



UNIVERSITI PUTRA MALAYSIA

***ECONOMIC VALUATION FOR IMPROVED CONSERVATION AMONG
COMMUNITIES OF YANKARI GAME RESERVE, NIGERIA***

MUHAMMAD SANUSI IBRAHIM

FPAS 2018 4



**ECONOMIC VALUATION FOR IMPROVED CONSERVATION AMONG
COMMUNITIES OF YANKARI GAME RESERVE, NIGERIA**

By

MUHAMMAD SANUSI IBRAHIM

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia
in Fulfillment of the Requirements for the Degree of Doctor of Philosophy**

November 2017

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DEDICATION

To my beloved parents

Late Hajiya Salamatu (Yalwa)

And

Alhaji Ibrahim Sule



Abstract of thesis presented to the senate of Universiti Putra Malaysia in fulfillment of the requirement for the degree of Doctor of Philosophy

ECONOMIC VALUATION FOR IMPROVED CONSERVATION AMONG COMMUNITIES OF YANKARI GAME RESERVE, NIGERIA

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November 2017

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Yankari Game Reserve (YGR) is situated at Alkaleri local government area of Bauchi state, Nigeria. The conservation of the reserve is a unique one because of its national and international significance and also the role it plays to both tourist and the surrounding environment of the state. Among the most important functions the reserve plays, the game reserve serve as a biological hotspot to about 50 species of mammals, over 350 bird species and many species of plants. Moreover, it also plays different roles such as ecological, environmental, educational, economic and social role not only to the communities but the country at large. Despite its numerous importance, the reserve is increasingly facing threats and challenges at various degrees of non-sustainable human activities. Such activities range from poaching, deforestation, over grazing, pollution of water bodies and agricultural encroachment. The major reason for this excessive depletion was lack of valuation or underestimation of non-market values of the reserve resources, hence the need for effective valuation of the ecosystem resources. Therefore, estimates the economic values of YGR as an important hotspot for ecosystem and also reveal such values to policy makers and the adjoining communities. Contingent Valuation Method (CVM) and Choice Experiment (CE) were the techniques employed in this study. A total 422 responses were elicited using stratified random sampling technique. The logit regression model was used to estimate the willingness-to-pay based on the specified bid amounts presented based on the hypothetical market to support the improve conservation of YGR. The estimated mean willingness-to-pay base on CVM result was ₦2376.42 and aggregate value of ₦130,000,464, while that of CE was estimated at and ₦2413.39 and compensating surplus ₦132,024,882. The total net benefit was estimated to be ₦262,025,346. The result was positive and highly encouraging as the respondents shows willingness to participate in the improve conservation of the reserve. Therefore, we recommend for a special conservation fund (donation) for sustainable conservation.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

**PENILAIAN EKONOMIK BAGI MENAMBAH BAIK KONSERVASI
DALAM KALANGAN KOMUNITI BERDEKATAN TERHADAP HUTAN
SIMPANAN MERGASTUA YANKARI, NIGERIA**

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Hutan Simpanan Mergastua Yankari (YGR) terletak di kawasan kerajaan tempatan, negeri Bauchi, Nigeria. Konservasi hutan simpan tersebut adalah unik disebabkan kepentingan kebangsaan dan antarabangsanya dan juga peranan yang dimainkannya dalam bidang pelancongan dan alam sekitar sekeliling negeri tersebut. Antara fungsi utama yang dimainkan oleh hutan simpanan tersebut, ia bertindak sebagai kawasan panas biologikal bagi lebih kurang 50 spesies mamalia, lebih 350 mergastua dan banyak sepsis tumbuhan. Di samping itu, hutan simpanan tersebut memainkan peranan yang berbeza, seperti ekologi, alam sekitar, pendidikan, ekonomi dan peranan sosial, bukan hanya pada komuniti tetapi pada negara khususnya. Walaupun kepentingannya banyak, hutan simpanan tersebut mengalami ancaman dan cabaran pada pelbagai tahap akibat aktiviti manusia yang tidak mampan. Aktiviti tersebut mencakupi daripada pemburuan haram, deforestasi, terlebih ragutan, pencemaran bahan air dan pencerobohan pertanian. Sebab utama bagi penyusutan berlebihan tersebut ialah kekurangan penilaian atau kurang anggaran nilai bukan pasaran sumber simpanan, oleh itu, keperluan untuk penilaian yang efektif terhadap sumber ekosistem. Oleh itu, menganggarkan nilai ekonomik YGR sebagai kawasan khas yang penting bagi ekosistem dan juga memperlihatkan nilai tersebut pada penggubal polisi dan komuniti berhampiran. Kaedah Penilaian Kontigen (CVM) dan Eksperimen Pilihan (CE) merupakan teknik yang digunakan dalam kajian ini. Sejumlah 422 respons telah diperolehi menggunakan teknik persampelan rawak berstrata. Model regresi logit telah digunakan untuk menganggarkan kesanggupan untuk bayar berdasarkan jumlah bida tertentu berdasarkan pasaran hipotetikal bagi menyokong penambahbaikan konservasi YGR. Min anggaran kesanggupan untuk bayar berdasarkan keputusan CVM ialah ₦2376.42 dan nilai agregat ₦130,000,464, manakala bagi CE dianggarkan pada dan ₦2413.39 dan lebih pampasan ₦132,024,882. Faedah bersih keseluruhan telah dianggarkan sebanyak

RM262,025,346. Dapatan kajian yang positif dan amat menggalakkan disebabkan responden menunjukkan kesanggupan untuk terlibat dalam penambahbaikan konservasi hutan simpanan tersebut. Oleh sebab itu, kajian ini mencadangkan suatu dana konservasi yang khusus (derma) bagi konservasi yang mampan.



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Thank you all.

I certify that a Thesis Examination Committee has met on 22 November 2017 to conduct the final examination of Muhammad Sanusi Ibrahim on his thesis entitled "Economic Valuation for Improved Conservation among Communities of Yankari Game Reserve, Nigeria" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Doctor of Philosophy.

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LIST OF ABBREVIATIONS

ABM	Averting behaviour method
ADB	African development bank
ASC	Alternative specific constant
ATQ	Attitude question
AVE	Average variance extraction
AWQ	Awareness question
AZE	Alliance for zero extinction
CBA	Cost benefit analysis
CBD	Convention of biological diversity
CBNRM	Community base natural resource management
CD	Compensation demand
CE	Choice experiment
CFA	Confirmatory factor analysis
CFUG	Cold fusion users group
CM	Choice modeling
CPB	Centre of plants diversity
CR	Contingent ranking/ Contingent rating/
CR	Construct reliability
CS	Compensating surplus
CV	Compensating variation
CVM	Contingent valuation method
DC-CVM	Dichotomous choice Contingent valuation method
DFID	Department for international development
EV	Equivalent variation
FAO	Food and Agriculture organisation
GEF	Global environmental facility
HWC	Human wildlife conflict
IBA	Important birds' area
ICCA	Indigenous and community conserved area
IUCN	International Union for conservation of nature

KBA	Key biodiversity areas
MDGs	Millennium Development Goals
MSE	Mean square error
NBS	Nigeria bureau for statistics
NGOs	Non-governmental organisations
NNPS	Nigerian National park service
NOAA	National oceanic and atmosphere administration
NPC	National population commission
PA	Protected areas
PC	Paired comparison
PCM	Participation in conservation management
PCQ	Perception question
PFM	Participation in forest management
SEM	Sequential equation modeling
SPM	Stated preferred methods
SPSS	Statistical packaged for social sciences
TCM	Travel cost method
TEV	Total economic valuation
TIOLI	Take-it-or-leave-it
UN	united Nations
USAID	United states agency for international development
USA	United States of America
UNDP	United Nations development program
WCPA	world conservation and protected areas
WTA	Willing-to-accept
WTP	Willing-to-pay
YGR	Yankari game reserve

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Protected areas, these are places such as national parks, wilderness areas, community conserved areas, nature reserves, game reserve, are the mainstay of biodiversity conservation, and also contributing to per capital earning of livelihoods to adjacent communities. Protected areas are at the centre platform of protecting natural environments and the services they offer to us, example food, clean water, medicines and protection from the effects of natural calamities. Their role in moderating, mitigating and adapting to climate change is gradually recognized; it has been considered that the worldwide network of protected areas stores at least 15% of earthly carbon (Ezebilo et al., 2010). Effective conservation of Floras and Faunas has been recognized as one of the objectives of the Convention on Biological Diversity (CBD) and the Millennium Development Goals (MDGs).

Adora (2014) defined protected areas as geographical sites that have protection because of their acknowledged natural, ecological and cultural values. International Union for Conservation of Nature (IUCN) defines Protected Area as; "A clearly defined geographical locations, recognized, devoted and managed, through lawful or other effective ways, to attain the long-term conservation of nature with associated ecosystem services and cultural values" (IUCN: 2008). There are several classes of protected areas, which differed by level of protection based on the enabling laws of each country or the rules and regulations of the international organisations involved. The 2014 United Nations List of Protected Areas provides figures information on over 209,000 protected areas in the world covering more than 30 million km² (UN List of Protected Areas, 2014).

Due to the rapid growing ecological resources of the present day society which lead to habitat destruction and fragmentation, extinction of species and the general decline or loss of biodiversity (Frikvist and Erika, 2015; Larby and Patricia, 2009). Globally, the rate at which varieties of species of plants and animals were lost supersedes its natural lost (Chanie & Tesfaye, 2015; Meduna, Ogunjinmu and Onadeko, 2009). The daily increase of human activities is destructing natural resources which necessitate the establishment of conserve and protected environmental resources globally (Grigoroudis, Petridis & Arabatzis, 2014).

The establishment of conserve reserves and resources parks was aimed at ensuring that varieties of plants species are conserved and protected (Jia et. al., 2014: An et. al., 2007). The main aim of ecosystem conservation is to maintain and protects ecological process which is proved to have continuously contributed significantly in the productive capacity of the protected ecosystem resources, biodiversity genetical

materials, protection of culture and rural area development as a whole. (Newing, 2010). Conservation of environmental resources serves as ecosystem maintenance system such as the sequestential of carbon, recreational and educational services, erosion and flooding mitigation and control (Jia, Fu et. al., 2014). Such areas are to serve as avenue of poverty reduction and job creation and sustainable community and conservation development (Rogerson, 2012). Therefore, conservation of natural environment resources is a wealth of life which is found on earth plants, animals, microorganisms and the system that exist in (Olaleru, & Egonmwan, 2014).

However, many conserve environment around the world are financially underfunded, and due to it, quit a number of such programs are either not able to achieve their conservation aims and developmental objectives (Whytock et. al., 2016). In Africa for example, many endowed conserve environment find it difficult to manage and conserve this resources due top continues human pressure and in adequate funds for management (Adamu et. al., 2015). There is the prediction that funding of conserve environment by most federation government of African countries may reduce or is reduced because currently most of these resources management are faced with limited funding from government to maintain the conserve natural environment (Cheung et. al.,2014).

This problem of under or poor funding will lead to the failure of many government, policy makers, environmental managers, visitors and peoples of adjoining communities to recognise the market and non-market values of conservation area. These include the internally generated revenue from visitors and the non-monetary services that can contribute to the improvement of life quality (Yacob et. al., 2009; Anderson & Huggins 2008). This unfortunate happening leads to lack financial independence of such rich conserve area in their sustainable survival (Waldron et. al., 2013), and virtually most of the conserve biodiversity will only survive or exist only if people choose and are willing to protect and allocate fund for their sustainable conservation (Klein et. al., 2015). Researchers within the conservation discipline have focused on the way that the financial independence of conserve area could be enhanced or achieved, Emerton, Bishop and Thomas (2006), defined the financially independence of conservation program as the ability to secure a long-term stable and sufficient financial resources, timely and appropriate allocation of funds to cover all cost of the management of the program to ensure its effectiveness and efficiency in line with conservation management.

Therefore, getting enough funding for protecting and enhancement of conserve environment is always a topic of concern for sustainable management of natural resources based conservation (Steckenreuter & Wolf, 2013). Funding is aim towards biodiversity conservation is the major point of conservation to environmentalist and conservationist. The services rendered by conserve resources are one of the major important components for sustainable growth and development of surrounding communities. The recent increase in leisure and recreation demand at various rich

and endowed ecosystem resources environment (Kelley et al., 2016) such as in countries like Tanzania, Kenya and Nigeria (Ezebilo, & Mattsson, 2010).

Such areas are designated with the objective of conserving biodiversity and providing a pointer for that conservation's progress, but the extent to which they protect resources and ecosystem dynamics from degradation are slightly more difficult (Kamins et al., 2011). Protected areas embrace other zones that are important for other conservation uses, such as Centre's of Plant Diversity (CPD), Important Bird Areas (IBA), Alliance for Zero Extinction Sites (AZE) Indigenous and Community Conserved Areas (ICCA), and Key Biodiversity Areas (KBA) among others (IUCN, 2008). Conservation is an interdisciplinary theme in natural science, social sciences and the exercise of natural resource management. It is the studying of the nature of Earth's biodiversity with the aim of protecting the ecosystem and their habitats from excessive extinction and destructions (Sahney and Benton, 2008; Van Dyke, 2008; Meffe, and Martha 2006; Hunter, 1996; Wilcox, *et al.*, 1980; Soule *et al.*, 1986).

Major threats to biodiversity and ecosystem survival include climate change, deforestation, pollution, mass, overgrazing, pesticide use, poaching, slash-and-burn agriculture, urbanization, and wildlife trade (Ezebilo et al., 2010; Sodhi *et al.*, 2008; Delaney *et al.*, 2004 Longcore and Rich, 2004; Thomas *et al.*, 2004; and Landres *et al.*, 1988). Habitat fragmentation poses one of the more tough challenges, because the global protected areas net only covers 30 million km² of the Earth's surface (UN List of Protected Areas, 2014; and Sautner, 2002). The consequence of the said threats leads many protected areas into great loss of ecosystem and causes a great exodus migration of many animals species globally ((Ezebilo et al., 2010); Hance, 2009).

In addition, deforestation, pollution, mass, overgrazing, pesticide use, poaching, slash-and-burn agriculture, urbanization and wildlife trade are the major conservation treats that take place and exhausts conservation due to lack of awareness or sarcasm of their non-market environmental values in our day-to-day activities. Therefore, determining and estimating their associated benefits of conservation of natural resources can be expedient in increase our level of knowledge in relation to importance and associated values of ecosystem and the need for improve conservation management of the associated resources for future generation and sustainability (Kaffashi, 2010; Rusli *et al.*, 2008, and Barbier *et al.*, 1997).

Consequently, IUCN has structured a global group of experts and researchers across the sphere of influence to monitor the decline of nature in an effort to control the elimination predicament. They identify those classes of species in essential need of protection devotion by providing a global key on the status of biodiversity (Al Tanko, 2013; Chan, 2008). Conservation scientists note that the eradication rates of requires urgent action than a priority focus on rare, endemic or endangered species.

Worries over biodiversity loss, tops a broader ecosystem conservation fiat that looks at ecological processes, such as migration, genetic, population and ecosystem diversity (Vié, *et al.*, 2009). The extensive, systematic and rapid rates of biodiversity loss threatens the sustainability and well-being of humankind by restraining the supply of ecosystem services that are otherwise restored by the complex and evolving holistic network of genetic and ecosystem assortment. Although some scientists highlight that it is the common species of floras and faunas that are the primary cause of utilization and habitat alteration by human race. Moreover, common species are often underrated or misjudged despite their role as the prime basis of ecosystem services (Molnar, *et al.*, 2004; Gaston, 2010).

However, to indicate the most logical and rational choices from the various conserved natural resources, one must first recognise, identify and list the benefits historically and currently derived from nature for future upgrade, and also to recognise and quantify the economic value of the attributes. In the former case, ecologist and environmental planners may help us; in the latter, economists do their work, but along the way both experts may work as a team.

The main aim of economic valuation in providing sustainable conservation management is generally to indicate to the policy on makers the overall economic efficiency and importance attached to the various attributes and their associated preference. Hence, conservation goods and services must be given a quantitative value if their conservation is important and has an alternative for improvement. Many conservation attribute such as Plants, animals, rivers have no market price, hence it is not easy to assign them price or estimate the attributes worthiness of conservation and their associated values.

Visitors entrance fee into conserve areas make such areas financially self-sufficient due to the sending good messages about the devoted conservation resource values. The idea of charging high entrance fees to foreigners into such conserve environment will help in boosting the internally generating revenue of the managed area and make it used sustainably (Das, & Chatterjee, 2015; Coria and Enrique, 2012). High entrance fee charges will be suitably change biodiversity rich conserve area with appealing natural resources (Stronza, & Gordillo, 2008). The species are of interest to visitors and are rare endangered. Therefore, the visitors will be willing to pay higher affordable amount to access the conserve area (Samdin, Aziz, Radam, & Yacob, 2010). The uniqueness of some of such endangered species can help in increasing the awareness about the conserve ecosystem and a lot has been done in estimating visitor's willingness to pay for entrance fees (Coria and Enrique, 2012). Therefore, determining the willingness to pay of the people of adjoining communities of conserve resources towards the improve biodiversity conservation will eliminate or minimise all unwanted human activities around the reserve and its resources.

1.2 Problem Statement

Yankari game reserve is an important sanctuary to over 50 species of mammal including African bush elephant, Olive Baboon, Patas Monkey, Tantalus monkey, Roan Antelope, African buffalo, Waterbuck, Bushbuck and Hippopotamus and a Lion and Leopard population which is at the verge of extinction. The reserve also accommodate over 350 species of bird such as, saddle-billed stork, guinea fowl, grey hornbill, and the cattle egret, among those, 130 are permanent residents, 50 are Palearctic migrants and the rest are intra-African migrants that move locally within Nigeria. Yankari is recognized as having one of the largest populations of elephants in West Africa, estimated at more than 300 in 2005. The growth of the elephant population has become a problem for surrounding villages at times as the animals enter local farms during the rainy season (A Handbill of the Yankari National Park, 2000).

Most protected areas lack protection because, illegal encroachment by farmers and cattle rearers, fuel wood gatherers and poaching still consume most of such areas. Widespread of such illegal activities and encroachment has been reported in YGR and other protected areas in Nigeria (USAID/Nigeria 2008).

Poaching in Yankari game reserve is a major threat to the survival and sustainability of biodiversity in the reserve as shown in Table 1.1. The animals and plants in the game reserve are on daily basis been under continuous attack by poachers, which leads to a decline in the population and extinction of many animals particularly the endangered species that were predominance some years ago. These unwanted activities are; hunting of animals for subsistence and commercial drive, overgrazing, encroachment of agricultural land and logging to mention but a few (YGR reports June 2012- September 2017). Poaching is an activity of concern and a major problem for conservation of wildlife populations in many parts of Africa and other developing countries like Nigeria. It is compelled by a number factors including, local demand for bush-meat and as a source of income for those living adjacent to PAs (Knapp *et al.*, 2010). The high demand for bush-meat in West Africa and other parts of Africa is one of the major drives for poaching activities (Wilkie *et al.*, 2005; Brashares *et al.*, 2004). In Nigeria, the demand for bush-meat is on increased because it continues to be an important source of animal protein and over 80% of Nigerian's both rural and urban would consume it if available (Ntiamao-Baidu, 1998). Poaching not only impacts wildlife with attendant implications for conservation but also affects communities. Although poaching may be carried out by only a small segment of the population, communities associated with poaching are branded and stereotyped. Such communities become the target of park law enforcement units and sometimes innocent people may suffer for the wrongful actions of others.

Destruction of biodiversity through human activities such as agriculture and fuel wood collection poses a serious threat to both the land and the biodiversity. The population of Nigeria is estimated to be about 178,516,904 million (NPC, 2014). These boost in population led to serious farmland hunger in some part of the country and with the current need for high food security production. The management of the reserve is always at loggerheads with adjoining communities' farmers, herdsmen and poachers who want to have access to the vast land for farming, grazing and hunting (Mohammed *et al.*, 2009; Barbour *et al.*, 1982).

Wildlife encroachment of adjacent farmlands and the neighboring communities from the protected area is causing serious damages and destructions to agricultural crops and attack on livestock by some of the dangerous animals from the reserve. This is generating huge economic loss by creating an untold hardship to the residents due to lack of compensation to cushion the effect of the damages caused by the animals, there by provoking a long term social conflict. Attack of villagers by wild animals in and around protected areas is perhaps the most serious aspect of HWC (Akinyemi, 2006; Jhala, 2002; Rajpurohit and Krausman, 2000).

Conserving wildlife that damages crops and livestock, or attacks humans poses special challenges. Increased social conflict over wildlife issues is often born from value systems and perspectives about wildlife (Teel and Manfredi, 2010). Worldwide efforts to balance human needs with those of wildlife have generated much interest, and solutions are required that are scientifically sound and socio-politically acceptable (Treves *et al.*, 2009; Wade *et al.*, 2001).

Table 1.1 : Annual Report on Poaching, Farmland Raiding and Reserve Encroachment in YGR

Years	Pouching, Nuts and fuel wood collections	Farmlands raiding	Grazing animal
June – December 2012	17	Very high	32
January to December 2013	37	Over 27 communities	123
January to December 2014	74	Over 20 communities	41
January to December 2015	76	Very high	68
January to December 2016	63	Over 20 communities	39
January to September 2017	53	Over 16 communities	28

(Source: YGR reports June 2012- September 2017)

The local people's encounter with the management of the protected area has been undermining conservation effort because of the continuous criminalization of the people's livelihood activities perpetrated on the basis of safeguarding natural resources. This has continued to foment hatred, negative attitude and local bitterness

towards conservation policies in the reserve (Emmanuel, 2013). However, many of the species that are attractive to tourists that visit the park can create problems for adjacent communities with implications for sustaining rural livelihoods and impacting on poverty. Although game reserves are very important in conservation of biodiversity resources particularly in developing countries such as Nigeria, the success of game reserves as a conservation strategy depends on the support of the nearby community. If the cost to adjoining communities is excessive, compared to the associate noticed benefits, community support for conservation may decline or be rejected and anti-conservation activities such as poaching may arise. The concerns and benefits unwary, Protected Area governance arrangement, and cultural perspectives based on the traditional areas.

Indiscriminate falling down of trees has continued in virtually every part of the country. For instance, the federal department of forestry (2001) estimated that Nigeria's forests are been depleted at an annual rate of 3.5%. Nigeria use to have about 20% of its area covered by natural forest but this has been reduced to about 10%. About 60% of this natural forest lost due to agricultural encroachment, excessive logging and urbanization between 1960 -2000. The rate of deforestation is very high as we continue to find evidences of serious soil erosion and desert encroachment in many part of the country (Aber, 2011; FAO, 2001).

1.3 Research questions

The issues raised in this study's problem statement, give rise to the following research questions as follow:

- I. What are the awareness, perception and attitude of these people towards the conservation of Yankari Game Reserve?
- II. Are the local peoples willing to participate in the improve conservation of Yankari Game Reserve?
- III. What are the most important attributes of conservation in YGR are been prioritized by the people of the surrounding communities?
- IV. What is the average willingness to pay of the local people for an improve conservation of Yankari Game Reserve?

1.4 Objectives of the Study

The general objective of this study is to evaluate the local community's potentials and prospects for improved and effective conservation of ecosystem of Yankari Game Reserve, Bauchi state, Nigeria. This is in the context of estimating the respondent's willingness to pay for an improved conservation from the attributed most convenience cost. In achieving these, the below outlined specific objectives for the study are;

1. To access the level of awareness, perception and attitude of the local people's on conservation.
2. To determine the local people of the surrounding settlements willingness to participate in the improve conservation of Yankari game reserve.
3. To examine the level of participation of the local people of the surrounding communities in conservation of Yankari game reserve.
4. To estimate the willingness to pay for improve conservation program by people of the surrounding settlements.
5. To determine the most relevant set of respondent choice-influencing attributes for improve conservation.

1.5 Significance of the study

This study will provide a full range of the economic value of YGR and its importance. It is aimed at providing insight knowledge of the various conservation services and goods of which this protected area has and the need for those services and goods to be safeguarded for the future generation. The finding of this research will provide a good and better understanding of the economic value of these services and goods and the role they play in our environmental quality and life. And if policy makers and conservation managers have enough information about the roles and functions of Yankari game reserve, a better policy and management decision can be made.

In economics, price or values are been attached to human wants and needs, and costs is being imposed on goods and services in order to satisfy human needs. Since most environmental goods and services values do not have market prices, the economic value of a protected area is the value at which people places on the goods and services provided by the reserve ecosystem. Therefore, valuation studies on improved conservation of YGR can help to estimate the worth utility from the reserve services and goods. Evaluating the value of conserving YGR will increase social benefit and in some extend maximize social welfare. Social welfare is by the associated changes or improvement in the situation of the reserve goods and services. There is a special need for this research on Yankari game reserve economic value because of the beneficial and diverse goods and services the reserve is providing to the area. These includes regulating of atmospheric chemical composition, regulating global temperature, precipitation and other biological mediated climatic process, regulating of hydrological flows, storage and water retention, retention of soil within an ecosystem, soil formation process, nutrient cycling, pollination, food production and raw material, recreation and providing opportunities for non-commercial uses, and water treatment. When policy and managerial decisions are to be making, a great care must be taken towards providing adequate and proactive measure in protecting Yankari game reserve from any type of unfavorable activity. This research will provide an in-depth knowledge and guide for the policy makers, management of the reserve, and donor agencies on appropriate approaches to encourage community participation in biodiversity conservation.

Finally, this research will make a significant contribution to existing literature, because at present there is lack of information on the non-market values of Yankari game reserve. Only a few market values have been quantified in previous studies. This research will try to fill the information gap by estimating the non-market values of conservation of Yankari game reserve. Secondly, it will estimate the willingness-to-pay for the improvement in conservation of the reserve using Choice experiment model. Thirdly, the Perception, attitude, participation of the respondents on the conservation of Yankari game reserve and their willingness-to-pay for improved conservation will be reported. Also, this study will contribute to the existing knowledge of Choice experiment in developing countries like Nigeria. Because at present, studies on environmental valuation with application of choice experiment are still limited in developing countries. This study is one of the few choice experiment studies to be conducted on conservation of protected area in developing countries. This study can be a platform to many other studies in the same country, region and area.

1.6 Scope and Limitation

Conservation cover a wide range of activities such as soils, water, plants, animals, minerals, timber, fish, game, topsoil, pastureland, and minerals, and also to the safeguarding of forests-forestry, wildlife-wildlife refuge, parkland, wilderness, and watershed areas. This research is centered on safeguarding of forests, wildlife and watershed areas of Yankari game reserve and specifically on the surrounding communities' willingness to pay and willingness to participate in improve conservation of the reserve resources. The study covers the all the conserve areas of Bauchi state such as, Yankari game reserve (2,244 km²), Sumu wildlife park (82km²), Maladumba lake and forest reserve (1,860Ha) and Lame Burra game reserve (2.057.67Km²). These reserves are very wide that is why the research was only limited to Yankari game reserve being the largest. The study also focused on the surrounding communities of the reserve on the improve conservation of Yankari game reserve biodiversity and springs.

1.7 Thesis Organisation

This research was organized into five (5) chapters as follows; chapter one comprises of introduction, background of the study area, problem statements, research questions, and objectives of the study, significance of the study, scope and limitations of the study. Chapter two focuses on reviewed of relevant literatures on conservation and protected areas, conservation in Africa and Nigeria, awareness, perception, attitude, participation, participation on conservation and local community participation on conservation. Chapter three of this thesis focuses on the methodology of the study such as conceptual framework, study area, sampling design, data collection, technique for valuing environmental resources, logit and probit models, use and non use values and welfare measurements. Chapter four dwells on the analysis of result, discussion and interpretations of findings and finally

chapter five which is on summary of research findings, policy implications of the study, limitations of the study, recommendations for further study and conclusion.



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