

Economic inequality and biodiversity loss in eriti community forest wetlands, Ogun State, Nigeria

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Received: 28 June 2014 / Accepted: 30 July 2014 / Published: 27 September 2014

Abstract

The study was carried out in Eriti Community Forest, Obafemi Owode local government, Ogun State, Nigeria to determine the relationship between economic inequality and biodiversity loss in the community. The instrument of data collection was questionnaire and simple random sampling was adopted as sampling method. A total of 75 respondents were selected and questionnaire administered with 100% valid rate of return. Both descriptive and inferential statistics were used for data analysis. Also, poverty line was determined with Income Level Approach and asset acquisition while multiple use benefits of the forest was determined with Combined Benefit Approach. The result showed that majority (74.7%) of the respondents were male and (25.3%) were female. Age distribution shows age bracket (41-50) years having the highest number of respondents (42.7%) while (60-70) years had the least (1.3%). On marital status, majority of the respondents were married (83%). On household size, the percentage of the respondents with the family size of 5-8 members recorded the highest (64%) while family size of above 9 had the least (1.3). Educationally, respondents with primary education were the highest (60.7%) while tertiary education had the least (1.3%). Poverty line was determined to be ₦141,083 or \$882 equivalent at ₦160=\$1. Consequently, 67% of the respondents were estimated to be poor. In view of this, the local community relied on the community forest and exploit various forest products for additional income which leads to biodiversity loss. The study recommends poverty reduction effort that requires a well articulated policy measures that will ensure that beneficiaries are not only well targeted but sensitized and fully mobilized to know the importance of natural resources to the environment as well as in the economic development of the state and country.

Key words: Economic inequality; Biodiversity loss; Poverty reduction; Environment.

Introduction

As problems of environmental change become more evident, we increasingly realize how much we depend upon forest for a wide range of ecosystem services. These services, which include soil protection, pest control and the supply of clean water, are to a significant extent provided by natural and semi-natural ecosystems which in the past were thought to have little or no economic significance. This recognition has important implications for conservation. The emerging discipline of ecological economics provides methods for assessing the economic value of wildlife. While it is idle to pretend that the application of such methods will solve the biodiversity crisis, economic analysis can be most useful in strengthening the case for conservation. Such analysis can demonstrate the potentially high economic value of wildlife, and reveal more clearly the economic and social pressures which threaten it. It is argued that while nature reserves and other protected areas will always be important, we must shift our attention increasingly to the

preservation of biological diversity within the major forms of land-use. High priority must be given to finding ways of restoring biological diversity and enhancing ecosystem function in those areas which have already been seriously damaged. In these tasks, ecological economics has an important role to play.

Studies of how economic concerns contribute to species loss have not analyzed the consequences of the distribution of economic wealth. Nevertheless, extensive empirical evidence demonstrates that inequality has a negative effect on other social outcomes and institutions (Holland et al. 2009; Wilkinson and Pickett 2006).

Researchers propose that social inequality has a significant effect on the environment (Ostrom 1990; Boyce 1994; Baland et al. 2007). Olson (1965) suggests that small groups with considerable inequality might favor the provision of a public good. The expectation is that when the majority of the wealth is held by a few resource users, it is in their interest to conserve, regardless of what the poorer members of the group do. Some more recent analyses also support this perspective (Itaya et al. 1997). Nevertheless, others suggest that inequality may hinder conservation, and empirical work shows that inequality can thwart the collective action required for environmental protection (Boyce 1994). Although these studies suggest a connection between inequality and environmental degradation, the direction and strength of the relationship with biodiversity were revealed only recently (Mikkelsen et al. 2007).

Mikkelsen et al. (2007) reported that greater inequality is associated with the number of threatened species (International Union for Conservation of Nature (IUCN) Red List data) at the international scale when human population, GDP, and the total number of species are controlled. The situation is similar to what obtains in the United States for species of birds: States with higher socio-economic inequality tend to have a greater proportion of species undergoing population decline (Mikkelsen et al. 2007). These are the only data on species endangerment that are global in scope; thus, despite some well-known shortcomings (Akçakaya et al. 2006), they are uniquely appropriate for a cross-national comparison of threatened species.

Human societies have been built on biodiversity. Many activities indispensable for human subsistence lead to biodiversity loss, and this trend is likely to continue in the future. Man clearly benefits from the diversity of organisms use for medicines, food, fibers, and other renewable resources. In addition, biodiversity has always been an integral part of the human experience, and there are many moral reasons to preserve it for its own sake. What has been less recognized is that biodiversity also influences human well-being, including the access to water and basic materials for a satisfactory life, and security in the face of environmental change, through its effects on the ecosystem processes that lie at the core of the Earth's most vital life support systems. Therefore, the objectives of this study are

to: (i) Describe the socio-economic characteristics of respondents in the study area; (ii) Determine the poverty line among respondents and income inequality i.e. the distribution or proportion of the poor in the productive/fragile lands or areas of high biodiversity; (iii) Identify the role of wealthy land owners in biodiversity loss and multiple benefits derived from the community forest.

Material and methods

Study area

Eriti forest wetlands is in Obafemi - Owode Local Government Area of Ogun State, Nigeria and is located in the humid tropical rainforest zone on latitude 6°50'N and 7°50'N and longitudes 3°18'E and 3°32'E some 20 kilometers on the southern corner of Abeokuta, Ogun State capital. The wetland shares western boundary with Ewekoro and Ifo Local Government Areas, and covers an estimated area of 156 km². The population of Eriti Forest Wetlands Community is over 6,000 people. The two major ecosystems are Eriti Forest and Riparian forest along Ogun River bank. The wetland possesses rich alluvial soil useful in farming as a result of seasonal inundation and overflow of the river during raining season. The annual rainfall, which normally spread over eight months between April and November, ranges between 100 mm to 200 mm, having bi-modal pattern with the peaks at May/June and September/October (Awojuola 2001). The relative humidity is high all the year and generally above 80% during the wet season and ranges between 60% and 80% during the dry season. The average daily maximum temperature varies from 28^oc in the rainy season to 32^oc in the dry season (Onakomaiya et al. 1992; Awojuola 2001).

Sampling technique

Simple random sampling method was used for the study. In simple random sampling method, a subset of individuals (a sample) is chosen from a larger set (a population). Consequently, seventy five (75) respondents were randomly selected and interviewed in the study area through questionnaire and interview guide.

Data collection and analysis

The instrument of data collection was the use of a structured questionnaire. Information gathered include socio-economic variables of the respondents, income and poverty level, social stratification of respondents in Eriti, plants and animals destruction and economic factors contributing to biodiversity loss. Descriptive and inferential Statistical methods were employed in the analysis of the data such as frequency distribution, mean and percentages. Income level approach (Deaton 1997) was used to determine the poverty level and the proportion of poor among the respondents. The multiple use benefit was determined by Mantel (1965) analytical tool used to analyse the combined benefits derived from the forest in the study area.

Results and discussion

Socio-demographic variables

Table 1 below shows the demographic characteristics of respondents in Eriti community forest in Ogun State. The distribution by age shows that majority (65.4%) of the respondents were within the age range of 31-50 years, thus showing that respondents were within the economically active age group. Majority (75%) of the households head were male which implies that male headed households were the dominant household structure in the study area. Educationally, (51%) of the household heads had primary

education with mean years in school of about 6 years. The implication is that majority of the household heads in the forest community had little or no formal education which would have consequences on their capacity to exploit latent opportunities in the community. Maritally, majority (85.3%) of the household heads were married. Household size 5-8 (64%) dominated in the area. This imposes a high cost of burden on the economic members of the household and community forest. Though a large family size may constitute a social burden, larger families use their labour input to an advantage in farming and forest products exploitation. The distribution of household heads by tribe shows that Yoruba constitute the majority (90.7%), Igbo (4%) and (1.3%) for others sub-ethnic groups in Nigeria. The major occupation distribution shows that majority (65%) engaged in farming, followed by (16%) in other forest based activities and (14.7%) and (2.7%) in self-employment and paid employment respectively.

Table 1. Demographic characteristics of respondents.

Characteristics	Frequency	Percentage	Mode
Age [years]			
1-30	16	21.3	
31-40	17	22.7	
41-50	32	42.7	41-50
51-60	9	12.0	
61-70	1	1.3	
Sex			
Male	56	74.7	Male
Female	19	25.3	
Educational level			
No formal education	22	29.3	
Primary school	38	50.7	Primary education
Secondary school	14	18.7	
Tertiary	1	1.3	
Marital status			
Single	10	13.3	
Married	64	85.3	Married
Widower	1	1.3	
Family size			
1-4	17	22.7	
4-6	48	64.0	4-6
7-9	9	12.0	
>9	1	1.3	
Tribe			
Yoruba	68	90.7	Yoruba
Igbo	3	4.0	
Others	1	1.3	
Major occupation			
Farming	49	65.3	Farming
Paid employment	2	2.7	
Self employment	11	14.7	
Forest based activities	12	16.0	

Source: Field Survey (2013).

The table 2 shows the socio-economic characteristics of respondents in the study area. The distribution of household by major income shows that majority (58.8%) of the household earn less than ₦20,000/year i.e (\$125/yr), (36.7%) earn between ₦20,001(\$125) to ₦40,000 (\$250), (15.9%) earn between ₦40,001(\$250) to ₦60,000 (\$375), (5.2%) earn between ₦60001(\$375) to ₦80,000 (\$500) and 6.6% earn over ₦80000 (>\$500).

The distribution of household by income from other sources shows that majority (66.9%) earns less than ₦20,000/year i.e (\$125), (9.3%) earn between ₦20,001(\$125) to ₦40,000 (\$250), and (5.3%) earn between ₦40,001(\$250) to ₦60,000 (\$375). The distribution of

household by income derived from other benefit shows that (39.9%) of the household earn less than ₦20,000/year (\$125), (5.3%) earn between ₦20,001(\$125) to ₦40,000 (\$250), (1.3%) earn between ₦40,001(\$250) to ₦60,000 (\$375) and (1.3%) earn above ₦100,000 (\$625) .The distribution of household by annual income shows that (12%) of the household earn less than ₦20,000/year (\$125), (38.5%) earn between ₦20,001(\$125) to ₦40,000 (\$250), (25.3%) earn between ₦40,001(\$250) to ₦60,000 (\$375), (7.9%) earn between ₦60001(\$375) to ₦80,000 (\$500), (6.6%) earn between ₦80,001(\$500) to ₦100,000 (\$625) and (9.2%) earn above ₦100,000 (\$625).

Table 2. Socio-economic characteristics of the respondents.

Characteristics	Frequency	Percentage	Mean
Major income[₦/year]			
<20000	33	56.8	
20001-40000	21	36.7	
40001-60000	12	15.9	36586
60001-80000	4	5.2	
>80000	5	6.6	
Income from other sources			
<20000	50	66.9	
20001-40000	7	9.3	15885
40001-60000	4	5.3	
None	14	18.7	
Income derived from benefit			
1-20000	30	39.9	
20001-40000	4	5.3	
40001-60000	1	1.3	20090
>100000	1	1.3	
None	42	56.0	
Annual income			
<20000	9	12	
20001-40000	29	38.5	55200
40001-60000	19	25.3	
60001-80000	6	7.9	
>80000	12	15.8	

Source: Field Survey (2013).

Poverty line using income level approach

The poverty line of the respondents was determined using Income level Approach (Deaton 1997). The income distribution was sorted in ascending order from the least income level of ₦12500 (\$78.1) to the highest of ₦300000 (\$1875), and then the total mean income was calculated by dividing the total income level of the respondents by the total number of respondents. Also, the mean percentage of 0.5 was chosen to calculate the poverty line. Then, the poverty line was set by multiplying percentage of mean by mean income of the respondents. The result shows that the respondents had a poverty line of ₦25,173.33 (\$157.33). According to World Bank (2009a) data of \$1.25/day (₦200) for developing countries at ₦160/\$1, each household head was expected to earn ₦66,300 (\$414.38) annually and therefore indicating that the real income of the respondents was 38% lower than World Bank data- a condition strongly indicating poverty in the study area. Consequently, assets acquisition by the respondents was carried out to confirm the income position of the respondents (Table 3).

The quality of life measured by acquisition of household assets is presented in table 3. Asset analysis shows that radio recorded (71%), kerosene stove (66%) and motorcycle (28%) accounting for the most predominant house hold assets owned by the respondents showing that these items were very essential. Majority of the respondents do not own luxury items such as gas cooker (2%), car (3%) and settee (15%) which shows that majority of the respondents were actually poor.

The rate of exploitation, income inequality between the poor and the rich, pattern of land ownership and activities of respondents on acquired land is presented in Table 4. Majority (73.3%) exploits the forest regularly, (21.3%) exploit the forest frequently and (5.3%) exploit it sometimes.

Table 3. Household Assets of respondents in the study area.

ASSETS	YES	NO
Car	3	72
Motorcycle	28	47
Television	34	41
Electrical generator	28	47
Bicycle	30	45
Settee	15	60
Radio	71	4
Gas cooker	2	73
Rug/carpet	16	59
Kerosene stove	66	9

Source: Field Survey (2013).

Table 4. Exploitation rate, income inequality and pattern of land ownership among the respondents in the community forest.

Characteristics	Variables	Frequency	Percentage
Exploitation rate	Sometimes	4	5.3
	Frequently	16	21.3
	Regularly	55	73.3
Income inequality (poor)	Less productive land	69	92.0
	High biodiversity area	2	2.7
	Others	4	5.3
Income inequality (rich)	Less productive land	12	16.0
	High biodiversity area	58	77.3
	Others	5	6.7
Pattern of land ownership	Leasehold	2	2.7
	Inheritance	8	10.7
	Purchase	65	86.7
Activities on acquired land	Farming	45	60.0
	Building	9	12.0
	Timber production	2	2.7
	Others	19	25.3

Source: Field Survey (2013).

This result shows that the forest is being exploited regularly and at a higher rate which can result into biodiversity loss. Income inequality among respondents shows that (92%) of the poor population stay in less productive or fragile area, (2.7%) stay in area of high biodiversity and (5.3%) stay in others. However, (77.3%) of the rich stays in areas of high biodiversity, (16%) stay in Less productive or fragile area and (6.7%) stay in others. This shows that more of the rich stay in highly productive areas while the poor were distributed in less productive or fragile areas. According to Ogwumike and Ozughalu (2001), poverty and environmental degradation have a bi-causal relationship. Poverty brings about environmental degradation. The poor continue to struggle for survival at the expense of the environment especially in forest dependent communities like Eriti. In addition, it was discovered that the rich have houses outside the community. The role of wealthy land owners is also presented in the table. It shows the pattern of land inheritance among the rich. The gradual change in land tenure in favour of the rich further promotes biodiversity loss. Soaga (2012) noted that change in tenure

pattern promotes loss of forest with individualistic tendency for wealth more pronounced than environmental protection. Majority (86.7%) acquired their land by purchase, (12.7%) by inheritance and (2.7%) by leasehold. The activities of the rich on acquired land shows that majority (60%) use the land for farming, (12%) for building, (2.67%) for timber production and (25.3%) for others. The community forest was evaluated for combined benefits derived by the respondents to identify products of significance to the community dwellers (Table 5). The multiple product benefits from the forest were identified as firewood, medicinal plants (leaves, barks, stem, seeds and root), snail,

bushmeat and geological materials for construction activities.

Consequently, respondents derive benefits from firewood collection, snail gathering, medicinal plant collection, leaves collection, Hunting activities, Geological material extraction. Table 5 shows the evaluation of combined benefits derived from the forest. The result shows that Benefit (1), that is, Firewood is the most promising to be the dominant use followed by benefit (3), that is Medicinal plant collection and then Leaves collection, Geological material extraction, Snail gathering and the least is hunting activities.

Table 5. Evaluation of combined benefits derived from the forest.

Benefits	(1)	(2)	(3)	(4)	(5)	(6)	Total value ²
Grades							
1	54	35	42	35	16	20	7786
2	3	7	6	8	13	5	352
3	0	0	0	1	18	39	1846
4	7	15	15	16	8	3	828
5	3	2	2	4	10	6	169
6	8	16	10	11	10	2	645
Total	75	75	75	75	75	75	

Source: Field Survey (2013).

Note:

Benefits
 (1)= Firewood collection
 (2)= Snail gathering
 (3)= Medicinal plant collection
 (4)= Leaves collection
 (5)= Hunting activities
 (6)= Geological material extraction

Grades

1. Insignificant
 2. Significant
 3. More significant
 4. Important
 5. Very important
 6. Indispensable

Conclusion

This study shows that poverty exists in the communities surrounding the Eriti community forest showing income inequality among the population of the forest community. Though, the residents depended on the community forest for their welfare such as wood for domestic energy, snail gathering, and leaves for various purposes, medicinal plants, hunting for games, geological material extraction and cultivation of land for agricultural purposes, some members of the community had access to the resources more than others and therefore creates separation between the poor and the rich in the community. Consequently, the rich were residing in high biodiversity areas and exploiting the resources to the detriment of the poor in the community. The poor were forced into less productive and fragile areas leading to land degradation and permanent loss of biodiversity in such locations. This is because they earn low income and relied more on the fragile ecosystem for survival despite the low productivity. Therefore attempts should be made to improve the current state of the community forest so that it will alleviate poverty in the area and impact positively on the lives of people living in the area and therefore reduce biodiversity loss.

Therefore, Nigeria like other countries in the world has become conscious of the poor attitude of her citizens to environmental management in general and deforestation in particular which is mainly due to economic inequality. It is actually imperative that food and other essentials of life for the increasing population should be subsidized by the government. Eriti community forest should be managed holistically in such a way that biodiversity is sustained and maintained. Conservation efforts should be based on integrated management that helps to maintain the environment, offer better socio-economic options, that would lead to adequate and acceptable quality of life for the

community people who depended on forest and forest products and at the same time maintain biodiversity for the future.

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