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Perspective: The Environmental Implications of Oil Theft and Artisanal Refining in the Niger Delta Region

Obenade, Moses[1] --- Amangabara, Gordon Tami[2]

[1]Department of Geography and Environmental Science, University of Calabar; National Centre for Technology Management (NACETEM), South-South Office, Bayelsa State, Nigeria
[2]Department of Environmental Technology, Federal University of Technology, Owerri, Nigeria

Abstract

Illegal oil bunkering and artisanal refining are on the rise in various communities in the Niger Delta and worsen the ecological destruction and social conflict caused by the oil industry. This review examines the concept of oil theft and artisanal refining and their environmental implications and concluded that Oil theft and artisanal refining in the Niger Delta are massive and growing problems. It is estimated that between 200,000 and 300,000 barrels of oil is lost daily to theft, known in the country as illegal bunkering. The majority of the stolen crude oil is taken to large ocean-going tankers waiting offshore, which export the oil to refineries outside the country to the rest of the world. Stolen oil is also refined in makeshift individual facilities into low quality petroleum products. The authors conclude that while acknowledging the seeming social and economic advantages that artisanal refining brings to the host communities, and the argument that artisanal refining actually represents an opportunity which could be harnessed by the government to enhance economic and social opportunities in an environment of high unemployment and poverty, especially in the oil-producing areas of the country, the disadvantages far outweigh the seeming advantages both to the community and the environment at large.

Keywords: Artisanal refining, Oil theft, Crude oil, Niger Delta, Environment, Pollution, Degradation, Bunkering, Pipelines.

1. Introduction

The Niger Delta region is the crude oil and natural gas hub of Nigeria with several networks of product pipelines (both surface and subsurface) which has created a social problem of vandalization of the product pipelines for the purpose of stealing the product. Oil theft and artisanal refining in the Niger Delta are massive and growing problems, it is estimated that between 200,000 and 300,000 barrels of oil is lost daily to theft, known in the country as illegal bunkering. The majority of the stolen crude is taken to large ocean-going tankers waiting offshore, which export the oil to refineries outside the country. Some of these tankers reportedly meet in mid-ocean to share and blend stolen oil, thus making it more difficult to identify, while the precise contours of the international networks may be difficult to discern; the rest of the stolen oil goes into artisanal refining which is the processing of the stolen crude in makeshift individual facilities into low quality petroleum products.

Fig-1. Map of Nigeria showing the Niger Delta Region
Source: Ite [1]

Many of the operators and oil thieves who are directly and indirectly involved in the bunkering and refining, make money in this multi-billion dollar business, they have secured social license from host communities by launching social welfare programs in the region; like drug cartels in Mexico, of militant jihadists in Pakistan and warlords in Somalia [2]. The militias in the region gained relevance by offering social services such as schools, security, food and education where government is unable or unwilling to deliver these services. In addition to the hard security challenge, oil theft has grown into a cancer that undermines the safety of the environment; the local oil producing communities suffer an incremental social death caused by a complex combination of economic and environmental complications, the environmental impacts oil theft and artisanal refining causes is clearly visible. No doubt oil bunkering and artisanal refining are on the rise in various communities in the Niger Delta and worsen the ecological destruction and social conflict caused by the oil industry.

This review examines the activities and impacts of oil theft and artisanal refining on the Niger Delta environment linking the discourse to the debate on development benefits of artisanal mining in developing countries. The author concludes that while acknowledging the seeming social and economic advantages that it brings to host communities and locals and the argument that artisanal refining actually represents an opportunity which could be harnessed by the government to enhance economic and social opportunities in an environment of high unemployment and poverty, especially in the oil-producing areas of the country. The disadvantages far outweigh the seeming advantages both to the community and the environment at large.

2. Oil Theft

Oil theft or illegal bunkering as it is known in Nigeria is an 'organized' theft of crude oil from product pipelines through the use of improvised conduits and direct pumping from oil well heads into barges by criminal syndicates. It may appear chaotic, but there is structure and strategy to this menace. It is a well- financed and highly organized criminal phenomenon – a parallel industry with a developed supply chain and growing sophistication. It involves trained artisans who break into high pressure pipelines, using welded valves and other complex instruments to siphon oil mostly in the night. Boat yards help construct and supply barges to the thieves to transport crude oil around the creeks. Local women supply firewood etc to workers at the camp. Many of the people involved in oil theft work for local markets, poorly refining products for communities desperate for affordable sources of energy. Some – far larger in scale, organization and significance – are managing an international export business with tentacles across the globe.

Oil theft has grown in scale since the end of organized insurgency in the Niger Delta and the introduction of the amnesty program in June 2009, their scale has grown beyond recognition. That year, the UN estimated thieves stole around 150,000 barrels of oil a day. By mid 2012, the Nigerian government estimated as many as 400,000 barrels were being stolen each day, costing the nation up to $1 billion per month in lost revenues. This escalation is unprecedented [3].

Oil is spilled at the point of siphoning, during transportation to camps and waiting vessels and at the camps (local refineries). Some of the oil stolen (about 25%) is delivered to small scale rudimentary refineries in the creeks and mangroves where it is heated in fabricated metal stills or drums to produce low grade diesel fuel. It's likely as much as 80% of the heavy end of crude cannot be refined and are just dumped into the environment. It is not possible to know how much of stolen oil is spilled but considering all the sources of spill as highlighted above, damage to the environment is enormous.

3. Artisanal Refining

Artisanal refining is the process of procuring stolen crude oil and in refining them in the so-called "bush" refineries with the use of local resources and skills (drawing on the indigenous technology used to distil locally made gin – ogogoro or kaikai). The basic materials typically involves rudimentary illegal stills – often metal pipes and drums welded together – in which crude oil is boiled and the resultant fumes are collected, cooled and condensed in tanks to be used locally for lighting, energy or transport [4]. The basic refining technique, first used during the Biafran Civil War, was resurrected and modernized by members of militant camps between 2005 and 2009, providing fuel and cash to support the Niger Delta insurgency. After an amnesty deal for militants was brokered in 2009, those in the militant camps returned to their villages, taking their knowledge of refining with them. As a result of the failure to prevent this at an early stage and the huge commercial rewards available, the trade grew and became more entrenched in the community. On the average, typical artisanal refinery produces about forty to sixty drums of diesel a day. Sites vary in size and reflect different levels of investment. Small scale sites tend to attract women and people with very low levels of capital to invest, whilst larger scale sites involve entrepreneurs who own relatively large production sites.

Fig-1. (a) Artisanal Refining of Illegal Crude Oil

(b) Site of Illegal crude refining Source [5]

Severe damage is done to the environment as a result of artisanal refining. The refining process leads to a significant quantity of wastage being dumped in rivers and streams or on land – two drums of crude oil translate into one drum of product once refined. The distilleries (Fig 2) are heated on open fires fed by crude oil that is tipped into pits in the ground. As a reasonable quantity of the oil burns away, some seeps into the ground during the process of refining. The resulting oil spills from broken pipes and wastes from tens of thousands of makeshift refineries combine to produce enormous environmental pollution on land and in the creeks. Apart from the high risk of self-harm from artisanal refining – a large number of accidents, fires and explosions occur [4].

4. The Environmental Impacts

According to Ogbuagu, et al. [6] , it has been reported that petroleum refining contributes solid, liquid, and gaseous wastes in the environment. Some of these wastes could contain toxic components such as the polynuclear aromatic hydrocarbons (PAHs), which have been reported to be the real contaminants of oil and most abundant of the main hydrocarbons found in the crude oil mixture [7] . Once introduced in the environment, PAHs could be stable for as short as 48 hours (e.g. naphthalene) or as long as 400 days (e.g. fluoranthene) in soils [8] . They thus, resist degradation and, remain persistent in sediments and when in organisms, could accumulate in adipose tissues and further transferred up the trophic chain or web [9].

Lyons, et al. [10] opines that acute exposures to aromatic hydrocarbons, which are common constituents of oil, are known to cause respiratory symptoms and high molecular weight PAHs are of significant concern because of the mutagenicity, carcinogenicity and bioaccumulation in organic tissues due to their lipophilic character [11]. Increasing evidence, mainly from the *Prestige* oil spill, suggests that human population exposed to risks may experience long term respiratory effects and chromosomal damage [Rodríguez-Trigo, et al. [12], Zock, et al. [13],Perez-Cadahia, et al. [14]]. It has also been widely reported that exposure to PAHs can cause skin damage, bronchial symptoms in children and has been implicated in the pathogenesis of skin tumours as well as chromosomal disorders.

Evidence of acute exposure to oil spill around the world demonstrates the potential adverse health effects associated with petroleum–contaminated environment. Some host communities like the Ogonis have suffered from significant environmental degradation and health impacts including increase in respiratory diseases and cancer cases [15]. According to [4], the health of several Ogoni communities has been severely compromised as a result of surface and groundwater contamination associated with petroleum exploration and production operations. However, there appears to be little information on potential human health risks of exposure to oil pollution in the oil–producing communities in the Niger Delta region over the past five decades. There is high probability for a wide range of toxic responses in many host communities of the Niger Delta including behavioural abnormalities, respiratory diseases, suppressed growth, induced or inhibited enzyme, adverse physiological responses, blood disorders, negative reproductive outcomes, reduced immunity to disease and parasites, and cancers of the various organs [16].

Fig-3. Environmental degradation around campsite

Source: [17]

Oil pollution in many intertidal creeks have left mangroves denuded of leaves and stems, leaving roots coated in a bitumen-like substance sometimes 1 cm or more thick. Mangroves are spawning areas for fish and nurseries for juvenile fish and the extensive pollution of these areas is impacting the fish life-cycle [4]. From the UNEP study, it was found that fish tend to leave polluted areas in search of cleaner water, and fishermen must therefore also move to less contaminated areas in search of fish.

Despite community concerns about the quality of fish, the results show that the accumulation of hydrocarbons in fish is not a serious health issue in the region but that the fisheries sector is suffering due to the destruction of fish habitat in the mangroves and highly persistent contamination of many of the creeks, making them unsuitable for fishing. Where a number of entrepreneurs had set up fish farms in or close to the creeks, their businesses have been ruined by an ever-present layer of floating oil.

Any crop in areas directly impacted by oil spills will be damaged, and root crops, such as cassava, will become unusable. When farming recommences, plants generally show signs of stress and yields are reportedly lower than in non-impacted areas [4].When an oil spill occurs on land, fires often break out, killing vegetation and creating a crust over the land, making remediation or re-vegetation difficult.

UNEP in its environmental assessment of Ogoniland observed that Bodo West, in Gokana Local Government Area, there was an increase in artisanal refining between 2007 and 2011 has been accompanied by a 10% loss of healthy mangrove cover, or 307,381 m^2, and that if allowed to continue unabated, this may lead to irreversible loss of mangrove habitat in this area.

UNEP in its report clearly stated that wetlands around Ogoniland are highly degraded and facing disintegration as a result of oil pollution. The study concludes that while it is technically feasible to restore effective ecosystem functioning of the wetlands, this will only be possible if technical and political initiatives are undertaken [4].

Most people in the Niger Delta communities are exposed to petroleum hydrocarbons in outdoor air and drinking water, sometimes at elevated concentrations, according to Amangabara and Njoku [18] the water table around Bolo and its environs is already being impacted by crude oil related activities; They are also exposed through dermal contacts from contaminated soil, sediments and surface water. Since average life expectancy in Nigeria is less than 50 years, it is a fair assumption that most members of the current Niger Delta communities have lived with chronic oil pollution throughout their lives.

4. Summary and Conclusion

Environmental degradation is the most visible and direct impact of illegal refining and oil theft. Photographic evidence gathered at sites visited across Delta, Bayelsa and Rivers States show the terrible impacts of artisanal refining to the local environment. Vegetation is visibly affected by the resulting pollution; crude saturates the mangroves and oil disturbs the surface water. The environmental destruction associated with illegal oil refining harms traditional livelihoods tied to the land and water.

Oil pollution is a significant barrier to cooperative integrated fish farming, one of the few businesses that could provide sustainable employment and incomes. Nigeria spent over N100 billion on the importation of frozen fish in 2010, some of which is necessary for Niger Delta communities to replace the fish they once caught [17]. Oil theft and artisanal refining has significant health risks for those involved and the environment as well. The handling and heating of the crude oil pollutes the air. The camps have a toxic feel and the health impacts of those working there are unknown. Communities are constantly exposed to inhalation of poisonous gases, causing coughing and breathing problems. However, many are in denial about the potential medium to long-term health implications because of the short term economic gains.

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