

# An Appraisal of the Challenges of Coastal Erosion in Ayetoro Community, Ondo State, Nigeria

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## Abstract

*Coastal erosion has become a challenging phenomenon to coastal settlements all over the world. The consequences of this reality have been overwhelming to the affected communities and related authorities. The above scenario has been discerned in Ayetoro community, one of the earliest and most prominent coastal settlements in Ondo State, Nigeria. This paper appraises the problem of coastal erosion and its various implications in the above-mentioned community. Survey research was used to gather relevant data and information from 640 household heads, with the use of structured questionnaires. Results revealed that coastal processes have been leading to retreating fishing grounds, deforestation and shift of physical development frontiers in the community. It revealed further that economic fortunes of the households are declining due to reduction in fish yields. Sustainable strategies that are community-oriented to prevent further loss were suggested by the study.*

## Keywords:

Coastal erosion; Coastline Retreat; Global Warming; Management Unit; Environmental Area.

## 1.0 INTRODUCTION AND STATEMENT OF THE PROBLEM

Since the past four decades, mankind has been confronted with multifarious environmental problems, at varying scales. Communities, regions and nations are at the receiving ends of these confrontations. Coastal erosion is one out of the many environmental challenges facing the world, and it is orchestrated by a combination of national phenomena and human activities.

Naturally-induced dimensions of the problems include global warming, climate change, rise in sea level and coastal erosion. The above are interrelated. The human-induced aspects of the matter are in the areas of soil, air, water and atmospheric pollution resulting from human activities. The problem is aggravated whenever the two scenarios above are co-mingled. This is perhaps related to why (1)Nelson (2011) observed that human habitation of low-lying coastlines might be in serious threat as a result of continuous sea level rise. The situation described above is being observed in Ayetoro community in Ondo State, Nigeria (the study area). Many

studies have linked coastal erosion with social and economic activities. For instance, a source (2)(<http://www.unep.org/Abidjanconvention/docs/>) established a significant link between oil and gas exploration and environmental degradation.

Scholarly literatures on coastal erosion are many, but most of them have not focused on the coastal region of Nigeria, especially this study area. The nature of coastal processes is both erosion and deposition. This study is a community-oriented one, as local inhabitants were used to collect the necessary data and information. The recommendations were also a direct reflection of the residents' expression and perception of the prevailing circumstances.

Furtherance to the foregoing is that there is only a scanty research work at a local community scale that focused on the interrelationships between coastal erosion and the peoples' socio-economic activities in this part of the world. This study therefore tries to appraise these interrelationships. The data, information and outcome of it are expected to add to the available body of knowledge and bridge existing research gaps on the subject matter.

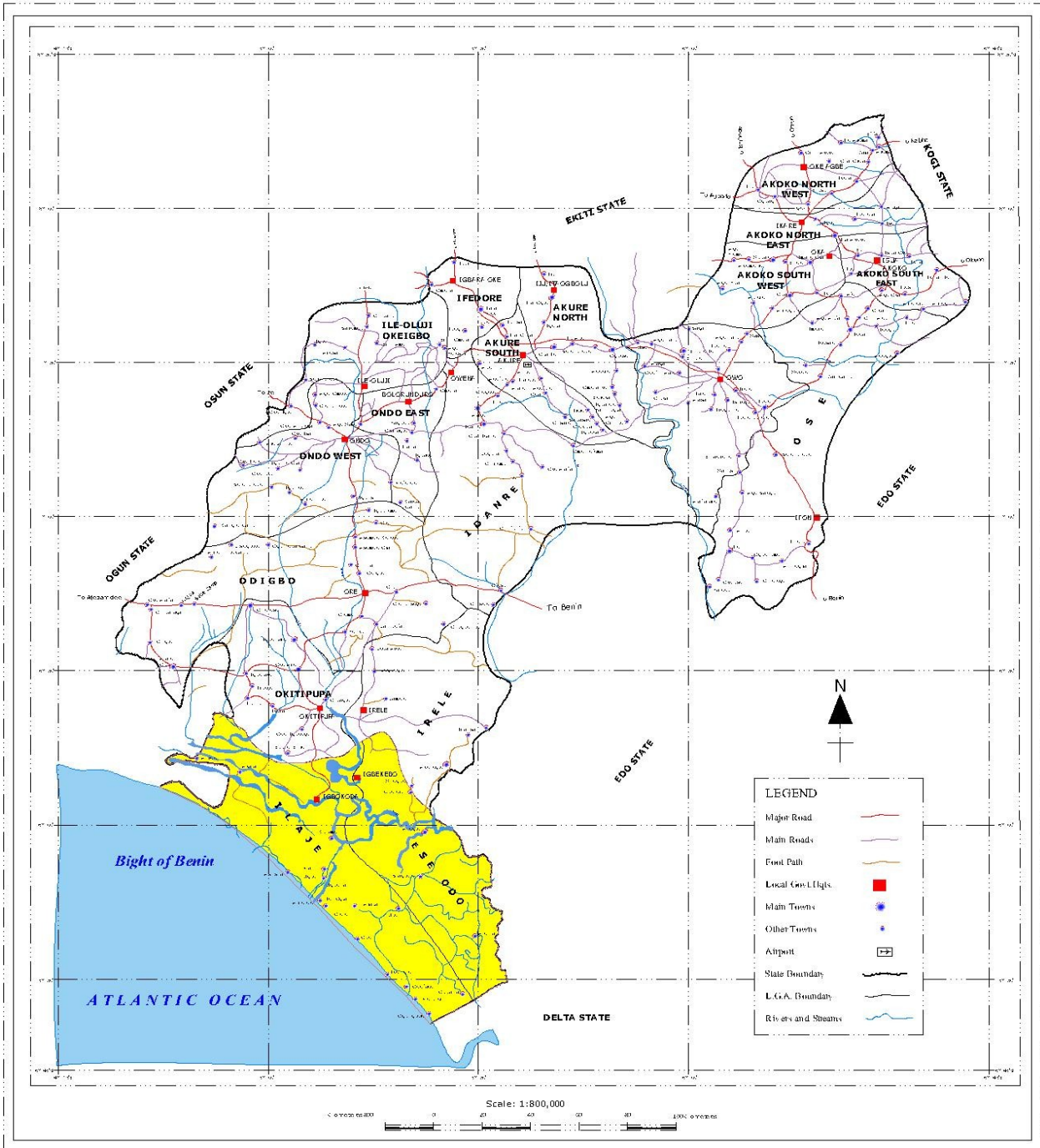
Coastal areas, which are generally regarded as the land and sea areas bordering the shoreline, have always been acknowledged to be a fragile natural areas of the earth's surface. (3)Karsten (2008) in Wikipedia (2008) define this area as "the interface between land and sea, delineated as the part of the land affected by its proximity to the sea and the part of the sea affected by its proximity to the land". Coastal regions, or coastal areas are areas of rich ecosystem where the bulk of the world's valuable mineral, vegetal, animal, fresh water and marine resources are homed.

No wonder, major cities and towns of the world are seated in such zones, and therefore home to a huge accumulation of population and stupendous concentration of socio-economic activities.

Specifically, the problem of coastal erosion and its socio-economic implications on the people in Ayetoro community is yet to be appraised in recent times. This is a major research gap that this study intend to bridge. This is relevant because data and information are germane to finding a sustainable solution to the problems of this community in order to prevent it from being gradually exterminated from the map of Nigeria. Additional challenges in this area are those presented by salinity and pollution that are orchestrated by movement of coastal waters and coastal pollution induced by human exploitation of natural resources. These have lead to decline in agriculturally productive lands and the erstwhile productive lagoons. For instance,(4)OSOPADEC (2010) reported that over 96% of the 263 lagoons in coastal region of Ondo State has virtually disappeared.

## 2.0 THE STUDY AREA

The study area (Ayetoro) is one of the prominent, water-route nodal communities in the Coastal region of Ondo State, Nigeria. The region lies approximately  $4^{\circ}28^{\text{E}}$  to longitude  $50^{\text{E}}$  and latitudes  $5^{\circ}45^{\text{N}}$  to  $6^{\circ}25^{\text{N}}$ . The town is an island located in the Southernmost part of the Ondo State portion of the Atlantic seaboard in southern Nigeria. The people are an extraction of the Ilaje sub-ethnic group of the Yorubas in South West Nigeria. Interestingly, Ayetoro is the only community in Nigeria known to have practiced socialism as a system of political economy up to the 1960s. The above description is partly depicted in map 1



### 3.0 METHODOLOGY FOR THE STUDY

Both primary and secondary data were collected for the study. Systematic random sampling and simple percentage ratio were used to determine the sampling size for the study. Meanwhile a pilot study was embarked upon to ascertain the current number of residential buildings in Ayetoro town.

Results of the pilot survey revealed 3,214 residential buildings are in the town. This formed the sampling frame, out of which 0.2%, amounting to 643 respondents was selected as sampling size. One household head was selected from each residential building, and systematic random sampling method was used to administer the questionnaires. Three of the questionnaires

could not be recovered. Therefore, 640 respondents was the eventual sampling size.

The study further assessed the activities of sea erosion around the shoreline. Up to 100 metre distance from the shore towards the hinterland was assessed, and Chi-square statistics was used to ascertain the effects of wave action/coastal erosion on physical development in the community. In this regard, 100 houses were also observed.

#### 4.0 LITERATURE REVIEW

The importance of coastal areas to the continuous survival of mankind cannot be over-emphasized. This is especially so when one considers its various characteristics such as its beautiful landscapes and rich ecosystems which attracts human socio-economic activities such as tourism and industries. Coastal areas are home to many of the world's most valuable mineral resources, fertile agricultural lands and source of water supply.

the above descriptions are applicable to the study area, being a part of the oil producing areas of Nigeria and a rich ground for variety of freshwater And marine foods.

A source from the Internet (5)(<http://www.unep.org/abidjanconvention/docs/>) described the Nigerian coastal wet land as isolated patches of mud ridge along the Atlantic coast. Coastal environment issues are at the core of contemporary urban and regional planning concerns.

(6)Robert (2005) observed that spatial planning is germane to the overall development of coastal regions. The source further observed that spatial planning enhances sustainable development as well as integration of social, cultural and economic ties within and among regions. The author opined that integrated coastal zone management is a potent tool towards the achievement of sustainable coastal development and higher standard of living for people in such areas.

**Table 1: The distribution of Mangrove ecosystem in Nigeria**

Costal State	Area of mangrove (sqkm <sup>2</sup> )
Edo	3,470.32
Cross Rivers & Akwa Ibom	721.86
Lagos	42.20
Osun	12.18
Ondo	40.62
Rivers	5,435.96

Source: (7)(FAO) Report on Land use Area of Nigeria 1981

The Nigerian coastal zone spread across nine states, out of 36 states of the Federation, namely, Akwa-Ibom, Bayelsa, Cross River, Delta, Edo, Lagos, Ogun and Rivers. The Coastline Stretches for about 853km including inshore waters, Coastal Lagoons and Mangrove.

(8)Karsten (2008) comprehensively describe coast erosion as erosion in the coastal

profile as it involve scouring in the foot of the cliffs or in the fort of the dunes, he maintained that coast erosion takes place mainly. During strong winds, high waves and high tides and storms surge conditions. Coast erosion is usually result in coastline retreat and measure in miles per year.

In Nigeria, the coastline has been subjected to erosion over the years, report of

Nigeria Institute for Oceanography and Marine Research (NIOMR) have reported widespread erosion and flooding of the Barrier Islands and the Niger Delta (9)(Ibe 1987, (10)Awosika et al 1993)

**5.0 DISCUSSION OF RESULTS**

The analysis of the 640 household heads that responded to the question on occupation shows that majority (50.6%) of them are engaged in fishing, this is followed by trading (30.6%). This result is not surprising since the major resource of the community is the water; therefore the livelihood of the community and by extension

the economy of the people in the study area is tied to the water resources and its sustainability. Further disaggregating of those involved in trading shows that majority of them are engaged in trading in Marine related products.

The 324 respondents engaged in fishing were further asked on the effects of coastal erosion on field yield and the result revealed that 98% of them affirm that they have been experiencing dwindling fish catches due to loss of fishing grounds caused by coastal erosion.

**Table 2: Occupational characteristics of the respondents**

S/N	OCCUPATION TYPES	NUMBER	PERCENTAGE
1	Artisans	80	12.5
2	Civil Service	20	3.1
3	Trading	196	30.6
4	Fishing	324	50.6
5	Transporter	20	3.1
	TOTAL	640	100

Source: Field survey, 2012

The result of the data obtained on the building construction materials in Ayetoro also reveals that 88.125 % of the buildings were constructed with wooden planks and only 11.875% were constructed with blocks. Apart from the buildings the interlinking roads in the streets of Ayetoro, also are constructed 90%

with wooden planks. This phenomenal the respondents said are due largely to government neglect, poor income and high cost of building blocks and cement. This phenomenal also contribute to the high deforestation of the Ayetoro hinterlands and man grooves.

**Table 3: Building Construction material types in Ayetoro Community**

S/N	MATERIAL TYPE	NUMBER	PERCENTAGE %
1	Concrete Blocks	---	0
2	Hollow Blocks	76	11.875
3	Wooden Planks	564	88.125
	TOTAL	640	100.00

Source: Field Survey, 2012

Figure 1 shows this situation clearly (Wooden planks are the predominant construction materials in Ayetoro).



The Hypothesis posed by the research team that 80% of the houses built within 100ms of the Ayetoro shoreline are not affected by coastal erosion was tested using Chi Squared statistics.

**Ho:** 80% of the houses built within 100metre to Ayetoro Shoreline are not affected by coastal erosion.

**HI:** 80% of the houses built within 100metre to Ayetoro Shoreline are affected by coastal erosion.

The research team observed that out the 100 houses sampled along the coastline, 38 of

them have been vacated due to coastal erosion impact.

When the null hypothesis was tested, the  $X^2$  calculated is greater than the  $x^2$  critical value of 3.84 and 6.62 at 0.05 and 0.01 limits. Therefore one can see clearly that 80% of the houses within 100ms to Ayetoro shoreline have been retreated by the action of coastal erosion occasioned by tidal waves and ocean surge. This validates the alternative hypothesis and reject the null hypothesis.

Cases	0	-E	0-E	(0-E) <sup>2</sup>	(0-E) <sup>2</sup> /E
Houses affected by coastal erosion	62	20	42	1764	22.20
Houses not affected by coastal erosion	38	80	-42	1764	22.05
					X <sup>2</sup> 110.25

Although, it was not possible for this study to determine numerically the volume of fish harvest by individual household heads, majority (68%) of them revealed that sea product, especially fish yields have drastically dwindled.

The above was attributed to higher and stronger tide, incursion of saline waters, and sedimentation of fishing grounds along the continental shelf.

Further results on the effect of coastal erosion on forest resources was obtained

through the interview conducted to the respondents revealed that the vegetation around Ayetoro community is the heterogeneous mangrove, evergreen forest. Forest woods in the community are used for local building materials, cooking fuel and the use of wild leaves for wrapping food items. Majority (60.4%) of the 640 respondents observed that several species of the flora has disappeared due to coastal erosion processes on one hand and exploitation by humans on the other.

**Fig 2: Retreated houses due to action of coastal erosion in Ayetoro.**



## 6.0 CONCLUSION AND RECOMMENDATIONS

The study has appraised coastal erosion processes and its impact on the people of Ayetoro community. It is observed that coastal erosion is affecting community livelihoods and threatening a sustainable development of the study area. In line with the above, the study found out that coastal erosion has led to shifting fishing grounds hence relatively lower yield of fish and other marine

products, salty water incursion, land submergence, and deforestation.

### RECOMMENDATIONS

The foregoing envisaged that integrated efforts on the part of community, local government, state and federal government must be harmonized to combat the menace. Strong embankments must be built to break ocean water surges, declaration of Ayetoro as an environmental area which will pave way for urban renewal programmes and

education of the community about the matter as well as about conservation of resources.

Establishment of Ayetoro Community Management unit is essential so that the issues involved can be effectively controlled. The Management Unit must be managed by a semi-autonomous agency comprising the local community, environmental experts and appropriate government representatives. The people must be orientated about how to organize and own community-bases-organizations (CBOs) towards saving the community from further threat of coastal erosion.

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## URL

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