

ASSESSMENT OF WILDLIFE LAW ENFORCEMENT PRACTICES IN CROSS RIVER NATIONAL PARK, NIGERIA

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Abstract

The study examined the level of wildlife law enforcement practices in Cross River National Park Nigeria. 172 questionnaires were administered to eight purposively selected local communities living close to the park known as Support Zone Communities (SZC) and 24 questionnaires to field staff in the park. Focus Group Discussion was also conducted involving community's leaders and key management staff. Data obtained were analysed using descriptive statistics such as means, percentages and frequencies. Inferential statistics Data was analysed using chi square. The result of the study revealed that anti-poaching patrols were the major strategies adopted by the management in addressing illegal activities in the park as reflected in the responses of majority of field staff (62%). Though the local communities were engaged by the park in a comprehensive public awareness programme that enlightened them on the need to conserve the biodiversity of the park as well as comply with park wildlife laws, it was evidenced that there were still engaged in activities that were critical to the conservation of biodiversity in the area. Inadequate funding, poor transport and patrol equipment including non-implementation of reward systems to encourage and motivate field staff during patrols were amongst the challenges that affected patrol success in the park. Though there was a drastic drop in the number of persons arrested from 74 persons to 26 between 2011 to 2015, this cannot be adjudged as a measure of patrol success during the period. The myriad of challenges in the park including paucity of funds jeopardise all efforts by management to effectively address the high level of threats in the park. Statistical analysis also revealed that cash reward system ($X^2_{cal} = 19.75$, $df = 2$,) and sustainable financing ($X^2_{cal} = 3.841$, $df = 2$) were significant respectively. Therefore wildlife law enforcement practices are not effective in controlling illegal activities in the park. The study recommended adequate funding, provision of modern patrol equipments, inclusion of benefit sharing and reward system to enhance and sustain wildlife law enforcement practices in the park.

Keywords: Wildlife law enforcement; Cross River National Park support zone communities; Support zone development programme; Integrated conservation and development programme.

Introduction

Wildlife law enforcement is the implementation of policies, regulations and laws for the development of wildlife conservation in a country. Since the life of any nation is dynamic, the need to regularly appraise the level of management effectiveness of protected areas on regular basis cannot be overemphasized. Although the intention of any law is not to satisfy the interest of everybody in a nation, however, all problems associated with wildlife conservation should be evaluated and solutions to them articulated based on consensus among all stakeholders [1]

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Therefore, wildlife laws and regulation provides reference points for the realization of the objectives of establishing protected areas. Wildlife laws provide definite reference points systematic and coherent view and action programmes to attain greater heights in wildlife management [2].

One of the greatest challenges in wildlife conservation and management is the high level of biodiversity lost due to various anthropogenic activities, which if not addressed can lead to a gradual extinction of many fauna and flora species [3]. This has led to intensive engagement in poaching and illegal in wildlife which in recent times has become an organised profitable and capital intensive business in most of the remote parts of National Parks and game reserves [4]. It has been established that wildlife law enforcement is a conservation strategy for the protection of wildlife species. However [4] has not considered this strategy as an effective means of addressing issues of illegal activities in protected areas. He attributed its ineffectiveness to limited human, financial and material resources required to monitor illegal activities and enforce existing laws. Wildlife laws are not likely effective in dealing with all known anthropogenic threats without complementary actions.

An effective wildlife law enforcement for the protected areas is based on three crucial factors including regular and routine patrols by well-trained field staff, effective wildlife enforcement practices and adequate funding [5]. The areas to be protected are often very expansive with inadequate manpower to cover these vast areas. Furthermore, the allocation and management of these limited resources is fruaded with irregularities and the level of success of routine patrols is low. Findings in past studies have reported how vulnerable Cross River National Park is to poaching and various anthropogenic activities. This development is further aggravated by the inability of management to provide substantial benefits to local communities surrounding the park. One of the key principles employed by [6] in the planning and establishing of Cross River National Park was complementing conservation with development in communities surrounding the park known as support zone communities. This according to him was to ensure that Cross River National Park archive the conservation goal of maintaining a globally important ecological area as well as develop strategies of improving the socio-economic life of support zone communities. This was in line with the goals of Integrated Conservation and Development Programme (ICDP). Support Zone Development Programme (SZDP) was therefore adopted as the mechanism for the realization of this goal in the park [4] Target villages of the SZDP are known as Support Zone Communities (SZCs), while their farmlands and communal forests are defined as 'support zones. A package of incentives is distributed to (SZCs) so as to encourage them participate actively in the protection and development of the Park, while benefiting from the parks intervention programmes which are agro forestry-based systems with high level of sustainability [7].

It has been widely acknowledging that ecotourism is relatively easy to develop in an environment where government, private and local communities have the will to undertake the tax of conserving the biodiversity of the area to ensure long term sustainability of the ecosystem. This cannot be archived without the participation of host communities [8]. Local community participation is therefore given prominence in the legal instrument that established the park the National Parks Service Act of 1999 (Laws of the Federation of Nigeria (LFN) Cap 65 of 2004) through the establishment of Local Advisory Committees (LAC). The local advisory committees were encouraged to organize, cooperate with associations and networks of support zone communities in the overall management of the park. However, the present challenges in Cross River National Park include inadequate funding to carryout critical management activities, which have imposed negative impacts on the overall management effectiveness of the park. This study therefore assessed the level of various wildlife law

enforcement strategies that are employed in addressing illegal activities in Cross River National Park, Nigeria.

Materials and Methods

Study area

Cross River National Park is situated in Cross River State, which is in the South – East end of Nigeria bordering the Republic of Cameroon (Fig 1). The Park covers a total area of 4000sq km, mainly made up of moist tropical primary rainforest ecosystem. The Park has two distinct, non contiguous Sectors: Oban and Okwangwo Sectors. Oban Sector lies within longitude 8°02'E and 8°55'E and Latitude 5°00'N, and 6°00'N. It covers a total area of 3000sq km, and is the largest of the two sectors, rich in biodiversity. Oban Sector is ecologically contiguous with Korup National Park in the Republic of Cameroon. It is reputed to be the richest ecosystem in Nigeria in terms of biodiversity [9]. It has 1568 plant species of which 77 are endemic to Nigeria, 75 species of mammals, 282 species of birds, and 42 species of snakes [9]. Oban Sector moist primary forests are also rich in epiphytic ferns and orchids. Okwangwo Sector covers a total area of 1000sqkm and lies between latitudes 6°02'N and 6°028'N and longitudes 9°02' E and 9°27' E. It shares international boundaries with Takamenda Game Reserve in the Republic of Cameroon. It is made up of primary rainforest, Montane Forest and derived savannah, with about 1545 identified species of plants in 98 families. The rediscovery of Gorillas in the Boshi and Okwangwo areas in late 1987 is of particular importance, because as they are the most viable population of low land gorillas in Africa [10].

Method of data collection

Eight communities within the 112 support zone communities in the two sectors of the park were selected for the study including Akim, Nsofang and Nsan in Oban sector, and Bokalum, Bamba, Abu-Obisu, Okwangwo and Buabre in Okwangwo sector (Table 1).

Table 1. Population of the Randomly Selected Support Zone Communities and the sample size

S/n	Sectors	Communities	Population 1991(NPC)	2015 projected @3% birth rate	Sample size (1%)
1	Oban Sector	Aking	829	4126	41
		Nsofang	2417	4158	42
		Nsan	1678	2887	29
2	Okangwo Sector	Bokalum	650	1118	11
		Bamba	894	1538	15
		Abu Obisu	467	804	8
		Okwangwo	1,061	1825	18
		Buabre	472	819	8
Total		8	8468	17275	172

Sample Size

The sample size of the respondents was 1% of the estimated population in each community. Therefore 41, 42 and 29 questionnaires were respectively administered to the respondents at Aking, Nsofang and Nsan communities in Oban Sector, while 11, 15, 8, 18 and 8 questionnaires were respectively administered at Bokalum, Bamba, Abu Obisu, Okwangwo and Buabre, communities in Okwangwo sector of the park. This gave rise to a total sample size of 172 (Table 1). Twenty-four field staff were purposively selected to compliment results from the local communities (Table 2).

Table 2. Population of randomly selected rangers and the sample size

S/N	Sectors	Patrol Stations	No. of Rangers	20% Sample Size
1	Oban Sector	Aking	19	4
		Orem	10	2
		Nsofang	12	3
		Nkunaya	14	3
		Ekuri	12	3
		Okoroba	10	2
		Owom	6	1
		Ekwang	7	1
2	Okangwo Sector	Okwa 2	7	1
		Bamba	6	1
		Abu Obisu	5	1
		Okwangwo	6	1
		Mbuli	4	1
Total			118	24

Data management and data analysis

Primary and secondary data were used for the study. The sources of primary data included personal observations in the communities, oral interviews and the use of well-structured questionnaires. Focus Group Discussions (FGD) were held with 13 principal stakeholders including 5 officials of the Park and 8 members in the communities.

Two sets of questionnaires were used for this study for two different target groups. The first set of questionnaires 172 were administered to 8 selected local communities around the study area including Aking (41), Nsofang (42), Nsan (29), Bokalum (11), Bamba (15), Abu Obisu (8), Okwangwo (18) and Buabre (8). The second set of questionnaires was for the 24-field staff that were purposively selected in the Oban and Okwangwo sectors of CRNP. The questionnaires consisted of a list of questions that were administered to respondents to obtain information on the level of threats and wildlife law enforcement practices in Cross River National Park.

Data analysis

The data collected were subjected to descriptive statistical analysis, chi-square test statistic, t-test and multiple regression analyses at 5% level of probability.

$$Y_i = a_1 + b_1X_1 + b_2X_2 + \dots + b_nX_n$$

where: $a_1, b_1, b_2, \dots, b_n$ are constants to be estimated while Y_i is dependent variable and X_i are independent variables.

Y_i : Management practices in addressing illegal activities in the park is the dependent variable, while the independent variables, X_5, \dots, X_{10} are X_5 : enforcement of wildlife law, X_6 : anti poaching patrols, X_7 : provision of livelihood option, X_8 : community participation in park management, X_9 : level of incentives to park rangers, X_{10} : inadequate boundary demarcation.

Hypothesis

Null Hypothesis (H₀): Wildlife enforcement practices are not effective in controlling illegal activities in the Park.

Alternative Hypothesis (H_a): Park Management practices are effective in controlling illegal activities in the Park.

Results and Discussion

Level of Awareness of Wildlife Laws

Majority of the population sampled (82.5%) agreed that local communities were aware of the existence of park laws and park activities (Table 3).

Though majority of the respondents were of the views that support zone communities were aware of park laws and activities, it was evident that the communities were still engaged in activities that are illegal and pose as threats to the survival of biodiversity in the park. The fact that the people are aware of park laws and regulations without following up with compliance is therefore a matter of great concern to the park. Generally, awareness and support by the communities was therefore in principle and could not be translated into practical terms. There is mixed evidence on whether awareness of rules and regulations can increase compliance to wildlife laws. A study in Namibia, revealed that awareness of wildlife laws and regulations had some positive bearings with compliance [11]. It is, therefore, necessary for Cross River National Park Management to strengthen its conservation education programmes in the support zone communities to enlighten them on the moral responsibility of supporting conservation programmes of the park. This has also been advocated [12].

Table 3. Respondents level of awareness of wildlife laws in the study area

Response	Communities								Total (%)
	Aking	Nsofang	Nsan	Bokalum	Bamba	Abu Obisu	Okwangwo	Buabre	
Agreed	35	35	20	10	15	7	15	7	142(82.5)
Not sure	2	2	5	1	0	1	3	0	14(8.1)
Disagree	4	5	4	0	2	0	0	1	16(9.4)
Total	41	42	29	11	15	8	18	8	172(100)

$$X^2_{cal} = 132.012^{**} \text{ df} = 28, X^2_{tab} = 41.34, P\text{-value} = 0.000$$

Since $t_{cal} (132.012) < t_{tab} (41.34)$, the null hypothesis was rejected implying that the people were fully aware of wildlife laws in the study area.

Strategies Adopted by Management to Address Illegal Activities in the Park

Majority of the respondents (62%) were of the views that anti-poaching patrols were a major strategy adopted by management to check illegal activities in the park (Table 4). There were also of the opinion that the park was not committed to adopting other strategies including the use of benefit sharing, public enlightenment campaigns, joint management, community development and employment of local communities' members to support anti-poaching patrol.

Various strategies were adopted to check illegal activities in the park including Anti-poaching patrols, public enlightenment campaigns, benefit sharing, community development programmes, employment and joint management activities. However anti-poaching patrols were in the mainstream of management approach towards addressing these challenges as expressed by majority of the rangers. Regular law enforcement patrols have been observed to greatly reduced the impact of threats in protected areas [13]. Conversely, reduced levels of law enforcement can also subject wildlife populations within protected areas to high level of hunting pressure and other illegal activities [14-16]. There are also similar studies that have alluded that increase in the level of patrols have potentials of recording significant level of success in the enforcement of wildlife law enforcement practices [17-21]. However the long term presence of patrol guards in protected areas does not translate to significant reduction in the status of threats in protected areas [13]. The opinion of [22] also suggest that extensive and complex landscapes like the case in Cross River National Park can undermine the efforts of rangers to access hotspot areas where illegal activities are very prominent. This position has

been corroborated by several studies including that of [23] that increase in anti-poaching patrols are not likely to reduce illegal activities but can even aggravate the situation if other important issues are not addressed. Therefore the reduction in the number of persons arrested in Cross River National Park from 74 persons to 26 between 2011 to 2015 cannot be adjudged as a measure of patrol success during the period. The myriad of challenges in the park including paucity of funds, lack of reward systems to serve as incentives to field staff including, non payment of allowances to park rangers as well as poor feeding of rangers during patrols would likely jeopardise all efforts by management to effectively address the high level of threats in the park.

Table 4. Strategies adopted to address illegal activities in the Park

Response	Anti-poaching patrols	Public enlightenment	Benefit sharing	Community development	Employment	Joint management	Total (%)
Agree	15 (62%)	7 (30%)	0 (0%)	11 (46%)	11 (46%)	9 (38%)	53
Not sure	3 (13%)	2 (8%)	6 (25%)	1 (4%)	1 (4%)	2 (8%)	15
Disagree	6 (25%)	15(62%)	18 (74%)	12 (50%)	12(50%)	13 (54%)	52
Total	24 (100%)	24	24	24	24	24	112

The result above is therefore an indication that emphasis by management is more on engaging field (Protection) staff in park surveillance without exploiting other options.

Anti-poaching equipment in Cross River National Park

Available anti-poaching equipment

As presented in Table 6, both Oban and Okwankwo sectors have one four-wheel drive vehicle each, 2 motorcycles were also allocated to Oban sector and 4 in Okwangwo sector. However, 250 ammunitions were recorded in Oban as against 122 in Okwangwo sector for use during patrols. 24 shot guns (double barrel) and 20 shot guns (pump action) as well as 33 and 7 handcuffs were recorded in Oban and Okwangwo sectors respectively (Table 6). Out of 14 camping tents in the Park’s anti-poaching unit, 11 in Oban and 3 in Okwankwo sectors respectively without camp beds. Six Global Positioning System (GPS) were also available for use during patrol as well as research (Table 5).

Table 5. Anti-poaching equipment in Cross River National Park

S/N	Description of equipment	Quantity	Remark s*
1	Four wheel Vehicle – Patrol vehicles	2	1 – good 1 – undergoing repairs
2	Motor cycles	6	2 – good 4 – bad
3	Shot guns (Double barrel)	44	30 – good
4	Shot guns (Pump action)		14 – bad
5	Rifles	-	
6	Camping tents	14	6 – good 8 – bad
7	Camp beds	-	
8	Global Positioning system	6	4 – good 2 – bad
9	Others		

Level of illegal activities recorded between 2011 and 2015

A summary of illegal activities perpetrated from 2011 to 2015 indicated that hunting, logging and encroachment of farms into the park were the major threats in the park while

grazing was the least and occurred around the montane vegetation in Okwangwo Division (Table 6).

Table 6. Level of illegal activities recorded in the study area between 2011 and 2015

Types of offence	2011	2012	2013	2014	2015	Total
Logging	23	15	6	0	11	55
Hunting	14	21	17	8	18	78
Water poisoning	5	0	3	6	4	18
Grazing	5	0	0	1	0	6
Farming	18	5	3	4	5	35
Trapping	1	0	4	7	0	12
Illegal entry	10	3	1	1	1	16
Total arrests	76	44	34	27	39	220

Arrests and prosecution of park offenders

Records of annual reports of the park between 2011 and 2015 indicated that 220 persons were arrested and charged to court during the period (Table 8). Out of those presented to the court for prosecution, the highest number (45%) were discharged, the cases of (34%) were compounded while only (14%) of those charged to court were imprisoned (Table 8). The cases of (7%) of the offenders being the least was still under investigation during the period while the sum of ₦334,850 (three hundred and thirty four thousand eight hundred and fifty naira) was recorded as fines during the period (Table 7).

Table 7. Arrests and prosecution of Park offenders from 2011 to 2015

Court Verdict	Level of persecution					Total	%
	2011	2012	2013	2014	2015		
Imprisonment	6	6	0	2	2	16	7
Compoundment	31	12	13	6	12	74	34
Still in Court	7	6	9	3	5	30	14
Discharged	30	28	14	21	7	100	45
Total	74	52	36	32	26	220	100
Amount fined (₦)	674,000	755,000	741,000	889,000	289,500	334,850	

The role of sustainable financing in wildlife law enforcement practices

All the rangers interviewed during the study endorsed sustainable financing as an integral part in a successful wildlife enforcement programme (Table 8). Adequate funds were required to procure and maintain anti-poaching equipment, undertake various management activities in the park and settle basic needs of staff including payment of salaries to all staff and allowances for field staff during patrols.

Funding is one of the major problems of conservation in Nigeria National Park System including Cross River National Park. Conservation of protected areas are critically underfunded despite their unique contributions to biodiversity conservation in Nigeria. Inadequate fund is a major challenge in Cross River National Park as there was a significant drop in the overall allocations to the park from 292.388M in 2011 to 144.75m in 2014. [24]. Generally, fund allocations were below proposed estimates submitted by the park during annual budget. The worst situation was recorded in capital allocations which were only released to the park in 2012, 2013 and 2014. [24] Funding was not considered adequate to conduct critical management activities thus erupting other management problems including inadequate field equipment, poor transport and patrol equipment facilities for anti-poaching activities. Underfunding of protected areas appears to be a global problem in view of its universal nature [25] have documented that

protected areas across Africa and Latin America are managed on less than US\$110 per square kilometre, far less than the generally accepted US\$210 per km² needed to adequately manage tropical parks. Cases of underfunding have also been reported in other studies [26].

Table 8. The role of sustainable financing in wildlife law enforcement practices

Response	Sector		Total	Percentage
	Oban	Okwangwo		
Agree	9	1	10	100
Not sure	0	0	0	0
Disagree	0	0	0	0
Total	19	5	24	100

$$X^2_{cal} = 3.841, df = 1 \quad X^2_{tab} = 0.667, P\text{-value} = 0.414$$

The results indicated that $t_{cal} (3.841) < t_{tab} (0.667)$. The null hypothesis is therefore rejected indicating that sustainable financing is very critical in a successful wildlife enforcement programme in the park.

The role of cash reward system

The highest number of respondents (75%) alledged that cash reward system as a managment strategy was not given prominence by the park for enhancing law enforcement practices, 20.8% while were not sure and only one field staff representing (1.2%) summited that the park adopted cash reward syteem to support law enforcement practices. (Table 9).

The non-implementation of reward schemes as a means of encouraging and motivating staff during anti-poaching patrols can be responsible for the gradual reduction in the number of arrests recorded durring patrols from 74 in 2011 to 26 in 2015. The addoption of reward systems to enhance law enforcement practices has been a standard practise in protected area management globally [16]. In supporting this position, [17] was of the opinion that cash reward systems encourage staff to put in their best in the execution of anti-poaching patrols in Zambia protected areas, though other studies including that of [27] did not consider bonuses as a stimulus for better performances in surveillance and patrols.

Table 9. The role of cash reward system in supporting law enforcement

Sectors Response	Sector		Total	Percentage
	Oban	Okwangwo		
Agree	14	4	18	75.0
Not sure	5	0	5	20.8
Disagree	0	1	1	4.2
Total	19	5	24	100

$$X^2_{cal} = 19.75, df = 2, \quad X^2_{tab} = 5.991, P\text{-value} = 0.000$$

The results further indicated that $X^2_{cal} (19.75) < X^2_{tab} < (5.991)$. Thus the null hypothesis were rejected, implying that rewarding park rangers with cash at the end of patrols enhances their performance.

Level of compliance of wildlife laws in the park

It was observed that majority of the respondents 79% believed the level of compliance to wildlife laws was inadequate while only 21% regarded compliance to wildlife laws as effective (Table 10).

Many studies on the role of compliance of people to wildlife laws and regulations have come out with divergent results. Generally, the local communities in the study area have not

been favourably disposed to complying with wildlife laws inspite of their high level of awareness on the need to conserve biodiversity in the area. This situation is posing serious challenges in the efforts of management to address the threat situation in the park as evident in the number of instance rangers on routine patrols are attacked by local communities [28, 29]. However, regulatory and normative approaches have been identified as possible measures of encouraging compliance to wildlife laws and regulation [11]. In Nigeria, persons that violate part 6 of section 29 and 37 in the National Park Act 45 of 1999, are arrested and prosecuted in conformity with the popular regulatory approaches that are adopted in many tropical Africa national parks [30]. Normative approaches, however, emphasize on moral obligations by people to support the protection and conservation of biodiversity for the present and future generation, a strategy that has received less attention by the management of Cross River National Park. However, studies have confirmed that a combination of normative and regulatory strategies has the greatest potentials of increasing compliance [31-34].

Table 10. Level of compliance of wildlife laws in the park

Response	Sectors		Total	Percentage
	Oban	Okwangwo		
Agree	4	1	5	21%
Not sure	0	0	0	0%
Disagree	15	4	19	79%
Total	19	5	24	100

$$X^2 \text{ Cal} = 3.841, \text{ df} = 1, X^2 \text{ tab} = 6.0, \text{ P- Value} = 0.014$$

Statistical analysis shows that $X^2 \text{ Cal} (3.841) < X^2 \text{ tab} (6.0)$ thus the null hypothesis is therefore accepted indicating that wildlife laws in the park were not complied by support zone communities. The proportion of respondent’s opinion noncompliance of wildlife laws by support zone communities was significant ($X^2 \text{ cal} = 3.841, \text{ df} = 1, \text{ p} < 0.05$)

The multiple linear regression analysis was used to illustrate management practices adopted in addressing illegal activities in the park which is the dependent variable. The independent variables include Enforcement of wildlife laws (X_5), Anti- poaching patrol (X_6), Provision of alternative livelihood options (X_7), Community participation in Park management (X_8), Level of incentives to Park rangers (X_9) and inadequate boundary demarcation (X_{10}).

$$Y_2 = 0.243 + 0.924 X_5 - 0.214 X_6 + 0.105 X_7 + 1.07 X_8 - 1.055 X_9 - 0.103 X_{10} \dots (2).$$

with: $R^2 = 0.961, \text{ Adj } R^2 = 0.948, \text{ RMSE} = 0.107, \text{ F- value} = 70.667.$

The above equation presented a prediction model with a high value of $R^2 (96.1\%)$. This shows that 96.1% variability in management practices is explained by combined effect of explanatory variables. The level of significance of explanatory variables is high since F- value is significant at both 1% and 5% probability level.

Individually, $X_6, X_7,$ and X_{10} were not significant ($\text{p} > 0.05$) but pulled together, it shows significant difference even at $\text{P} < 0.01$.

The result also revealed that the contributions of independent variables to management practices were effective but weakened by variables such as anti-poaching patrol, level of incentives and inadequate boundary demarcation as shown in equation (2).

Conclusion

From the study, it can be concluded that anti-poaching patrols that were the main trust of the management of Cross River National Park in addressing the anthropogenic activities in the park have failed, because the aspect of benefit sharing was not adequately addressed by the park to engender efficient conservation of the Park.

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