

# ENVIRONMENTAL ISSUES AND SUSTAINABLE DEVELOPMENT OF BITUMEN EXPLOITATION IN ONDO STATE

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## Abstract

Bitumen was discovered in Nigeria over hundred years ago preceding the discovery of oil by over fifty years but remained unexploited despite the vast deposit in South Western Nigeria. The focus on bitumen reflects the present administrative policy emphasis on the maximization of the country's huge hydrocarbon. However, exploitation of bitumen impacts on the environment either positively or negatively, depending on the nature of exploitation and precaution taken. The positive impact results in provision of products useful to humanity, thereby leading to a better and improved quality of lives and the environment at large, while the negative changes included wide spread environmental problems in form of land degradation, air and water pollution etc. This, in turn, adversely affects the quality of human lives and threatens sustainability of the environment. The paper argues that for the goal of sustainable development to be a reality and to minimize environmental problems, there is a need for bitumen exploitation initiatives to be carried out in such a way that gives serious consideration to the effects on the environment. Based on *this, the paper* recommended some measures in tackling environmental issues in bitumen exploitation.

## Introduction

Mineral exploration is fundamental to economic development because it forms the bedrock of industrialization (Adisa, 2002). Bitumen also called 'heavy oil' has lots of carbon double bonds with

compared to ordinary crude oil it has too many carbon atoms and too few hydrogens. The main commercial use of bitumen is to produce "Synthetic Crude".

Bitumen exploration includes its searching, exploration of its properties and its development, distillation, blowing cracking, precipitation, blending and handling. This exercise involves great financial expenses and requires large financial reserves. Nigeria, the second-largest bitumen deposit reserves in the world, after Venezuela, has its greatest deposit location in Ondo State (Akubueze, 2003).

Due to its high viscosity, it cannot flow easily and it cannot be exploited by the conversion method of recovering light oil found in the Niger-Delta. Normally, enhanced recovery processes (like thermal processes) are used in the recovery of bitumen, which can be either in situ (that is, recovering without moving the sand) or through moving by using surface mining technique. Though some of its advantages over light oil is that little money (finding cost) is spent on seismic work (depth determinant) due to the fact that it's already waiting to be tapped; Bitumen can be upgraded to light crude by using some "new upgrade processing technology" at site (Oladunjoye, 2003:2).

Preliminary estimates by the Nigerian government put the bitumen reserves, which leads over Agbabu. Ondo State and some other Southern States like Edo and Ogun States at about 1 billion barrels of bitumen - in - place. If bitumen is upgraded, to light crude oil, the value would increase and it can be sold at the same price as the Nigerian sweet Bonny light/North Sea Brent.

As Nigerians await the exploration and exploitation of bitumen, one of the impediments to securing foreign technical partners for this multi-billion naira project is the lingering communal clash in Warri as identified by Chief Alex Akinvelo former Minister of Information (Johnson, 2003).

## Activities of Bitumen Exploration and Exploitation in Ondo State

Bitumen was discovered in Nigeria over fifty years but remained unexploited despite the vast deposit stretching from Lagos, Ogun, through to Ondo and Edo States. Focus on bitumen reflects the present administrative policy emphasis on the maximization of the

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country's huge hydrocarbon.

A giant step towards the realization of the century old dream of economic exploitation of Nigerian massive deposits of bituminous tars has been taken when President Olusegun Obasanjo in Ode-Irele, Ondo State, performed the ground-breaking ceremony of the project, signaling the formal

*The Siberian Academic Forum, Volume 9 No. 4, November, 2005* commencement of the exploitation of the mineral resource, he however, charged the companies, which had been allocated blocks in the belt by the Bitumen Project Implementation Committee (BPIC) to let the interest of their host communities be uppermost in their minds and avoid the civil unrest that is now the vogue in the oil-producing areas. He commended Ondo State government for its co-operation and also work plans which will allow the consortium to move to the field to start its exploration and exploitation work (Oladunjoye, 2003:1).

The BPIC comprehensively reviewed and restructure financial procedures and administrative structures in order to improve transparency and accountability. Also the committee remarked digitalize block demarcation and other technical data to support the bidding and block allocation processes. They also take full inventory of project facilities / properties including efforts to retrieve public / project properties and renovate and rehabilitate all project buildings in Akure and Ore.

As the country is basking in the euphoria of having this new foreign exchange earner, there is an urgent need for us to pause and reflect on the negative implications of the exploitation of bitumen on the environment and the communities concerned (Nene, 2003). In fact, the Ondo State government has commenced the base-line study of the Bitumen areas of the state to avoid the Niger Delta experience. It is necessary to determine the environment of the host communities before the exploration/exploitation commence and also ensure the compensation to be paid to the host communities to ensure that it is commensurate with what was exploited from their land. Also the state government will continue to guide against any form of degradation or hazardous impact on the environment of the host communities (Johnson, 2003).

Also the establishment of Seaport according to the President at Igbokoda area of the State will go a long way in making the State become an economic center in the country and also creating avenue for the government to liaise with the host communities with the sole aim of not allowing the people in bitumen area suffer unduly because of the economic gain it will derive from the product.

### **Stages in Bitumen Exploitation Development**

The level of technology required in bitumen developments varies with the nature and location of the mineral. For instance, if the mineral deposit is alluvial, it takes but little to identify their existence and establish production "generally small and scattered units"

On the other hand, if the workable deposits are underground, such as mineral their development requires the involvement of specialists in mining, engineering, geology, geophysics etc for development. The requirement for development in this case, is one of very large size, high capital intensity and high technology (Okigbo. 1996).

The various stages in bitumen exploitation which activities adversely impact on the environment are three main stages namely:-

- i. Prospecting and exploration;
- ii. Bitumen development and exploitation; and
- iii. Bitumen processing.

### **Benefits of Bitumen Exploitation**

Bitumen exploitation has numerous benefits such as:

- a) **Road and Airfield Construction:** Bitumen provides a strong durable adhesive binder for mineral aggregate. These mixtures were used for the surfacing layers and good road bases.
- b) **Engineering Construction:** It is used in soil stabilization to render the existing soil less susceptible. It is employed on sea wall construction and surfacing of breakwater and cause ways and in canal reservoir lining. In industrial engineering, bitumen is now used in many ways ranging from roof manufacturing, felt base floor covering, performed damp proof

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- cause, waterproof papers for packing our building. Blown bitumen is used for the external protection of steeling e.g. pipes for oil, water, gas. and sheet metal for structural purposes.
- c) **Synthetic Crude:** can be refined from bitumen to produce motor fuel, diesel oil, grease, wax, pitch and low cost petrochemical products such as naphia. Also phenols are produced for pharmaceutical industries.
  - d) **Benefit to the Economy:** the exploitation of the bitumen deposit according to experts would open a new source of foreign exchange earnings for the nation's oil-dependent economy. It is projected that Nigeria can earn NI35 Billion annually from bitumen exportation and N20 Billion from the local market (internally generated). Also, various arms of government would make more revenues in terms of taxes and bonuses (Ayodele. 2000). of prospecting exploration.
  - e) **Job Creation:** The various stages of prospecting exploration and manufacture are going to provide various economic bases for Nigeria as a whole and for affected local areas in particular. This may also lead to improvement in the educational sector, as new courses of relevant technology content will have to be developed to cope with the demand for skilled personnel.
  - f) **Improved Commercial Activities:** In areas where bitumen exploitation will take place eg. Akure will experience high commercial activities. New business would spring up at these bitumen belts. It will save foreign exchange and would diversify the resource base of the state concerned and of the government generally. This will also lead to unparallel development in these areas.
  - g) **Attraction of Foreign Investors:** Nigeria's bitumen holds great attraction for foreign investors because it offers high returns on investment, given that the tar sands are more amenable to open-pit mining gravity drainage, have a potential for steam assistance, (SAG-D.), while its sulphur content is adjudged to be very low.
  - h) **Development of More Infrastructures:** Provision of more infrastructure good roads, electricity, clean water, schools, hospitals e.t.c in the locality will be necessary to improve the living standard of the people in the locality.

### **The Negative Impact of Bitumen Exploration and Exploitation**

The various stages of bitumen exploration - prospecting and manufacturing will have impact on human and the environment in which he lives.

- a) **Impact on Human:** About thirty (30) communities in South - Western Nigeria will be displaced when the exploration and exploitation of its bitumen deposit starts e.g. places like Irele in Ondo State. People in at least half of the satellite towns and villages in the district would be affected, especially peasant farmers who grow mainly cocoa, palm produce, kolanut and cassava (African Newsservice, 1999).

Akubueze (2003) noted that it is not enough to pay compensation provided for in the Land Use Act 1978, as the individual privacy or group privacy is violated. Air pollution from toxic emission of chemicals causes health injuries in the cities leading to illness and possible death, such illness as asthma, lung cancer, bronchitis, eye and noise irritation and discomfort, skin cancer etc. Changes, such as environmental impacts that are difficult to foresee.

- b) **Impacts on the Environment:** The impact of bitumen exploration and exploitation as seen in Adisa (2003), can be in two different dimensions:
  - Direct Environmental Impact: This can be attributed to the nature of bitumen itself.
  - Indirect Environmental Impact: This may result from project changing social-cultural relations in the local community through migration.

Environmental impact may be of local, regional or global in nature and it may affect air, water, land, vegetation etc. Emission of toxic compounds into air leads to formation of acid rain by chemical compounds as SO<sub>2</sub> etc. This contributes to the green house effects, acidification of soil vegetation and fresh water destruction damage occurring to paper, textile and marble and corrosion of metals.

Lamed and Ogunsusi (2002) observed that by the time the exploitation of bitumen is in full scale, the balance in the forest ecosystem will be adversely affected with possible decline in

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the relative abundance of the wildlife resources. The ill-effects of the exploitation, will, however be grave when the vegetation is destroyed beyond 75% cover.

Akubueze (2003) also mentioned the fact that nuisance, the ambit of which in geophysical operations covers noise and vibrations from use of explosives destabilizes the delicate balance between natural flora and fauna. These vibrations shake not only the human heart but also buildings leading to vertical cracks and other structural damages.

Ecological disintegration, which includes the pollution of the land, air, water, the destruction of the aesthetic value of the original landscape vegetation and animal life. The project may affect

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tropical savanna, or deserts as well as rivers and lakes. All such areas may contain vulnerable or conservation - worthy ecosystem. Encroachments on such ecosystems can cause irreversible changes. The projects may also affect areas with rich traditions of fishing and hunting.

finally the handling stage is also fraught with accidents, which could occur from a bulk storage depot. If accidents occur at this stage severe pollution is bound to occur causing severe damage to the ecosystem.

### **Bitumen Exploitation and Environmental Sustainability**

Aregbeyen and Adeoye (2000) noted that oil has played a major role in the growth of the Nigerian economy since the early 1970s. Actually, the combination of sharply increased crude oil prices, higher export sales and the distributions of oil rent from the foreign oil companies to the state through oil tax law reforms and majority equity participation have generated a massive inflow of oil revenue into the Nigeria economy.

This oil revenue has financed capital accumulation as well as the aggregate consumption in the economy. The income from oil did not only sustain the sharp increases in aggregate consumption over the years but had also relaxed considerably the capital and foreign exchange constrains which have often confronted sustainable economic development in developing countries. For instance, oil export increased its share in total exports over the years.

In fact, agricultural and other non-oil mineral exports, which provided the bulk of the foreign exchanges before the emergence of oil have become largely neglected because of easier source of foreign exchange of oil which have become imperative as a strategy to achieve the much-desired sustainable development. Besides, oil as a natural resources is exhaustible and not renewable. The explosive imports over the years sustained by oil income realizations and expectations.

Oil revenues, as earlier observed, have also dominated total government revenues, contributing over 80 per cent since the mid 1970s. The magnetization of government oil revenue sustained the explosive growth in government expenditure over the years.

With the exploration and exploitation of bitumen the nation's economy will also improve, create more jobs for the masses, as well as improve their standard the living. It is therefore important to utilize these bitumen resources to diversify the nation's economy in order to attain the much- desired sustainable development.

Sustainable developments are those developments that meet the needs of their own need (United Nations). Environmental sustainability issue considers the present as well as looks to the future. It does not encourage inactivity in the environment. Rather it encourages the use of the environment in a manner that will absorb all the threats of today and still remains of optimal usage for generations to come. It therefore encourages solid mineral development initiatives that are environmentally friendly having answered questions like:-

- What does the present generation stand to gain from the development?
- Does the development have any adverse effect on the environment?
- To what extent can such adverse effects be checked?
- Is the future generation to compromise their comfort as a result of such present development?

Nigeria as a nation is committed to a national policy that ensures sustainable development and has enacted laws and established designated authorities charged with the responsibility of protecting and preserving the environment.

in the area of legislation, the Mineral Act 1946 (now under review). Quarries Decree and Regulations 1969, Federal Environmental Protection Decree, and Environmental Impact Assessment Decree 1992 are all relevant. Details of the contents of these laws as they affect sustainable development of solid minerals are beyond the scope of this discussion.

Suffice it to say that the Environmental Impact Assessment Decree makes it mandatory for preparation and submission of Environmental Impact Assessment where proposed projects are likely to have adverse effects on the environment, or if such project appears on the mandatory study list. Environmental Impact Assessment (EIA) is the process of

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determining the probable effects of human use of (and interest) in the land (Daniel and Edward, 1995).

Mining appears on the mandatory study list and this makes it imperative for E.I.A. for mining development activities-to ensure that only projects that will have minimal or no adverse effect on the environment will be approved.

Institution wise, the Ministry of solid Minerals has been created, the Federal Environmental Protection Agency (FEPA) has been established at the federal level to enforce environmental laws. States have established their various equivalent institutions for the same purpose. For instance, we have Ondo State Environment Protection Agency in Ondo State. All these institutions are to protect and preserve the environment for sustainable development.

### **Recommendations**

To improve on the activities of bitumen to be carried out the following recommendations are made to ensure environmental sustainability.

Adequate compensation should be payable to those that will be affected to ensure peaceful exploitation. As a preventive measure, government should take concrete steps to,mandate companies to resettle villages at risk of being subjected to adverse environmental effects of solid mineral development operations. The Estate Surveyor and Value has an important role to play in advising the government as well as the community in this matter. He is in a position to advise government on available options, acquisition procedures, relocation, resettlement of residents, negotiating with land owners, determination and payment of compensation. In other words, he is in a position to advise on the quantum of compensation for effect of bitumen activities on the community as well as represent the interest of land owners to ensure that they are adequately compensated for their economic and social disruption so that no party is cheated in the transaction.

Training of necessary manpower and acquisition of necessary equipment for monitoring the environment.

Compelling mineral prospecting companies by legislation to pool their resources to enable them obtain insurance covers against environmental pollution and disturbance of ecosystem and to ensure that prompt and adequate compensation for environmental hazards are paid.

Harmonizing the provision of the Land Use Act and the Mineral and Oil Pipelining Act to ensure adequate compensation for environmental disturbance.

Since environmental degradation has regional, national and global implications, it is suggested that all hands should be on deck in the bid for environmental restoration. Again, government should pursue a strategy for concurrent treatment of pits by compelling the mining companies to refill and restore any pit resulting from mining activity before proceeding to a new site. Alternatively, government should make it mandatory for mining companies to pay a compulsory fee into a special "Restoration Fund" from which withdrawals would be made for restoration of damaged land.

Investing more on research and ensuring that only the state - of - the art technology that minimizes waste and is environmentally friendly is allowed in bitumen exploration and exploitation of other mineral resources of Nigeria.

Comprehensive legislation spelling out clearly the liabilities of mineral exploration and prospecting companies operation should be enacted in Nigeria with a view to establishing rules and regulations for effectively supervising and monitoring their activities.

Insuring that member of Clean Nigeria Association a joint anti-oil pollution body formed by NNPC and joint venture oil companies pool their resources to arrange a common comprehensive insurance against the risk of oil spills and other emergency situation.

### **Conclusion**

Bitumen exploration has a good prospect in Nigeria and it can as well be the second black gold after crude oil. However, if environmental issues are not taken with the desired seriousness, it can turn into a Pandora's box. The Environmental impact of Bitumen exploration is good on one hand and bad on the other, if measures are not taken to reduce the bad side then it is not worthwhile. The use of the state of the arts technology will not only enhance productivity but will also ameliorate pollution effects. The need for the necessary

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infrastructure to ensure a harmonious ecosystem cannot be over emphasized. The legal framework and proper functioning of regulation bodies are equally essential. Also the day-to-day monitoring and supervision of projects to forestall environmental abuse is necessary judging from the long-term global effects of abuse.

**References**

- Adisa, S.Y. (2003). Environmental Restoration: A Desideratum to Bitumen Exploration in Nigeria. A Paper Presented at the 33<sup>rd</sup> Annual Conference of Nigerian Institution of Estate Surveyors and Valuers.
- Akubueze, C.O. (2003). Environmental Impact of Bitumen Exploration. A Paper Presented at the 33<sup>rd</sup> Annual Conference of Nigerian Institution of Estate Surveyors and Valuers.
- Aregbeyen, B.O. and Adeoye, B.W. (2000). The Oil Industry, Environmental Health and Sustainability Development in Nigeria. *African Journal of Environmental Studies* Vol. 2 No 2:8-4.
- Ayodele, O.R. (2000). Why Nigeria Bitumen Deposit is Challenging the Conventional Light Oil. <http://www.nigeriaworld.com/board-old>.
- Daniel, B. and Edward, K. (1995). *Environmental Science: Earth as a Living Planet*. John Willey & Sons.
- Egvvuatu, L.J.S.C. (2002). Environmental Issues in Solid Minerals Development in Nigeria. The Estate Surveyor and Valuer. *Journal of the Nigerian Institution of Estate Surveyors and Valuers*. Vol. I 5 No I, PpI 3-19.
- Johnson, D. (2003). Bitumen Exploitation: Ondo Government Rules Out Environmental Hazards. Vanguard Newspaper March 20.
- Johnson, D. (2003). Consortium Shops for Foreign Partner as Obasanjo Flags off Bitumen Project. Vanguard Newspaper. March 19. <http://allafrica.com/stories/printable/20030305295.html>.
- Johnson, D. (2003). Warri Crisis will Hinder Bitumen Exploration, says Akinyele. Vanguard News paper August 25. (AilAfrica.com).
- Lamed, G.A. and Ogunsusi K. (2002). Environmental Impact Assessment of Bitumen Exploitation on Animal Resources of Ode - I re 1 e Forest Area. *Africa Journal of Livestock Extension*. <http://Avwinasp.org.uk/ajol/journals/ajlix/vol.1abs.htm> 14.
- Nene, J. (2003). Heralding Bitumen Exploitation in Nigeria. This Day News Paper July, 25.
- Nigeria First Org. (2003). Consulate - General of Nigeria. New York: Website Bitumen Production.
- Oladunjoye, P. (2003). The Bitumen Challenge: Nigeria's Dependence on Aid as Main Revenue Earner May be Broken as Exploitation of Bitumen Promises Billion of Naira in Annual revenue: *NewsWatch*, May 5, P52 -53.
- Oladunjoye, T. (2003). Ihonvbere and Bitumen Project. A Vote for Merit. Vanguard Newspaper April 22. <http://allafrica.com/stories/printable/200304220303.html>.