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POPULATION PRESSURE AND FOREST RESOURCES DEPLETION IN GELE - GELE FOREST RESERVE OF EDO STATE, NIGERIA.

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ABSTRACT: *The history of Man's dependence on natural forest resources for survival is as old as the origin of man. Thus since ages, man has exploited forest resources for food, shelter and as a means of survival. Unwanton exploitation of forest resources has led to decimation of biodiversity and loss of their values in the survival of mankind. Against this background forest reserves are created as a strategy for conserving biodiversity from net loss. These reserves are ideally protected against unauthorized access. However, with the growing human population and the challenge of providing food for the teeming population reserved areas are being encroached. There seems to have been depletion of the forest resource stock in the Gele-Gele forest reserve in Edo state, Nigeria. Thus, this paper set as its objectives, to assess the impact of population pressure on the forest stock of Gele-Gele reserve. With a Focus on five communities that the forest reserve cuts across, both primary and secondary data were derived and analysed using simple descriptive statistics. The results of the analyses show that there is a steady growth on the population of the communities around the reserve at. Result of the analysis shows that the Gele-Gele forest reserve is rich in biodiversity and biological resources and people derive a lot of livelihood opportunities from the reserve. The authors also found out that there is rapid decline and depletion of the forest stock in the reserve as a result of over dependence on the forest resources in the reserve owing to growing human population. The result also shows that aside from population pressure, lack of indigenous people's participation in the conservation strategy has contributed to poaching and a major factor to depletion of the forest stock. The people feel alienated from the conservation efforts as such develop apathy towards the reserve. Thus it is recommended that the local people be properly integrated from the planning stage of any conservation activity as the forest reserve. There is need for government to call for stakeholders' forum in the affected reserve area where all will be free to air out their opinions on ways to enhance the protection of the forest reserve. Government should possibly reduce the size of the reserve to a reasonably manageable size considering the growth in the local population. Also, there is need for incentives to motivate the locales and empower them into investing in other ventures rather than depending on the proceeds from forest resource exploitation in the reserve.*

KEYWORDS: *Conservation, Forest Resources, Gele-Gele Reserve, Population Pressure, Resource Depletion*

INTRODUCTION/ BACKGROUND

Rapid population growth and the resultant anthropogenic activities have exerted great pressures on the natural and as well as man-made environments. Most of these activities such as agriculture, urbanization, road construction, mineral exploitation, industrialization among others are driving factors to forest depletion globally. While the world population has reached 7 billion, the world natural resource base has continued to be at a diminishing state leading to changes in every aspect of the natural environment. Estimates of forest losses in Africa (FAO, 2003) and Nigeria (FORMECU, 1999) were observed to be higher in the past two decades. For instance between 1990 and 2000, the continent lost about 52 million hectares of the forest, accounting for about 56 percent of the global reduction of forest cover (Nwoboshi,1987), while Kalu and Okojie (2009) reported a net loss of about 4 million hectares for the period 2000 - 2005.

In Nigeria, deforestation rates have not been protected from the ugly trend of depletion. For instance, from 1956 to 1986 the country lost about 23,000ha of the gazette forest estates per annum through government de-reservation (FORMECU,1999) and 5 percent of closed forest is converted annually (WR1,1991) reported that Nigeria lost 60 percent of her forest within the period of 1950-1960. Forest clearance in the country is put at an average of 400,000ha per annum, while aforestation has only 32,000ha annually. The cumulative effect of these is that the country has lost 50 million hectares of forest in less than 100 years (Mason, 1986). The increasing loss of forest land implies loss of biodiversity and other numerous forest resources with high potential value for the sustenance of the people of Edo State and Nigeria at large.

With increasing anthropogenic pressures at local, regional, and even global scales, an understanding of both the nature of change and the responses of natural systems to change becomes pertinent. Human beings generally have been viewed by Mmom (2007) as destructive intruders to natural ecosystems; hence, this suggests stringent rules and legislation that will protect the vegetation and its resource deposit. In as much as human beings are viewed this way, human population and the environment have a very strong complementary linkages or relationships. In actual fact, biodiversity conservation efforts especially vegetation can only be sustained if human beings give their support.

The Problematic

Over the last decades, the world has witnessed tremendous demographic changes. The historic loss of forests is closely related to demographic expansion and the conversion of forest land to other uses. Kalu, and Isikhuemem, (2005), Gulati, and Suresh, (1997), and Mmom (2007) maintained the thinking that rapid population growth is the major cause of much vegetation resource degradation especially in developing countries like Nigeria. Major direct causes of forest depletion brought on by humans include overharvesting of industrial wood, fuel wood and other forest products, and overgrazing. Underlying causes include poverty, markets and trade in forest products, and macroeconomic policies. Forests are also susceptible to natural factors such as insect pests, diseases, fire and extreme climatic events. (Population Reference Bureau, 2008) The implications of these developments on the forest reserve are huge. In some extreme cases

government has lost substantial earnings. A study by Nigerian Environmental Study/Action Team (1991) indicated that over 350,000 ha of vegetation in Nigeria are being lost annually due to farming alone. Oriola (2008) concluded that scientific studies of the vegetation in Nigeria illustrate the apparent effect of farming activities resulting in the modification of the original vegetation while some vegetation resources such as wildlife have gone to extinct.

The evidence above presents a significant and direct role of human activities culminating into forest stock depletion. Very recently volumes of studies on the forest, vegetation and methods of conserving it have emerged, Mmom and Arokoyu (2009), Aremu, Osayimwen, and Emelue, (2009), Mayer (1985 and Mmom ,(2007). However, records about the linkage between forest depletion and population pressure are a less documented phenomenon particularly in Edo state. Although Aremu, Osayimwen, and Emelue,(2009) estimated biodiversity indices of macro flora and fauna resources of Gele-gele forest reserve, Edo State, but they did not examine the impact of population pressure on the forest reserve. Yet cursory observation of forest stock in Gele-gele, Edo State revealed that it is under pressure. To this extent the paper seeks assess the level of impact of population pressure on forest stock in Edo State, Nigeria. Thus, the following questions become fundamental: Is forest stock in Gele- Gele really under stress or threat? Is the depletion of the Gele-gele forests caused by increase in population or are there other factors accounting for the depletion? What strategies are being put in place to forestall further depletion of the forest stock? Are there traditional forest management strategies put in place by the local communities check this environmental nuisance? Providing answers to these questions form the bases of this study

MATERIALS AND METHOD

Study Area:

Gele-gele forest reserve lies within latitude 5 55’ and 6 0 0 09’ N and longitude 50 16’ and 50 27’ E and is located in Ovia North East local Government Area of Edo state, Nigeria which has a total population of about 153894 (NPC, 2006).The reserve covers an area of 365 square kilometers that range from water swamp forest to tropical rain forest. The reserve is drained by rivers Osse and Benin (Aremu, Osayimwen and Emelue, 2009). Historically, they are part of the Benin kingdom and their language is Benin. The predominant occupation of the people in this locale is farming, carpentry and logging activities. In Gele- gele, the major cash crops produced are rubber and palm produce.

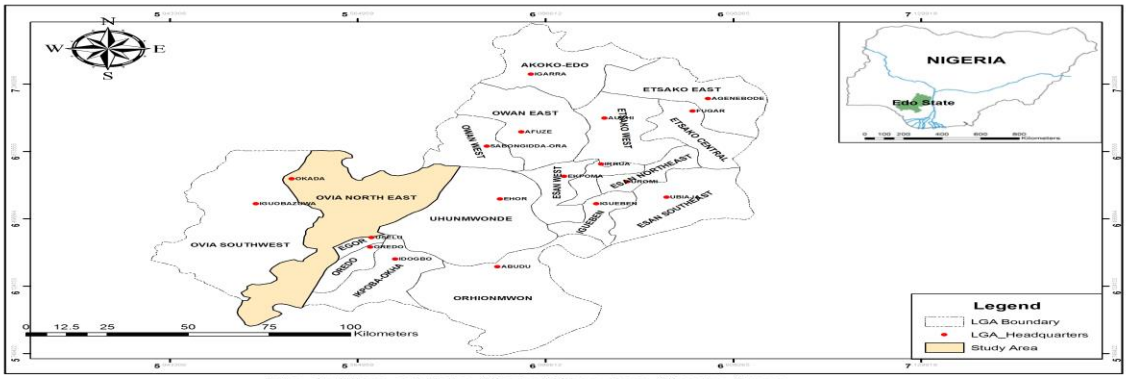

Fig.1: Map of Edo State Showing Study Area

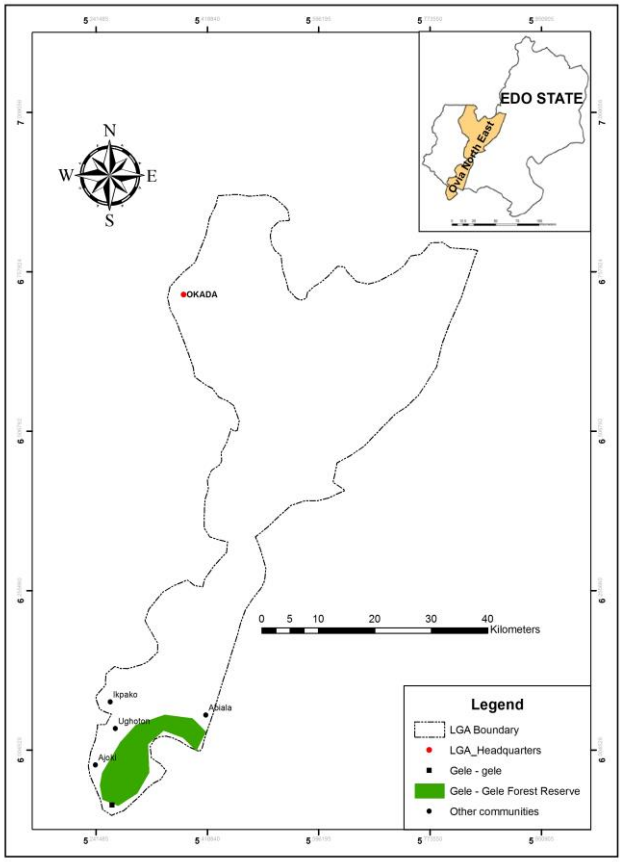

Fig. 2: Map of Ovia North East LGA Showing Gele - Gele Forest Reserve

The study focused on the impact of population on the rich Gele- Gele forest reserve in Ovia North West Local Government of Edo state. A total of 14 settlements claim ownership of Gele-Gele forest. However, out of these settlements, 5 communities, namely: *Ikpako, Ajoki, Gele-Gele, Ughoton and Abiala*-1were selected for the study. These settlements were selected for sampling based on their accessibility, geographical contiguity, size and population. In these communities chosen, preliminary fieldwork reveals that there are about 600 households that

make up the entire five communities. To avoid bias the researcher using simple random sampling technique chose 180 household heads representing 30% of the total household heads.
The data used for analyses were essentially primary data which were generated using structured, questionnaire. The questionnaire had two sections, the first section contained demographic data of respondents, that is, sex, age, educational attainment as well as occupation of the respondents. The second section dealt with population distribution in the area, the common forest resources exploited in the area, average annual harvest of Wood /Timber logged/ harvested in the sampled communities, average monthly income from exploitation of non-Timber forest product in the area, common forest stock being exploited in the reserve, major Non-Timber Forest products found / harvested in the study area, factors responsible for the possible depletion of forest stocks in the reserve, conservation practices ,perceived use of the forest, traditional management practices and their effectiveness in conserving the forest. 180 copies of questionnaire were distributed and retrieved in the five settlements. The data collected were analysed using both descriptive and inferential statistics and tables and pie charts were used to represent the results.

DATA ANALYSES

S/N	Communities	Population in the year 1991	Pop. In the year 2006	Population in the year 2010
1	Ikpako	**1,873**	**2,215**	**3,217**
2	Ajoki	**637**	**1,127**	**1,519**
3	Gele Gele	**3,472**	**5,756**	**6898**
4	Ughoton	**892**	**1,719**	**2,217**
5	Abiala1	**615**	**1,117**	**1436**
	Total	**7,489**	**11,834**	**15,287**

Source: NPC, 2006

Analysis of population growth in the five (5) communities within the Gele-gele Forest reserve shows a substantial growth in the population. The table revealed an increase a steady growth in the population of the area. For instance, in 1991, the total population of the area was 7,489, this rose to 11,834 in 2006, showing an increase of 4,345 in about 15 years. However, within an interval of 5years, there was an increase of 3,453 in population thus implying that there would likely be more pressure on the forest resources in the area.

Table 2: Occupational distribution of respondents

S/N	Location	Farming	Wood logging	Civil Service	Fishing	Business	Others	Total
1	Ikpako	5	20	1	1	9	-	36
2	Ajoki	4	21	1	2	7	1	36
3	Gele Gele	4	19	-	1	9	3	36
4	Ughoton	3	22	-	-	10	1	36
5	Abiala1	5	18	1	2	8	2	36
	Total	21	100	3	6	43	7	180
	Percentage	11.7	55.5	1.7	3.3	24	3.8	100

Source: Researcher's Field Work, 2012.

Table 2 above shows the analysis of the occupational distribution of the respondents in all the five communities selected for the study. 55.5% of the respondents engage in carpentry and logging activities as their primary occupation. 11.7% carry out farming, 3.3% engage in fishing activities. Those who engage in business were 24%. 3.8% engage in other forms of undisclosed occupation and 1.7% is in the civil service. The findings show that 70.5% of the respondents depend solely on the forest stocks from the reserve for survival purposes and livelihood sustenance.

Table 3 Average Annual harvest of Wood /Timber logged/ harvested in the sampled communities.

S/N	Communities	Average Annual Harvest (Tons)
1	Ikpako	48
2	Ajoki	74
3	Gele Gele	131
4	Ughoton	91
5	Abiala-1	45
	Total	**108**

The analyses of table 3 above shows an average annual harvest of timber in the study areas as 108 tons. However, there is spatial variation in the timber harvest among the various communities. The table reveals that Gele-Gele community recorded the highest amount / number of timber logged, with an annual average of 131 tons. This was accounted for by the fact that they are located at the heart of the forest reserve with over 35% of their landmass occupied by the reserve. Moreso, this was followed by Ughoton community with 91 tons of timber, on the annual average, 74 tons for Ajoki community and 48 tons for Ikpako community.

Table 4 Major Non-Timber Forest products found / harvested in the study area

Utilization Category	Botanical Names	Local Name	Habit	Part used
Species Used as Food/Main Dish	Artocarpus altilis (Parkinson) Fosberg (Moraceae)	Afon	Tree	Part(s) used
	Edible mushrooms (Varies)	Berefuutu	Tree	Fruit, Seed
Species Used as Food supplement	Treculia africana Decne. (Moraceae	Ataase (Olu)	Fungi	Fruit
Species Used as Snacks/Sweeteners	Chrysophylum albidum, G. Don (Sapotaceae)	Afon	Tree	Whole fungus
	Synsepalum dulcificum (Schumach. & Thonn.) Daniell (Sapotaceae)	Agbalumo	Tree	Fruit, Seed
	Tetracarpidium conophorum (Mull.Arg.) Hutch.& Dalziel (Euphorbiaceae)	Agbayun	Shrub	Fruit
	Blighia sapida, K.D.Koenig (Sapindaceae)	Asala	Climbing shrub	Fruit
	Irvingia gabonensis (Aubry-Lecomte ex O'Rorke) Baill (Irvingiaceae)	Isin	Tree	Fruit
	Garcinia kola, Heckel. (Clusiaceae)	Ooro	Tree	Fruit
	Sida veronicifolia, Lam. (Malvaceae)	Orogbo	Tree	Fruit
	Dialium guineense Willd. (Cealsalpinaceae)	Esi-ile	Creeper	Seed
	Irvingia gabonensis (Aubry-Lecomte ex O'Rorke) Baill (Irvingiaceae)	Omoyin	Tree	Fruit
Species Used as Soup/Soup ingredients/ Spices/Condiments	Brachystegia eurycoma Harms, B. (Caesalpiniaceae)	Aapon (Ogbono)	Tree	Fruit
	Afzelia africana Sm. (Caesalpiniaceae)	Akporachi (EKU)	Tree	Seed
	Crassocephalum crepidioides (Benth.) S. Moore (Asteraceae)	Apa	Tree	Seed
	Ceiba pentandra, (L.) Gaertn. (Malvaceae)	Ebolo	Herb	Seed,
	Adenopus breviflorus Benth. (Cucurbitaceae)	Eegun		Leaf

	Boerhavia diffusa, L. (Nyctaginaceae)	Egusi ile	Climber	Leaf
	Vernonia amygdalina , Del. (Asteraceae)	Etiponnla	Herb	
	Beilschimiedia mannii, (Meisn.) Benth. & Hook. f (Lauraceae)	Ewuro	Forb or Shrub	
	Gongronema latifolium Benth. (Asclepiadaceae)	Isigun	Herb	
	Cissampelos owariensis, P. Beau (Menispermaceae)	Iteji	Shrub or Tree	
	Dichapetalum pallidum (Dichapetalaceae)	Jenjoko	Climber	
	Adansonia digitata, L. (Malvaceae)	Marigbo	Tree	
	Capsicum spp. (Solanaceae)	Rinrin	Herb	
	Aframomum sceptrum (Oliv. & Hanb.) K Schum. (Zingiberaceae)	Ata ijosi	Shrub	
	Zingiber officinale, Roscoe (Zingiberaceae)	Ata oguro	Herb	
	Zanthoxylum zanthoxyloides, (Lam.) Zepern. & Timler (Rutaceae)	Ata-ile (Ginger)	Tuber	
	Piper guineense Schumach. & Thonn. (Piperaceae)	Igi ata	Shrub	
	Parkia biglobossa, (Jacq.) R.Br. ex G.Don. (Mimosaceae)	Iyere	Liana	

Table 4 above shows some of the non-timber forest product in the forest reserve that are often exploited and used. It shows their utilization category, their botanical names, local names as well as the parts that is utilized. It is worthy of note that some of these products are endemic in these reserve, but are rapidly being eroded due to overexploitation, and most especially, unauthorized access to the protected area (Poaching). The unchecked exploitation of these resources in the reserve would mean total decimation in the nearest future.

Table 5: Average monthly income from exploitation of non-Timber forest product in the area.

Non-Timber Forest Products (NTFP)	Quantity Harvest	Average Monthly income from them (₦)
Canes	**6 tons**	**427,000.00**
Herbs	**N/A**	**184,472.00**
Fruits	**268 baskets**	**318,215.00**
Others	**N/A**	**147,205**
Total		

**N/A=Not Available*

Table 5 above shows the average monthly Level of income earned from the harvesting of NTFP from the Gele-Gele Forest reserve. From the table, about ₦427,000.00 was indicated as being the average monthly revenue from canes exploited from the reserve. In terms of herbs, even though data about the average monthly quantity harvest was not known, the respondents indicated that about ₦184,472.00 was earned monthly. In terms of proceeds from harvest of fruits, an average of 268 baskets is the monthly average, with about ₦312,215.00 as average monthly revenue, whereas about ₦147,205 was indicated as average monthly revenue from other non-timber forest products.

Table 6: Common forest stock being exploited in the forest reserve

Forest Stock	Economic value/ use
Economic trees(African walnut, Red Mahogany and Teak)	For Fuel wood, carpentry, bridge construction purposes, income
Porcupine	For Food and income purposes
Cave rat	For Food purpose
Giant squirrel	For Food purpose
African civet	For Income and raw material purpose
Gaboon viper	For Raw material purposes
Monkey	For Food and income purposes

Source: Researcher's Field Work, 2012

The table 6 shows the various types of forest stock being exploited and their use. The findings show that the economic trees were more than over-exploited. This is so because of the various multiple uses the trees possess (as fuel wood, income generation, construction) etc. The main occupation of the most of the communities which is carpentry and logging activities accounts for this major exploitation of the stock. Other stocks being depleted include animals which happen on a daily basis for food, income and raw material options they provide.

Table 7: Factors responsible for the possible depletion of forest stocks in the reserve

S/N	Factors	Frequency	Percentage (%)
1	Population Pressure	169	93.8
2	Illiteracy	78	43.3
3	Inadequate protection	94	52.2
4	Poverty	142	78.8
5	Lack of indigenous participation	165	91
	Total	**180**	

Source: Researcher's Field Work, 2012.

Table 7 shows analysis of the various factors or causes of depletion of forest stocks in the reserve. The result show that 93.8% of the respondents affirmed that increased population has been a major factor in the depletion of the forest stock in the reserve. More so, because the people depend mainly on primary activities of wood logging and farming, rapid growth in population would mean more dependence and pressure of the forest resources. Also, 91% strongly affirmed that lack of indigenous participation in the management and protection of the reserve is the major cause of the depletion. 78.8% indicated that poverty which is prevalent in the place leads to poaching activities in the reserve to make ends meet. Greed and wasteful consumption were associated with poverty. On the other hand, 52.2% noted that the reserve is inadequately protected from unauthorized access. Of course, since the local people do not see themselves as stakeholders, protecting the reserve from external influence would not be seen as a priority. Finally, illiteracy as a factor identified was perceived to account for 43.3% of the responsible factor for the depletion of forest stock.

SUMMARY AND CONCLUSION

Forest ecosystems play multiple roles at global as well as local levels. Forests are sources of economically valued products like industrial wood, fuel-wood, non-wood forest products such as fibre, food, medicines. In essence it is a source of income and employment. It also provides maintenance of biological diversity (habitats, species and genetic resources), and controls against climate change. Burgeoning population affects forest stock. People living around the forest reserve exploit the forest reserve for survival and livelihood. Traditionally, forests and woodlands were viewed as a source of timber, fuel wood and grazing sites, and forest policy was designed to protect these resources, with forestry departments in the region acting as resource guardians. The unique nature of forest ecosystems has long been acknowledged. However, the rapidly growing population has mounted a lot of pressure on the reserve which is not well protected thereby leading to rapid erosion/depletion of forest resources in the reserve.

This study has revealed an important factor in the failure certain project, and that is lack of involvement of the local stakeholders. When the local or indigenous people are alienated from projects that go on around them, they develop apathy in the project. Apart from the fact that

population around the Gele-Gele reserve is growing rapidly, the lack of indigenous participation in the protection of the reserve has led to poaching and rapid decimation of the resources in the reserve. When the people see themselves as stakeholders, they contribute their quota in the protection of the reserve. This finding corroborates with Mmom and Arokoyu (2009) assertion that community people are major stakeholders in conservation projects within their locale as such need to be integrated from the planning stage of the project. "When they feel alienated, they develop apathy towards the project and cannot support or protect such conservation efforts."
Thus where reserves are created around an agrarian community, conscious efforts are needed to integrate the people from the planning stage.

Finally, it is recommended that to forestall total destruction of the forest reserve, there is need for government to call for stakeholders' forum in the affected reserve area where all will be free to air out opinions on ways to enhance the protection of the forest reserve. Government should possibly reduce the size to a reasonably manageable size considering the growth in the local population. Also incentives is needed to motivate the locales and empower them into investing in other ventures rather than depending on the proceeds from forest resource exploitation in the reserve.

References

Aremu, Osayimwen, and Emelue,(2009) Developing indices for estimating floral and faunaBiodiversity components of the Gele-Gele Forest Reserve in Edo State, Nigeria.Environmental Sustainability and conservation in Nigeria. Akure. Jubilee-Niyo Publishers

FAO, (1997, 2001). '*Management and Utilization of the Mangroves in Asia and the Pacific'*. FAO. Rome, pp: 319.

Foods and Agriculture Organization, (1993, 1997),*'Population and Deforestation'*. Sustainable Development Department.

Gulati, S.C. and Suresh S. (1997), *'Population Pressure and Deforestation in India'*. Population Research Centre, Institute of Economic Growth, University Enclave, Delhi-7.

Kalu, C. and Isikhuemem, M.E. (2005),' *Adopted Forest Management Option and Factors Influencing Forest Allocation in Edo State'*. In: *Agricultural Rebirth for Improved Production in Nigeria*, Orheruata, A.M., S.O., Nwokoro, M.T. Ajayi, A.T. Adekunle and G.N. Asumugha (Eds.). University of Benin, Benin City, Edo State, Nigeria, pp: 226-268.

Kalu, P.C and Okojie, E.C (2009) Economic contribution of forests in Nigeria 1970-2000. Research journal of social sciences. INSLnet, Pakistan

Mason, D.T (1986) Timber and the Forest services. University press. Kan Lawrence.

Mmom P. C. and Arokoyu S.B. (2009), '*Mangrove Forest Depletion, Biodiversity Loss and Traditional Resources Management Practices in the Niger Delta, Nigeria'.* Research Journal of Applied Sciences, Engineering and Technology 2(1): 28-34, 2010 ISSN: 2040-7467.

Mmom, P.C. (2007), *'Impact of Human Density and Economic Activities on the Mangrove forest of the Niger Delta, Nigeria'*. Paper presented at the Annual Conference of the International Association for Impact Assessment, held in Seoul South Korea. 1-9th June, 2007.

Myers (1985) The primary source: Tropical forest and our future. W. W. Norton and Coy Ltd. London

National Population Commission (2006). The 2006 final National Population Census on Edo State. NPC

NEST (1991) Threatened Environment: A national profile. Nigerian Environment Study/Action Team. Ibadan. Pp.288

Nwoboshi, L.C (1987)Tropical Silviculture. Principles and Techniques , Ibadan press Ltd

Oriola, E.O (2008) Forestry for sustainable development in Nigeria, International Journal of African studies. Vol.1.no 11 Euro-journal publishing.

Population Reference Bureau, (1999), '*Population Change, Resources, and the Environment'*, Population Bulletin, Vol.53, No.1, March 1998.

United Nations for Food and Agriculture Organization, (2005). '*Forest Resource Assessment'*. Rome, Italy.

World Resources: 1994, '*A Guide to the Global Environment'*, A Report by The World Resources Institute (WRI) in Collaboration with The United Nations Environment Programme and The United Nations Development Programme, Oxford University Press.

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Competing interest

The authors declare no competing interest.