

# **SUSTAINABLE MANAGEMENT OF NATURAL RESOURCES FOR SOCIO-ECONOMIC DEVELOPMENT OF IMO STATE OF NIGERIA**

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## **Abstract**

This paper studies sustainable management of natural resources for socio economic development in Imo state. This it does with the aim to determine the extent to which the exploration and exploitation of natural resources has affected the ecological and environmental conditions of the area. The research also tends to determine various natural resources and their locations in Imo State while 200 copies of questionnaire were distributed in three local government areas of the state used for the pilot survey, 96.33 percent or 289 copies of questionnaire were retrieved and used for the study. Both primary and secondary data were used for the study. Questionnaires were administered through sampling. Data collected were presented using frequency tables and percentages. The research identified various resources, their locations in Imo State, various environmental/ecological problems associated with natural resources exploitation in the state and various socio-economic effects which the location of natural resources has on host communities. Finally, the research concluded by giving recommendations which include harnessing the resources in a manner that is sustainable and which will not destroy the environment.

**Keywords:** Natural Resources, Sustainability, Sustainable Development, Imo State

## **Introduction**

Natural resources in an area cannot play optimal role for socioeconomic development if they are not managed in a sustainable manner (Okpara, 2001). Natural resources are naturally occurring products and features which support life and human need on earth. They therefore occur freely in the wild and constitute vital elements in human development process of any state. Okpara joined Abramovitz (1997: 95), to assert that one of the nature's obvious service to humanity is the development and production of commodities vital to human wellbeing. Hence the natural resources of a nation, be it renewable or non renewable, enhance the wellbeing of an individual in particular, leading to the development of the nation in general if properly harnessed and managed. Nature synthesizes and produces food, fibre, fuel, building materials, medicines, solid and liquid

materials, water, solar energy and other objects of aesthetic value. These resources when harnessed by man and processed into other forms serve the purpose of development of the area in particular and the nation in general, where they are located. Many natural resources play an invaluable role in both local and international trade as well as in industry and in maintenance of food security. The utilization of industrial processes typified by forward and backward linkages creates goods and employment, while their entry into international trade has salutary implications on balance of payment (Okpara, 2001). The major renewable and non renewable resources currently being exploited for socioeconomic development in Imo State include: solid mineral (coal, iron ore, limestone, bitumen, crushed rock); liquid minerals (crude oil and its associated natural gas). These two groups fall into non renewable resources. Renewable resources exploited in the state include agricultural products, water resources, wildlife resources and other forest resources including non timber forest products (NTFPs), fishery products and other sea foods. In Imo State, both renewable and non renewable resources exploited help in socioeconomic development of the area. Other renewable resources like solar energy and wind power have not been properly harnessed for socio economic development of the state.

### **Statement of the Problem**

The exploitation of natural resources, both renewable and non renewable, is associated with various forms and degrees of environmental and ecological degradation. The seriousness and degree of spread of the associated problems depend on the environment that is affected. For instance, oil spill on aquatic environment spreads more rapidly and affects more life and aquatic environment than when it occurs on land. The degree and extent of the problems are also associated with the manner in which these resources are exploited. Resources exploitation methods in Imo state are done in an unsustainable and environmentally unfriendly manner that the environment including life on it is imperiled. For instance, an oil spill which occurs near the coast will always have more devastating effect on the organisms than the one which occurs on Open Ocean. A good example is Oguta Lake and other water bodies found in oil producing areas of Oguta Local Government area of Imo state. However, it has not been established whether marine creatures in upland water bodies in an oil exploration and exploitation communities in Oguta local government area have any significant variation in their food web.

Apart from oil exploration and exploitation, other natural resources exploitation cause other serious environmental/ecological problems like deforestation, watershed de-vegetation, soil erosion, exposing of top soil, landslide, water pollution, loss of biodiversity and siltation (Agoruo, 2007). All these ecological and environmental problems were observed in quarrying sites in different localities in Okigwe local government area and places where similar activities are going on. Top layers of the soil are excavated exposing the rich fertile A<sub>0</sub> horizon to negative impact of soil erosion, and also the leaching of soil nutrient by water where they cannot be reached and used by plant roots.

Also, some agricultural and forestry practices in Imo State are still done in traditional manner that affects the overall condition of the soil. For instance, slash and burn method of agricultural practice increases the quantity of carbon in the atmosphere as well as affects, and in some situation, kills the soil micro organism that converts plant and animal matters into fertile humus and in so doing reduces the soil fertility.

Generally, oil spillage in an aquatic environment severally damages fish habitats. Fish eggs and larvae suffer a high rate of mortality due to oil slicks. Bottom dwelling organisms such as jelly fish are vulnerable to smothering by heavy oil. Also spillage on land damages agricultural lands and affect terrestrial life. Quarrying activities expose soil to possible attack by erosion as a result of deforestation and de-vegetation of the area. This singular activity (quarrying) also destabilizes the isostatic state in which different rock layers are laid under the soil. Finally, what needs to be determined however, is whether and if at all the extent to which natural resources exploitation in Imo State has affected the environmental and ecological condition of the areas where these activities are taking place.

### **Aims and Objectives**

The major aims of this research were to determine the extent to which the exploration and exploitation of natural resources have affected the ecological and environmental conditions of the area as well as determine the extent to which peoples lives are affected by the presence of the resources.

The aims will be achieved using the following objectives;

- i. Determination of different natural resources and its locations in Imo State.
- ii. Assessing the impact of the natural resources on the environment and on the economic life of the people.
- iii. Identifying the major environmental problems caused by natural resources exploitations.

### **Research Questions**

The following research questions are considered relevant in the present study.

- i. What natural resources are found in the study area?
- ii. What economic benefits do the people derive from the existence of these resources in their area?
- iii. How are these resources exploited and extracted and by who?
- iv. What are the environmental problems associated with the natural resources exploitation?
- v. What are the relationships existing between these natural resources and socio economic development?
- vi. What are the relationships between natural resources exploitations and environmental problems?

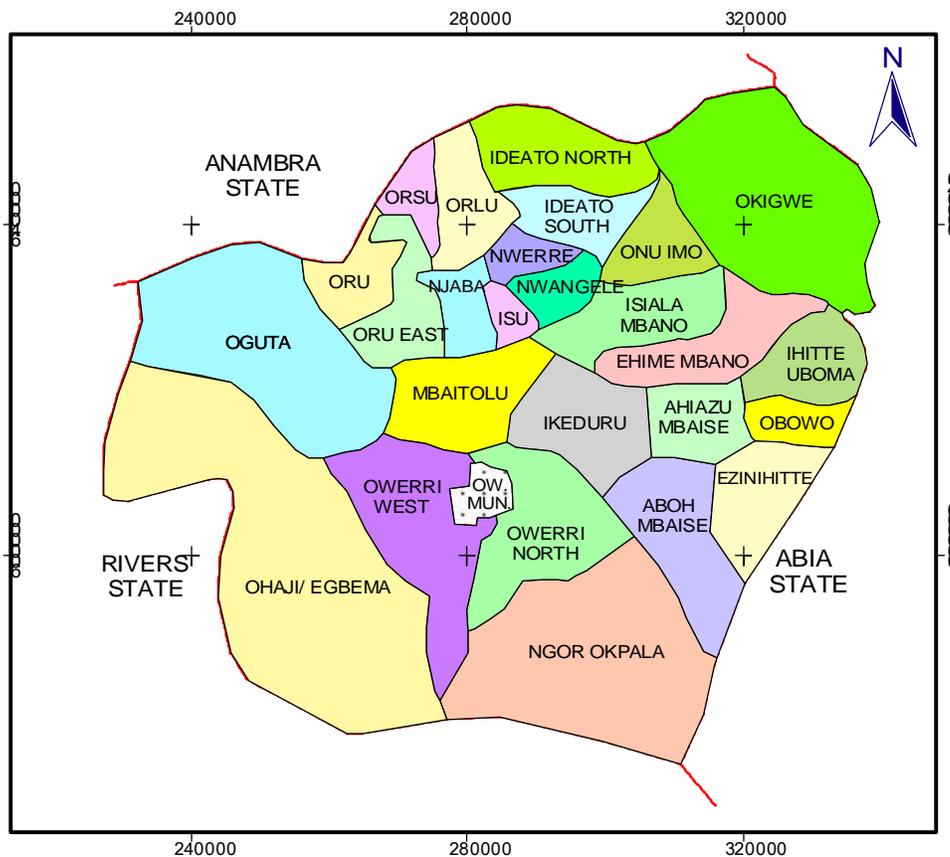
### **Methodology**

The methodology involves the review and presentation of socio-economic and environmental/ecological effects of natural resources exploitation in the study area, based on secondary and primary data. Therefore both primary and secondary data obtained from the field and library through questionnaire, oral interview, basic statistics, textbooks, journals, magazines, published and unpublished materials related to the study were employed. Data for this study were collected through sampling. Generated data were presented using frequency tables, percentages and charts.

### The Study Area

The area for this research is Imo State using three local government areas of Oguta, Okigwe and Ikeduru for the pilot survey representing the three zones of the state. Imo State according to the Federal Office of Statistics (FOS) occupies a land area of 5,530km. The state is one of the five states of the South Eastern Nigeria. It lies between latitudes 5°10'N - 6°00'N and longitudes 6°40'E-7°23'E of the Greenwich meridian. It is bounded on the west and south by Rivers State, on the east by Abia State and on the north by Anambra State (Fig. 1). It lies on a relatively higher terrain averaging 130-200 meters above the sea level. The 2006 National Population Census of the study area is shown in

## MAP OF IMO STATE SHOWING HER LOCAL GOVERNMENT AREAS



### LEGEND

Study Area 

State Boundary 

LGA Boundary 

Date of Production: 15th March, 2010

**Table 1: 2006 National Population Census of the Study Area**

Area	Population		Total
	Male	Female	
Imo	1,976,471	1,951,092	3,29,563
Okigwe	67,660	54,041	132,701
Oguta	72,549	69,791	142,340
Ikeduru	75,025	74,712	149,737

Source: NPC, 2006

However, it was projected that the population of the area grows at about 2.8 percent annually. The area is located within the tropical monsoon (AM) based on Koppen's classification of climate. Mean annual rainfall ranges from 2250mm to 2500mm in areas lying between 5°40'N, and decreases to mean annual value of 2000-2250mm between 5°49'N and 5°55'N, and further inland 5°55'N to 6°03'N, Mean annual value decreased to 1750-2000mm (Igbozurike, 1980). Humidity is high in the state being about 80-85 percent (Duru, 2007). The mean monthly temperature of the area ranges from 28°C to 35°C, while annual minimum air temperature ranges between 19°C to 24°C. The state is drained by a major river called Imo River which the state is named after and other tributaries.

### Literature Review

The literature for this study is considered under the following two headings

- i. Resources, and
- ii. Sustainable Development/Management

### Resources

A resource is any physical or virtual entity of limited availability that needs to be consumed to obtain benefit from it. The dictionary of Geography (Monkhouse, 1976), defines resource as anything that provides support for a state. Dictionary of Contemporary English (1950), sees resources as possessions of a country in form of wealth and goods that help one get what one wants. They are human appraisal and they may vary from place to place and from time to time. It could be any form of human and natural appraisal which varies over time and space. Resources also refer to the sum total of wealth or sources of wealth of a person or country (Danjuma, 2007). A critical look at the above definitions of resources shows that it has three main characteristics; utility, quantity (often in terms of availability) and consumption. The quantity of a resource refers to the total amount of a given raw material, rather than reserve which is an economic term.

Resources can be grouped into many types using different criteria. They can be natural (God given) and manmade (human); tangible and intangible among others. Natural resources can further be sub-divided into different types - renewable and non renewable resources. Natural resources occur in nature within the environment that exists relatively undisturbed by mankind in a natural form. A natural resource is often characterized by the amount of biodiversity existent in various eco-systems. They are derived from the environment. Many of them are essential for our survival while others are used for satisfying our want (Groom et al, 2006). Natural resources may be classified in different forms:

- i. On the basis of origin, resources may be divided into biotic and abiotic resources.
- ii. On the basis of stage of development, natural resources may be called; potential resource, stock, reserve and actual resources
- iii. On the basis of renewability, natural resources can be categorized into renewable and non renewable resources.

Natural resources can be regrouped again following how they are being used. They include; resources which are available for immediate use, after reactivation; resources available after conversion; resources available after development and hypothetical resources. Okpara (2001) highlighted that the major natural resources currently being exploited in Nigeria for supposedly meeting the demand for socioeconomic development include:

- i. Solid minerals such as iron ore, coal, limestone, bitumen, crushed rocks etc
- ii. Liquid minerals such as crude oil and its associated natural gas.
- iii. Agricultural products.
- iv. Forest products and non timber forest product (NTFPs)
- v. water resources
- vi. Fishery products and other sea food
- vii. Wildlife resources etc.

### **Sustainable Development Management**

The concept of sustainability and sustainable development has attracted meanings to different scholars, institutions, organizations etc depending on their specific orientation, focus and dispositions. Oladipo and Mabogunje (2001) definition range from fairly narrow and precise one to broad and nebulous concept. World Commission on Environment and Development (WCED) defines sustainable development as the development that meets the need of the present without compromising the ability of the future generation to meet their own need. Brundtlandt Commission (1987) recommends that there should be a breakaway from past pattern of development and seek security through change, reduce risk to survive and put future development on the paths that are sustainable. Burnett (1992) seems to see sustainable development to mean a process of change in which resource exploitation, direction of investment, orientation of technological development, and institutional change are basically in harmony so as to meet the current and future human needs and aspirations, while at the same time gradually arresting and eliminating activities which are progressively leading to unacceptable degradation. Six broad concepts of sustainability have been identified by Perman et al (1999). They are

1. Sustainable development as capacity and consensus building
2. A sustainable state is one in which consumption is non declining through time.
3. A sustainable state is one which satisfies minimum conditions of ecosystem stability and resilience through time
4. A sustainable state is one in which the natural capital stock is non declining through time
5. A sustainable state is one in which resources are managed so as to maintain a stable yield of resource service.
6. A sustainable state is one in which resources are managed so as to maintain production and opportunities for the future.

The United Nations Division for sustainable development lists the following areas as coming within the scope of sustainable development; agriculture, education, international law, energy, atmosphere, sustainable tourism, biodiversity, biotechnology, finance, technology, capacity building, forest, toxic chemical, climate change, fresh water, institutional arrangement, human settlement, land, transport, industry, water sanitation.

From the foregoing, there is need for sustainable management of natural resources. The reasons for sustainable management of natural resources are not farfetched. The resources of the earth are limited in supply and most of them especially the non renewable ones have fixed quantity deposited. Human population is dynamic increasing at a very rapid rate. Sustainable management enables for controlled utilization of the fixed quantities of resources to meet the need of the present generation while allowing the generations yet unborn the access to the same resources. In the spirit of sustainable management, many international organizations such as OPEC have imposed a production ceiling on its member states in order to avoid flooding their product in the world market thereby decreasing wastage of the product which should be used by future generations.

### Discussion and Findings

Primary data was used for this research through questionnaire in three local government areas. The questionnaire administration is presented in Table 2

**TABLE 2: Questionnaire Administration**

Location	Number Administered	Number Retrieved	Percentage Retrieved
Oguta	100	96	32.00
Okigwe	100	98	32.66
Ikeduru	100	95	31.67
<b>Total</b>	<b>300</b>	<b>289</b>	<b>96.33</b>

**Source:** Authors' Fieldwork, 2010

A total of 300 copies of questionnaire were distributed among the three local government areas at the rate of 100 copies for each local government area and a total of 289 copies representing 96.33 percent were retrieved from the respondents. About 11 copies or 3.67 percent of the questionnaire were not retrieved from the respondents.

### Examination of Natural Resources in Imo State

Data obtained from the questionnaire reveal that different types of natural resources are located in different localities in Imo State. The resources range from renewable to non renewable ones as well as different fossil fuel minerals including resources from water bodies. Table 3 shows some different types of natural resources seen in Imo State and their locations.

**Table 3: Natural Resources in Imo State**

Location	Resources						Total
	Petroleum	Natural gas	Timber	Water Res.	Quarry stone	Fruit Tress	
Oguta	25	18	28	15	-	10	96
Okigwe	-	-	10	20	48	20	98
Ikeduru	-	-	47	-	-	48	95
<b>Total</b>	<b>25</b>	<b>18</b>	<b>85</b>	<b>35</b>	<b>48</b>	<b>98</b>	<b>287</b>

**Source:** Authors' Fieldwork, 2010

Data in Table 3 reveal different types of natural resources found in Imo state. Petroleum and natural gas take 43 respondents or 14.98 percent of the total resources. These resources are located in Oguta Local Government Area of the state together with its neighboring Local Government area, Ohaji/Egbema. The presence of these resources is responsible for the attraction of oil prospecting firms in the area, example ADAX Oil Company which employs some indigenes of the area as well as generating some environmental problems associated with oil and gas as observed in the area. Quarrying and sand mining take 48 respondents or some 16.73 percent of the sample population. This activity takes place in different localities but it is prominent in areas around Okigwe local government Area. While stone quarrying takes place around Ihube, Ope, Ogii communities etc, and mining is seen around Umulolo and also in areas around Imo River.

#### **Environmental Problems of Natural Resources Exploitation**

Natural resources exploitation has significant social and environmental impacts. This occurs through accident and routine activities such as seismic exploration, drilling and generation of pollution, landslide and various forms of social unrest/conflict on oil producing areas. The response of respondents on various environmental problems of natural resources exploitation is summarized in Table 4

**Table 4: Environmental hazards of Natural Resource Exploitation**

Environmental Problems	Respondents	Percentage Response
Soil Erosion	91	31.5
Water Pollution	52	17.99
Air pollution	30	10.38
Landslide	17	5.88
Destruction of Farmland	42	14.53
Loss of Biodiversity	35	12.11
Deforestation	21	7.26
<b>Total</b>	<b>289</b>	<b>100</b>

**Source:** Authors' Fieldwork, 2010

Soil erosion is the greatest environmental problem associated with natural resources exploitation in the study area as indicated by 91 respondents or 31.5 percent of the sampled population. This is because soil surface is cleared of vegetation cover, thereby exposing the soil to direct impact of rain drops. Hence the soil becomes vulnerable to erosion. The areas mostly affected are places where quarrying activities are taking place exemplified in quarrying sites in Okigwe Local Government Area. Sometimes landslides as indicated by 17 respondents or 5.88 percent occur within the extraction sites. This is common in sand mine areas. People are buried alive as a result of collapsed mine fields. Recent incidences were observed in New Zealand where about 16 lives were lost in a collapsed mine field and in Chile where about 33 people were trapped for months before they were rescued (Chibo, 2012). Pollution of nearby streams and ground water is another problem associated with natural resources exploitation in the study area. This problem is indicated by 52 respondents or 17.99 percent of the sample population. This occurs in the form of oil spills. When this takes place, drinking water is often contaminated. If drinking water is contaminated, even if no immediate health effects are apparent, the hydrocarbons and chemicals present in crude oil are highly carcinogenic. This is precipitated by the carelessness of the oil companies. This in many cases has resulted in conflict between the oil companies and the indigenes of the area. For instance, a statement from an aggrieved community member in an oil producing area of Niger Delta is presented thus: "we witness the slow poisoning of water of this country and the destruction of vegetation and agricultural land by oil which occur during petroleum operation. But since the inception of oil industry in Nigeria more than 25 years ago, there has been no concern and effective effort on the part of the government, let alone the oil operators to control environmental problems associated with the industry" (Okpara, 2004).

### Impact of Resource Exploitation on Economic Life of the People

Though natural resources exploitation has many adverse impacts on the natural environment, but there are some positive impacts the activity has on socioeconomic life of the people where they are found. Data on Table 5 shows the effect of natural resource exploration on the economic life of the people.

**Table 5: Socio - Economic Effects of Natural Resource Exploitation**

Socioeconomic Effect	Number of Respondents	Percentage
Source of employment	47	16.26
Source of revenue	50	17.30
Source of food	22	7.61
Attracts industries	31	10.73
Provision of infrastructures	52	18.00
Provision of raw materials	38	13.15
Development of an area	49	16.96
<b>Total</b>	<b>289</b>	<b>100</b>

**Sources:** Authors' fieldwork

Analysis of the data in Table 5 shows different socioeconomic effect of natural resource location in an area. The table shows that provision of infrastructures and other amenities by companies and industries is the greatest gain indicated by the people as a result of location of natural resources in their area. This is represented by 52 respondents or about 18 percent of the sample population. These infrastructures include roads, water, electricity, markets, schools etc. They provide these as a social and corporate responsibility to the host communities.

Natural resources exploitation also brings about industrialization of an area as indicated by 10.73 percent of the respondents. This is because some organizations prefer to locate their industries near to the source of raw materials in order to reduce cost involved in transportation of these raw materials. Through the establishment of these industries, employment opportunities are generated. Indigenes of the host communities are employed by these industries located in their area. This is seen in Table 5 where source of employment is indicated by about 47 respondents or 16.26 percent of the sample population. Natural resources like agricultural and water resources provide a source of food to the people as indicated by 22 respondents or 7.61 percent of the sample population. Areas where water bodies are located provide sea food to the people. This provides employment to local fishermen and canoe makers. Through these, revenue is generated as indicated by 50 respondents or 17.3 percent of the population. Other economic effects of natural resource exploitation include provision of raw materials for industries as pointed out by 13.15 percent of the respondents. Economic development of an area has been observed as one important effect of natural resources exploitation. This was indicated by 49 respondents or 16.96 percent of the sample population.

## **Conclusion**

The development of an area correlates with the type of the available resources and also how these resources are effectively harnessed and utilized for socioeconomic development. Imo State is blessed with abundant resources as indentified in Table 3 of this study. Some of these resources have been properly harnessed and utilized thereby contributing their own quota in the socioeconomic development of the state. Examples include crushed stones, and mines, petroleum and natural gas, agriculture and forestry products and water resources have been harnessed to some reasonable extent. Others such as wind power, solar energy etc are still lying untapped. The presence of these resources especially oil and natural gas has made the state a member of Niger Delta Development Commission and this is responsible for extra amount of money the state receives from the federation account for development. However it is unfortunate that the exploitation of these resources bring a lot of negative social and environmental problems that some scholars have argued that the availability of these natural resources especially crude oil is a curse to the nation. This is as a result of numerous environmental and social problems like soil erosion, air pollution, water pollution, destruction of agricultural land and sometimes wildfire due to oil spill. Despite these observed problems, the availability of any resource in an area will enhance socio-economic development of that area if the resource is exploited in a manner that is both environmentally and economically sustainable.

### Recommendation

Finally, the research recommends the following

- The unexploited and abandoned resources should be harnessed as this will improve the income generation capacity of the state.
- The resources should be harnessed in a manner that will not imperil the environment. This is because resource exploitation leads to environmental degradation.
- Gas flaring which represents flaring of wealth should be stopped and the gasses captured and utilized effectively for socio- economic development.
- Capitals realized from these resources should be effectively channeled for socio-economic development of the host communities, as this will reduce social conflicts between the host communities and prospecting companies.

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