

## Economic Valuation of Some Wildlife Species with Food and Tourism Value in Hong Local Government Area, Adamawa State

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### Abstract

The study carried out the valuation of some wildlife species that have food and tourism potential, determine the willing to pay and perceptions of wildlife species conservation. The contingency valuation method was used for valuation of wildlife species for food and tourism. The study tool consisted of structured questionnaire, simple random sampling techniques were used for data collection. Descriptive statistics was used for data analysis. Results indicated that wildlife species was perceived as something good by majority of respondents. Wildlife species with food and tourism potential were 26, and 3 with only food value. Prices of wildlife species prescribed by respondents for food ranged from ₦739.00 to ₦ 1543.00 per kg while that for tourism ranged from ₦ 22.00 to ₦ 193.00. Wildlife species that attracted the highest price from the respondents for meat included Roan antelope, Western heart beast, Buffalo, Kob, Yellow backed duiker, Bush buck etc. Wildlife species with the highest prices for tourism included: Lion, Elephant, Python and larger bovidae such as Buffalo, Roan antelope, Western heart beast etc. The study recommended that government should encourage integrated effort among local governments, non-governmental organizations and local communities to ensure the implementation and success of wildlife species conservation, Local communities should be trained on an alternative means of livelihood to prevent further destruction of wildlife resources, enhancement of conservation education program and establishment of training centers for wildlife species domestication.

**Keywords:** Economic Valuation, Wildlife Species, Tourism, Food Value, monetary

### Introduction

Wildlife species traditionally refers to undomesticated animal species, but has come to include all organisms that grow or live in an area without being introduced by humans. Wildlife species can be found in all ecosystems (deserts, rainforest, plains, grasslands and other areas, including the most developed urban areas). Each of the ecosystems have distinct forms of wildlife species (Haris and Brown, 2009). The term value is used in different ways amongst a range of academic disciplines. According to Jacobsen and Hanley (2013), there are three main types of uses of the term value; i) exchange value, the relative price of a good or service in the market, ii) utility, the use value of a good or service, which can be very different from the market price (e.g. the market price of water is very low, but its use value is very high; the reverse is the case for example, diamonds or other luxury goods); and iii) importance, which is, the appreciation or emotional

value attached to a given good or service e.g. the emotional or spiritual experience some people have when viewing wildlife or natural scenery, or our ethical considerations regarding the existence value of wildlife.

Valuation plays an important role in creating markets for the conservation of wildlife species and ecosystem services, for instance through payments for ecosystem services (Engel *et al.*, 2012). Such market creation process requires three main stages; namely, demonstration of values, appropriation of values and sharing the benefits from conservation (Kontoleon and Pascual, 2014). Demonstration refers to the identification and measurement of the flow of ecosystem services and their values. Appropriation is the process of capturing some or all of the demonstrated and measured values of ecosystem services so as to provide incentives for their sustainable provision. This stage in essence internalizes, through market systems, demonstrated

values of ecosystem services so that those values affect wildlife species use decisions. Internalization is achieved by correcting markets when they are “incomplete” and/or creating markets when they are all-together missing. In the benefit sharing phase, appropriation mechanisms must be designed in such a manner that the captured ecosystem services benefits are distributed to those who bear the costs of conservation (Rowcroft *et al.*, 2010; Bateman *et al.*, 2015; Lantz and Slanny, 2016). Economics, as the study of how to allocate limited resources, relies on valuation to provide society with information about the relative level of resource scarcity. The value of ecosystem services and wildlife species is a reflection of what we, as a society, are willing to trade off to conserve these natural resources (Lantz and Slanny, 2016). Economic valuation of ecosystem services and wildlife species help the society in general and policy makers in particular, understand that wildlife species and ecosystem services are scarce and that their depreciation or degradation has associated costs to society. If these costs are not imputed, then policy would be misguided and society would be worse off due to misallocation of resources (Barbier *et al.*, 2009).

Environmental economist has extended demand theory to goods and services that are not traded on markets, including most ecosystem services. For the fact they are not traded on markets, their value is not captured in market prices. The reason is that many ecosystem services bear characteristics of what economists call “public goods”. One important characteristic of public goods is that nobody can be excluded from their use (Aylward, 2010). For this reason, markets prizes cannot spontaneously develop for public goods. Public decision-making and its allocation of public funds will also be distorted if the repercussions of governmental activities on these wildlife species and the associated ecosystem services, are not adequately factored in (Postel and Thompsom, 2005).

According to Philip and Macmillan (2015), there are at least six reasons for conducting valuation studies: (i) Missing markets, (ii) Imperfect markets and market failures, (iii) For some biodiversity goods and services it is essential to understand and appreciate its alternatives and alternative uses. (iv) Uncertainty involving demand and supply of

natural resources, especially in the future (v) Government may like to use the valuation as against the restricted, administered or operating market prices for designing wildlife species/ecosystem conservation programmes, (vi) To arrive at natural resource accounting, for methods such as Net Present Value methods, valuation is a must. In consequence, valuation raise awareness of the hidden benefits of wildlife species conservation in terms of maintaining critical ecosystem services. It also has the potential of improving public decision-making as well as, under specific circumstances, improve legal decision-making (Humavindu, 2014).

The concepts and methods to value ecosystems and wildlife species have progressively emerged and their roots can be found in the core of economic theory of value (Gomez *et al.*, 2010). Review of the published literature has suggested itemizing three broad perspectives on valuing wildlife species; namely, perspectives that cover the economic, socio-cultural, and ecological benefits of wildlife species as distinguished in the Millennium Ecosystem Assessment (MEA, 2005). The first approach is to value wildlife species in terms of the services provided for the society, while the second approach is to assess socio-cultural values and the last approach adopts a biological viewpoint. However, integrative approaches that take into account all three perspectives of the sustainability are lacking (Sales, 2017). Economists have developed varieties of techniques for valuing wildlife species. They divided it into three categories that ranges from pure market to non-market based techniques: i). Market-based, ii). Revealed preference and iii). Stated preference techniques. Market-based techniques, is where a benefit generated by wildlife species is bought and sold directly in markets. It can be done using standard economic techniques to estimate the values for both buyers and sellers. The market price method uses standard economic techniques for measuring the economic benefits from marketed goods, based on the quantity people purchase at different prices, and the quantity supplied at different prices. However, market-based techniques are rarely used to value wildlife species because many of the benefits of wildlife species cannot be exchanged in market (Daily *et al.*, 2010; Turner *et al.*, 2013).

According to Fazey *et al.*, (2017) revealed preference techniques are characterized by the use of surrogate or related markets. Consumer behaviour in the surrogate market provides an indication or reveals consumer preferences for the non-marketed environmental resource. Techniques such as the travel cost method and hedonic pricing are typical of these techniques. (i) The travel cost technique estimates a value for the environment (such as a national park) by measuring the cost of using the asset as a surrogate estimate of the willingness to pay (WTP). Costs of using the resource included items such as cost of travel, entrance fees, and boat hire. Stevens *et al.*, (2014) stated that this method does not attempt to measure the value of a change in the quantity or quality of a specific resource, it simply estimates the direct use value of the resource in its entirety as a demand function. (ii) The hedonic pricing technique defines an environmental resource as elements of a vector of characteristics which describe a good that is traditionally marketed. For example, a park could be described in terms of its characteristics such as area of land and access to water, characteristics which would describe any land marketed in an area.

Stated preference techniques are characterized by the use of surveys which estimate stakeholder preferences by directly asking individual stakeholders about their preferences (Sales, 2017). These techniques include contingent valuation, contingent rating, contingent ranking and choice modelling. Contingent rating, contingent ranking and choice modelling are forms of conjoint analysis, a survey technique more commonly used for market research but more recently acknowledged as a technique which could be utilized for resource management (Gomez *et al.*, 2010). The stated preference technique which is commonly regarded as superior to the others in terms of its validity and reliability for valuation of the environment is contingent valuation. This technique directly assesses willingness to pay (WTP) or willingness to accept (WTA) for a particular environmental outcome in a carefully constructed hypothetical or simulated market (Mitchell and Carson, 2011).

Many of the products and services provided by the ecosystem does not have a real or estimated market and/or social value. Improved knowledge on the estimation of the value of all wildlife species

and services will allow a more informed decision making both at the political and business level.

This study is not only justifiable but imperative, more especially that Nigeria is on the trend of radical economic reform, which seeks for ways of boosting other sectors of the economy, rather than sticking to old status quo that encourages mono-economy (petroleum sector). It would therefore bring about the success of conservation of wildlife species and in turn the development of tourism industry, which is one of the fastest growing sectors in the world economy and consequently economic transformation of the study area.

This study provides decision makers and the general public increased understanding of the range of values and benefits that wildlife species offer and also ensure that appropriate government policy is formulated for wildlife conservation in the study area.

## Materials and Methods

### Study area

Hong falls within the Sudan Savannah zone in Adamawa State of Nigeria. Hong is located at latitude 9°27'12.95"N and longitude 12°1'54.65"E. The elevation of the area is 156 meters above sea level. It has a mean annual rainfall ranging from 700 to 900mm and the rainy season last for 4-6 months. The area has a tropical climate with an average temperature of 91°F. It has an average relative humidity ranging from 27% to 100% (Adebayo, 2020). Farming and animal rearing are known to be the major occupation and the predominant tribe is Kilba (Adebayo and Uyi, 2013). The dominant woody plant species in this zone are *Acacia senegal*, *Acacia nilotica*, *Adonsonia digitata*, *Borassus aethiopum*, *Ziziphus spana-christi*, *Selerocarya birrea*, and *Terminalia avicennioides*. Species of Southern and Northern Guinea Savanna zones may be found in this zone. More abundant grass species of the area include *Aristida longiflora*, *Cenchrus biflorus*, *Pennisetum pedicellatum* and *Eragrostis spp.* Kopre game reserve is located in Hong Local Government Area. Important game animals such as lion, leopard, Spotted hyena, Western hartebeast, Roan antelope, Waterbuck, Buffalo, Kob, Rock python, Ostrich etc. could be sighted in the study area (Akosim *et al.*, 2000).

### ***Sampling Method/Technique***

For the purpose of this study, data collection involved the use of random sampling technique and structured questionnaires while Journals, Proceedings, Texts, Brochure, and Manuals were used to elicit information for secondary data. Agu (2003) reported that the larger the sample size, the smaller the magnitude of sampling error. Cochran (2000) method of determining sample size agreed with the above observations, hence this study adopted Cochran 2000 method in determining the representative sample in each ward of the study area. The Categories of respondents from each ward include: traditional leaders, Forest/wildlife officers, farmers, women leaders, traders, civil servants, artisans, hunters, bush meat sellers, pastoralists and students. A total number of 5915 respondents were randomly administered questionnaires in 4 wards of the study area namely: Mayo lope, Hong, Husherezum and Shangui with 912, 3050, 870 and 1083 respondents respectively. The study employed Contingency Valuation Method (CVM) for the valuation of wildlife species by Kontoleon and Pascual, (2014). The method requires from each respondent willing to pay (WTP) for the price of each wildlife species for meat per kilogram and value for game view.

### ***Data Analysis***

Descriptive statistics was employed in the analysis of data. The descriptive statistics used were: Tables, means, frequency distribution, percentages and charts. They were used to analyze the following: (i) valuation of some wildlife species with food and tourism value (ii) Perception of respondents towards wildlife species conservation.

### **Results**

#### ***Wildlife Species that have food and Tourism value***

The result in Table 1 shows the food and tourism value of some wildlife species in the study area. It shows that twenty-three (23) wildlife species have both food and tourism values while three (3) wildlife species have only food value.

#### ***Valuation of some wildlife Species for monetary value (₦)***

The result in Table 2 shows the average prices of food (meat) and tourism (game view) of some wildlife species the respondents are willing to pay in the study area. The prices prescribed by respondents for wildlife species as meat ranged from ₦739.0 to ₦1543.00 per kilogramme and that of game view ranges from ₦ 22.00 to ₦ 193.00. Wildlife species that attracted the highest price from the respondents for meat included Roan antelope, Western heart beast, Buffalo, Kob, Yellow backed duiker, Bush buck etc. Wildlife species with the highest prices for tourism included: Lion, Elephant, Python and larger bovidae such as Buffalo, Roan antelope, Western heart beast etc. Wildlife species that attracted the least prices for meat were the primate family such as baboon, red pates monkey, Tantalus monkey including civet cat, genet, Monitor lizard etc. The same group of animals have the lowest game view prices. Majority of the respondents 4649 (78.6%) are willing to pay for food and tourism value of wildlife species while 1017 (17.2%) are not willing to pay and 249 (4.2 %) fall within no response (figure 1).

#### ***Perception of wildlife species in the study area***

Figure 2 and 3 presents the perception of wildlife species by the respondents in the study area. The result shows that 4862 (82.2 %) of the respondents viewed wildlife species as something good and worth conserving while 899 (15.2 %) regard wildlife species as something bad and only meant for killing and eating and 154 (2.6 %) made no response. 4762 (80.5 %) of the respondents are willing to support the conservation of wildlife species while 952 (16.1 %) of them were not in support of wildlife species conservation and 201 (3.4%) did not respond.

**Table 1:** Food and Tourism values of some Wildlife Species at Hong Local Government Area

S/N	Wildlife specie	Wildlife species with food value	Wildlife species with tourism value
1.	Grass cutter	✓	-
2.	Porcupine	✓	✓
3.	Giant rat	✓	-
4.	Thomson’s gazelle	✓	✓
5.	Grimes duiker	✓	✓
6.	Kob	✓	✓
7.	Red flanked duiker	✓	✓
8.	Yellow backed Duiker	✓	✓
9.	Bush buck	✓	✓
10.	Roan antelope	✓	✓
11.	Western heart beast	✓	✓
12.	Elephant	✓	✓
13.	Buffalo	✓	✓
14.	Monitor lizard	✓	-
15.	Rock python	✓	✓
16.	Ostrich	✓	✓
17.	Warthog	✓	✓
18.	Red river hog	✓	✓
19.	Baboon	✓	✓
20.	Red patas monkey	✓	✓
21.	Tantalus monkey	✓	✓
22.	Civet cat	✓	✓
23.	Genet	✓	✓
24.	Stripped hyena	✓	✓
25.	Lion	✓	✓
26.	Wild dog	✓	✓

**Source:** Field survey 2021

**Table 2:** Prices that the Respondents are willing to pay for Meat and Tourism of some wildlife Species at Hong Local Government Area.

S/N	Wildlife species	Average Prices of meat per kilogram by respondents ₦	Average Prices for game viewing by respondents ₦
1.	Grass cutter	1018	-
2.	Porcupine	1087	39
3.	Giant rat	827	-
4.	Thomson’s gazelle	1274	63
5.	Grimes duiker	1206	74
6.	Kob	1304	92
7.	Red flanked duiker	1232	85
8.	Yellow backed Duiker	1286	74
9.	Bush buck	1309	81
10.	Roan antelope	1483	152
11.	Western heart beast	1402	142
12.	Elephant	1151	186
13.	Buffalo	1543	149
14.	Monitor lizard	739	-
15.	Rock python	1156	158
16.	Ostrich	1193	54
17.	Warthog	1043	51
18.	Red river hog	1071	55
19.	Baboon	856	27
20.	Red patas monkey	883	22
21.	Tantalus monkey	976	31
22.	Civet cat	865	32
23.	Genet	832	38
24.	Stripped hyena	1086	83
25.	Lion	1151	193

Source: Field survey 2021

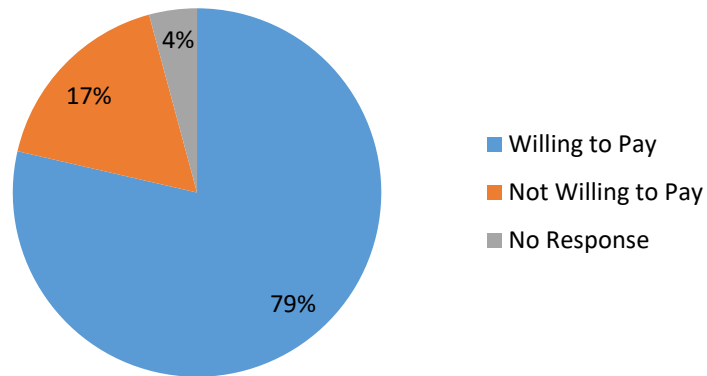


Figure 1: Willing to Pay by Respondents

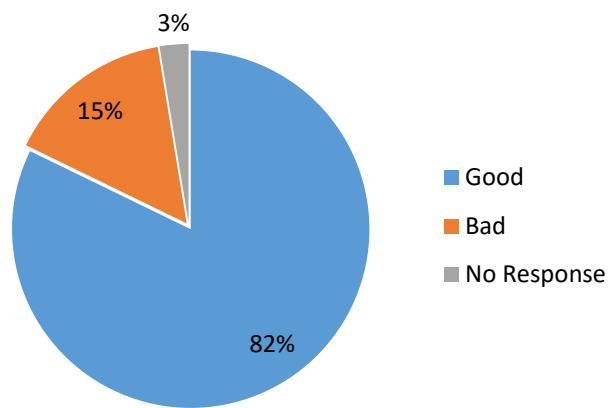
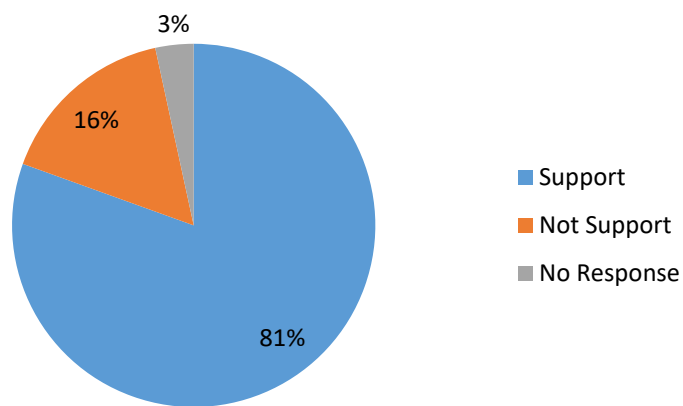


Figure 2: Respondents Opinion on Whether Wildlife Species Conservation is Good or Bad



**Figure 3:** Respondents Support/No Support for Wildlife Species Conservation

### Discussion

To obtain the valuation for food and tourism of some wildlife species in the study area, the wildlife species that have either food or tourism values or both were first determined. The monetary values of these wildlife species were then obtained. The finding indicated that 23 wildlife species that are of value for food and tourism and 3 wildlife species are having only food value. The result of wildlife species composition of the study area is in consistent with Osunsina (2016) report of wild animal resources of the savanna ecosystem of Nigeria. Furthermore, what is significant about the composition of wildlife species of the study area is the FAO (2014) observation that the composition of wildlife species of the area has high potential for food and tourism industry.

The prices respondents are willing to pay for wildlife species for meat in the study area ranges from ₦739.0 to ₦1543.00 per kg while that of game view ranges from ₦ 22.00 to ₦ 193.00. Wildlife species that attracted the highest price from the respondents for meat are the Bovidae family such as: Roan antelope, Western heart beast, Buffalo, Kob, Yellow backed duiker, Bush buck etc. Wildlife species that attracted the least prices for meat were the primate family such as baboon, red pates monkey, Tantalus monkey including civet cat, genet, Monitor lizard etc. This is in the same vein with the National Biodiversity Report, NBR (2015) which stated that many Nigerians view the consumption of wildlife resources as normal and in some cases a delicacy. However, field reports on bush meat trade have confirmed that apart from primate species, other large games are used for food and traditional medicines in northern Nigeria. Wildlife species with the highest prices for tourism included, Lion, Elephant, Python and the larger bovidae such as buffalo, roan antelope, and western heart beast. The ones with the lowest game view prices were the primate family such as baboon, red pates monkey, Tantalus monkey as well as civet cat, genet, Monitor lizard etc. The study indicated that majority of the respondents are willing to pay for meat and tourism of wildlife species. This is in consonance with the report of Engel *et al.* (2012) in a related study in Kenya which indicated very high population of respondents willing to pay for food

and tourism value of wildlife resources making wildlife industry as a profitable venture. Therefore, wildlife production programmes for meat and tourism based ventures in the study area are likely to be profitable since majority of the respondents are interested in paying for food and tourism value of wildlife species.

The view of majority of respondents of wildlife species as something good and their support for conservation may not be unconnected with their positive attitude towards wildlife species and the possible benefits derivable from them. This is in agreement with the report of Ijomah and Akosim (2000) that the perception of local dwellers of wildlife species in their environment determines their attitude towards the resources. The respondents in the study area perceived wildlife species as something good and beneficial, hence, their support for the management and conservation of the wildlife species in their domains. Similar findings was made by Alexander (2015) in Belize while working on a community baboon sanctuary.

### Conclusion

In conclusion the study revealed some wildlife species of the study area including their potential for food and tourism. The monetary value of some of the wildlife species in the study area were prescribed according to their potential for food and tourism. Majority of the respondents were willing to pay for the food and tourism value of some wildlife species. More over higher number of respondents view wildlife species as something good and worth conserving and therefore they are willing to support the conservation of wildlife species.

### Recommendations

In view of the finding of this study the following recommendations were made. The Local Government, Non-Governmental Organization (NGO,s) and the Local communities need to intensify efforts towards conservation of wildlife and ecosystems. Local communities should be trained on an alternative means of livelihood in areas such as craft making, tailoring, shoe and bag making, motor mechanic, carpentry, mason and modern agricultural practices in order to prevent further destruction of wildlife species. The local

government should also enhance its conservation education programme to enlighten more residents about the benefit of wildlife species. Government should establish training centres for wildlife species domestication.

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