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Factors Determining Visitors' Willingness to Pay for Conservation in Yankari Game Reserve, Bauchi, Nigeria

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ABSTRACT

The objective of this study is to examine the factors that determine the local visitors' willingness to pay (WTP) for conservation in Yankari game reserve, Bauchi, Nigeria. The study employed a dichotomous choice survey design – contingent valuation method (DC-CVM) on 335 local tourists. Binary Logit and Probit models were used to estimate the visitors' willingness to pay (WTP) for conservation. The empirical results obtained revealed that the game reserve has a considerable use value in that 77.9% of the visitors interviewed are willing to pay for conservation. The results showed that age, gender, income, level of education and first-time visit are the significant determinants of visitors' willingness to pay. This empirical study would guide not only the management of the game reserve, but also policymakers to consider the important market segment among the visitors with a view to encouraging the visitation of such a target group in order to create an avenue for enhancing revenue for conservation in the game reserve.

Keywords: Contingent valuation; Determinants Protected areas, Willingness-to-pay; Yankari game reserve.

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Any remaining errors or omissions rest solely with the author(s) of this paper.

INTRODUCTION

The 2010 global target of reducing the rate at which biodiversity is lost worldwide has not been achieved (Butchart *et al*., 2010; Christie, Fazey, Cooper, Hyde, and Kenter, 2012). However, growing concerns about the rapid decline of global biodiversity resources in recent times have helped to increase awareness of the significance of these resources in the stability of ecosystem functions. It is believed that the biodiversity resources form the basis for sustainable natural functions, and also provide potential for human use, which include the opportunity for scientific research as well as recreational benefit, such as ecotourism (Nijkamp, Vindigni, and Nunes, 2008).

Although conflicts often exist between tourism and the conservation goals, especially the nature-based tourism, which relies on access and the use of natural resources in protected areas as tourism products (Mohd Rusli, Alias, Khairil, and Shuib, 2009). However, it is of paramount importance to note that among the cardinal objectives of ecotourism is the optimum use of natural resources, while, at the same time, maintaining the ecosystem functions and preserving the natural heritage as well as conserving the biodiversity in general (Chen and Jim, 2012). Achieving the ecotourism objectives requires an in-depth knowledge and understanding of the economic value of the ecotourism resources as environmental goods and services that need to be measured in monetary terms, to view them from the same scale as commonly traded commercial goods in the market.

However, there is evidence that, in many places, ecotourism sites are facing a decrease in fund allocation for maintenance and other developmental projects. The shortage or inadequacy of the funds together with an increase in the number of visitors and their incessant impact on the environment including congestion, littering and wildlife disturbances have been threatening the sustainability of many ecotourism sites (Chen and Jim, 2012). Acquiring funds for the enhancement and preservation of these natural attractions is always a source of concern for sustainable tourism in many places worldwide. However, some possible options for meeting the financial needs of protected areas were identified and found promising. These include the market-based approach that includes the visitors' entrance fee to the sites (through ecotourism), resource user fees, payment for ecological services (PES) and bio-prospecting charges, (Emerton, Bishop, and Thomas, 2006).

Therefore, charging visitors an economically viable entrance fee to nature-based ecotourism sites is one of the promising options that would curtail the problem of fund inadequacy for conservation in many destinations. The entrance fee policy into protected areas has been in place for a long time in many parts of the world including the United States and Canada (Reynisdottir, Song, and Agrusa,

2008). To determine a socially acceptable entrance fee, economic approaches were developed, such as non-market techniques. Among the prominent and widely used non-market-based techniques is the contingent valuation method (CVM). This technique has been widely used for the valuation of environmental goods and services (Salazar and Garcı, 2007; Venkatachalam, 2004). It is acknowledged to be an effective method in measuring the economic value associated with the non-marketed goods, such as the recreational resources, species conservation and other environmental resources (Chen and Jim, 2012; Hanemann, 1994).

The interest of this paper is centred on examining the significant determinants of visitors' willingness to pay for conservation in Yankari game reserve, Bauchi, Nigeria, so as to identify the potentially important market segment from the visitors that would contribute to higher revenue for the development of sustainable tourism in the game reserve.

REVIEW OF LITERATURE

Protected Area and Conservation

Protected areas are considered to be the core of most biodiversity conservation in many places worldwide. With about 120,000 designated areas worldwide, these places occupy nearly 13.9 per cent of the total earth's surface (Coad, Burgess, and Fish, 2010). These areas are widely known to be a refuge for species and many ecological functions that may not survive in many disturbed environments. Protected areas have the capability of providing a favourable environment for ecological restoration and natural evolution (Dudley *et al*., 2010). In many countries of the world, especially developing countries, these areas used to be the only natural places where a significant number of species could be found and nowhere else in the world (Pettorelli *et al*., 2012).

The primary objectives of establishing protected areas are the protection of ecosystems, the maintenance of ecological processes and conservation of biodiversity (Baral, Stern, and Bhattarai, 2008). It is expected that the establishment of protected areas can contribute considerably to sustainable development and poverty reduction among the local people living near their boundary (Rogerson, 2006).

With many protected areas around the world, and a reasonable number of them being found in Africa, the shortage or inadequacy of the funds for the management of these areas has rendered their very survival critical (Togridou, Hovardas, and Pantis, 2006). Consequently, many of them failed to meet either their conservation objectives or developmental goals. This problem is attributed to society's failure to recognize the market and non-market benefits associated with the protected

areas (Cardinale *et al*., 2012). Among the benefits derivable from protected areas are the means of revenue from tourism and other non-monetary benefits that can contribute to the improvement in the quality of life. In recent times, much of the literature within the field of conservation focused on the ways of enhancing the financial sufficiency of these protected areas, with emphasis on ecotourism as the principal source of ensuring sustainable means of financing the areas (Togridou *et al*., 2006). Wang and Jia (2012) for example, investigated tourists' willingness to pay for biodiversity conservation and also determined how large an entrance fee was appropriate for Dalai Lake Protected Area (DLPA) in north eastern China in order to ascertain the possibility of increasing the entrance fee. Barnes *et al*. (1999) also investigated the tourists' willingness to pay for wildlife viewing and wildlife conservation in Namibia. The findings of his study have shown that each wildlife viewing tourist in 1995 contributed an estimated amount of N$ 907 (Namibian dollar) to the national income in tourism sector at economic prices.

In Annapurna Conservation Area Nepal, Baral *et al*. (2008) conducted a study specifically to determine appropriate candidate entrance fee with implications for sustainable park finance and local development. The outcome of their study suggested that most visitors were willing to pay an amount much higher than the currently charged entrance fee.

The Contingent Valuation Method

The contingent valuation method (CVM) was first introduced by Ciriacy and Wantrup in 1947 for estimating the side effects of soil erosion (Venkatachalam, 2004). The CVM is based on the concepts of the willingness to pay a certain amount in order for the individual to maximize his/her utility or willingness to accept compensation so as to improve his utility as a result of damage, or absence of the public good. The attention of CVM studies has in the recent past shifted from valuation of the environmental damage to the valuation of environmental protection. It is widely used as an effective policy tool in protected area management and biodiversity conservation (Baral *et al*., 2008).

Ellingson and Seidl (2007) stated that CVM is among the prominent valuation techniques available for measuring the economic value of environmental goods where market information is not available, or does not exist. Although CVM is not a perfect substitute for obtaining revealed preferences information and does not give all the necessary answers for environmental monitoring, it provides the individual with a hypothetical opportunity to purchase public goods in the absence of real market. The CVM willingness to pay for non-market goods is based on the theory of rational choice and utility maximization (Reynisdottir *et al*., 2008).

CVM is a method that provides individuals with the opportunity to purchase public goods under hypothetical situations, especially in the absence of real market or existing information concerning the real market scenario. It plays a significant role in the establishment of environmental policy (Pettorelli *et al*., 2012). The CVM technique is applied in many fields including the protected areas (Togridou *et al*., 2006), endangered species conservation (Kotchen and Reiling, 2000), ecosystem services (Turner and Folke, 1995), and also biodiversity conservation (Wang and Jia, 2012). Other areas where CVM is gaining popularity include the improvement of water quality, energy systems, human health, land conservation and many of its applications in the field of outdoor recreation or ecotourism (Lockwood and Tracy, 1995).

Determinants of Willingness to Pay for Conservation

Although from the literature, it has been established that there is difference between willingness to pay (WTP) and what visitors expect to pay (reference price) (Chung, Kyle, Petrick, and Absher, 2011). WTP can be described as the maximum amount that visitors intend to pay (Chung *et al*., 2011; Kyle, Graefe, and Absher, 2002).

In tourism literature, WTP has been used to estimate the value of non-market goods (Reynisdottir *et al*., 2008) and various antecedents of WTP have been identified. These includes; some socio-demographic and other variables found to be important determinants of WTP such as; past payment history, length of stay, visitor satisfaction, and attitudes toward the environment (Bhandari and Heshmati, 2010).

Among the socio-demographic variables determining the visitors' WTP that have been popular in most of the CVM literatures is the income. The effect of income on WTP has been extensively debated over a long period and the solution is still unclear. However, a substantial number of studies on outdoor recreation have found that low-income earners are more sensitive to price changes than high-income earners (Mamat *et al*., 2013; More and Stevens, 2000). Bhandari and Heshmati (2010) in their study to investigate tourists' willingness to pay conservation in Sikkim India, they reported income level of the respondents as important determinants of WTP. Thus, visitors' WTP depends chiefly on their income level, irrespective of the purpose (Reynisdottir *et al*., 2008). Therefore, it can be hypothesized that the level of visitors' income has a positive impact on their contribution for biodiversity conservation.

Age is another important variable; older people tend to be particularly attracted to the cultural activities of ecotourism spots. As such, age is most often positively related to the WTP for conservation as found by Baral *et al*. (2008) and Togridou *et al*. (2006). Importance of education as determinant of WTP has been reported

in many studies (Baral *et al*., 2008; Bhandari and Heshmati, 2010; Mamat *et al*., 2013). A higher level of education has been found to be positively related with WTP, as educated people are usually more aware of environmental issues and engage in conservation activities, thus, it is expected that a higher level of education would indicate a higher awareness about natural resources, which would result in a higher WTP (Brennan, Tapsuwan and Ingram, 2007). Although the effects of gender difference on WTP have been reported by a few studies, the results are largely mixed and inconclusive (More and Stevens, 2000; Reynisdottir *et al*., 2008). Studies of the effects of previous visitations or regular visits to a particular site have also shown mixed results (Williams, Vogt, and Vitterso, 1999). However, Reynisdottir *et al*. (2008) explained that previous visits to a site have a negative effect on WTP indicating that first-time visitors are more willing to pay than regular visitors to a particular site.

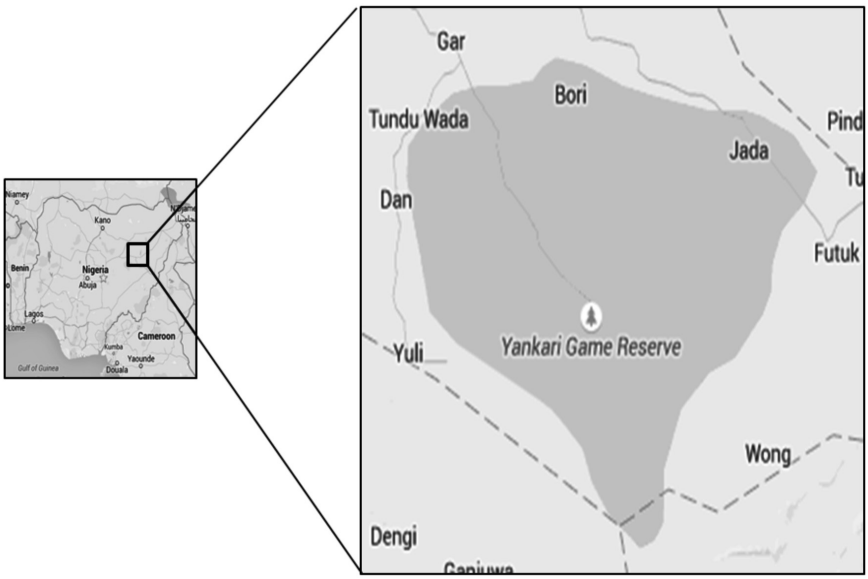
Attitude towards the environment has been found to be a significant determinant of WTP in many studies (Kotchen and Reiling, 2000; López-mosquera and Sánchez, 2012). On the other hand, attitude toward fee policy or perceived fairness has also been reported as one of the important predictors of WTP (Mitchell and Carson, 1989; Rosenberger, Needham, Morzillo, and Moehrke, 2012). It is important to consider these factors before implementing or reviewing any fee-paying policy, this would help in identifying the important market segments among visitors, who might contribute in generating more revenues for biodiversity conservation.

RESEARCH METHODOLOGY

Study Area

Yankari Game Reserve is the premier game reserve in Nigeria, and was established in 1956 as a protected area. It lies between latitude 9° 50'N and $10^{0}13$'E, covering an area of 2244.10 km^2 within the Alkaleri Local Government Area of Bauchi State, North-eastern Nigeria. Yankari has some important watersheds including the Gaji River and its tributaries. By virtue of the landscape, it is an open woodland rising from 215-369 metres above sea level, and offers beautiful scenery for wildlife viewing in a natural and undisturbed environment.

It is one of the 18 major nature conservation areas and wildlife parks in Nigeria, and has been described as the most popular, game reserve in west African sub-region (Femi, 1990), thus, most visited in Nigeria. The average annual tourist inflow to Yankari is estimated at 16,000 visitors yearly. The game reserve provides enormous recreational opportunities to visitors such as game viewing, camping, swimming, birds watching, and many sporting activities that attract many local and international visitors to the game reserve.



Source: Google map

Figure 1 Map of Nigeria showing the study area

Sampling Methods and Data Collection

The sample of this study was drawn using the systematic random technique. The first visitor interviewed was randomly selected and subsequently, every third adult visitor arriving at the game reserve for recreational purpose was interviewed during the data collection period. Lee and Han (2002) explained that achieving an accurate result from the contingent valuation method largely depends on the survey method employed. However, the National Oceanic and Atmospheric Administration (NOAA) panel recommends the use of an in-person face-to-face interview in CVM studies as a superior and more reliable method for data collection that is comparable to a self-administered survey, such as a mail survey (Arrow *et al*., 1993). Thus, the direct face to face interview, which is a commonly used method at recreational sites including protected areas (Lee and Han, 2002), was employed for the data collection.

Three (3) interviewers were trained concerning the content of the questionnaire and the survey protocols for conducting the face-to-face interviews with the visitors. This is done in order to minimize possible interviewer and respondent's bias in CVM as suggested by (Turner, Pearce, and Bateman, 1994), that well trained interviewers or enumerators should be used where they would follow the wordings of the

questionnaire as exactly as it is by offering the respondents a choice of prepared responses and giving a detail explanation about the scenarios.

Earlier, a pilot test of 30 samples was conducted in January 2014 where various bid prices offered in the main survey were determined from the results of the open-ended elicitation format. The main survey was conducted between the months of February and April 2014.

To determine appropriate sample size in CVM study, Calia and Strazzera, (2000), categorizes sample size for CVM Study as; 100 or less as small size, 250-450 as medium sample and 1000 and above as Large sample. A total of 400 visitors were interviewed with 346 valid responses obtained after treatment of outliers, missing cases of vital information such as income level and non-attendance of the CVM questions. Moreover, 11 out of the valid response were international visitors. The number obtained from this category of visitors (11) was too small for comparison, and cannot stand alone for analysis. Thus, these were as well treated as outliers and excluded from final analysis. Total of 335 was used for the analysis.

The purpose of the study was explained to them and their participation was encouraged. The respondents were informed that the study was specifically for academic purposes only, and that all the information collected would be treated confidentially. Giving the respondents confidence that the responses they provided would not influence the pricing policy of the protected area would help to reduce possible strategic bias (Mmopelwa, Kgathi, and Molefhe, 2007). The data collected were analysed using NLOGIT Version 4.0 econometric software and Stata version 12.

Dichotomous Choice Contingent Valuation Method

This study employed the dichotomous choice contingent valuation method (DC-CVM) to elicit visitors' willingness to pay for conservation. The DC format was introduced by Bishop and Heberlein (1979) in a study to measure the economic value of goose hunting. Dichotomous choice provided just two options of either voting 'Yes' or 'No' to the bid price provided to each respondent under a hypothetical market scenario. It is easier to respond to the DC questions as respondents are already familiar with the discrete choices in a market transaction (Hanemann, 1994). Thus, Lockwood and Tracy, (1995) suggested that the DC format is considered to be the superior elicitation method compared to open-ended format which lack realism and generally criticized for being associated with high percentage of protest bid mainly due to difficulties in estimating the willingness to pay (Arrow *et al*., 1993; Mmopelwa *et al*., 2007). Hence the choice of DC format in this study.

Resource Value Estimate

The willingness to pay estimates are basically categorised based on the concept of having use and non-use values (Lee and Han, 2002). The use value refers to the consumer surplus benefits derived from the direct use of the resources or the consumer surplus achieved from actual recreational use of the resources (Togridou *et al*., 2006). The non-use value on the other hand refers to the benefits derived from the intangible or abstract value that society attaches to natural resources. The benefits enjoyed from the non-use satisfaction are a result of the option value, existence value or bequest value (Lee and Han, 2002).

The option value here refers to the belief of making use of the resources in future. It is the WTP for maintaining the recreational opportunity for possible use in the future. The existence value is the WTP for guaranteeing that the natural resources are preserved and not destroyed. The existence value is based on the fact that a benefit is derived by the individual due to the belief or knowledge that the resources continue to exist. The bequest value is related to the perception of taking care or preserving the resource undamaged for future descendants to see. It is the WTP for bequeathing or endowing the natural resources to the future generation (Togridou *et al*., 2006). Therefore, the focus of this study is centred on the concept of use values, since the target respondents are the visitors to the game reserve.

Model Specification and Procedures

Since the dichotomous choice format is employed for estimating the visitors' willingness to pay, the dichotomous variable has a value of 1= willing to pay a premium for conservation fee and 0= otherwise. In this case, using ordinary least squares (OLS) regression of the relationship between WTP as the dummy variable and the explanatory variable is believed to be affected by certain problems, such as the heteroscedasticity (predicting the probability values beyond the 0 and 1 range), the non-normality of the error term and the likelihood of the estimated probabilities to lie outside the boundary of 0-1 (Yacob Mohd Rusli, Alias, and Shuib, 2009). Thus, the OLS regression can be used to fit a linear probability model. Since the dummy variable (WTP) is a proxy for the actual willingness to pay, the logit and probit models are used in such a situation, as they ensure that the estimated probabilities lie within the range of 0-1 and that they are nonlinearly related to the explanatory variables.

The two (2) approaches are similar, but the major difference between them is mainly in the distribution of the error terms. The logit model takes the assumption of the distribution of the error term as logistic. The probit model, however, assumes

that the distribution of the error term is normal. The willingness to pay of the respondents can be obtained by estimating the demand function, which is based on the theory of utility maximization. The visitors had the choice of accepting by voting 'Yes' or rejecting by voting 'No' to the proposed bid price offered to them in order to maximise their utility. The logistic regression technique is commonly used to estimate WTP in such situations (Hanemann, 1994). In this method, the probability of saying "YES" to a bid price at different levels of the independent variable is estimated as:

$$P = (1 - e^{-x})^{-1} \quad (1)$$

Where P is the probability of accepting by saying 'yes' to the bid price, x is the bid price. The mean WTP can be estimated as the area under the probability function. The area under the curve shows the proportion of the population who are willing to pay at each bid price level, and their associated utility function. The area below the curve is estimated using the following integration technique:

$$E\,(WTP) = \int_L^U (1 - e^{a+b\ bid\ price})^{-1}\ dbid\ price \quad (2)$$

Where E (WTP) is the expected willingness to pay, $(1 - e^{a+b\ bid\ price})^{-1}$, is the probability of saying 'Yes', U is the upper limit and L is the lower limit of the integration.

RESULTS AND DISCUSSION

Sample Characteristics

The socio-demographic characteristics of the visitors (Table 1) indicate that men constitute 73.4% of the sample interviewed while women constitute the remaining 26.6%. Those who were married were 71.3% and 28.7% were single. The average age of the visitors was 36 years. The category of the visitors whose age was 25 years or below was 17.3%, those within the range of 26-35 years were 35.5% and those within 36-45 years were 26.6%. About 14.0% of the visitors were within the age range of 46-55 years while the category with the smallest percentage (6.5%) was aged 56 years and above. The educational level of the respondents showed that 43.3% of the visitors interviewed have attained university level of education while the remaining 56.7% were reported to have attained non-university level of education including primary, secondary or polytechnic and colleges. Of the total visitors surveyed, 38.5% reported being government employees, 29.3% engaged in businesses and those who were privately employed were only 21.8%, while the

remaining percentage constitute retirees, unemployed as well as other occupations not mentioned. The respondents' income indicated average monthly earnings of around Nigerian Naira 71100 (USD 444.3) and were relatively evenly distributed among the various income categories.

Table 1 Socio-demographic characteristics of the visitors

Variable (n=335)	Category	Percentage
Gender	Male	73.4
	Female	26.6
Marital status	Married	71.3
	Single	28.7
Age	25 and Below	17.3
	26-35	35.5
	36-45	26.6
	46-55	14.0
	56 and above	6.6
Educational level	University	43.3
	Non-University	56.7
Occupation	Government employed	38.5
	Privately employed	21.8
	Business	29.3
	Unemployed	1.5
	Retiree	3.3
	Others	5.7
Income	₦ 19000-55000 (USD 119-344)	46.3
	₦ 56000-92000 (USD 350-575)	27.8
	₦ 93000-129000 (USD 581-806)	15.2
	₦ 130000-166000 (USD 813-1038)	6.9
	₦ 167000 and above (≥USD 1044)	3.9

Note: ₦ is the Naira sign (Nigerian currency), 1 USD = 160 N

Parameter Estimates of the Dichotomous Choice Models

From the regression results obtained, different model specifications were tested using logit and probit models (Table 3). The overall models were both significant at the .01 level according to their model chi-square statistic. The percentage for the correct prediction of the responses by the two models was the same (83.58%). The McFadden's pseudo R^2 was .3071 for the logit model and .3133 for the probit

model. This goodness of fit, in terms of percentage of correct predictions and McFadden's pseudo R^2, were all within the acceptable level.

Creating an equation that predicts the willingness to pay for the environmental good with reasonable explanatory variables, having coefficients with the expected signs provides the reason to suggest that the study has measured the desired construct (Carson, Flores, and Meade, 2001). The explanatory variables used in the models include the respondents' gender (1=male, 0=female), level of education (1=university, 0=non-university),' respondents' age, household income, bid price and regular visit (1=regular visitor, 0=first-time visitor). All of the variables were statistically significant in both the logit and probit models. Each variable in the models has a marginal effect and coefficient. The marginal effect shows the strength of the effect of the endogenous variables on the probability of paying for conservation. For the coefficient, it conveys two vital bits of information – the sign and weight. If the coefficient has a positive coefficient, it signifies a positive relation between the explanatory variable and the dependent variable (WTP). However, if the coefficient carried a negative sign, it indicates an inverse relationship between the variable and the WTP. The weight on the other hand is the value of the coefficient, which shows the magnitude of the variable or factor in determining the WTP. Two out of the six variables estimated (the bid price and regular visit) carried negative signs on their coefficients in both models. The other variables with positive coefficients were gender, education, income and age, as shown in Table 2.

Table 2 Visitors' reasons for willingness/unwillingness to pay for conservation

Reasons for willingness to pay	**Freq. n=261**	**(%)**
To sustain it for future generation	92	35.2
For conservation of natural resources	78	29.9
For its sustainability, so that I can visit again.	47	18.0
To reduce overcrowding of visitors into the reserve	23	8.8
Is not expensive, I can afford it.	18	6.9
Others	3	1.1
Reasons provided for not willing to pay	**Freq. n=74**	**(%)**
Is government responsibility to conserve the reserve	29	39.2
I don't believe the money will be used for conservation	20	27.0
I am not interested in resource conservation	19	25.7
I already pay enough through taxes	6	8.1

The Willingness to Pay Determinants

Gender

The respondents' gender was found to have positive signs on the coefficients in both the probit and logit model (Table 3). It was the variable with the highest weight value on its coefficient, with the logit model having a weight value of 1.2128, while in the probit model, it was .7172. It was statistically significant at the 1% confidence level in the two models. This study outcome showed the elasticity of gender to willingness to pay, revealing a higher probability of willingness of male visitors to pay for conservation than their female counterparts. The outcome supports the findings of Wang and Jia (2012), and Hejazi, Shamsudin and Rahim (2014) who found a positive relationship between male gender and WTP.

Table 3 Result of the regression models

Variable	Logit model		Probit model	
	Coefficient	**Marginal effect**	**Coefficient**	**Marginal effect**
Gender (male)	1.2128 ? (.3353)***	.1386	.7172 (.1929)***	.1406
Education (University)	1.0967 (.5182)*	.1253	.6504 (.2861)*	.1275
Age	.0475 (.0223) *	.0054	.0254 (.0122) *	.0254
Household Income	.0196 (.0089)*	.0022	.0113 (.0049)*	.0022
Bid Price	-.0070 (.0020)***	.0008	-.0042 (.0012)***	-.0008
Regular visit	-1.1821 (.4317)**	-.1350	-.6761 (.2452)**	-.1326
Intercept	1.8850 (1.1707)		1.1890 (.6604)*	
No. of observations	335			
Log likelihood function	-119.8985		-118.8192	
McFadden Pseudo-R^2	.3070770		.3133146	
% Correct prediction	83.58		83.58	

Note: *** 1%, ** 5% and * 10% significant level, values in parenthesis are standard errors.

Education

The level of education is an important variable with positive coefficients in the models (Table 3). The weight value of the logit model was 1.0967 and that of the probit model was .6504. In addition, it was statistically significant at the 10% confidence level in both models. The result showed that those with a university level of education have a higher probability of willingness to pay than those with a non-university level of education. The positive relationship between the level of education and the willingness of the visitors to pay for conservation in this study is in line with many studies where education plays a significant role in determining the willingness to pay (Baral *et al*. 2008; Wang and Jia 2012; Hejazi, Shamsudin, and Rahim 2014).

Income

Income is another important variable in the models with positive coefficients of .0196 weights in the logit model and .0113 in the probit model (Table 3). This revealed that those with a higher income have higher probability to pay a premium for conservation than the low-income earners. It was statistically significant at the 10% level of confidence in both models. This result conforms with the findings of many studies where a positive relationship existed between income and willingness to pay, such as the study of Wang and Jia (2012) Bhandari and Heshmati (2010), Reynisdottir *et al*. (2008), Seongseop, Wong, and Cho (2007) and Togridou *et al*. (2006).

Age

The visitors' age is another important variable with a positive sign on the coefficients in both models (Table 3). The coefficient weight in the logit model was .0475 and that of the probit was .0254. This is the variable with the least positive coefficient weight values compared to gender, education and income. It revealed that the higher the age, the higher the probability of WTP. Thus, older visitors are more willing to pay for conservation than the younger ones. This finding is in disagreement with that of Montes, Benayas, and Martı (2007), and Reynisdottir *et al*. (2008), but in agreement with the findings of Bhandari and Heshmati (2010), and Lee and Mjelde (2007).

Bids Price

The bid price has a negative sign on its coefficient in both models (Table 3). As explained earlier, a negative sign on a coefficient indicates an inverse relationship

between the variable and the WTP. It has weight values -.0070 in the logit model and -.0042 in the probit model, and was found to be statistically significant at the 1% confidence level in both models. This outcome supports the economic theory of demand and many CVM studies of Willingness to pay (Adamowicz, Louviere, and Williams, 1994; Baral *et al*., 2008; Lockwood and Tracy, 1995; Y. Mohd Rusli *et al*., 2009; Reynisdottir *et al*., 2008). Loomis *et al*. (2000) emphasised that while using the CVM-WTP format, an increase in bid price decreases the probability of willingness to pay and vice versa.

Regular visit

Regular visits to the game reserve also carried a negative sign on its coefficient in both models, with a weight value of -1.1821 in the logit model and -.6761 in the probit model (Table 3). It was statistically significant at the 5% confidence level in both models. The negative sign on the coefficients indicated that those who previously visited the game reserve had a lower probability of WTP than the first time visitors. This means that regular visitors are not willing to pay, whereas first time visitors are very willing to pay for conservation in Yankari. This outcome is in agreement with the finding of Reynisdottir *et al*. (2008).

CONCLUSION

The present study employed a dichotomous choice contingent valuation method in estimating the visitors' willingness to pay a premium for conservation in the Yankari game reserve with explanatory independent variables. This shows an encouraging result, as the majority of the visitors express their willingness to pay for conservation.

The results of this study are credible, as they were able to pass a minimal test of theoretical validity behind the reliability of CVM. Venkatachalam, (2004) stated that CVM results can be said to be theoretically valid if they are in conformity with the underlying principles of the economic theory.

The estimation of the logit and probit models with the socio-demographic variables has shown that the probability of a ''yes'' response was significantly correlated (positively) with the visitors' gender, level of education, age, household income and negatively correlated with the bid price offered and the regular visit to the game reserve. Mitchell and Carson (1989) explained that the theoretical validity of a CVM study required the assessment of the willingness to pay (WTP) values by regressing them against the standard socioeconomic economic variables. Thus, the outcome of the study justified the validity of the result and helps to identify the significant determinants of the willingness to pay.

From the results obtained, it was revealed that an elderly male visitor that attained university level of education with a higher income and who is not a regular visitor constitutes the target market that would contribute to revenue generation and biodiversity conservation in the protected area. This empirical study provides a useful policy guide by revealing the importance of economic valuation within the context of natural resources management for the development of sound environmental policies and strategies that would help to identify the important class of visitors who can contribute socially, economically as well as ecologically for the sustainability of the protected area resources. The results can also help other protected areas in Nigeria as well as other countries with wildlife and other nature-based resources to identify the benefits associated with efficient resource management. In a wider sense, this finding can contribute to the growing literature in relation to the application of the contingent valuation method for conservation in nature-based tourism areas, especially in developing countries.

This study, like many others, is not without limitations. Some important variables may have been left out from the models. Variables, such as psychological, which include the membership of an environmental organization, number of spots visited and attitude towards species or environmental protection, can be incorporated in the models in future research. In addition, future studies may consider collecting data from both local and international visitors for over a long period of time in order to capture all classes of visitors that visited the game reserve at different seasons. Additionally, this study was conducted between February and April (off peak visiting season). This might have missed some representatives of the population especially those visitors patronising the game reserve during the festive periods (peak seasons), thus, creating the possibility of sampling bias to existed. It is therefore suggested that further research can be conducted with larger samples size, focusing on longitudinal study (in both peak and off-peak and seasons), so as to improve the generalisation of the result and eliminate possible sampling bias.

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