



## COMMUNITY PERCEPTIONS AND ATTITUDES TOWARDS PROTECTED AREA CONSERVATION APPROACH: EMPIRICAL EVIDENCE FROM FALGORE GAME RESERVE IN KANO STATE, NIGERIA

M.S. Suleiman<sup>1</sup> and O.V. Wasonga<sup>2</sup>

<sup>1</sup>Department of Agricultural Economics and Extension, Bayero University  
Kano, Nigeria

<sup>2</sup>Department of Land Resource Management and Agricultural Technology,  
University of Nairobi, Kenya,

### ABSTRACT

This study assessed the perceptions and attitudes of the communities living in the fringes of the Falgore Game Reserve (FGR) in Kano, Nigeria towards the protected area conservation approach. Multistage sampling technique which comprises of purposive and random sampling technique were used for the study. The data were analysed using descriptive, chi-square test, and OLS regression analysis. The findings indicated that perceptions and attitudes of the communities were a function of their knowledge about the goals of protected area, quality and quantity of Non-Timber Forest Products (NTFPs), enforcement of protection rules and discriminative access to NTFPs. Majority (64%) of the interviewed households held positive perceptions and attitudes towards conservation of the forest. Respondents' perceptions and attitudes towards FGR were positively influenced by age, education level, and contact with extension agents and membership in social groups. The respondents' sex and distance to FGR were, however, negatively correlated with their perceptions and attitudes towards FGR conservation approach. Households, who held negative perceptions and attitudes towards FGR, such as the youth, women, and those with low level of education, highly cast a doubt on the future of FGR. It was concluded that communities located around FGR held favourable attitudes and positive perception towards protected area conservation approach in spite of total exclusion of local people in conservation strategies employed in the approach. The study, therefore, recommended that women, youth, and the less educated households should be enlightened on the need for sustainable NTFPs conservation given the steep opposition towards protected area conservation.

**Keywords:** Non-timber forest product; perceptions; attitudes; protected area; conservation

### INTRODUCTION

Establishment of protected area (PA) in the world can be traced back to the protection of Yellowstone National Park in the United States in 1872 in response to uncontrolled

degradation of biodiversity and ecosystem services in the area (Pretty and Smith, 2004; Chape *et al.*, 2008). Since then, the number of PAs around the world have continued to increase. For instance, by 2005, there was a total of 144,296 protected sites world over, covering a total area of about 19,381,000 km<sup>2</sup>, or 12.9% of the earth's land area (Fisher *et al.*, 2009 and Thammanu *et al.*, 2020). These areas are meant to serve as reserves for conserving biodiversity and regulating use of important wild flora and fauna. However, managing these reserves has become a challenge over the years (Fisher *et al.*, 2005).

More than 99 % of the protected areas around the world are faced with various threats such as poaching, encroachment by cultivation and unsustainable harvesting of non-timber forest products (NTFPs), (Negi *et al.*, 2018 and Barve *et al.*, 2005). In addition, conflicts between local communities and states over resource user rights and access are common worldwide, particularly over non-timber forest resources. Over the years these conflicts have become more frequent due to several factors, among them, population growth, urbanization and the realization that resources are finite, as well as the desire of the States to ensure sustainable management of natural resources (Duong *et al.*, 2021 and Blaikie and Springate-Baginski, 2007).

Many game reserves in Nigeria have been established following top-down approach and therefore most of them have failed to consider pertinent social, cultural, and political issues, which can only be addressed through community participation from conception to implementation of conservation strategies. Establishment of PAs in Nigeria often saw the exclusion of communities from extracting natural resources that are important for their livelihoods, and in many cases, some communities forced out from their lands with little or no compensation (Anthony, 2007). Such action often results in adverse social impacts on local communities, and consequently leads to negative attitudes towards state led conservation strategies (Garcia-Frapolli *et al.*, 2009). Aswani and Weiant (2004) observed that when local communities are excluded from the management of protected areas and their needs and aspirations ignored, it becomes extremely difficult to enforce conservation policies.

Socio-economic and demographic factors such as sex, income, age, education status and household level of dependence on natural resources have been reported to significantly influence attitudes and perceptions of natural resource users, although not consistently (Ayodeji, 2009 and Tarvinga and Mushunje, 2010). For instance, Wunder *et al.* (2014) reported that educational status of the resource users could make them more conscious and attached less utility maximization in their attitude towards natural resource conservation. However, the perceptions of the communities on conservation are influenced by their socio-economic characteristics, and are therefore, site and context specific (Allendorf *et al.*, 2012; Baral and Heinen, 2007; Shibia, 2010). This, therefore, necessitates the need for location specific research if the twin goal of sustainable rural livelihoods and biodiversity conservation is to be achieved. In addition, understanding community's perceptions and attitudes towards natural resource conservation is crucial in informing entry point for community-based natural resource management, as well as mitigating resource-based conflicts (Meijaard *et al.*, 2013).

Protected areas are used globally to conserve wild flora and fauna of important value to mankind. Despite the widespread adoption of the approach, its appropriateness and effectiveness in ensuring sustainable conservation has been a point of debate for decades. Specifically, its protectionist approach that often excludes local communities from accessing the critical natural resources has been a big concern.

## Community perceptions and attitudes towards protected area conservation approach

Falgore Game Reserve (FGR), which is located in Kano State is an example of the protected areas found in the savannah woodland ecosystems of Nigeria. The reserve is a watershed for river Kano and also the main source of water to Lake Tiga that supplies water to the Kano River Irrigation Project (KRIP). Despite its protection, rural households living next to reserve have been encroaching into it mainly because of the poor enforcement of rules, and partly due to the shifts in rural household economy and population pressure. These have rendered the reserve a more or less de facto open access resource. Thus, if left unchecked the high rate of deforestation in FGR could accelerate the siltation rate in the Lake Tiga, thereby undermining its socio-economic and ecological functions. The main challenge facing the management of FGR is thus reconciling the short-term extractive needs of the local people and the long-term conservation interests. Therefore, understanding of the economic value and utilization trends of the NTFPs by the forest nearby communities, and their perception on forest management by external agencies is essential for designing management policies that would address the dual goal of community interests and conservation for future generations.

The objective of this study was to assess the perceptions and attitudes of local communities towards protected area conservation approach; and to determine the socio-economic factors influencing local peoples' perceptions and attitudes towards FGR and conservation of non-timber forest products.

## METHODOLOGY

### The Study Area

The study was conducted in three Local Government Areas (Doguwa, Sumaila and Tudun wada) which border Falgore Game Reserve (FGR). FGR which is the main focus of this study is located between longitudes 8° 30' and 8° 50' East and latitudes 10° 46' and 11° 20' North, and 150 km south of Kano city. The reserve has an estimated area of 92,000 ha, and borders Tiga artificial Lake to the north, and Lame Burra Game Reserve in Bauchi State to the southeast (BirdLife International, 2007). The FGR and the surrounding communities falls within northern guinea savannah agro-ecological zone of Kano State, which is best suited for arable crops and livestock production. The area receives mono-modal rainfall which falls from May to mid-October with the peak in August, while the dry season starts from October to May. The annual mean rainfall is between 800 mm and 900 mm with up to ± 30% mean annual variations (KNARDA, 2006). The FGR is a gallery forest with a high density of tree species and high floristic diversity found within the open northern guinea savannah woodland vegetation type, and the sudan savannah in the northern tip (BirdLife International, 2007). The vegetation of the study area is dominated by trees such as *Isobertinia doka*, *Khaya senegalensis*, *Vitex doniana*, *Anogeissus leiocarpus*, *Tamarindus indica*, *Detarium microcarpum*, *Azelia africana*, *Anogeissus leiocarpa*, *Diospyros ebenum*, *Syzygium cordatum* and *Pterocarpus erinaceus* (Badamasi et al. 2010). Over 75% of the population in the area are farmers with an average land size of 1ha per household. Poverty is a common phenomenon in the study area with about 80% of the population living below the poverty line (KNARDA, 2006).

## Sampling Technique and Sample Size

Multistage sampling technique was used in this study. Three Local Government Areas (LGAs) namely Doguwa, Sumaila, and TudunWada around Falgore game reserve were purposively selected because of the existence of a large portion of the reserve in their territories, as well as the high number of forest dependent communities in the LGAs. At the second stage, three villages, which are directly adjacent to FGR were purposively chosen from TudunWada and Sumaila, and four from Doguwa. More (four) villages were selected in Doguwa because of high population density and more communities neighbouring the reserve as compared to the other two LGAs. In total, 10 villages namely: Falgore, Yantabarmi, Dogon Kawo, Sabuwar Kaura from Doguwa, Ziria, Gomo, Diwa from Sumaila, Makwasa, Farurunruwa, and Nufawa from Tudun Wada were selected for the study (Table 1). At the third stage proportionate random sampling was used to select 400 out of 18,133 respondents that participated in the study. A formula by Taro Yamana (1967) was used to compute the appropriate sample size for the study, taking into consideration the population size of the household heads of the selected communities. The adoption of this formula was informed by the desire to draw a representative sample from the target population and also to minimize sampling error and bias.

Table 1: Sampling frame and sample size

S/No.	Local Areas	Govt Forest Adjacent communities	Sampling frame (Household Population)	Sample size head
1	Doguwa	Falgore	2535	56
		Yantabarmi	1250	27
		Dogon Kawo	1178	26
		Sabuwar Kaura	2090	46
2	Sumaila	Ziria	1544	34
		Gomo	2096	46
		Diwa	1780	39
3	Tudun Wada	Makwasa	1888	42
		Farurunruwa	2108	47
		Nata'ala	1664	38
Total	3 LGAs	10	18,133	400

Source: Author's computation from the lists of household heads provided by the Village heads

## Data Collection

Primary data were obtained through household survey using a structured questionnaire, and focus group discussions (FGD) guided by a check list of questions. The questions asked were related to household utilization of NTFPs, attitudes, and perceptions toward FGR and also the socioeconomic and demographic attributes of the respondents. The respondents' attributes considered for the study include sex, age, household size, membership of social group, contact with an extension agents and level of education as well as primary and secondary occupation.

Questions on perception and attitudes concerning the NTFPs and resource utilization focussed on the benefits derived from the forest, restrictions on resource use, illegal resource

collection, NTFPs resource degradation, among others. Responses to perception statements posed to respondents were measured on a 5-points Likert scale depending on the respondents' extent of agreement, where selected statements assigned scores as follows: strongly agree = 5, agree = 4, don't know = 3, disagree = 2, and strongly disagree = 1. The statements on the respondents' attitude were based on the level of satisfaction with the management of FGR. This was also measured on a 5-points Likert scale as follows: very dissatisfied =1, dissatisfied = 2, neutral = 3, satisfied = 4, and very satisfied =5 (Kothari, 2014). Scores were finally categorized into very positive and very negative perceptions, and very favourable to very unfavourable attitude, while any score between the two extremes represented a neutral position. A total score for each respondent was therefore summed up for both perceptions and attitude.

The perceptions and attitude statements were 16, hence the highest score value for positive perceptions and attitude was 80, and the least was 16. Therefore,  $16 \times 5 = 80$  represented the most positive response possible;  $16 \times 3 = 48$  neutral response; and  $16 \times 1 = 16$  most unfavourable response possible.

### Data Analysis and Model Specification

Descriptive statistics such as frequency distribution, percentages, pictogram and measures of central tendencies were employed to summarize the data on socio-economic characteristics of the respondents in forms of tables, charts and figures where necessary. However, the chi-square test was used to test the difference in communities' perceptions and attitudes toward FGR in the three LGAs considered in the study.

Multiple linear regression analysis was used to determine the socio-economic and demographic factors influencing households' perceptions and attitudes toward FGR and conservation of NTFPs. Multiple regression analysis is best suited for continuous variable; hence the respondents' perception and attitudes were computed as continuous variable as described below. In order to avoid the multicollinearity problem, a correlation analysis was carried out to identify variables that were significantly ( $r \geq 0.5$ ) correlated with one another prior to performing multiple linear regression analysis. Where variables were found to significantly associate with one another, one was dropped taking into consideration its relevance and prediction ability of the dependent variable. Thus, the variables with higher t-values were retained for the Ordinary Least Square (OLS) regression analysis.

Using OLS Method the hypothesis of no significant relationship between socioeconomic and demographic characteristics of the households and their attitudes toward FGR and NTFPs conservation was tested at 5% level of significance with (n-k) degrees of freedom (Gujarati, 2004). The ordinary least squares (OLS) model of regression as expressed by Gujarati (2004) was specified as follows:

$$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k + \varepsilon_i \dots \dots \dots (1)$$

Where  $\beta_0$  is the intercept,  $\beta_i$  measures the change in y with respect to  $X_i$  holding other factors fixed.

Y = dependent variable (total score of household perception and attitude toward FGR)

X's = Independent variables

$\beta_1 - \beta_k$  = are the parameters of the coefficient to be estimated

$\varepsilon_i$  = error term.

Where:

$X_1$  = Age in years

- $X_2$  = Sex dummy variable (1 if male; 0 if female)  
 $X_3$  = Household size (persons or adult equivalent)  
 $X_4$  = Main occupation  
 $X_5$  = Educational level of household head (1, if educated, 0 if otherwise)  
 $X_6$  = Farm size (Ha)  
 $X_7$  = Contact with extension agent  
 $X_8$  = Membership to social group  
 $X_9$  = Distance to FGR (km)  
 $X_{10}$  = Monthly households' income (\$)

## RESULTS AND DISCUSSION

### Socio-economic and Demographic Factors of Sampled Households

Socio-economic factors such as age, education, occupational status, income, household size, proximity and access to social and economic development projects are known to exert significant influence on the way of thinking, attitudes and perceptions of the people towards a given developmental initiatives. The results presented in Table 2 showed that more than half (53%) of the respondents were between the ages of 30 and 49 years, less than one-third of the respondents (23%) were below 30 years of age. The respondents who were above 50 years of age were 19%, while the mean age was 38 years. This implies that majority of the sampled respondents were still young and therefore expected to hold positive perceptions and attitudes toward natural resource conservation. This is because youth are likely to depend on NTFPs for their livelihoods even in the future.

The average household size of the respondents and standard deviation were 8 and 2 persons respectively. About 63% of the respondents had a family size of 6-15 persons, while 29% had 1-5 persons. Only 9% of the respondents were having more than 15 members in their families. These variations in household size of the respondents could largely influence their demand for NTFPs, as their needs would be expected to vary with their socio-economic characteristics (Rodrigues *et al.*, 2011).

Table 2: Socio-economic characteristics of the respondents (n= 400)

Household attribute	Frequency	Mean±STD
Age		
20-29	90(23)	38±11.34
30-39	128(32)	
40-49	86(21)	
50-59	74(19)	
60-69	22(5)	
Household size (persons)		
1-5	114(29)	8±2
6-10	180(45)	
11-15	70(17)	
16-20	34(8)	
21-25	2(1)	
Farm size (ha)		
0.25-1.24	145(36)	2±0.5

## Community perceptions and attitudes towards protected area conservation approach

1.25-2.24	117(29)	
2.25-3.24	91(23)	
3.25-4.24	32(8)	
4.25-5.24	15(4)	
Distance to FGR (km)		
0.25-2.25	158(40)	3.64±2.34
2.26-4.25	97(24)	
4.26-6.25	89(22)	
6.26-8.25	49(12)	
8.26-10.25	7(2)	
Household income (USD)		
17-84	100(25)	165±10.5
85-150	109(27)	
151-215	101(26)	
216-285	44(11)	
286-350	21(5)	
351-415	8(2)	
≥416	17(4)	
Proportion of income derived from NTFPs (%)		
0.51-20.50	88(22)	34.84±8.27
20.51-40.50	181(45)	
40.51-60.50	90(23)	
60.51-80.50	32(8)	
≥80.51	9(2)	
Sex		
Male	344(86)	
Female	56(14)	
Marital status		
Married	377(94)	
Single	20(5)	
Divorce	3(1)	
Educational level		
Informal education	135(34)	
Primary	140(35)	
Secondary	97(24)	
Tertiary	28(7)	
Main occupation		
Farming	149(37)	
Trading	74(19)	
NTFP extraction	114(28)	
Employment	9(2)	

Craft and artisans	54(14)
Contact with extension agents	
Have contact	253(63)
Have no contact	147(37)
Main source of NTFPs	
FGR	304(76)
Own farm	62(16)
Market	34(8)
Procedure for NTFPs collection from FGR	
Seeking permission	100(35)
Illegal collection	204(67)

Source: Field survey, 2016

The results of farm size distribution of the respondents as presented in Table 1 indicates that most (66%) of the respondents had a farm size of between 0.25-2.24ha, while the average farm size was approximately 2 ha. This implies that most of the respondents were subsistence farmers who may not produce adequate food to cater for their dietary and income requirements, and therefore would be expected to rely on natural resources around them to meet the deficit.

The average distance from the respondent's homesteads to FGR was 3.6km and approximately 64% of the sampled respondents live between 0.25 and 4.25 km away from the reserve. This showed that most of the sampled respondents considered for the study could easily access and utilize NTFPs from FGR and thus expected to have a positive and favourable attitude towards FGR due to the possible benefits accrued. As noted by Sundriyal and Sundriyal (2004), the community attitude towards forest resources varies depending on the average distance to forest, availability of resources and access rights.

The monthly income of more than half (53%) of the respondents ranged from USD 85-215 (₦26,000- ₦65,000) whereas about a quarter (25%) of the respondents had a monthly income of USD 17-84. The mean household income was USD 165 (₦49,952) per month. This indicates that most of the respondents were low- and medium-income earners who are likely to find it difficult to meet their family needs, considering the average household size of 8 persons. Thus, most of these respondents were more likely to depend on sales and consumption of natural resources around them. They are therefore, most likely to have negative attitudes toward the protectionist approach of NTFPs conservation that excludes them from exploiting the resources.

The results on income derived from sales of NTFPs revealed that about 68% of the respondents derived between 20-60% of their total household income from NTFPs. This finding corroborates that of Ojo (2007) and Ejidike and Ajayi (2013) who reported that majority of the rural households in Nigeria derived more than 50% of their total income from forest products. These results clearly indicate the relative significance of NTFPs to households' livelihoods. Although peoples' attitudes and perceptions towards a given management strategy is a function of costs and benefits of the approach on their welfare, from the above abstraction it is expected that a reasonable number of the sampled population would have a positive attitude towards conservation of the NTFPs. In addition, it is also



believed that compliance to a given management approach is a function of costs and benefits accrue to the target population.

Sex distribution of the respondents revealed that there were more male headed-households (86%) than female-headed households (14%) (Table 2). The fewer number of female respondents was attributed to the seclusion of women as is the norm in predominantly muslim communities of northern Nigeria, another reason was the fact that second marriage among widows is common among Muslims. However, as reported by Vedeld *et al.* (2007) and Mahonya *et al.* (2019), sex of the head of the household may affect the types of resources that they collect from the environment. This is particularly true in traditional societies where males and females have specific roles and activities to play.

About 94% of the respondents were married, 5% were single and only 1% were divorced. This implies that a higher percentage of respondents had family responsibilities, hence required more sources of livelihoods to cater for their household needs. This could affect their attitude towards protected area system of conservation as they would be expected to be more reliant on the NTFPs for their livelihoods, and therefore, may not welcome any strategy that would deny them access to the resources. Ideally, households' attitudes and perception pertaining to NTFPs conservation and utilisation are expected to be influenced by the educational level of the respondents. As noted by Muchapondwa (2003), educated people are expected to be more informed and aware of potential benefits to be derived from the forest than the less educated counterparts. The results of this study show that most (66%) of the respondents had formal education while the remaining 34% had informal form of education. Technically this finding implies that all the respondents were exposed, and thus, were expected to have a better understanding of the benefits of FGR and the protection policy, thereby leading to a positive attitude towards the system. The occupational structure of the interviewed households revealed that about 66% of the respondents rely on natural resources (farming and forest resources extraction) for their livelihoods. This finding concurs with that of Musa *et al.* (2012) who reported that over 70% of the Nigeria's rural dwellers engaged in agriculture and forest resource extraction as their primary occupation.

About 63% of the respondents had contact with extension agents on a periodic basis. This indicates that most of the respondents were likely to be aware of the importance of natural resource conservation and may perceive protected area conservation approach positively. As observed by Madumere (2000) and Agbogidi and Ofuoku (2005) effective utilization of agricultural extension education programs can help in raising awareness among forest-dependent communities on environmental issues.

Majority (76%) of the respondents sourced their NTFPs from FGR, while 16% and 8% obtained NTFPs from their own farms and market, respectively. These results corroborate those of Shackleton and Shackleton (2007) who reported that majority of the rural inhabitants in South Africa sourced their NTFPs from forestlands adjacent to their communities. Most (67%) of the respondents collect NTFPs products from FGR without permission despite its protection status (Table 2). This implies that such respondents are unlikely to positively view conservation policies that would deny them access to the forest. This finding agrees with that of Mohammed *et al.* (2013) which revealed a drastic vegetation cover decline in all the National Parks in Nigeria as a result of illegal collection and unsustainable harvesting of both timber and non-timber forest products.

### Communities' Perceptions toward Protected Area and NTFPs Conservation

The general perception of communities towards FGR and its non-timber forest products conservation approach is presented in Table 3. A greater proportion (72%) of the people agreed that the establishment of FGR is necessary if biological diversity of the forest is to be conserved. However, some of the respondents from Doguwa (18%), Tudunwada (33%) and Sumaila (19%) opposed the protected area conservation approach. This finding indicates that the community generally entrust the state with conservation of FGR partly because of the fear of tragedy of the common scenario if the reserve is to be managed by the community.

Table 3: Households' perceptions towards protected area conservation in Falgore Game Reserve (n = 400)

Perception statement	LGAs	Percentage of respondents						$\chi^2$
		SD	D	N	A	SA	DF	
FGR is necessary	Doguwa	7	11	5	28	49	8	16.17***
	Tudunwada	17	16	3	29	35		
	Sumaila	11	8	4	39	38		
Local people should protect the forest	Doguwa	32	41	5	18	9	8	14.40**
	Tudunwada	22	46	5	21	6		
	Sumaila	27	40	4	16	13		
PA recognized indigenous peoples' rights	Doguwa	8	22	6	47	17	8	13.97**
	Tudunwada	9	29	6	34	22		
	Sumaila	4	21	7	54	14		
Participatory NTFPs conservation is necessary	Doguwa	5	12	6	49	28	8	19.95***
	Tudunwada	10	20	5	33	32		
	Sumaila	4	14	12	32	38		
Illegal collection of NTFPs causes forest degradation	Doguwa	5	17	6	43	29	8	15.25**
	Tudunwada	4	12	2	48	34		
	Sumaila	5	6	3	58	28		
Restriction of access is key to sustainable conservation	Doguwa	6	15	5	38	36	8	0.09**
	Tudunwada	6	11	7	48	28		
	Sumaila	5	6	3	58	28		
Need for NTFPs collection fees	Doguwa	12	12	3	50	23	8	12.98NS
	Tudunwada	11	14	6	40	29		
	Sumaila	7	6	3	60	24		
Adequate time for NTFPs collection	Doguwa	19	35	11	26	9	8	19.79***
	Tudunwada	23	21	25	25	6		
	Sumaila	23	17	25	25	10		
Discriminative access to NTFPs	Doguwa	18	31	17	13	21	8	18.16***
	Tudunwada	18	14	27	26	19		
	Sumaila	19	17	26	20	18		

Source: Field survey, 2016; NTFP- Non-timber forest products, FGR – Falgore game reserve, LGAs – Local government areas, PA – Protected area, 1% (\*\*\*), 5% (\*\*) and NS (Nonsignificant)

In assessing whether the local people should be responsible for the protection of FGR, the results indicated that majority of the respondents from Doguwa (73%), Tudunwada (68%) and Sumaila (67%) were against community-based forest resource management approach. This was attributed to the fear of free riding, strategic behaviour and also mismanagement which may eventually lead to the tragedy of the common scenario with the tendency of users pursuing individual interests at the expense of conservation. Furthermore, most of the

## Community perceptions and attitudes towards protected area conservation approach

interviewed residents (63%) reported that they were satisfied with the forest user right given to them by the management of FGR to collect NTFPs from the reserve for household consumption only. However, they indicated that the period of time allocated to collect resources was very limited and hence needed to be reviewed. This implies that communities were somewhat happy with the State management of forest reserve.

The majority (Doguwa (77%), Tudunwada (65%) and Sumaila (70%)) of the sampled respondents perceived joint forest resource conservation by stakeholders as one way to reduce illegal resource collection from the reserve (Table 3). This clearly indicate the need for community involvement in natural resource management in the study area in spite their acceptance of state management. The results of the households' perceptions on the negative consequences of illegal exploitation of NTFPs from FGR revealed that the quality and quantity of NTFPs stock is declining and if left unchecked such trends may consequently affect the livelihood of those who depend on the products for their social and economic wellbeing. However, the communities associate illegal collection of NTFPs to outsiders and Fulani cattle herdsman who illegally settled in the reserve for many decades.

Majority of the respondents Doguwa (74%), Tudunwada (77%) and Sumaila (86%) favoured restricted access to NTFPs as key to successful conservation of the forest. Similarly, about 75% of the sampled households expressed their readiness to pay for non-timber forest products collection from FGR if required. This was attributed to the fact that most of the respondents considered illegal resource exploitation detrimental to their livelihood sustainability. This shows how critical the forest is to the households of the proximate communities, especially during the dry spells and droughts when food is in short supply. Besides the limited time allocated for NTFPs collection, the respondents indicated that forest officials tend to favour local leaders while issuing NTFPs collection permit. Such perceptions may ultimately lead to noncompliance with the rules and regulation governing the use of the forest by the community.

### **Communities' Attitudes towards Falgore Game Reserve**

It is widely acknowledged that communities living in and around the vicinity of PAs are critical to the success of conservation efforts (Wiggins *et al.*, 2004; Robertson and Lawes, 2005). Therefore, their attitudes towards conservation and understanding of the environmental policies are critical in informing conservation approaches. The respondent's attitudes towards FGR and NTFPs conservation is presented in Table 4. More than half of the respondents from Doguwa (52%) and Tudunwada (53%) were not satisfied with capacity or adequacy of the available game guards in providing full protection of the reserve. This finding concurs with that of Tudunwada (2012) and Badamasi *et al.* (2012) who reported that the Falgore game reserve was lacking well-trained and adequate staff and even the ones available were poorly remunerated and ill equipped.

Local people participation in conservation activities enables clear definition of resource users' rights, as well as benefits sharing where necessary, thus promoting collaborative management of resources in protected areas. The results of the level of satisfaction of local people involvement in the decision-making process regarding the conservation of NTFPs in FGR showed that most of the surveyed households from Tudunwad (63%) and Sumaila (55%) were dissatisfied with the low level of local people involvement in the decision-making process. This implies management decisions regarding conservation

strategies are carried out by forest officials with little or no inputs from communities who are important stakeholders, this act may further aggravate noncompliance if not address.

Table 4: Households' attitude towards Falgore Game Reserve

Attitude statements	Percentage of respondents						df	$\chi^2$
	LGAs	SD	D	N	A	SA		
Adequacy of game guards	Doguwa	35	17	6	14	28	8	25.09***
	Tudunwada	46	7	14	5	28		
	Sumaila	36	5	13	11	35		
Local people involvement in conservation activities	Doguwa	34	2	9	25	30	8	50.28***
	Tudunwada	40	1	22	5	32		
	Sumaila	36	11	9	12	32		
Local people contribution to NTFPs conservation	Doguwa	26	2	10	18	44	8	14.66**
	Tudunwada	24	4	21	15	36		
	Sumaila	23	7	11	20	39		
Application of penalties against illegal resource exploiters	Doguwa	21	5	14	18	42	8	12.64NS
	Tudunwada	26	2	12	11	49		
	Sumaila	32	2	7	15	44		
Information sharing	Doguwa	27	5	10	24	34	8	13.82**
	Tudunwada	31	2	16	15	36		
	Sumaila	30	21	2	17	30		
Protected area is the best conservation system	Doguwa	22	5	9	30	34	8	10.25NS
	Tudunwada	22	3	11	25	39		
	Sumaila	29	2	15	29	25		
Quality and quantity of NTFPs under PA conservation approach	Doguwa	8	13	6	30	43	8	15.03**
	Tudunwada	9	10	5	33	43		
	Sumaila	7	14	7	22	60		

Source: Household survey, 2016; n = 400, NTFP- Non-timber forest products, FGR – Falgore game reserve, LGAs – Local government areas, PA – Protected area, 1% (\*\*\*) , 5% (\*\*) and NS (Nonsignificant)

Most (57%) of the local residents interviewed expressed their high level of satisfaction about the local people contribution towards NTFPs conservation in FGR (through protection of illegal exploitation of resources, excessive fuel wood collection and information sharing with game guards). This shows the value the communities attach to the forest and the willingness to conserve it.

The local respondents shared the same opinion about the application of penalties against illegal resource extractors by the officials of FGR. Majority (60%) of them indicated that the game guards duly meted out the punishment meant for the illegal resource collectors. Exploratory analysis of the local people satisfaction with public access to information regarding FGR conservation strategies showed that more than half of the interviewed households from Doguwa (58%) and Tudunwada (54%) were satisfied with the level and process of information sharing often used by the forest officials to reach out to communities close to FGR. However, more than half (51%) of the sampled respondents from Sumaila were not satisfied with efficiency and effectiveness of the procedure of information sharing. They opined that inadequate information sharing between the forest reserve managers and local people remained the main source of resource use conflicts in the area. They however, called for improvement in information sharing strategies.

The results of the local peoples' view on the efficiency and effectiveness of protected area system of natural resource conservation indicates that many (61%) of the sampled households were satisfied with the approach and considered it as the best system for

conservation of FGR. The majority (77%) of the respondents showed satisfaction with the current quality and quantity of the available NTFPs in FGR under the state property right regime. This was further supported by the local communities' perception that FGR would have been degraded under communal tenure rights. This implies that despite the deterioration and resources degradation due to natural and anthropogenic induced influences, the locals still appreciate the condition of the reserve, as well as the role of the state in conservation. This finding concurs with National Biodiversity report of Nigeria (FRN, 2010) that Protected Areas in forms of game reserve, forest reserve and national parks are crucial for attaining the objectives of the Convention on Biological Diversity and meeting the 2010 biodiversity target and goals number seven (ensure environmental sustainability) of the Millennium Development Goals.

### **Factors Influencing Households' Perceptions and Attitudes towards Protected Area Conservation System**

The results of factors influencing household perceptions and attitudes towards protected area conservation are presented in Table 4. Out of the ten predictor variables fitted in the model, six variables (age of household head, gender, education of household head, membership to social group, contact with extension agent and distance to FGR) have significant influence on households' perceptions and attitudes towards FGR and NTFPs conservation strategies. On the other hand, household size, main occupation, farm size and households' income did not significantly influence households' perceptions and attitudes towards FGR. Whereas age, education, contact with extension agent and membership to social group had positive and significant influence on households' positive perceptions and attitudes towards conservation of the forest, gender and distance from home to FGR had negative influence on the respondent's positive attitudes towards FGR.

The age of the household head had a positive and significant influence on perceptions and attitudes towards FGR as a priori hypothesised. This implies that the older generation are likely to have more positive attitude towards conservation than the youth. Similar findings were reported by Beyene *et al.* (2014) who found significant positive relationship between age of household head and the local communities' perceptions on Bamboo deforestation in Benishangul Gumuz Region, Ethiopia. This implies that older persons are likely to be less utilitarian environmentalists and may also have better understanding of the environmental regulations than younger counterparts.

Sex of the household head ( $P < 0.01$ ) was negatively associated with a favourable attitude towards protected area conservation. Majority (70%) of the male-headed households were willing to pay for NTFPs collection from the reserve and also willing to support participatory forest resource conservation. Meanwhile, less than 25% of the female-headed households were willing to support participatory forest resource conservation and also most of them were not willing to pay for NTFPs collection from FGR. This can be explained by the fact that women perceived the forest as less important than men because most of the women in the study area do not collect NTFPs from the reserve due to cultural reasons. Men view the forest as an important resource base for their livelihoods, particularly those who derive large proportion of their household incomes from sales of NTFPs.

Table 1: Factors influencing households' perceptions and attitudes towards protected area conservation (n = 400)

Households' attributes	B	Std. Error	t-value
Constant	56.2310	3.0062	3.0062
Age	0.1242	0.0445	2.79***
Sex	-2.6222	1.2047	-2.18***
Household size	-0.1387	0.1057	-1.31
Occupation	-0.3731	0.2541	-1.47
Education level	4.3173	0.5264	8.20***
Farm size	0.3950	0.3888	1.02
Contact with extension agent	7636	1.0569	3.56***
Membership to social group	4.9856	1.0306	4.84***
Distance to FGR	-1.0819	0.2262	-4.78***
Household income	0.0000014	0.000	0.83
F-value	48.19***;		
R <sup>2</sup>	55.33%;		
N	400		

Note: \*, \*\*, \*\*\* stand for significant at 10%, 5% and 1% respectively.

The education level of the household heads positively influenced the positive attitudes and perceptions of the respondents towards conservation, implying that the more educated the persons were, the more likely to support conservation of the forest. This finding corroborates that of Bogale (2011) who noted that households with higher education and training expressed more willingness to pay for ecosystem services than those with less. This may be attributed to the fact that less educated households may have less understanding of environmental policy and natural resource users' right. In essence, it is logical to find uneducated household heads engaging in illegal resource exploitation in protected areas, unlike educated households who would comply with regulations of resource exploitation.

The results show significant positive relationship between the sampled households' perceptions and attitudes towards conservation and their interaction with extension agent. This is not surprise as quality interaction with extension agents help in sharpening household understanding of negative consequences of environmental degradation on agriculture and general human well-being. The results further suggest that household heads who belonged to social groups were more positive towards protected area forest conservation approach. This finding is consistent with that of Koenig *et al.* (2011) who reported that social networks among members of a group can build community resilience and increase the adaptive capacity for environmental management.

An inverse relationship between household heads' perceptions and distance to FGR was observed, an indication that households living near the forest are likely to be more positive to conservation of the forest as compared to their distant counterparts. This may be partly due to the fact that households proximate to the forest could be more dependent on the NTFPs and therefore attach more value to their conservation than those living farther away from the forest. This finding is inconsistent with those of Taruvinga and Mushunje (2010) who reported a positive relationship between household participation in wetland conservation and distance from farmers' field to the wetland. They noted that farmers with the distant field rely on wetland for their livelihood and are therefore more responsive to wetland conservation; hence, they are less likely to participate in wetland cultivation which may eventually result in wetland resource degradation. This is probably due to distant constrained

## Community perceptions and attitudes towards protected area conservation approach

forcing them to only cultivate their own field and also make them more likely to participate in wetland collective action.

### CONCLUSION

The results show that most of the respondents were aware of the benefits of the conservation of FGR, and also supported the need to conserve the forest. Protected area forest resource management is popular among the households and therefore considered by the majority as the best management option for NTFPs conservation in FGR. Despite the community acceptance of the protection of the FGR, they would be willing to partner with government in the area of biodiversity conservation, specifically, participatory forest management, in order to supplement the effort of the state and also to strengthen biodiversity conservation in the area. The prevalence of illegal exploitation of NTFPs from FGR is attributed to poor communication between communities proximate to FGR and forest Department as well as unequal treatment of the forest resource users by the forest officials in the study area. This study shows that younger household heads are opposing protected area system of conservation than their aged counterparts; this is partly because of the overreliance of the former on NTFPs, thus, this cast a doubt about the future of FGR in the long run. Social network among community members in form of membership to social group and extension services are critical to awareness creation as well as increasing favourable perceptions and attitudes towards protected area conservation approach in the study area.

It is recommended that policy makers and other stakeholders should take advantage of the positive attitudes and perceptions held by the communities towards protected area conservation approach as an entry point to promote participatory forest management in the study area. This will help in ensuring proper enforcement of forest protection rules, as well as equitable distribution of costs and benefits of forest conservation among stakeholders.

To avoid apathy and illegal resource exploitation, the issuance of NTFPs collection permit to local residents should be transparent and non-discriminative given their positive perceptions and attitudes towards imposition of NTFPs collection fees.

Development of effective and efficient channels of information sharing between the community and the FGR officials is highly recommended. This would help to ensure informed decisions and inclusivity in conservation matters.

Public enlightenment and awareness campaign should give more emphasis to the youth, less educated and women who held negative perceptions and attitudes towards protected area conservation. This should be aimed at not only addressing the negative attitudes towards conservation by the state, but also to ensure sustainable exploitation by groups such as the less educated that are likely to be more dependent on the forest resources, as well as the youth that would still rely on the resources in the future.

### REFERENCES

- Agbogidi, O.M. and Ofuoku, A.U. (2005). State of forestry research and education in Nigeria. *In: Popoola, L., Mfon, P., Oni, P.I. (Eds.), Proc. 30th Annu. Conf. FAN held in Kaduna, Kaduna State between 7th and 11th of November 2005, 484–490.*

- Allendorf, T.D., Aung, M. and Songer, M. (2012). Using residents' perceptions to improve park-people relationships in Chatthin Wildlife Sanctuary, Myanmar. *Journal of Environmental Management*, 99, 36-43.
- Anthony, B. (2007). The dual nature of parks: Attitudes of neighbouring communities towards Kruger National Park, South Africa. *Environ. Conserv.*, 34(3), 236–245.
- Aswani, S., & Weiant, P. (2004). Scientific evaluation in women's participatory management: monitoring marine invertebrate refugia in the Solomon Islands. *Human Organization*, 63(3), 301-319.
- Ayodeji, I., Pendlebury, S. and Annegarn, H. (2009). Forest people, two countries and one continent: what empirical connections? *International Research in Geographical and Environmental Education*, 18(1), 45-56.
- Badamasi, M. M., Yelwa, S. A., AbdulRahim, M. A. and Noma, S. S (2009). NDVI threshold classification and change detection of vegetation cover at the Falgore Game Reserve in Kano State, Nigeria. [www.academia.edu/](http://www.academia.edu/).
- Baral, N., and Heinen, J. T. (2007). Resources use, conservation attitudes, management intervention and park-people relations in the Western Terai landscape of Nepal. *Environ. Conserv.*, 34(1), 64–72.
- Barve, N., Kiran, M. C., Vanaraj, G., Aravind, N. A., Rao, D., Shaanker, R. and Poulsen, J. G. (2005). Measuring and mapping threats to a wildlife sanctuary in southern India. *Conservation Biology*, 19(1), 122-130.
- Beyene, F., Bessie, S., Kotu, B.H., Goshu, G. and Mengesha, Y. (2014). Local communities' perceptions of bamboo deforestation in Benishangul Gumuz region, Ethiopia, 25-34
- Blaikie, P. and Springate-Baginski, O. (Eds.). (2013). *Forests, People and Power: The Political Ecology of Reform in South Asia*. Routledge.
- Bogale, A. (2011). Valuing natural forest resources: an application of contingent valuation method on Adaba-Dodola Forest Priority Area, Bale Mountains, Ethiopia. *J. Sustainable For.* 30, 518–542.
- CBD (Convention on Biological Diversity). (1992). The convention on biological diversity. Secretariat of the Convention on Biological Diversity, *United Nations Environment Programme*, Montreal. Available from [www.biodiv.org/convention/convention.shtml](http://www.biodiv.org/convention/convention.shtml) (accessed July 2014)
- Chape, S., Spalding, M. and Jenkins, M. (2008). The world's protected areas: status, values and prospects in the 21st century. Univ de Castilla La Mancha.
- Duong, T.M.P., Lobry de Bruyn, L., Kristiansen, P., Marshall, G. R. and Wilkes, J. (2021). Nature and level of NTFP reliance: a case study in the buffer zone of Cat Tien National Park, Vietnam. *Forests, Trees and Livelihoods*, 30(2), 116-132.
- Ejidike, B.N. and Ajayi, S.R. (2013). Trends in wildlife conservation practices in Nigeria. *International Journal of Biodiversity and Conservation*, 5(4), 185-191.
- Fisher, R.J., Maginnis, S., Jackson, W.J., Barrow, E. and Jeanrenaud, S. (2005). Poverty and conservation: landscapes, people and power. IUCN, Gland, Switzerland.
- Fisher, B., Turner, R.K. and Morling, P. (2009). Defining and classifying ecosystem services for decision making. *Ecological Economics*, 68(3), 643-653.
- Gajere, E.N., Mohammed, S.O., Eguaroje, E.O., Shaba, H., Ogbole, J.O., Mangut, Y.S. and Kolawole, I.S. (2013). Spatio-temporal analysis of the national parks in Nigeria using geographic information system. *Ife Journal of Science*, 15(1), 159-166.



## Community perceptions and attitudes towards protected area conservation approach

- García-Frapolli, E., Ramos-Fernández, G., Galicia, E. and Serrano, A. (2009). The complex reality of biodiversity conservation through Natural Protected Area policy: Three cases from the Yucatan Peninsula, Mexico. *Land Use Policy*, 26(3), 715-722.
- Guruswamy, L.D. (1999). The convention on biological diversity: Exposing the flawed foundations. *Environmental Conservation*, 26(02), 79-82.
- Koenig, J., Altman, J., Griffiths, A.D. (2011). Artists as harvesters: natural resource use by indigenous wood carvers in Central Arnhem Land, Australia. *Hum. Ecol.*, 39, 407–419.
- Kothari, C. R. and Garg, G. (2014). *Research Methodology. Methods and Techniques*. New Age International Publishers. New Delhi-110002.
- Madumere, A.J. (2000). Environmental programme as indispensable tool for enriching public environmental education in Nigeria. In: Akale, M.A.G. (Ed.), Proc. 41st Annu. Conf. Sci. Teach. Assoc.
- Mahonya, S., Shackleton, C. M. and Schreckenberg, K. (2019). Non-timber forest product use and market chains along a deforestation gradient in southwest Malawi. *Frontiers in Forests and Global Change*, 2, 71.
- Meijaard, E., Abram, N.K., Wells, J.A., Pellier, A.S., Ancrenaz, M., (2013). People's perceptions about the importance of forests on Borneo. PLoS ONE 8 (9), e73008. <http://dx.doi.org/10.1371/journal.pone.0073008>.
- Muchapodwa, E. (2003). The Economics of Community-Based Wildlife Conservation in Zimbabwe. Ph.D Thesis, Department of Economics. Göteborg University Sweden and University of Zimbabwe Harare, 76.
- Musa, S.A., Mustapha, A. and Suleiman, A. (2012). Socio-Economic Characteristics of Rice Value Chain Actors in Kano State, Nigeria. In: Jibrin, J.M., Hussaini, M.A., and Auwalu, B.M. (Eds.), *Agricultural Transformation in Deregulated Economy: Prospects and Challenges*. Proceedings of the 46th Annual Conference of the Agricultural Society of Nigeria, 191-196
- Negi, S., Pham, T. T., Karky, B. and Garcia, C. (2018). Role of community and user attributes in collective action: Case study of community-based forest management in Nepal. *Forests*, 9(3), 136.
- Ojo, J. A. (2007). Financial Sector Maladaptation, Resource Curse and Nigeria's Development Dilemma. Public Lecture Series, 9, 2-79.
- Olofin, E. A. (2000) 'Environmental Hazards and Sustainable Development in Northern Nigeria' in Issues in Land Administration and Development in Northern Nigeria, Falola, J.A; Ahmed, K; Liman, M.A.; Maiwada, A. (Eds.) Department of Geography, Bayero University, Kano, Nigeria, 207-220
- Pretty, J. and Smith, D. (2004). Social capital in biodiversity conservation and management. *Conservation Biology*, 18(3), 631-638.
- Robertson, J., & Lawes, M. J. (2005). User perceptions of conservation and participatory management of iGxalingenwa forest. *South Africa. Environmental Conservation*, 32(01), 64-75.
- Rodrigues, R.R., Gandolfi, S., Nave, A.G., Aronson, J., Barreto, T.E., Vidal, C.Y., Brancalion, P.H.S., (2011). Large-scale ecological restoration of high diversity tropical forests in SE Brazil. *For. Ecol. Manage.* 261, 1605–161
- Sesabo J.K., Lang, H. and Tol, R.S.J. (2006). Perceived Attitude and Marine Protected Areas (MPAs) establishment: Why households' characteristics matters in Coastal resources

- conservation initiatives in Tanzania.  
<https://www.researchgate.net/publication/24130214>.
- Shackleton, C.M., Shackleton, S.E., Buiten, E. and Bird, N. (2007). The importance of dry woodlands and forests in rural livelihoods and poverty alleviation in South Africa, *Forest Policy and Economics*, 9(5):558-77.
- Shackleton, R., Shackleton, C., Shackleton, S. and Gambiza, J. (2013). Deagrarianisation and forest revegetation in a biodiversity hotspot on the Wild Coast, South Africa. *PLoS One*, 8(10), e76939.
- Shibia, M.G. (2010). Determinants of attitudes and perceptions on resource use and management of Marsabit National Reserve, Kenya. *J. Hum. Ecol.* 30(1),55–62.
- Sundriyal, M., Sundriyal, R.C. and Sharma, E. (2004). Dietary use of wild plant resources in the Sikkim Himalaya, India. *Economic Botany*, 58(4), 626-638.
- Taruvinga, A. and Mushunje, A. (2010). Socio-economic factors that influence households' participation in wetland cultivation: a binary logistic regression of wetland cultivators and non-cultivators Paper presented at the Joint 3rd African Association of Agricultural Economists (AAAE) and 48th *Agricultural Economists Association of South Africa (AEASA) Conference*, Cape Town, South Africa, September 19-23, 2010.
- Thammanu, S., Han, H., Marod, D., Zang, L., Jung, Y., Soe, K.T., ... and Chung, J. (2020). Non-timber forest product utilization under community forest management in northern Thailand. *Forest Science and Technology*, 1-15.
- Tudunwada, I.Y. (2012). Vegetation change detection due to anthropogenic activities in Falgore Game Reserve, Kano, Nigeria, using GIS and Remote Sensing. *The International Conference Geotunis 6th Session 26th – 30th March 2012*.
- Van den Ban, A.W. and Hawkins, H.S. (1996). *Agricultural Extension*. Second Edition. Blackwell Science Ltd., Cambridge, Massachusetts.
- Vedeld, P., Angelsen, A., Bojö, J., Sjaastad, E. and Berg, G.K. (2007). Forest environmental incomes and the rural poor. *Forest Policy and Economics*, 9(7), 869-879.
- Wiggins, S., Marfo, K., and Anchirinah, V. (2004). Protecting the forest or the people? Environmental policies and livelihoods in the forest margins of Southern Ghana. *World Development*, 32(11), 1939-1955.
- Wunder, S., Angelsen, A. and Belcher, B. (2014). Forests, livelihoods, and conservation: broadening the empirical base. *World Development*, 64, 1-11