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CRUDE OIL BUNKERING: TECHNOLOGY FOR ADOPTION AND DIFFUSION

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ABSTRACT

The discovery of crude oil in commercial quantity in 1956 in the Niger Delta of Nigeria, has made the region the economic backbone of the country, but the activities of oil exploration has rather impoverished the region through environmental degradation, lack of corporate social responsibility and government insensitivity. Consequently, the people have developed a local technology to tap into their natural endowment and refine same to create a livelihood for themselves. The major objective of this study was to evaluate the feasibility of adopting local technology in crude oil refining and scaling it up as local technology in the country. Case-study and interview were adopted to carry out this investigation. The study revealed the style applied to be simple distillation, and confirmed that it could be adopted, harnessed and sustained. The study recommends that a standard monitoring board should be established to ensure environmental best practices in the trade. Crude oil should be sold to operators of local refineries, instead of hot-tapping. Nigeria scientist should be involved to fabricate modernized distilleries and other instruments for local refineries to produce the volume needed to sustain the country's demands.

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1. INTRODUCTION

Crude oil is the mainstay of Nigeria's economy and the Niger Delta region is the hub of crude oil and gas in Nigeria. Indeed, oil and gas resources from the Niger Delta region accounts for over 95% of Nigeria's export earnings (NBS, 2022). And over 80% of Nigeria's total revenue (Opeoluwani 2022). This region was defined as a difficult terrain by the departing colonial masters in the Willink Report, it then set up the Niger Delta Development Board and requested each of the regions to donate 1% of their Gross Domestic Product (GDP) for the development of the region. No region ever paid in a dime by the end of the colonial exercise in 1960. Subsequent revenue allocation formulas have been to the disadvantage of the region instead of derivation that hitherto benefited the regions, the revenue allocation commissions lay emphasis on need, population, landmass, balance development, equality of states, national minimal standards etc, to the detriment of the goose that lays the golden egg. The implication is the deliberate transfer of the oil wealth out of the Niger Delta to develop other regions (Ebienga, & Kumokou, 2012).

1.1 The Reasons for Continued Oil Bunkering in Nigeria

It is usually assumed that the success recorded by oil bunkers in Nigeria as compared to other oil producing countries is as a result of the low level of development in the Niger Delta region (where Oil exploration activity is predominant) which has made it difficult for security operatives to engage those involved in the activity, as the creeks have proven to be a difficult terrain for navigation (Rufus, 2018). Boris (2015) highlighted some of the factors that are responsible for oil bunkering to include: (a) poverty; (b) ignorance; (c) greed; (d) lack of respect for National Economic Survival; (e) get rich syndrome; (f) lack of gainful employment (g) exploiting the loopholes in the criminal justice system to circumvent the law; (h) evolving culture of impunity from the wrong perception that some people are above the law; (i) weak institutional structure to checkmate criminals; (j) malice; and (k) bad governance (corruption and incompetency). Brock (2012) noted that due to years of neglect, marginalization and underdevelopment of the Niger Delta by the Federal Government and MNCs operating in the region, rings of organized groups, called "Oil Bunkers" in our local parlance has evolved and specializes in stealing, illegal refining and transportation of Nigeria's crude oil to the international black markets.

In line with the above assertions, the following are the reasons for the continued operation of oil bunkering in Nigeria:

Poverty and Unemployment: Since the discovery of crude oil, the available farmlands for cultivation of crops, the natural forest for the hunting of wild animals and the rivers for fishing have been destroyed by numerous oil spills, gas flaring and forest fires leading to barren lands, habitat loss and dead rivers (Gimah & Bodo, 2019). The vast majority of the host communities are unemployed, even the MNCs operating within their territory have refused to give them skills to employ them, contracts are given to only few elites who are willing to betray their communities for the MNCs; the only livelihood of the host communities are destroyed by oil exploration activities. Thus, the seemingly available means of survival to the youths is the oil bunkering.

Marginalization and Neglect: The people of Niger Delta have alleged that the cities of Lagos and Abuja have been transformed from rural settlements to mega cities with the revenues from the Niger Delta, yet the region where this enormous wealth is coming from lacks basic social amenities (Bodo, 2019). The host communities where flow stations and oil pipelines are found, houses one of the poorest people on earth, with no means of survival, as their known livelihood has been destroyed by oil exploration activities. The MNCs will rather employ people from other places, instead of people from the host communities with the guise of qualification. Contracts are issued to outsiders with little or none awarded to people from the host communities. Instead of addressing these issues, the government have rather chosen to militarize the Niger Delta region to intimidate the people, hence, the establishment of Operation Pulo-Shield.

Feeling of Injustice from the Government: The people of the Niger Delta region where oil exploration takes place have a feeling of being unjustly treated by the Nigerian government. The people of the Niger Delta region complains that, crude oil is taken from their soil with its attendant negative impacts from the activities with little or nothing to show for as benefits accruing from oil exploration. Yet they are prohibited from having access to the crude oil product that is extracted from their soil. The same government that have refused Niger Delta people access to crude oil product from their soil have granted other parts of the country access to products found under their soil. In June 2020, Nigeria launched the presidential Artisanal Gold Mining Development Initiative – an initiative that legalize the activities of artisanal miners' gold in Kebbi, Osun, Kaduna, Zamfara and Niger States. Through this initiative, the Central Bank buys artisanally-mined gold, processes and refines them according to the London Bullion Market Association (LBMA) standards (the cable.ng, 27th April, 2021). The Niger Delta people argument is that, if the Nigerian government deems it fit to give illegal gold mining in parts of the north a legal framework, it should also provide a legal framework for the Niger Delta artisanal refiners.

The High Demand for Petroleum Products: The scarcity and high cost of crude oil bye-products in the country as a result of non-functional refineries and importation of petroleum products encourages black market operations in the country. A country that has abundance of crude oil with scarcity of its bye-products calls for the ingenuity of the citizens, consequently, the emergence of local technology and refineries. The government should as a matter of urgency and necessity, look into adopting and upgrading the local technology of crude oil refining, instead of labeling it illegal. Consequently, the call for resource control, restructuring, self-governance, oil bunkering, militancy etc., oil bunkering is therefore a protest movement by the Niger Deltans, to have access to the resource endowment in their area, where the Nigerian state would not willingly give to them a fair share of what destroys their ecology and further impoverish them, as witnessed in Ogoni area where the clean-up exercise has been delayed by politics. The citizens put their knowledge of "distillation" (the act of purifying a liquid by a process of heating and cooling or evaporation and condensation) into action by accessing crude oil, refining same and selling both crude and locally refined product.

Hence, this study was carried out to evaluate the feasibility of adopting local technology in crude oil refining and upgrading it as local technology.

The specific objectives include:

(i) To understand the technology deployed in the bunkering industry, with a view of harnessing it for adaptation.
(ii) To evaluate if the various bye-products of crude oil refining could be obtained in the process.
(iii) To establish if the system is sustainable and would not be dangerous to the environment.
(iv) To establish what volume of the crude oil bye-products could be obtained to meet local consumption.

This study is important, as it will direct people's attention towards a different perspective on the issue of crude oil bunkering. The study is expected to contribute greatly to knowledge on oil industry, especially as its recommendations may lead to government regulation of the trade, thus, improving the growth of the economy. Furthermore, the study will be an instrument to policy makers in government and other relevant agencies on how to turn a seemingly ugly incidence to an advantage. The study will also contribute significantly to literature on bunkering activities, as its novel ideas will serve as an academic bank to other researchers, scholars, the government and other relevant organizations.

2. THEORETICAL FRAMEWORK

This study adopted the "Resource Curse" thesis also known as the "poverty paradox", it is the phenomenon of countries with abundance of natural resources (fossil fuel and minerals) which turn out to have less economic growth, less

democracy, or worse development outcome than countries with fewer natural resources (Sachs et al 1995). This has been explained as the "lottery winners" analogy – lottery winners are said to struggle to manage complex side-effect of their new found wealth. In this paradigm, in spite of abundance of resources, poverty levels are increasing while their resources are extracted and exported to western countries. The resources curse countries are characterized by the International Monetary Fund (IMF) as those which (i) depend extremely on resource wealth for fiscal revenue, export sales or both (ii) have low saving rates (iii) poor growth performance (iv) highly volatile resource revenue (Auty, 2018).

Applying this theoretical framework to the Nigerian situation, will enable as understand why Nigeria is economically backward, despite her enormous natural endowments. According to Theresa May (2018), Nigeria houses largest population of world's poorest people. Like the "lottery winners" analogy, the people struggle to manage their new found wealth. It is seen as free gift of nature, so everyone who has the opportunity to be in position of authority mismanages it without paying attention to the side effects of environmental degradation and its attendant negative impact on the people of the oil producing areas. Consequently, this increase the poverty level of the people as stated in the theoretical framework. This framework explained the reality on ground in the country wherein their God given endowment does not benefit them in anyway commiserate to the negative impact of oil exploration, they decided to help themselves with distilleries to refine the crude oil to enable them earn resources to live a good life.

3. METHOD OF STUDY

Two major methods of this study namely: case-study and interview were intensively deployed. The study picked five locations from Rivers state and Bayelsa State where bunkering activities are very pronounced as a case-study; Oluasiri and Peremabiri in Bayelsa State, and Ke, Killometer-45 and Okaki in Rivers State. After careful observation of the operations, five persons were interviewed to gain more insight of the technology deployed, the possibility of getting the different crude-oil bye-products, the sustainability of the system and to ascertain the volume of crude oil bye-products that can be obtained to meet local consumption.

4. RESULTS

Deploying the major two components of this method namely; case study and interview revealed the following:

4.1 The Case Study

This revealed the following:

(i) The study revealed that the local refineries are applying simple distillation process – the procedure of separating components of a mixture (crude oil) using different boiling points.
(ii) Different temperature (boiling points) and condensation (cooling system) were used to extract petrol, diesel, kerosene, engine oil and tar (which is known in the local parlance as waste).
(iii) The structures in the creeks are known as distilleries – when pulled together could become modular refineries.
(iv) The processes are similar to the ones used in the production of distilled water, alcohol, paraffin etc.
(v) Local refineries involve "simple distillation, whereas standard refining processes would involve fractional and destructive distillation process.

4.2 The Interview

Interview were conducted in five locations, (Oluasiri, Peremabiri, Okaki, Ke, and Kilometer-45), five people were interviewed. Three of them were workers – operating it for big-men, while the other two were all owners of the distilleries. They revealed their sources of crude oil, technique of refining and marketing outlets respectively.

One of the interviewee from Oluasiri in Bayelsa State gave their source of crude oil as follows:

> *"We paid an engineer working with International Oil Companies (IOCs) to teach us the technology of removing the Christmas-Tree from the wellhead to be able to take crude oil directly from the wellhead".*

Another respondent from Ke in Rivers State revealed their source of crude oil as follows:

> *"We buy our crude oil from the point owners (a combination of war-lords and serving military officials) whom get the service of a professional welder to tap into the high pressure pipeline and divert a little portion of it with host to a convenient creek for loading, while it is still working normally (this is also called hot-tapping)".*

On their technique for refining the crude oil into different component products, one of the interviewee from Kilometer-45 in Rivers State revealed the following style.

> *First you get a welder to construct a pot made of 3mm plates and angle irons, the number of plates determines the size of the pot. Then you place the pot in an oven (specially constructed for the purpose) which will be heated at different temperature, then get a carpenter to construct a*

cooler (condenser) that will be filled with water in order to cool the vapor – pipe to convert the vapor into different liquid forms of petrol, kerosene and diesel; engine oil and waste (tar) are the last components you get from the bottom of the pot. The size of the pot determines the volume of bye-products derivable.

All other interviewees affirmed the above pattern for refining crude oil locally. The picture below depicts what is obtainable in the creeks.

LOCAL DISTILLERIES

THE POT AND COOLER

WASTE PIT

PRODUCT CONTAINERS

RECEIVER

Source: Field Observation

The fire engulfed welded container is the pot where crude oil is boiled at different temperature, the wooden figure is the cooler where different forms of vapoure is condensed into liquid, the black pit is where waste (tar) is contained, and the large container is the receiver of the liquefied form of different vapourized bye-products of crude oil.

On their marketing outlets, a respondent from Peremabiriin Bayelsa State stated that:

> *"People buy in small and large scales, those who buy in large scales come with vessels and barges, most of which are contractors that supplies for oil companies, the ones that buy in small scale come with locally constructed boats to supply local customers within the environment".*

Another respondent from Okaki in Rivers State revealed that:

> *"Tankers escorted by the Nigerian Police and Military come to buy in large quantity from them; and even small scale buyers come with their vehicles to buy after settling the Police and military on the way".*

The study revealed that the phenomenon of bunkering was still very active and found numerous in the creeks of Niger Delta in spite of the presence of security operatives. It was revealed through the study that both security personnel's, government officials and several business men were involved in the exercise. All the persons interviewed refused to give their names and they all claimed unemployment, negligence from government and IOCs and lack of development of their localities as excuse for getting involved in bunkering activities. It was also revealed through the study that most of their major buyers are IOCs supply contractors, this speaks volume of how much Nigeria needs these local refineries.

5. DISCUSSION OF FINDINGS:

The main aim of this study was to evaluate the feasibility of adopting local technology in crude oil refining and upgrading it as a local technology. To this end, the discussion of findings is done in relation to addressing the specific objectives of this study. The first object seeks to understand the technology deployed in the bunkering industry, with a view of harnessing it for adaptation. Through the observation, case – study and physical examination of the outcome of the distillation procedure, it was discovered that the distilleries produce premium motor spirit (petrol), diesel, kerosene, engine oil and tar. The implication is that there could be oil refining in small scale in Nigeria, if the technology applied by these local bunkers are scale-up or upgraded by harnessing the technology, Nigeria would have produce its own refinery without the usual "technology transfer".

The second objective borders on whether the various bye-products of crude oil refining could be obtained in the local refining process. The study after critical observation discovered that the various crude bye-products of Petrol, Kerosene, Diesel etc are obtainable through their distillation and condensation process. Nigerian scientist could be requested to fabricate the instruments used in the bunkering operations in a large scale and be operated. The number three objective was to establish if the system is sustainable and would not be dangerous to the environment. From revelation obtained from the study, the system is sustainable, if operated with environmental best practices. In order to save the environment from degradation from the waste, a standard monitoring board could be established to regulate the activities of local refineries and the operators could be educated on the fact that what they call waste is actually raw material for tyre and tube production and bitumen for road construction. Even the fire applied to heat the pot, electrical heating could be used alternatively. The forth objective was to establish what volume of the crude oil bye-products could be obtained to meet local consumption. According to the Department of Petroleum Resources (DPR), Nigeria consume an estimated amount of 38,200,000 (thirty-eight million, two hundred thousand) litres of petrol daily; 12,000,000 (twelve million) litres of diesel daily and 8,000,000 (eight million) litres of kerosene daily (Vanguard, 26 February, 2020).

A local refinery pot constructed with 14 plates of 3mm produces 35 drums (7,280 litres) of diesel daily. So 1,648 (one thousand six hundred and forty-eight) of that type of pot could produce Nigeria's daily consumption. This is outside other pots with higher number of 3mmm plates which produces more litres. The system could be made sustainable into medium size (modular) refinery which could serve the country and beyond, if it gets the required backing and encouragement.

6. CONCLUSION

The issue of oil bunkering has been a serious topic of discussion in this country, with many writers criminalizing it. This study goes contrary to that school of thought and propose for the adaptation of crude oil bunkering technology in Nigeria. The study presented a chronology of how oil exploration which is the mainstay of Nigeria's economy has impoverished the Niger Deltans (the goose that lays the golden egg) with little or no means of livelihood. Even the government and the oil companies have failed to carry out their corporate social responsibilities. Consequently, oil bunkering is a protest movement by the Niger Deltans to have access to the resource endowment in their region since the bye-product of crude oil are not even readily available. This study therefore investigated the possibility of adopting the technology applied in these local refineries. In the course of investigation, it was revealed that the technology applied by the local refineries can be adopted to boost local production of crude oil bye-products. It was discovered that with the right

backing and monitoring, the volume of crude oil bye-products produced in these local refineries could be increased and environmental best practices applied. It is therefore the position of the study that, instead of criminalizing bunkering activities in Nigeria, the government should embrace the operators and adopt their technology to provide crude oil bye-products locally, instead of importing them and expecting technology transfer from advanced countries.

7. RECOMMENDATIONS:

Based on the investigations of this study, the following has been recommended:

(i) In line with Brock (2012), who noted that due to years of neglect, marginalization and underdevelopment of the Niger Delta by the Federal Government and Oil Companies operating in the region, the study discovered that rings of organized groups of oil bunkers emerged as a protest movement. The study therefore recommended that these bunkers should not be treated as criminals, but their technology should rather be studied, adopted and encouraged with a better training to produce what the government have failed to produce (crude oil bye-products).

(ii) It has been revealed from the study that the various bye-products of crude oil refining could be obtained from the local refineries, the study therefore recommend that instead of criminalizing these activities, they should be sustained with the establishment of a standard monitoring board by the government to ensure environmental best practices in the trade.

(iii) The study revealed that the system could be sustained if given the required support and assistance. It is therefore recommended that crude oil should be sold to operators of these local refineries at an affordable price to avoid / minimize hacking of oil facilities to access crude oil. This will in turn reduce pipeline vandalism and spillages to ensure the protection and safety of the environment.

(iv) It has been revealed by the study that the bigger the distillery, the higher the volume of bye-product derivable. The study therefore recommends the upgrading / scaling-up of these local refineries to produce the volume of crude oil bye-products needed in the country.

(v) Nigerian scientists should be tasked to fabricate a better modernized instruments to be used in the bunkering distilleries in a large scale. Example, providing an electronic means of heating the pot, instead of using fire.

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