



## **Potentials of Indigenous Knowledge in the Management of Okwangwo Division of Cross River National Park, Nigeria**

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### **Authors' contributions**

*This work was carried out in collaboration between both authors. Author AAN designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author PCN managed the analyses of the study and the literature searches. Both authors read and approved the final manuscript.*

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### **ABSTRACT**

Institutional changes in the management of biodiversity over the years have given rise to negative impacts on forest conservation, however, the use of traditional knowledge systems, taboos, sacred sites and institutions have great potentials in the conservation and utilisation of forest and wildlife resources. The study, therefore, accessed the potentials of indigenous knowledge in the management of Okwangwo division of Cross River National Park. Questionnaires and interviews were used to collect primary data while secondary data were sourced from relevant documents in cross river national park as well as other past studies on the area. A total of 188 questionnaires were administered in four selected communities in the study area while forty 40 questionnaires were administered to park rangers in the division. Respondents identified four major traditional institutions that exist in the communities including Ntsebe-Oshie, Mfam, Mgbe, and Angbu. Ntsebe-Oshie was

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overwhelmingly rated by respondents as the most prominent traditional institution in the area (100%), followed by Mfam (94%), angbu (67%) and Mgbe (66%). The most dominant practice in the communities as submitted by a majority of the respondents was traditional harvesting methods 97%, while royal traditional rules, taboos and secret landscapes were all rated equally (85%). However spiritual landscape received the least scores from respondents (64%), the majority of the respondents asserted that violation of the rules and regulations enacted by these communities attracted sanctions by Ntsebe-Oshie, while the general perception of the respondents was that indigenous knowledge has great potentials in supporting protected area management in the division. However, the park rangers interviewed alluded to the fact that these special traditional knowledge system was not incorporated by the park in its overall management. Combination of various strategies including traditional knowledge is recommended for the effective management of the park.

*Keywords: Traditional knowledge system; taboos; sacred sites; traditional institutions; traditional practices.*

## 1. INTRODUCTION

The significance of biodiversity conservation in controlling environmental and ecological changes cannot be overemphasised, thus various strategies have been employed globally to ensure that bio-resources are used sustainably. However, deforestation has continued to pose a major problem in the conservation of the forest [1].

The use of experience-based knowledge represents an important advancement in ecological research [2,3]. This new scientific development has been described in various ways. Berkes et al. [4] described this knowledge system as Traditional Ecological Knowledge (TEK), while [5] as indigenous knowledge (IK) and Kothari [6] as Rural Peoples' Knowledge (RPK). Indigenous Knowledge will be used for the purpose of this study and is considered as knowledge held by local people working in and making their livelihoods from their surrounding environments. It has been recognised that conventional ecological research cannot always be conducted over large areas to access complex as well as long term changes in the environment. The documentation of this type of knowledge can, however, provide a framework for discussion between scientists and the local communities around their research sites [7]. Local communities, particularly those living close to protected areas often have good background of the environment they live. Local communities often offer alternative knowledge and perspectives based on their own locally developed practices of resource use [4]. In recent times, academics, scientists, and policymakers are exploring the potentials of local knowledge as a source of managing ecosystems and protected areas. Consequently, the United

Nations Convention on Biodiversity is in support of the use of TEK globally. Although traditional instruments play a significant role in natural resource management, many studies on policies for biodiversity management often negates the use of these traditional institutions in biodiversity conservation. Traditional institutions consist of codes including norms and procedures that shape people's actions [8]. These institutions include taboos, rituals and various cultural practices of the people which have been sustained over the years [9].

Recent studies have recorded a significant decline in large mammal populations in many protected areas across Africa due to droughts, degradation, habitat loss, illegal hunting and diseases. The loss of biodiversity have pose serious threat to the sustainability of protected areas, raising serious concern that led to the convention of biodiversity, organised by the United Nations Convention on Environment and Development (UNCED) in Rio de Janeiro, Brazil, June, 1992. In spite of the major effort to address the situation, the loss of biodiversity is still going on at alarming rate globally [10]. In response to these developments, attention is now shifted to the use of indigenous knowledge as one of the solutions. Indigenous knowledge will likely provide a significant source for sustainable animal species conservation and management in the future. This study, therefore, seeks answers to the following research questions;

What are the existing traditional institutions and practices?

Are people punished for contravening local rules and regulations?

What are the perceptions of the relevance of indigenous knowledge by the local people?

What are the extents to which this knowledge is incorporated in the management of the Division?

## 2. MATERIALS AND METHODS

### 2.1 The Study Area

The Okwangwo Division (Okwangwo Division) lies between latitudes 9°02'E - 9°027'E and longitudes 6°05'N - 6°28'N in Boki and Obanliku Local Government Areas. It covers an area of about 1000km and is contiguous with Takamanda National Park in the Republic of Cameroon. Okwangwo division has a seasonal climate with rainfall varying considerably across the area. Most rain occurs between May and November, with the heaviest rains in July-September. In Obudu Plateau where the Obudu Ranch Resort is located, the annual average is 4280 mm [11]. There is usually a long dry season in the area, with very little or no rain between December and February. However, on the average there is less than 50mm of rain in both November and March [12]. Rivers in the area generally flow from north-east to South-West, the greater elevation is accompanied by increased dissection and structural control of drainage so the complex topography causes sharp changes in the direction of river courses in the higher areas. An important feature of the vegetation of Okwangwo Division is an ecotone of unbroken and little disturbed forest within the heights of 150 m to 1700 m. This situation is very rare in the African Continent [11]. There is a montane forest in the plateau part of the Division. This forest formation is characterised by an extremely low, and often disjunct, canopy, large numbers of trees, a low total basal area and lower species richness than the lowland or mid-elevation forest. The Fauna diversity of Okwangwo Division is rich, including *Cercopithecus mona* and *Cercopithecus nictitans* that are the most common primates in the Division [13]. Forest Elephants (*Loxodonta africana cyclotis*) in small numbers are reported in the Division, and contiguous with Tarkamada National Park in Cameroon. Hippopotamus, *Hippopotamus amphibius* was reported to occur in the Oyi River (Okwangwo Division) during the wet season, though their current status is uncertain [13]. The region has high bird richness and endemism [14]. The birds of Cross River National Park have been fairly well documented [15,16,17,18]. There are at least more than 280 species from Okwangwo [17] including the rare green ibis (*Bostrychia olivacea*), violet-backed flycatcher (*Hyliota violacea*) and the black Guinea-fowl (*Agelastes niger*). Cross River National Park as a

whole contains in excess of 1,100 species and as such is the richest site in Africa [19].

### 2.2 Method of Data Collection

#### 2.2.1 Target population

Four cells were randomly selected from the eight cells that constitute support zone communities in the study area. One community was purposefully selected from each of the cells to make up four communities. The total population that makes up the four communities is 3760 [12]. Five percent of the total population representing 188 respondents of the selected communities (3760) was sampled. These 188 respondents include farmers, local medicine men, hunters and civil servants. Forty questionnaires were administered to forty park rangers in the division.

#### 2.2.2 Sources of data

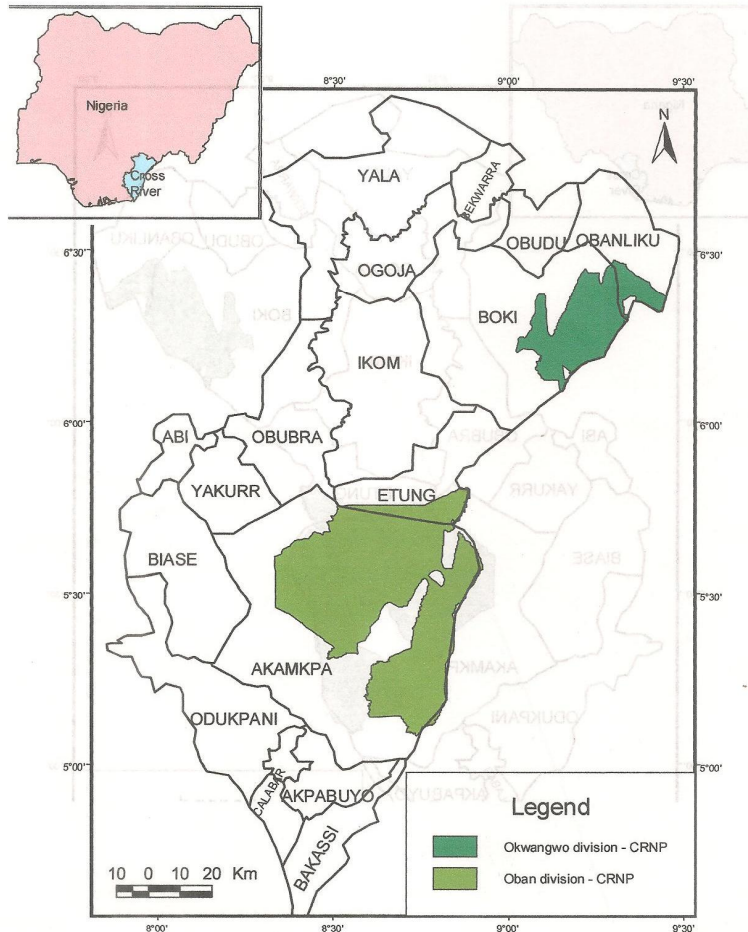
The primary sources of data used in the course of this study were from reconnaissance survey, personnel observation in the communities, oral interview and the use of questionnaires. Semi-structural questionnaires were used for data collection. Two sets of questionnaires were administered. The first sets of questionnaires were administered to the 188 respondents in the four communities while the second set was administered to 40 park officials in the Division. The questionnaires consisted of a list of questions that were administered to respondents to obtain information on the role of indigenous knowledge in the management of Okwangwo Division of CRNP. Some of the questionnaires were structured around a Likert Scale [20] which allowed respondents to make personal decisions based on the individual degree of ratings and intensity of items contained in the questions. The questions were structured from Strongly agree (SA), Agree (A), Not Sure (NS), Disagree (D) to Strongly Disagree (SD).

#### 2.2.3 Secondary data

Secondary sources of data was from literature review and information gathered from the National Park Service Headquarters and existing works relating to the study from libraries, journals, textbooks and the internet.

### 2.3 Data Analysis Techniques

Data collected were analysed using quantitative methods. The Statistical Package for Social Science (SPSS) was used to analyse the quantitative data and presented in the form of tables, percentages, pie and bar charts.



**Map 1. Cross river national park, Okwangwo division**  
 Source: NNPS, 2018 [45]

**3. RESULTS**

**3.1 Demographic Characteristics of Respondents**

**3.1.1 Religion of Respondents**

The distribution of the religion of the respondents sampled is shown in Fig. 1.

The results showed that, 100% of the populations were Christians.

**3.1.2 Educational attainment of respondents**

Fig. 2 shows the educational attainment of the respondents sampled.

Result indicated that 62% of the respondents sampled had education at primary level, 35%

attained up to secondary level while 4% had tertiary education.

**3.1.3 Occupation of the respondents**

The occupation of the respondents sampled is shown in Fig. 3.

The result showed that 70% of the respondents were farmers, 12% were either civil servants, or engaged in business activities, 4% were involved in other occupations, while 2% were students.

**3.1.4 Period of residence of respondents**

Fig. 4 shows the period of residence of the respondents sampled.

The results indicated that 8% of respondents had lived in the area for a time ranging from

11 to 20 years, 38% from 21 to 40 years, while 79% had lived in the area for over 40 years.

### 3.2 Traditional Institutions in the Communities

The Fig. 5 shows the traditional institutions in the communities.

The results on the traditional institutions existing in the communities indicated an overwhelming response (100%) that village assembly (NTSBE - OSHIE) was the most popular traditional institution in the area. The next popular institution was the deities (Mfam, Ekwuunke, Owahi and Ejia) in the community (94%) while Mgbe and Angbu recorded responses of 69% and 67% respectively from those interviewed.

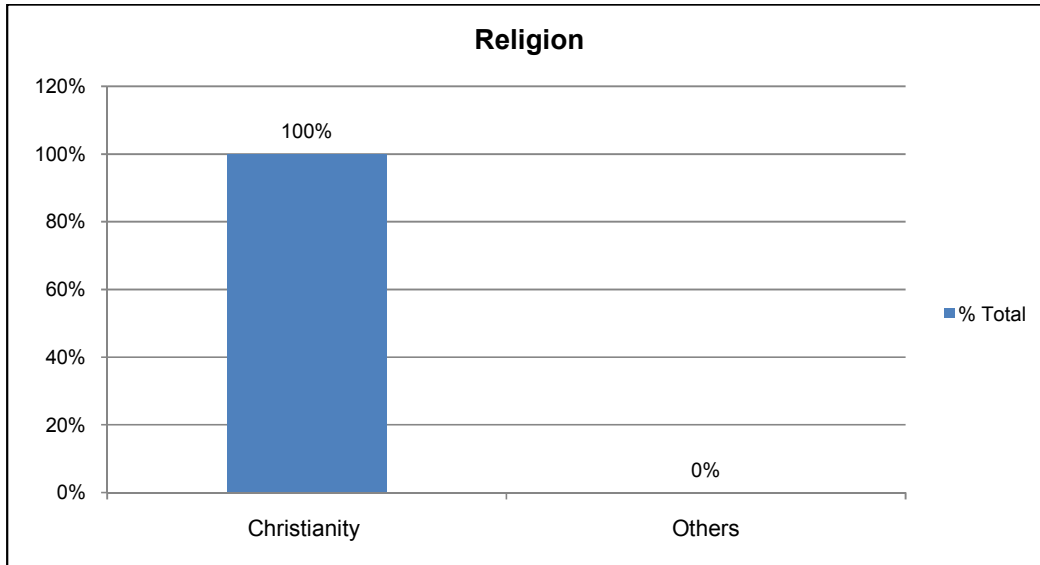


Fig. 1. Religion of the respondents

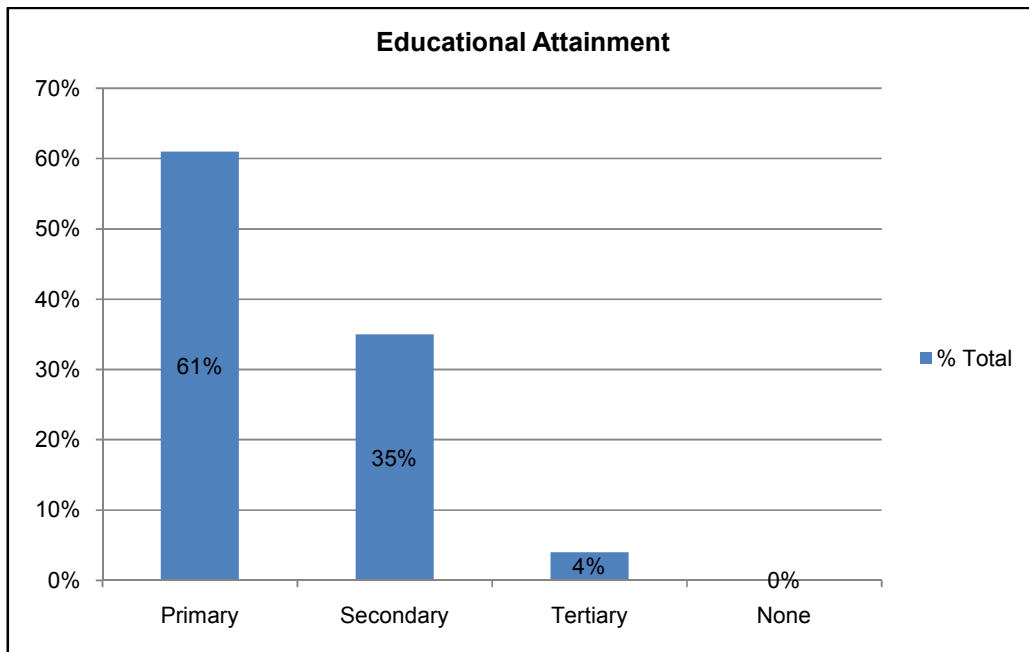


Fig. 2. Educational attainment of the respondents

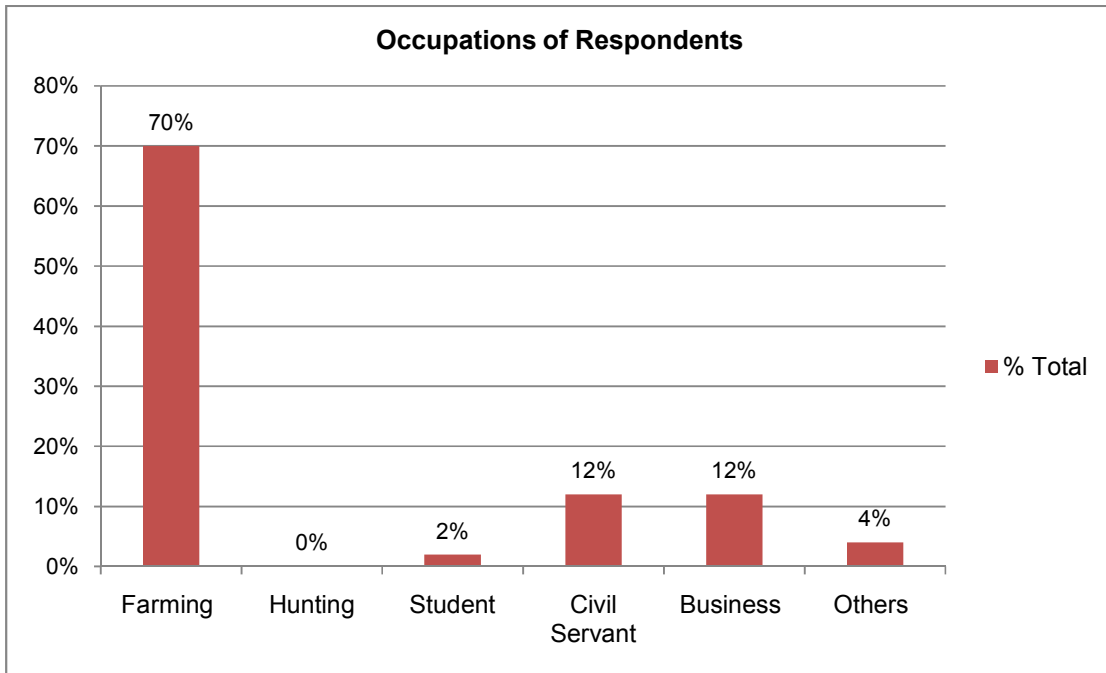


Fig. 3. Occupation of respondents

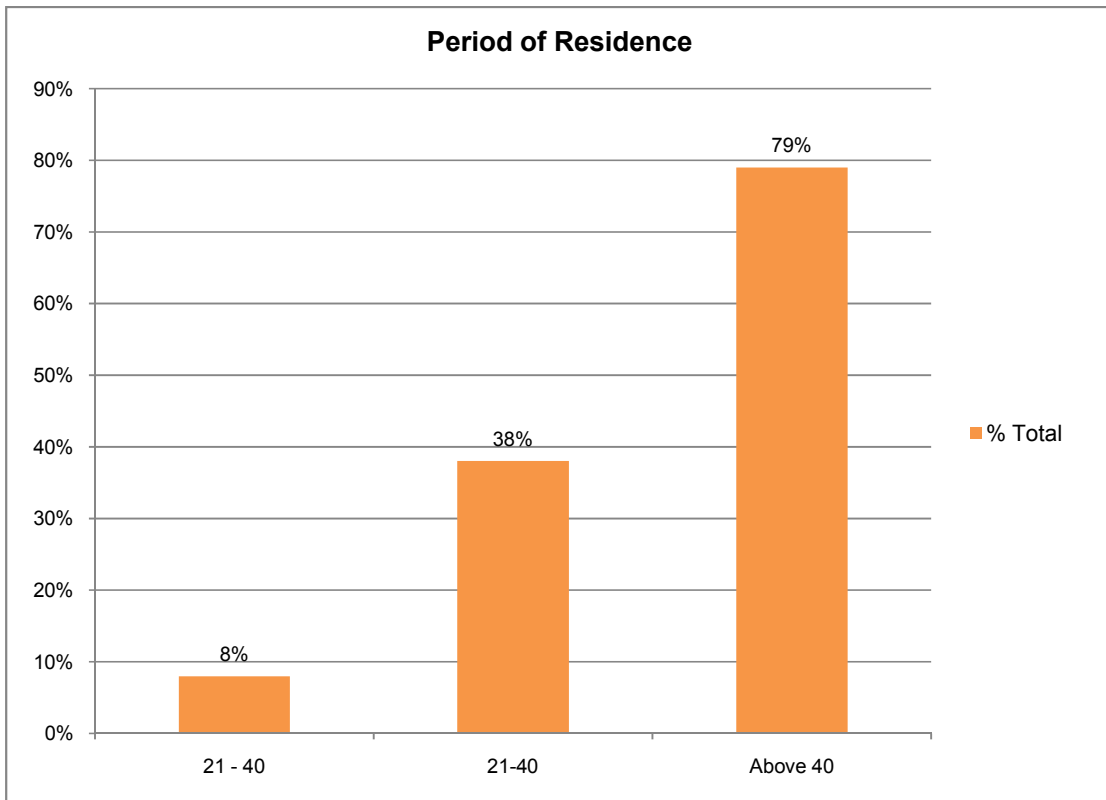


Fig. 4. Respondents' period of residence

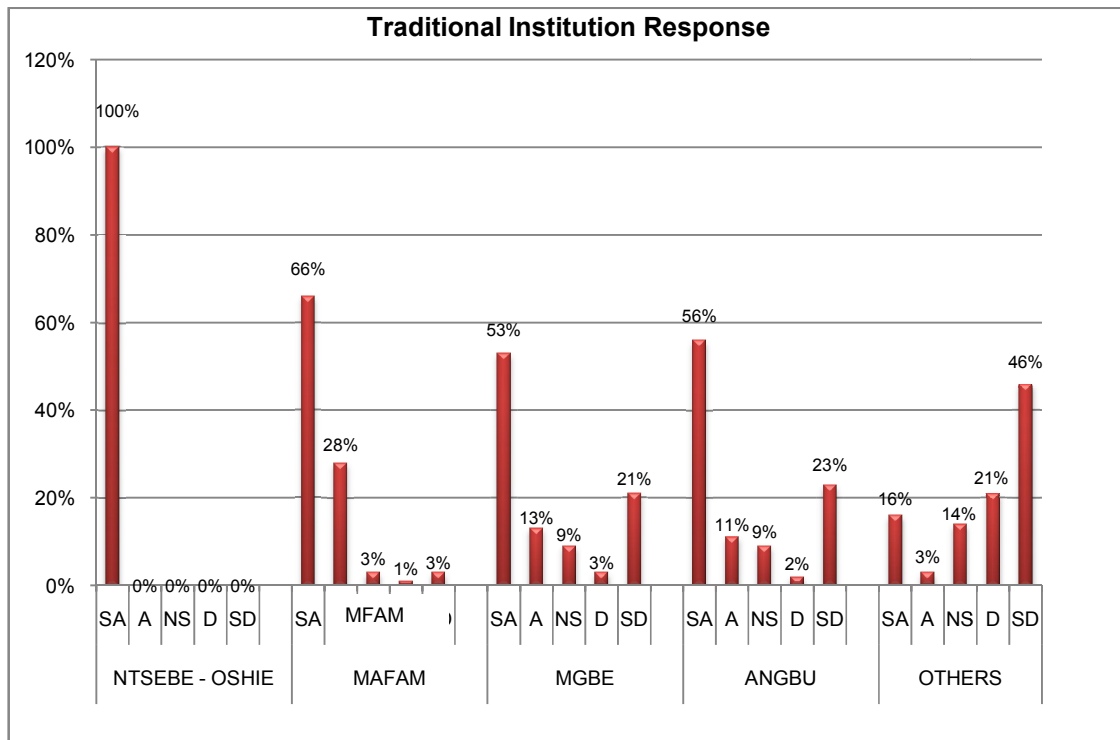


Fig. 5. Traditional institutions in the community

### 3.3 Traditional Practices in the Communities

The Fig. 6 shows the traditional practices in the communities.

A reflection on the result shows that traditional harvesting methods were the most common traditional practices in the study area (97%). This was followed by Royal traditional rules, Taboos and Belief system, Sacred landscapes both recording 85% from respondents' opinions while Spiritual landscape was the least recognised by the respondents as Traditional practices in the study area.

### 3.4 Contraventions of Local Rules and Regulations

The action of the communities on those who violate local rules and regulations is reflected in Fig. 7.

The results showed that 86% of the respondents sampled agreed that people are been punished when they violates or contravened the rules and regulations put in

place by the relevance institution in the community, 10% had a different opinion, while 4% were indecisive.

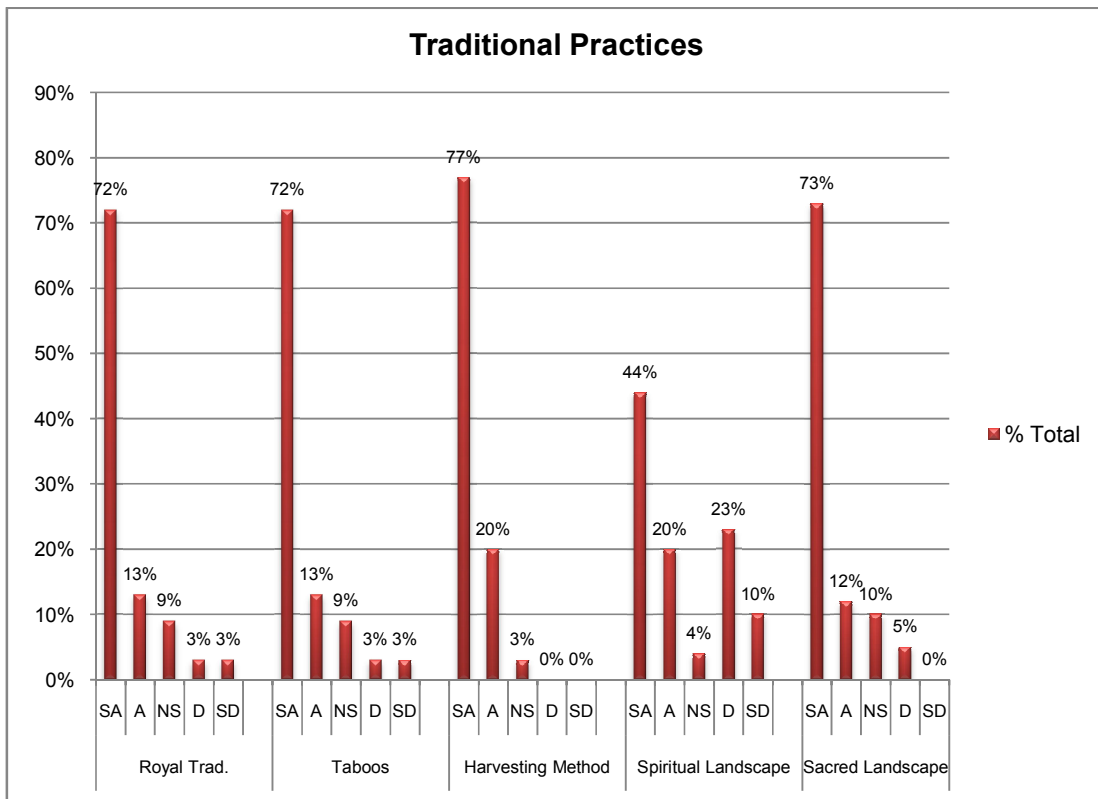
### 3.5 Perception of Local People on the Relevance of Indigenous Knowledge in Park Management

Fig. 8 reflects the perception of the local Communities on the relevance of indigenous knowledge in the management of Okwangwo Division.

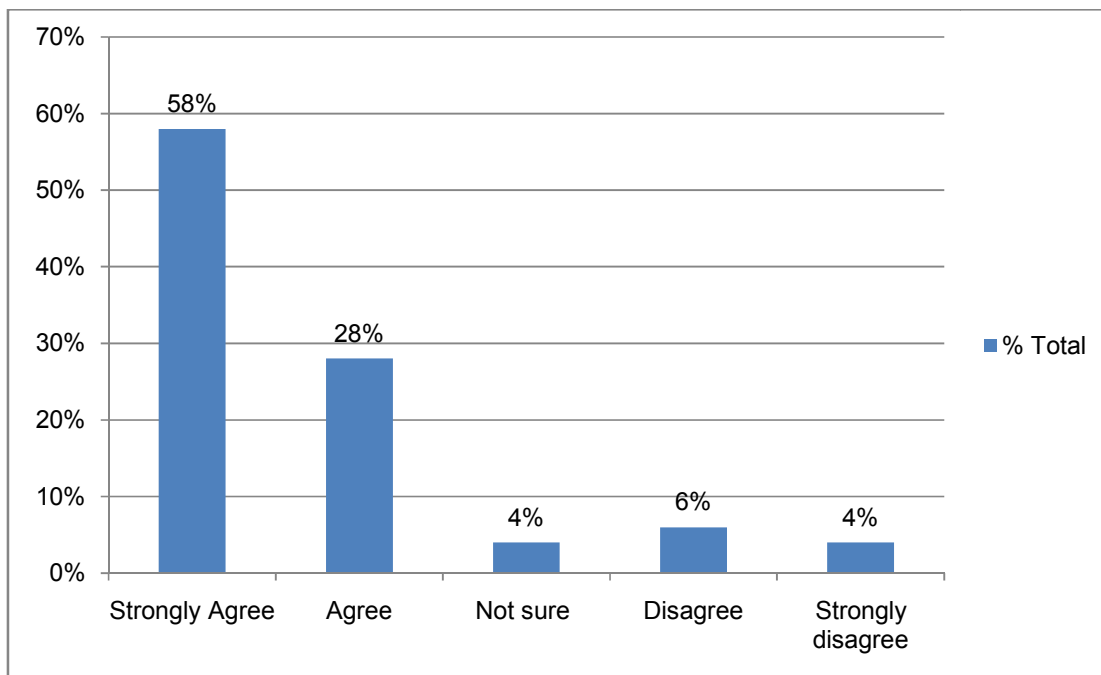
In the results, majority of the respondents (95%) asserted that indigenous knowledge has a very important role in the management of Okwangwo Division of Cross River National Park as against the 4% and 1% who either disagreed or did not align to any position respectively.'

### 3.6 Use of Indigenous Knowledge by Park Staff in the Management of Okwangwo Division of CRNP

Results on the use of Indigenous knowledge by the management of Okwangwo Division of CRNP are reflected in Fig. 9.



**Fig. 6. Traditional practices of the respondents**



**Fig. 7. Punishment for contravening local rules and regulations**



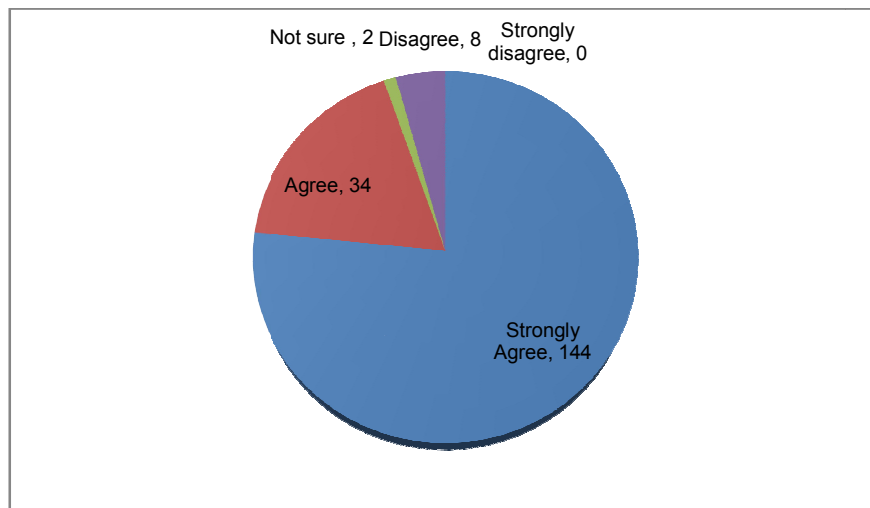


Fig. 8. Perception of local people on the relevance of indigenous people in park management

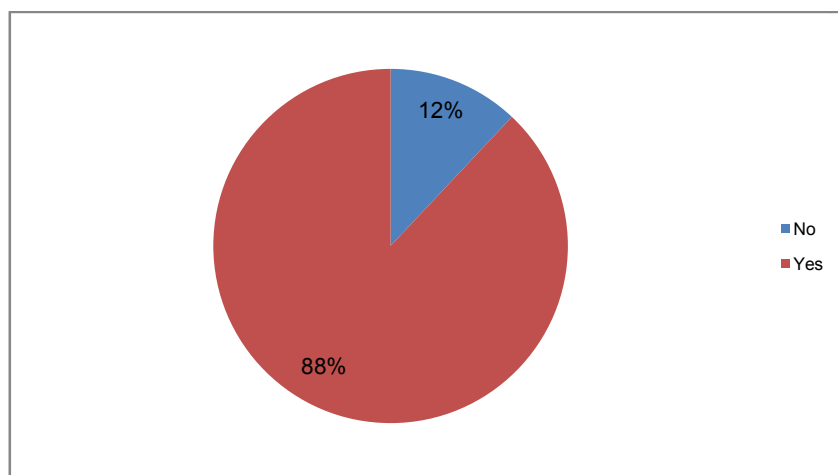


Fig. 9. Use of indigenous knowledge in the management of Okwangwo division of CRNP

From Fig. 9, majority of the respondents (88%) were of the views that Indigenous knowledge was not incorporated in the management policy of CRNP, while 12% had a different view.

#### 4. DISCUSSION

##### 4.1 Contributions of Demographic Characteristic of Respondents on the Effectiveness and Implementation of Indigenous Knowledge in the Communities

Majority of the members who participated in FGD consented to the facts that people should be

punished for contravening local rules and regulations. This group is likely going to fall in the category of people who have great respect for the socio cultural structures of their community despite the introduction of foreign culture into the area. The views of participants on the influence of sex in the obedience to local laws and regulations indicated that men were less obedience than women to penalty put in place by the communities to check violation of local laws and regulations [21]. This position is also corroborated by Augustino [22] that management of vegetable garden is mostly the pre occupation of women, while men were mostly involve in exploiting resources from the forest, including timber exploitation, hunting as well as

encroaching into the sacred forest of the community for income generation activities without recourse to lay down rules and regulation [23].

On the relevance of years of residence on the obedience to rules and regulations regarding indigenous knowledge, opinion of majority of the participants tilted to the fact that the longer one stays in a particular area, the more he or she becomes knowledgeable and committed to the protection of the natural resources in the area. It will be recalled that majority of the respondents (79%) (Fig. 7) had resided in the area above 40 years, laying credence on the outcome of the FGD. This position was also reflected in the general opinion of those who participated in a similar study by Ruheza et al. [21]. Zazu [24] submitted that indigenous knowledge is linked to long term interaction between the people and the ecosystem in the area.

#### 4.2 Existing Indigenous Institutions and Practices

Majority of the respondents submitted that local institutions and practices exist in these communities. The responses from most of the key participants interviewed revealed various conservation practices which the local people were involved in either purposefully or by reasons of their traditional activities that promote the conservation of biodiversity. These practices were placed into 5 categories [25].

**Taboos and Beliefs** being unwritten rules or social prohibitions, **Royal traditional rules**, referring to rules and regulations as enforced by the local traditional government system, **harvesting methods** which are also critical in the practice of these communities and covered both plants and animal species. Extraction methods such as firewood collection by picking only dead wood for cooking without cutting the whole tree or picking of ripe fruits from the ground were some of the practices mentioned by the respondents that fall into this category. Other practices included using only roots, barks and leaves for medicinal purposes while people were encouraged to bury dug holes after extracting roots for medicinal purposes. **Spiritual values and sacred landscapes** were some of the practices by the people referring to restricted places such as grave yards or forest patches dedicated to traditional worship.

Traditional institutions common in the communities included Village Assembly known

as **Ntsebe-Oshie** in Boki language, **Deities** (Mfam and EkwuUnkie, Mgbe and Angbu). It was also reported that the village was the highest political unit in the study area while village authority had three organs – The Council of the Elders known as “**Echikpe**”, the Village Assembly known as “**NsebeOshie**” and the Age grades.

Traditional institutions were also reported in Busi community including “**Ikam**” referred to as the god of reproduction, **Urim-higure** which is the god of peace, happiness and progress as well as “**Ititsong**”, **Urim-ichang** and **Kiakpe** worshiped as deities [26].

All the practices and institutions are relevant in biodiversity conservation among the communities as indicated by the overwhelming affirmation by respondents. A similar study by Jimoh et al. [27], in Oban Division of CRNP, Nigeria also identified ten cultural groups/associations including 7 laws and taboos which were relevant to sustainable use of natural resources. **Mgbe, Angbu, and Ekpe** were the most common cultural institutions in all the villages in the study area and had direct bearing they have direct bearing on the lives and behaviours of the people. In Ghana, the Asante's' belief that God has given special powers to some animate and inanimate objects including stones, plants, animals, woodlands, mountains and water points. These objects were considered sacred and are believed to have souls or spirits inherent in them incurring the wrath of the soul of the tree or animal if wantonly destroyed [28].

#### 4.3 Punishment for Contravening Local Rules and Regulations

The people still believe in the supernatural powers of the ancestral spirits. Majority of the respondents who believed on punishment for contravening local rules and regulations might fall into the category of local people who will always preserve their tradition despite the introduction of foreign culture in their areas. The punishments that people suffer when they contravene these local rules and regulations are always very severe, thus regulated their actions when they contemplate to over exploit the natural resources in their communities. Awuah-Nyamekye [29] submitted that the people of Asante in Ghana are constantly under the watch by the supreme deity, the ancestors and the lesser spirits and show their displeasure to culprits destroying the environment through

sickness, with some individuals facing sudden death, grievous ailments including leprosy, epilepsy and various mental disorders [30,31].

However, a few of the respondents who had contrary views might be those who have strong Christian background. Therefore, the opinion of those who were involved in focus group discussion asserted that modern ways of life and Christianity have caused people to shift completely from traditional beliefs as some people, particularly the youths seek scientific explanations as solution to local community challenges. In spite of the efficacy and importance of traditional African belief systems in biodiversity conservation and management, little attention is given to its practical application [32]. In recent times, efforts have been put in place to integrate rural people into conservation programmes and projects, however this has been slow [33]. Ntiemoa-Baidu [34] has attributed this development to increasing non-adherence to traditional beliefs, following the advent of the growing influence of foreign religion and beliefs, lack of modern regulations to enforce the traditional rules.

#### **4.4 Roles of Indigenous Knowledge in the Management of the Division**

Most of the key participants were of the opinion that indigenous knowledge has been used in the past to manage their forest resources. It was further stated that these knowledge can be very useful if used to support biodiversity conservation in Okwangwo Division of the park. Monuwenyu [35] argues that prior to colonisation in Zimbabwe, traditional methods of resource management posed little stress on the environment. Jimoh et al. [27] submitted that forbidden forest were common in every *Ejagham* community or village containing the *Mgbe* shrine, where initiation into the *Mgbe* cult is conducted. The existence of forbidden forest (*Mgbe* Forests) in the communities and villages play vital role in the support of wildlife conservation across the area. Similar studies in Tanzania have revealed that traditional laws prevent people from entering sacred Forest on certain days and seasons [36].

However, these traditional practices become less important in recent times where scientific approaches are now popular.

Though, the management of CRNP has not in any way incorporated the use of indigenous knowledge in its management policies, majority

of the respondents believed that this form of knowledge will go a long way in supporting conservation of resources in the Division. The key informants interviewed expressed the need for indigenous knowledge systems to be incorporated in the management systems of the Division. The effectiveness of traditional practices and institutions in conservation and protection of biodiversity has also been reported in some parts of Nigeria [37,38,39,40]. Anoliefo et al. [37] noted that cultural taboos and their sanctions have helped to check abuse of natural resources at least among the local people. This has also contributed to the conservation of biodiversity and wise use of resources in some parts of Ghana [41,42]. Among the *Akan* tribe, Thursday was considered as sacred to the mother earth as no farming, or hunting is allowed on this day [43]. This is targeted at reducing pressure on biodiversity, as it allows for sustainability. This study are affirmed by Bhagwat et al. [44] that sacred forests were richer in biodiversity than any other sites, concluding that threatened and endemic species were found in sacred /taboo forests which were absent from conventionally conserved forests in some parts of India.

#### **5. CONCLUSION**

The integration of indigenous knowledge into biodiversity conservation management practices in Okwangwo Division have not been officially recognised and promoted by management. Majority of the people are of the opinion that rules and regulations including basic institutional structures still exist and governed the use of natural resources in the area. Mismanagement of natural resources in anyway is highly prohibited under indigenous knowledge system. Official recognition and promotion of indigenous structures and institution is very essential for successful conservation of bio diversity in the Division.

#### **6. RECOMMENDATIONS**

There is need to develop national strategies to support the use of indigenous knowledge. This should result in full participation between local communities, the government, Non-governmental organisations, as well as the Academia. Further studies are recommended in the area of preparing strategies and policies for effective integration of indigenous knowledge into the overall management of Cross River National Park.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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