Afi mountain had a higher perception mean (4.92) towards forest management compared to Mbe mountain (4.45). which could be linked to the community-driven bottom up approach to forest management compared to the government-owned top-bottom approach in Mbe mountain.

Community perception on forest management systems in Afi and Mbe mountains

The Afi community believed that a better management of the forest will be achieved when all stakeholders (46.6%) are equally represented and involved in decision making for sustainability. This was followed by management by forest dependent communities and NGOs alone (Table 5. This implies that the people perceived that better management of forest resources will be achieved by the community and NGOs (25.8%) working together. This could probably be because of the effect of the community based management approach in Mbe mountain.

Table 2: Socio-economic characteristics of households heads in Afi and Mbe mountains, Cross River State

Demographic Characteristics	Afi		Mbe	
	Frequency	**Percentage**	**Frequency**	**Percentage**
Gender				
Male	254	99.3	135	98.5
Female	1	0.7	2	1.5
Age				
20-35	25	9.8	14	12
36-45	81	31.7	31	23.6
46-55	67	26.3	35	28.5
56-65	43	16.9	33	26.8
66-75	31	12.2	19	5.6
76-85	8	3.1	4	2.9
86-5	-	-	1	0.7
Mean	50.89		53	
Marital Status				
Single	-	-	-	-
Married	243	98.5	136	98.6
Widow(er)	2	1.5	1	1.4
Religion				
Christianity	255	100	137	100
Education				
No formal education	3	1.2	4	2.9
Primary Education	13	5.1	28	20.5
Secondary Education	201	78.8	78	56.9
Tertiary Education	38	14.9	27	19.7
Occupation				
Farming	231	90.6	117	85.4
Trading	2	0.8	6	4.4
Civil Servant	22	8.6	13	9.5
Artisan	-	-	1	0.7
Household Size				
1-5	45	17.6	22	16.1
6-10	166	65.1	88	64.2
11-15	41	16.1	24	17.5
16-20	2	0.8	3	2.2
21-25	1	0.4	-	-
Mean(SD)	8.10 (±2.76)		8.34(±2.83)	
Annual Income				
<500,000.00	66	30.9	35	27.1
500,000.00-1,000,000.00	159	55.3	85	60.2
1,000,000.00-1,500,000.00	25	11.8	14	11.5
1,500,000.00-2,000,000.00	3	1.2	1	0.7
2,000,000.00-2,500,000.00	2	0.8	1	0.7
Mean (SD)	782,235.29 (±306,000.527)		700,627.74 (±700,627.74)	
Years of Residence				
20-40	53	22	30	18.7
41-60	140	51.5	69	51
61-80	60	25.7	35	28.1
81-100	2	0.8	3	2.2
Mean (SD)	50.89 (±12.65)		52.42 (±13.97)	

Table 3: Socio-economic characteristics of key stakeholders in Afi and Mbe Mountains

Demographic Characteristics	Afi		Mbe	
	Frequency	**Percentage**	**Frequency**	**Percentage**
Gender				
Male	46	79.3	23	76.7
Female	12	20.7	7	23.3
Age				
20-35	8	13.7	8	26.7
36-45	20	34.3	8	26.7
46-55	11	18.8	7	23.2
56-65	11	18.8	1	3.3
66-75	7	11.9	4	13.2
76-85	1	1.7	2	6.6
Mean	49.29		53	
Marital Status				
Single	1	1.7	4	13.4
Married	57	98.3	26	86.6
Religion				
Christianity	58	100	30	100
Education				
No formal education	-	-	1	3.3
Primary Education	10	17.2	6	20
Secondary Education	35	60.3	16	53.3
Tertiary Education	13	22.4	7	23.3
Occupation				
Farming	48	82.8	23	76.7
Student	1	1.7	2	6.7
Civil Servant	9	15.5	5	16.7
Household Size				
0-5	10	15.8	12	39.9
6-10	24	40.6	13	43.3
11-15	3	7.9	3	9.9
16-20	19	32.3	2	6.7
21-25	2	3.4	-	-
Mean	9.1		8.34	
Annual Income				
<500,000.00	34	64.1	16	59.4
500,000.00-1,000,000.00	20	34.5	11	30.6
1,000,000.00-1,500,000.00	2	0.7	2	6.7
1,500,000.00-2,000,000.00	2	0.7	1	3.3
Mean	817982.46		567000	
Years of Residence				
1-40	19	30.8	13	40.4
41-80	39	69.2	15	53
81-100	-	-	2	6.6

In Mbe mountain, more people believed that the management of the forest should be left in the hands of Forest dependent communities and NGOs alone (90%). This implied that the people were satisfied with their system of community driven forest management, as the NGOs adopted the bottom-up management system as against Government's top-down approach in Afi mountain.

Community perception on the impact of local laws on forest management in Afi and Mbe mountains

Esekwe community had more stringent local laws against violators of conservation laws compared to other communities in Afi mountain (Table 6). This might be due to their better perception of forest management, as they considered the forest as theirs and were willing to

Table 4: Community perception on forest management in Afi and Mbe mountains, Cross River State

Perceptional Statement	Afi		Mbe	
	Index mean	Decision	Index mean	Decision
Participation in decision making and extraction of some resources will ensure commitment to conservation.	5	Agreed	4.94	Agreed
Education through extension services will enhance effective forest management.	4.93	Agreed	4.89	Agreed
Provision of employment will generate income and reduce impact on forest resources.	4.92	Agreed	4.78	Agreed
Promotion of alternative energy sources will reduce deforestation	4.91	Agreed	4.84	Agreed
Provision of incentives will promote conservation	4.85	Agreed	4.81	Agreed
	4.92		**4.45**	

1- 2.5 = Disagreed, 2.6 -5 =Agreed

Table 5: Community perception on forest resources management in Afi and Mbe mountains

Forest management system	Afi	Mbe
	Yes (%)	Yes (%)
All stakeholders	27 (46.6)	3 (10)
Government alone	1 (1.7)	0 (-)
Government and forest dependent communities alone	10 (17.3)	0 (-)
Forest dependent communities alone	5 (8.6)	0 (-)
Forest dependent communities and NGOs alone	15 (25.8)	27 (90)

conserve and manage it. NGO stakeholders indicated that Esekwe and Ndemenchang communities in Afi mountain were very supportive of forest management followed by Olum and Buanchor communities. This was demonstrated by their fight against the 2016 fire outbreak in Afi mountain. Data obtained WCS and other key stakeholders in the communities around Mbe mountain pointed out that the communities were supportive in the management of the forest mountain, though they had a problem with benefit sharing ratio as regards core communities, leading to non-attendance of management meetings and the partial involvement of the Kanyang I community in forest management activities. Extension of boundary in some communities was another issue as respondents observed that their population was increasing and more land was needed for more shelter and agricultural activities. The local peoples' attitude was also reflected in the general agreement on local laws to arrest offenders by each community in Afi and Mbe mountains. Penalties for violators varied from one community to another, ranging from #50,000 with a goat, #100,000 with a goat and #150,000 with a goat depending on the gravity of offence. There were strict and higher penalties in Esekwe and Ndemenchang communities in Afi mountain compared to the rest of the communities in Afi and Mbe mountains. The strict penalties were meted against violators in hunting, fishing, ignition of forest fires, logging, and collection of non-timber forest products in the forest mountain.

Table 6: Community perception on the impact of Local Laws in Afi and Mbe mountains

Site	Communities	Strength of Local Laws	Compliance by Community Members
Mbe	Bamba	Strong	High
	Wulla II	Strong	High
	Kanyang II	Strong	High
	Abo Mkpang	Strong	High
Afi	Olum	Strong	High
	Buanchor	Strong	High
	Enyi	Strong	High
	Ebranta	Strong	High
	Katchie	Strong	High
	Ebok	Strong	High
	Esekwe	Very Strong	High
	Ndemenchang	Very Strong	High

Community Perception on the State of forest Resources in Afi and Mbe mountains

The result in Fig. 2 shows that the local people in Mbe mountain had high perception that their forest resources were increasing. According to some of the key stakeholders (45%), there was minimum disturbance in the forest due to the community-driven management system and therefore the forest resources should be increasing but majority (55%) expressed their fears that encroachment by farmers, poachers and logging activities might lead to decline of the forest resources in the future. On the other hand, key stakeholders in Afi mountain linked the decline of forest resources to human activities such as encroachment by

farmers, bush fires (mostly during land clearing for farming), poaching and logging activities.

According to Hassan and Bahauddin (2014), encroachment is one of the main reasons for forest habitat degradation, occurring through expansion of agricultural lands and settlements. The issue of land clearing by farmers especially those whose farms were close to the forest mountain boundary constituted the major cause of forest fires, agreeing with the annual report of WCS (2016).

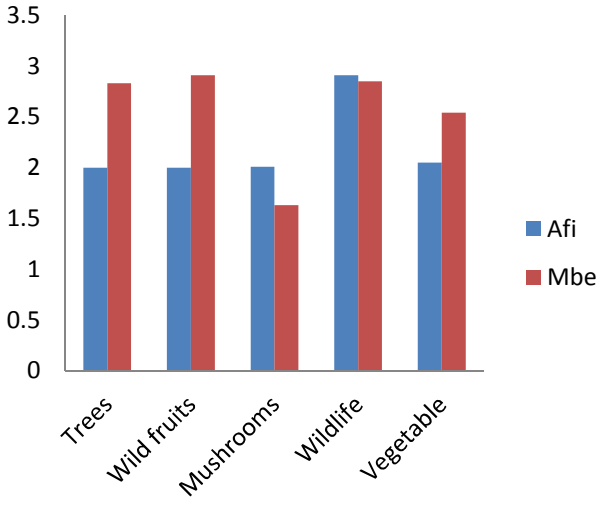

Figure 2: State of some forest resources in Afi and Mbe mountains, Cross River State

CONCLUSION AND RECOMMENDATIONS

The study concludes that local communities around Afi and Mbe mountains had good perception of the forests which can facilitate community support to forest management programmes and conservation of forest resources in the area. Residents of Afi mountain believed that the involvement of all stakeholders in the management of the mountain forest was a better approach than the community and NGOs alone, while people around Mbe mountain believed that the community-based approach involving community members and NGOs alone should be promoted in the management of the forests. The fact that the NGOs, Forest Management Committees (FMCs), and Conservation Association of the Mbe Mountains (CAMM) movement were gaining ground, the collective strength of the NGOs, Ministries, Departments and Agencies (MDAs) and community members could be treated as an opportunity to enhance sustainable management of the mountain forests. It is recommended that enforcement of local and state laws be strengthened in both communities for improved ownership and management of the forest resources. Also, farmers should be trained in sustainable intensive farming practices especially in major crops grown in the communities and supported with farm inputs/incentives so as to discourage forest encroachment, bush burning around the forests and improved crop productivity.

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