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Local People's Attitude and Willingness to Pay for Conservation in Yankari Game Reserve Bauchi, Nigeria

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ABSTRACT

Many people living near protected areas especially in developing countries highly depend on natural resources in their neighbourhood for survival. However, excluding them from the areas' management and criminalizing their activities has always been a source of conflicts. The present study developed and validate a nine-item construct on a 5-point likert scale to evaluate environmental attitudes among local people and also to examined their willingness to pay (WTP) for conservation in Yankari game reserve. A dichotomous choice contingent valuation questionnaire was administered to 237 households in communities near the game reserve between months of February and March, 2015. The results revealed that 68.4% of the respondents were willing to pay for conservation. From the logit regression estimated, gender, age, income, bid amount and attitudes were the significant predictors of WTP and the mean WTP value was estimated at 594 Naira, (US$ = 3.71) per household per month. The aggregate non-use value was also estimated to be 32 500.116 Naira (US$ = 203,125.73) yearly. Thestudy finding would inform the management of the reserve and policy makers on the importance of integrating local communities in decision making related to resource conservation for efficient and sustainable management of the game reserve.

Key Words: Attitude; WTP; Local People; Logit Regression; Conservation; Yankari

INTRODUCTION

Biodiversity conservation in particular and environmental protection in general hascontinued to attract global attention due to the continuous destruction of the natural environment by human activities. The establishment of protected areas worldwide has continued to increase and is believed to be an effective way of protecting biodiversity and the environment (Wang and Jia 2012). With this increase in number, many are faced with critical issue of financial self-sufficiency or otherwise referred to as financial sustainability. Many of these protected areas are experiencing a decline in their budgetary allocation, or inadequate funds from governments (Reynisdottir et al. 2008), this resulted in many of them not meeting their conservation and developmental goals (Bushel and Eagles 2007). Emerton et al. (2006) have highlighted number of mechanisms that would potentially enhance the financial sustainability of protected areas which includes seeking local support through donations and other market-based strategies that are compatible with protected area objectives such as charging fees.

Apart from financial difficulties, an important issue that requires careful attention and also contributes to the failure of many protected areas is the exclusion of local people. Many previous conservation strategies have excluded communities' support and often concentrated on imposing strict rules such as the command-and-control approach concerning natural resources conser-

vation in protected areas. This approach often creates conflicts between the community needs and the conservation goals of the protected area (Dimitrakopoulos et al. 2010), thus, resulting in local residents and sometimes tourists developing negative attitudes towards conservation efforts within those areas (Vodouhê et al. 2010).

New conservation strategy was developed in response to the belief that many protected areas are likely to fail if the local communities are not involved in their conservation planning and programs (Allendorf 2007). The new approach referred to as the participatory management (Dimitrakopoulos et al. 2010) or community conservation (Infield and Namara 2001) which intended to be inclusive, rather than exclusive of the role of local communities who are believed to be the custodians of those resources. This strategy according to Vodouhê et al. (2010) tried to reconcile between local people's need and the goals of the protected areasby promoting communities' participation in resource management and conservation. Considering the critical role of local residents in the survival and success of any conservation efforts, understanding people's attitude towards protected areas and identifying the level of support they would offer for nature conservation is important for an improved protected management programs and policies. This has proved to be of critical importance towards ensuring public acceptance of conservation programs and it guaranteed a harmonious relationship between communities and the protected areas (Szell and Lucius 2013).

Therefore, the importance of incorporating attitudinal variable in contingent valuation studies is not only justified in the literature as an effective way of examining the relationship between people's attitude towards the environment, but also as a way of testing the robustness of economic valuations tool, such as the willingness to pay (Baral et al. 2008).The choice of suitable economic instruments like the CVM in measuring people's willingness to pay is often viewed as an ideal way of developing sound management policies that would help to generate more funds and assist the protected area management in achieving financial sustainability (Jones et al. 2011). This paper therefore advances the knowledge of how attitudinal considerations would contribute to CVM methodologies by exploring the relationships between local people's attitudes, the socio-economic variables and their willingness to pay for conservation in Yankari game reserve and estimates the maximum amount that they would be willing to pay (WTP) to support conservation in the protected area.

Environmental Attitudes and the Contingent Valuation

The link between attitudes and behaviour has led to the interest in examining the role of environmental attitudes as determinants of environmental related actions and public participation decisions. Many researches in this area were based on the theory of planned behaviour or the theory of reasoned action by Ajzen and Fishbein (1980). Fundamental to the later theory is the notion that individuals have some range of personal values, and each value has different preference weight or rank. These preferences served as measures for judging the suitability of a particular behaviour towards the environment. Cognitive thinking leads to behavioural decisions in which the most noticeable values are assessed based on their relative importance. This means that the likely behaviours with more favourable outcomes are related to the behavioural intentions of the individuals, which consequently increase the probability of actual occurrence of these particular behaviours (Kotchen and Reiling 2000). For instance, individual who strongly disagree with statement describing abuse of environment is expected to support conservation than the one who strongly agree with such statement. Environmental attitude therefore, can be defined as the set of beliefs, values, and behavioural intentions that a person has pertaining environmentally related issues actions or activities (Milfont and Duckitt 2004).

The National Oceanic and Atmospheric Administration (NOAA) of the United States assembled panel of renowned economists to assess the reliability of CVM in estimating the non-use values (Arrow et al. 1993). The panel explained that CVM is capable of providing useful information about the non-use values of environmental resources and recommended some guidelines that governs the conduct of CVM studies in order to achieve reliable estimates (Kotchen and Reiling 2000). Among their recommendations is the use of psychometric variables, and they specifically recommended the use of 'attitudes' measures, as that will assist in the interpretation of the responses to the valuation questions (Arrow et al. 1993). This is the rationale behind the use of environmental attitudes in CVM studies and is supported with the growing concern in the literature about motivations and ethical beliefs that gives rise to non-use values. Thus, experts have attested that an unbiased estimate of non-use values depends largely on evaluating the underlying motivations behind the responses (Milfont and Duckitt 2010).

In many CVM studies, the relationships between environmental attitudes and willingness to pay have extensively been examined from different perspectives. Three main approaches have been identified, where in the first approach; the attitude-willingness to pay relationship was used to examine the CVM predictive validity. Cooper et al. (2004) and Kotchen and Reiling (2000) use this method by employing attitude and belief variables to explain willingness to pay. In the second approach, the attitude-behaviour relationship was used to examine use and non-use values of the environmental goods being valued from the WTP response (Gelso and Peterson 2005, Kotchen and Reiling 2000). Using this approach, some studies such as Cooper et al. (2004) and Kotchen and Reiling (2000) reported to have found a correlation between non-use values and environmental attitudes, whereas Gelso and Peterson (2005) found relationship between environmental attitude and use values. The third approach employed attitudinal measures to test the theoretical validity of CVM (Ojea and Loureiro 2007, Spash et al. 2006). This study used attitude measures based on the notion of the theory of planned behaviour to explain the effects of attitude towards willingness to pay. In this context, the willingness to pay was considered as a behavioural intention.

METHODOLOGY

Study Area

The study was conducted among households in communities near Yankari Game Reserve (YGR) in Alkaleri Local government area of Bauchi State, North-eastern Nigeria. YGR is the famous game reserve in Nigeria, established in 1956. It is located between latitude 9^0 50' N and 10^0 13' E, covering an area of 2244.1 km^2 in Alkaleri Local Government Area in North-eastern state of Bauchi (Figure 1). The game reserve is known as wildlife and forest reserve, making it an important area in terms of natural resource management under protection.

The game reserve has a rich variety and number of wild animals including more than 50 species of mammals. There have been little studies of fishes, amphibians, reptiles and insects. Nevertheless, 26 species of fish, seven species of amphibians, and 17 species of reptiles have so far been identified. More than 350 species of birds have been recorded in the park. Of these, 130 are residents, 50 are Palearctic migrants and the rest are intra-continent migrants that move locally. The vegetation inYankari Game Reserve and its surroundings is mostly varieties of Sudan savannah type.

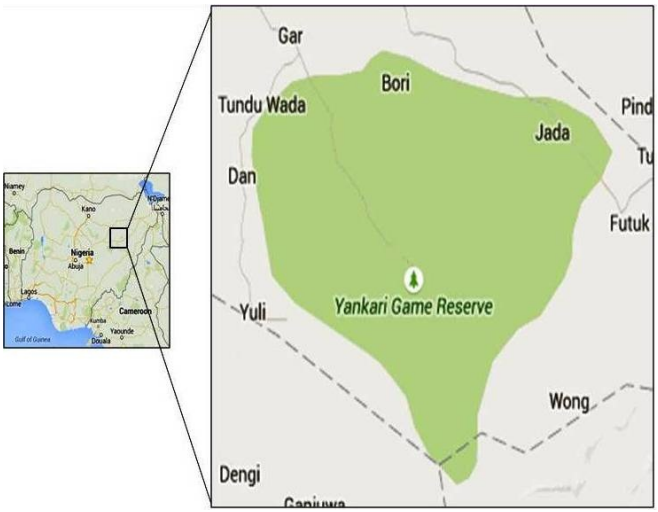

Figure 1. Map of Nigeria showing the Study Area (from Google Map)

Dichotomous Choice Contingent Valuation Method

As contingent valuation method is regarded as a standard approach for measuring economic values of non-market goods (Hanemann 1994, Lee and Han 2002). This research employed a dichotomous choice contingent valuation method (DC-CVM) to measure households' WTP. The dichotomous choice (DC) approach was first introduced by Bishop and Heberlein (1979) in their study to measure the economic value of goose hunting. DC approach provide the respondents with only two answer choice of either 'Yes' or 'No', commonly described as a single "take it, or leave it" (TIOLI) to the bid amount option presented to the respondents (Mohd Rusli et al. 2009).The DC question format is much easier for respondents to answer than the open-ended format, as respondents are more familiar with discrete choices in market transactions (Hanemann 1994). Therefore, the DC format is generally regarded as a more superior elicitation method (Lockwood and Tracy 1995). However, limitation of CVM generally relies on individuals' stated WTP under given hypothetical market scenarios (Lee and Han 2002), the hypothetical setting in

the DC contingent valuation method may result in overestimating the respondents' WTP. This study employed a specially designed field survey instrument with a specific real payment vehicle in an attempt to reduce hypothetical bias.

Payment Vehicle

Choosing a realistic payment vehicle is one of the important steps in CVM (Lee and Han 2002). The payment vehicle referred to the way in which WTP amount would be paid by the respondents. The common payment vehicles related to preservation values are; donations and taxes. However, Champ et al. (1997) suggested the use of donations as a more useful and relevant payment vehicle that offers a plausible means of estimating the non-use economic value of public goods. They further explained that mandatory payment vehicle such as taxes, or access fee may be objected by the respondents. Thus, donation was chosen as the most appropriate payment vehicle for this study.

Sampling Procedure, Survey Instrument and Data Collection

The study area was divided into two stratified sampling units based on the distance of sampling community to the boundary of the game reserve. Systematic random selection was employed within each stratum where every third household was selected as sampling unit. The sampling frame of the study is the household head or his representative who must be of 18 years and above in each community. This probability sampling was employed in order to ensure good representation of the study population.

Based on a simple statistical tolerance formula, sample size ranging from 200 to 2500 samples is considered to be adequate in CVM study (Ghosh and Mondal 2013, Mitchell and Carson 1989).Samples of 250 households residing in one of the sampled communities were randomly selected. Among the recommendations of NOAA panel, in-person interview is emphasised as the superior and reliable method for data collection in CVM compared to self-administered survey (Arrow et al. 1993).This method is preferred because of the believed that it help to minimize possible interviewer and respondent's bias in CVM as suggested by Turner et al. (1994). This study therefore, employed the direct face-to-face interviews with the households' head or eldest member of the family.

The WTP questions were asked in the context of a voter referendum for the creation of a special trust fund exclusively for conservation program in Yankari. The proposed conservation trust fund was planned to be established through a yearly payment method in the form of a donation from the public. Environmental economics literature has emphasised that valid CVM question of willingness to pay should include at least three components, namely: a comprehensive description of the resources planned to be valued in the hypothetical scenario. Secondly, specify the payment vehicle and frequency of the payment into the dedicated trust fund. This refers to the mode of payment such as entry fee, income tax, utility bill as well as donation. The third component is the format of the willingness to pay question, such as dichotomous choice. open-ended question and payments cards (Mitchell and Carson 1989). A total of 237 valid responses were used for the analysis with the aid of the NLOGIT Version 4.0 econometric software and SPSS 21.

Willingness to Pay Model Specification

The contingent valuation method is used to obtain the respondents willingness to pay for conservation in Yankari game reserve. The theoretical basis of the CVM employed in this study is that of individual utility maximisation, since WTP estimate is obtain based on demand function and demand is usually based on the utility maximization theory. For a given donation amount that an individual household would pay for the purpose of conservation in Yankari, he had a choice of accepting or rejecting the proposed donation amount offered in order to maximise his utility under the following condition:

$$v(1, Y - A; S) + \varepsilon_1 \geq v(0, Y; S) + \varepsilon_0 \quad (1)$$

where v is the indirect utility function, Y is gross monthly income, A is the donation amount offered (bid price), S represents to the socio-economicvariables and the attitudinal variable determining individuals' preference. ε_1 and ε_0 are identical independently distributed random variables with zero means.

The change in utility (v) can best be presented as follows:

$$v = v(1, Y - A; S) - v(0, Y; S) + \varepsilon_1 - \varepsilon_0 \quad (2)$$

Since the dichotomous choice (DC) format of CVM has a binary choice dependent variable that requires a qualitative choice model, the commonly used qualitative choice methods are the probit and logit model. However, the logit model is more appropriate for a survey data, whereas the probit model is best fit for experimental data (Bhandari and Heshmati 2010). Therefore logit model was preferred than the probit model in many field that uses survey data (Lee and Han 2002), thus, logit model was used in this study. The probability that the households would accept a given amount (A) as donation can be expressed in the following logit model based on Cameron (1989) method (Lee and Mjelde 2007, Wang and Jia 2012).

$$P_i = F_{\eta}(\Delta v) = \frac{1}{1+\exp(-\Delta v)} \qquad \frac{1}{1+\exp\{-(\alpha-\beta A+\gamma x)\}} = \quad (3)$$

where α is a constant, β refers to the coefficient of donation amount A, x is the vector of other explanatory variables that influences the response and γ is the vector of the corresponding slope.

There are three common methods of estimating the WTP value. The first method is called mean WTP, where the expected value of WTP is calculated by numerical integration, ranging from 0 to ∞. The second method is called the overall mean WTP, where the expected WTP value is calculated by numerical integration which ranges from -∞ to +∞. The last method called truncated mean WTP, where the expected WTP value is calculated by numerical integration of ranging from 0 to maximum bid amount (A). This last method is preferred than the two others, as it is consistent with theoretical constraints, it satisfies statistical efficiency, and it possesses the ability to be aggregated (Lee and Han 2002). Hence, the expected WTP value can be obtained by integrating equation (3) numerically, ranging from 0 to maximum bid offered.

$$E(WTP) = \int_0^A \frac{1}{1+\exp\{-(\alpha-\beta A+\gamma x)\}} \qquad (4)$$

The coefficients in the model comprise of the socio-economic characteristics as well as the attitudinal variable. From equation (4), the mean WTP can be estimated using the following equation(Hanemann 1994).

$$\text{Mean WTP} = \frac{\beta_0 + (\sum \beta_n X_n)}{-\beta_1} \qquad (5)$$

where; β_0 is the estimated constant, β_n is the parameter of the coefficients, X_n stand as the mean value of explanatory variables and β_1 is a coefficient of the bid price.

RESULTS AND DISCUSSION

Demographic and Socio-economic Profile of Respondents

The respondents' socio-demographic profile is presented in Table 1. From the household interviewed, (86.5 %) were male and the remaining (13.5%) were females. The mean age of the respondents was 38.10, where those between 26-35 years constitute the majority (38.0%) of the respondents and the most productive age category targeted for development. On respondents' level of education, majority (31.2%) attained secondary level of

Table 1 Socio-economic profile of the respondents (N = 237)

Element	Mean	Frequency	Percentage
Gender			
Male		205	86.5
Female		32	13.5
Age (yr)	38.10		
25 and below		40	16.9
26-35		90	38.0
36-45		69	29.1
46-55		24	10.1
56 and above		14	5.9
Educational level			
Never been to school		23	9.7
Primary		69	29.1
Secondary		74	31.2
Collage/Polytechnic		51	21.5
University		20	8.4
Occupation			
Government employed		37	15.6
Privately employed		64	27.2
Business		116	48.4
Retiree		2	0.8
Others		18	7.6
Gross monthly household income	₦ 40887.7		
≤₦ 25000 (≤ US$ 156.25)		61	25.7
₦26000-35000 (US$ 162.5-218.7)		90	38.0
₦ 36000-45000 (US$ 225.0-281.2)		54	22.8
₦ 46000-55000 (US$ 287.0-343.7)		23	9.7
₦ 56000 and above (≥US$ 350)		9	3.8

education. From the total responses obtained, (48.4%) were engaged in business as primary occupations.For the households' gross monthly income, the mean Income was 40887.7 (US$ 256).

Local People's Attitude and Their Environment

Although there is variation of views expressed by the survey respondents, responses of both strongly agreed and strongly disagreed with the environmental attitudes' statements were observed. The responses' percentages and means (Table 2) obtained have revealed that predominantly, the respondents agreed with the pro-environmental statements. As evidenced from the CVM literature, a behavioural intention such as the WTP, is a function of attitudes, thus attitudes towards environmental conservation have been found to be closely related as well as a significant predictor of WTP (Chung et al. 2011, Reynisdottir et al. 2008). This result showed that if the local people will beintegrated in the conservation programs and policies of the game reserve, their social support would be ensured, which would help in achieving a long term sustainable resource conservation goal.

Exploratory Factor Analysis (EFA)

The factorability of the items measuring attitude of the respondents towards the environment was examined. It was observed that the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.87, which is considered as 'great' (Field 2009). The diagonals of the anti-image correlation matrix (KMO for individual items) were all greater than 0.79, that is higher than the minimum acceptable limit of 0.50 (Field 2009).The Bartlett's test of sphericity $\chi 2\ (36) = 973.817$, $p < 001$) was significant, showing a good correlations between the items for factor analysis, and lastly, the communalities of the items were all above 0.47, indicating that the items shared some common variance with each other. Given all these indicators justified the suitability of the data for factor analysis with the 10 items.

Two round of Principal components analysis (PCA) were conducted in this study with orthogonal rotation (varimax) and oblimin solutions on the 10 items measuring local people's attitude towards the environment. Only one dimension (factor) was extracted which have eigenvalue greater than 1 and explaining 50.26% of the variance. There was no much difference between the outcome of the varimax and oblimin solutions, however, after cross examination of the two solutions varimax was used, as it provides the best defined factor structure. Since only one dimension was extracted, rotation for the final solution was not possible. All items in this analysis had primary loadings above 0.5, and only one item was eliminated "Establishment of game reserve can help in maintaining many ecosystem functions" as it did not contribute to a simple factor structure and failed to meet a minimum requirement of having a primary factor loading of 0.4 and above. The factor loading of each of the 9 items retained in the final solution is presented in Table 2.The factor label was maintained as 'attitude towards the environment'.

The Internal consistency for the items was examined using reliability analysis, where the Cronbach's α of the 9 items was 0.882 (see Table 2), which is considered 'Good" (George and Mallery 2003). The mean score for each item and their standard deviation were obtained and higher mean score indicated a more positive attitude towards the environment. Overall mean score was computed for the factor based on the means of the individual items. This analysis indicated the uni-dimensionality of the constructs measuring attitude towards the environment, where the overall composite score formed an important input into the regression analysis.

Confirmatory Factor Analysis (CFA)

To further validate the measurement model of the latent construct, Confirmatory Factor Analysis (CFA) was conducted with the aid of computer software (AMOS-SPSS version 22) as validating procedure. The CFA method has the ability to assess the Unidimensionality, construct validity, convergent validity, discriminant validity and Reliability of a latent construct.

The unidimensionality is achieved when all measuring items have acceptable factor loadings with positive signs for the latent construct. For newly developed items the factor loading for every item should exceed 0.5(Awang 2014).Construct Validity; The construct validity is achieved when the Fitness Indexes of a measurement model achieved the required level of acceptance (Awang 2014). The fitness indexes indicate how fit is the items in measuring their respective latent constructs. Standardized factor loadings (standardized regression weights) for each item were identified after the final measurement model was constructed to meet the criteria fitness indexes. Nine items (ATD1, ATD2, ADT3, ATD5, ATD6, ATD7, ATD8 ATD9 and ATD10) with factor loading of <0.6 were retained. Although not all fitness indices have been achieved, but

Table 2. Exploratory Factor Analysis and Descriptive Statistics

	Items	Mean	SD	Dimension (factor Loadings)	Communality
1.	I am concern about the environment so I will support biodiversity conservation	3.98	0.978	0.800	0.640
2.	People should be involve in the conservation of nature	3.81	1.222	0.756	0.571
3.	Game reserve should be protected from human exploitation	3.92	1.204	0.715	0.512
4.	Yankari is a biodiversity hotspot	3.89	1.037	0.709	0.502
5.	Flora and fauna are important natural resources for research and education	3.97	0.922	0.705	0.498
6.	Natural resources has many benefits to human being	3.95	0.994	0.698	0.487
7.	The resources in Yankari are worthy of conservation for sustainability	4.05	0.908	0.69	0.479
8.	Preservation of natural resources can help to prevent many species from extinction	4.10	0.838	0.681	0.464
9.	Yankari is a very suitable place for ecotourism	4.37	0.757	0.609	0.371
	Eigenvalue			4.524	
	% of variance			52.141	
	Chronbach α			0.882	

Table 3. Correlation, Reliability and Validity

	Inter-Item Correlation Matrix									Cronbach's α	CR	AVE
	ATD1	ATD2	ATD3	ATD4	ATD5	ATD6	ATD7	ATD8	ATD9			
ATD1	1.000	0.597	0.508	0.418	0.442	0.470	0.361	0.428	0.325	0.882	0.886	0.521
ATD2	0.597	1.000	0.530	0.461	0.417	0.497	0.315	0.437	0.231			
ATD3	0.508	0.530	1.000	0.458	0.373	0.400	0.409	0.372	0.399			
ATD4	0.418	0.461	0.458	1.000	0.386	0.575	0.492	0.505	0.538			
ATD5	0.442	0.417	0.373	0.386	1.000	0.545	0.494	0.326	0.492			
ATD6	0.470	0.497	0.400	0.575	0.545	1.000	0.478	0.535	0.591			
ATD7	0.361	0.315	0.409	0.492	0.494	0.478	1.000	0.598	0.625			
ATD8	0.428	0.437	0.372	0.505	0.326	0.535	0.598	1.000	0.545			
ATD9	0.325	0.231	0.399	0.538	0.492	0.591	0.625	0.545	1.000			

Note: AVE= Average variance extracted, CR= Composite Reliability

most of the other indices have shown a significantly good fit for the measurement model (RMSEA=.116, chi square (104.5, DF= 25),CMINDF= 4.178, CFI =.919, IFI=.920, GFI=.913). Themodel fitness obtained indicated the satisfaction of assumption of construct validity.

Convergent Validity

This is assessed and verified by computing the Average Variance Extracted (AVE) for the construct. The AVE is a summary measure of convergent among items and acceptable if the value of AVE > 0.5 (Awang 2014). Table 3 showed AVE value computed (0.521), indicating that the construct has adequate convergence.

Discriminant Validity

This validity indicates the measurement model of a construct is free from redundant items. Using AMOS software, it helps to identify the items redundancy in the model through a discrepancy measure called Modification Indices (MI). High value of MI (>15) indicates the respective items are redundant (Awang 2014). However, all MI values obtained were less than 15, indicating that the condition for discriminant validity is achieved.

Reliability

Reliability is the extent of how reliable the said measurement model is, in measuring the intended latent construct. Two criteria for assessing reliability are

Cronbach's alpha value and the composite reliability (CR). The reliability analysis showed that the total Cronbach's alpha value (0.882) of the model (Table 3) indicated a high level of internal consistency, and the composite reliability computed was 0.886.

Willingness to Pay Responses

The responses obtained from the survey, shows thatsignificant numbers of respondents were willing to pay for conservation in Yankari by responding "Yes" to the various bids offered, as presented in Table 4. The respondents' probability of voting 'Yes' decreases as the bid price is increased which shows consistency with the economic theory of demand. The follow-up questions in the CVM section indicated that bequest and existence values were the more frequently stated reasons for the respondents' willingness to pay. However, those who were not willing to pay, provided their reasons as either not interested in resource conservation, or is the government responsibility to conserve the game reserve.

Table 4. WTP responses to bids and probability of Yes answer

Bids Price ₦ ($)	Samples Freq.	Yes Freq.	Yes (%)	No Freq.	No (%)	Probability of Yes (%)
360 (2.25)	57	49	20.7	8	3.3	81.7
420 (2.63)	50	35	14.7	15	6.3	58.3
480 (3.00)	44	28	11.8	16	6.7	46.7
540 (3.38)	45	27	11.4	18	7.6	45.0
600 (3.75)	41	23	9.7	18	7.6	38.3

Logit Regression Model

Table 6 presented the result of the logit model of the dichotomous choice CV responses.The result obtained revealed that the variables found to be significance in the case of socio-demographic characteristics include the respondents' gender (GEN), age (AGE), gross monthly income (INC), and bids price (BIDS). The psychographic variable used in the model is the respondents' attitude towards the environment (ATTD). For the attitude variable, a mean score of the 9-item construct measuring the environmental attitudeof the respondents on a five point (likert) scale was used. From the variables, only bids price carried negative sign on its coefficient, the remaining had positive coefficient. Positive sign indicates a positive relationship between the variable and the WTP, while negative sign indicates an inverse relationship with the WTP.

Respondents' gender was found to be significance with a positivesign on its coefficient, and statistically significance at 10% confidence level. The marginal effect of the variable indicates that male respondents are 13% more likely to donate than the female respondents. This outcome is in agreement with the findings of Wang and Jia, (2012) where positive and significant relationship exist between WTP and male gender.

Age was also significant in the model with a positive coefficient as expected and statistically significant at 10% confidence level. The marginal effect for age shows that for every unit increase in age, there is 0.73% probability of instantaneous increase in WTP. Thus, it indicates thatthe higher the age, the higher the probability of WTP for conservation of the resources in Yankari. The propensity of age to willingness to pay was reported in many studies such as Lee and Mjelde (2007).Respondents' gross monthly income also plays a significant role in the model. Its coefficient value was found to be positive and significance at 10% confidence level, with marginal effect showing the probability of 0.50% increase in WTP for every unit increase in income. This result showsthe elasticity of income with WTP; hence, WTP increases withincrease in income. This result is in conformity with the findings of Reynisdottir et al. (2008), Seongseop et al. (2007) and Wang and Jia (2012) that higher income increases the probability of willingness to pay.

The psychometric variable in the modelwas the respondents' attitude towards the environment. It was the most significant determinants of WTP in the model, with positive coefficient and statistically significance at 1% confidence level. Being the variable with the highest marginal effect, it shows the strength of the effect of attitudes on the probability of WTP. A more pro-environmental attitude increases the probability of willingness to pay for conservation by 18%. This outcome is in agreement with many studies such as Kotchen and Reiling (2000) who found positive significant influence of pro-environmental attitude and willingness to pay for non-use value.The bids price carried a negative sign on its coefficient in the model as expected for the willingness to pay estimation. It was found to be significance at 1% confidence level. Negative sign indicates a negative relationship between bid price and WTP. The marginal effect of bid price revealed that for every unit increase in bid price, the

probability of willingness to pay decreases by 0.13%. This shows that as the bids price offered increases, the respondents' willingness to pay decreases which is in consistence with economic theory of demand.

Table 5. Logit Regression Model

Variable	Coefficient ± Std.Error	Marginal Effect
Constant	-3.5745 ± 1.3437**	-
GEN	0.8777 ± 0.4751*	0.1345
AGE	0.0474 ± 0.0206*	0.0073
INC	0.0326 ± 0.0171*	0.0050
BIDS1	-.0083 ± 0.0020***	-0.0013
ATTD	1.2254 ± 0.2621***	0.1877
Number of observations	237	
Log likelihood function	-111.6263	
McFadden Pseudo R-squared	0.2454	
Percentage Correct Prediction	76.37	

Note: *=10%, **=5% and ***= 1% significant level, values in parentheses are Standard Errors.

Mean WTP Estimate

From the logit regression result obtained in Table 5, the mean WTP was estimated using equation (6) and found it to be₦ 594 (US$ 3.7) per household per month. This result showedthat the neighbouring communities are willing to donate money for conservation in Yankari game reserve. The mean WTP amount was also estimated based on certain characteristics of the respondents as presented in Table 6. Gender plays a significant role in determining willingness to pay. The result of mean WTP estimated for male was much higher as compared to that of female. In the case of age, the mean WTP values estimated also varies across the different age groups. The result of mean WTP value for each age category indicated that age variation plays a significant role in WTP, as older people tend to pay higher for conservation than the younger ones; hence the result showsa high elasticity of age to willingness to pay.

The Aggregate Non-use Value of Environmental Resources in Yankari

The expected non-use benefit of conserving the biodiversity resources in Yankari game reserve was calculated based on Richer, (1995)method, where the estimated aggregate value was obtained by computing the mean WTP value from the logit model, and the total number of households in the study area. Based on demographic data from National bureau of statistics, the total households in Alkaleri local government area (the study area) was found to be 54 714 and the mean WTP estimated was (₦ 594, US$ 3.71). By computing these figures, the total benefit was estimated at ₦ 32 500 116 (US$ 203 125.73) monthly.

Table 6. Estimated WTP based on respondent's characteristics

Variable	Category	Mean WTP (₦)	(US$)
Gender	Male	830	5.2
	Female	120	0.75
Age (yr)	25 and Below	430	2.68
	26-35	543	3.39
	36-45	637	3.98
	46-55	740	4.62
	56 and above	818	5.11

CONCLUSION AND RECOMMENDATIONS

This study examined the local communities' attitudes towards environment and their willingness to pay for conservation.The result provided the basis for improvement ofprotected area management and designing management strategies that would incorporate the local communities into the management and conservation of natural resources of the game reserve. Some of the socio-economic variables such as the gender, age, income, and pro-environmental attitudes were found to be significant determinants of local people's willingness to pay for conservation in Yankari game reserve. Those who were male respondents, older in age, with higher level of income and who shows more positive attitudes towards the environment tends to be more willing to pay for conservation in the game reserve. Therefore, in order to foster a harmonious relationship between the management of the game reserve and the adjacent communities, it is of paramount importance to consider these categories of households for the successful implementation of conservation programs that will ensure the survival and sustainability of resources in the game reserve.

An important conclusion of this study is that in spite of restrictions of access, nearly 68.4% of the local people were willing to pay for conservation of the game reserve translating to willingness to cooperate with the authorities for co-management. Many studies have emphasized that the attitude of local people is one of the ultimate factors determining the improved management and conservation effectiveness of the protected areas, there is the need to improve the strategies that address this aspect so that human attitudes, value systems and behaviour can be influenced to the benefit of the game reserve. Also, it is essential that new policy alternatives should be developed that are more acceptable to the local people by ensuring adequate representation of the stakeholders in decision making process.

This study provides a policy recommendation to the management of Yankari game reserve for setting up a conservation trust fund where people can make donation, and the money obtained can exclusively be allocated for resource management and conservation. The outcome of this study also serves as a guide to policy makers and management of the game reserve to consider the integration of local people in the conservation program of the game reserve so as to ensure a sustained park-people relationship. The findings would help the management of the reserve to identify the target class from the population that will help in contributing higher for the financial sustainability of the game reserve through donation.

Authors' Contributions

A. Adamu collected the data, performed data entry, took part in data analysis, and drafted the article. M.R. Yacob supervised the whole research work, conceptualised the manuscript, interpreted the results and helped in manuscript writing. A. Radam analysed the data of the contingent valuation section and helped in the interpretation of results. M. Fallah developed the psychometric section of the questionnaire, analysed the confirmatory factor analysis and interpreted it using SPSS. M.H. Danladi helped in data collection exercise, data analysis and interpretation of the reliability analysis and exploratory factor analysis of the psychometric variables.

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