VALUATION OF FOREST FUNCTIONS IN IKENNE REMO LOCAL GOVERNMENT AREA OF OGUN STATE: DICHOTOMOUS CHOICE CONTINGENT VALUATION APPROACH

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AKNOWLEGEMENT

What shall say unto my maker? All have to say is "THANK YOU LORD ONE MILLION TONGUES ARE INSUFFICIENT TO PRAISE YOU AGAIN I SAY "BABA E SE

Words are not enough to appreciate my wonderful parents, Dad & Mum, I am proud to have you

As the most caring Parents in the universe! Love you more than ordinary pen can express and I am highly indebted to you. But Dad, please ACCEPT JESUS NOW!

DEDICATION

This writes up is dedicated to the Glory of the king of kings, Lord of lords, The unchangeable change, the bright moming star who reigns in wholesome Majesty. Further dedication goes to Professor Emmanuel. (DR JESUS), The giver of Wisdom. Finally to the Gentle Holy Spirit- who has not in any ramification, forsaken me

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A RESEARCH PROJECT SUBMITTED TO THE

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JUNE, 2003

CERTIFICATION

This is to certify that OGUNNOWO ADERENKE ADUNOLA Of the department of agric

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ABSTRACT

This research work was carried out to identify and value the market and neo-maker fusions of rainforests using kenne Remo (LGA of Ogun States a case study.

Malissage sampling technique was used to select the sample size is 120 respondents The analysis of the socio economic characteristics of respondents revealed that 58 perons of them are employed, 37 percent have secondary education and 56 percent fall within the age If 20-40 years.

Environmental attinades of respondents showed that deforestation is a well known rue to them. 63 percent of respondents claimed to be familiar with causes of deforestation while 68 percent said they have visited a rainforest before.

Income has the expected positive relationship with Willingness-to-pay (WTP) for ranforest protection,indicating that households with higher incomes are willing to pay more for environmental improvements than households with lower incomes. Such findings provide further evidence that respondents considered their personal circumstances and budget constraints when answering the WTP questions

The bid value is the offered amount that a respondent was asked whether he was willing to pay. According to the most chosen bids in the pre-test with their lower and upper quartile, the bid values arrived at are N 30, N 20 and NS0 respectively. The bid value also has a positive relationship with WTP, indicating that as bid value rises, there is a shift in the demand for rainforest protection. However, the bid value is significant at 10 percent

The Contingent Valuation Method (CVM) was used to measure the total WIP of respondents for conserving the forest functions. The probability that an individual's WTP is greater than or less than the hid offered was estimated with a polynomial Logit Regression model. The results showed that the restricted mean WTP was N528 per household per annum

While the total WTP was № 26.4 million; aggregating a population of 50.000 households.

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“Who among the gods is like you, O Lord! Who is like you- Majestic in holiness.

Awesome in glory working wonders? Who has understood the mind of the Lord. Or instructed him as his counselor? Whom did the ord consult to enlighten him, and who taught him the right way? Who was it that taught him knowledge then the or showed him the path of understanding? To whom they will compare God? What image will you compare him to? As for an idol, a craftsman custs it, and a goldsmith overlays it with gold and fashions silver chains for it. He sits enthroned above the circle of the earth and its people are like grasshoppers. He stretches out the heavens like a canopy. And spreads them out like a tent to live in Nor will there be one after Him. Him, even Him, is the Lord and apart from him there is no Saviour. He has revealed and saved and proclaimed. I am a witness that He is God. Yes, and from ancient days He was and He is. No one can deliver out of his hand When He acts, who can reverse it? Jesus Christ is the same yesterday and today and forever.

He brings princes to naught and reduces the rulers of this world to nothing Lift your eyes all these? Who created all these? He who brings out the starry host one by one, and calls them each by name, Because of his great power and mighty strength Not one of them is missing. Before him no god was formed.

Jesus is Lord No Controversy

DEDICATION

This project work is dedicated to my loving, wonderful and responsible parems: MR

ABOLADE GEORGE and MRS. ESTHER BUKANLA OGUNNOWO

Also, to every parents in the universe who have thought it worthwhile to give their

Children a legacy of education

To all parents and guardians who cherish a child being educated and appreciate

Value of literacy.

To all mothers whose crucial and paramount interest is, to devote time and substance

To train their children

To all fathers who discharge their full responsibilities to their offspring

ACKNOWLEDGEMENT

What shall I say unto the Lord

All I am to say thank you Lord To the Omnipotent. Omniscient and Omnipresent God

My deepest appreciation goes to the Lord Almighty , the owner of my soul strength of my life, my hope helpes, strong tower and reftage The completion of my first Degree Programme is “This doing which is marvelous in my sight

I Am highly and greatly indebted to supervisor Mr Okope L. O who carefully supervised this project work. I specially thank him for his moral and intellectual assistance through out the course of this research work. It is not a gain saying that he is indeed a father, he is more than a lecturer and a supervisor to me May God cominue to bless and increase you in Jesus name

Also, my profound gratitude gues to all my lecturers in the department of Agricultural Economics and Fann Management whom have drawn lots of inspiration from

I am grateful to my 110D, (Prot) Pluffigs for his moral assistance and useful suggestions in the course of my study

Furthermore, my immensurable thanks goes to my valuable and treasured parents Mr and Mrs. Abolade Ogunnowo I truly recuinise your presence in his life They are the backbong and pillar behind my successful cificational career 1 ans lighly indebted to you for your care, love, affection and relentless efforts in my life Dad and Mums, you really laboured very hard for your children you are the greatest parents in the universe. I love you very much and I pray that you live long to reap the fruits of your labour in Jesus name

Likewise, I appreciate the assistance of my friends has brother, Gbenga Osho who stood by me and offered tremendous help in collecting penury data set in this research work

I also appreciate the afforts of my friends and colleagues like Sis Toyin Ogunyemi, Wunmi Poppola, Bro ‘Tope Fadipe, Bro Kela Aigbe, Bio Jahis Bodo Sis Banke Opusori Sis Taiwo Akande and many others too numerous to mention

I cannot but remember my younger ones Dewale, Remi, Deola. ADESOLA and Olumide Shobogun for their assistance.

Finally, I thank everybody who made my stay in UNAAB a memorable une especially the Abegundes and the Orukpes

All the aforementioned people are so dear to my heart Everything you’ve done for me will ever remain green in my memory

I love you all

CHAPTER ONE

1.0 INTRODUCTION

1.1 Environmental Resource Management

Environmental economics as it applies to developing economics remains a subject. Practiced by comparatively few economists. It is a new branch of economics which started just in 1980

Assessment of environmental damage is paramount, for instance people should know how much loss they suffer in terms of their welfare change when forests are destroyed. Far from environmental and resource conservation being inimical to sustained economic development, it is in a great many cases integral to the development process (Stavros es al 1997)

A deterioration in environmental quality could cause a loss of productive asseste or loss in earning power. There should be a policy formulation, which will creme awareness of the true worth of environmental assers such as forest amongst others

1.2 Forest and Its Benefits

Forest is a renewable natural resource, which provides timber and non-timber forest. Products for home and industry, food and cover for wild and domestic animals, protection of soil and water values and facilities for recreatium

Generally, natural resources indicate the potential wealth of a country Thos potential wealth, when property harnessed by the people can become a key factor in economic reconstructions and national development Iffective unlization of natal resources like forest, is of great aid in industrial developemt

Forest benefits can be classified in bond fadlines nunely-direct and Indirect

Benefits The direct benefits comprog of forest pulls which can either be on nom timber forest prodias (NTP)

The majes forest products consist of mainly fumber (both as large logs and small coal firewood, plywood and pulpwood.

There are manerous NTEP's derivable from the firess. These consist of over 3000 non wood plant species which are used by people as green vegetables, oil Vielding pluts, fruits, food grains, medicinal plants and construction materials

In addition fibres, gum Arabic, fates and leaves are other constituents of NTTP

Honey is a valuable N11 which yields a lot of foreign exchange for many cumries

Of the world. Moreover, yimm stakes, wild tile bamboo chewing sticks, palm wine and palm

Oil are al important NTFPS Besides the direct benefits derivable from the forest, there are several other indirect benefits, which under certain circumstances can be more beneficial than the direct economic benefits These indirect benefits are not easily quantifiable monetarily

The protective and regulative services of forest make them crucial for Agriculture as they prevent soil and wind erosion, floods silinion of dams, deseruication and drought Moreover, sol comervation and improvement is bude possible by the forest in various ways In addition, trees uitam mutrient recycling and increase soil fertility through humus production Also, forests produce a inore pleasant climatic conditions by giving shade and cooler weather, the air becomes fumid and purer to breathe

Furthermore, the socio-cultural werkes of firest could be so is employment opportunity along side with the forest being used for scientific study Finilly, the recreational, touristic and aesthetic values of the forest cannot be over emphasized

Forests car fufill the various functions if they are protectal against destruction and Junge Forest protect the ratio of the natal properties of the forest by protecting it from various hital inforces. These harmful intences include erosion, mar, Cathropogen luence wild ammals posts and fis, ete

This staly set to anatsse the comic and social inputs of the forest functions in Ikeme LGA of Olum State The Dichotomous Choice Contingem Valuation Method will be oed The Contingent Valuation Method (CVM) will be based on referendian style of questioning respondems about their willingness pay (WTP) for camforest comvation and protection

1.2 Problem Statement

In the last several decades, the intensity and scale of forest, exploitation liave increased significantly. This has brought along with it many problems. Besides, potential environmental degradation, depletion of forests and trees induce poverty displace indigenous populations and impede agricultural productivity. A large number of developing countries experiencing increasing deforestation trends are abo facing acute shortages of fuel wood, fodder, industrial timber and other forest products for domestic use these are problems that urgently need rectification if the swucial welfare charge associated with them are properly valued for their great monetary loss to be seen

A significant example of an activite that impairs the welfare of future generations is global warming which occur when forests are cleared and burm Mic, endemic species of plants and animals go into extinction because their natural habitat are destroyed Furthermore the mumerous fimctions of forests as a major contributor to the GDP

Through log export are lost throaigh deforestation for arable crops and other uses. There is the

Need to quantity in pecuniary terms such losses for the government and society to be able to appreciate more closely, the need fin a polies thrust to protect the forest to enable it sustain

Its functions. This project sets out to do th

1.1 Objectives of Study

The broad objective of this study is to identify and value the market and non market functions of the forest using Ikenne Remo LGA of Ogun State is a case study

The specifle objectives however are to

(a) Describe the socio-economic characteristics and environmental attitudes household respondents
(b) Measure the total willingness to pay (WIP) of respondems for conserving the forest functions

(c) Postolate relationship between the socio-economic and attitudinal variables of respondents and their willingness-to-pay for ramforest protection

(c) Make recommendation for policy formulation from the findings of the study.

1.2 Justification of Study

Environmental and natural resource benefits are being lost to die-forestation and all forms of environmental degradation To address these problems, a cooperative effort on a global scale is needed to assist countries in implementing effective long-term forest conservation and management programmes It should be noted that renew-ability of natural resource is a socio-economic concep, what is renewable may be non-renewable if there is no proper management, hence, there is an urgent need to manage the forests scientifically to provide on a sustainable basis, its environmental service functions

Peoples' orientation about forests need to be updated while awareness of the true worth of forest calls for government attention. Having known that forest is an indispensabile natural asser, it is justifiable to study,value and quantify its numerous functions stut resources will be effectively managed

CHAPTER TWO

LITERATURE REVIEW

2.1 Understanding the Environmental Economics Concept

Trafell (1993) opined that, too often envinumental goods are treated as free goods. When they are, in fact, relatively scarce. He concluded that, from an coutumie point of view, environmental goods should fave a price attached to their use reflecting their social value

However, over the last few years, environmentalists and many members of the development community have questioned whether investments in environmental quality improvements should wait until income rise They have argued that communie development and improvements in environmental quality are in fact complementary, not competing objectives:

This argument that environmental quality should not be sacrificed for economic growth was the prmcipal message of the United Nations Conference un Environment and Development in Rio de Janeiro in 1992

It is with this view that the World Comervation Strategy placed most of its emphasis

On administrative solutions to conservational environmental problems Tisdell, 1983)

Until recently the conventional wisdom in the development community has been that most people in developing countries do not put a high value on improvements in environmental quality, either because they are unaware of the problem or because they cannot afford to pay for it (Choe erol. 1995)

According to Kramer er ut (1994), sponsorship and encouragement of institutional capacity in both developed and developing countries is needed to increase understanding of environmental economics amongst policy makers

It has been found that when property valued, investment in natural resnice magmentation yields rates of ecomottun en comparable to that earned on continual capital investments (Stavrower al 1997).

This was further batressed by fill (19) that a deterioration in chinamental

Quality could came a loss of pinductive assets or loss in camning power

According to Stavros et al (1997), economics is about making choices, he stated further that, making choices about the environment is inore complex than nukitu choices in the context of purely private goods and services He concluded that, the discipline of environmental economics has developed techniques whereby values can be constructed

The environmental economics literature holds that environmental valuation calculus can only be defensible if all market and non-market goods are valued from the trade-offs humans make based on their individual preferences (Braden and Kolstad 1991)

Randall er af (1995) concluded that decisions about levels of environmental protection should be based on economic criteria alone They opined that the monetization of environmental benefits can provide useful information for the mostly political allocations of environmental protection funds

Arrow er all (1994) reported that environmental economies as it applies to developing economics remained a subject practiced by comparatively few economists

2.2 The Contingent Valuation Method (CVM) In Measurement of Forest Functions

The Contingent Valuation (CV) studies people are asked directly fix state, race asked 4 question that will reveal what they are willing to pay to gain an improvement in the provision of a good or service or to avond a detrimental change in the provision of a good or services Alternatively (or additionally they may be asked what they are willing to accept to forego an improvement, or tolerate a dermatal chunge

The situation the respondent is asked to value is hypothetical (hence, contingent"),

Although respondents are assumed to behave as if they were in a real nutket Over the past two decades, the use of the CVMI in policy analysis and academic

Research has grown rapidly CVM is used to elicit peoples' preference, expressed in terms of Willingness-to-pay (WTP) Or Willingness—Accept (WTA)

A contingent market is taken to include not just the good itself for instance, better water quality and also the institutional context in which it would be financed

The use of CVM for measuring WI for social projects is well accepted and widely used in many different circumstances in developing countries (Churai and Jintapati, 1999)

At present the CVM is the only method generally recognized as being able to capture the general public's total WIP for forest preservation (Loomis, 19961Arrow or al (1994) reported that the US National Oceanic and Atmospheric Administration (NOAA) panel has recommended CVM to reliably estimate means WFP

The Exxon Valdez oil spill, led the NOAA to appoint a blue ribbon" panel. The panel was co-chaired by two Nobel Latitente economists and included an environmental policy economic and a survey research specialist. They concluded that CVM was capable of reliably estimating passive use (Arrow er al, 1993).

Harris and Brown (1992) identified only self interested losers from a resource change as the appropriate gising to be surveyed with WTA format questions They also argued that WTP is infact the appropriate measure of welfare change for a majority of situations

As CV has spread internationally it has been used to estimate the value of placing public forest lands off limits to logging in National Parks (Lockwood er al 993) They showed that the Net Present Value (NPV) of protecting the old-growth forests in national parks is positive for a wide range of assumptions about WTP of non-respondents

Mc Connell 4 al (1998) developed a model that tested the inthence of heterogeneous preferences and previous responses. They estimated a model of sport-fishing and showed that correlation between answers to a CV question is induced by heterogeneous preferences Consequently, they concluded that

test-retest studies help establish the reliability of contingent valuation responses but warned that, it must confront the problem that the initial response may influence subsequent responses and this weaken conclusions

Further research work on CVM was buttressed by Richer, (1995) who reported that the total amount that california residents would be willing to pay to ect desert protection legislation, ranges from $177 million to $ 448 million per year.

Moreover, Lindberg er al (1997) used CV by measure the social impacts of tourism in rural Oregon communities They reported that annual household WIP to reduce traffic congestion is S 186 million per year

At the 1994 Annual Meeting of the American Economics Association during a panel discussion about the findings of the NOAA a leading expert in CVM Professor Kenneth: Arrow, remarked that “CV studies are fine when the results are accurate and reliable”

2.3 Some Biases Evident in CVM

None randomness in the variance of valuation responses can be causole amber of factors which introduce bins into respondent behaviour Obviously, it is possible that some biases are due to the hypothetical nature of the

Approach Nevertheless, careful survey desten is necessary to control these sources of bas Hypothetical bias could mean that respondems answers are meaningless if their declared intentions cannot be taken as an accurate guide to their actual behaviour

Hanley, (1990) compared hypothetical bids with those obtained in simulated markets where real money transactions took place. He angested that hypothencal bias can be reduced significantly if WTP formats are used instead of WTA, the reason being that respondents have more practical experience with payment than with compensation scenarios

Stavros er al (1997) also reported that the problem of strategic bias has long worried economists They affirmed the fact that, the becurrence of strategie belixiour depenits on the respondent’s perceived payment obligation and his or her expectation about the provision of the good

As a result of research investigations aimed at solving the probleitos associated with strategic biax Stavros er uf 010971 concluded that overall fears of strategic bias problems

Have not been substantiated by the large amount of empirical investigation into the question

Loonis (1996) pointed out that a number of studies have found evidence of payment vehicle him, where WTP depends upon the choice of the method of paymem The later suggested that controversial payment vehicles should be avoided in favour of those most likely to be employed in real life to clicit payment for the good in question. But the fact that the respondents answers may depend on how they are asked to pay should be expected It should not be a source of concern because a preference for payment vehicle in another may be perfectly reasonable

Starting point bias arises when the initial value suggested at the begining of a bidding game has a significant impact upon the final bid reported by the responder.

According to Stavros et al (1997) the use of starting points can reduce valuation variance and the number of non-responses in open-ended type questionnaires. They opined that, one solution might be to use a payment, with a range of numbers from which respondents can select their bid But warned that this could result in anchoring of bids within the range presented

It has been argued that an optimal range of prices should include a low price that results in almost all respondems rejecting it Within this range, prices offered should reflect the distribution of bids so that optimally, each bid interval reflects the same proportion of the population (Bateman et al, 1992)

2.4 Reliability of CVM Responses

There is a very large part of the literature in CVM which discusses the accuracy of CVM. The few replicability tests that have been conducted to date have found a high correlation between the individuals WIP in the test and retest experiments, indicating that the CVM appears to be reliable measurement approach (leberlein, 1986. Lochman and De 19982, and Loomis, 1989, 1990)

Moreover, Whitehond et al (1999) developed a temporal reliability test of the CVM In the retest, respondents have less favourable attitudes toward the environment. They discovered that the estimates were temporarily reliable after accounting for attitudes which have changed over the period.

2.5 Validity Tests of CVM

According to Cummings er af (1986) CV can be compared with true values when these can be discerned in actual behaviour

To this ascertion, Stavros et al (1997) disagreed They opined that it was not feasible for many environmental goods, discovered that, in general, WTP format CVM studies can give valid estimates of true WTP

CHAPTER THREE

3.0 METHODOLOGY AND ANALYTICAL TECHNIQUES

3.1 Study Area

The study ares for this project is Ikenne Remo Local Government Area of Ogas State Ogun State is situated in the tropics covering an area of 16, 400 26 km and it is bounded in the West by the Republic of Benin, in the East by Ondo State, in the South by Lagos State and the Atlantic Ocean while in the North by Oyo State

Ikenne Remo has a land area of about 273 48km with a population of 180 000 by 1991 population census. Average number of households is 50,000

The Local Government belongs to the derived Savannah with a tropica unda pattern with two peaks in the year, this allows for double cropping The soil type range from loam sandy loam to clay loam It has high productivity with good potential for growing varying types of crops

Also, the study area is naturally endowed with large population of thick forests jungles and wild life resources. The climatic condition highly favour the establishment of tropical rainforests and forest reserves Even though deforestation for arable crops occur. There is still an appreciable virgin forests which have not been tampered with for agnoultural purposes

Ikenne Remo people are mainly farmers, and traders while a few people engage in craftsmanship and only few being artisans A large proportion of the farmers are small scale farmers cultivating between 1 to 2 hectares of land Agricultural products in the study area include cocos, palm-kernel, maize, vegetables, cocoyam, yam, kolanut, banana, cassava and poultry.

3.2 Data Sources And Collection

The data gathered in this survey work are of two kinds primary and secondary date The primary data was collected from the structured questionnaire that was administered to the respondents during the field work. The secondary data were from journals, research reports and other publications

Primary data were collected from respondents with a referendum style questionnaire Dichotomous choice questions (Yes/N) were asked

A pilot survey or a pre-test was carried out. This was necessary because it helped to sample the generality of peoples' opinion concerning the offered bid values Also, the necessity of the pilot survey was to set the offered bid value such that its probability of acceptance would fall between 0 and 1

Bid value is the offered amount that a respondent was asked whether he was willing to pay. The bid values arrived at (according to the most chosen bids in the pre-test with their lower and upper quartile) are 20. N30 and 50. The bid values were randomly set before the respondents: That is, a bid value (out of the three bids) was randomly given to a respondent to answer if he was willing to pay or not: This means that different bids were randomly set before all the respondents. A respondent can only choose or reject only one at a time

3.3 Sampling Technique and Sample Size

The sampling techniques used for this survey is multistage sampling technique. Based on the Zonal structure of Ogun State Agricultural Development Programme (OGADEP), there are four zones in Ogun State. They are namely Abeokuta, Ijebu-Ode, Ikenne and Ilara

Also, each zone has blocks and cells under them. So far for the purpose of this survey, Ikenne zones of OGADEP was chosen and stratified according to Extension blocks into 4 Is Simawa. Someke and Obafemi

Consequently, each stratum has sub-cells which comprise of villages. From Isara block are Isara, Orile Oke, Sagamu and Ilara cells. From Isara and Ilara cells, 10 villages

Were randomly selected to fall under the Ikenne LG which is the study area

Twelve respondents were sampled randomly from each selected village making a

Sample size of 120 respondents. The stratification procedure is shown thus:

IKENNE ZONAL STRUCTURE OF OGADEP

BLOCK	CELLS	VILLAGES SELECTED
Isara	Isara	Ogere Remo Ilishan Remo Ipara Remo Iperu Remo Isara Remo
	Ilara	Irolu Ilara Remo Ode Remo Ikenne Remo Akaka

3.4 LIMITATION OF DATA USED

There were some limitations in the process of data collection Some problems were encountered on the field while interviewing the respondents.

Even though 120 respondents were sampled, only 90 were finally used for the analysis. The other 30 were not used due either no response at all, or mis-understanding of some of the questions which in turn made the questionnaire invalid. Some were as a result of in-correctly filled questionnaire and loss of questionnaire in transit. There were also, some low or in-consistent responses

3.5 ANALYTICAL TECHNIQUES

The analytical techniques used are descriptive statistic and Contingent Valuation Method (CVM) that encompassed the used of the Logistic Regression Model

The descriptive statistics was used for the first specific objective, to describe the socio-economic characteristics and environmental attitudes of respondents. This involved the use of frequency tables, percentages, mean, range and others

The CVM was used to measure the total willingnes-to-pay (WTP) of respondents for conserving the forest functions. The respondents acceptance and non-acceptance probabilities to the bid offered were computed to measure the WTP The probability that an individual's WTP is greater or less than the bid offered was estimated with a polynomial Logit Regression Model The Logit Regression Model was used to find mean WTP. The total WTP is mean WTP x total households in the study area Then, how the socio economic and environmental effectors affect the willingness-to-pay or accept the bid offered.

By including other explanatory variables, in addition to the offered bid in the Logit Models, it was explored how income and other explanatory socio-economic variables influence the demand for forest protection

The Logistic Regression Model is stated thus

$$Pn(t) = \frac{1}{1 + \exp", "^}$$

Respondents acceptance probability to the bid offered

$$Pn(t) = \frac{1}{1 + \exp (B+B.\ RI+B - (B+B\ RI+B\ SX+B\ ED+B\ HS+B\ TD+B\ RV+B\ OG+B\ UN+B\ ID+B\ AG)}$$

Where

BO=. Constant

BI=. Bid value

RI=. Respondent's Income per year

SX=. Sex dummy

ED=. Educational level of respondent

HD =. Household size

TD- Tropical deforestation dummy

RV=. Rainforest visitor dummy

UN= Unemployment dummy

AG= Age

The apriori expectation for the 11 variables in terms of the sign of the independent parameters were assigned based on economic theory and logic. Test of significance was conducted on each of the parameters in the full model at percent, 5 percent and 10 percent significant levels in which the explanatory variables were included

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

Socioeconomic Characteristics And Environmental Attitudes Of Survey Respondents

Age distribution, sex, marital status, household size and so on are discussed in this chapter

The respondents were overwhelmingly male with 73.3 percent of the population of respondents in the study area, 267 percent were female (see table 4.1). Majority of the respondents fall within the age group of 20-40 years. Actually 50 respondents representing 56 percent are in this category only 34 percent fall within the group of 40-65 years old while 8 percent are above 65 years old and only 2 percent are less than 20 years old, (table 4.2), this shows that half of the respondents are predominantly youths

Table 4.1: Sex Distribution of Respondents

Sex	**Frequency**	**Percent**
Female	24	27
Male	66	73
Totall	**90**	**100**

Source: computed from Field Survey, 2002

77 percent of respondent are married while just 8 percent are divorced. Only 3 percent

Being widows and 12 percent still single, (table 4.3). This implies that respondents are

Predominantly

Table 4.2: Age distribution of Respondents

Years	**Frequency**	**Percent**
20-40	50	56.6
40-65	31	34.4
Above 65	7	7.8
Below 20	2	2.2
Total	**90**	**100**

Source computed from Field Survey, 2002

Table 4.3: Marital Status of Respondents

Marital Status	**Frequency**	**Percent**
Divorced	7	7.8
Married	69	76.7
Single	11	12.2
Widow	3	3.3
Total	**90**	**100**

Source computed from Field Survey**,** 2002

36percent of respondents have household size within the range of 4 to 6, similarly,27% have household size ranging from 7 to 9. The least household size range from 1 to 3 and 20per respondents fall in this category. Only 2 respondents have the household size above 12

Table 4.4: Household Size of Respondents

Household size	**Frequency**	**Percent**
1 to 3	18	20
10 to 12	14	15.6
4 to 6	32	35.6
7 to 9	24	26.7
Above 12	2	2.2
Total	**90**	**100**

Source computed from Field Survey, 2002

37percent of respondents have secondary education while 28percent have primary School education 20percent didn't go to school at all while only 16percent have tertiary Education.

(Table4.5).58percent Of respondents are employed while 42percent were Unemployed. Meaning that respondents are predominantly (table 4.6)

Table 4.5: Educational Level Of Respondents

Educational level	**Frequency**	**Percent**
None	18	20
Primary	25	27.8
Secondary	33	36.4
Tertiary	14	15.6
Total	**90**	**100**

Table 4.6:**Employment Status of Respondents**

Employed	**Frequency**	**Percent**
No	37	42.5
Yes	50	57.5
Total	**87**	**100**

Source: computed from Field Survey, 2002

46 percent respondents engage in farming as a major occupation while 37 percent are atisam. Only 3 respondents are hunters while percent engage in trade as major occupation.
(Table 47) likewise, 54 percent engage in farming as minor occupation. 21 percent are artisans while hunters constitute 15 percent while just 3percent engage in carpentry work
Farming appear common in both major and minor occupation (table 4.8)

Table 4.7:**Major Occupational Distribution of Respondents**

Major occupation	**Frequency**	**Percent**
Carpentry	4	4.8
Artisan	30	36.6
Farming	38	46.3
Hunting	3	3 7
Trading	7	8.5
Total	**82**	**100**

Source: computed from Field Survey, 2002

Table 4.8: Minor Occupational Distribution of Respondents

Minor occupation	**Frequency**	**Percent**
Carpentry	2	2.9
Artisan	14	20.6
Farming	37	54.4
Hunting	10	14.7
Trading	5	7.4
Total	**68**	**100**

Source: computed from Field Survey, 2002

43percent of respondents have spent up to 2 years in the study area while 22 percent have lived for 21 to 30 of the respondents have resided for 10 to 20 years in the study area

(table 4.9)

Table 4.9: Resident Period of Respondents in the Village

Years	**Frequency**	**Percent**
10-20	39	43.3
21-30	20	22.2
31-40	16	17.8
41-50	6	6.7
Above 50	5	5.6
Below 10	4	4.4
Total	**90**	**100**

Source: computed from Field Survey, 2002

80% of respondents are indigenes while just 20% are non-indigenes table (4.10). Respondents are predominantly indigenes

Table 4.10: Indigene Status of Respondents

Indigene	Frequency	Percent
No	18	20
Yes	78	80
Total	**90**	**100**

Source computed from Field Survey, 2002

1/3 of respondents have an annual income within the range of N 10,000 to N 50,000. 26percent earn within N 50,000 to N 100,000. This implies that 60percent of respondents earn income in N 10,000 to 100,000 category 12 percent have an annual income within N100,000 and N 150,000 while just 7 percent earn less than N 10,000 per annum (Table 4.11)

Table 4.11: Income Distribution of Respondents

Annual income	Frequency	Percent
10,00 to 50,000	30	33.3
100,000 to 150,000	11	12.2
150,000 to 200,000	5	5.6
200,000 to 250,000	7	7.8
50,000 to 100,000	23	25.6
Above 250,000	8	8.9
Below 10,000	6	6.7
Total	**90**	**100**

Source computed from Field Survey, 2002

4. 2 **Environmental Attitudes of Respondents**

Table 4 11 Cleaby show that tropical deforestation appears to be a well known issue autoing the general public. Seventy-nine percent of the respondents responded affinatively to the question “Before today, fave you ever real, licard, on seen TV shows about tropical rainforests? 63 percent, claimed to be familiar with reasons for deforestation (table-4 12) 68percent had visited a tropical rainforest while 38percent cut down tress to farm 62percent supported the view that old growth forest be cleared (table 4.12)

Table 4.12: Environmental Attitudes of Respondents

	Yes(%)	No(%)
Any Knowledge of rainforest	**82**	**18**
Whether to clear old growth forest	**63**	**37**
Knowledge of causes of deforestation	**62**	**38**
TV shows on tropical rainforests	**79**	**21**
Cut down trees to farm	**38**	**62**
Had previously visited **a** rainforest	**68**	**32**

Source Computed from Field Survey, 2002

In a similar fashion, respondents were encouraged to weigh tropical deforestation against other environmental problems by asking them to rank a variety of environmental problems. Highest rankings (indicating greatest importance) were given to water (2247) an air pollution (2.63) (table 4.13). This is not surprising since the local effects of these problems are more pronounced than other problems in the list, and there may be a perceived greater link with the health of respondents and their families. Next in average order of importance were tropical deforestation (3.01) and global warming (3.95). Global warming is an international environmental problems that has received extensive media attention Considerably, lower rankings were given to the other problems on the survey list atmospheric Ozone depletion (4.38) and ecological disturbance (448).

Table 4.13 Relative Rankings of Six Major Environmental Problems

Environmental problem	**Average Rank 1 =Most Important 6= Least important**	**Percentage for each rank**					
		1	**2**	**3**	**4**	**5**	**6**
Water pollution	2.47	27	37	16	10	6	6
Air pollution	2.63	31	30	12	8	9	10
Tropical deforestation	3.01	24	13	24	16	19	3
Global warming	3.95	2	10	27	24	24	12
The hole in ozone layer	4.38	10	2	12	21	23	31
Ecological disturbance	4.48	6	8	11	21	18	37

Source Computed from Field Survey, 2002

4. 3 Contingent Valuation Methods (CVM) in Forest Valuation

The maximum likelihood estravations of responses to WTP questions are presented In table 4:14.

From the table the factors affecting WIP evident with them coefficient estimates Income has the expected positive effect on the WIP in the mesdel. As income rises, there is a shift se the demand for dus environmental good (forest) The statistical analysis of respondents answers to the referendum questions unambiguously indicated thust the respondents to the referendum question asked depended on the monthly price offered

Variable	**Coefficient estimate**	**Z-statistics**	**P>/Z/**
Bid value	0.029	1.778	0.075
Income	1.186	1.046	0.296
Sex dummy	-1.089	-1.475	0.140
Education	0.003	0.043	0.965
Household size	0.035	0.0456	0.648
Tropical deforestation dummy	-0.062	-0.113	0.910
Rainforest visitor dummy	0.757	1.264	0.206
Old- growth forest dummy	0.361	0.634	0.526
Employment dummy	0.208	0.394	0.693
Indigene dummy	-0.820	-1.039	0.299

Age	-0.018	-0.3869	0.385
Constant	0.950373	0.656	0.512

R^2. 0.1459

Likelyhood ratio statistic. – 48.313

Source: computed from Field Survey, 2002

Note*coefficient significant at 10% level

These results suggest that the estimates of household WIP are not likely to be biased by respondents agreeing to pay prices they cannot afford.

Moreover, the results of multivariate analyses of the determinants of the responses show clearly that, households with higher incomes are willing to pay more for environmental improvements than households with lower incomes. Such findings provide further evidence that respondents considered their personal circumstances and budget constraints when mswering the WTP questions

A dummy variable which reflects past visits to rainforests abs a positive relationship with WIP This perhaps indicate that visiting a rainforest has effect on WIP for rainforest protection.

The bid value has a positive relationship with WTP, indicating that es bud value rises. There is a shift in the demand for rainforest protection. However, the bid value is significant the 10 percent significance level

Educational level of respondents showed a positive with WTP but was not sigsignifican at neither 1 percent, 2 percent norb 10 percent significance levels.

Household size sleo had a positive relationship with WIP but not significant. This Hb that, the higher the household size, the more the demand for rain forests benefit and comiquently, the more they are willing to pay

Unemployment dummy variable also had a positive sign it could be deduced that employed people will have a higher WTP than unemployed people That is, if income is considered

Indigene dummy had a negative sign indicating that being a non-indigere does not affect the WTP It means that a non-indigene still wants to pay for rainforest protection.

Respondents age showed a negative sign and not significant can be concluded that, according to this survey, respondent's ages did not explain the model because of it not being significant

The raking given to tropical deforestation compared with other environmental problems was included as an independent variable As expected, the more important the ranking (1m important), the higher the WTP

Rainforest visitor and cutting of old growth forest dummy both have a positive elationship with WTP The more people visit the forest to appreciate its beauty, the higher is their WTP for its protection. Likewise, if old-growth forest are cleared (so that new ones can tepla telim), peuples WIP may likely increase

4.5 Total WTP Computation

The referendum format yields a restricted mean WTP per household of N 44 monthly Aggregating over 50,000 households in the study area, gives a total WTP of N2,200,000. Monthly

Consequently, the annual Total WTP is N26,400,000 annually as Federal Environmental Tax

This means that, an average household will be willing to pay a total of N 528 per Annum

The computation is given thus Total WTP Mean WTP X number of households in study areas

Aggregate number of households = 50,000.

In 44 is a monthly due, then annual due will be № 44 x 12 months in a year consequently, 4 x12=№ 528 per household per annum.

Aggregating the 50,000 households in study area, the annual Environmental Tax is given by 528 x 50,000-26,400,000 annually.

Therefore, total WTP in Ikenne Remo LGA of Ogun State is N 26.4 million per annum.

CHAPTER FIVE

5.0 SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATION

5.1 Summary OF Findings

The study was carried out to value the rainforest functions in Ikenne Remo Local Government Area of Ogun State. The method employed in this study is cost Dichotomous – choice Contingent Valuation The analysis of the socio economic characteristics of respondents revealed that 58 percent of them are employed, 37 percent have secondary education and 56 percent fall within the age of 20-40 years. Also, 66 percent are male, 77 percent are married while their predominant occupation is farming 33 percent of respondents earn an annual income of N 10,000 to N 50,000 and 26 percent earn N50,000 to N100,000 annually.

Environmental attitudes of respondents showed that tropical deforestation is a well known issue to them. 63 percent of respondents claimed to be familiar with causes of deforestation, 68 percent said they have visited a rainforest before. Highest rankings indicating greatest importance were given to water and air pollution among environmental problems

The Contingent Valuation method gave the mean WTP to be N528 per annum per household and Total WTP of N26.4 million per annum aggregating the 50,000 households in study area

The variables that were not significant in this study could be due to faulty data or, that the variables do not totally explain the model. There is need for further research in this aspect of economics because the cross sectional data was subjected to analysis and this is the result

5.2 Conclusion

The respondents are familiar with the causes of deforestation and have shown their readiness to pay for rainforest conservation Majority of those unwilling to pay for the service have been found out to be either protesting the bid or too poor to pay. The implication of this is that, if they are more aware of the project and understand its importance, they might be more willing to support and to pay the necessary fee to keep the project operational

In applying CVM to this study, the respondents showed their displeasure to deforestation and are willing to sacrifice their resources to improve their standard of living. It is now up to the government to appropriately respond to this demand in a timely, efficient and effective way.

5.2 Recommendation

If forest could be seen as an environmental as an environmental assets that provide food for human and animals, provide facilities for recreation and employment, climatic amelioration, soil conservation among others, then why do we deforest for agricultural purposes? Forests also provide medicinal herbs of high value but it is rather unfortunate that forests are being treated as ‘cheap’ as the case may be based on the findings in this study, the following recommendations are made

Environmental policies should be enacted to reflect bridge to the peoples’ welfare status and that it is an offence that should be punishable by either payment of fine as the case may be

Federal Environmental Tax (FET) should be encouraged by all citizens to protect the environment from damage

Development of pollution reducing technology should be encouraged by environmental policies which should include economic incentives.

Provision should be made for the use and development of alternative environmentally sound products and processes

There should be a correct valuation so that producers and consumers face the full social costs of their decisions and so that public planners make a more realistic evaluation of economic possibilities.

Government should enforce a campaign that will sensitise the populace, on the dangers in rapid rate of deforestation

The use of slogans like “For Every Tree cut, plant Another” or “Tree Is Life, Sa,

Plant A Tree Today” should be revitalized

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This questionnaire is meant to obtain information on the undergraduate research programme I in carrying out

Pilot survey

Forest provides balitat for plants and animals They supply wood timber and other forest products such as fruits honey, leaves herbs etc. They also provide recreational facilities However, clear felling of trees for cultivating arable food crops leads to soil erosion, air pollution, loss of species ete

To prevent deforestation and environmental problem from arising conserving the forest and in there is need for

Order to do this, it will cost money.

Keeping in mind the above information as well as your current income and expenses, please

Answer the questions that follow

Name of village town_____

forest conservation were to be the next program and it would cause your household money

How much are you willing to pay per month for this?

200) (b) N30) (c) N35)(d) N 40 (e) N 50 (Dothers (specify) How much are you willing to pay per month for your descendent to be able to benefit from

The forest in future?

200) (b)30 () (c) 35 () (d) N 40 () (e) 50() (1) others (specify)

How much are you willing to pay per month for recreational value of rainforest?

200) (b) 30() (c)) 35() (d) 40() (e) 50() (1) others (specify)

How much are you willing to pay per month in order to benefit from the forest?

200) (b) 300) (c) 35() (d) N 40() (e) 500) (f) others (specify)

UNIVERSITY OF AGRICULTURE, ABEOKUTA

DEPARTMENT OF AGRICULTURAL ECONOMICS AND FARM MANAGEMENT

Dear Respondent,

This questionnaire is designed to help me obtain some relevant data in my final year research work, Please, kindly fill in as appropriate you are assured that all information provided will be treated with strict confidence. Thanks for your co-operation.

Ogunnowo Aderonke.

BACKGROUND INFORMATION

NAME OF VILLAGE/TOWN:

SEX: MALE(), FEMALE( )

AGE: <20( ), 20-40 ( ).40-65 ()>65 ()

MARITAL STATUS: MARRIED ( ), SINGLE(), DIVORCE(), WIDOW()

HOUSEHOLD SIZE:

EDUCATIONAL QUALIFICATION: NONE () PRIMARY () SECONDARY () TERTIARY ()

ARE YOU EMPLOYED: Yes ( ), No()

MAJOR OCCUPATION…… MINOR Occupation……

YEAR OF RESIDENCE IN THE TOWN/VILLAGE

What is your present income per year in Naira……

Are you an indegene YES() NO()

ENVIRONMENTAL ATTITUDES OF RESPONDENTS

Have you ever visited a rainforest before: Yes ( ) No ()

Are you aware of any benefit of rainforest: Yes ( ) No ( )

Do you cut down trees every year in order to farm: Yes ( ) No (

If yes how many hectares/year:

Are you aware of causes of deforestation: Yes ( ) No ()

Should old growth forest be cleared: Yes () No ( )

Before now, have you ever heard, read or seen on TV shows about tropical rainforest?

Yes ( ) No ()

Please, rank the following environmental problems in order of their importance to you

(1=Most Important while 6=Least important) :

Environmental problem	**1**	**2**	**3**	**4**	**5**	**6**
Air pollution						
Water pollution						
Global warming						
The hole in the Ozone layer						
Deforestation						
Ecological disturbance						

REFERENDUM CONTINGENT VALUATION SURVEY

Forest is a renewable natural resource which provides timber and non timber products for home and industry, food and cover for wild and domestic animals, protection of soil and water values, it also provide facilities for recreation. However, clear felling of trees lead to soil erosion and other environmental hazards. Conservation of forest will be the next programme and it will cost money.

Keeping this in mind, as well as your current income and expenses, please answer the questions that follow:

20a. If conservation of visiting forest were to be the next program and it would cause your household money. Will you be willing to pay a sum of N 20 per month? Yes () No ( )

20b. Suppose you are to pay the sum of N30 to improve the forest conservation programme.

Would you be willing to pay. Yes() No ()

20. Suppose you are asked to pay the sum of N50 to improve the forest conservation ogramme, would you be willing to pay. Yes() No ()