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KPO-Fire: The Effect of Unharnessed Technology in Niger Delta, South - South Nigeria.

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Abstract
The extraction and processing of minerals have visible and notable effect on workers and citizens within the area. Of interest to this work is the effect of "Kpo-fire" Which is the explosion that results from local refining technology. However local refining technology sustained the short lived Republic of Biafra during Nigerian civil war. There are two categories of Kpo-fire – the primary and the secondary level. The most pitiable is the secondary level. It has been observed that the products that lead to "kpo-fire" can hardly be distinguished from properly refined products; therefore users are at mercy of explosion, since that is the only way to distinguished real and fake product. This work has attempted to identify kpo-fire kerosene and measures to prevent kpo-fire which include among other things – the rate of evaporation, attract fire faster around the wick than expected, gives cool effect like that of fuel (petrol) to the skin. So, users must ensure that there is no fire in the stove or lamp before top up or refill. The lid should be closed properly after top up. Avoid splash of kerosene on the floor, stove or lamp, or any rag around the cooking area. Always have a damp detergent soaked towel around the kitchen or lightning point. To create job and to discourage illegal refining, we suggest that those involved in illegal refining be trained and encouraged to register with the Department of Petroleum Resources (DPR). This will save Nigeria from importing finished products like kerosene and petrol. Our candid suggestion is that illegal refiners should not be killed or arrested or imprisoned, rather that government should take over the local refiners and improve the standard in spirit of amnesty.
Keywords: Exploration, illegal refineries, kpo-fire, Mineral Resources, Nigeria.

1. Introduction

There is no nation of the world that is not endowed with some quantities of mineral resources. Some are being tapped, some have been exhausted, and others are yet to be discovered, while the rest are at the surface but of lower quality. Depletion of mineral deposits in a given location often leads to exploration for local use and exportation as well as importation of minerals from other regions of the world. When iron ore deposits in superior lake region (Mesabi, Vermilion and Cuyuna ranges) became depleted, deep-seated and very expensive to mine, iron ore was sort elsewhere. That is how Sierra Leone and Liberia ores came into focus.

Crude oil was first struck in USA in 1859 at 20meters deep, since then crude oil prospectors have been exploring and drilling crude oil not only in US but in other parts of the world. Exploration of crude oil is under-taken by corporations or individuals, Thus crude oil being sort for anywhere in the world is meant for exportation and importation. Thus, Kuwait, Iran, Iraq, Libya, Egypt, Algeria and Nigeria became major sources of crude oil for export to USA, Europe and other nations of the world.

Nigeria, like other nations of the world, has different types of mineral resources ranging from fossil fuels, metallic, and non-metallic to radioactive (Babour at el 1982) According to Oguntoyinbo's definition; the minerals when tapped must be useful to man. It is therefore expected that measures must be taken to reduce risk and eliminate any likely source of danger to man.

The mineral resources found at the Northern part of Nigeria include Gold, Uranium, Tin and Columbite, Tantalite Wolframite Molydenite, Lead, Zinc, Copper, and limestone. Recently crude oil has been discovered in Chad basin at North East.

The River troughs i.e. (River Niger and Benue troughs) have salt while the South East has coal, manganese, lead, zinc and limestone. South west has phosphate, iron ore, gold and limestone. While south- south has crude oil and glass sand.

Extraction of mineral in Nigeria has been on for centuries although at rudimentary level. Perkins et al 1975 noted that Hausas mined and smelted tinstone as far back as 1884. Also in Ogbomosho, Iseyin within the axis of Ibadan and Idoma (Benue axis) iron ore was mined and smelted locally, and Pottery was also common. Then, mining and processing of mined products had little or no negative effects on man rather they served man usefully. Farm implements like hoes, cutlasses, axes, knives and war weapons such as spears and arrow heads were made. Although the method of mining which was open casting and smelting were rudimentary, but it had little or no negative effects on man.

As importation and exportation of raw materials improved, local mines and the traditional factories, gave way to more sophisticated methods of mining and processing and which also began to endanger the life of man.

Illegal mining is a setback for countries blessed with natural resources. In Nigeria for instance most of the

solid minerals are mined illegally. It belongs to the owner of the land or the state; whereas crude oil is viewed as national resources. The imbalance in handling natural resource in Nigeria has led to dismal stealing of petrol products. The perceived marginalization of the minority oil rich Niger Delta region by the majority tribes, coupled with poverty led restive youths and their godfathers to theft and illegal refining of crude oil. Unfortunately, this has brought untold hardship, death and destruction of lives and the environment.

2. The Study Area

Niger Delta is located in the southern coast of Nigeria. It is a major geomorphic feature in Nigeria coastal zone. It stretches from the Benin river estuary for about 450km eastward and terminates at the mouth of Imo river estuary. It consist of major distinct ecological zones such as the fresh water, swamp mangrove, creeks, estuaries and barrier island (Ukong, 2009).

Niger Delta has a fragile soil made up of infant alluvial deposit. The two major soil types in the region are the alluvial soil and the ferrasol(Agbola, 1979).

The climate is the subequatorial. The temperature is generally high, but is modifies by maritime air mass, the mean temperature is about 28^{o}C and a low range in temperature of about 3-5^{o}C. The relative humidity in most months is about 80%, but during May-September rainy months it stood at over 95%. Because of availability of water the vegetation are broad leaves and evergreen in nature with about three canopy of forest. Figure 1 shows the study area.

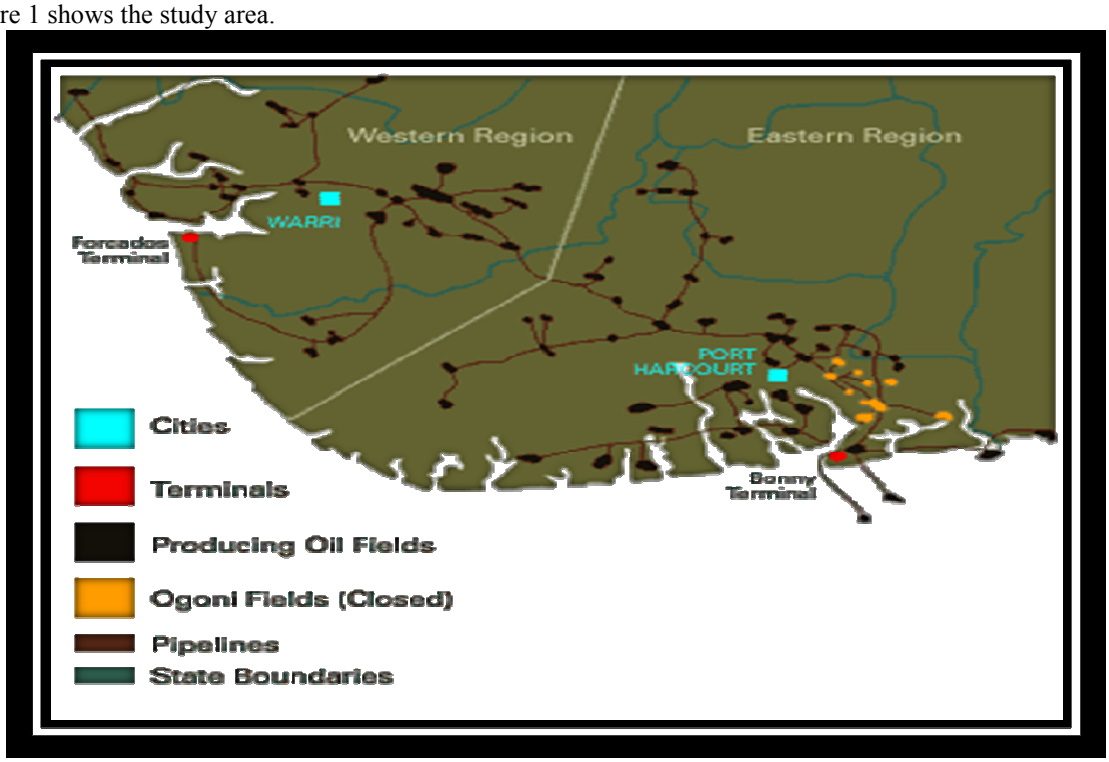

Figure 1: Map of Niger Delta showing oil pipelines and terminals(Source, waado.org).

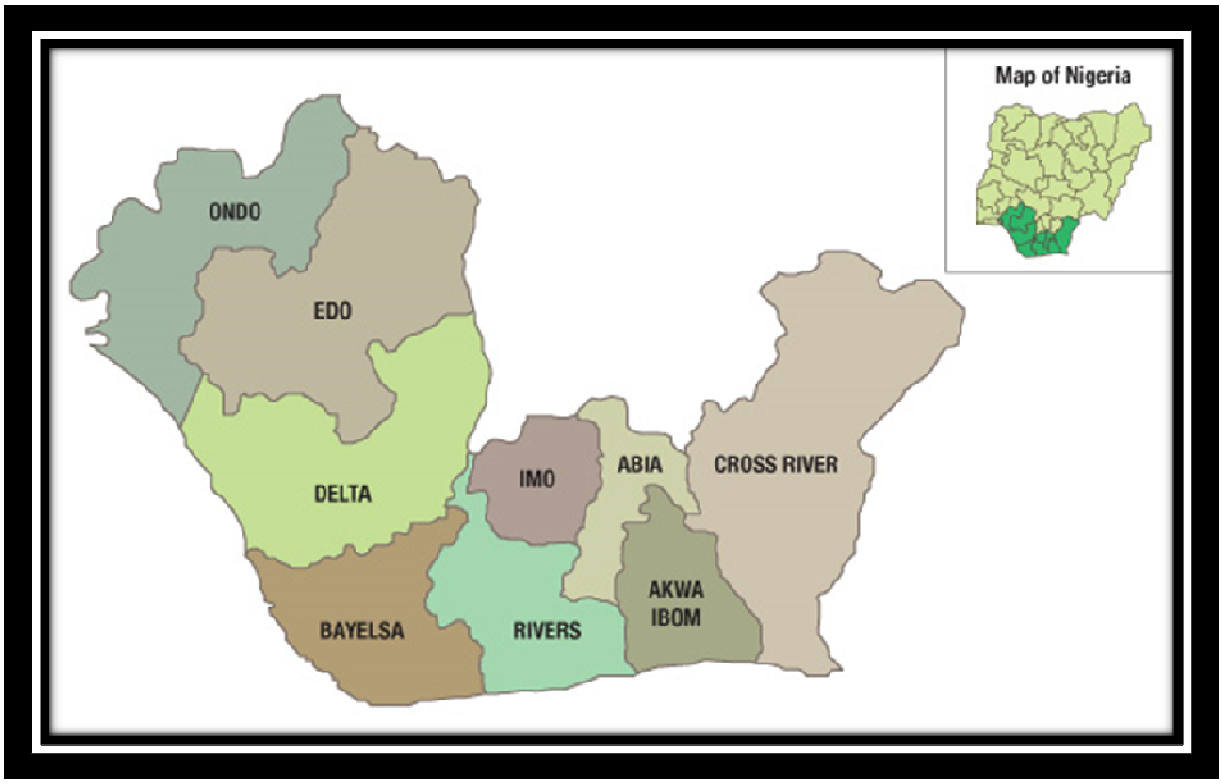

Figure 2: Map of Niger Delta Region Showing the States.

3 Effects of Mining/Processes of Mineral Resources

Mining and processing of mineral resources have positive and negative effects. The positive effects such as financial gains, employment opportunities and the economic development associated with mining seem to supersede the negative effects which are grievous, to many.

However, as giant shovels, bulldozer and dynamite are used to loosen and excavate the soil, erosion and landslide become inevitable. 'Bad land' is formed. When pits are dug during excavation, massive areas of land are rendered useless. In Jos axis, the pits dug have been filled with water and labelled 'lake districts'. In Sierra Leone the numerous holes dug for diamond mining have made the land area unprofitable for human activities. Bad land can be created by small and large scale operators as long as the earth is excavated for mining.

Sometimes the large mounds formed by the overburden excavated to reach the ore can cause landslide. Underground tunnels dug while mining can lead to collapse of land and its effect can be derailment, abrupt drop of road and collapse of houses and bridges.

Oil spillage has devastating effects not just on drilling point but on all areas the spill covers. Animals and plants are all at risk of dying or withering. The land remains unproductive until a clean-up is done. If it occurs on a stream or river, all aquatic animals dies and total blindness for any human that goes under such water. Underground water of such regions is usually contaminated.

Loss of life is common in mining of mineral resources and drilling of crude oil. Collapse of roof or cutting into trapped poisonous gas as it happened in Choingquig in Japan in November 2016, flow of water into tunnels can endanger the lives of miners.

Apart from death that occurs due to one accident or another at the mining or drilling sites, at times the health of miners is usually at risk. In South Africa, for instance most miners suffer from heart related diseases which culminate to death or the man becomes in- capacitated for life, unable to attain life ambition.

Those inhabiting the areas where oil is drilled are prone to chronic diseases like lung and kidney diseases, brain damage and miscarriages and they have higher potentials to develop cancer. The waste, chemicals and toxins pumped into the environment, are daily endangering the lives of people of Niger Delta. The water is polluted; the animals are affected by one chemical substance or the other. Recently, the cloud and blue sky have been cover by black soot. Rain water is no longer colourless but dark, and unsuitable for drinking.

3.1 Local Refinery

Local refineries operate secretly in the forest or swamp of mangrove forest in the Niger Delta covered and protected from the eyes of Federal Government of Nigeria.

This is a simple and crude form of refining crude oil. It is nothing comparable with the gigantic refineries of today. Two sections can be identified: a steaming section and a collection part. The two sections are linked by a very long pipe. The drum used for the boiling of crude is about 15mm thick constructed by wielders. The pipe linking the boiler and the collector drum is about 72 to 90 feet long and about 16mm think. The drum for collection is 15mm thick with no lid. The length of the pipe is necessary to reduce the magnetic power of fuel and kerosene. The initial fire is started using mangrove wood called 'Ngala' or 'Agala' thereafter crude oil is used.

3.2 Distillation

The boiling point of each fraction is not known. The first product that comes out is identified by its smell and colour as fuel. The second product that follows has lighter colour and by its smell, is identified as kerosene. The last of the product which is dark green and also by its odour is identified as diesel. At the end of each distillation, a pumping machine is used to transfer the product to another container where it is allowed to cool. After cooling, the product is then jerry canned or stored in GP tanks of various sizes for onward transfer to the market. Twenty-five and fifty litres (25/50 litres) of jerry cans are very useful.

3.3 Kerosene (Paraffin)

Kerosene is one product of petroleum consumed in all homes whether rich or poor, either through the use of stove for cooking or used in lamps to illuminate the rooms and surroundings. It is almost colourless and its odour is different from other products of petroleum. Kerosene is sold in filling stations, often times, the filling stations do not have kerosene for sale. This product is retailed in bottles and small plastic cans and once it cannot be accessed from the filling station, buyers move to these retailers.

It is a little difficult to distinguish between locally produced and properly refine kerosene. Consumers buy bottles and cans of kerosene as long as it is labelled so. Whoever that buys kerosene assumes that what has been bought is good kerosene. The purity is confirmed on usage. If there is an outburst of flame or explosion then the kerosene is labelled as "bad" otherwise, it is a good one, therefore safe to use.

4 Effect of Locally Refined Kerosene

Kerosene or paraffin is a commodity that is meant to give man joy and good health. It is one of the products extracted from crude oil. It is used to cook, burn unwanted materials and illuminate the surroundings.

Local Kerosene most times does not perform the functions named above. This is because sometimes when the stove or lamp is lit, the Kerosene burst into flame engulfing and destroying the purpose for which it was bought. Human being, properties and even the building may not be spared if help does not come fast.

Instances of secondary "kpo-fire" victims abound in the Niger Delta. Scarcity of well refined Kerosene increases the risk of fire accident.

4.1 "KPO-FIRE"

"Kpo-fire" is a local word used to describe fire incident that occurred during illegal refining of crude oil or breakage of fuel pipe line.

Victims of such fire accident are referred to as "kpo-fire" victims.

There are two categories of "kpo-fire" victims:

The first category is referred to as 'primary level' victims. The victims in this category are aware of the risk or danger involved in the business or job they have accepted to do. They must have heard and/or seen victims of such risky businesses.

The second category will be referred to as 'secondary level'. This involves unsuspecting, unindenting purchasers who become victims of such fire. They are completely unaware of what was coming.

4.*2 Identification of good or bad Kerosene*

It is really difficult to identify or distinguish one from the other by colour or smell since they look alike.

The prices may help a little. Local kerosene, in the villages, creeks, is sold at cheaper rate than government refined.

Another way bad kerosene can be identified is by pouring a little on the ground and watches its rate of evaporation. Bad kerosene evaporates faster; the fact is that its rate of evaporation is equivalent to that of fuel. It also draws or attracts the fire faster than expected. It also has cool effect on skin just as fuel does.

It can also be identified by close observation when lighting the stove. The stove wick abnormally draws fire round without any effort; within fifteen minutes of heating, there is bound to be an explosion.

4.3 SAFETY MEASURES TO AVERT SECONDARY "KPO-FIRE"

For safety and security of users of kerosene whether locally refined kerosene or not, the following measures

should be taken.

i. Ensure that there is no fire in the stove or lamp before top up.
ii. After pouring the kerosene into the stove or lamp, the lid should be closed properly.
iii. Clean any drop of kerosene on the stove or lamp. Also make sure there is no splash of kerosene on the floor.
iv. Put away the container of kerosene which has been properly closed, then light the stove or lamp. Ones face should be kept at distance away from the stove or lamp.
v. Detergent and water must be available and reachable.

5. WAY FORWARD

Our nation exports crude oil and imports fuel, kerosene, diesel and other products of petroleum. The desire of Nigerians is that these practices should stop. The nation should look inward to develop, provide employment opportunities for the teaming youths and ease the hardship enveloping us.

One of the ways to achieve the desire of our nation is to look inward and provide enabling environment for development by encourage young ones who are daring to produce.

It may sound ridiculous and/or total rubbish to suggest any form of encouragement and improvement of the local crude refineries. But this is one way to improve and encourage development of local factories (small scale refineries).

This also will lead to construction of link roads and rail lines to access and evacuate the high needed petroleum products.

The state government or business entrepreneur should be allowed and given the right to build small scale refineries using the ideas, intellect and strength of the youth, (engaging preferably those already in the business). The youths that have the capability and knowledge to construct a local 'crude' refinery should not be arrested, jailed or even killed. Rather they should be encouraged and trained. In the main time crude oil recovered from the illegal refiners should not be burn. Illegal refineries should be taken over by the state government to improve and construct a safer, better local refinery that can provide 'good' kerosene, fuel, diesel and other related products and employ the youths to give them sense of belonging.

This idea being portrayed here is not new. Vanguard March 4, 2014. "Between illegal and modular refineries in Niger Delta", called the small scale refineries at source of flows of crude as 'Modular' refineries. The Modular refineries are necessary to save the environment of continuous pollution from dump of residues of boiled crude and from destruction of local refineries by members of the security agents

The local "illegal" refineries should be legalized by registering with the Department of Petroleum Resources (DPR).

More youths can be employed, since a modular refinery can take up to 30 personnel to refine 24 barrels per day. (Premium times 2016).

This will reduce or put an end to illegal crude refineries and "kpo-fire" accidents. It will also help to reduce unemployment and its related vices.

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