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Global oil theft: impact and policy responses

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Abstract: This paper, the first of two on global oil theft and fraud, discusses the prevalence, methods, and consequences of global oil theft, valued at US\$133 billion per year and equivalent to 5–7 per cent of the global market for crude oil and petroleum fuels. However, the impact of oil theft is significantly larger than the value of theft itself. Government tax yields have been assessed for 30 developing countries associated with oil theft and found to be significantly lower than in the International Monetary Fund's benchmark study. Oil theft, smuggling, and illicit trade in petroleum products are often seen as lesser forms of crime than human trafficking, the drugs trade, smuggling of weapons, kidnapping, and terrorism. However, oil theft as an act of opportunity tends to evolve into organized crime and, if left unchecked, oil theft may interlink with other organized crime activities and groups. Actions against oil theft should target the transnational crime syndicates that continue to find ways to replicate their thefts by adapting their theft strategies and business models. However, there is a lack of basic data, including how much oil is stolen, how the stolen oil is transported, and how illicit oil transactions are conducted. The mixing of legal commercial operations with illegal oil theft activities and fraud obscures many oil theft crimes.

Key words: oil, fuel, theft, corruption, transnational crime, domestic revenue mobilization, tax evasion and avoidance

JEL classification: H2, Q3, Q5, K42

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Note: abbreviations and units at the end of the paper

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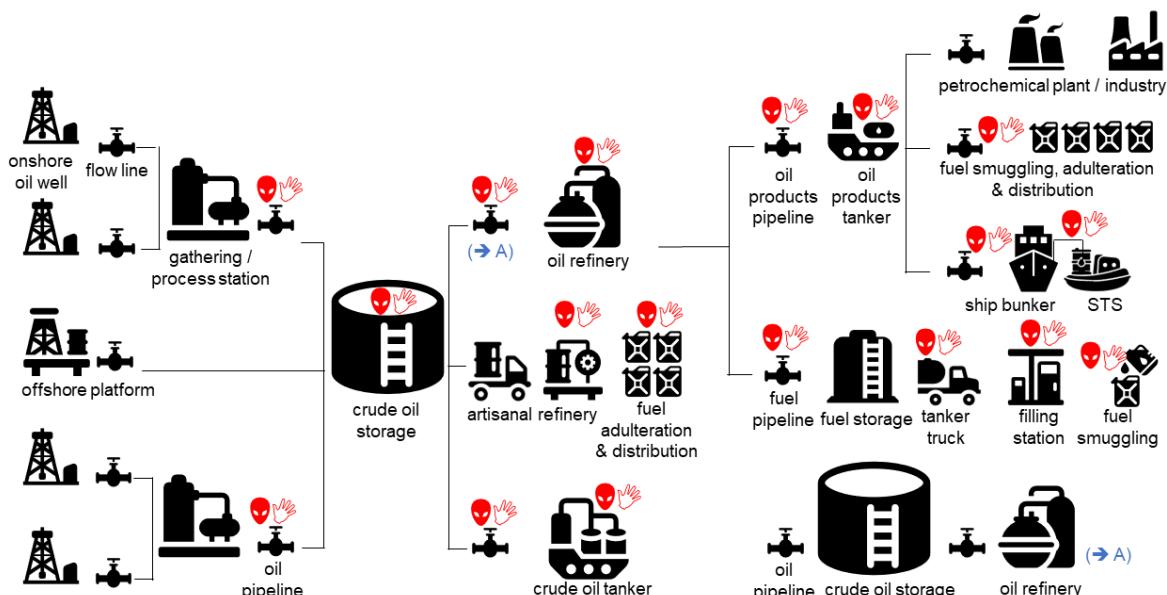
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1 Introduction

This working paper is the first of two addressing global oil theft and related fraud. This first paper primarily explores the impact of oil theft in terms of domestic resource utilization, revenue loss, transnational economic impact, regional insecurity, community impact, and interlinkages with organized crime.¹

Global oil theft is estimated at US\$133 billion per annum (Bonnier and Bonnier 2019; Desjardins 2017). This equates to some 5–7 per cent of all crude oil and refined fuels produced. Oil theft regularly occurs across the supply chain (see Figure 1), from the wellhead, gathering station, crude oil pipeline, oil storage facility, and oil bunkering station, during crude oil tanker loading, during illegal ship-to-ship (STS) transfers facilitated by oil tanker crews, and owing to violent acts of robbery and piracy at sea. Some of the crude oil stolen is refined into primitive fuels in ‘bush’ or ‘artisanal’ refineries.

Figure 1: Elements prone to oil theft in the total oil supply chain



Note: oil supply chain elements particularly exposed to oil theft and discussed in this paper are highlighted by the symbols in red.

Source: author's illustration, icons created by Vectors Market from the Noun Project.

After crude oil has been converted into fuel by a refinery, theft occurs again during the subsequent elements of the supply chain: at the refinery, at the fuel bunkering station, during fuel tanker loading, during illegal STS transfers facilitated by fuel-tanker crews, owing to violent acts of robbery and piracy of fuel tankers at sea, from illegal selling of bunker fuel by commercial vessels, at fuel depots, from fuel pipelines, via hijacking of fuel tankers, and at fuel filling stations. Furthermore, when structural cross-border fuel-price differences occur, this incentivizes smuggling of ‘legal’ and stolen fuel.

¹ The second paper (Romsom, forthcoming) focuses on recent oil theft trends and enforcement successes, as well as commonalities in oil theft and how these can direct countermeasures and solutions.

More subtle versions of fuel theft involve adulteration of legal fuels with stolen fuels, lower quality fuels, mud, waste chemicals, or even air. The oil industry has recognized terms for these: adding air to fuel to mislead fuel meters and seemingly provide more fuel during bunkering than is actually the case is called a ‘cappuccino’ bunker. Adding mud to a fuel for the same reason is termed a ‘milo’ bunker. Misappropriation of fuel further occurs due to ‘errors’ in paperwork. Overstating a fuel bunker by recording a higher volume of fuel delivered than was actually the case adds profit to the fuel bunker company. Understating the fuel-in-tank volume before the bunker operation commences allows the bunker company to sell more ship fuel; this excess can then be sold by the ship crew at sea to fuel traders in illegal fuel transactions using STS transfers. Meter tampering is common at commercial facilities such as fuel bunkers as well as at consumer retail facilities such as filling stations.

In this paper, the following definitions have been adopted:

- Oil theft is theft of crude oil or oil that has been refined into fuel.
- Crude theft is theft of unrefined crude oil.
- Fuel theft is theft of oil products derived from refining crude oil.

This paper takes a wide definition of ‘oil theft’. In addition to physical theft of oil, it also includes theft of oil-related money in illegal transactions through (tax) fraud, misappropriation, and other malpractice. These oil thefts have in common that value is extorted from its rightful (infrastructure) owners or beneficiaries.

A study into criminal oil theft and fraud generally lacks public data, information, and analysis. With the exception of Nigeria, Mexico, and some high-profile incidents elsewhere, relatively little has been written about oil theft. It is for this reason that countries such as Nigeria and Mexico may appear over-represented in the literature and in the news (and perhaps even in the present paper and Romsom, forthcoming). However, this work has sought, as far as is possible, to provide a global perspective on oil theft.

A key conclusion is that oil theft is globally pervasive and occurring in many developing as well as developed countries. As the global oil supply chains are transnational and have a global reach, so do the syndicates that commit organized oil theft. Individual acts of oil theft may have started small-scale, local, and opportunistically. However, relatively low risks,² high profit margins, the opportunities to upscale thefts, and the ability to combine multiple elements of the oil supply chain provide many incentives for oil theft criminals to expand and professionalize their activities and networks. This is why legitimate oil companies, their senior officers, and employees are increasingly at risk of getting embroiled in oil theft. Some theft syndicates are formed by aligning theft activities by companies or their employees. In other circumstances, existing crime organizations (such as the Mexican crime cartels) diversify their criminal activities to include oil theft. These are indeed the trends that can be observed in the many countries where oil theft occurs. Oil theft syndicates have much in common with other crime syndicates, in terms of skills (e.g., building tunnel systems to conduct oil taps), smuggling methods and routes, and the abundant flow of illegal money. The scale of potential profits and competition between oil theft syndicates attract a level of violence similar to that used by drug cartels, militant terrorists, and arms smugglers. Crime-on-crime activities and diversification of the types of crime (as law enforcement catches up) are also common among oil thieves (see also Section 5.3).

² Contrary to drugs and arms, oil is not an illicit good but a freely traded commodity in many countries.

The following observations and estimates reveal the scale and prevalence of global oil theft, the illegal fuel trade, and fraud.

- Oil theft in Nigeria is estimated at 400,000 barrels³ per day (bpd), costing the country up to US\$1 billion per month in lost revenues, according to a Chatham House report (see Royal Institute of International Affairs 2013). A further 1 million bpd of oil production capacity is shut-in due to oil theft-related deferments, causing an additional tax deferment loss of US\$20 billion per year.
- In 2010, 80 per cent of Benin's domestic fuel consumption was smuggled from Nigeria, at a value in excess of US\$863 million (UNODC 2013).
- In 2013, the Algerian energy authority reported losing US\$1.3 billion a year as a result of fuel smuggling to neighbouring countries (Al Makhfi 2013).
- Iraq's UN oil-for-food programme (1996–2003) was corrupted by 2,200 companies from 66 countries that paid US\$1.8 billion in kick-backs to support Saddam Hussein's regime (Kearney 2008).
- In 2015, during the Syrian civil war, the Islamic State of Iraq and al-Sham (ISIS) made US\$40 million a month from selling crude oil to brokers. Some of the crude oil would be refined into low-grade fuel for smuggling into Turkey (using tanker trucks and cross-border irrigation pipes, making fortunes for local villagers). ISIS sold most of its oil to the Assad regime, despite being its arch-enemy (Ralby et al. 2017).
- Turkey imports 2.7 million tons of smuggled fuel annually, depriving its government of US\$2.5 billion in tax income. While the number of cars on the road in Turkey increased by 70 per cent from 2003 to 2010, the rise in recorded fuel consumption was only 20 per cent (Ralby et al. 2017).
- Russia's state-owned investment bank VTB Capital estimated that in 2013 Russian oil companies were losing US\$1.8 billion to US\$3.5 billion annually due to oil theft (Khazov-Cassia 2021).
- In 2015, Chinese customs arrested 250 people from two criminal syndicates involved with the illegal import of 440,000 tons of untaxed fuel from ship vessels, worth US\$355 million (Chen 2015).⁴
- In 2021, Guangdong (China) police arrested several people, including two BP staff, for illicit trade and sales of light cycle oil (LCO), a potentially pollutive and sub-quality fuel. From 2019 to 2021, China LCO imports increased from 142,000 to 511,500 bpd, as traders exploited a tax loophole exempting LCO from consumption tax. China's unnaturally high LCO demand would have resulted in US\$3.9 billion in avoided taxes annually if authorities had not intervened (Chen and Samanta 2021a, 2021b).
- South East Asia (SEA) registered 42 tanker hijacks for siphoning of oil/fuel, mostly during 2011–15 and the most recent in 2018 (ReCAAP, n.d.); Defence IQ estimates the illegal maritime fuel trade in SEA to be worth US\$10 billion per year (3 per cent of SEA fuel consumption) (Gloystein and Geddie 2018).
- Three million litres of fuel are smuggled daily over land alone, from Malaysia to Thailand, valued per year at US\$1.2 billion in Thailand and US\$0.54 billion in Malaysia (Ralby et al. 2017).

³ 1 barrel (bbl) is approximately 0.159 m³

⁴ When referring directly to numbers referenced in other sources, I have adopted the units used by these sources, whether m³, barrel, (short) ton, or (metric) tonne.

- The Bukom refinery theft of 340,000 tonnes of gasoil by two syndicates during 2007–18 cost Shell US\$150 million, with at least 30 people detained or charged to date (*The Straits Times* 2018).
- Singapore, the largest global marine bunkering hub, faces serious compliance issues and major credit risks among fuel traders. Fraud and malpractice caused 19 bunkering companies to have their bunkering licences revoked (MPA Singapore 2012–19), resulting in a number of high-profile bankruptcies with at least US\$6 billion in outstanding debts.
- Fuel fraud costs Europe more than US\$4 billion in lost taxes annually (Rozhov and Strzelecki 2013).
- Global fuel traders price in 0.2–0.4 per cent of ‘losses’ in ordered cargo volumes.
- Fuel adulteration at Brazil’s retail filling stations are estimated at US\$4.1 billion (2020), and fuel tax evasion across states accounts for a further US\$1.3 billion (2019) (Slattery 2021).
- Mexico lost 81,000 bpd of fuel due to more than 12,500 illegal fuel taps, costing the country US\$3 billion in 2018 (Semple 2019).
- In 2021, criminals who hijacked the US Colonial pipeline system with ransomware were paid 75 bitcoins, worth US\$4.4 million, to reinstate the system software. The pipeline provides 45 per cent of the fuel demand for the US East Coast (Eaton and Volz 2021).

This paper focuses on criminal oil theft as a commercial activity. Other potential motivations exist for securing someone else’s oil wealth, including political drivers to ‘keep’ another nation’s oil, driven by security, retribution, power, or profit (Stewart 2019). This paper also describes to some degree the nexus between oil theft, transnational crime organizations, and potential linkages to extremism, violence, and terrorism. Oil theft provides a source of finance for criminal and terrorist organizations, while attacks against oil facilities and companies destabilize existing governments and economies. This paper demonstrates that turning local populations into sympathetic audiences for their cause is what makes the activities of oil theft syndicates, criminal cartels, freedom fighters, and terrorist groups remarkably similar (Cook 2008). It is also one of the key reasons why oil theft activities are so difficult to root out. The Niger Delta history particularly exemplifies how illegal oil supports political ambitions and blurs the lines between criminality, terrorism, social equity, and governance.

Oil theft and recent digital hijacking of energy infrastructure are large-scale global problems, not limited to developing countries. However, developing countries are disproportionately affected by the loss of business confidence, loss of tax income, lawlessness, and armed mobs spreading their illegal activities into new detrimental business models such as kidnapping. The criminal syndicates responsible for oil theft are highly diversified, reaching into many areas of the energy system and infrastructure, as well as security and political organizations.

2 Impact of oil theft on domestic resource mobilization

Domestic resource mobilization is a strategic priority for developing countries, particularly in a world still grappling with the COVID-19 pandemic (United Nations 2021). Debt sustainability is a major issue for many countries that are simultaneously adversely affected by a decrease in tax proceeds and large-scale fiscal measures as a result of COVID-19 (Asakawa 2021). For oil-producing countries, 2020 has been further marked by a price war for market share that was quickly followed by a global collapse in oil demand due to lockdowns, travel restrictions, and much reduced global economic activity. This was followed by a partial price recovery later in 2020.

A recent International Monetary Fund (IMF) study (Balima et al. 2020) on domestic revenue mobilization highlighted that the tax revenue as a share of gross domestic product (GDP) averaged 15.3 per cent for 72 emerging market and developing countries. Many developing countries struggle to meet a ‘sustainable tax yield’ of 15 per cent tax-to-GDP benchmark, or the IMF’s minimum criterion of 12.75 per cent tax-to-GDP ratio for accelerated growth and development outcomes. Commodity exporters have typically lower tax revenue ratios (14.7 per cent) than non-commodity exporters (16.2 per cent).

For the purpose of this paper, tax yields were assessed for 30 developing countries (plus the European Union as reference), for which the Atlantic Council reported significant oil theft (see Table 1). The analysis distinguishes countries affected by oil theft as oil producers from those affected by oil theft in their consumer markets (a few countries fall into both categories). These developing countries affected by oil theft show a lower average tax yield (13.6 per cent) than the IMF benchmark for developing countries (15.3 per cent). The tax yield differences are even more pronounced when comparing tax yields for countries facing oil theft as producers (9.2 per cent versus 14.7 per cent IMF benchmark for commodity exporters) and those countries facing oil theft in their markets (15.0 per cent versus 16.2 per cent for non-commodity exporters) (see Table 2).

Table 1: Tax yield of key countries with suspected significant oil theft

Country affected by oil theft	Oil theft producer or market	Key oil theft issue	Per cent of tax/GDP (year)
Algeria	Producer	Subsidized fuel smuggled to Tunisia/Morocco	14.1 (2017)
Azerbaijan	Producer	Crude smuggled to Armenia, Georgia, Turkey, Russia, Ukraine	14.3 (2019)
Benin	Market	Fuel smuggled from Nigeria	14.0 (2018)
Brazil	Market	Fuel adulterated at retail stations, bribery	14.0 (2019)
Cambodia	Market	Subsidized LPG smuggled from Thailand	19.7 (2019)
Colombia	Market	Smuggled from Venezuela, Ecuador	15.1 (2019)
Ghana	Transfer	Crude smuggled from Nigeria	12.3 (2019)
India	Market	Fuel adulterated with subsidized kerosene	12.0 (2018)
Indonesia	Producer/market	Illegal STS fuel transfers	9.8 (2019)
Iran	Producer	Subsidized fuel smuggled to Turkey	7.4 (2009)
Iraq	Producer	Fuel smuggled to Syria, Iran	1.3 (2019)
Jordan	Market	Subsidized fuel smuggled from KSA	14.8 (2019)
Kenya	Market	Fuel adulteration	15.9 (2019)
Libya	Producer	STS smuggled subsidized fuel to EU	1.2 (2012)
Malaysia	Producer/market	Fuel smuggled to Thailand	12.0 (2019)
Mexico	Producer/market	Fuel theft, distribution, sales, smuggling	13.1 (2019)
Morocco	Market	Subsidized fuel smuggled from Algeria	21.4 (2019)
Mozambique	Market	Fuel adulteration with kerosene (fixed) dumping of (untaxed) transit fuel	27.1 (2019)
Myanmar	Market	Subsidized LPG smuggled from Thailand	5.8 (2019)
Nigeria	Producer/market	Fuel and crude theft, illegal refining, fuel adulteration, sales, smuggling	8 (2019)
Pakistan	Market	Subsidized fuel smuggled from Iran	12.8 (2017)
Philippines	Market	Fuel adulteration	14.5 (2019)
Russia	Producer	Fuel smuggled to EU	10.9 (2019)
Serbia	Market	Fuel smuggling from Bosnia, Romania	24.1 (2019)
Tanzania	Market	Fuel adulteration with kerosene (fixed)	11.5 (2019)
Thailand	Market	Fuel smuggled from Malaysia	14.7 (2019)
Tunisia	Market	Subsidized fuel smuggled from Algeria	21.1 (2012)
Turkey	Market	Oil smuggling from Iraq, Iran, Syria, Azerbaijan	16.5 (2019)

Uganda	Market	Fuel smuggled from DRC, Kenya, dumping of (untaxed) transit fuel	12.3 (2019)
Zambia	Market	Fuel adulteration with kerosene (fixed)	16.7 (2019)
European Union	Market	Fuel storage theft, STS smuggled fuel from Belarus, Russia, Libya	19.5 (2019)

Note: LPG, liquified petroleum gas; STS, ship-to-ship; KSA, Kingdom of Saudi Arabia; EU, European Union; DRC, Democratic Republic of the Congo. World average tax revenue as percentage of GDP was 15.3 per cent in 2019.

Source: author's construction based on World Bank (n.d.), IMF (2021a), and Atlantic Council data (Soud et al. 2020).

Although a wide range of potential factors can cause the strong negative correlation between oil theft and the tax yield of developing countries, the main objective of this analysis is to illustrate that governments of developing countries dependent on oil revenues are particularly exposed to oil theft, if they are not well diversified by other sources of (tax) income. Developing countries that produce and export oil are affected significantly worse by oil theft than those that import and consume oil. Oil smuggling denies importing countries government duties, tariffs and taxes. Fuel distribution companies (which could be government owned) miss out on revenues for smuggled fuels, further impacting governments on profit tax (and dividends). However, the community does get access to the oil resource, although often at compromised quality that can cause further negative impact on assets (engines) and the environment.

Table 2: Tax yield analysis of developing countries—impact of oil theft

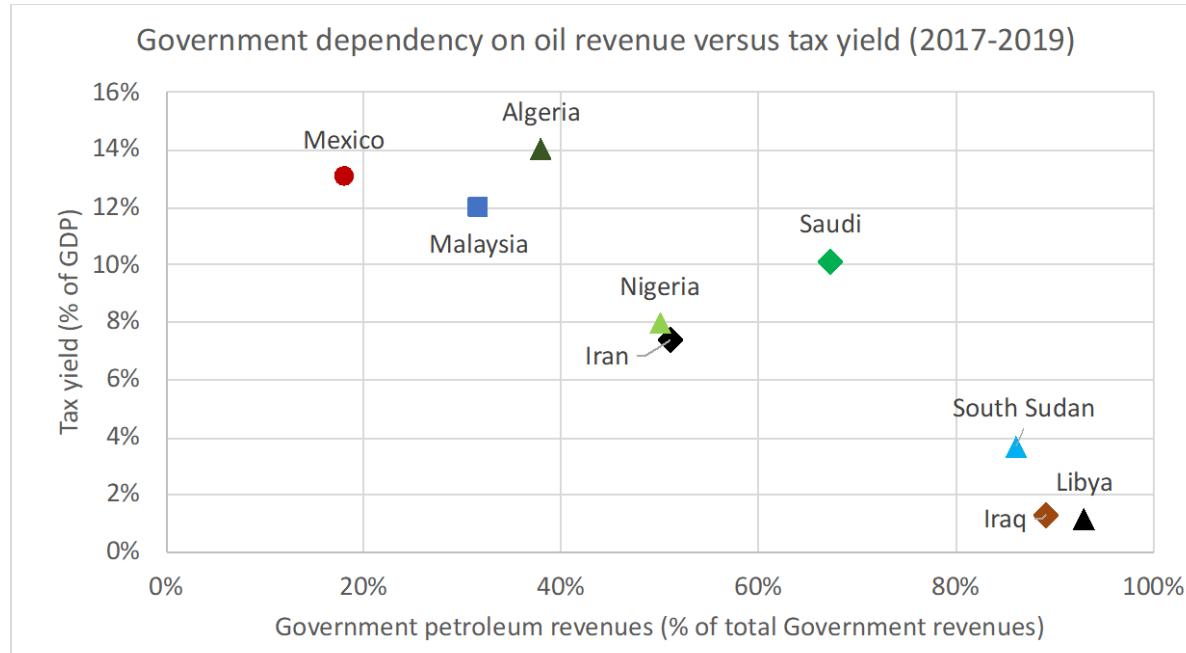
Domestic revenue mobilization—tax yield analysis	Tax yield of developing countries affected by oil theft (per cent of GDP)	IMF tax yield benchmark study for 72 developing countries (per cent of GDP)
Commodity exporting developing countries	9.2	14.7
Non-commodity exporting developing countries	15.0	16.2
Total data set developing countries	13.6	15.3

Source: author's construction based on Table 1 results (30 countries) compared with IMF study (70 countries; see Balima et al. 2020).

The impact of oil theft for producing countries is worse: the value lost is a combination of physical resources plus associated government revenues. In countries such as Nigeria, oil companies do not directly share in the loss of (most) stolen crude as they get their entitlement share at the place of loading (i.e. into the export oil tanker). Environmental damages (from spills and artisanal refineries) and value chain inefficiencies compound the detrimental impact on oil-producing countries. Furthermore, oil theft activities compromise the integrity and security of oil facilities, causing significant deferment of oil and government income. For example, while Nigerian oil theft is estimated at 400,000 bpd, shut-in oil production capacity is 1 million bpd, causing an annual tax deferment loss of US\$20 billion in addition to US\$12 billion loss in stolen product (see Box B).

The results in Table 1 and summarized in Table 2 show that these impacts of oil theft can be highly substantial to government revenues, particularly if economies are not well diversified. Figure 2 shows the trend between tax yield (as a fraction of GDP) and the degree of dependency of government revenue from petroleum activities for a number of oil-producing developing countries.

Figure 2: Government dependency on oil revenue versus tax yield (2017–19)



Note: for many developing countries, government tax yield is less when it depends more on petroleum reserves. Most oil-producing countries aiming for accelerated growth and development are overexposed to petroleum revenues and do not meet a minimum 12.75 per cent tax-to-GDP ratio. Libya data are from 2012.

Source: author's illustration based on data in IMF (2021a).

Government tax yield benchmarks are also important for maintaining access to principal sources of external financing in developing countries as well as for achieving their sustainable development goals (SDGs). A ‘green recovery’ after the COVID-19 pandemic, through promotion of carbon tax and other environmental taxes, is at risk for countries with endemic/systemic oil theft. Increases in price premium of legitimate fuels over black-market fuels further incentivizes oil theft and cross-border smuggling.

3 Economic impact of oil theft on neighbouring countries

Oil theft not only deprives governments of internal revenues but it also has direct and indirect impacts on the economic development of neighbouring countries. Oil theft erodes regional business confidence, investment, and domestic development. A common pathway for oil theft’s transnational impact is through cross-border fuel smuggling. Another pathway is through regional insecurity caused by violent oil theft operations. This section describes and exemplifies why oil theft needs to be approached from a transnational perspective.

3.1 Disparity in prices incentivizes transnational fuel smuggling and fraud

Oil smuggling, fuel adulteration, and tax fraud are common across many countries. The cases that are discovered and reported are often the tip of the iceberg.

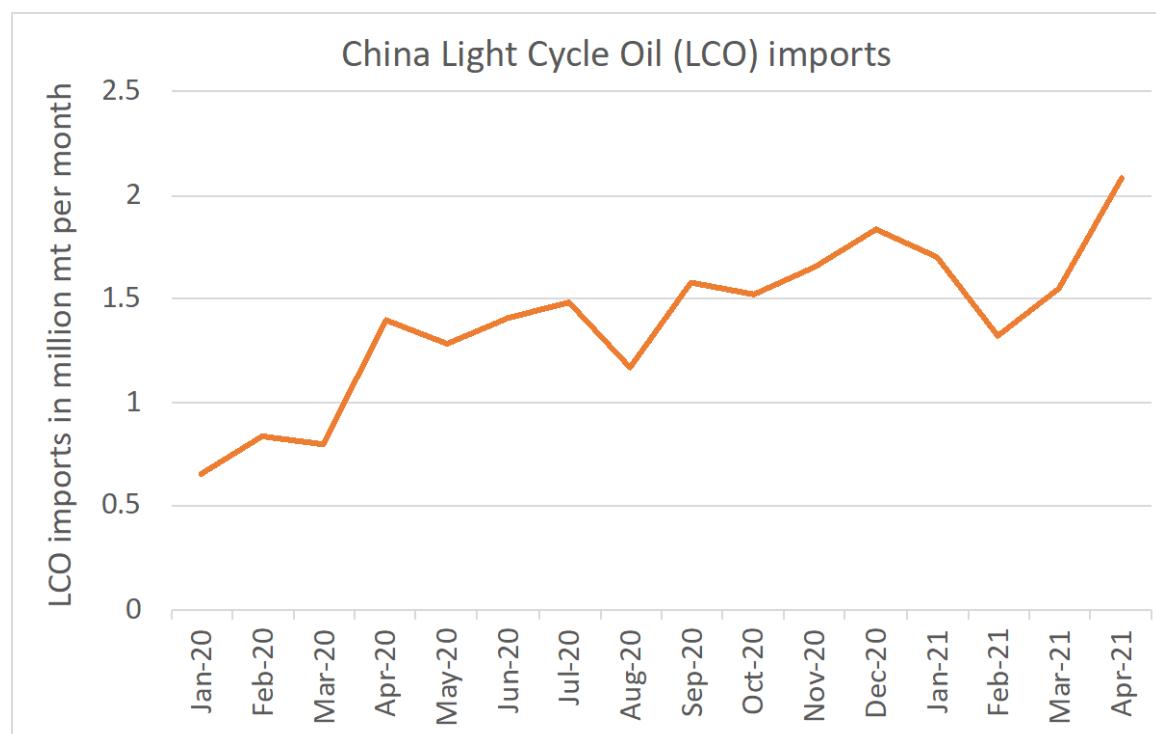
3.1.1 China’s enforcement activities to counter fuel smuggling and tax fraud

Locally stolen oil and fuel find their way to transnational markets. In 2015, Chinese customs arrested 250 people from two criminal syndicates involved with the illegal import of 440,000 tons of untaxed fuel. Fuel smuggling from overseas markets increased significantly after China raised

consumption taxes on oil products by up to 50 per cent in 2014. This greatly increased the profit margins for oil smugglers who evade such levies. After taxes were raised, China's official imports of fuel oil declined by almost 30 per cent in the early months of 2015, partly due to rising illegal imports. The professional theft operations were conducted from multiple Chinese ports such as Shenzhen, Ningbo, Qingdao, Dalian, and Xiamen. One syndicate used smuggling vessels, including modified fishing boats, to conduct illicit STS transfers from larger 'mother' tankers in open seas. The other syndicate used service vessels converted into covert tankers to illegally buy bunker fuels (Romsom, forthcoming). The action of the Chinese authorities on these two crime syndicates averted US\$355 million of smuggled fuels (Chen 2015).

In 2021, Guangdong (China) police arrested several people, including two BP staff, for illicit trade and sale of LCO (Chen and Samanta 2021a). LCO is a petrochemical feedstock that has similarities to diesel, but is of inferior quality. As traders exploited a tax loophole, China's LCO demand grew some 360 per cent to 511,500 bpd in April 2021, compared with 142,000 bpd two years earlier (see Figure 3). Because LCO was exempted from consumption tax and can be used as a diesel substitute, fraudulent oil traders could make illicit profits through tax evasion (diesel tax is charged at US\$29 per barrel) and fuel-price differentials. The artificially low price of LCO compared with other fuels invited large-scale fuel adulteration of high-grade diesel with low-grade LCO. This caused an unnaturally strong demand increase for LCO in China and resulted in an estimated US\$3.9 billion in avoided fuel taxes on an annualized basis. When China decided to stop LCO misuse, it created major repercussions in Asian fuel markets. South Korea, which had supplied 63 per cent of China's LCO demand in 2020, saw shipments reduced by 60 per cent and spot premiums halved (Chen and Samanta 2021b). China's fiscal action is expected to cause a systemic lower repricing of LCO in Asian markets. This, in combination with higher domestic fuel taxes, may make it more attractive for oil theft syndicates to smuggle low-cost LCO into the country and illegally blend it with legitimate fuels (Zhou 2021).

Figure 3: Light cycle oil (LCO) import trends in China



Note: the fast-increasing demand in China LCO imports in 2020 was largely driven by fuel fraud and tax evasion schemes.

Source: author's illustration based on Zhou (2021).

3.1.2 Nigeria: Abuse of fuel subsidies

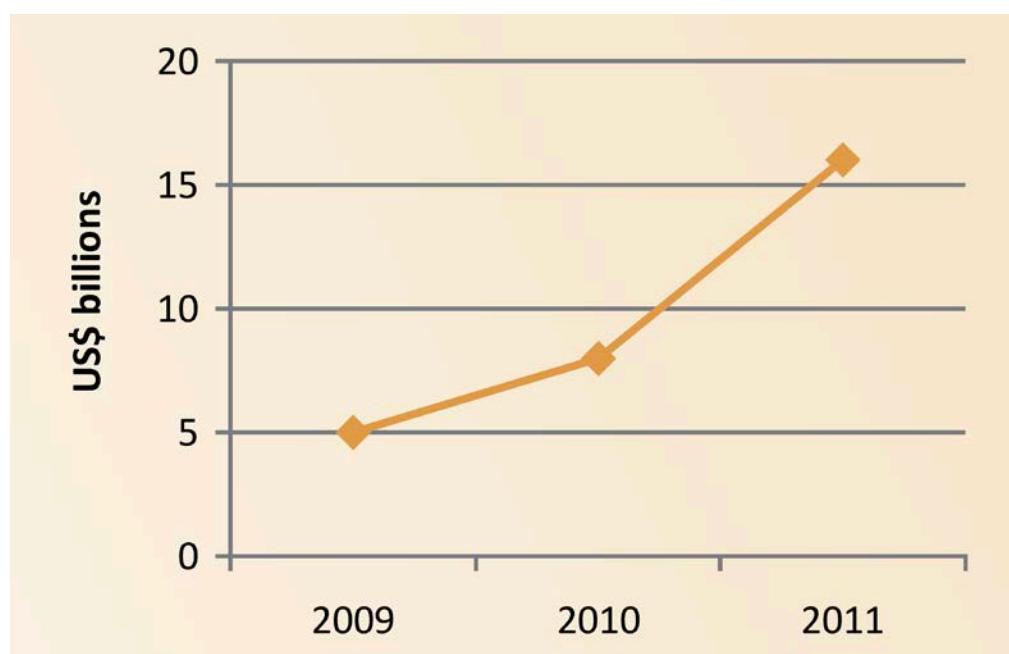
With fuel subsidized in Nigeria and costing up to three times the market price in neighbouring countries, the margins for fuel smugglers have been extremely lucrative. Fuel subsidies have come at a huge economic cost to Nigeria, until it was forced to reduce these in 2020, when the decline in oil price put the budget under severe pressure. Nigeria itself has a shortage of refining capacity and therefore imports fuel products from international markets. Between 2009 and 2011, the government's fuel subsidy costs more than tripled from US\$5 billion to US\$16 billion (see Figure 4), far in excess of any increase in domestic consumption.

A parliament investigation in early 2012 revealed the following:

- The number of fuel importers had increased from 6 in 2006 to 140 in 2011.
- Many of the new importers had no permits, no physical assets, and no oil-trading experience.
- Subsidies were provided for 59 million litres per day, while domestic consumption was only 35 million litres per day.
- In 2011, the country's Petroleum Support Fund had been defrauded of US\$6 billion.

Parties involved in fuel imports and smuggling fuel exports were suspected of round-tripping (i.e. exporting and re-importing the same fuel) to repeatedly cash in on the fuel subsidy opportunity.

Figure 4: Costs of fuel subsidy to the Nigerian government (2009–11)



Note: the increase in fuel subsidy cost from 2009 to 2011 is partly due to increased global fuel prices (US\$ billion) and partly due to increased smuggling (US\$6 billion) in 2011.

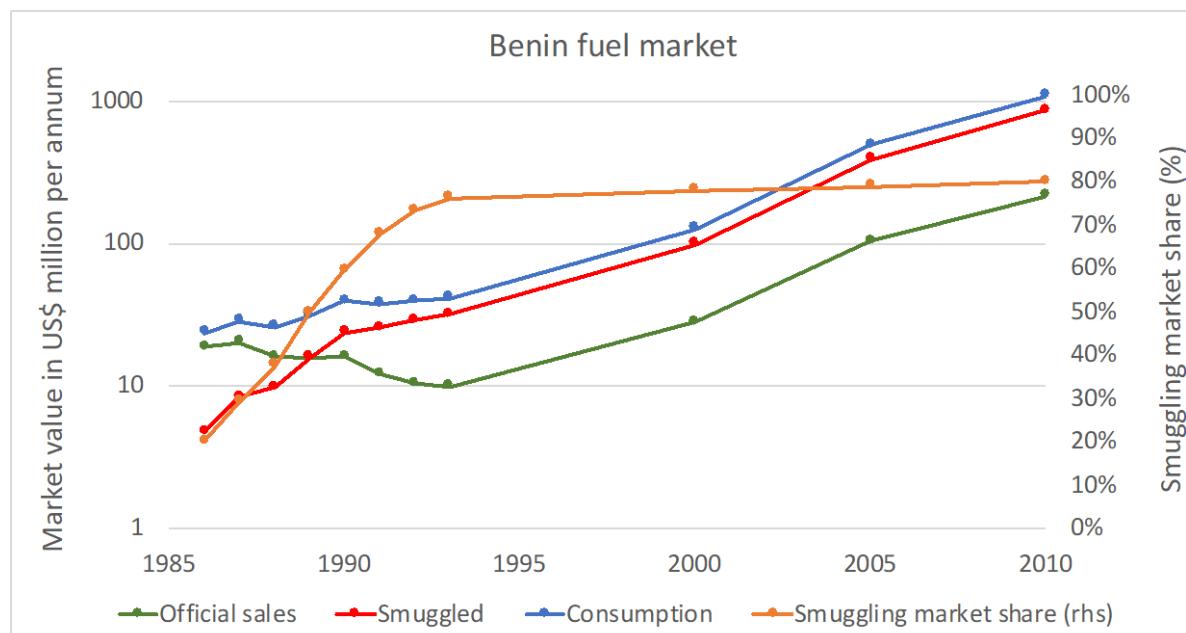
Source: reproduced from UNODC (2013: 46), Figure 39, with permission.⁵

⁵ Source of data: Government of Nigeria, House of Representatives. Report of the Ad-Hoc Committee 'To Verify and determine the actual subsidy requirements and monitor the implementation of the subsidy regime in Nigeria,' Resolution No. (HR.1/2012).

3.1.3 Benin's regular fuel market supplanted by smuggling

The IMF estimated (Wang 1994) that fuel smuggled from Nigeria to neighbouring Benin increased from 20 per cent of Benin's consumption in 1986 to 68 per cent by 1991, while officially recorded sales of fuel fell from 134,800 tonnes in 1986 to 63,300 tonnes in 1991, despite increased demand (see Figure 5). The difference was made up by smuggled fuel, estimated by the IMF to have increased from 33,900 tonnes in 1986 to 133,200 tonnes by 1991. In an interview to the United Nations Office on Drugs and Crime (UNODC) in November 2011, Benin's Minister for Government Affairs stated that the market share of Nigerian smuggled fuel had increased to almost 80 per cent of Benin's total fuel consumption in 2010 (UNODC 2013). During 1986–93, Nigerian domestic fuel prices were at a 20–80 per cent discount to global market prices, while Benin fuel prices were at a premium of three to four times the global price. The same fuel could sell in Benin for four to twenty times its price in Nigeria. Consequently, the market growth for fuel smuggling from Nigeria to Benin grew from US\$4.8 million in 1986 to US\$25.5 million in 1991, and from US\$100 million in 2000 to US\$863 million in 2010. Smuggling continued at least until 2016 and is most likely still current (Usman 2016). The cost to Nigeria is not only the loss of a valuable resource but also the macro-economic impact as the loss exacerbates fiscal pressures, thereby increasing the country's fiscal deficit, accelerating inflation, and putting pressure on the currency to depreciate. By keeping Nigeria's domestic fuel prices fixed, the effective degree of subsidization increases and so do the price differentials with neighbouring countries. This increases the profitability for smuggling, providing further opportunity to grow the illegal market. Oil smuggling from Nigeria is not limited to Benin as these activities also occur with Cameroon, Chad, and Niger.

Figure 5: The market share and value of fuel smuggling in Benin (1986–2010)



Note: lhs, left-hand side; rhs, right-hand side. The left vertical axis (lhs, in US\$ million per annum) is on a logarithmic scale, while the right axis (rhs, in percentage market share) is on a linear scale. Market value is calculated based on the global market wholesale diesel prices set by the US Energy Information Administration (EIA).

Source: author's illustration based on data from Wang (1994), UNEP (2017), IEA (2018), and EIA (n.d.).

The sale of illegal fuels at the roadside are a common sight in Benin (Figure 6).

Figure 6: Illegal fuels sold by bottles at the roadside in Bohicon Benin



Source: image by Adam Cohn, taken on 5 March 2008, reproduced from Flickr.com under CC BY-NC-ND 2.0.

In 2020, as part of the measures taken by the Nigerian government to strengthen the fiscal sector in the fallout of the COVID-19 pandemic, fuel subsidies were removed in the revised 2020 budget. These fuel subsidies had largely benefitted households with higher incomes, and the government can take other more targeted social spending measures to support the poor at a fraction of the cost (IMF 2021b). Removal of fuel subsidies is a key step in reducing cross-border fuel smuggling.

3.1.4 Fuel smuggling in SEA: Typical cases of cross-border price arbitrage

The smuggling of fuels from Malaysia and Indonesia into Thailand is a classic example of illicit cross-border price arbitrage. On average, 3 million litres of fuel are smuggled daily over land alone, from Malaysia to Thailand, having an annual value of US\$1.2 billion in Thailand and US\$0.54 billion in Malaysia. The price differentials are sufficiently large that some syndicates buy fuels in Malaysia and arrange smugglers to transport these across the land border at a service charge of US\$0.13 per litre. Modified trucks, capable of holding 3,000–5,000 litres of fuel, are commonly used for transport.

In addition to land transport, large-scale smuggling also takes place at sea using fishing vessels, adapted to also allow smuggling, or using decoy fishing vessels that are actually dedicated fuel tankers. In February 2013, one such vessel was detained carrying 50,000 litres of diesel. In 2016, another smuggling boat was seized with 70,000 litres of diesel remaining after it had already illicitly sold 50,000 litres through STS transfers. Some large-scale operations use ‘open fuel stations’ in Malaysian waters where multiple fuel tankers gather to sell Malaysian fuel to Thai vessels at sea. In one clampdown operation of Malaysian authorities in 2014, four vessels at an open fuel station were jointly captured carrying 3.7 million litres of diesel (Ralby et al. 2017).

Although Malaysia abolished fuel subsidies in December 2014, large fuel-price differentials (ranging from a factor of 1.6 to 2.3; see Table 3) continue to exist across the two countries because of different taxation levels. In March 2019, 300,000 litres of smuggled diesel was seized from two converted fishing trawlers that had bunkered their cargo offshore through STS transfers. One of

the two ship captains confessed to making such trips six to seven times a month. The arrests were made when the fuel was about to be offloaded to four waiting 18-wheel trucks and a six-wheel tanker truck at the pier of Bo Non, in Tha Sala (Rakrun 2019).

Table 3: Fuel-price differences for Malaysia, Indonesia, and Thailand on 14 June 2021

Country	Diesel (in US\$/litre)	Gasoline (in US\$/litre)
Malaysia	0.523	0.498
Indonesia	0.729	0.746
Thailand	0.822	1.152

Source: author's construction based on data from GlobalPetrolPrices.com (2021).

Distribution of smuggled fuels takes place in plastic bottles at the roadside or at small-scale black-market fuel stations mostly located in remote areas. While diesel and petrol are smuggled into Thailand, subsidized liquified petroleum gas (LPG) is smuggled out of Thailand into Myanmar, Laos, and Cambodia to benefit from price disparities. Thailand also functions as a transfer country for LPG as 40 per cent of Malaysian subsidized LPG was reported lost due to smuggling into Thailand and other nearby countries. As in other countries, oil theft syndicates are well diversified. In 2013, a Thai fuel smuggling syndicate was apprehended that also engaged in drug and human smuggling and was allegedly funding insurgents in South Thailand as well.

Fuel subsidies have particularly significant cross-border impact when fuel smuggling effectively extends a country's subsidies into neighbouring countries. The volume leakage due to smuggling limits the benefit such subsidies are intended to have for the poor in the subsidizing country. Instead, they profit the wealthy oil crime syndicates. In the country that is the recipient of smuggling, these black-market fuels undercut legal retail outlets and thereby erode its government tax base (Soud et al. 2020). The relationships and interactions between oil theft and smuggling syndicates and government enforcement organizations are not necessarily always antagonistic. In many countries, alternative interactions to genuine enforcement are shaped jointly by smuggling organizations and state structures (Romsom, forthcoming). Shifting tolerances, consolidation in the smuggling markets, and expanded versus declined opportunities of smuggling syndicates may transform the smuggling economy and their interaction models dynamically over time. As the influence of the developing interaction models extends beyond the smuggling economy, these may eventually contribute to the shaping of states.

3.2 Regional insecurity caused by oil theft

The impact of oil theft and smuggling extends well beyond the legal and illicit oil economy of countries. This section describes a number of cases where illegal oil activities had remarkable fallout effects on the non-oil economy and security of countries.

3.2.1 Pirates cripple Benin's port activities

One common scheme for oil theft is through piracy of oil tankers to steal their cargo (see Figure 1). This phenomenon has been prevalent in many global regions, but particularly so in the South China Sea and in the Gulf of Guinea. Piracy at sea significantly undermines economic port activity in regions where maritime security is absent. Particularly developing countries rely on the furthering of maritime trade as an economic lifeline for revenues, growth, jobs, and stimulation of exports. In 2011, 22 pirate attacks were conducted off the coast of Benin mainly targeting oil product tankers. Maritime insurance companies reclassified Benin as high risk and insurance premiums for ships rose drastically. Consequently, Port of Cotonou traffic declined by 70 per cent. At the time, trade taxes provided 50 per cent of the Government of Benin's revenues and Benin's Port of Cotonou provided 80 per cent of the country's taxes on trade (UNODC 2013). Despite

that Benin does not produce any oil and has very little official fuel imports (see Section 3.1.3), its government revenues fell by at least 28 per cent in 2012. This example highlights the impact of oil theft and its potential to cripple the governments of developing nations, even if these countries are not exposed to crude oil production or fuel trading.⁶

3.2.2 Colombia's local economy disrupts when Venezuela lacks oil to smuggle

Colombia is located between two countries, Venezuela and Ecuador, that massively subsidize fuels. Smuggling of fuel across the mountainous border from Venezuela to Colombia delivered profit margins of 200,000 per cent in 2016 (Soud et al. 2020). In 2017, Colombian officials estimated that 400 million gallons of gasoline crossed the border with Venezuela, largely to meet demand as a solvent in processing cocaine, which represents 28 per cent of Colombia's total gasoline market. When Venezuela's oil production collapsed in 2018—the result of mismanagement in the national oil company Petróleos de Venezuela, S.A.—the illegal fuel supply across the smuggling routes dried up.

Colombian communities had become so dependent on the smuggled petrol that it greatly disrupted the local economy. Thousands of people that had been dependent on the illicit fuel trade were no longer able to provide for themselves and their families. Fuel stations previously supplied by smuggled fuel ran dry. The disruption of the illegal fuel market also caused a local war and regular gun battles among multiple armed militias battling for control over the few remaining black markets, such as the smuggling of refugees from Venezuela. Extortion schemes of local businesses (legal and illegal) and violence flourished. To make up for the lost fuel trade, armed bandits charged for passage across the border paths, where hundreds of people disappeared, permanently (Collins 2019).

3.2.3 The risks of hardened borders in North Africa

Fuel smuggling has been rampant in North Africa and an active smuggling economy exists across most of the borders. In 2013, Algeria reported losing US\$1.3 billion a year due to fuel smuggling to neighbouring countries. This included Morocco, where an estimated 600,000 cars were running with fuel smuggled from Algeria (Al Makhfi 2013). However, the official border between Morocco and Algeria has been closed since 1994 and this has particularly affected the poorer region of East Morocco where local livelihoods have become strongly dependent on (fuel) smuggling with Algeria. Smuggling has been accepted by both Algerian and Moroccan authorities as it fulfilled a socio-economic need (i.e. smuggling is a survivalist activity) with few alternative economic options (Bukhars 2019). Most proceeds from smuggling were invested in the formal economy, particularly real estate. Some 30,000 East Moroccan families lived off fuel smuggling. Tolerating smuggling was also seen to support stability in these remote regions and added additional income to connected political elites (Gallien and Herbert 2018).

With the fallout of the 2011 Arab uprisings, Algerian authorities hoped that strengthening its borders would be paid for by increased government revenues from arresting fuel smuggling. Algeria clamped down on fuel smuggling by raising its domestic fuel prices (although still 36 per cent lower than those in Morocco in 2021). It also dug trenches along the border region so that fuel smuggling was only possible with jerrycan-loaded donkeys to cross the difficult terrain. Caravans of unaccompanied donkeys carry their liquid burden on instinct across the border at night. Moroccan authorities branded all donkeys in the region with ear tags to trace them, while

⁶ Benin was a small oil producer (8,000 bpd of peak production in 1986) until 1998 and has plans to restart domestic oil production under Norad's Oil for Development Programme (see Norad 2020).

Algerian authorities instead had a reputation to shoot them (explaining why the donkey caravans were unaccompanied). Others switched from smuggling fuel to smuggling people across the border, charging €28 per person each way.

To further strengthen their control on cross-border movements, both Morocco and Algeria built walls along their common border. Even so, these measures ignore the reality that most smuggling occurs under informal agreements between professional smugglers and state agents that regulate the flow of goods. The barriers have mostly affected survivalist smugglers, while professional smugglers have simply adapted. Communities became isolated, families divided, and local economies worsened. The stand-off between Algerian and Moroccan authorities behind their border walls does not facilitate much-needed transnational collaboration in law enforcement to counter increasing smuggling flows of people, drugs, and counterfeit medicines, transported by donkeys following the fuel-smuggling trail. Yet, legitimate goods trades between both countries need to transit over Marseille, rather than being simply transported over land. Many of the agricultural commodities imported by Algeria are produced in Morocco but these are not able to cross the border.

The border situation between Libya and Tunisia has similarities with Algeria and Morocco, though Libya has been in an on-off civil war since 2011 and the fall of the Gaddafi regime. Until Libya's recent clampdown, US\$119 million worth of fuel was smuggled annually into Tunisia, employing thousands of families in the borderlands (Gallien and Herbert 2018). At the Ras Ajdir border crossing, smugglers and authorities had informal yet detailed agreements over what goods could be smuggled (fuel was allowed, but not weapons or drugs), how bribes were determined, and who should be paid (Gallien 2019). This level of organization and regulation differs from petty corruption (Romsom, forthcoming). Centralizing smuggling activity restricted and controlled the flow of goods.

However, Libyan authorities grew frustrated with the outflow of subsidized goods that caused shortages in Libya. When Libya restricted gasoline volume smuggled under the informal regulation, prices in Tunisia doubled. An imposed entry fee of US\$11 into Libya shut out the survivalist smugglers and small traders. However, Tunisia continued to tolerate the smuggling economy on its southern border, bypassing the border wall that was built with US\$45 million funding from the United States and Germany. There has been much concern of what a destabilized Libya may imply for neighbouring Tunisia. Much less thought is given to how a stable Libya may not tolerate the continuation of a large smuggling economy, triggering a serious destabilization of southern Tunisia (Gallien 2018).

There are many survivalist smugglers for whom smuggling is a lifeline. However, alongside (and sometimes under cover of) the survivalist smugglers operate the organized crime syndicates that smuggle at industrial scale and have agreements with authorities that allow their operations. In exchange for money, these authorities provide smuggling syndicates with government infrastructure and security to conduct their operations, and services for taking out the competition, all contributing to undermine legal economies and government finances. When there is a clampdown, the survivalist smugglers are made to suffer, while the cartels simply adjust their operations.

Extreme border protection in Northern Africa has resulted in macro-economic inefficiencies that have significantly impaired growth in its countries. Youth unemployment and crime are stubbornly high. Disruption of the smuggling trade has caused distress, popular anger, and protests on both sides of various borders. Economic marginalization and security services' abuse of powers under hard-line border measures are strong contributing factors in the radicalization of youth. Yet, border measures to reduce smuggling need to be applied intelligently and recognize that smuggling

is a core development issue. The full context of smuggling needs to be understood for measures to be effective and have targeted impact. Barriers alone hurt the poor and cause socio-economic collateral damage, but they are insufficient to deter professional smugglers who simply adapt to new markets, change routes, and amend their interactions with state actors to continue their practices.

4 Impact of oil theft on local communities and development

Oil theft not only deprives governments from revenues it also erodes business confidence, investment, and domestic development. This section elucidates how the prevalence of oil theft and practices of oil thieves involve and affect local communities.

In winning the support of local communities, the efforts of oil theft syndicates have multifaceted consequences. Law enforcement organizations are impeded in their anti-oil theft operations when local witnesses stay silent, or worse, if communities tip-off thieves on law enforcement activities. Local communities become complicit if they share in the oil theft spoils, or actively engage in oil theft operations and related ‘employment’ opportunities. Oil theft erodes governments’ abilities to mobilize their domestic resources to support local development. Basic services are then provided for by crime syndicates. In Mexico, for example, criminal cartels are deeply engaged in oil theft and have embedded themselves firmly into the community by offering employment and cheap or free fuel and providing gifts and community services, such as paying for healthcare. In Nigeria, oil theft is portrayed as a ‘moral economy’, where criminal groups involved in oil theft describe their activities as economically rational, politically necessary, morally defensible, and socially productive (Katsouris and Sayne 2013).

The widespread occurrence of oil theft and the scale of its operations can be a key source for jobs in local communities, ranging from technical work (e.g., digging the ground for pipeline tapping access), security, operations jobs in rudimentary artisanal or bush crude oil refineries, to illicit fuel distribution and sales. Protection and extortion schemes are rampant, whereby communities offer their services to protect pipelines from sabotage and theft in return for regular payments. Those individuals who are not able to join an existing scheme often join militant groups to attack other syndicates to take market shares or start their own extortion schemes towards these syndicates.

Community support, complicity from politicians, and individuals in government organizations (such as those responsible for security) provide enduring power to oil crime syndicates. Oil theft schemes incite and thrive on corruption, misappropriation, and fraud. Bribery and loyalty payments allow illegal practices to continue despite an outside appearance of crime fighting. Security forces responsible for protecting and securing the nation’s resources may be actively involved in oil theft. Oil crime organizations may bribe security forces, or provide them with a profit share, in return for undermining the competition. Oil theft has the power to erode the rule of law and create political instability. Politicians and officials may use stolen oil for their own motivations. There have been reports of oil theft syndicates rigging elections or keeping regimes in power.

To hide oil theft, lines are blurred between legal and illegal oil supplies and oil-related activities. In such an environment, it is not clear who is and who is not involved in the actual acts of theft, the aiding and abetting, the facilitation, financing, transporting, processing, trading, and sales. A large fraction of stolen oil finds its way into global commercial markets. This contaminates legal oil trade with illegal product flows. Jurisdiction issues limit the effectiveness of enforcing organizations, particularly as criminal oil syndicates are often transnational in conducting their business.

In multiple ways, local communities are affected adversely by oil theft practices that exert a high and lasting toll on those most vulnerable and living off the land and its waters.

- Many pipeline taps cause oil spills that create widespread and lasting environmental damage. Artisanal refineries cause permanent damage to communities, nature, agriculture, and water sources.
- Oil spills often provide opportunities for locals to siphon fuel into containers to get their small share of the spoils. More than occasionally, this has disastrous consequences when casual neglect of safety causes illegally tapped pipelines to explode.
- Oil theft attracts and aggravates organized crime and local violence, through armed militias and crime-on-crime activities.

These impacts are further detailed in the following sections.

4.1 Environmental impact of oil theft

Oil operations are exposed to potential spills that occur due to equipment failures and human errors. Countries' oil and gas regulations hold asset owners accountable and operators responsible for cleaning up oil spills and impose penalties for lost product, clean-up costs, and damages. However, in case of sabotage and oil theft, damages are caused intentionally by external actors. In the case of oil theft, leaks and spills may go undetected for some time, particularly if thieves intend to repeat tapping the same location, further aggravating the environmental damage to and impact on local communities. Such scenarios can cause legal wrangling between oil companies, regulators, and local communities. There are cases in which there is ambiguity around the causes of spills resulting in local communities blaming the large multinational oil companies to extract more compensation. Transparency on the amounts of oil spilled, the causes of spills, and the effectiveness of the clean-up is necessary to keep stakeholders informed and aligned to avoid repeat occurrences: such transparency and the regulations around it are often absent. Oil operators have and accept a duty to secure their assets, but the type and degree of protection needed to ward off professional oil theft syndicates, armed militants, and saboteurs can often only be delivered by the security forces of countries.

4.1.1 Spills from illegal pipeline oil taps

In the first 10 months of 2018, Mexican authorities identified more than 12,500 illegal fuel taps on pipelines of Petróleos Mexicanos (Pemex) (Semple 2019). Spills from these pipeline taps caused by Mexico's criminal cartels are frequently not cleaned up. Instead, local Mexican farmers and landowners get financial compensation when spills happen on their land. According to the Nigeria National Petroleum Company (NNPC), pipeline vandalism was detected 20,965 times in the period 2010–14 (Olu-Adeyemi 2020), although spills also occur from pipelines and equipment operations (see Figure 7). Such spills often provide opportunities for locals to siphon fuel into containers, although they are rarely the ones that originated the thefts. In comparison, Russia's Transneft (the largest oil pipeline company in the world, with over 70,000 kilometres of trunk pipelines) uncovered merely 566 illegal pipeline taps in the period 2018–20, but this may just be the tip of the iceberg. State-owned investment bank VTB Capital estimated in 2013 that oil companies were losing US\$1.8 billion to US\$3.5 billion annually due to oil theft from such taps, the losses thereby depriving the Russian budget of US\$632 million to US\$1.2 billion (Khazov-Cassia 2021). Most occurrences of theft are not exposed nor reported to the Russian authorities. Many oil spills caused by illegal oil taps remain undetected in remote locations. With regulatory enforcement lacking, there is no restoration and the oil spills are simply left. In 2020, illegal pipeline

taps (i.e. those that were detected and reported) caused more than 60 per cent of Transneft's cases of crude oil and petroleum products spills (Transneft 2021).

Figure 7: Kegbara-dere community oil spill, Ogoniland, Nigeria



Source: images by Luka Tomac / Friends of the Earth International, taken on 5 November 2015, reproduced from Flickr.com under CC BY-SA 2.0.

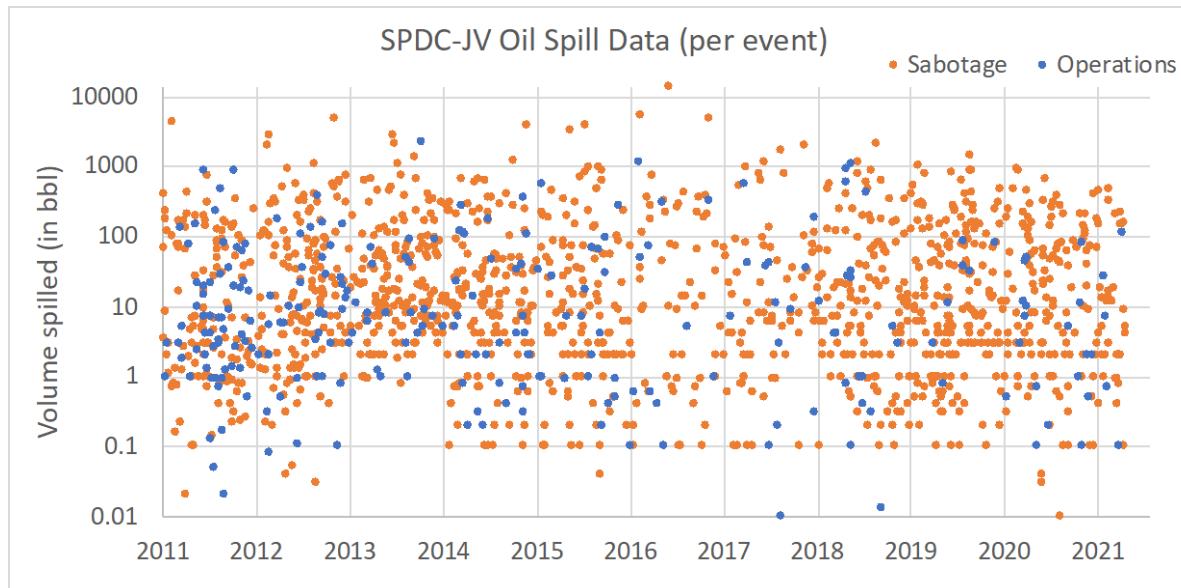
In the Niger Delta, environmental damage from leaking oil wells and pipelines spoil the natural swamplands and fishing waters at such a scale and frequency that it has gained significant international attention. Since 1995, Shell records detailed oil spill data from its Shell Petroleum Development Company of Nigeria joint venture (SPDC-JV) operations (see *Reuters* 2018). Its website details each spill with the date of occurrence, location, cause, volume spilled, volume recovered during clean-up and clean-up status (see SPDC 2021a). Shell's detailed database further describes the dates of joint investigation visits (JIVs). Evidence is presented in the form of photographs and a digital copy of the JIV report. The joint inspection team is represented by SPDC-JV, regulators, government security agencies, state governments, communities, and sometimes local non-governmental organizations (NGOs) as observers. According to Shell, once clean-up and remediation are completed, the work is inspected and, if satisfactory, approved and certified by Nigeria's regulator National Oil Spill Detection and Response Agency. For operational spills, SPDC-JV pays compensation to people and communities affected. Shell's transparency on its leak detection and remediation programme is commendable. However, some note that this effort aims to influence the thinking in international courts regarding accusations by NGOs against Shell for having caused environmental damages (Figure 12).

SPDC-JV's operations are located in the Niger Delta and adjoining shallow offshore areas where it operates in an oil mining lease area of 31,000 square kilometres. SPDC-JV has more than 4,000 kilometres of pipelines and flowlines, 87 flow stations, 8 gas plants, and more than 1,000 producing wells. SPDC-JV employs 2,700 people directly; 97 per cent are local Nigerians and 63 per cent are from the Niger Delta. Another 9,000 people are employed indirectly through the network of companies that provide supplies and services (SPDC 2021b, d). SPDC-JV is capable of producing 1 million bpd on average, about two-thirds of Nigeria's reported crude oil production in 2019. However, in 2018 it produced only 194,820 bpd (up from 169,723 bpd in 2017) (see Department of Petroleum Resources 2018). The difference in production capacity and actual production is largely caused by shut-in production awaiting repairs after sabotage;⁷ the remainder is stolen, spilled, or lost as a result of operational inefficiencies.

⁷ Pipelines are depressurized to enable repairs. This triggers a vicious cycle of further theft. The lower pressure allows criminals to 'safely' install more taps along the pipeline route and extend theft operations. The more pipelines are shut-in, the more opportunity for theft. Company staff often inform criminals which pipelines are safe to tap in to.

Shell's oil spill data highlight disturbing details. On average, there were 152 spills per year (ranging from 73 to 190) during the period 2011–20. The vast majority of spills (i.e. 1,269 out of 1,519, or 83.5 per cent) are caused by sabotage and theft. The average volume of oil spilled by sabotage or theft (129 bbl) is almost twice that of operations spills (67 bbl). Theft also causes the largest spill each year, up to 13,578 bbl in 2016. The largest operations spill was 2,249 bbl in 2013. The total volume spilled in the period is almost 180,000 bbl, with sabotage and theft responsible for 90.7 per cent. In March 2013, Shell reported finding 90 illegal tapping points on the Nembe Creek Trunk Line, which transports crude to the Bonny export terminal. Thieves reuse undiscovered pipeline taps two to five times a week. There is no declining trend in sabotage-related spills, neither in terms of spill frequency nor in terms of volumes (see Figure 8). Years 2016 and 2017 saw a temporary decline in the number of spills, yet 2016 had a record total oil spill volume of 31,085 bbl (among 73 spill events that year), almost all (94 per cent) due to sabotage and theft. Yet, operations-related spills did decline both in frequency and average spill size (see Figure 9 and Table 4).

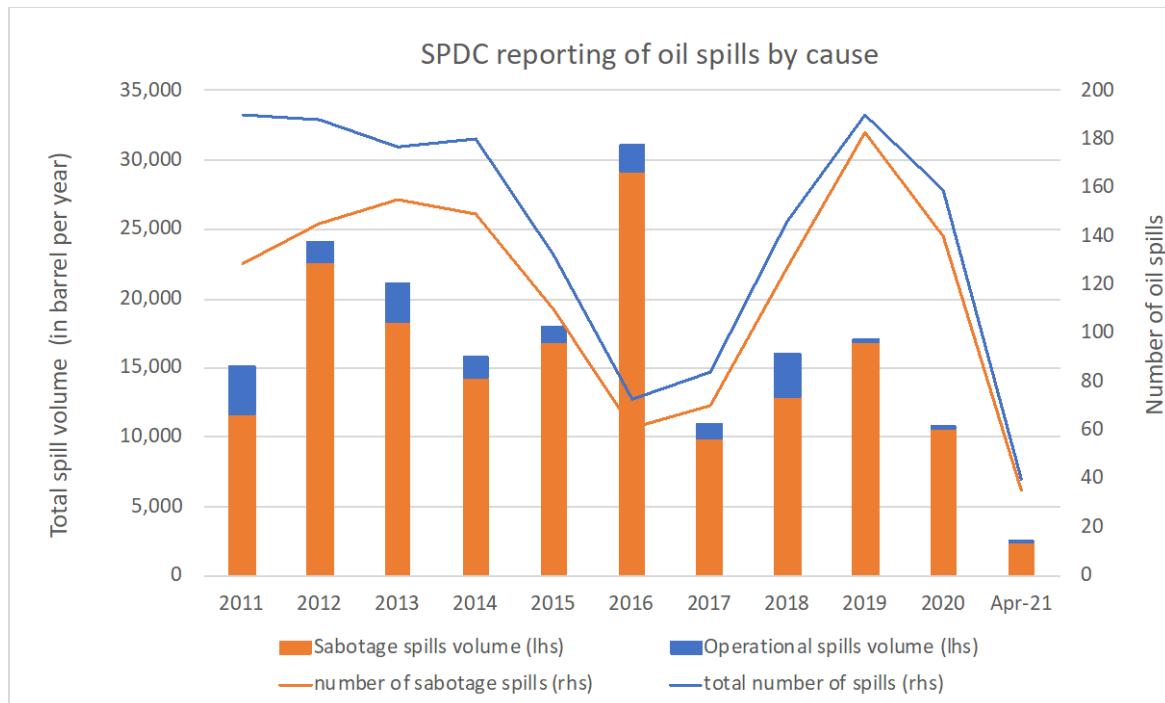
Figure 8: Oil spill data from Shell from 2011 until April 2021



Note: the vertical axis (spill volume in barrels) is on a logarithmic scale.

Source: author's illustration based on oil spill data from Shell (see SPDC 2021a).

Figure 9: Shell annualized oil spill data from 2011 to 2020 from its SPDC joint venture operations in Nigeria



Note: lhs, left-hand side; rhs, right-hand side. The left vertical axis denotes spill volumes (in barrel per annum), while the right axis shows the number of spill events per annum by source.

Source: author's illustration based on oil spill data from Shell (see SPDC 2021a).

Table 4: Overview of oil spill data from SPDC joint venture operations from 2001 to April 2021

Year	Number of spill events	Total spill volume (bbl)	Average spill volume (bbl)	Number of sabotage spill events	Total sabotage spill volume (bbl)	Average sabotage spill volume (bbl)	Maximum sabotage spill volume (bbl)	Number of operations spill events	Total operations spill volume (bbl)	Average operations spill volume (bbl)	Maximum operations spill volume (bbl)
2011	190	15,071	79	129	11,653	90	4,387	61	3,417	56	863
2012	188	24,121	128	145	22,626	156	4,689	43	1,495	35	386
2013	177	21,045	119	155	18,335	118	2,699	22	2,710	123	2,249
2014	180	15,805	88	149	14,342	96	3,803	31	1,464	47	367
2015	132	18,007	136	110	16,824	153	3,851	22	1,183	54	549
2016	73	31,085	426	61	29,200	479	13,578	12	1,885	157	1,135
2017	84	10,904	130	70	9,961	142	2,026	14	944	67	570
2018	146	16,075	110	127	12,906	102	2,150	19	3,169	167	1,114
2019	190	17,033	90	183	16,785	92	1,453	7	249	36	87
2020	159	10,811	68	140	10,584	76	904	19	227	12	81
Apr-21	40	2,565	64	35	2,421	69	463	5	145	29	110
2011–20	1,519	179,956	118	1,269	163,214	129	13,578	250	16,742	67	2,249

Source: author's compilation of Shell-reported oil spill data (see SPDC 2021a).

The data in Table 4 only reflect spills from SPDC-JV and not those from operations of other oil and gas operators in Nigeria. In comparison, NNPC recorded a total of 1,336 vandalized points on its pipelines in the Niger Delta during the 12 months up to January 2018, more than the 1,269 sabotage spill events recorded by Shell in a 10-year period (Goodnews and Wordu 2019). The largest SPDC-JV spill recorded during 2011–20 occurred on 3 June 2016 at the ‘Forcados 48” Export Pipeline Right of Way’ onshore along Okuntu road (Figures 10 and 11) (as noted on Shell’s oil spill website; see SPDC 2016). Operational spills can be distinguished from theft-related spills as exemplified in Figure 12.

Figure 10: Part of spill impact on 48" Forcados Export Pipeline Right of Way at Ogulagha



Note: picture was taken during overfly on 9 June 2016.

Source: courtesy of Shell Nigeria (SPDC 2016).

Figure 11: Close-up of spill point on 48" Forcados Export Pipeline at Ogulagha



Note: picture was taken during pipeline repair works on 13 July 2016.

Source: courtesy of Shell Nigeria (SPDC 2016).

Figure 12: Oil spills caused by sabotage



Note: spills by sabotage are very clearly marked by evidence left by thieves. The double tap in the top right is an advanced mechanism to avoid detection from pipeline pressure sensors. One tap is used to withdraw fuel, while the other is used to simultaneously inject water and replace voidage.

Source: courtesy of Shell Nigeria (SPDC 2021c).

4.1.2 Ecological damage from artisanal refineries

Artisanal refining refers to the use of a primitive and illegal process in which crude oil is refined by heating and supplemented with chemical additives, in locally crafted drums. The crude oil mix is boiled and the resultant fumes are collected, cooled, and condensed in tanks to be used locally for lighting, energy, or transport. Diesel is the primary product in most artisanal refineries. The process facilities are inefficient, low capital, dangerous, and highly polluting. All artisanal refineries rely on crude oil theft to thrive. This implies that there is a continuous relationship between oil theft and artisanal refining, as a fraction of the stolen crude is feedstock for the artisanal refineries (Goodnews and Wordu 2019). Artisanal refineries typically occur in areas where normal regulatory oversight is lacking or dysfunctional.

They often arise in conflict zones where there is a need for fuel to support militant operations, or where smuggling and sales of illicit fuels provide funding opportunities for militants. After professional refineries were destroyed during the armed conflict with ISIS in northern Iraq in 2014 and extending to Syria in the years following, small artisanal refineries quickly appeared in large numbers. By early 2015, more than 1,600 artisanal refineries across at least 20 clusters were identified in northern Iraq, while in 2017 north-east Syria hosted some 50,000 ‘barrel-size’ refineries across 60 clusters (Zwijnenburg and Postma 2017).

Apart from conflict zones, artisanal refineries also occur in locations where there is opportunity for oil theft syndicates to make financial profits from black-market fuels. In Russia, such mini-refineries are called ‘samovars’, after the traditional Russian teakettle. These refineries and their regular supplies of stolen crude as feedstock are able to exist because of the complicity of law enforcement officers who are collaborating closely with organized crime organizations. Employees in security departments of oil companies and the private security firms they hire to guard pipelines frequently play key roles in oil theft practices. Oil companies that combat theft regularly face pushback from authorities, while those who are caught stealing oil often receive lax punishment if the cases make it to trial. A 2020 study by the Russian Fuels and Energy Technology Development Institute concluded that in numerous regions ‘powerful criminal groups with strong ties to the Interior Ministry, prosecutors, and courts have formed around the theft of fuel’ (Khazov-Cassia 2021). Most oil theft and samovars are consequently not reported.

A large part of Nigeria’s stolen crude oil ends up in artisanal or bush refineries that create oil products for Nigeria’s black market for fuel. A typical artisanal refinery in Nigeria produces about 40–60 bpd of diesel and 5 bpd of gasoline, although installations can vary considerably in size. With a low 20 per cent ‘refinery efficiency’, each barrel of product requires 5 bbl of crude oil input. Therefore, a single refinery output of 60 bpd requires 300 bpd of crude oil supply. There are indications that bush refining grew particularly in 2011, as in 2012 NNPC’s domestic refined gas oil volumes and Nigeria’s imports of gas oil both declined with 17,500 bpd combined. This indicates a growth in artisanal refining capacity of at least 87,500 bpd of additional (stolen) crude oil intake. A Nigerian Joint Task Force was reported by Shell to have destroyed over a thousand illegal refineries in 2013 (Royal Institute of International Affairs 2013). In 2015, the Nigeria Security and Civil Defence Corps (NSCDC) was reported to have destroyed over 250 illegal refineries. The destruction of these bush refineries often adds significantly to the environmental damage (see Figure 13 and Channels Television 2015). These 250 illegal refineries destroyed by NSCDC are estimated to have consumed some 75,000 bpd of stolen crude. If these 250 refineries represent only one-third of all bush refineries, in total they could have consumed some 225,000 bpd of stolen crude and produced some 45,000 bpd of product, mostly for blending with regular fuels. Such estimates are consistent with the scale of Nigerian oil theft mentioned earlier. However, another sizeable share of Nigeria’s stolen crude is transported by barges or small tankers to

international oil tankers to top up their cargoes through STS transfers. Therefore, it remains a rough estimate how much stolen crude oil ends up at bush refineries.

Figure 13: A formerly functional creek-side refining camp in the Niger Delta region, Nigeria, destroyed by the Joint Task Force in 2012.



Source: images by Stakeholder Democracy, taken on 27 November 2012, reproduced from Flickr.com under CC BY-NC-ND 2.0.

The socio-economic cost from artisanal refinery practices are substantial (Obenade and Amangabara 2011; Stakeholder Democracy Network 2015).

- As highlighted in the previous section, tapping into crude oil pipelines causes significant environmental damages due to the oil spills at source.
- Artisanal refineries use open ground and waterways to transport and distil product and dispose of waste, creating an environmental disaster for affected areas (see Figure 14).
- These refineries are only maximum 20 per cent efficient, leaving 80 per cent of the partially processed crude to seep into the ground and to contaminate water ways.
- Artisanal refined crude is of such poor quality that it regularly causes equipment and motor damage, as well as high degree of atmospheric emissions due to poor combustion.
- Artisanal fuels are often blended with legal fuels to attract better profit margins. This affects the quality of commercial fuels and blurs the lines between legitimate and illegitimate fuels.
- The low cost of setting up many new artisanal refineries has turned huge land and water areas into waste lands due to lack of refinery containment.
- Remediation of land and water ways is mostly absent and if clean-up action is taken, it is mostly too late to contain the contamination to a restricted area.
- Artisanal refineries are responsible for significant air pollution with toxic gases and particulate matter (soot) causing significant health effects (Romsom and McPhail 2021).
- Artisanal refineries are prone to fires, extending the potential harm to the environment.
- In Nigeria, artisanal refineries are accorded a social licence to operate by local communities. Intending refiners and investors are required to register with unions at prohibitive prices; youths engaged in this business have become community overlords.
- Gang violence and violent turf wars between competing criminal syndicates occasionally erupt as rival gangs, attracted by easy profits, challenge established structures.

Figure 14: A bush refinery in operation in the Niger Delta region, Nigeria



Source: images by Stakeholder Democracy, taken on 21 November 2012, reproduced from Flickr.com under CC BY-NC-ND 2.0.

4.2 Oil thefts gone wrong

Local communities, lured by the promise of free fuel, often fall victims to oil thefts gone wrong. On 18 January 2019, in the town of Tlahuelilpan, Mexico, following an illegal tap into a gasoline pipeline, an explosion occurred and ultimately killed at least 137 people among a crowd that had gathered to collect free fuel with containers (Harrup and Whelan 2019). On 13 November 2019, at least nine people died, and more than a dozen others were injured when an oil pipeline exploded during an illegal oil tap in northern Egypt (Paraskova 2020). Nigeria has a shocking record of pipeline fires and explosions related to oil theft. It reported 28 cases of pipeline explosions between 1998 and 2006. Many additional events are assumed to have occurred in this period but were not documented.

The largest disaster occurred on 18 October 1998, when 1,082 people died in the community of Jesse in Nigeria's Delta state, while pilfering fuel from a petrol-carrying pipeline (Friedman 1998). The events surrounding this incident continue to be disputed, but there are reports of oil thieves tapping into the pipeline overnight and siphoning the fuel into tankers. When they finished their theft, they failed to close the leak properly, causing a large fuel spill in the wider area, including farmlands and into the Ethiope river. In the morning, people going to their farms noted the spill and rushed to collect as much as possible from it. A casual cigarette could have been a likely cause of the fire. However, some claimed the fire was created intentionally by officials 'to prevent anybody from giving evidence' (Bassey 2020). Box A provides a snapshot of oil theft pipeline disasters affecting Nigerian communities (also see *Al Jazeera* 2006; *Reuters* 2007; Nnadi et al. 2013; Okoli and Orinya 2013).

There is a lack of independent research into the wider consequences to communities and the environment caused by pipeline explosions, fires, and leaks due to theft (Omodanisi et al. 2014). In many cases there appears to be an understanding between thieves, who know where and how to tap a pipeline and who conduct a professional scale oil theft, and local communities who follow on by siphoning the tap for local use. By that time, the professional thieves are likely to have left the site of the crime, making the theft seem to be a local community action. In most instances, the presence and locations of pipeline taps are kept secret, so that thieves can return later and siphon more oil. The process of tapping into a pipeline is most dangerous when the pipeline is live (i.e. under working pressure), a so-called hot-tap. However, many of these pipeline thefts are insider jobs, in which thieves tap into pipelines that are under maintenance, or where the pressure has been reduced, and where there are no maintenance or security crews active. Oil company personnel

often provide such detailed information to thieves. The technical knowledge for making pipeline taps is specialized and, therefore, taps are often done by former oil company technical staff.

International oil companies (IOCs)⁸ working in regions with persistent oil theft and theft-related accidents are confronted with practical and moral dilemmas. Practical dilemmas involve their role in safeguarding their own infrastructure and the government's role to do so. When an illegally tapped oil line leaks oil into the environment, who is responsible? Moral dilemmas concern their potential complicity in not doing more to prevent oil theft when the theft does not affect their business revenues directly.

Because of insider involvement, bribery, extortion, the threat of violence, and fear of persecution, there remains a significant and systemic lack of data and practical information on illegal oil taps, artisanal refineries, and oil theft-related accidents. Underreporting of theft-related events results in underestimation of the scale and severity of the oil theft problems. When oil thefts go wrong, even the dead remain unclaimed (see Box A). Measures against oil theft need to address the risk of occurrence (prevention) as well as seek to mitigate the consequences to peoples' lives and the environment.

⁸ IOCs most often refer to large international integrated oil and gas companies.

Box A

Oil theft-related pipeline disasters in Nigeria from 1998 to 2006: A snapshot

Pipeline tampering, sabotage, and theft have resulted in a countless number of deaths, burn victims, destruction of property, and environmental destruction. The lure of free fuel gushing from damaged and sabotaged pipelines proves to be too strong, despite so many examples of explosions and fires that wipe out whole communities. Large-scale disasters happen repeatedly at the same locations (such as in Jesse: 1,082 killed in 1998 and again 250 killed in 2000). Sometimes, the same accident happens again a day later at the same location (such as in Afroke: on 23 and 24 July 2000).

Natural gas flaring and venting reduction framework

- 17 October 1998: 1,082 people died in Jesse while pilfering fuel from a petrol pipeline
- 22 April 1999: more than 10 people were killed in pipeline fire in Bayana in Delta state
- 8 June 1999: at least 15 people were burned alive in a pipeline explosion at Akute-Odo
- 13 October 1999: a pipeline explosion killed an undetermined number of people at Ekakpamre Ughelli
- 14 January 2000: at least 12 people died in a pipeline explosion in Gana community in Delta state
- 7 February 2000: 17 people died in a pipeline fire near Ogwe in Abia state
- 20 February 2000: at least 3 people died in a pipeline explosion in Lagos state
- 14 March 2000: more than 50 people were burned alive in a pipeline explosion near Isisioma in Abia state
- 22 April 2000: at least 6 people died in a pipeline explosion at Uzo-Uwani in Enugu State
- 3 June 2000: undetermined number of deaths were caused by a pipeline explosion at Adeje in Delta state
- 20 June 2000: 28 people died in a fire caused by a pipeline explosion at Okuedjeba
- 10 July 2000: a pipeline explosion, again near the town of Jesse, killed some 250 villagers
- 16 July 2000: more than 300 villagers died when a pipeline exploded in the town of Warri
- 23 July 2000: at least 40 people were killed at a pipeline explosion at Afroke village near Sapele
- 24 July 2000: 15 people died in a second blast in the same Afroke area as the day before
- 30 November 2000: a leaking oil pipeline near the village of Ebute killed at least 60 people
- 5 November 2001: 15 people died in a pipeline explosion at Umudike in state of Imo
- 29 September 2002: several people died and many more were injured following an explosion of a pipeline that was being illegally tapped in Akute-Odo in Ogun state
- 19 June 2003: a pipeline tapped by thieves exploded in Ovim, north of Umuahia, killing 125 locals
- 6 January 2004: undetermined number of deaths were reported and 200 hectares of farm land destroyed at Elikpokwodu in Rivers state
- 30 July 2004: at least 7 died and several more were injured at Agbani in Enugu state
- 16 September 2004: an explosion killed at least 60 as thieves tapped a gasoline pipeline at Ijegun in Lagos
- 19 December 2004: at Imore village in Lagos state, a pipeline explosion killed at least 500
- 21 December 2004: at least 20 people died in a pipeline blast in Ilado in Lagos when stealing fuel
- 13 January 2006: 7 died and 6 were injured at a pipeline explosion at Iyeke in Edo state
- 12 May 2006: a pipeline explosion in Ilado village outside north-east Lagos killed more than 250
- 2 December 2006: at least 1 died and farmlands were damaged following a pipeline incident
- 26 December 2006: more than 269 people were burned alive and more than 500 were ultimately killed when a fire erupted from an illegally tapped pipeline at Atlas Creek Island, Lagos. In addition, a dozen homes, a mosque, two churches, numerous business and workshops, and 40 vehicles were incinerated (see BBC 2006).

This list above is only a snapshot of the many disasters that continue to happen with pipeline oil theft, in Nigeria and in other countries. Many pipeline disasters are unreported and the death tolls are almost always underestimated, for two key reasons: many victims die later from their burns and many incidents remain

unreported (and the dead unclaimed) for fear of reprimand or prosecution. In most cases with a high death count, the professional thieves who are responsible for the illegal tap would have left the scene before the incident, leaving the spoils and spills of the still flowing pipeline for the local community to collect with plastic containers, often with disastrous consequences.

4.3 Oil theft as a symptom and a cause of local violent conflicts

Oil theft often coincides with acts of violence that occur between law enforcement and organized crime syndicates, between organized crime syndicates themselves (i.e. crime-on-crime activities), between organized crime syndicates and members of the community (including employees of oil companies), and sometimes even between law enforcement and members of the community. Although not all acts of violence are directed towards the community, they almost always occur within the community.

In Mexico, Pemex employees are being threatened, kidnapped, and even tortured by criminal gangs to provide information on pipeline operations, so that the cartels can plan and execute their thefts. Pemex workers who do not collaborate or who go to the police run the risk of being killed. Between 2006 and 2015, 123 Pemex workers and 12 former employees were arrested for alleged complicity in oil thefts (Woody 2018). Due to wholesale corruption, the Salamanca local law enforcement was replaced with state police in 2017. The militarization of the government's response resulted in street executions of oil thieves and a further escalation of violence (Gagne 2017).

In Russia, violent turf wars occasionally erupt over access to the illegal pipeline taps. Law enforcement authorities are being bribed by oil thieves to prosecute the competition. Official security forces are protecting oil thieves from competing organized crime syndicates. Journalists, ecologists, and police officers that investigate oil theft not only fear repercussions from criminals but also become the subject of criminal investigations themselves (Khazov-Cassia 2021).

In 2017, a wave of gang-related killings occurred near Petrobras' large refinery, north of Rio de Janeiro, Brazil. These killings were related to a power struggle between rival gangs, earning millions of dollars a year from stealing crude oil, diesel, and gasoline and selling it on a thriving black market. The precision with which the oil taps were executed strongly indicated insider knowledge from refinery personnel. The stolen crude oil was transported by tanker trucks to a large artisanal refinery in Boituva in São Paulo, Brazil. The thefts are thought to have been orchestrated by the city's militias, initially created to combat drug gangs, but now evolved into criminal organizations themselves. Following a crackdown on violent crimes, the militias, run by retired and off-duty police officers, moved to oil theft as a lower-profile source of income. However, by doing so they discovered that the violence followed them and exposed their activities (Gaier 2017).

In Nigeria, groups such as the Movement for the Emancipation of the Niger Delta (MEND) admitted to stealing and smuggling oil. This theft was rationalized as re-appropriation of wealth and as a form of protest. However, following the political amnesty to Niger Delta militants in 2011, oil theft spread beyond the Niger Delta territory. With the political pretence lost, there was no longer any need for oil thieves to limit themselves to targets in the Niger Delta region (UNODC 2013). The increasingly violent nature of oil theft crime groups, and their linkages to militant organizations, such as the Niger Delta Avengers, causes key security issues. After some successes in preventing oil tanker theft due to piracy, the business models of oil thieves changed to conduct maritime piracy for kidnapping (see Figure 15) (Romsom, forthcoming). They frequently target

international tanker crews, but also local vessels. These violently brutal activities often result in loss of lives.

Figure 15: MEND fighters and hostages in Nigeria



Source: images by Dulue Mbachu, International Relations and Security Network, taken on 22 February 2006, reproduced from Flickr.com under CC BY-NC-ND 2.0.

Leaving oil theft unchecked has destabilizing consequences for local communities as well as countries as a whole (see Box B). Patterns of oil theft opportunity crimes give rise to organized crime. Riches created through oil theft fund other criminal activities, such as illegal arms trafficking, violence, extremism, terrorism, kidnapping, drug trafficking, and human trafficking (Katsouris and Sayne 2013). Oil theft is both a symptom of violent conflicts as well as a source of such conflicts, particularly when competing criminal gangs and crime syndicates attack each other's activities for 'market share' and share of the loot. Individuals who are not able to join an existing scheme often join militant groups to attack other syndicates to take a market share or start their own extortion schemes towards these syndicates or towards their communities.

Not only do stakeholders lack the knowledge and ability to stop oil theft, also their lack of will allows these malpractices to persist. For example, political corruption is endemic in the Niger Delta, where most of Nigeria's oil theft happens. Local participation in oil theft is rampant and is often portrayed in the light of greater local 'resource control'. Protection rackets and crime-on-crime activities by local militants further aggravate the heavy costs of oil theft on Nigeria's economy. Attacks on oil field installations caused a shutdown of about half of Nigeria's onshore oil production between 2007 and 2009. In 2017 and 2018, more than 80 per cent of SPDC-JV's production capacity was shut-in due to oil theft and sabotage-related activity.

Box B

Nigeria oil theft: Most common and most covert

Nigeria regularly attracts headlines that describe it in superlative terms about the state of oil theft and corruption in the country. In 2016, British Prime Minister David Cameron was overheard telling Queen Elizabeth II that Nigeria was ‘fantastically corrupt’. When President Muhammadu Buhari of Nigeria was asked whether he agreed, he responded: ‘Yes’ (Chan 2016).

Atlantic Council’s downstream oil theft report summarized Nigeria in the following words: ‘Oil and illicit hydrocarbons activity are therefore at the heart of Nigeria’s current instability, and together may ultimately prove the deciding factor in the success or failure of Nigeria as a state’ (Ralby et al. 2017).

The opening sentences of the 2013 Chatham House report on Nigeria’s criminal crude state read: ‘Nigerian crude oil is being stolen on an industrial scale. Some of what is stolen is exported. Proceeds are laundered through world financial centres and used to buy assets in and outside Nigeria. In Nigeria, politicians, military officers, militants, oil industry personnel, oil traders and communities profit, as do organized criminal groups. The trade also supports other transnational organized crime in the Gulf of Guinea’ (Katsouris and Sayne 2013).

Although Nigeria is unique (as is every nation) and its oil theft crimes are among the world’s most blatant, Nigeria as a country is by no means alone in its struggles with oil theft and its related corruption. What differentiates Nigeria’s oil theft, other than the immense scale of its activity, is that it is ‘common knowledge’. Yet, in investigating the most basic facts about Nigeria’s oil theft, it becomes quickly apparent that even the most trivial questions are impossible to answer: How much oil is being stolen? How much crude and how much fuel? How much of the oil stolen is exported and to which countries? How much is processed at bush refineries? How and where is the oil stolen? How much is stolen from pipelines, how much at export terminals, and how much at illegal ship-to-ship (STS) transfers? How much fuel is smuggled to neighbouring countries? Who is doing the theft? Who is facilitating the theft? Who is financing and trading the stolen oil? How are payments made? None of these questions can be answered with any workable level of accuracy. Nigeria’s oil theft may be the most common, but it is also the most covert.

Nigeria reported that crude oil production declined from 2.1 million bpd in 2010 to 1.65 million bpd⁹ in 2019 (EIA 2020). These production numbers exclude oil volumes stolen, volumes affected by oil adulteration, wrong metering, and data manipulation. Estimates vary of how much oil in Nigeria is being stolen from wellheads, pipelines, oil storage locations, through illegal bunkering, bunkering (metering) malpractices, smuggling, tanker hijacking, falsification of records, and corrupt practices. There are many ‘theft’ schemes along the supply chain, some being masked as legal transactions. According to the 2013 Chatham House report, oil/fuel theft in Nigeria is estimated at 400,000 bpd, costing the country up to US\$1 billion per month in lost revenues (see Royal Institute of International Affairs 2013). Others estimate crude theft between 200,000 and 300,000 bpd (Obenade and Amangabara 2011). A recent estimate from S&P Global Platts estimates crude theft at 200,000 bpd (Gupte 2021). The Nigeria Extractives Industries Transparency Initiative (NEITI) quotes in its 2019 policy brief that ‘while figures from government put the loss [from 2009 to 2018] at 150,000 to 250,000 bpd, data from private studies estimate the figure to between 200,000–400,000 bpd. This implies that Nigeria may be losing up to a fifth of its daily crude oil production to oil thieves and pipeline vandals’ (NEITI 2019).

The reason for the spread in Nigerian oil theft estimates reflects the depth of the problem: no one really knows. Also, higher estimates of Chatham House and NEITI are for crude oil and oil products (fuel) theft combined, while other estimates are for crude oil only. Because there are many theft schemes along the supply chain, estimates differ also because of the point of measurement. For example, pipeline crude theft estimates exclude crude theft further downstream as a result of bunkering malpractices, fraud, hijacking of export tankers, etc. Recently, Nigerian authorities clamped down on theft in its key oil products pipeline (transporting imported gasoline) and noted a consequent increase in crude oil theft. Oil theft is dynamic, yet persistent.

The oil volumes stolen, although large and highly significant, are only a fraction of the oil theft losses incurred by Nigeria. SPDC-JV, with a capacity to produce 1 million bpd (about half of Nigeria’s oil production), has its production curtailed to less than 20 per cent of its capacity because of production

⁹ Natural gas liquids and gas condensates add a further 350,000 bpd to Nigeria’s petroleum liquid production.

deferment (see Section 4.1.1). Shut-in capacity of some 800,000 bpd due to sabotage, repairs, clean-up operations, and other consequences deprives the Nigerian government of significant income. Some of the other production areas face similar impacts as SPDC. Assuming a total onshore shut-in capacity of 1 million bpd, the Nigerian government loses in excess of US\$20 billion per year in direct profit tax proceeds (85 per cent tax rate, US\$65/bbl).¹⁰ Lack of investment and reduced activity levels further exacerbate the situation.

Nigeria's natural oil resource wealth is diverted from its main population in a variety of ways (UNODC 2013):

- oil theft from producing assets (wellheads, pipelines) and diverted to local artisanal refineries or exported to international markets;
- malpractices at bunkering installations as well as illegal bunkering;
- kidnapping of oil company employees and oil tanker crews for ransom;
- extortion schemes involving protection money and 'blessings' to security companies, armed militias, local communities, and crime gangs to avoid infrastructure sabotage;
- subsidy fraud and other embezzlement schemes;
- smuggling of fuel to neighbouring countries where it is sold at higher market prices; and
- piracy of oil tankers, initially for oil theft (illegal STS cargo transfers to crime network's mothership) and later for kidnapping tanker crews for ransom.

There are many aspects that have given rise to these practices and they all form part of an enabling environment in Nigeria for oil-related crime:

- Nigeria is the world's 11th largest oil producer in 2020 and much of its production is onshore, across vast tracts of low-density land, through jungle and swamps;
- pervasive corruption and fraud in the oil and gas sector;
- poor governance;
- presence of organized crime;
- blurred lines between legal and illegal oil supplies and oil-related activities;
- lack of transparency on hydrocarbons produced, sales, and revenues;
- government crude entitlements are sold through brokers obscuring transparency;
- oil theft as an organized crime is not on the international community radar (other than in cases of high-profile maritime piracy); and
- the opacity of Nigeria's oil theft practices also deprives the international community from insight to what degree and how its interests are being harmed.

Without good intelligence on these criminal practices, any counter measures are doomed to fail.

5 Oil theft interlinkages with rights groups and other organized crime

5.1 The struggle for oil resource control

Nigerian oil theft started in the early 1980s during military rule, with a self-enrichment scheme of senior officers in the Nigerian armed forces. There are many signs that Nigerian security forces continue to be involved in oil theft today, including acts of theft as well as facilitation thereof. The latter includes protection services for stolen oil as well as safe (unchecked) passage through control points. Ships impounded by the armed forces later reappear reflagged and repainted. The practice

¹⁰ Nigeria is a member of the Organization of the Petroleum Exporting Countries (OPEC). The tax deferment calculation ignores any OPEC production constraints.

of oil theft widened to civilian officials when Nigeria returned to democracy in 1999. Increased oil production and opening up of the oil sector in the 2000s, significantly increased the number of people and organizations that participated in theft, to a point that these participants hotly contested each other on their ‘rights’ to the oil. Instability ensued as criminality, violence, corruption, and militancy rose unchecked. Individual oil theft networks are pervasive, diverse, overlapping, and secretive. Opportunistic allegiances complicate legal investigations into their activities, as there are no formal hierarchical structures to target. However, functional roles in the oil theft business appear common: high-level opportunists (senior officials and ‘godfathers’ control access to the business), facilitators (financiers and shadow-banking structures), operations (executing the physical thefts), security (protect the stolen oil/fuel, provide passage, and secure the territory), local transport (trucks and barges), foreign transport (commercial tankers), sales (brokers, traders, foreign buyers), and low-level opportunities (protection/extortion rackets) (Katsouris and Sayne 2013).

Bribes and protection money distribute the profits of the theft business to wide-ranging participants. Navy clearance for tankers is charged typically US\$3/bbl (see Figure 16), while weekly security payments at the theft site are US\$4,000 to local youths, US\$6,000 to the community and US\$12,000 to armed forces (Katsouris and Sayne 2013; Stakeholder Democracy Network 2015).

Figure 16: Security boats photographed collecting bribes at trade zones, Niger Delta region, Nigeria



Source: image by Stakeholder Democracy, taken on 18 November 2012, reproduced from Flickr.com under CC BY-NC-ND 2.0.

Furthermore, militant organizations roved around, demanding additional monetary ‘blessings’ for not attacking thieves’ installations and stolen cargoes. Some of these militants expanded the ‘legal’ side of their business by offering lucrative ‘pipeline surveillance’ and ‘oil spill remediation’ services to legitimate oil companies for a similar purpose. Profitable positions in oil theft networks have reportedly been offered to militants in return for assistance in rigging elections, further blurring the lines between violence, theft, and politics. Nigeria’s process of allocating term contracts for crude lifting rights to mostly private oil-trading firms involves many shadowy brokers. Those who are squeezed out from the ‘regular’ business, often try their luck as advance-fee fraudsters, that is, tricking people into oil purchases without having any oil to sell.

All of the above-mentioned activities occur in parallel to the legitimate and regulated activities of professional oil companies. IOCs operating in Nigeria struggle with keeping their normal operations going against a background of theft and sabotage. Furthermore, they must keep their businesses free from corruption and dissuade their staff from complicity in providing operational information that facilitates theft, or from participating in such theft. Oil theft often happens on IOC acreage and affects their infrastructure (oil wells, gathering stations, local storage, pipelines). Operating companies are often tasked to clear up the spills that oil thieves leave behind and pay for this (although such costs are tax-deductible), despite frequent recurrences. Financially, the IOCs are not directly affected as they get paid for their oil at the point of loading into export tankers. Any oil lost due to theft does not come out of their share (the Nigerian government takes about 85 per cent profit share plus approximately 3 per cent in fees goes to the Niger Delta Development Commission) (see Royal Dutch Shell 2019). The largest direct cause of concern for IOCs in Nigeria is perhaps the impact on their international reputation and potential legal entanglement as NGOs hold them at least partially accountable for the malpractices conducted on their operated acreage and assets. Some IOCs are seemingly doing a better job in preventing theft and, consequently, wider stakeholder issues (Chevron, Total, and Exxon) than others (Shell and Agip-Eni).

Domestic market liberalization, privatization of state resources, and access to the global oil trade further contribute to the blurring of lines between legitimate and illegal oil practices. The recent Petroleum Industry Bill passed by the Nigerian parliament proposes to separate the regulatory from the commercial functions of NNPC. The setup of two new independent regulators is proposed.

Going forward, striking the right balance between independence and accountability, while ensuring data and information sharing between regulators and relevant ministries and agencies, will be essential. For transparency and accountability purposes, adhering to the principle that all petroleum sector revenues, including royalty, taxes, government profit oil share and dividends, should flow through the Federation Account will be important and helps to reduce vulnerabilities to corruption. (IMF 2021b)

The removal of fuel subsidies in 2020 is expected to have a significant impact in countering fuel smuggling and round-tripping (i.e. exporting and re-importing the same fuel).

5.2 The emergence of a ‘moral economy’

Oil theft and artisanal refineries form part of the moral economy, in which lack of local economic development opportunities and disparities in wealth have mobilized locals to extract their own wealth they deem to be entitled to. The economic activity supporting oil theft does indeed create temporary local jobs and many people share in the opportunity: engineers to siphon oil, barges to transport crude, transport of materials to build the artisanal refineries, labourers to operate them, security guards to protect against rival gangs, product marketers and distributors to supply distilled fuel to markets.

The competition for citizens’ loyalty is perhaps best described by the following excerpt of a speech by Shell at the Chatham House ‘Gulf of Guinea Security’ conference, on 6 December 2012:

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. But how worried should we be? A recent headline in a Nigerian newspaper stopped me in my tracks. Here’s what it

said: 'Niger Delta: Oil thieves build roads, hospitals, schools for communities. As Navy deploys warships, gunboats, aircraft in N/Delta.' This headline succinctly captures the looming threat: that in addition to the hard security challenge, oil theft has grown into a cancer that undermines the role of government and competes for the loyalty of citizens. When I learn that oil thieves have launched social welfare programs in the delta, it reminds me of drug cartels in Mexico, of militant jihadists in Pakistan and warlords in Somalia. In addition to the use and threat of violence, criminals win over parts of society by offering schools, security, food and education where government is unable or unwilling to deliver these services. Is this the future of Nigeria? I sincerely hope not. (Attah 2012)

This moral economy logic carries perhaps the greatest cost of all. In an extensive study by Chatham House published in 2013, criminal groups involved often described their own activities as economically rational, politically necessary, morally defensible, and socially productive (Katsouris and Sayne 2013). A foundational solution to the problem of crude theft and artisanal refineries is the provision of local electricity and fuel to communities, so that this could trigger economic activity and reduce the demand for illicit and poor-quality fuel.

5.3 Interlinkages between oil theft and other organized crime groups

Oil theft, smuggling, and the illicit trade in petroleum products is often seen as a lesser form of organized crime than human trafficking, the drugs trade, smuggling of weapons, kidnapping, and other violence and terrorism. However, as oil theft is often linked to these harder crimes, the question arises about how these relationships are formed.

- Oil theft often starts as an opportunistic, small-scale crime. With a lower risk and being potentially more financially lucrative than other 'hard' crimes, there is a natural progression towards a more professional approach and larger scale in operating oil theft.
- Profits from oil theft significantly increase when the oil thieves control a larger portion of the supply chain (artisanal refineries, adulteration, transportation, distribution, consumer sales). To control these supply chains, thieves need to expand their activities by evolving its activities into crime syndicate organizations.
- Sometimes, oil theft is conducted to finance other criminal or destabilizing activity. For example, ISIS used oil theft to finance its terrorist wars. Militant freedom fighters in many countries were financed by oil theft and were able to operate activities using artisanal fuels.
- The skill sets required for oil theft and for other crimes may overlap. Mexican crime syndicates' expertise in digging tunnels for cross-border drug smuggling is also deployed to create tunnel systems for underground access to tap pipelines, storage of stolen fuels, and use as a distribution point.
- Oil smuggling routes are often suitable and used to smuggle other goods, such as weapons and drugs. Sometimes, there are synergies in using smuggling infrastructure and routes bi-directionally (e.g., oil is smuggled one way and drugs are smuggled the other way on the return journey).
- Most of the oil is smuggled using official border crossings, under informal yet detailed agreements with state organizations on the modalities of the smuggling operation (including types of goods, amounts, payment methods, etc). One of the most common and preferred arrangements among oil thieves is the 'flat fee' arrangement that promotes market consolidation and makes the oil theft syndicate much more powerful.
- The smuggler-state interactions are likely to shift tolerances over time as the interaction model develops and transforms over time. Habituation and tolerance to smuggling may result in diversification of goods smuggled. Smuggling of oil may be extended to people,

drugs, and weapons. These developing interactions eventually contribute to the shaping of states. When state officials or influential entities within states become interdependent with officials or entities in other states to maintain an illicit supply chain, other elements in the relationships between those states can become jeopardized and unstable (Ralby 2017; Romsom, forthcoming).

- Crime syndicates prefer to diversify their operations to manage their risks. When the Mexican government started a crackdown on drugs, the cartels adapted by focusing more on fuel theft as a source of income (see Box C). The ability to change business models flexibly makes crime syndicates more resilient against law enforcement. When international navies were successful in countering oil theft piracy of tankers, the oil thieves adapted by kidnapping shipping crews instead. When cross-border oil smuggling is disrupted (Venezuela, North Africa), smugglers turn to smuggling of people (and other ‘goods’).
- Violence and crime-on-crime activities are particularly likely to occur with changes in the smuggler-state interaction and changes that affect market concentration. Such hardening of competition between crime syndicates stimulates arms trafficking and the emergence of armed militias that also impact local communities.
- Illicit money flows from oil theft intersect with those used to fund other transnational crimes and terrorist undertakings. Methods to smuggle the proceeds from oil theft and to launder money are common to those used for profits of other organized crimes. Facilitation of these financial transactions may be conducted by the same intermediaries.

The Transnational Alliance to Combat Illicit Trade (TRACIT) has evaluated and compared twelve global illicit trades, including the illicit trade in petroleum products on their wider impact on society and SDGs (see Bonnier and Bonnier 2019). TRACIT particularly highlights the negative impact of the illicit oil trade on SDG 16 (peace, justice, and strong institutions), as well as its primary impact on eight other SDGs. Table 5 presents an evaluation of TRACIT findings.

Table 5: Societal impact from illegal oil trade on sustainable development goals

SDG	Scope	Impact
SDG 3	Good health and well-being	Harmful emissions from adulterated fuels
SDG 6	Clean water and sanitation	Water contamination from oil spills, sabotage, and artisanal refineries
SDG 7	Affordable and clean energy	Diversion of kerosene for transportation, fuel adulteration, abuse of fuel subsidies
SDG 8	Decent work and economic growth	Severe impact in developing countries by undermining tax revenues, loss of natural resources, and subverting economic stability
SDG 9	Industry innovation and infrastructure	Compromises existing oil and gas infrastructure and dependent energy supply chains, reduces tax income utilization for infrastructure investments
SDG 14	Life below water	Large-scale systemic pollution from illegal pipeline taps and artisanal refineries ruins fishing grounds
SDG 15	Life on land	Degradation of farm land and soil contamination due to oil spills, pollution from artisanal refineries, and emissions from poor-quality adulterated fuels
SDG 16	Peace, justice, and strong institutions	Facilitates and intensifies criminality, threatens national security and economic stability
SDG 17	Partnerships for the goals	Widespread illicit trade in oil debilitates efforts to improve domestic resource mobilization by denying government significant potential tax income

Source: author's construction and evaluation based on input from TRACIT study (Bonnier and Bonnier 2019).

Box C: Mexico oil theft: An oligopoly of criminal cartels

Mexico's oil production was 2.5 million bpd in 2016, of which 1.2 million bpd was exported. Continuing a 16-year period of oil production declines, 2020 production reduced to 1.66 million bpd, 1.8 per cent less than in 2019. National oil company Pemex has a refining capacity of 1.58 million bpd, but it is under increasing financial strain with a debt of US\$110 billion. Hydrocarbon activities have historically been under the full control of Pemex, but in the last years the sector is slowly opening up for participation by the private sector, adding 54,000 bpd of production in 2020. However, a new nationalist agenda since late 2018 prevents Pemex from finding partners to provide technical support and co-investment for developing its deep-water fields (Stillman 2020).

Mexico is renowned for the scale and prevalence of its fuel theft, to such a degree that it has its dedicated name for it: 'huachiclero' (*Yucatan Times* 2019). Mexico's total hydrocarbon theft rose from US\$160 million (3,000 bpd, 460 illegal taps) in 2008 to US\$1.17 billion (23,500 bpd) in 2016 and US\$3 billion (81,000 bpd, more than 12,500 illegal taps) in 2018 (Semple 2019). Most of Mexico's oil theft is focused on fuel, as margins are larger and thieves are able to own a larger share of the value chain by also controlling stolen fuel distribution and sales channels:

- in bottles to small consumers;
- by tanker to industry or transportation companies;
- by tanker to retail fuel stations;
- to the thieves' own 'clone' Pemex fuel stations, offering 'discounts' of some 50 per cent; and
- export by semi-truck tankers into the United States.

Mexico fuel theft is closely interlinked with organized crime groups. The Zetas are a leading criminal organization in narcotics, weapons, and human trafficking. They also control 39 per cent of Mexico's illicit hydrocarbon market in 2016, giving the Zetas a fuel theft value of US\$372 million annually (Ralby et al. 2017). Criminal organizations are flexible in readjusting their business models. When enforcement of narcotics increased, the Zetas compensated their loss of income by increasing their oil theft. Control of the illegal fuel market also caused violence between criminal organizations to increase sharply. Fuel stations are being used to launder the profits of the cartels. An overview of Mexico's illicit fuel trade by the key organizations involved is shown in Table 6.

Table 6: Mexico oil theft by market share (in 2016)

Rank	Organization	Market share (%)	Annual value of oil stolen (US\$ million)
1	Los Zetas	38.9	372
2	Jalisco New Generation Cartel	21.4	212
3	Gulf Cartel	16.3	187
4	Beltrán-Leyva	7.6	89
5	Sinaloa Cartel	6.3	74
6	La Familia Michoacana	2.5	29
7	Knights Templar	1.3	15
8	Juárez Cartel	0.7	8

Source: author's compilation of Atlantic Council report (Ralby 2017).

More than private oil companies, Mexican crime groups broke the Pemex monopoly in the fuel trade. Some of Pemex's own employees facilitated this process in assisting criminal organizations with information and technical expertise. In one instance, hundreds of Pemex employees were alleged to have worked with criminal groups to siphon fuel and steal from tankers. However, from 2006 to 2015, only 97 Pemex employees were implicated in fuel theft.

6 Conclusion

Global oil theft is valued at US\$133 billion per year, equivalent to 5–7 per cent of the global market for crude oil and petroleum fuels. This paper has found no reason to materially doubt this estimate. Oil theft is pervasive, geographically as well as along the oil supply chain. Oil theft is certainly not limited to developing countries, although these are likely to suffer the most from its impacts.

Oil theft does not only affect countries where the theft takes place. It also affects countries that are destinations of fuel smuggling and have fuel fraud in their markets. For the purpose of this paper, the government tax yields were assessed for 30 developing countries associated with significant oil theft. These developing countries affected by oil theft show a lower average tax yield (13.6 per cent) than the IMF benchmark for developing countries (15.3 per cent). The tax yield differences are even more pronounced when comparing tax yields for countries facing oil theft as producers (9.2 per cent versus 14.7 per cent IMF benchmark for commodity exporters) and those countries facing oil theft in their markets (15.0 per cent versus 16.2 per cent IMF benchmark for non-commodity exporters). While there is a wide range of potential factors that can cause the strong negative correlation between oil theft and the tax yield of developing countries, the main objective of this analysis is to illustrate that governments of developing countries dependent on oil revenues are particularly exposed to oil theft, if they are not well diversified by other sources of (tax) income.

Oil theft is most common, yet it is also most covert. There is a lack of basic data, including how much oil is stolen, what the stolen oil movements are, and how illicit oil transactions are conducted. Oil theft crime syndicates continuously show great flexibility to adjust their oil theft execution strategies and business models. They know how to exploit gaps in transnational jurisdictions as well as the limited capacity in law enforcement to move to new targets and methods.

It is a misconception that oil thieves and smugglers are always focused on evasion of authorities and that corruption, if any, is caused by individual custom officers taking ad-hoc bribes. Most fuel smuggling occurs through controlled border posts, where smugglers often pay a flat fee to the authorities in charge for unhindered passage. Smugglers and the authorities have informal yet detailed agreements on what goods can be smuggled, how the levels of bribes are determined, and who should be paid. This level of organization and regulation differs greatly from petty corruption. These arrangements benefit both smugglers and authorities. A clampdown by indiscriminately imposing hard borders (e.g., building walls) disproportionately affects survivalist smugglers, hurts the poor living in borderlands, and causes socio-economic collateral damage. However, these measures are seldom sufficient to deter professional smugglers who simply adapt to new markets, change routes, and amend their interactions with state actors to continue their practices.

The impact of oil theft is diverse. In addition to smothering economic growth (SDG 8) by undermining tax revenues, causing a loss of natural resources, and subverting economic stability, oil theft also affects eight other SDGs.

A particular key concern is the mix of legal commercial operations with illegal oil theft activities. Crime syndicates work under the cover of and with the support of legal businesses, insiders, and government organizations to provide them with technical/operational support, information, and business stability. This not only facilitates oil theft and thwarts detection/clampdown but it also contaminates oil markets and financial markets with illicit oil and money. Oil theft-related insecurity affects government finances to a much higher degree than the value of oil stolen. For example, the amount of oil closed-in and deferred in Nigeria due to oil theft is at least twice the amount of oil that is being stolen. Tanker piracy in Gulf of Guinea reduced Benin's port activity

by 70 per cent and government taxes by 28 per cent in 2012, despite that Benin does not produce any oil and has very little official fuel imports.

Perhaps the most worrying impact of oil theft, beyond the loss of stolen resources and the destruction of the environment from oil spills and artisanal refineries, is the impairment of governments' ability to take care of their people and stimulate local development. In several countries, oil theft syndicates are winning the hearts and minds of local communities, by offering employment and cheap or free fuel and providing gifts and community services, such as paying for healthcare. In such countries, oil theft is portrayed as a legitimate (if not legal) part of a moral economy.

The international community should take a stronger stance against oil theft. Transnational oil theft crime syndicates are often linked to other crime businesses, such as arms, drugs, and people trafficking, and extremist organizations. The actions needed to stop oil theft have similarity with those taken against other international organized crime. However, the international community should work with and be led by the local countries where oil theft and fraud occur.

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Abbreviations and units

€	Euro currency
bbl	barrel (1 bbl is approximately 0.159 m ³)
bpd	barrels per day
COVID-19	coronavirus disease of 2019
DRC	Democratic Republic of the Congo
EIA	Energy Information Administration (US)
EU	European Union
GDP	gross domestic product
IEA	International Energy Agency
IMF	International Monetary Fund
IOC	international oil company
ISIS	Islamic State of Iraq and al-Sham
JIV	joint investigation visit
JV	joint venture
KSA	Kingdom of Saudi Arabia
LCO	light cycle oil
lhs	left-hand side
LPG	liquefied petroleum gas
MEND	Movement for the Emancipation of the Niger Delta
MPA	Maritime and Port Authority of Singapore
NEITI	Nigeria Extractives Industries Transparency Initiative
NGO	non-governmental organization
NNPC	Nigeria National Petroleum Company
NSCDC	Nigeria Security and Civil Defence Corps
OPEC	Organization of the Petroleum Exporting Countries
Pemex	Petróleos Mexicanos (Mexico's national petroleum company)

ReCAAP	Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia
rhs	right-hand side
SDG	sustainable development goal
SEA	South East Asia
SPDC	Shell Petroleum Development Company of Nigeria
SPDC-JV	Shell Petroleum Development Company of Nigeria joint venture
STS	ship-to-ship
TRACIT	Transnational Alliance to Combat Illicit Trade
UNEP	United Nations Environment Programme
UNODC	United Nations Office on Drugs and Crime
US	United States of America
US\$	United States dollar