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Assessment of Demographic Variables and Forest Resources Conservation in Cross River State Nigeria

Ambe, B. A. Ph.D Benjamin.a.ambe@unical.edu.ng	A	Department of Environmental Education, Faculty of Arts and Social Science Education, University of Calabar, Calabar, Nigeria.
Eyos Kevin Acha[1] kevinacha7@gmail.com	B	Becheve Nature Reserve/Nigeria conservation foundation Obudu Plateau Cross River State, Nigeria.
Aidam Igwe Akposi	C	Department of Environmental Education, Faculty of Arts and Social Science Education, University of Calabar, Calabar, Nigeria. Corresponding author

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Correspondence Email:

kevinacha7@mail.com

Abstract

This study assessed sex, age, and location as demographic variables and conservation of forest resources in four protected areas in Cross River State, Nigeria. Three (3) research questions were formulated to guide the study. Survey research design, Purposive, stratified, simple random sampling, accidental sampling techniques and a validated structured questionnaire was used to obtain responses from the 367 respondents, descriptive statistics of simple percentage and bar chart was for data analyses. The result of the finding revealed that Males were more forest resources conserving than their female counterparts. The result also indicates that those within age bracket of 50 years and above showed that location influence conservation of forest. Based on the result of the findings, it is recommended that donor agency (ies)), NGOs, national park service, protected area managers, local communities, environmental educators should create more awareness among all sex's, age groups, and intensified more effort in other protected areas, which will promote the conservation forest resources among groups and location while adopting rural people participation in forest resources conservation in Cross River State.

Introduction

The depletion of forest resources and consequently its effect on the as observed through global warming, climate change, flooding, rise in sea level, and erosion calls for concerns. The adverse change in the environment, has been observed to be attributed to the increasing unsustainable anthropogenic activities such as unsustainable agricultural practices, Bush burning, logging, mining, and industrialization amongst others.

In Cross River State, it has been observed restrictions of human accessibility to some forested areas which are designated as protected areas (PA's) this site includes the Cross River National Park Okwangwo and Oban Division (CRNP), Afi Mountain Wildlife Sanctuary (AMWS), Becheve Nature Reserve (BNR), and Mbe Mountain Wildlife Sanctuary (MMWS) (Damilola 2018). These protected areas are reported to be major biodiversity hot spots in Nigeria, Key Biodiversity Areas ((KBAs) as well as Important Birds Areas (IBAs) in Cross River State International Union for the Conservation of Nature (IUCN 2016).

Interestingly, these restricted sites (PA's) are reported to be home to some of the threatened species such as the Cross River Gorilla (Gorilla gorilla diehli) Nigeria-Cameroon Chimpanzee (Pantroglodytes ellioti) Drill monkey (Mandrillus leucophaeus) Preuss Guenon (Cercopithecus preussi), Red-headed Picathartes (Picathartes oreas), Mount Kupe Bushshrike (Chlorophoneus kupeensis) and roosting and wintering ground for migrant bird species such as Barn Swallows (Hirundo rustica), Willow Warbler (Phylloscopus trochilus), Western Yellow Wagtail (Motacilla flava), European Pied Flycatcher (Ficedula hypoleuca), Pale Flycatcher (Melaenornis pallidus), Whinchat (Saxicola rubetra), Eurasian Wryneck (Jynx torquilla), and Blackcap (Sylvia atricapilla) which are key indicators of the state of the environment. However, there is a growing increase in the rate of unsustainable forest resources utilization by buffer zone and enclave communities in and within the PA's.

Therefore, the utilization of forest resources by rural communities living in and within these PA's, seems to be influenced by some social demographic factors such as age sex, and location of protected area which are observed to determine forest resource conservation, degradation, and utilization which are also observed to be exacerbated by male, female age groups and location of protected areas. According to Ukwetang, John, Otu, and Hope (2014) indicated that male gender as one of the demographic variables, attitude and awareness to forest conservation was very low compared to female gender.

Similarly, Asifat, and Oyebamiji (2019) report that the proportion of life woody forest product collected, and dry wood forest products collected did not bother about transplanting suggesting forest degradation by women in areas where the wood was removed with no interest in replacing tree removed.

Rural people in buffer zone do not specialize in a specific livelihood activity but practice a combination of different activities depending on what fetches revenue at different times of the

year. Interestingly, game hunting activities, are underpinned the by cocktail of factors which are all centered on generating income toward meeting household socio-economic needs and demand of their families. However, household cope with disappointing livelihoods outcome by engaging in commercial wildlife hunting activities and gathering of non-timber forest product (NTFP) as men dominate hunting activities, women dominate NTFP activities with hunting as the most lucrative livelihood activities in buffer zone and enclave communities (Enuoh, 2014).

Therefore, access to, and control of forest resources are complex and heavily influenced by gender. With women rely to a greater extent on Forest products for their basic and non-basic needs than the men Ayodeji, Harold, Shirley, and Isaac (2016). Similarly, forest resources exploitation done along gender disaggregated line with the male harvesting timber and animal products and harvest few of non-timber forest products while the female harvest non timber forest products and very little of animals and timber for fuel wood. This shows that, both sexes are involved in unsustainable forest resources exploitation with male harvesting more of timber forest products and little of non-timber forest products while their female folk harvest more of non-timber forest products and little of animals and timber forest products (Eneji, Ogar, Mubi and Husain, 2016).

The age rural people living in and within protected areas is observed to influence in the conservation of forest resources in among rural dwellers. which significantly determine communities' participation in forest management (Jamal, Anthony & Hadrat, 2017). There are also indications that no significant association between age group and local people participation in FLEGT-VPA implementation and monitoring activities (Derkyi, Appau & Boadu, 2021). This is contrary to Jamal (2017) finding that age significantly influence forest resource conservation and degradation Furthermore, Atmis et Al as cited by Derkyi (2021) emphasized the importance of age in determining the preference of activities by local communities in participatory forest management activities.

The level of household forest dependency will significantly differ across a range of demographic factors such as age. However, age significantly influence household reliance on forest dependency as it is observed to be decreasing with an increase on both in both young and old which indicates that youths were likely to be more reliant on forest product compared to their elderly counterpart Hesekia, Olekae and Joyce (2017) similarly, age, education experience, gender and farm size significantly have relationship with income of respondents hence influence conservation of forest resources Faleyimu and Akinyemi (2014)

Similar the annual rate for Afi-Mbe cluster declined interestingly a similar trend of annual deforestation declined in Ekuri-Ukpon Cross River South cluster however, mangrove forests clusters also experienced a rise in the annual deforestation, showing that Afi-Mbe and Ekuri-Ukpon, Cross River South cluster, both managed by local communities, government and

conservation organization experienced decline in deforestation and subsequent rise in afforestation over time Onojeghuo, Fonweban, Godstime, and Onojeghuo (2016).

Since the establishment CRNP in 1991 and other PAs in Cross River State, there is perceived efforts in engaging age groups and all sexes in PAs' in the conservation of forest resources to reduce or stop unsustainable exploitation of forest resources, as in increased logging activities, farming, hunting and human settlement encroachment into protected sites (Obeten, Ambe, Aneshie, Etta, Obun, Ojong,.. Onnoghen, 2024). It is based on these efforts put in place to reduce the unsustainable utilization of forest resources and improve on the sustainable conservation of forest resources that necessitated the aim of this study to how demographically age, sex, and location influence forest resources.

Specifically, this study aims to determine the difference in conservation forest resources by Gender, determine the difference in conservation of forest resources between age, and determine the difference in forest conservation by protected areas protected areas in Cross River State.

Study area/methodology

Area of the study

Generally, this study was carried in Cross River State Nigeria, located at Latitude $05^0$45'N, and longitude $08^0$30'E however, Specifically the study area for this study was Protected Areas (PAs) in Cross River State (Becheve Nature Reserve/Obudu plateau in Obanliku Local Government Area, and Cross River National Park Okwangwo Division located at Latitude $06^0$and Longitude $09^0$14'E with a total protected area of 1000sqkm, Mbe Mountain in Boki Local Government Area which is located at latitude $06^0$10'N, longitude $09^0$30'E, and Cross River National Park Oban Division in Akamkpa Local Government Area Located at latitude $05^0$23'N longitude $08^0$35'E). The projected population from the National Population Commission (NPC 2006) about 445,949 of this specific local government areas of the study as of 2021 is estimated to be 695,681 at 2.8%

The major vegetation type is montane forest, rolling mountain with grassland, lowland rainforest with rivers such as Calabar, Kwa and Korup River flowing through the heart of the CRNP. These PAs are also an Important Bird Area (IBA) and Key Biodiversity Area (KBA) with key stone species include Pan troglodytes (VU) Gorilla gorill delhili (VU) *Cercopithecus sclateri* (EN), *Cercopithecus preussi* (EN) and *Mandrillus leucophaeus* (EN) among others (Birdlife International 2021).

Communities in and around these protected areas practice subsistence farming as their major occupation with major crops such as maize, cocoyam, plantain, banana, oil palm, cocoa, bush mango and cassava. Other sources of livelihood for the locals include logging, fishing, and the sales of agricultural produce and non-timber forest product as well as trapping (hunting). While communities around the Becheve Nature Reserve cultivate temperate vegetables such as carrot,

Irish potatoes, Cabbage, Lettuce, tomatoes strawberries. Rearing of livestock such as cattle, goat, sheep, as other sources of livelihoods for the rural people and the Fulani community.

The popular Obudu Mountain Resort also known as Obudu Cattle Ranch or Obudu Plateau is also situated in this PAs. Institutions found within this study area include government owned secondary and primary School, as well as private owned nursery and primary schools and a college of education Akamkpa. The major religion practiced by these community is Christianity with a few African traditional worshipers as well as Muslims Fulani who are more of resident grazers. The major local dialect spoken is Boki, Ejagam, and Icheve.

Methodology

Survey research design was used for this study. The survey research design allows the researcher to use questionnaire as instrument for data collection and part of the population for the study, by studying the samples and drawing inference about the characteristics of the required population from the sample which is generalized on the population (Dangal, 2021).

A structured questionnaire was used for data collection for this study multistage sampling approaches adopted (Purposive, stratified, simple random sampling and accidental sampling techniques) used to select the sample for this study. The researcher purposively selected four (4) stratified protected areas out of the five (5). The reason for the selection was informed by the location and organizations managing them as the PAs are in three different local government areas and are managed by private and government organization. Simple random sampling technique was used to select three buffer zones, enclave communities which led to the total selection of twelve (12) buffer zone/enclave communities from the four (4) PAs while accidental random sampling technique was used to administer questionnaire to respondents in the twelve (12) buffer zone/enclave communities. To achieve this, the researcher seeks the consent of all participants was obtained prior to their involvement in the study and measures were taken to ensure confidentiality of all inform provided by participants. Participant were given the right to participate or withdraw from participating in the study without repercussion. The researcher respected the right, dignity, and welfare of all participants involved as every effort was made to carry out the research in a manner that ensures ethical standards

The researcher sampled and administered questionnaire to the respondents who were easily accessible, readily available and willing to respond with the help of a field assistant and community leaders. The researcher considered the number of participants who participated in conservation programmes in the PAs. The population of this study was all the 1586 who are beneficiaries of livelihood programmes in buffer zone and enclave communities in the five (5) protected area (Becheve Nature Reserve, Cross River National Park, Okwangwo and Oban Division, Afi Mountain forest Reserve and Mbe Mountain). hence Twenty-five (25%) of the total population of 1502 participants were selected forming a sample size of 376 representing 25% of 523 participants of CRNP Oban division, 25% of 112 participants from CRNP Okwangwo division, 25% of 197 beneficiaries from Mbe Mountain and 25% from 670

participants of BNR, Therefore, the study sample was made up of 376 participants of conservation programmes provided by environmental non-governmental organizations in enclave/buffer zone communities from protected areas. The data collected were imputed into SPSS and analysed using Descriptive statistics mean, standard deviation and simple percentage.

Results

The research question was answered by of the demographic data collected.

Difference in forest conservation between male and female participant in conservation of forest resources in protected areas.

What is the difference in forest conservation between male and female participant in conservation of forest resources?

This question was answered using results of descriptive data analysis. The mean of male beneficiaries was compared with the mean of female beneficiaries and described accordingly. The results are presented in Table 1. The results show that the males had a mean conservation of 30.09 with standard deviation of 3.47, while the females had a mean conservation of 29.08 with standard deviation of 3.27. By these results the males were adjudged as conserving the forest better than their female counterparts.

Table 1: Means and standard deviations for male and female participants in forest resource conservation.

Sex	N	$\overline{x}$	SD
Male	173	30.09	3.47
Female	203	29.08	3.27

Age brackets in forest resource conservation

What is the difference in conservation of forest by age of participants in conservation programmes?

This question was answered using results of descriptive data analysis. The means of beneficiaries of the different age brackets were compared and described accordingly. The results are presented in Table 2. The results show that beneficiaries in the age bracket of 16-30 years had a mean conservation of 29.65 with standard deviation of 3.47, those in the age bracket of 31-50 years a mean conservation of 29.25 with standard deviation of 3.22, while others in the age bracket of 51 and above had a mean conservation of 30.28 with standard deviation of 3.40. By these results people in the age bracket of 51 years and above were more forest conservative than their counterparts in other age brackets. The study concludes that age affected forest conservation.

Table 2: Means and standard deviations for the difference in age brackets in forest resource conservation

Age Brackets	N	$\bar{x}$	SD
16-30 years	89	29.65	3.57
31-50 years	215	29.25	3.32
51 years & above	72	30.28	3.62
Total	376	29.54	3.40

Difference by protected areas in forest resource conservation

This question was answered using results of descriptive data analysis. The means of beneficiaries of the different protected areas were compared and described accordingly. The results are presented in Table 3. The results show that beneficiaries in Becheve Nature Reserve had a mean conservation of 30.30 with standard deviation of 3.35, those at CRNP Okwangwo Division, a mean conservation of 29.15 with standard deviation of 3.11, while others at Mbe Mountain had a mean conservation of 28.94 with standard deviation of 3.14. The results also show that CRNP Oban Division with a mean conservation of 28.88 and standard deviation of 3.44 had the lowest forest conservation. By these results people in Becheve Nature Reserve were more forest conservative than their counterparts in other locations. The study concludes that location affected forest conservation. Results are shown in table.

Table 3: Means and standard deviations for the difference by protected areas in forest resource conservation.

Protected area	N	$\bar{x}$	SD
CRNP Oban	132	28.88	3.44
CRNP Okwangwo	26	29.15	3.11
Mbe Mountain	50	28.94	3.13
Becheve Nature Reserve	168	30.30	3.35
Total	376	29.54	3.40

DISCUSION

Difference in forest conservation between male and female participant in conservation of Forest resources

The result of **f**orest conservation between male and female participant in conservation of forest resources showed that male was adjudged as conserving the forest better than their female counterparts. Interestingly, the finding of this study is in line with Ifegbesan, Anneyarn, Pendlebury, and Rampedi, (2016) and Asifat and Ogbode (2019) who state that female gender rely to a greater extent on forest product for their daily basic needs and with no interest in replacing what has been removed than their male counterparts. However, the finding of this study also differs from that of Ukwetang, John, Otu, and Hope (2014) who outline that the male gender attitude and awareness to conservation of forest was very low compared to their

female counterpart. In a similar vein, the finding of this research question disagrees with Eneji, Ogar, Mubi, and Husain (2016) outlining that both male and female harvest forest products with the male interested and exploiting more of timber forest products and animal product while the female exploiting more of no-timber and little of animal product.

Difference in forest conservation by age of participant in conservation of forest resources.
The results of forest conservation by age of participant in conservation of forest resources **r**eviled that people in the age bracket of 51 years and above were more forest resources conservative than their counterparts in other age brackets. The study concludes that age affected forest conservation. This result agrees with the findings of other studies that social demographic factor (age) contribute to conservation of forest resources. Therefore, Faleyimo and Akinyemi (2014), Mohamed, Kofi-Fosu, and Yusif, (2017) and Garekae, Thakadus, & Lepetu, (2017) all agrees that age among other social demographic variables, positively influence households' participation in forest management, revealing that youths were likely more reliant on forest product compared to their elderly counterpart, Interestingly, indicating that older people within the age bracket of 50 years and above tend to conserve forest resource more as most of them tend to have less involvement in logging, and forest clearing.

In the other hand, Derkyi, Appau, and Boakye, Boadu (2021). disagree within the finding of this result and Jamal, that there was no significant association between age groups as a social demographic characteristic and rural people participation in FLEGT-VPA implementation and monitoring activities. Stating that older folk are more inclined to collect Non timber forest and timber forest product while their younger folk prefer active participation through decision making in forest programme that affect their livelihood. This is not the case as it was also observed that young people between the age bracket of 16-30 and 31-50 years, as indicated by the finding of this study that young folk were more actively involved in forest resources exploitation and establishment of new cocoa farms, banana plantation, more than their older folks who were observed to be more active in maintaining their existing farms rather than clearing new plantation farms. Older people were also observed to be more active in taking conservation decision more than their younger counterpart who were also observed to question most conservation decision that affect their extraction of forest resources.

Difference in forest conservation by PA's
The difference in the conservation of forest resources in selected protected areas show that people in Becheve Nature Reserve were more forest conservative than their counterparts in other locations. The study concludes that location affected forest conservation. This result is in line with the finding of Onojeghuo, Fonweban, Godtime and Onojeghuo (2016) they outline that the annual deforestation rate for Afi-mountain and Ekuri-Ukpon Cross River South cluster decline after 14 years implementation of REDD pilot project. Similarly, the reverse was the case in mangrove forest cluster experience a rise in the annual deforestation over the 14 years period after the implementation of the REDD project. Interestingly this is also evidence in this study as its indicated that people in Becheve Nature Reserve top in conservation of forest

resources, CRNP Okwangwo Division, were second in the conservation of forest Resources followed by Mbe Mountain with CRNP Oban Division being the least in conservation forest resources. This result is a clear indication of the reality on ground added to key informant information. As the researcher was informed by his key informant that since the establishment of the Cross River National Park the only alternative livelihood provided was in 2021 when Wildlife Conservation Society (WCS) provided improved cocoa seedling which are expected to start producing in 1 year 6 six months but as the time of this study findings none of the improved seedling had started producing after two (2) years transplanting hence giving the beneficiaries no options than to resort to old and unsustainable forest resources exploitation.

In Becheve Nature Reserve (BNR), CRNP Okwangwo Division and Mbe Mountain it was observed that more than one Non-governmental Organization were actively involved in different forest resource conservation programme at different period of the establishment of the protected area. Organizations such as Nigeria Conservation Foundation (NCF), African Research Association Managing Development in Nigeria (ARADIN), Organization for Positive Sustainability Change in Nigeria (OPSCN) had provided alternative such as Temperate vegetable, micro-credit, cassava processing mill, and beehive. Additionally, the present of Obudu Mountain Resort around BNR was also observed to be one of the variables that may have influence beneficiaries to be more conservative. While the present of National Park Service, WCS, Okwangwo Conservation Society (OCS) in CRNP Okwangwo Division and the efforts of Conservation Association of Mbe Mountain (CAMA) and WSC were observed to have impacted the beneficiaries hence the finding of this research question.

Conclusion

Based on the finding of this study, the following conclusions were reached; that gender, age and location of protected areas has influence on participant in conservation of forest resources, indicating that male are more forest conservative than their female counterpart as well as those above the age bracket of 51 year.

Recommendations

Base on this result and finding of this study, the researcher therefore recommend that a clear-cut conservation targets groups should be defined while engaging rural dwellers in conservation programmes and activities and the programmes should be design with the major aim of improving participation of younger people and women which will improve their standard of living hence reducing their participation in activities that degrade forest resources and improve their active involvement in forest resources conservation. Especially involving the young folks in key conservation policies and decision make process. Need assessment should be conducted to guaranty success of the programmes and add value to conservation of forest resources. This is to understand which gender or age bracket the exploit forest resources the more for proper programme design and implementation.

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