Perceived Benefits of Selected Wetlands in South-West Nigeria

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Abstract

Poor appreciation of wetlands has been linked to a massive destruction of wetlands in Nigeria thereby constituting a missed opportunity that would have led to improved income generation, food security and environment sustainability. This study assessed people's perception of selected wetlands benefits in South West, Nigeria. The study was based on primary data obtained in a cross-section survey of 197 individuals that were either resident and/or pursuing livelihood activities in communities around Eleyele, Eriti and Lagos lagoon wetlands of Oyo, Ogun and Lagos States, respectively. The study found that majority of respondents recognised the direct benefits of the Wetlands especially in terms of its role in provision of food, herbs and building materials while only a few recognised its environmental services as it relates to provision of windbreaks, nutrient recycling and microclimate stabilization. The level of appreciation of all Wetland benefits among the respondent was a low Perceived Benefit Index (PBI) value of 0.45 on a scale of one. Tobit regression analysis revealed that age, Wetland share of income, activity type as well as the location of Wetland are factors that significantly influence people's perception of Wetlands benefits. It can therefore be concluded that people around Wetlands have a poor appreciation of Wetland benefits especially the environmental services they provide. The study recommends that governments and NGOs should put in place appropriate community based education/awareness campaign to promote better appreciation of Wetlands benefits.

Keywords: Perception, Wetland benefits, Likert scale, Perceived Benefit Index and Policy.

Introduction

Environmental income (income derived from the ecosystems) is a major constituent of the livelihoods of the rural poor (World Resources, 2005). According to this report, reliance on the environment is now been explored as a veritable tool in economically empowering the rural poor especially in Africa, Asia, and Latin America. The importance of these resources as a sheet anchor can therefore not be overemphasized as any harm done to them will affect the livelihood of the people that depend on them.

Wetlands – generally referring to marshes, swamps, floodplains, mudflats, estuarine and the littoral areas of large bodies of water – are used together with uplands in an integrated manner by the rural people to sustain livelihood. They are among the Earth's most productive ecosystems (Barbier et al, 1997). They have been described both as "*the kidneys of the landscape*", because of the functions they perform in the hydrological and chemical cycles, and as "*biological supermarkets"* because of the extensive food webs and rich biodiversity they support (Mitsch & Gosselink, 1993). Wetlands perform a wide variety of functions that include flood control, ground water recharge, shore line stabilization and storm protection, climate moderation and also serve as habitat for living things, recreation, tourism and cultural values (FME, 2009; Bikangaga, 2007).

In Nigeria just like everywhere else in the World, floodplains and wetlands are rich sources of livelihood for millions of people yet; their destruction is taking place at an alarming rate, with as much as about 50% of the World Wetlands already lost (O'Connell, 2003, RAMSAR, 2009). Nigeria's most important wetlands, the Hadejia-Nguru Wetlands in Jigawa and Yobe states respectively, have shrunk by as much as two-thirds in the past 30-40 years because of diversions from dams, irrigation developments and drought. Fisheries, farming and wildlife are all impacted by these hydrological changes (Idris, 2008) and by extension the livelihood sustenance of the local communities that depend on them. Also, uncontrolled oil exploration activities with the attendant oil spillage and pollution has caused a vast track of the agricultural land in the Niger-Delta Wetland (the largest in Nigeria, and the third largest RAMSAR designated site in the world) to be laid waste, thus becoming unproductive (NEST, 1991). As a result, surface water in the area is invariably contaminated and polluted, rendering the water undrinkable, and aquatic life destroyed, while the vast majority of the natives whose livelihoods depends largely on the Wetlands are equally impoverished. Most of these loses are unfortunately due to human activities, including large scale diversion of water for irrigation, burning and exploitation of peat land, extensive drainage of marshes, pollution of lakes and rivers (RAMSAR, 2009) as well as balancing the different use options so as to ensure sustainability of the resource. Nevertheless, wetlands can be sustainably exploited if the dynamics of the local institutions that influence accumulation and consumption of livelihood assets are well understood and harnessed appropriately, (Mwakubo and Obare, 2009; Gren et al, 2001). The life support systems that are inherent within the wetland ecosystems can provide a wide range of valuable functions to society if they are used in a sustainable manner, for example, by incorporating the primary users in the management of the wetlands within the context of societal livelihoods and local institutions (Folke, 1991). To achieve this, Springate-Baginski., et al (2009) has opined that decentralization of management to the lowest appropriate level of all stakeholders will help achieve greater efficiency, effectiveness and equity. However, Martin & Sutherland (2003) in reviewing several projects (Soil and Water Research in Malawi, Participatory Management of Kapuwai's Wetlands in Uganda, Forging New Institutional Arrangements for Common Property Resource Management – A Case Study from Southern Zimbabwe) has observed that an understanding of the immediate Wetland community dwellers perception of its benefits is very important. According to them it allows interventions to be targeted to specific groups for whom the problem is most acute.

Furthermore, they opined that motivation for participation is strongly influenced by the relevance of the research focus and intervention strategy to stakeholders' priorities, roles and expectations of benefit. Therefore, an express knowledge of the values they associate with the Wetlands will be the fundamental step upon which correction in their values and the eventually sustainability programme hinges on. Also, more explicit understanding of this relationship has the potential to encourage the greater involvement of specific groups in monitoring and evaluation (Martin & Sutherland 2003). Studies of this nature are thus urgently required to critically assess people's perception of the benefits derivable from Wetlands for policy implications geared towards consideration of how to improve the complementarities of strategies for income generation, food security and environment sustainability.

The broad objective of the study was to assess the economic value and benefits the perception of well as wetland community dwellers perception and Willingness to pay for sustainable management of selected Wetlands in Southwest, Nigeria. The specific objectives were to

1. Describe and compare the socio-economic characteristics of various categories of Wetland service users in the study area;
2. Determine the benefits that the Wetland service users perceived they derive from the existence of the Wetlands in their area; and
3. Examine the influence of various socio-economic, attitudinal, location-specific, and other factors on the perceived value.

Materials and Methodology

Study Area

This study was based on data obtained from a cross-section of 197 respondents drawn across 17 communities around three Wetlands in Lagos, Ogun and Oyo state. The Wetlands included in this survey are the Lagos Lagoon, Eriti in Ogun and Eleyele in Oyo states. The Wetlands of Lagos were included based on the extensiveness of Wetlands found in the state. Eriti Wetland was however included because of its use for Agricultural purposes and its consequent involvement in FADAMA programmes. Eleyele Wetland is also notable in Oyo state particularly as the major source of portable water distributed for household use upon treatment in the area.

Sampling Procedure

Multi stage sampling technique was used in this study. Stage one involves the purposive selection of three Wetlands (Eleyele, Eriti and Lagos Wetlands). The second stage involves the random selection eighteen communities close to the water bodies while the third stage involves systematic random selection of respondents from residential buildings and from farm/ nonfarm enterprises. Communities surveyed around Lagos Lagoon included Ebute Afuye/ Chief in Epe, Foolu, Ise, Odofin and Ibeju in Ibeju-Lekki, Itoga, and Ikoga Zebbe in Badagry. Those surveyed around Eleyele Wetland are Eleyele, Ijokodo, Apete, Awotan and Olopomewa while the communities visited around the Eriti Wetland which is one of the tributaries of the Ogun-Oshun River are Eriti, Oluwo-Isale, Olorunda, Saare, and Mokoloki harbouring another Wetland which is also a part of the Ogun-Oshun River.

Data Collection

Primary data were used for this study. The data were collected through the use of personally administered questionnaire. The data consists of information on socio-economic as well as demographic characteristics of the respondents. Information was also obtained on the benefits that are derivable from these Wetlands as well the degree of importance the respondents attach to such benefits. Based on evidence in literature, the range of benefits presented to the respondents included:

- Access to fresh food produced around the Wetland at a cheaper price.
- Provision of cool breeze
- Provision of sand and other building material.
- Provision of recreation and tourist site.
- Provision of clean air.
- Provision of herbs and pharmaceuticals.
- Helping to recharge ground water.
- Serves as water storage facility thereby making water available all year round.
- Help in controlling flood by accommodating run-off water.
- Provision of wind breaks that serve as storm protection device.
- Helping in nutrient recycle by retaining nutrient from eroded topsoil.
- Micro-climate stabilization such as lowering of day and night temperature

Each of the respondents was required to specify whether the Wetland in his or her area offer these benefits and the extent to which such benefit is important to him/her. Other data obtained included detailed data on direct utilization of Wetland services, the number of years the respondent has been living, or working in the Wetlands among others.

Analytical Technique/ Measurement of Variables

The analytical techniques employed for this study included both descriptive and quantitative techniques. The details of analytical techniques, for each of the specific objectives, are as follows:

Description and Comparison of Socio-economic Characteristics

Simple frequency and cross-tab tables were used to facilitate description of socio-economic characteristics of the sampled respondents, and comparison of socio-economic characteristics of different categories of Wetland service users.

Measurement of Perceived Benefits

A score of one (S = 1) was assigned if a respondent believes the Wetland in his area renders a particular benefit to the immediate society while failure to perceive such benefit attracted a score of zero (S_j=0). The perception score was then weighted on a Likert scale to determine the level of importance a respondent personally attach to such benefit. From this, the perception index for each respondent was computed based on all the benefits presented to them.

The value of PBI falls between zero and one. The higher the PBI the greater the value the respondent attached to the Wetland.

Determinant of Perceived Benefits

The influences of various socio-economic factors on the respondents' perceived benefits (measured by the Perceived Benefit Index – PBI) were examined by specifying and estimating the following Tobit regression model. The choice of Tobit regression model is hinged on the fact that it is well suited in a situation where the dependent variable jumps discreetly at zero (Koutsoyianis, 1982). The model is as stated below

$$PBI_i = \beta_O + \beta_j X_{ij} + e_i$$

where;

PBI_i is the Perceived Benefit Index of the i^{th} respondent
X_1= Age (years)
X_2= Age Square (years)
X_3= Sex (1 if Female 0 if Male)
X_4 = Education (years of schooling)
X_5= No of years living, working or visiting the area (years)
$X_{6=}$ Respondent's income from all sources (naira/year)
X_7= Share of total income derived from Wetland related activities (naira/year)
X_{8j}= A set of dummy variables for various categories of respondent (j=0, 1, ., .,k for residents, farmer, fisher-folks, resource collection, other occupation). It takes a value of 1 if respondent belong to the j^{th} category, and 0 if otherwise.) The dummy variable for residents (j=0) was dropped in the estimation.
X_9= Wetland location (A set of dummy variables for various Wetland location (j=0, 1, 2 for urban, sub urban and rural location). It takes a value of 1 if respondent belong to the j^{th} category, and 0 if otherwise.) The dummy variable for rural location (j=0) was dropped in the process of estimation.

Results and Discussion

Characteristics of Wetland Users

Three main categories of Wetland service users were identified among the survey respondents as shown on Table 1.

An exploration of Table 1 shows that majority (94.7%, 74.2%, and 70.4%) of the respondents in Eleyele, Eriti, and Lagos Lagoon both live and pursue livelihood (indirect and direct users respectively) around all the Wetlands respectively. The same trend is also observed in the pooled data (74.6%) irrespective of the Wetland location. This shows that irrespective of their location, Wetlands are actively explored by their surrounding community in generating income. Also, the Table revealed 14.2% of the respondents come from outside the immediate environment of the Wetland (direct users) to pursue livelihood activities. This by implication further shows that it is not only the Wetland community dwellers that depend on the Wetland for livelihood sustenance. The Table however suggests that about half (48.7%) of the people found around Wetlands are involved in crop farming. Farming is thus the major activity that

these Wetlands are being used for although large proportions (63.2%) of the people found around the Eleyele Wetland are artisans. This may be due to the fact that part of this water body is found in a commercial area (Eleyele Motor Park) while around the Lagos Wetlands other non Wetland livelihood activities such as food vending, trading, transport services, civil service etc constitute about 23.5% of the peoples main occupation.

Socio Economic Characteristics of Wetland Users

Socio economic characteristics of the respondents as shown on Table 2 reveals that majority of the survey respondents and by extension people resident and or pursuing livelihood activities around the selected Wetlands are economically active, aged between 31-50 years (54.5%) and mostly (90.4%) married. They are predominantly educated either to the primary (35.5%) or secondary (39.1%) school level, with as much as 12.7% of them having no formal education. In terms of gender, although both sexes are involved in Wetland related activities, the male folk however constitute the majority (73.6%). By religion, the Christians constitute a slight majority (59.4%) as against the Muslims (40.6%). Also, the Table reveals that majority (64.4%) of the respondents have spent at least 10years either residing and or pursuing livelihood activities around the Wetlands.

Perception of Wetland Benefits

Results on Table 3 shows the benefits clearly recognised by the respondents as; provision of food (67.5%), provision of herbs (57.9%) and provision of sand and other building materials (62.9%). Those poorly recognised include provision of windbreaks (28.1%), nutrient recycling (31.0%) and microclimate stabilization (43.1%). Incidentally, food and sand are some of the Wetland resources that are being actively explored by the people for income generation. Furthermore, the three benefits recognised by the majority of the people are direct benefits of the Wetlands while those poorly recognised are indirect benefits of the Wetlands which are its contribution in balancing the ecosystem. Although recreation and tourism is another income generating potential of the Wetland, this is also not recognised by more than half (66.0%) of the Wetland users. Thus their perception of the Wetland benefits is limited to the present income generating potentials of the Wetlands.

Perceived Benefit Index

The overall strength of the respondent's recognition of all the benefits combined is shown by Perceived Benefit Index (PBI). Table 4 presents this result across the different categories of Wetland service users. The table shows that almost half (48.2%) of the respondents have low / poor perception of the Wetland benefits and this is unaffected even by the category of the Wetland service users. It can thus be inferred that a respondent who live and or pursue livelihood around these Wetlands have low perception or appreciation of the Wetland benefits.

Determinants of Perceived Benefit Index

In Table 5, Age, age square, total income and the share of the income that is derived from the Wetland were discovered to be the socio economic factors that influence people's perception of the Wetland benefits. Positive signs borne by the regression co efficient shows that an increase in the associated variable will lead to an increase in the PBI while the reverse holds for

the coefficient that has bear negative signs. Interestingly while age favours an increase in perception, it can be observed that this is to an extent after which it begins to decline. Also, the higher their total income the lesser they perceive the Wetland as being beneficial while in contrast, the higher the portion of this income that comes from the Wetland the more beneficial they regard them. These therefore go on to show that it's only the direct use value of the Wetlands that are appreciated as those who don't depend on the Wetland for income generation are likely to view them as less beneficial. Among the activity types, it was only the coefficient of fishing that was significant and also positive. A fisherman thus perceives the Wetland benefit better than a resident which is the reference category. This may be because of all the activity types, fishing is the one that depend entirely on the Wetland as they "only harvest without sowing" any substantial input into the Wetland. The suburban dummy coefficient was also significant but negative. This reveals that a respondent in a sub urban area perceives the Wetland in his/her area as less beneficial when compared with the rural Wetland people's perception of their own.

Conclusion and Recommendations

Firstly, Wetlands regardless of their location are being explored for various income generating activities. This if combined with conservational plans for these Wetlands will help enhance their functioning for this purpose and that of ecosystem balancing.

Secondly it was discovered that the use i.e. direct use values of the Wetlands, are better perceived by the people and their perception increases with the share of their income that comes from the Wetland as against a reduction with a higher total income. This implies that they rank and appreciate the use values better than the non use values.

The study therefore concludes that Wetland benefits are lowly perceived by the people especially their roles in ecosystem balancing. Based on these, the study therefore recommends that awareness should be created about all the various benefits and impacts people's activities have on wetlands functioning so as to stimulate them for possible future sustainable management plans.

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Table 1: Distribution of Respondents by Location, type of Wetland Use and Main Occupation.

	Wetland			
	Eleyele	**Eriti**	**Lagos lagoon**	**All respondents**
Benefit type				
Direct & Indirect users	18 (94.7%)	72 (74.2%)	57 (70.4%)	147 (74.6%)
Direct users	1 (5.3%)	16 (16.5%)	11 (13.6%)	28 (14.2%)
Indirect users	0 (.0%)	9 (9.3%)	13 (16.0%)	22 (11.2%)
Occupation				
Farming	3 (15.8%)	53 (54.6%)	40 (49.4%)	96 (48.7%)
Fishing	2 (10.5%)	17 (17.5%)	8 (.9%)	27 (13.7%)
Fish farming	0 (.0%)	2 (2.1%)	4 (4.9%)	6 (3.0%)
Sand mining	0 (.0%)	9 (9.3%)	1 (1.2%)	10 (5.1%)
Artisan	12 (63.2%)	2 (2.1%)	9 (11.1%)	23 (11.7%)
Others	2 (10.5%)	14 (14.4%)	19 (23.5%)	35 (17.8%)
TOTAL	**19**	**97**	**81**	**197**
	100.0%	**100.0%**	**100.0%**	**100.0%**

Source: Data from Field Survey 2010

Table 2: Distribution of Respondents by Personal Characteristics

Description	**Wetland Service User Category**			
	Direct users	Indirect users	Direct &Indirect users	All respondents
Number of respondents	**28 (14.2%)**	**22 (11.2%)**	**147 (74.6%)**	**197(100.0%)**
Age Group				
Below 30	6 (21.4%)	2 (9.1%)	27 (18.5%)	35 (17.9%)
31-40	8 (28.6%)	7 (31.8%)	48 (32.9%)	63 (32.1%)
41- 50	7 (25.0%)	8 (36.4%)	29 (19.9%)	44(22.4%)
51-60	4 (14.3%)	5 (22.7%)	25 (17.1%)	34 (17.3%)
Above 60	3 (10.7%)	0 (0.0%)	17 (11.6%)	20 (10.2%)
SEX				
Female	4 (14.3%)	10 (45.5%)	38 (25.9%)	52 (26.4%)
Male	24 (85.7%)	12 (54.5%)	109 (74.1%)	145 (73.6%)
Marital Status				
Married	25 (89.3%)	17 (77.3%)	136 (92.5%)	178 (90.4%)
Single	2 (7.1%)	3 (13.6%)	7 (4.8%)	12 (6.1%)
Widow(er)	1 (3.6%)	2 (9.1%)	4 (2.7%)	7 (3.6%)
Educational Level				
No Formal education	2 (7.1%)	4 (18.2%)	19 (12.9%)	25 (12.7%)
Primary	9 (32.1%)	5 (22.7%)	56 (38.1%)	70 (35.5%)
Secondary	13 (46.4%)	10 (45.5%)	54 (36.7%)	77 (39.1%)
Tertiary	4 (14.3%)	3 (13.6%)	18 (12.2%)	25 (12.7%)
Religion				
Christian	19 (67.9%)	14 (63.6%)	84 (57.1%)	117 (59.4%)
Muslim	9 (32.1%)	8 (36.4%)	63 (42.9%)	80 (40.6%)
Years spent around the Wetland				
Less than 5	6 (21.4%)	2 (9.1%)	25 (17.0%)	33 (16.8%)
5-10	5 (17.9%)	8 (36.4%)	24 (16.3%)	37 (18.8%)
11-15	9 (32.1%)	5 (22.7%)	31 (21.1%)	45 (22.9%)
16-20	3 (10.7%)	3 (13.6%)	18 (12.3%)	24 (12.1%)
Greater than 20	5 (17.9%)	4 (18.2%)	49 (33.3%)	58 (29.4%)
TOTAL	28 (100.0%)	22 (100.0%)	147 (100.0%)	197 (100.0%)

Source: Data from Field Survey 2010

Table 3: Respondent Perception of Wetland Benefits

Wetland Benefits	**NR**	**NI**	**IND**	**IMP**	**VI**
Supply of Fresh Food	61 (31.0%)	4 (2.0%)	3 (1.5%)	35 (17.8%)	94 (47.7%)
Provision of Herbs	83 (42.1%)	7 (3.6%)	0 (0.0%)	35 (17.8%)	72 (36.5%)
Supply of Sand	64 (32.5%)	9 (4.6%)	7 (3.6%)	27 (13.7%)	90 (45.7%)
Recreation and Tourism	130 (66.0%)	3 (1.5%)	6 (3.0%)	19 (9.6%)	39 (19.8%)
Air Purification	110 (55.8%)	1 (0.5%)	7 (3.6%)	26 (13.2%)	53 (26.9%)
Provides Cool Breeze	83 (42.1%)	1 (0.5%)	3 (1.5%)	29 (14.7%)	81 (41.1%)
Ground Water Recharge	112 (56.9%)	3 (1.5%)	4 (2.0%)	25 (12.7%)	53 (26.9%)
Water Storage Facility	95 (48.2%)	1 (0.5%)	10 (5.1%)	33 (16.8%)	58 (29.4%)
Flood Control	133 (67.5%)	1 (0.5%)	3 (1.5%)	26 (13.2%)	34 (17.3%)
Provision of Wind Break	139 (70.6%)	1 (0.5%)	3 (1.5%)	21 (10.7%)	33 (16.8%)
Nutrient Recycle	132 (67.1%)	2 (1.0%)	3 (1.5%)	32 (16.2%)	28 (14.2%)
Micro Climate Stabilization	105 (53.3%)	1 (0.5%)	7 (3.6%)	24 (12.2%)	60 (30.4%)

Source: Data from field survey 2010

Table 4: Distribution of Respondents by Overall Perception Score.

Description	Wetland User Category			
	Direct users	Indirect users	Direct & Indirect users	All Respondents
Perceived Benefit Index				
Low perception (less than 0.45)	15 (53.6%)	10 (45.5%)	70 (47.6%)	95 (48.2%)
Moderate perception (0.45-0.64)	6 (21.4%)	8 (36.4%)	28 (19.0%)	42 (21.3%)
High perception (greater than 0.65)	7 (25.0%)	4 (18.2%)	49 (33.3%)	60 (30.5%)
Total	28 (100.0%)	22 (100.0%)	147 (100.0%)	197 (100.0%)

Source: Data from Field Survey 2010

Table 5: Estimated Tobit Model of Perceived Benefit Index

	Regression Parameters		Marginal
Explanatory Variables	**Coefficient**	**t-ratio**	**Effect**
Constant	-0.5223	-1.3462	
Age	0.3336E-01**	1.9910	0.7227E-02
Age Square	- 0.3958E-03**	-2.1867	-0.8574E-04
Female dummy	0.7004E-01	0.8107	0.1517E-01
Education in years	0.1386E-02	0.1694	0.3002E-03
Years spent around Wetland	0.2707E-02	1.0049	0.5864E-03
Total Income	-0.1406E-06***	-2.6005	-0.3000E-07
Wetland share of income	0.1997**	2.4157	0.4326E-01
Farming	-0.3601E-01	-0.4645	-0.7799E-02
Fishing	0.1755**	2.1937	0.3801E-01
Resource Collection	-0.1617	-1.5844	-0.3502E-01
Other livelihood options	-0.1820	-1.6291	-0.3943E-01
Sub urban dummy	-0.6041***	-5.8979	-0.1309
Urban dummy	-0.7870E-01	-0.9395	-0.1705E-01
Log-likelihood function	-260.4342		
Predicted F (I)	0.2166		
Squared correlation	0.1595		

*NOTE: ***, **, * implies that associated parameter is significant at p<0.01, p<0.05 and p< 0.10 levels respectively*