



The Trail and True Costs of Oil Refining in Nigeria.

Health of Mother Earth Foundation

Oil Trail and True Costs in Nigeria

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Preface

For more than 50 years now, Nigeria's major source of foreign exchange earning has been crude oil, but the oil wealth comes at a great cost: death and devastation of the ecosystem without substantive actions to restore the ecosystem.

It is exactly 64 years since the commercial export of crude oil from the lands, rivers and creeks of the Niger Delta in Nigeria began. In that period, the Nigerian state and its oil company partners generated tremendous wealth. Unfortunately, not only are the oil-producing states plagued with the worst employment indicators, unusually low life expectancy, high levels of conflict and criminality, poor education and health records, massive pollution and livelihood losses; but other communities that are fence line to oil-related facilities such as refineries, also suffer similar fate.

The entire country and most especially the oil-producing region has declined from a thriving agricultural and fisheries hub to an ecological wasteland with angry and destitute people. Investigative journalist, Gabriel Ogunjobi, reports on the activities around oil refining, and the compromises and stakes made for Africa's most populous nation.

Nnimmo Bassey

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List of Abbreviations

bpd:	Barrels per day.
CRU:	catalytic reforming unit
EGASPIN:	Environmental Guidelines and Standards for the Petroleum Industry In Nigeria.
FCCU:	Fluid Catalytic Conversion unit
GIS:	The Geographic Information System
IOCs :	International Oil Companies
KPRC :	Kaduna Petroleum Refining Company
MOSOP :	Movement for the Survival of the Ogoni People
MTBE :	methyl tertiary butyl ether
NPRC:	Nigeria Petroleum Refining Company
PAFPI :	Poverty Alleviation for the Poor Initiative
PES:	Philadelphia Energy Solutions
PHRC :	Port Harcourt Refining Company.
SPDC:	Shell Petroleum Development Corporation.
UNEP:	United Nations Environment Programme.
USEPA:	United States Environmental Protection Agency.
WHO:	World Health Organization.
WRPC:	Warri Refining and Petrochemical Company.



Introduction

OIL REFINING IN NIGERIA

The first cargo of crude oil from Nigeria was shipped in February 1958 on the oil tanker ship, *Hemisfusus* to Britain. And, as the economy of the nation grew, demand for petroleum products was met by importation.

However, shortly after independence the Shell-BP Petroleum Development Company saw an opportunity to meet the product needs of the country. It built the first refinery—the 38,000 barrels per day (bpsd) facility—near Port Harcourt and commissioned it in 1965. Then, the Federal Government of Nigeria acquired 50% shareholding under a participatory agreement with Shell-BP.

Thus, began Nigeria's ownership of refineries, their basic function being the separation of crude oil into various light and heavy components; piping crude oil through hot furnaces and in the process, discharging liquids and vapours.

Port Harcourt Refinery

The refinery later became registered as the Nigeria Petroleum Refining Company (NPRC) in 1972 when the Government of Nigeria increased its shareholding to 60%, but it remained as a Joint Venture (JV) Company under private sector control and **management**.¹ The Port Harcourt Refining Company (PHRC) is located at Alesa Eleme near Port Harcourt with a jetty (for product import and export) located 7.5km away.

In 1983, the Port Harcourt refinery with 60,000 bpsd nameplate CDU capacity and the tankage facilities were acquired by Nigerian National Petroleum Company (NNPC) from SHELL. Subsequently, the new 150,000 bpsd export refinery was built in 1988 and commissioned in 1989. This brings the combined crude processing capacity of the Port Harcourt Refinery to 210,000 bpsd.

According to **Mr. Kyari, NNPC Group Managing Director** in justifying the sum of 1.5 billion dollars earmarked for rehabilitating the facility in 2021, to build refineries of this sort today would cost around 7 billion and 12 billion dollars. This is not including “things you do outside the construction battle limits

like utilities that are never accounted for when estimates of this nature are done.”²

Warri Refinery

Based on projections by the economic surveillance unit of the Nigerian National Oil Corporation (NNOC) which indicated that at the rate the economy was growing in the mid-1970s, demand for petroleum products would outstrip production by NPRC, the NNOC commenced work on a project to build a second refinery to be sited in Warri.

The Warri Refinery—Warri Refining and Petrochemical Company (WRPC) is the first Nigerian government wholly owned refinery and was commissioned in 1978 after the merger of the then Warri Refinery and the Ekpan Petrochemical Plants. A 100,000-bpsd conversion plant, complete with a naphtha catalytic reforming unit (CRU) and a Fluid Catalytic Conversion unit (FCCU) for gasoline, it was built to add value to some of the refinery by-products such as propylene-rich stock and decant oil.³

Kaduna Refinery

The petroleum product needs of the country were being fully met by both existing refineries, i.e. Port Harcourt and Warri refineries. Economic activity was growing in the northern as well as in the southern parts of the country and products were being delivered by long-haul trucks **to the North as well as rail** ⁴

Kano and Kaduna were experiencing rapid growth, as well as sections of the Middle Belt. Projections again indicated that by the mid-1980s, demand would outstrip the production capacity of the two existing refineries. Therefore, the decision was made to build a third refinery and locate it in Kaduna, closer to the high-demand areas in the North.

The Kaduna Refinery was completed and commissioned in 1980. Like the Warri Refinery, it was a modern conversion refinery but had two parts: a 50,000 bpsd Fuels Plant with a CRU and an FCCU; and a 50,000 bpsd Lubes Plant for the production of lubricating oil blendstocks and waxes and bitumen. In 1986, the capacity of the first crude train was expanded to 60,000 B/D.

The expansions have increased the current nameplate capacity of the refinery to 110,000 B/D.⁵

The Kaduna refinery was built to be able to process waxy crude which feedstock was imported from Saudi Arabia and Venezuela, as all Nigerian crudes were naphthenic. Curiously, despite being the only refinery in Nigeria with this feature, it is situated several miles away from Nigeria’s seaports.

TURNING ABOUT THE TURNAROUND

Nigeria's refineries, with a combined, installed capacity of 445,000 bpd and linked by a comprehensive network of pipelines and depots strategically located throughout **the country**, have, in the last about 15–20 years, had a poor operating record with average capacity utilisation hovering between 15 and 25% per annum.⁶ As a result, 70–80% of the national petroleum products demand is met **through import**.⁷

In fact, they have been operating at a huge loss. According to *BusinessDay*,⁸ the country may have spent about \$25bn on refineries in 25 years. In the 13 months between February 2020 - February 2021 alone, **the four refineries lost** a total of N104.3 billion while not processing any crude oil.⁹ In August, 2021 the Minister of State for Petroleum Resources, Timipre Sylva disclosed that the Warri refinery alone got \$897,678,800, while Kaduna Refinery would cost \$586, 902, 256, for their rehabilitation. All three refineries were reported to have together gulped about N100billion in supposed attempts to get them working in 2021.

One would think the above is bad enough. But on August 23 2022, NNPC in its Federation Accounts Allocation Committee (FAAC) presentation **disclosed that all the N2.38 trillion revenue it made from oil sales was spent as they came in on projects** including refineries repairs, Pipeline Security & Maintenance cost, oil search (Frontier Exploration Services), National Domestic Gas Development, cost recovery/cash call etc! Nothing was deposited into the government's account in six months.¹⁰ **The Gaurdian also reported** that on average, NNPC spends about N68 billion in paying salaries and other expenses at the moribund refineries, yearly. As of 2021, NNPC had 7,338 staff, 1,701 of the workers were at the Kaduna, Port-Harcourt and Warri refineries. About 660 staff, representing 8.99 per cent of the company's total workforce is at the KRPC, and 506 are at the PHRC and 437 are at the WRPC. In the last two years, the losses have amounted to an average of N136 billion. Curiously, this is coming at a time oil prices within the last six months hit their highest level in years and many oil-producing countries in the world are making huge profits.¹¹

At this alarming rate, the refineries can be likened to the American Pygmy Shrew with a pulse clocking in at more than 1000 per minute and needing lots of food to keep their phenomenal metabolism going. But, despite all this amount of "food" at these short intervals, the refineries remain comatose and non-productive. Not even a drop of fuel is being refined by them.

Some quarters have read the writing on the wall: the comatose refineries are

a burden on the Nigerian economy and people, even as the government keeps turning about their rehabilitation and turnaround. “The non-functioning of the refineries has resulted in the payment of fuel subsidy [over N6 trillion subsidy government is currently paying], importation of bad fuel, and the resurgence of long queues at filling stations across the country which has seriously impacted negatively on the wellbeing of Nigerians,” agrees Nigeria’s House of Representative. The Green Chamber **urged the Federal Government** to hand over the moribund refineries to International Oil Companies (IOCs) operating in Nigeria or other competent private organisations with a view to resuscitating the facilities for functionality.¹²

One wonders if the recent transmutation of the NNPC to NNPC Limited in accordance with the Petroleum Industry Act (PIA) is part of the Government’s effort at “resuscitating the facilities for functionality”. Many Nigerians do not share in this sentiment; it is mere “rebranding and reinforcing of corruption”, they believe. Only time will tell.

Enter the Dangote Refinery

While Nigeria continues to pay what is believed to be lip service to fixing its insatiable, decrepit refineries and disperse the long queues at filling stations, under construction since 2017 in the Lekki Free Zone near Lagos, is the Dangote Oil Refinery, a 650,000-barrels per day (BPD) integrated refinery project.

On the **official website of the Dangote Group** the project is described with all grandness. A multi-billion dollar project that promises to create a market for \$21 Billion per annum of Nigerian Crude, the Pipeline Infrastructure at the Dangote Petroleum Refinery is touted as the largest anywhere in the world, with 1,100 kilometres to handle 3 Billion Standard Cubic feet of gas per day. Having a 435MW Power Plant, it is expected to be Africa’s biggest oil refinery and the world’s biggest single-train facility.

“The Dangote Refinery promises to meet 100% of the Nigerian requirement for all refined products and also have a surplus of each of these products for export,” says the website.¹³

However, the project has been moving at the pace of a crippled millipede, with the **date of completion ever shifting** ¹⁴ Aliko Dangote first announced the intention to build a refinery in 2013. But major structural construction **began in July 2017**, and it was later estimated that the refinery would be mechanically complete in late 2019 and commissioned in early 2020.¹⁵

The project has continued to delay and the cost has shot to \$19 billion from Dangote’s earlier estimates of \$12 billion - **\$14 billion** ¹⁶ In August of 2021, the Federal Executive Council (FEC) **announced** its approval of the sum of \$2.76 billion for the acquisition of a 20 percent minority equity stake in the Dangote



Photo Credit: <https://www.vanguardngr.com/>

Refinery.¹⁷ Perhaps this will speed up the project's completion, as Dangote believes the refinery will be commissioned “**before the close of President Muhammadu Buhari's presidential term**”.¹⁸

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But, the true costs of oil and refining are not all postponed; they are ongoing in the communities besieged by the oil pipelines and refineries—facilities which, more often than not, end up separating fence line communities from the enjoyment of good health and a peaceable and beneficial environment. This investigation follows the trail of oil into fence line communities in Rivers, Delta, Lagos, and Kaduna States, respectively, of Nigeria.



Part Two
**Rivers State and Delta
State**

THE AFFLICTED PEOPLE OF Ogoni CLEAN-UP

Friday Kpeloi, sat quiet with his arms folded, as he listened to his two colleagues narrate how their land, water and atmosphere were contaminated by oil pollution. The two veteran activists of the Movement for the Survival of the Ogoni People (MOSOP) were Lazarus Tamana and Pastor Christian Lekova Kpandei. The Movement's pioneer, Kenule Beeson Saro-Wiwa had been hanged with eight other activists in 1995 by General Sani Abacha. They had sought justice for their people who suffered the consequences of crude oil mining on their land.

Described as one of the world's worst environmental catastrophe, the Ogoni communities; Eleme, Gokana, Kana and Tia local government areas of Rivers State were overflowed in 1970 by oil following the corrosion of the Trans-Niger pipelines owned by the Shell Petroleum Development Corporation (SPDC). The clean-up of the **2010 Deepwater Horizon disaster** caused by the same international oil giant has become a **done deal** but Ogoniland remains saturated in sticky residue of oil.²⁴ The aquatic habitat is still polluted, vegetation is dried up and human lives are strangled by the effects of this unending depletion.

Successive spills between 2008 and 2009 from defective Shell pipelines led to another massive contamination in Bodo. The Ogoni people accused Shell of late responses to the two instances, leaving oil to pump into the creeks for over two months. While the legal battle instituted by a law firm, Leigh Day, against Shell before the High Court in London was still ongoing, the oil giant eventually **agreed to a compensation package of £55m** for 15,600 Nigerian fishermen and Bodo community.²⁵ It was the first time compensation would be paid over an oil spill in Nigeria.

Kpeloi was apprised of the unfolding events in his homeland from the United States where he lived at the time: reading articles, including some written by Saro Wiwa himself, and phoning his kinsmen settled home. The news was not always pleasant. One particular triggering instance was when Saro Wiwa led the Ogoni people in a non-violent protest to demand clean-up of their indigenous land. They declared Shell persona non grata and banished them across Ogoniland. But by 1995, nine of these activists were charged for incitement and sentenced to death by hanging.

The murder of the Ogoni nine ignited undying resolve to tackle the government and oil giants both home and abroad, ultimately garnering the interest of the United Nations as well for Ogoni clean-up. Indigenes abroad felt the urge to return home; Tamana, for example, returned from the UK and Kpeloi from the US, to become frontline fighters. "But I am not back home to finally settle" Kpeloi told me, insisting that he would return to the US whenever the struggle was over. His hometown, Kegbara Dere, neighboring Bodo, bears no sign of development, apart from the tarred road that leads to the oil manifold station. The locals are disconnected from the power grid because the transformer is non-functional. But this is the least of their problems. After the manifold station was blown up during the 1967 civil war, floods brought the still-flowing oil beyond the manifold spill area to farms, acres of mangroves, and the creeks that sustained most of the riverine area of Kegbara Dere.



Jetty at the Bodo community, Rivers state. Aquatic life impossible here because the freshwater has become contaminated by oil spill.

When oil was spilled from Bodo pipelines - transporting crude through the sea into the edge of Bonny Island for offshore refining - their shared waterfront was contaminated. The creek water still clots with oil in some places till this very moment.

The two communities are like Siamese twins; same breath, same death. For more than six decades, the people of these two communities have been firsthand victims of the impacts of oil contamination. When some indigenes of Bodo were compensated, Kegbara Dere was exempted and Kpeloi says he won't give up for life until that happens. But aside from this activism, he himself has become a victim of the story.

In late 2021, Kpeloi began to experience difficulty in breathing. "When the cough was getting severe, I decided to visit the hospital for a check-up in February," says the activist, with a quaint English accent. He brought out a paper from his chest pocket, reading the doctor's diagnosis: "Chronic Obstructive Pulmonary Disease."

As if to prove that he was struck with the illness in Nigeria, he tried to look for another piece of paper. The paper, as he would later find, was a sheet from the 263-page report by the United Nations Environment Programme (UNEP) over Ogoniland pollution in 2011.

The report revealed that benzene, a known carcinogen, was detected in all air samples at concentrations ranging from 0.155 to 48.2 $\mu\text{g}/\text{m}^3$. Approximately 10 per cent of detected benzene concentrations in Ogoniland were higher than the concentrations WHO and the United States Environmental Protection Agency (USEPA) report as corresponding to a 1 in 10,000 cancer risk. Many of the benzene concentrations detected in Ogoniland were higher than those being measured in more economically developed regions around the world.



Friday Kpeloi.

According to the UNEP report, Ogoni people should be placed on health monitoring but this is not happening yet, says Kpeloi.

In Kegbara Dere, for instance, there had been a series of spills from 1990 to 2009 at the Bomu manifold area owned by Shell. In April 2009, there was a fire following an oil spill on the Trans-Niger Pipeline, which transports over 120,000 barrels per day through Ogoniland. Although Shell claimed to have completed two remediation projects in the Bomu manifold area in the past, most of the manifold area was still covered in oily residues, soot and ash.

UNEP's findings corroborated that some 9,000 square metres of the manifold area are heavily polluted, the concentration of oil on the surface being above saturation, resulting in an oily sheen on pools of standing water and a strong oily smell.

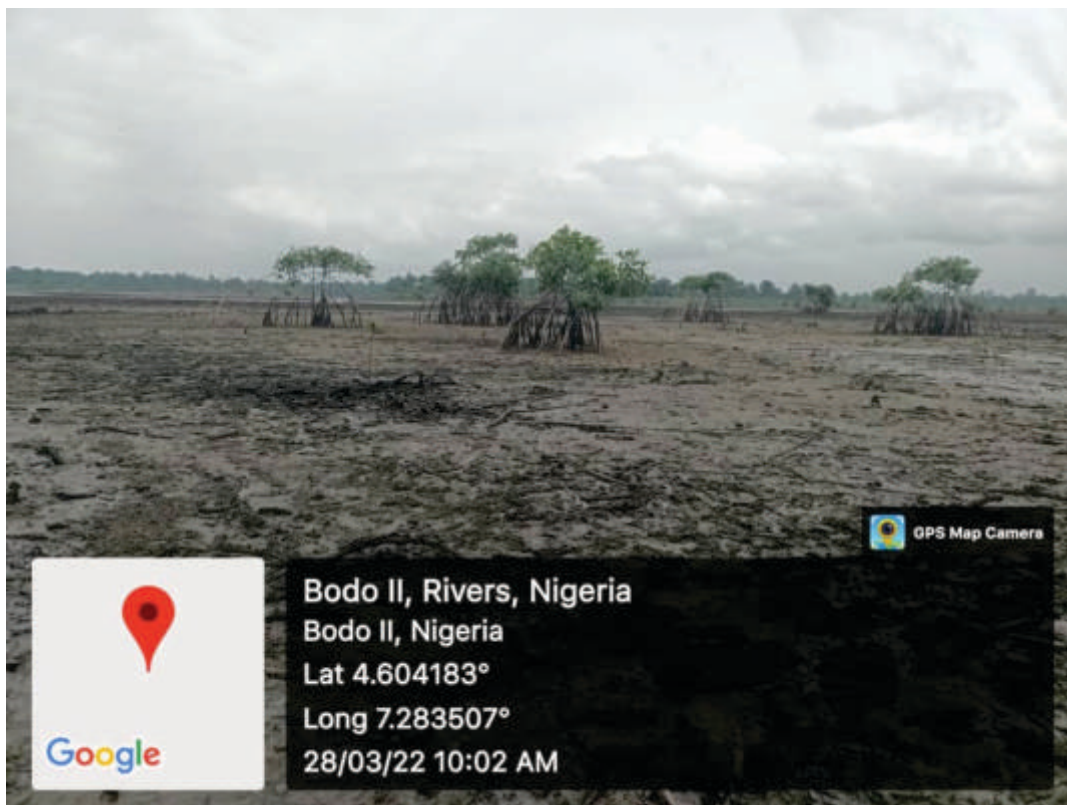
The highest soil contaminations, at 63,600 mg/kg TPH, were found in the top 0.60 metres of a borehole in the most heavily contaminated area directly bordering the southernmost part of the manifold. This is extremely high and is far above the Environmental Guidelines and Standards for the Petroleum Industry In Nigeria (EGASPIN) intervention value of 5,000 mg/kg.

The 70-year-old Kpeloi is not only nursing a terminal illness, he is bereaved, his younger brother died at the age of 68 to an undisclosed illness early this year. Yet, Kpeloi seemed optimistic of life and his fight for justice.

"There are cases that went on for seven, eight years before justice," Kpeloi noted, before adding that their case was before the court in the Netherlands.

Aside compensation in some quarters across Ogoniland, the agreement with the Shell companies included clean-up of all polluted areas. “But as far as I am concerned, clean-up has not started. What they are doing is crude and ridiculous,” Tamana declared.

In 2015, Nigeria’s President Muhammadu Buhari \$1bn restoration fund for the **pilot clean-up project** ²⁶



Pastor Christian Lekova Kpandei, a decoder with Amnesty International, is at the frontline of monitoring oil spills. He holds the oil corporations accountable towards clean-up. In 2016, he had an experience that shook his conviction.

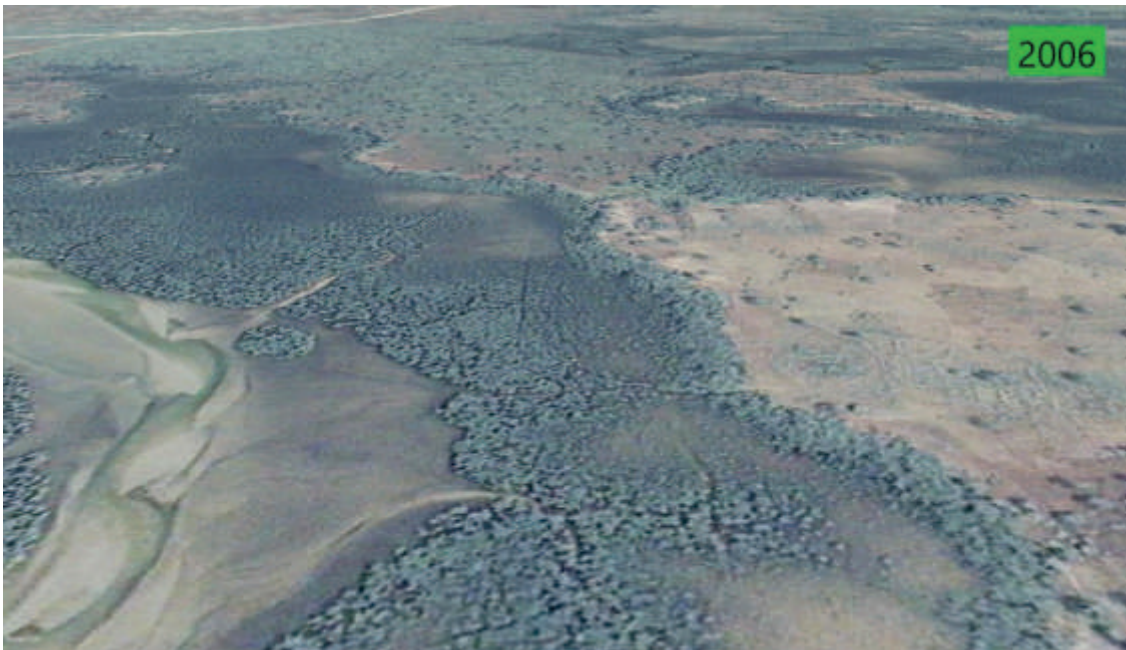
“Whilst I was tracking the patterns of the spills in the creeks, the Army arrested and detained me for two weeks,” he remembers. “Since then, I told myself there is no point dying for nothing while some people are in the cities enjoying the wealth. The striking questions are these: How do these people know where to burst? How do they transport the contents when the entire Ogoniland is militarised? They are aided by the military.

” Christian benefited from the paltry N600,000 compensation but the remaining part of the bargain, which was restoring their farmlands remain a hard nut. The creek at Bodo is polluted by oil directly flowing into it, killing the mangroves where fishes used to lay their reproductive eggs and crabs take as shelter.

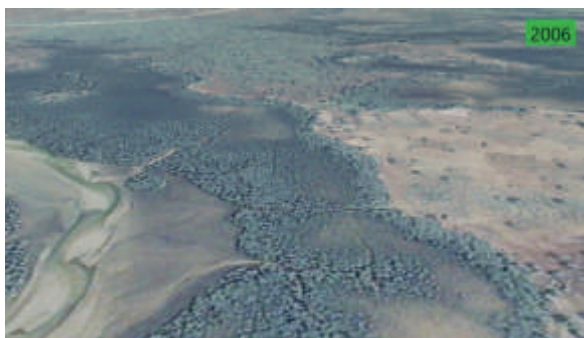


In January 2015, Shell admitted responsibility for the Bodo spills, pledging to compensate the people and clean up Bodo Creek. Whilst Bodo residents have since received the compensation, clean-up is haphazardly done, this investigation can confirm. Apart from residents' allegation that the contractors were using simple tools such as shovels to sandfill spill sites, satellite imagery views from 2006 till 2020 showed no signs of Bodo environmental restoration.

The Geographic Information System (GIS) analyses showed that the coastal fringes of Bodo were still occupied by mangrove vegetation and appeared healthy, resembling a community of short water plants on the river surfaces as of 2006.



But the continued oil spill in the community disrupted this ecosystem. After the 2009 oil spill disaster in the area, the contaminants progressively weakened the integrity of the swamp vegetation. Bodo swamp in 2013 became less vegetative, losing its appearance of dense shrub-like assemblage. The combination oil spill and the mangrove vegetation form a black, brown and green texture on the surfaces thereby compromising the health of the swap ecosystem.



By 2020, sparse plants and trees rising from dark coastal soil suggests that Bodo is still not completely rid of oil contaminants.

Apart from Bodo and Kegbara Dere, this reporter confirmed that many other communities outside Nigeria's Ogoniland are still battling the ripples of oil contamination. For example, all the pipe borne water plants in Bori, Khana LGA were shut down because of the suspicion of contamination.

Not only that, the wide stretch of riverine area near an old oilfield in Goi is soaked in oil, with earth crust sinking in the blackish abyss. The oil residue renders the entire land useless.

SOOT IN RIVERS

Despite the controversy dogging Ogoniland clean-up, the environmental pollution in Rivers is worsened by illegal oil bunkering in the state. The consequence of this is illegal artisanal refining of the stolen oil, which in turn leads to the release of carbon black or 'soot' into the ecosystem. From one creek to the other, flares envelop many parts of the state which is about 60 per cent landmass and turns a bright morning day into an evening. The cloud is misty as if rain was imminent. When it does rain, even that water is not potable and often comes as acid rain.

In Port Harcourt especially, homes are rarely painted white these days because their

walls are stained with the soot. The windows in urban settlements of Rumuodara and Rumuokoro in the capital city are coated by deposits of soot and the nostrils of the dwellers release black fluids whenever they sneeze.

Pius Dukor, a socio-political commentator based in the state's capital, recalled how he lost his voice for more than seven days after inhaling the thick soot. The choking smoke, he said, seized his breath but luckily spared his life at the end.

Regina is one of the victims of the soot problem. The mid-40-years--old woman, who hailed from Bodo, a 30-minute drive from Port Harcourt, recounted her stillbirth experience in 2013. She sells periwinkles for a living in the soil-rich state but because Bodo shores had become toxic for aquatic creatures, Regina would paddle a canoe far to Bonny to pick periwinkles where the water is relatively fresh.

Pregnant women like Regina were advised to keep off from the shores to reduce the health risk on their babies. "But I was always going to the shores to pick periwinkles so I lost my baby," she says. "I was feeling a sharp stomach pain that evening in 2013 and at the same time bleeding until I was rushed to the clinic."

UN experts have opined that the environmental restoration of Ogoniland may take at least 25 years, adding that all sources of ongoing contamination, including the artisanal refining must be stopped before the clean-up of the creeks, sediments and mangroves can begin.

Lately, Rivers state governor Nyesom Wike showed efforts to stop oil bunkering. He demanded a comprehensive list of illegal refineries and their operators across the 23 LGAs and also promised the disbursement of N20 million to each of the 23 local council chairmen ready to clampdown on the illegal refineries in their creeks.

OIL REFINING OR RENEWABLE ENERGY?



Goi community now a shadow of its old self.

At various quarters, there are conversations that artisanal refining, though illegal, is bridging the gap for the demands of petroleum products. Government, on the other hand, is pushing for the establishment of modular refineries to halt illegal refineries, an alternative to keep the oil market afloat. But these two positions are half story. From the inception, refining oil in Nigeria has come at great cost with the government losing billions of naira to rehabilitate ailing refineries that has had productivity for the decades of existence. Also, oil production has far-reaching public health risks for the communities hosting the government-owned refineries or the pipelines.

For the first time in 43 years of operation, the NNPC published an audited financial report in 2020. In 2018 alone, the report revealed that the refineries incurred a total loss of N154 billion, with the Port Harcourt refineries alone losing N45.59 billion. But this huge loss was not even for rehabilitation but administrative maintenance including paying workers' salaries.

In 2021 alone, the NNPC **spent** N100 billion on the rehabilitation of the nation's four refineries in 2021²⁷, yet no success. The PHRC is made up of two refineries, located at Alesa Eleme near Port Harcourt with a jetty (for product import and export). The jetty is located 7.5km away from the refinery complex. In 1983, the Port Harcourt refinery with 60,000 barrels per stream day (bpsd). Subsequently, a new 150,000 bpsd export refinery was built in 1988 and commissioned in 1989. Both oil refineries possess a combined capacity of 210,000 barrels per day making PHRC the "biggest oil refining company in Nigeria.

At the PHRC's current moribund status since 2019, the federal government has processed \$98m and N17.2bn as partial payments for the **ongoing rehabilitation**²⁸ of the Port Harcourt Refining Company which will cost a total of \$1.559 billion at completion by the end of 2024. The Bureau of Public Enterprise initially commenced plans to privatize the four refineries, partly because Dangote's incoming refinery with 650,000 bpsd capacity may drive government out of oil business. The plan was later jettisoned on the request of the NNPC around March 2021.

For the communities on the fencelines of these Port Harcourt refineries, their consequences are the spilled oil cloaking farmlands and killing their farm yields. The wastewaters from the PHRC are often not properly disposed of, ultimately contaminating residents' source of drinking water. For instance, at Ekerikana community where the Port Harcourt Refinery discharges effluents into their river, the people complain that the underground water emits oil odour and becomes harmful when used domestically. It is not exactly different from the spill from the NNPC product pipeline that runs through Nisisioken Ogale in Eleme around 2005. The groundwater was found contaminated with benzene, a known carcinogen, and the presence of methyl tertiary butyl ether (MTBE). The benzene concentration was at levels over 900 times above the World Health Organization (WHO) standards. MTBE is not a part of crude oil but an additive added to refined products at the refinery. Its presence proved that the spill was not from the crude oil but that of a refined product, which the NNPC was directly responsible for.

In Kegbara Dere too, there had been a rupture in the 24-inch NNPC Bonny to Port Harcourt Refinery trunk line which runs in a north-south direction transporting crude oil from Bonny Terminal to the Port Harcourt Refinery. The UNEP estimated that sediment in the creek was highly contaminated over an area of 20,000 square metres. The contamination in the immediate vicinity of the spill was never remediated, as suggested by the soil sampling results. Instead of over-reliance on fossil fuel, Steve Trent, founder of the Environmental Justice Foundation, stressed the need to transition to renewable energy, which is environment-friendly.

According to him, “the average wind farm’s capacity is double that of what it was in 2016, and solar and wind now provide the cheapest source of new power for 67% of the world.

“Renewables are ready now and strong state investment in accelerating the pace of renewable roll-out and boosting energy efficiency can see us end the fossil fuel age for good. Decisive action on climate is not a ‘cost’: it is an investment, not just in our future, but in our survival. Such investment would represent the greatest cost-saving of human history.”

DELTA, NIGERIA: A LOST HERITAGE



NNPC oil pipelines inside Warri refinery.

The Warri refinery is hosted in the sprawling neighbourhood of Ifiekporo and Ubeji communities. Its entrance is manned by the military conducting stop-over searches for vehicles entering any of the two communities on the fence line. For motorcycles and tricycles, they ride past gently. Within this refinery road, commuters give a furtive look at the pipelines of Nigeria’s commonwealth that transport its crude content from other parts of the state where it is being explored to the tank farm, which is another five kilometres away from the refinery. From the tank farm, international and local oil companies ferry the vessels on the Atlantic front in Delta offshore for refined oil.

Living on the fenceline of a refinery in Nigeria is characterized by one thing in Delta: an untamed rage gravitating towards militancy. Apart from the greenery along the same paths with pipelines, what oil-rich Warri represents needs no telling. There is crude everywhere; the nose perceives its smells seeping from the nooks and crannies, as if the whole place would be in flames if there was any spark. There are traces of oil in the Ifiekporo creeks but it is difficult to trace the source on foot.

Where is the smell oozing from? Certainly, not from the tank farm. Whether or not the land was of tranquillity or militancy will manifest in a bit.

Flashback to the days of yore. Warri was the nerve of the state's economy, dubbed as the oil city. Its prominence in Nigeria's south is only surpassed by Ogoni's Rivers state, bearing the same natural resource but in larger quantities. The thing about Nigeria's crude oil is that the moment it came, it overrode the nation's existing priority. The country's economy and the citizens are yet to recover from the effect; Nigeria tarnished agriculture, especially cocoa and palm oil farming, which was the economic mainstay for the new bride (crude oil).

Warri had attracted the fortune of oil multinationals, Shell Petroleum Development Company of Nigeria (SPDC), and the Warri Refinery and Petrochemical Company (WRPC), the youths flourished and the city boisterous. Alas, a dangerous trend hit the oil city many years later.

Before noon on March 30, I arrived at the tank farm, still looking for the source of the oil smell. A friendly soldier ushered me to the sight of the berthed ships waiting for the vessels to be loaded. There was a tailback of tankers clogging the vicinity but the soldier tells me "the traffic is still subtle this time"



Tank farm at Ifiekporo.

According to him, the place was more rowdy at the period many states were said to be frustrated by fuel scarcity between February and March. He mentioned that all that happened back then was hoarding of fuel to hike prices, not scarcity.

As I moved a few miles out of the tank farm, I caught the sight of some teenagers and young adults breezing in and out of the creeks that led to the waters. Their bodies were dripping black oil. Behind the shelters where they came from on canoes with blue plastic barrels on canoes are swamps. Away from the waterside, they load the heavy barrels onto the truck beds.

Such bunkerers litter the creeks around the oil refinery and the tank farms. Some other times, they tap directly into pipelines away from oil company facilities, and connect from the pipes to barges that are hidden in small creeks with mangrove forest cover. They pollute the water bodies while transporting stolen crude oil to the illegal refining sites where they 'cook' the oil and flare soots into the atmosphere in the process.

Soot is a threat to public health but no one in the community was willing to talk to me about the impacts of this oil theft.

Oil theft in Delta is an organized crime of sea pirates whose history hacks back to the Warri crisis of 1997 and 2003. First, a crisis over land ownership and supremacy erupted in 1997. Militias fighting site of a local government headquarters went on a five year rampage that unhinged the city. By 2003, the gun-toting non-state actors and the Nigerian navy clashed over illegal oil bunkering. They use the waterways to transport arms into the country, intimidating oil workers on the sea and also hijacking their vessels.

This was how Delta deteriorated over the years by prolonged violence. Because of oil. Oil multinationals such as Shell, Chevron, Nigeria National Petroleum Corporation, and its subsidiaries, and other ancillaries and servicing companies, now lay supine. And in the mid-2000s, they fled the city in droves. Shell initially downsized in the mid-2000s through SoFu (Securing our Future) initiatives, and later shut down its operation in Warri, a development that threw the state into turmoil. Oil production was severed because flow stations were attacked by non-state gunmen.



Erhoike flow station of Kokori/Orogun oil bloc formerly under Shell's OML 30.

Chevron also closed its onshore facilities, and then its main export terminal at Escravos. Both Shell and Chevron declared *force majeure*-an inability to fulfil their obligations due to events beyond their control on Nigerian exports.

Human Rights Watch concluded that the Warri crisis was a classic example of a “resource war”, connected to the oil bunkering around the Escravos River and other oil fields.



Substandard clean-up at Kokori palm oil plantation after oil spill.

For Delta, the joy of oil was short lived. Oil activities shrank but the business of oil criminality grew rapidly and pollution exacerbated, owing to both unscrupulous activities of oil companies and oil theft such as I witnessed in Ifiekporo.

Nigeria’s oil production quota as approved by OPEC is pegged at about 1.8 million barrels per day but in the last few years the country has struggled between 1.3 and 1.4 million barrels per day. Nigeria lost over \$2bn to crude oil vandalism in 2020, according to the recent **report**²⁹ by the Nigeria Extractive Industries Transparency Initiative.

Kelvin of Kokori was a product of the criminality that emerged post-oil era in Delta. Some indigenes believed the man originally Kelvin Oniarah was merely fighting the cause of his marginalized people until he was arrested in 2013, after he and his colleagues kidnapped prominent lawyer, Mike Ozekhome (SAN).

Aside from the militancy that heralded oil ventures in Delta, I know of another injustice done to the people of Kokori and economic sabotage of the nation. Kokori land is flat and situated in the evergreen tropical forest zone which is dominated by the oil palm tree. The community also has over twenty oil wells, source of the second best crude oil in the world by reason of its low sulphur content. In 1994, Kokori alone generated N68 billion for the nation.

But this was a nightmare for farmers in the community because the crude oil boom spelt a doom for palm oil.

There was a massive oil spill in 2018 at Erhoike flow station of Kokori/Orogun oil bloc formerly under Shell's OML 30.



“We now have to travel far to fish”, says a man visibly in his seventies who refused to have his name in the press.

But his complaint was what Kejekpo Omonade, Executive Director at Poverty Alleviation for the Poor Initiative (PAFPI), would later stress when revealed that oil spill “had been happening in Kokori for many years but this was most devastating”.

‘CAN THIS LAND RETURN TO THE GARDEN OF EDEN?’



Kokori Community, Delta State.

The spill came from the square-shaped flare wall, gushing into over four acres of land and killing ponds with the palm trees occupying spaces. The farmers were compensated for their loss while the oil company promised to restore the polluted land for continued farming. “Some people bought cars, some built houses from it,” says Omonade.

On the polluted farmland beside the flow station, four to five workers were seen scooping the oil on the earth’s crust. It was an extremely crude means done with simple tools like shovels and rakes.

One of them spoke to me, although anonymously. He revealed that the stage they had reached was “mopping” up. He assured me that: “we will complete the final stage of clean-up in a few days”.

My fixer jumped on the conversation to ask a question: “can this land return to the Garden of Eden? The worker answered in the affirmative but with a coy smile depicting uncertainty.

With the extent of the spill and deforested farmland yet on-ground, it will take a miracle for the expanse of land to be resuscitated in months and not a few days as the worker mentioned.



Satellite Image: Kokori, Delta state. Image Credits: Google Earth Pro.

Due to oil spill, the Kokori's mangrove forest and tree have been systemically depleted over the years, a GIS investigation confirmed. As oil contaminants widened, the forest floor decreased by acres of the plant and tree assemblage. As at 2011, the forest floor was occupied by the rainforest trees. The first major change to the environment became apparent in 2017 where about 4 acres of land was deforested due to the spill. However, after a major spill in 2018, the deforested land extended to nearly 10 acres in 2022.

In Nigeria, environmental restoration following the oil spill has proven to be a hard nut to crack. Farmers have learnt from many experiences to put less hope on the possibilities. They rather look for used land elsewhere if they still wish to continue their farming. As it is in Ogoniland, four years since the last oil spill at Kokori, the farmland is not only barren but clean up is sub-standard and ineffective.

NIGERIA'S DWINDLING PALM OIL LEGACY

Before crude oil exploration in the 1960s, palm oil - like other cash crops - was lucrative in Nigeria, being the world's largest producer with a global market share of 43%. When the crude oil fever struck, Malaysia and Indonesia surpassed Nigeria as the world's largest palm oil producers. From 1966, both countries combined produced approximately 80% of total global output. Today, Nigeria is the fifth largest palm oil producing country, with 1.5% or 1.03 million metric tonnes of the world's total output, according to the United States Department of Agriculture (USDA).

According to PwC and the Central Bank of Nigeria (CBN), if Nigeria had remained the world's largest exporter of palm oil, the country would be earning about \$20

billion annually from cultivating and processing oil palm today.³⁰

Mysteriously, the Nigerian palm oil industry has always been dominated by small-scale farm holders, which account for over 80% of local production, while established plantations account for less than 20% of the total market.

Though the production dwindles, Nigeria remains the largest consumer of palm oil in Africa, hence an inevitable dependence on importations. To resolve this menace, the CBN tried to encourage local production and manage foreign reserves by restricting 41 items, including palm oil from forex through the Nigerian interbank market. A duty charge of 35% was also applied on crude palm oil (CPO).

Needless to say, the financial policy might have worked except for the counter-effects of oil spills in Kokori pushing the small-holder farmers out of business.

Many of the people who used to cultivate on the Kokori land before contamination migrated out of the village for city jobs to eke a living. Omonade himself resumed his soap and cosmetic factory business in a spacious flat on the periphery of Ughelli. By and large, Nigeria is losing the heritage of palm oil farming.





Part Three Lagos State and Kaduna State



One of the ships used to transport construction materials for refinery berthed at the seaport at Ibeju Lekki jetty



Moored boats at the jetty.

LAGOS, NIGERIA

Idowu Abimbola was leaning on one of the moored boats, knitting new silk to fix a tangled fishing net. The sun had set, and while many fishers had retired to their shelters - his hope to go fishing the next day was to tarry by the shore that dusk and fix his wrecked equipment. He appeared frustrated by the hurdle that has become the nightmare of every fisher in Ibeju Lekki.

When fishers cast the net upon the ocean, they paddle their boats back to the shore and wait for a few hours or sometimes overnight — expecting that varieties of fishes would have been trapped on their return. This was the fishing culture for decades until

dredging began on the Lekki water around 2019. By December 2020, a lawmaker in the National House of Representatives raised a motion against the Dangote Group and Lekki Port LFTZ over “an unprecedented dredging of the sea, causing unquantifiable erosion of the seashore, leading to destruction of building and fishing equipment and making fishing almost impossible”.

Aliko Dangote, 65, Africa’s richest man embarked on a project: building the largest single-train refinery in the world. The \$19.5 billion project attracted the bourgeoisies, oil magnate, Femi Otedola, and Bola Tinubu, a former Lagos State governor and now a 2023 presidential hopeful. Nigeria’s President Muhammadu Buhari also visited the project site in March. This refinery, built in a fit of pride, was meant for a period like this, when the nation experiences economic downturn from dwindling global fuel price and long-held fuel subsidy scandals. The Government-owned Nigerian National Petroleum Corporation has acquired a 20 per cent stake in the investment, hoping to end its gasoline imports through Dangote’s refinery. The refinery is complemented by a Fertilizer Plant and a private seaport for the receipt of all cargoes for the construction purposes.

With ships berthed near at the Lekki jetty, both the activities at the jetty and the oil refinery pose an environmental threat to indigenous fishing communities near the Atlantic Ocean. The fish are disappearing, and the fishers’ shelters are being washed away by the Atlantic, displacing the low income-earners living on the shoreline. To these hundreds of victims, a refinery is a curse rather than a blessing.

OIL, YES, FISHING, NO!



Apaakin community, like other fishing communities at Ibeju Lekki can no longer fish at the shore near their shelters except they travel to the jetty. The fishers complain about the rising sea level, partly blaming it on the refinery/seaport construction activities



Idowu Abimbola.

The woes betiding the likes Abimbola are a constant reminder of the lawmaker's concern on the fishing community. The fisher's had hoped to catch fish when he laid his net at the Lekki jetty axis of the Atlantic. As the net sunk deep into the water, a dredging bar buried underneath hooked it. Abimbola would later recover the net awash to a shore, dirty and useless. So, he paddled the boat back home. "Sometimes, we see the engineers dredging on the sea but we can't say anything," Abimbola complains.

A bundle of silk sells for N20,000. When Abimbola's net was wrecked from that single expedition, it cost him more than N100,000 to procure five bundles. It is easier for fishers to run into debts with the dwindling economy of fishing business.

Back at the jetty where he narrated his ordeal, he is joined by a co-fisherman, Musemiu Safriyu, who gave no more than a hint that their predicaments were double. Apart from their financial struggles with damaged boats and fishing nets, the climate change threatens housing in the community - and its impacts are aggravated by unregulated engineering works on Lekki water.

Fishing camps spread at various villages surrounding the Atlantic are Ibeju Lekki where over 3,000 people lived are extinct from 2020. In the recent years, the rise in the sea level, influenced by climate change and the seaport dredging, expanded the reach of the water.

"Before now, if you are hungry, you just need to fuel the boat with N1,000 and stay at the tip of 'Olokun' (the Yoruba lingo for the sea), your bucket will be full with fish to eat and merry for days," one of the women I met at the jetty on my second visit says, attempting to compare the old with the current situation.

Although Nigeria has an Atlantic coastline of 853km (530 miles), it remains Africa's largest importer of foreign fish, with a demand for more than 3m metric tonnes each year. Some of the fishers bridging the demand gap are currently plagued by the nation's glaring priority for oil refining.

The indigenous fishers say they now have to travel past 20 meters on the sea before they are able to fish at all, buttressing the point about fishes vanishing. On my second day at the shore I met these women relaxing under the shade, there were black-coloured bowls of fish, half-full.

Another woman, Olasunkanmi Adelaja, says: "I was born into fishing over 50 years ago now. When our fathers were alive, the village Apaakin Oniyanrin was where we fished but we can't do that there anymore. In this year, we might have to leave our home because of the violence of the Olokun fast approaching us."

Musemiu Safiriyu went missing for hours after his boat developed fault on the Atlantic while fishing.

In the middle of our conversation someone came to break the news that ended our chat. Safiriyu, whom I had met the evening before, had gone missing on the sea.

He was found after a long haul. When I called him some days after, he told me his boat broke down in an unfamiliar path on the sea, making it difficult for people to come to his aid on time.

Fishers would not have to risk their lives paddling boats such long distances, if fishes were within reach.





‘BURROWED HOMES’

When the ocean waves hurl violently at Apaakin, like other towns inside Ibeju where it was no longer possible to fish, it burrows through the coconut trees protecting the houses and pulls them down. Again, it rushes forward, collapsing the houses, mostly built of sand gathered at the shores and covered with palmfront. The surge is no respecter of both the living and the dead; as it threatens human’s dwelling places, the graves are equally washed away.

In one of such turbulent moments, Orlando Oseni’s house was wrecked by the ocean tide in 2020. From what the 70-year-old man said, the village has not experienced such a sea rise of that magnitude destroying properties.

“It is no other thing than the construction works at that jetty,” he says, adding that “as you can see, there are no boats here again because we moved all of them to the jetty since we cannot fish here again.” His brothers’ houses were also affected but Oseni managed to rebuild his’. Some residents have since relocated. Apaakin Town Hall is halved by the water as well, leaving the remainder for people to defecate in its rubble.

Oseni warned that there will be more collapses if “pillars are not built at the shore before the rainy season later in the year”.

“And we have told them but nothing is being done about our plight,” he worries.

Anthony Chiejina, the Chief Corporate Communications Officer of the Dangote Group told this newspaper that the company has no knowledge of the plights of Ibeju Lekki fishing community. “Nobody has brought that complaint to us”, he said, before inviting the journalist for a media tour to the project site for “explanation of the processes”.

At the inception of the refinery project, Dangote Group had promised a climate-friendly



When ocean waves hurl violently at Apaakin, it burrows through the coconut trees protecting the houses and pulls them down.



Pa. Oseni.

refining but this investigation showed that the realities are contrary for fishermen and women at Ibeju Lekki on this assurance.

Our Geographic Information System (GIS) investigation confirmed that the refinery activities have plunged the Atlantic causing drastic impacts on the communities ashore.

As a result of this, to eke out a living has become a nightmare for the fishers, with heightened climate change threats in the last few years.

Construction of the Dangote Refinery began in 2016 with excavation and preparation of the site for further development. This preparation involves sand filling of the ocean basin, especially for the construction of a seaport. The sand filling was used to extend the coastal land surface into the Atlantic Ocean. Due to this, the ocean shorelines continued to extend inland towards the coastal communities of Ibeju Lekki.



Image 1: Satellite images show significant progress on the Atlantic shore in Ibeju-Lekki. (Red Circle) in the port development by 2017.

*Image 2: Satellites Image: Apaakin village, Ibeju Lekki, west of Dangote refinery.
Image Credits: Google Earth Pro.*



*Image 3: Satellite Image: Apaakin village, Ibeju Lekki, west of Dangote Refinery.
Image Credits: Google Earth Pro.*

Leveling the ocean allowed the water to extend into the land, progressively redefining its shorelines. The Atlantic ocean's boundaries have progressed inland to about 57 meters since 2015, the year before construction started. Between 2015 and 2018 the shoreline extended inland by 12 meters and between 2018 to 2022 it extended to an additional 45 meters.

Speaking with this reporter, Steve Trent, founder of the Environmental Justice Foundation raised an alarm about the activities on the Atlantic to be consequential on climate change.

He said: “the ocean is the world’s largest active carbon sink and the greatest nature-based solution for climate change mitigation we have. It gives us every second breath, producing vastly more oxygen than all the world’s forests combined, and absorbs around a third of the CO₂ we pump out. But this only applies to a healthy ocean, and currently, our marine ecosystems are under severe stress. With fish populations plummeting around the world due to overfishing and harmful activities, we are not only jeopardising marine ecosystems, we are fuelling climate breakdown.”

In Lagos, a fisherman risks his life to catch fish in the longest distance he has ever travelled on the Atlantic because a proposed refinery makes fishing herculean. With Nigeria’s regulatory failure on oil refineries, the nation’s old heritages — farming and fishing — are at a low ebb.



Kaduna refinery. Through this tunnel, wastewater is released from the refinery into the Railway Quarters, contaminating the locals' groundwater source

KADUNA, NIGERIA

Sometimes, Garuba Usman beams his face and the smile that comes from it is contagious. At othertimes, a reminder of his past shrinks his face, dampening the whole mood. The 70-year-old is one rare Fulani indigene of the old Kaduna whose occupation is farming; he says he never reared a single cow, the most lucrative business of his kinsmen across Nigeria.

Even Nigeria's President Muhammadu Buhari who hails from the same town, Daura, keeps a ranch for his herds. But farming, which Usman knows how to do best, suddenly turned horrible last year. The reason, he said, was due to the oil spill from the refinery at a stretch of less than a kilometer away from his farmland.



Rido community flanking Kaduna refinery on one side, Kapam on the other.



Pa. Garuba, a farmer at Kapam.

He is one of the 15 farmers waiting to be compensated by the Kaduna Refining and Petrochemical Company (KRPC) one year later. Kaduna refinery, like others have been shut down since 2016 but the residents of Kapam community in Kaduna believe the residue of oil in pipelines was what spilled on their land during an

equipment failure.

“The people gathered names of farmers affected but to the best of my knowledge, none of them has been compensated,” says Joseph David, the youth leader, who has the frontline of the advocacy for the community.

More than 40 years that Usman has lived in Kapam, he raised a family and built a modest Bungalow from the profits he made cultivating vegetables and crops like rice and cassava.

Before he joined me under the mango tree in his farm that afternoon, he alongside his youngest son was pilling cassava streaks. At his rear are beds of vegetables germinating brightly in the scorching sunshine. In 2021, the farmer says he had his lowest harvest of the most recent years. Worse still, there were high expectations for that year’s farming. One of such was to betroth a wife for his son. When that could not be realized, he went borrowing.

“I barely harvested 5 bags of rice last year,” he stated as his luminous gesture began to fade away.

During a good season, Usman said he could harvest up to 30 bags of rice from the large expanse of land. Kaduna has been in a dire strait for many years because of attacks by the non-state armed groups in the agrarian South of the state. In 2021 alone, **no fewer than 1,192 lost their lives to armed bandits and other forms of in the same violence in the state, and a total of 3,348 persons were kidnapped** period.³¹



However, the situation of a refinery caused a double jeopardy for the two agrarian communities: Kapam and Rido flanking KRPC on both left and right. Usman epitomizes the parlous experience the people endure; it would later lead to a pent-up anger among the youths who felt cheated and attempted to protect land rights.

When KADVIS accompanied the Kaduna State Urban Planning Development Agency (KASUDA) to demolish some houses on the borderline of the refinery, the people protested. KADVIS matched the protest with brute force, killing one of the protesters.

The community chairman, the elder brother of the deceased, refused to speak on the incident but Adamu Alkali, another protester narrated how he survived the scuffle by sheer luck.

After the demolition of over 10 buildings on March 28, Alkali was thrown into the vigilante's van, and driven away, bloodied. "they left me for death in one hospital," he claimed, threatening a lawsuit against KASUDA, upon full recovery.

At that moment he spoke, one of his eyes were bloodshot red, the other sealed; his occiput was bruised as the heavy-stomached man writhes in pain on a sofa chair.



KPRC denied sending KADVIS on the bloody operation demolition but the community said the management have a history of not taking assuming responsibility even whenever they err. Neither with the Kapam farmers nor at the second community known as Rido.

ABANDONED WITH A PLAGUE

Rido is less than the 3km Abuja-Kaduna expressway that has become frost by bandits in the last few years. Not only are these inhabitants at the mercy of armed gang using forests as hideouts, their luck for portable water is snatched. No thanks to the refinery, says Jonathan David, who stays at the Railway Quarters within Rido.

The length and breadth of this community with more than 3000 inhabitants, according to the 2006 National Census, is by far remote, with an adjoining road to the federal highway are rickety in between market and tad-built houses. As if to mysteriously preserve the unwholesome history of its existence, livelihood inside the Railway Quarters, on the exit wing of the community, is particularly squalid.

In January 1980, the borehole water system was launched alongside the government's quarters built opposite the KPRC. When the minister of petroleum back inspected the housing project, he disapproved of the idea that people should reside because of the environmental hazard the refinery would pose.

The remaining buildings were not completed but the Nigerian Railway Corporation took over the finished blocks for the temporary lodging of railway staff since they were rail tracks transporting crude from Rivers state into the Kaduna refinery.



Today, over a hundred people — both NRC staff and non-staff — live there, with a shortage of potable water.

“Each time there is an equipment failure or whatever, we see oil flowing out of the outlets into our farms,” the non-staff resident David, noted. “We started noticing traces of oil in our well.”



A well abandoned at Railway Quarters after oil was perceived inside.

According to him, the borehole wasn't working when he moved into the quarters in 2006. So, contaminated wells were their source of water.

A forensic research conducted on by the trio of Louis Buggu, Funmilayo Yusufu - Alfa and Abigail Abenu for the Ghana Journal in 2020 found out that the streams and other sources of water linked to the Rido river were contaminated by discharged effluents.

Ten water samples were collected and tested for Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Iron (Fe), Lead (Pb), Manganese (Mn), Mercury (Hg), Nickel (Ni) and Zinc (Zn).

Table 1: Mean Values of Heavy Metal in River Rido

S/N	Metal (mg/L)	Mean Values of Control Samples		Mean Values at Points after Discharge (mg/L)		Differences in Mean Values	
		Dry Season	Wet Season	Dry Season	Wet Season	Dry Season	Wet Season
1.	As	0.0061	0.0125	0.0387	0.0490	0.0326	0.0365
2.	Cd	0.0017	0.0017	0.0068	0.0071	0.0051	0.0054
3.	Cu	0.1030	0.4192	0.3359	0.8152	0.2329	0.3960
4.	Cr	0.0019	0.0265	0.0004	0.0946	-0.0015	0.0681
5.	Fe	1.0334	1.0052	0.9821	1.6252	-0.0513	0.6200
6.	Mn	1.1592	1.1931	1.4403	1.6551	0.2811	0.4620
7.	Ni	0.0019	0.0252	0.0220	0.0337	0.0201	0.0085
8.	Hg	-	-	-	-	-	-
9.	Pb	0.0481	0.0038	0.0439	0.0408	-0.0042	0.0370
10.	Zn	0.0978	0.4422	0.3529	0.5498	0.2551	0.1076

Source: Fieldwork, 2018

Table 2: Levels of Heavy Metals in River Rido and Maximum Tolerable Limits

S/N	Heavy Metal	Mean Values at Points Discharge (mg/L)		Maximum Tolerable Limits		Health Impact from SON
		Dry Season	Wet Season	SON (2007)	WHO (2011)	
1.	As	0.0387	0.0490	0.010	0.010	Cancer
2.	Cd	0.0068	0.0071	0.003	0.003	Toxic to the kidney
3.	Cu	0.3359	0.8152	1.000	2.000	Gastrointestinal disorder
4.	Cr	0.0004	0.0946	0.050	0.050	Cancer
5.	Fe	0.9821	1.6252	0.300	0.300	None
6.	Mn	1.4403	1.6551	0.200	0.050	Neurological disorder
7.	Ni	0.0220	0.0337	0.020	0.020	Cancer
8.	Hg	-	-	0.001	0.006	Affects the kidney and the central nervous system
9.	Pb	0.0439	0.0408	0.010	0.010	Cancer, interference with vitamin D metabolism, affects mental development in infants, is toxic to the central and peripheral nervous system
10.	Zn	0.3529	0.5498	3.000	5.000	None

Source: Fieldwork, 2018

The results revealed that in the dry season, six heavy metals, namely As, Cd, Cu, Mn, Ni and Zn, presented mean values that were higher after the point of effluent discharge; while Cr, Fe and Pb had lower values and Hg was not detected.

In the wet season all the heavy metals tested, except Hg, increased in values after the point of effluent discharge. The values of As, Cd, Fe, Mn, Ni and Pb after the discharge point, in dry and wet seasons, were greater than the maximum tolerable limits set by the Standard Organisation of Nigeria (SON) and the World Health Organisation (WHO). The values recorded for Zn and Cu at both dry and wet seasons were below the limit set by the Standard Organisation of Nigeria (SON) and the World Health Organisation (WHO), but the value of Cr was lower than the maximum tolerable limit only in the dry season. The contamination of the river with heavy metals poses a grave danger to human health, as its water is used for diverse purposes.

The researchers recommended that the wastewater treatment plant of KRPC should be rehabilitated and the wastewater can be pre-treated before it is discharged into the river.

Railway Quarters belly two wastewaters outlets from the refinery, making the people direct victims of oil contamination. "When the problem persisted, we shut down the wells and I personally revived this borehole with my own money. Now, we contribute to treating it whenever we detect the water smells."

The two contaminated wells shutdown is about five meters from the outlet and the borehole is even closer. With the well abandoned, the major source of water is the borehole whose purity is also erratic.

The other source is at a distance at the refinery military lodge off the rail link. They are not the only people depending on the tank. A neighboring Ungwan Bulus fetches there too. Bulus was in the news on March 31. It was attacked two days after the train hijack and 20 people kidnapped.

A railway staff, who doesn't want to be named says: "we are abandoned here," bemoaning risks to their lives by the water they drink, yet the marauding bandits in their forest.

Garba Deen Muhammad, the NNPC spokesman didn't answer calls to his line for interview over the contamination of Kaduna communities by the refinery.

With Nigeria's regulatory failure on oil refineries, the nation's old heritages — farming and fishing — are at a low ebb. The lack of environmental remediation across parts of Nigeria where oil is either explored or refined, has advanced the advocacy to halt oil processing in the country. Whilst the government is yet to be accountable for the ripple effects of crude oil, communities on the fencelines of refineries suffer for these. There are peculiar instances of sea surge and difficulty for fishing in Lagos with aquatic splendor. Across the Niger Delta, the overwhelming menace is the lack of standard environmental clean-up, sometimes leading to sudden or steady deaths while Kaduna communities, already ravaged of insurgence, reeks of soil and groundwater contamination.

The life lost over land tussle between refinery management and local community in Kaduna is like adding insult to the injury of the people whose farm yields are ruined by the refinery wastewater. All these devastating impacts have made ecological experts worry whether the crude oil in Nigeria worths the risks at all or remain buried in the soil it belonged.

Endnotes

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About HOMEF

HOMEF is an ecological think tank and an advocacy organisation promoting environmental /climate justice and food sovereignty in Nigeria and Africa.

Our main focus is on examining the roots of exploitation of resources, peoples and nations. We nurture movements for the recovery of memory, dignity and harmonious living with Mother Earth.

HOMEF believes in the rights of Mother Earth, the need to equip communities to push back oppression and the need for justice for the environment, our food systems, and natural cycles at every level of policy engagement.

HOMEF believes in contextual solutions over externally generated and imposed ideas and is firmly rooted in the ideals of solidarity and dignity.

Our Core Values

- **Justice and equity in all circumstances**
- **Peoples and the planet in harmony and free from exploitation**
- **Dignity(respect)**
- **Action (solidarity)**
- **Knowledge**

