Illegal logging, timber laundering and the global illegal timber trade

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Introduction

Deforestation claims an estimated 10 million hectares each year (FAO 2020). Today's global demand for timber products[1] simply cannot be met by legal, sustainable forestry anymore. The competition for cheap wood products on the global timber market has become a major driver of illegal deforestation and the global illegal timber trade. This article focuses on activities related to the licensing, harvesting, processing and trading of timber products inconsistent with international, national or subnational law at any point in the supply chain.

Legal deforestation is regulated through national or local forestry legislation, often in the form of forest codes that include a system of logging concessions and permits. However, even where forestry legislation exists, the definition of what exactly constitutes legal, informal and illegal logging often remains ambiguous. Boekhout van Solinge et al. (2016) identify three different types of illegal logging: (1) informal logging, (2) illegal forest conversion and (3) criminal logging. Informal logging, also known as "chainsaw" or artisanal logging, is mostly carried out by forest communities that rely on subsistence logging as their regular income. This form of informal logging is often perceived by these communities "neither as a criminal nor a harmful activity" (Bisschop 2015: 115), and yet it contributes a significant share of the illegal production and export of timber from tropical countries (Kishor and Lescuyer 2012 and Wit et al. 2010, as cited in Gan et al. 2016: 39). Increasingly, illegal logging occurs in the form of forest conversion, mostly for commercial agricultural purposes, for instance by converting forest land into pasture or crop land. While this has become a major driver of illegal deforestation, it must be distinguished from criminal logging in the sense that the extraction of wood is not the primary motivation of this criminal activity. Rather, the timber cut

1 Timber products include round wood, paper and derivative products.

in this process is a by-product of forest clearing for other purposes. In contrast, criminal logging refers to the process of unauthorised large-scale deforestation or the selective cutting of (high-value) timber for the sole purpose of generating profits through the international trade and sale of illegally harvested timber.

Illegal timber trade is the commercial activity of illegally trading timber across one or more state borders without proper papers or authorisation. Most illegally extracted timber is consumed domestically and never actually enters the international market (Bisschop 2015: 106). The timber that does get traded on regional and international markets mostly comprises high-value species characterised by a large profit margin. The illegal trade in timber is almost always linked to other criminal offenses, including forgery, mislabelling, tax evasion, corruption, bribery and money laundering.

Both illegal logging and the associated illegal timber trade are thus not isolated crimes, but need to be seen as "a mosaic of interdependent criminal activities" (INTERPOL and World Bank 2010: 9). As such, they often exist in a grey area between the legal and the illegal, between clandestine and legitimate business activities, carried out by legal, informal and criminal actors and on multiple layers of timber markets (local, regional and international) (Nellemann and INTERPOL Environmental Crime Programme 2012). This interplay of legal and illegal actors can be observed throughout the entire supply chain – from producer to transit to consumer countries – and creates the central gateway for timber laundering, a process by which illegal timber is given a clean bill of health and integrated into the legal supply chain, from where it ends up as seemingly legitimate timber on our market shelves.

Global supply chains of tropical timber follow a trade pattern from producer countries in the Global South to consumer countries in the Global North. Practically all global timber supply chains include at least one transit country that forms the link between production sites in the Global South and buyers of timber products in the Global North. China has become the most important transit country for both legal and illegal timber products; other common transit countries include Brazil, Malaysia, Madagascar, Mozambique and several Central African states. On the purchasing end, the biggest importers of tropical wood products are China, the US, Japan, the EU (particularly Germany, Italy, the Netherlands and Belgium) and the UK.

The international character of timber supply chains not only adds to the difficulty of tracing the origin of the timber but also creates legal hurdles for addressing the problem of illegal logging and timber trade. Illegal log-

ging constitutes a localised crime that is subject to national legislation. It becomes relevant to international law enforcement only when the timber is leaving the country in which it was cut. Whether the timber is legal or illegal thus depends on the legislation of its country of origin, not on the legality or illegality of the downstream process. Consequently, a piece of wood can originate from illegally logged timber and still be sold with complete legality in another country (INTERPOL and World Bank 2010: 16).

Environmental, social and economic implications of illegal logging

Illegal logging and its associated timber trade have enormous environmental, social and economic implications. Illegal deforestation threatens the unique composition of tropical rainforests and their ability to serve as a habitat for a vast variety of flora and fauna. With the loss of biodiversity also comes an ecological instability and degradation that may ultimately prove irreversible (Bisschop 2015: 108; Peck 2001: 17). Tropical rainforests also function as a carbon sink – the Amazon has played a significant role in absorbing up to a quarter of all fossil fuel emissions since 1960 (Carrington 2021). As deforestation continues, however, tropical forests are gradually losing their ability to act as a climate regulator. In fact, scientists confirmed in 2021 that the Amazon is now actually emitting more carbon dioxide than it is able to absorb (Gatti et al. 2021).

In terms of social impacts, illegal logging is often directly linked to the disempowerment and displacement of local and indigenous communities as well as a growing tendency for violence towards environmental activists. The year 2020 has been declared the deadliest year so far for land and environmental defenders, with more than 220 lethal attacks recorded, many of which were associated with forestry (Global Witness 2021). In some cases, the proceeds from illegal timber are also used to actively fuel and finance armed conflict, as has been the case in Liberia, Cambodia and the Democratic Republic of the Congo (DRC). Oftentimes, the timber supply chain is further linked to other crimes, such as the illegal trade of wildlife, drug trafficking and money laundering (Boekhout van Solinge 2008).

Seen from a financial angle, illegal logging and the global illegal timber trade bear economic consequences, including the distortion of market prices, a loss of state revenues and taxes and increasing income disparities (McElwee 2004; Sotirov et al. 2015; Kleinschmit, Leipold and Sotirov 2016). This causes an annual global market loss of up to US$10 billion, with governments losing an additional US$5 billion in assets and revenue

(World Bank 2008). At the same time, illegal logging is estimated to be the highest-value environmental crime, accumulating a global worth of $US 51–152 billion every year (Nellemann et al. 2020). The latest WWF report on the EU Forest Crime Initiative (2021) captures the situation as follows: "Forestry crime may involve the greatest mismatch of government and intergovernmental resources spent on combating them relative to the crime profits that they generate." (WWF 2021: 4 citing Nellemann et al. 2020)

And yet, with the exception of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES; also known as the Washington Convention) that aims at protecting endangered plants and animals, a formal overarching international treaty on illegal logging and related timber trade remains lacking. In the early 2000s, concerted efforts by governments, civil society and the private sector to improve forest management and law enforcement have led to a significant decline in illegal logging activity in many countries, including Brazil, Cameroon and Indonesia. However, these improvements are seen as mainly "procedural rather than substantive" (Kleinschmit, Leipold and Sotirov 2016: 15), mostly because they have since been offset by two major developments. First, while the US, Australia and the European Union have developed legal frameworks in order to prevent the placement of illegal timber on their markets, the illegal timber trade has gradually shifted towards non-sensitive markets (i.e. those with less strict regulations on legality). China in particular has emerged as the new timber trading hub, with the People's Republic now being a major importer, exporter and consumer of timber products. This geographic shift has rendered the policies of traditional consumer countries significantly less powerful and effective.

Second, the rising demand for agricultural products such as soy and beef as well as large-scale mining and infrastructure projects has led to massive conversions of forest land into areas used for agricultural or other industrial purposes. Around half of the tropical timber traded around the globe today stems from forest conversion, of which two thirds are deemed illegal. Brazil and Indonesia account for 75 per cent of the global tropical forest area that has been illegally converted for commercial agriculture between 2000 and 2012 (Lawson 2014: 2).

The issue of illegal deforestation has long been conceived solely from an environmental and climate protection angle. However, greater attention is increasingly being paid to the role of transnationally operating criminal networks associated with illegal logging and related timber trade. The spatial dimension in which illegal logging takes place – from the local to the regional up to the global level – as well as the sophistication with

which the timber is harvested, laundered, transported and then traded indicate the involvement of well-equipped and organised criminal networks. As such, these groups possess the capacity and capital to provide heavy equipment, hire and coordinate workers and devise methods with which to pass off illegally harvested timber as legal products (Human Rights Watch 2019: 32). According to INTERPOL and UNEP, it is estimated that between 50 and 90 per cent of timber harvested in key tropical producer countries in Amazonia, Central Africa and Southeast Asia is illegal (Nellemann and INTERPOL Environmental Crime Programme 2012: 6). These groups often forge interlinkages with other networks of organised crime, such as drug syndicates, private militias, wildlife traffickers and illegal mining groups. Together, these transnationally organised crime groups act along the entire supply chain, exploiting institutional and legislative weaknesses and a lack of communication between law enforcement agencies both within and between countries (INTERPOL 2019: 2).

This chapter examines illegal logging and the global illegal timber trade as a form of transnational criminal activity. The chapter first presents a description of the structure and stages of illegal logging and timber flows. This will be followed by an analysis of two case studies, the Brazilian Amazon and the Southeast Asian region, to exemplify the characteristics of illegal logging and timber trade in two different contexts. This analysis will serve as a basis for identifying possible entry points at the local, regional and global levels to curb illegal logging and control the global illegal timber trade.

Three stages of illegal logging and timber trade

Before illegal timber enters the market of consumer countries in the Global North, it passes through a complex global supply chain involving multiple layers and types of markets as well as a wide network of actors, including tree owners, millers, intermediaries, traders and purchasers (Kishor and Lescuyer 2012: 258). Like money laundering, illegal logging and illegal timber trade follow a clear three-step process: extraction (placement), laundering (layering) and integration (integration).[2]

2 See the Financial Action Task Force (FATF) on the different stages of money laundering, https://www.fatf-gafi.org/faq/moneylaundering/.

Extraction

The use of forest codes or similar forestry legislation has become a standard tool for countries to improve their forest management by better monitoring, tracking and safeguarding of forest inventory and timber licenses. However, legal loopholes, a lack of resources and understaffing of responsible authorities as well as a high susceptibility to corruption have curtailed the effectiveness of many of these mechanisms. In general, there are four main forms of illegal timber harvesting.

Cutting outside of concessions and with fraudulent permits: One of the most commonly practised forms of illegal logging is cutting outside of or without concessions and permits. This includes overcutting beyond allocated quotas, using forged or expired permits or harvesting protected timber species without logging permits. For rare and/or protected timber species, logging concessions are limited, and their harvest is regulated by CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora). The higher the value attributed to these timber species, the higher the incentive for criminal groups to illegally harvest and trade them for lucrative prices on the international market. Increased logging and trade, in turn, amplify the rarity of these species, intensifying their threatened status and even driving them to extinction (Gan et al. 2016: 38). A tactic of selective single-tree logging makes it more difficult for satellite imagery to detect the illegal loggers or their harvest under the dense tree cover. As Chimeli, Boyd and Adams (2012: 2) explain, "[a]lthough this method of selective logging in remote tropical forests may entail large opportunity costs, some species fetch high enough prices in international timber markets to justify the construction of logging feeder roads and other infrastructure for selective harvesting".

Overestimation of forest inventory: The allocation of cutting concessions is based on a forest inventory that catalogues existing tree species and their quantity within a certain forest area. Weaknesses in inventory systems offer an easy way for corrupt forest engineers to systematically accumulate fraudulent credits, for instance by way of misidentifying undesirable trees as valuable species, overestimating the volume of rare wood species or listing non-existent specimens (Greenpeace 2018: 6). By overestimating the legal amount of timber allowed for harvest, incorrect forest inventories create a gateway for illegal loggers and facilitate the legalisation of their indiscriminate harvest.

Land conversion: The illegal clearance of forest space is increasingly taking place under the pretext of land conversion for agricultural and other industrial purposes. Here, the primary motive is not the extraction of timber per se; rather, the timber becomes a by-product of the clearance of forest land for agricultural (e.g. cattle ranching, soy production or plantations) or other industrial purposes, such as mining and infrastructure projects. It is estimated that by now around half of all tropical timber derives from forest conversion.

Cutting in road corridors: Since many deforestation sites are concentrated dozens of kilometres away from main roads, forest aisles provide the necessary access to concession and plantation areas. These forest aisles then create incentives for illegal loggers to cut along existing road corridors or create extensive "fishbone" patterns of unauthorised secondary roads (Ungar 2018: 10).

Laundering

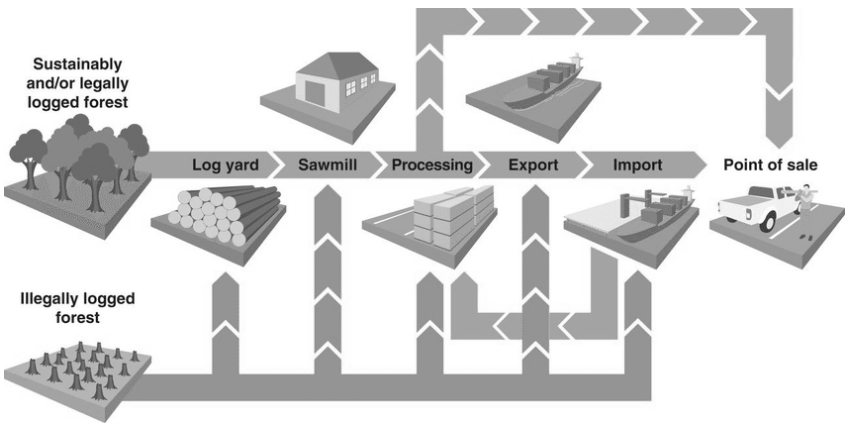
After timber is illegally cut, criminal groups use a variety of methods with which to conceal its illegal origin, a process known as timber laundering. Once extracted, the timber is transported from the cutting site to the sawmill as quickly as possible, often on the very same transport routes that are used for legal timber. Transport passes and timber labels ought to verify the legality of the timber in transit. However, the common practice of simply forging the necessary documents or issuing false labels has made this control system extremely fallible. Forgers typically provide incorrect information on the botanical identity of the wood (e.g. the species), its geographic origin or the product type itself (e.g. solid wood vs. particleboard) (Wiedenhoeft et al. 2019). Transport passes are also forged or simply used multiple times. This type of fraud and mislabelling can occur at all stages of the timber supply chain, beginning with the forestry permit system up to the transport pass at the international trade harbour. Investigators found that the large majority of wood traded on the regional or international market is falsely declared as legally sourced and traded (Nellemann et al. 2014).

Once at the sawmill, the illegal timber is processed, making it almost impossible to discern its origin and legality. Sawmill operators mix the illegal with the legal timber, giving it a "clean" origin statement. They do so either voluntarily as beneficiaries of the illegal timber business, or

because of pressure and extortion by criminal groups. Fraudulent permits and inventory credits are used to "cook the books" of sawmills processing illegally harvested timber (Greenpeace 2018: 3).

To further disguise the origin of the timber, it is common practice to export illegal timber for further processing. Neighbouring countries are a particularly attractive market for illegal timber traders owing to their close geographic proximity, their potentially laxer timber regulations as well as the historical, economic, cultural and political ties among the region's countries and their markets (Schloenhardt 2008; Forest Trends 2010, as cited in Kleinschmit, Leipold and Sotirov 2016). The more processing stations and countries are involved, the more difficult and costly it becomes to monitor and trace the legality of the timber along the supply chain (Nellemann and INTERPOL Environmental Crime Programme 2012).

Figure 1: Intersections between the legal and the illegal timber supply chain.



Source: Lowe et al. 2016

Integration

The large majority of tropical timber is consumed directly on domestic markets; only ten per cent of illegally produced wood products are traded on the international markets (Gan et al. 2016: 52). Due to the clandestine nature of the illegal timber trade, quantifications of the volume of illegally traded timber on the global market are mostly based on "guesstimates" (Bisschop 2012) rather than certainty. Comparing trade data can give a good indication; however, this method is not without errors. Trade dis-

crepancies could simply be the result of shipment issues, incompatible and incoherent classification and measuring systems as well as time lags (Liu et al. 2020).

Even though the exact scope of illegal timber on the global timber market remains somewhat vague, there is extensive knowledge on the different methods used by criminal networks to introduce illegal timber into legal markets. As at the earlier two stages, forgery and corruption play a central role also at this stage of the supply chain.

Illegally logged timber can be integrated into the legal supply chain through different entry points along the supply chain (see Figure 1). Legally logged timber (dark arrows) passes from extraction sites over log yards and sawmills to (multiple) processing stations. Illegally logged timber (bright arrows) can potentially enter the legal supply chain at each of these stages; most often, however, it is integrated through sawmills (as described above) or through the practice of exporting the illegal timber to foreign processing stations and then reimporting it for further processing or trade.

Timber smuggling across state borders is a common practice used by criminal networks to circumvent export or import bans and disguise the origin of the illegally extracted timber. The majority of illegal timber supply chains involve at least one transit country before the timber reaches its final destination. Especially rare and high-value timber species are often shipped across the entire globe to conceal their true origin. This is confirmed by Bisschop (2015: 118) using the example of Afrormosia, a protected timber species from West Africa: "The seller and buyer […] know that we know it comes from West Africa. Therefore it gets sent to Brazil, stays there for a few years, an edge is machined into it and then it is shipped to Europe. They know our alarms don't go off if this type of wood comes from Brazil."

Ports and international trade hubs are a key juncture in the process of mislabelling timber and integrating it into the global timber market. Hong Kong's free trade port in particular has been identified as a major smuggling hub for tropical timber species. The international shipping magazine SeaNews Turkey reported that 114 tonnes of high-value wood were smuggled into Hong Kong in the first half of 2018, marking a 170 per cent increase from the previous year (Papachristou 2018). The timber that reaches Hong Kong, often through brokers based in Singapore or Taiwan, is then exported to mainland China, where it is processed and passed on to third countries (Joy 2010: 4). According to INTERPOL, most of these import crimes remain undetected since less than two per cent of the cargo is actually inspected (INTERPOL and World Bank 2010: 12).

China, which has become the biggest importer, consumer and exporter of timber products, now plays a central role in the global timber market. As one of the biggest players in the timber business, China has also emerged as the primary destination for the illegal timber trade. Since 2016, China has successively imposed commercial logging bans to preserve its own natural forests. As an export-oriented economy, the country now depends on imported timber to produce secondary wood products for export (Zhang and Gan 2007). According to the Environmental Investigation Agency (EIA) (2012: 8), "[t]he gap between domestic timber supplies and the volume of timber used by the industry has in effect led to China exporting deforestation to a host of countries around the world". The organisation found that state-owned companies are directly involved in logging operations in countries with a high risk of illegality in the timber sector, including Indonesia, Mozambique and Myanmar.

National or regional policies to combat illegal logging have further been linked to a trade diversion towards China as a primary export market. During the negotiations between Indonesia and the European Union for a Voluntary Partnership Agreement (VPA), the value of Indonesia's sawnwood exports to China almost doubled, while its exports to the EU decreased by 40 per cent (Gan et al. 2016: 50). This trade diversion is indicative of a broader geographic shift that has taken place over the past decade and that suggests that timber traders choose regional and global markets with less stringent regulatory frameworks (such as China or India) since legality requirements set by other markets (such as the EU, Australia and the US) often come with extra costs for legality certificates and other required documentation (Giurca et al. 2013).

The who, the where and the how: criminal networks and market structures

The organisation and professionalisation of illegal logging and the associated timber trade are indicative of a shift from individual front-line timber criminals to conglomerates and organised crime groups. These criminal networks are typically involved not only in illegal logging but also in a multitude of other logging-related crimes, including violence, extortion, fraud and corruption. These "timber mafias", "criminal syndicates" or "timber gangs", as they are commonly referred to, use "an international network of quasi-legitimate businesses and corporate structures to hide their illegal activities" (WWF 2021: 6).

The more countries are involved in the processing, transport and trade of the illegal timber, the harder it is to retrace its origin, and the easier it is

to take advantage of inconsistencies between different national legislations and international treaties (INTERPOL and World Bank 2010: 5). According to INTERPOL and the World Bank (2010), the illegal trade in timber has a business-like structure, with both provider and buyer companies. "It is driven by the economic principle of supply and demand: an increase in the demand for specific, often cheap wooden goods leads directly to an increase in the scale of illegal logging" (INTERPOL and World Bank 2010: 4).

Wyatt, Uhm and Nurse (2020: 351) distinguish three types of criminal networks: (1) organised crime groups, (2) corporate crime groups and (3) disorganised crime groups, each with a distinct set of actors, motives and modus operandi. In the context of illegal logging and timber trade, the boundaries between these types are often blurred, creating multiple intersections and "hybrid concepts" between corporate and state actors, organised criminal networks and disorganised groups. Thus, the concept of organised forestry crime might better be understood as a social system and social world "composed of relationships binding professional criminals, politicians, law enforcers, and various entrepreneurs" (Block 1983: vii, as cited in Boekhout van Solinge et al. 2016).

Interlinkages between illegal and legal actors are made possible through the involvement of so-called "facilitators of crime". These facilitators are brought in through bribery and corruption and can be found at every stage of the supply chain, from the origin through the transit up to the consumer station. Facilitators of crime include "security guards" hired by violent criminal groups to protect network members and illegal logging sites and transport routes (Boekhout van Solinge et al. 2016: 86). Other examples include members of law enforcement, political and military elites, corrupt officials from the forestry sector, money launderers and document forgers. The latter play a key role in falsifying logging and transport permits or timber certificates, sometimes even by hacking into government websites and forestry databases (Kleemans 2013; Lawson and MacFaul 2010).

For instance, Brazilian hackers once "legalised" 500,000 cubic metres of illegal timber by infiltrating the governmental digital timber control system. In investigating the case, the Federal Police also searched the houses of members of the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA), whose responsibilities include monitoring and regulating national deforestation and logging activities. The involvement of government authorities and high-ranking personnel is by no means an exception. Several non-profit organisations have found a direct link between illegal logging groups and corrupt actors at the highest level of

government, a form of cooperation known as "state-capture corruption" (Goncalves et al. 2012: 6). In Indonesia, illegal logging is often facilitated by high-ranking members of the government or military, and in African countries traditional chiefs and "custodians of the land" function as gatekeepers in this business. Owing to their connections and reputation, these actors are able to control and exert influence over the entire process of illegal logging and timber trade, for instance by granting forest concessions (INTERPOL and World Bank 2010: 7) or permits for the harvest, transport, processing and trade of illegal timber.

On the international level, such facilitators of crime include members of border authorities or shipping companies as well as personnel working at airports or trade harbours, where they can ensure that illegal cargo or certain people are not checked (Boekhout van Solinge et al. 2016: 86). In Indonesia, investigations by the EIA and Telapak found that in addition to members of the country's economic, political and military elites, businessmen, brokers and banks from Malaysia as well as international logging companies were involved as facilitators in the illegal transnational timber trade (EIA and Telapak 2004, 2005, 2006).

Finally, governments in the production, transit and consumer countries can play a facilitating, even perpetuating role by tolerating or even engaging in corruption and bribery and thus allowing the trade in illegal timber for the benefit of criminal actors.

As in other cases of transnationally organised illegal transactions, there is a starkly asymmetrical distribution of profits along the global timber supply chain. The greatest share of the financial benefit from the illegal timber trade goes to the intermediaries, i.e. processors, traders and financers, particularly in transit and processing countries, while (informal) loggers on the local level only receive a tiny fraction of the ultimate timber price. This means that the global illegal timber trade involves significant profits for intermediaries, with most of the money ending up in the hands of "elites" (Kishor and Lescuyer 2012). A study by the EIA and Telapak (2001) tracing the global supply chain of illegally extracted ramin found that the local logger in Indonesia received about US$2.2/cum, while the final product sold for close to US$1000/cum in the European and US markets. This not only shows that the production of illegal timber and its trade on international markets involve "a complex web of operators within and across countries, characterized by highly unequal political and market power and division of the 'spoils'", but further means that very little of the true market value of this high-value timber actually ends up in its original producer country (Kishor and Lescuyer 2012: 259–260).

Case studies

The bulk of illegal logging takes place in tropical forests such as the Amazon rainforest and the East Asia and Pacific region, where 50 to 90 per cent of all forestry is believed to be illegal. Brazil, which covers around 60 % of the Amazon basin, Indonesia, which contains the largest expanse of rainforest in all of Asia, and Malaysia, which is home to an equally rich rain forest, count as the world's leading exporters of tropical wood-based products. All three countries are vulnerable to and known for illegal logging and the export of illegally harvested timber. At the same time, their most lucrative destination markets for timber products are countries of the Global North, most notably the US, Italy, the Netherlands and Japan.

With a little help from the state: forest crime in Brazil

With over 670 million hectares, the Amazon basin is the largest rainforest in the world. Around 60 % of the Amazon rainforest lies in Brazil, making the country a major exporter of timber products. Brazil accounts for 70 to 80 per cent of all timber exported from the region, of which almost half goes to China and the US, with Italy and the Netherlands as top destination markets following closely behind. Over the past few years, Brazil's forestry sector generated more than US$3 billion in annual revenue and employed more than 200,000 people, although this number is likely to be significantly higher when informal employment in the forestry sector is included (see Lippe, Cui and Schweinle 2021).

Illegal logging continues to be a major issue in Brazil, where up to 70 per cent of the total forestry production is believed to be illegal (Perazzoni 2018: 24; Gan et al. 2016). Up until 2010, the Brazilian government had actually made significant progress in curbing (illegal) deforestation, with data showing that deforestation rates were down 70 per cent in 2013 compared to the average from 1996 to 2005, while greenhouse gas emissions resulting from deforestation had been cut by almost 70 per cent (Corrêa 2014). This drop was likely the result of a combination of a soy and beef moratorium and several private sector initiatives that sought to tackle illegal deforestation by establishing negative lists of properties and municipalities known to deforest illegally (Corrêa 2014; Azevedo et al. 2017). However the rate of deforestation in Brazil has been on an upward trajectory once more since 2012 and reached a 12-year high in 2020 (Phillips 2020). Data from Brazil's real-time Deforestation Detection System (DETER) and the Brazilian National Institute of Space Research

(INPE) show an 85 per cent increase in deforestation from 2018 to 2019, and another 34 per cent increase in deforestation in 2020 (Abdenur et al. 2020: 2; Escobar 2020). This latest uptick in deforestation has been encouraged by the policies of Brazil's current administration under President Jair Bolsonaro. Since coming to power in 2019, Bolsonaro has initiated major policy changes resulting in the weakening of environmental regulations, the dismantling of central governance structures and resource cuts for agencies tasked with monitoring and enforcing forest management. His positive attitude towards deforestation has further incentivised (illegal) land conversion for agricultural purposes and encroachment on indigenous lands. Meanwhile, the COVID-19 pandemic is believed to play a part as well, as criminal networks exploit "the lack of state attention and official discourses promoting land invasions in the Amazon" (Abdenur et al. 2020: 4 citing Kimbrough 2019; Butler 2020). According to the Instituto BVRio (2016: 8), Brazil has one of the most comprehensive and sophisticated timber control mechanisms, combining a federal system with two separate systems in Mato Grosso and Pará. However, "[w]idespread corruption and fraud […] have rendered these systems unreliable and put Brazil at the top of the list of risky countries worldwide".

Organised criminal networks are increasingly believed to play a central role in the illegal logging business in Brazil. These networks include ranchers, loggers, miners and land grabbers and possess the logistical capacity to coordinate large-scale extraction, processing and sales of timber (Human Rights Watch 2019: 1). By extorting protection money, these criminal networks are able to force loggers and timber transporters into an alliance, granting them control over entire portions of the country. In fact, a study on environmental crime in the Amazon basin concludes that there are cities within the Brazilian state of Pará whose economies largely depend on revenue stemming from environmental crime, including illegal logging and timber trade (Abdenur et al. 2020: 5).

Criminal groups active in organised forest crime can rely on an extensive network of partners and facilitators that reaches up to the highest level of legitimate businesses, authorities and governments. In 2021, a group of researchers uncovered the close connections between the illegal timber business and drug trafficking. Investigative researchers found that there is a growing overlap in the infrastructure used by drug traffickers and illegal logging groups. Between 2017 and 2021, at least 16 major drug seizures revealed cocaine hidden within shipments of timber destined for export to Europe (Barros 2021).

In 2015, Brazil's Federal Police and Federal Prosecutor started an investigation into a large illegal logging and trade network that had used fraud-

ulent timber credits and transport documents to pass off illegally harvested timber as legal. A large timber company that also owned several sawmills coordinated the illegal timber scheme, while several corrupt officials were found at the federal level (at the IBAMA and the National Institute for Colonisation and Agrarian Reform (INCRA)), at the state level in Pará as well as at the municipal level. This case of "state-capture corruption" was not the first one and was not going to be the last one, either. In mid-2021, high-ranking government officials once again became the focus of an investigation related to illegal logging and the timber trade. In the same year, Brazil's environment minister Ricardo Salles was forced to resign after facing an investigation into his involvement in alleged illegal timber exports. Several high-ranking environmental officials of IBAMA, including the head of the agency, were suspended after the Federal Police carried out raids on several ministry offices (Hanbury 2021). The investigation goes back to a decision by IBAMA's superintendent in 2019 to cancel a fine against Brazil's largest wood floor and deck exporter, which was suspected of illegal practices (Earthsight 2021). These cases exemplify the close-knit connection between (some) members of the administration and corporations involved in illegal logging and timber trade.

Illegal loggers in Brazil apply many of the methods for illegal timber harvesting laid out in the section above (cutting beyond or without concessions, selective logging, land conversion, etc.). However, even before the first tree is illegally cut, a flawed forest inventory system constitutes Brazil's first weak link in the chain of illegal logging. A study from 2018 analysing Brazil's licensing system found a strong overestimation bias towards high-value timber species and their assigned volumes in logging permits. This fraudulent surplus of licensed timber can then be used to launder and legalise the illegally harvested timber (Brancalion et al. 2018: 1). This method has become particularly attractive for rare and high-value species such as the ipê tree, a wood species known for its durability, which once processed can reach up to US$2,500 per cubic metre in export value (Greenpeace 2018: 8). Since the average population density of ipê trees is just one tree per ten hectares, loggers have to clear large swaths of forest in order to access the species and make the logging of ipê trees commercially viable (Schulze et al. 2008). This leads to a sprawl of illegal roads – the total length of unauthorised roads in Brazil has reached almost 170,000 km (Perazzoni 2018: 24) – encroaching on indigenous lands and protected areas and often resulting in violence between illegal loggers and local communities. Additionally, the selective logging of valuable timber has become a precursor for land grabbing and (illegal) land conversion. After

the most valuable logs have been harvested, the rest of the forest is set on fire and turned into pasture land (Alessi 2021).

Once harvested, the timber is assigned a transport document and an associated identification number by IBAMA. However, the flawed inventory and credit system paired with corrupt state authorities and law enforcement agents as well as the widespread use of forged documents make these documents near useless for guaranteeing the legality of Brazilian timber. Effective oversight of logging activities and forest management is impeded by the vast physical dimensions and complex characteristics of the Brazilian rainforest. Environmental agencies are chronically understaffed, and with their offices located in major urban areas, land owners and environmental agents are rarely present in remote areas of the Amazon. Additionally, the decentralised system of Brazil's forest management and the coordination issues between federal and state agencies have created bureaucratic barriers and a lack of transparency (Hummel 2016: 3). If and when illegal logging activities are caught by the authorities, the perpetrators face very few consequences. In fact, during the first eight months of Jair Bolsonaro's presidency, the number of fines for offences related to deforestation fell by 38 per cent, reaching its lowest number in at least two decades. Meanwhile, NGOs promoting enforcement efforts have been limited in their capacity and even received threats against their members and local forest defenders (Human Rights Watch 2019: 9–10).

Most of the (illegal) timber harvested in Brazil is processed and sold domestically, with an overall export rate of timber products of around 44 per cent. According to data collected by Chatham House (n.d.-a) in 2014, about 2 per cent of Brazil's timber exports were deemed illegal, most of them pulp and paper product, while the export of ipê timber made up a large share, with the US, France, Portugal, Belgium and the Netherlands being the top destination countries (Greenpeace 2018: 12). Meanwhile, the steady rise in deforestation indicates that much of the timber harvested is a result of (illegal) land conversion mostly for agricultural products. In fact, both the opening of the Chinese market and the continuously high demand from the US and the EU have drastically increased the production of soybean and beef in Brazil, leading to a steady increase in the expansion of forest area lost to industrial agriculture (Forest Trends 2018). Even though illegal timber does not reach countries of the Global North through the direct trade of timber, roughly 20 per cent of soy exports and at least 17 per cent of beef exports from the Amazon and Cerrado to the EU may be contaminated with illegal deforestation (Rajão et al. 2020: 246). This share is expected to increase further in light of the possible implementation of the EU-Mercosur and US-China trade agreements, which are expected to

lead to a growing EU demand for Brazilian products and to incentivise trade with lower tariffs (Rajão et al. 2020: 248).

The timber triangle: Indonesia, Malaysia and China

Indonesia is not only the world's top-selling palm oil producer but also one of the world's leading exporters of tropical timber. Indonesia ranks second to Brazil on tropical deforestation. Forest loss on the islands doubled between 2000 and 2012, mostly as a result of forest conversion for palm oil and timber plantations. Studies estimate that over 75 per cent of this forest conversion was illegal (Hoare and Wellesley 2014: 5). Even though longitudinal data suggest that illegal logging in Indonesia has decreased consistently since the 2000s, around 40 per cent of Indonesia's total timber production is still believed to stem from illegal sources (Hoare and Wellesley 2014: 5). Systematic illegal logging thus continues to be a widespread issue, with illegal activities occurring at the extraction, laundering and integration stages.

According to Hoare and Wellesley (2014), Indonesia's illegal logging issue is rooted in three major factors: a poorly functioning governance system, widespread corruption and a lack of transparency. As in Brazil, criminal groups involved in the illegal timber business have strong connections to other networks of organised crime, particularly those involved in the trade of narcotics. These networks use their influence to collude with law enforcement, judges and patrol officers, but also lawyers, banks and government officials who benefit from the profits gained through illegal logging activities (Joy 2010: 2). Using social network analysis, Baker (2020: 1) was able to characterise the landscape of forest criminals in Indonesia as "informal local networks of public and private actors" involving corrupt "forest field officials, timber entrepreneurs and brokers, army personnel, village and customary law leaders, and pioneer agriculturalists". The political elite plays a central role in this constellation, as illegal logging networks "reconfigured around the political authority of the regent", who, once elected, "appoints a cohort of corrupt administrators willing to manufacture licenses and permissions for campaign donors" (Baker 2020: 2).

Companies also play a central role in the illegal extraction of timber. In her analysis of one particular organised timber network, Baker identified members of the pulp industry as the largest occupational group involved in the network (41 %), followed by district and provincial forestry officials (28 %) (Baker 2020: 20). These companies cut beyond concessions and use "farmers' groups and indigenous communities as fronts for harvesting in

areas that would otherwise be off-limits for commercial logging" (Jong 2019). Using boats and tugs, they transport the illegally cut wood along the rivers towards the sawmills, where it is processed and mixed in with legal timber (Joy 2010). The rising demand for timber products is putting pressure on poorer communities to collude with criminal groups for lucrative profits that far exceed the revenue they would otherwise get from legal logging activities. Meanwhile, plantation companies are known to systematically bypass fines and penalties associated with illegal land conversion and logging.

The extraction of high-value timber species has become a lucrative business for illegal logging groups. Rare and high-value timber species such as merbau and ramin are in high demand, particularly in China, where they are increasingly used for flooring, furniture and musical instruments. The high economic value of these timber species makes them an attractive target for illegal loggers and timber traders. Once extracted, the timber is smuggled across the border into Malaysia via the overland route. Even though Malaysia and several other countries, including China and Singapore, banned the import of timber from Indonesia in 2001, trade data between Malaysia and Indonesia revealed that cross-border timber trade continued illegally. For example, in 2003, the EIA uncovered a sophisticated network of ramin smugglers ferrying 4,500 cubic metres of illegal ramin from the Indonesian island of Sumatra to the neighbouring Malaysian port of Pasir Gudang every month. There, the wood was packed into containers, mislabelled as Malaysian and shipped to Shanghai and Hong Kong (EIA 2012: 10). Similarly, the EIA revealed the existence of an international criminal syndicate comprising government, police and military officials operating from Indonesia, Malaysian logging gangs, Singapore-based shipping companies and financiers as well as timber brokers in Hong Kong and mainland China, who were shipping large amounts of illegal merbau logs from Papua, Indonesia, to China.

This practice of declaring timber as Malaysian to disguise its origin and legality and then transferring it to neighbouring countries has become common among timber networks in this region. Ports in particular have become a hotspot for the illegal timber business. Since Hong Kong does not have a forestry crime policy, Indonesian illegal logging activities are not considered foreign indictable offences in Hong Kong (Joy 2010: 4). This provides a safe haven for criminal networks for timber trafficking and money laundering. Shipments to Singapore often contain illegal timber hidden beneath legal logs or equipped with forged documents and transport permits. From these initial destinations, the illegal timber is either shipped back to Indonesia, where it is considered imported wood, or

exported on to China. Trade data show significant discrepancies between Chinese and Indonesian trade records, as China reports much higher import volumes of timber than Indonesia's export records show, indicating that fraud and smuggling remain frequent practices between the two countries (Hoare and Wellesley 2014: 26).

Illegal logging has long been a problem in Indonesia, which has not only put stress on the country's forestry sector but has also led to international pressure on Indonesia as a major timber exporter to address the issue. As a response, in 2009, Indonesia engaged in a multi-stakeholder process to refine the legal framework for wood extraction and develop a timber verification system, the SVLK (Sistem Verifikasi Legalitas Kayu). The system allows for third-party auditing to verify the legality of the operations of certificate holders and for independent monitoring by civil society groups while requiring licensed timber companies and concessionaires to obtain official SVLK certificates (Pohnan, Stone and Cashore 2014: 246). Since the introduction of the system, observers have criticised its weak enforcement and several loopholes that curb the effectiveness of the SVLK in tackling illegal logging. One example is the lack of what is known as "chain of custody verification", which means that certified sawmills are not required to source their timber from likewise certified logging concessionaries (Hoare and Wellesley 2014; Jong 2019). Nonetheless, in 2014, Indonesia and the EU ratified a VPA within the framework of the EU's Forest Law Enforcement, Governance and Trade (FLEGT) Action Plan, and the EU has since imported timber from Indonesia on the basis of its SVLK system. This was the first such agreement struck between the EU and a major Asian timber exporter and has been considered a cornerstone of the EU's efforts to curb illegal logging.

Yet, several major problems remain. Recent confiscations of shipping containers have revealed a large volume of illegally harvested timber, of which some could be traced back to companies certified under the SVLK system. Moreover, although Indonesia is the EU's biggest FLEGT VPA trading partner, the country exports only a minor share of its total timber volume to the European Union. In fact, trade data show that Indonesia's exports to sensitive markets such as the EU have continuously fallen, while its exports to non-sensitive markets, particularly China, have more than doubled over the years. At almost 30 per cent of its timber export volume, China has become Indonesia's top trading partner for timber products[3], followed by Japan (11 per cent) and the US (7 per cent) (United Nations

3 Comprising timber products HS 44, 47 and 48.

n.d.). Chatham House (n.d.-b) estimates that 70 per cent of Indonesia's timber exports to China come from illegal sources, meaning that a significant portion of Indonesian timber reaching the European Union via China and often declared as of Chinese origin must be considered illegal as well.

International regulation

There exist a number of loosely connected international instruments that focus on forest governance in the form of binding or non-binding multilateral treaty regimes and agreements, transnational governance frameworks, public-private partnerships or other types of non-binding norms, pacts, principles or coalitions (see Sotirov et al. 2020, as cited in Abdenur 2022: 11). CITES is arguably the most important mechanism to fight illegal logging and the illegal trade of timber, as it requires states to criminalise the illegal trade of timber species protected under the convention. However, its limited applicability to only certain timber species leaves room for illegal deforestation of non-listed species. Moreover, CITES does not contain an international enforcement mechanism and has thus far failed to implement a consistent verification procedure that addresses the multiple levels involved in the illegal timber trade (Kaphengst, Umpfenbach and Bräuer 2008: 8; Goncalves et al. 2012: 25; Bisschop 2015: 125–126).

This has led to a number of other policy measures being developed on the national, regional and international levels. Some of these are market-based incentives such as the Forest Stewardship Council (FSC) certification scheme; others are regulatory enforcement mechanisms, including the 2008 US Lacey Act; and yet others, such as the EU's Forest Law Enforcement, Governance and Trade (FLEGT), include both market and enforcement instruments. The FLEGT combines producer country-based instruments in the form of bilateral trade agreements (VPAs) as a way to curb illegal timber harvest and trade at the beginning of the supply chain with consumer country-based mechanisms in the form of the 2013 EU Timber Regulation (EUTR) that prohibits operators at the other end of the supply chain from placing illegally sourced timber on the European market. The two instruments are thought to reinforce one another by covering both ends of the supply chain. However, certain provisions within this mechanism have led to a number of loopholes and have thus reduced its effectiveness. The EUTR applies only to first-time operators, i.e. companies that place wood on the EU market for the very first time. All other downstream actors are only required to maintain records of purchases and sales

for a period of five years, which they need to make available only upon request (EIA 2018).

Another weakness of the EUTR is its limited scope, which is significantly narrower than that of the US Lacey Act and the Australian Illegal Logging Prohibition Act. A study by WWF has found that only around a third of products that contain wood are covered by the EUTR (Drewe and Barker 2016). Raw materials typically have a higher coverage ratio, while finished or processed wood products are less likely to be covered. At the same time, timber and wood-based products originating from Southeast Asian countries are among those that are most often not covered by the EUTR (Weimar, Janzen and Dieter 2015).

Lastly, implementation of the EUTR varies considerably among member states, with many state authorities lacking the necessary resources to fully apply the regulation. A study by WWF (2021: 10) examining six European timber-consuming countries exposed the apparent lack of "capacity of relevant authorities to fight forestry crime […] at certain or at all levels, showing a discrepancy between mission/intention and reality on the ground". Examining the implementation of the EUTR using Ukraine and Romania as two case studies, Davidescu and Buzogány (2021) confirm that the implementation of the EUTR is at best limited and uneven among consumer countries, and at worst impeded by state-supported illegal activities, corruption and mafia-like structures to the benefit of EU-based timber companies.

A 2018 study on the enforcement of the EUTR showed that Germany, which has the largest number of operators placing imported timber on the EU market, carried out the highest number of checks on companies (103 in total) and found that almost two thirds of those companies had not fully complied with the regulation. In contrast, Belgium, the biggest importer of tropical timber, conducted only two checks in the period under study. This stark disparity creates a loophole that encourages companies to trade with countries in which they expect no or only minimal checks (Blackman 2018). Additionally, many timber-consuming countries lack the necessary national legislation to criminalise transports of illegal timber. Therefore, to determine whether timber was logged, processed and transported legally or illegally, law enforcement agencies in importer countries rely on the national and local laws of the timber producing countries (Bisschop 2015: 126).

Responding to illegal logging and the global illegal timber trade

Regulatory mechanisms such as the US Lacey Act, the EU's FLEGT and third-party certification systems such as the FSC have certainly contributed to reducing the rate of illegal timber harvest and trade by bringing together business and civil society to develop common understandings and strategies for fighting (illegal) timber flows and increasing awareness of the problem. Yet, suffering from issues of inconsistency and transparency themselves,[4] these initiatives have proven inadequate to tackle the underlying structures of illegal logging and the global illegal timber trade. One reason for this is their inability to respond and adapt to the geographically shifting nature of the illegal timber industry. This applies both to the geographic shift of illegal timber markets, i.e. moving from highly regulated to loosely regulated environments, and to the trend away from large-scale illegal logging towards selective cutting and illegal land conversion.

The second reason is the absence of a comprehensive, integrated criminal justice strategy that combines the mechanisms for tackling illegal logging with strategies to counter corruption, organised criminal networks and financial crime. Such an integrated criminal justice strategy faces problems of coordinating the efforts of the different levels of governments and must include measures at each stage of the timber supply chain (from extraction to laundering to integration) and each level of the timber market (local, regional and global). But the stakes are high: the EU can provide certain incentives, support or exert pressure through conditionality at various points, but it must be aware that corresponding regulations can be quickly circumvented or undermined.

Extraction

At the local level, the focus should lie on preventing the illegal extraction of timber. To this end, strengthening national capacities to monitor and enforce forest law is key. In the Brazilian Trairão National Park, two forest officers are responsible for monitoring 257,000 hectares of forest; in the Riozinho do Anfrísio Park, the same number of staff looks after 736,000 hectares (WFB 2011). An effective response to forestry crime must allocate

4 For instance, Greenpeace revoked its membership in the Forest Stewardship Council in 2018, citing doubts about the effectiveness of the FSC to guarantee the protection of forests.

appropriate resources to forestry officers as much as to anti-corruption agencies, law enforcement and auditing and financial oversight institutions. Forestry and criminal justice personnel should not only have access to specialised investigative training but also to appropriate equipment needed to effectively monitor forest areas (e.g. helicopters, drones, satellite imagery). The strategic use of technological equipment especially for vast and remote forest areas plays a pivotal role in this. Some governments cooperate with local forest communities in using GPS satellite technology to collect evidence on illegal logging and timber trafficking routes (Boekhout van Solinge et al. 2016: 91). Additionally, deep learning and AI could soon be used as auxiliary tools for better monitoring and tracking logging activities (Abdenur 2020).

At the same time, governments must establish structures for greater intersectoral and interagency cooperation, for example by establishing specific interagency committees or task forces, such as a National Environmental Security Task Force (NEST) as proposed by INTERPOL. (Illegal) deforestation is not exclusive to forestry, but rather constitutes a cross-cutting issue also spanning the agricultural, mining, rural development and energy sectors. While actors involved in illegal logging and timber laundering are increasingly interlinked, the responsibility and competency to combat forestry crime is dispersed along the supply chain across different institutions at the local, regional and federal level, making it harder to develop an integrated strategy (Schönenberg 2002: 25).

Central to making domestic interagency cooperation more effective is to recognise that illegal logging and timber laundering are perpetuated by systemic corruption that reaches the highest levels of governments and corporations. This demands a change in strategy from reactive to proactive engagement: rather than going after the smaller and more visible offenders (i.e. (informal) loggers, millers, etc.), law enforcement should focus on the "big fish", those higher up in the pyramid of organised networks. A 2019 report by INTERPOL revealed that of all actors arrested for forestry crime, only ten per cent were company owners and managers and only two per cent were identified as heads of criminal groups, although they are the ones pulling the strings and driving the business of the illegal timber trade.[5]

5 The report revealed that between 2012 and 2017, 48 per cent of actors arrested for illegal logging or timber trade activities were loggers and truck drivers, 40 per cent were intermediaries, 10 per cent were company owners and managers, while only 2 per cent were identified as heads of criminal groups (INTERPOL 2019: 7); see also Goncalves et al. 2012: 7.

In parallel with responding better to the sophisticated nature of these networks, law enforcement must also end the common practice of foregoing prosecutions and issuing non-dissuasive penalties. One study found that the probability of a forestry crime being penalised in Brazil lies at just about 0.082 per cent; in Papua, Indonesia, that rate is even lower (Gonclaves 2012: 5). Even if offenders are prosecuted, the imposed penalties hardly affect the business conduct of the actors involved. After all, informal loggers can easily be replaced and seizures of timber transports do little damage to the established networks. The first steps for law enforcement would therefore be to make use of effective deterrence mechanisms such as appropriate dissuasive penalties and to include other related criminal offenses such as tax fraud, forgery, or bribery in the prosecution.

Laundering

Regulative frameworks that address illegal logging and the global illegal timber trade should be augmented to ensure a more tightly knit system of traceability and responsibility. This includes attributing more responsibility to timber processors and traders to conduct due diligence not only on their immediate suppliers but also further down the supply chain, including sawmills, shipment companies and operators of trade hubs. The central gateway for introducing illegal timber into the legal supply chain is at the point of processing, predominantly at the sawmill. Efforts to prevent the mixing and mislabelling of timber products must therefore concentrate on increasing transparency at the sawmills as well as both upstream and downstream along the supply chain.

Additionally, multi-agency and cross-border cooperation between border and customs agencies must be strengthened in order to curb the systematic smuggling of timber. When preventive measures have failed to prevent the illegal timber harvest, border checkpoints become a crucial point at which to break the link between supply and demand of illegal timber (UNODC 2013: 8). Ports and transit countries play a central role in this process, as they create and facilitate regional trade routes and trafficking hubs. VPAs can be an effective tool to promote legality verification schemes and curb illegal timber harvesting, but their effectiveness is diminished if they do not take into account major regional players such as Singapore and China. The European Union should therefore work towards extending its VPAs to third-party processing countries, most notably China, in order to close this loophole.

One way of addressing the issue of facilitating transit countries is to make anti-money laundering (AML) and confiscation laws central elements of the anti-logging and illegal timber trade strategies. According to Kishor and Lescuyer (2012: 265), the traditional "follow-the-log" approach must be complemented by a "follow-the-money" strategy to effectively trace back the proceeds from illegal timber trades that flow through third countries and trafficking hubs. Employing AML laws would enable authorities to prosecute agents involved in the illegal timber trade even in areas with no forestry crime policies, such as Hong Kong. It would also allow them to monitor financial institutions that take part in financing and enabling large-scale timber extraction in countries such as Indonesia and to mandate them to exercise enhanced due diligence for high-risk customers (Goncalves et al. 2012: 39; Reboredo 2013).

Integration

An integrated criminal justice strategy on the international level must embrace anti-logging and border control measures taken on the local, national, and regional levels while making use of tools of cooperation in the area of organised crime and corruption on the global level. Such tools include extradition and mutual legal assistance in criminal matters, a form of cooperation between countries for collecting and exchanging information. International police and justice cooperation should prioritise the prevention and detection of what Boekhout van Solinge et al. (2016) call "opportunity structures" or "illegal windows of opportunity". This involves the above-mentioned shift from reactive to proactive engagement and a focus on facilitators of crime, "some of whom are found at or near the interface of the legal and illegal" (Beokhout van Solinge et al. 2016: 92). Existing regional networks as well as financial intelligence units (FIU) can serve as an effective operating base for these forms of international cooperation.

Forensic tools analysing the chemical and genetic properties of timber have also become an established tool for verifying the geographic origin of timber. They can help identify and expose international timber trafficking routes and increase supply chain transparency. However, in order to do so, they rely on a large reference database. The creation of large and transnationally accessible databases would further enable states and organisations to better analyse and identify key actors, trade routes as well as direct and indirect risks along the supply chain. The use of big data analysis appears as a promising tool. By combining the outputs of a wide range of

approaches (e.g. GPS tracking, DNA analysis, bar codes, radio frequency identifiers, mass spectrometry (Lowe et al. 2016)), analysis based on big data is able to more accurately determine the origin and legality of timber (Instituto BVRio 2016).

Additionally, policies on illegal logging and timber trade should focus as much on identifying and breaking the criminal networks and beneficiaries of forestry crime as on the direct and indirect drivers that perpetuate the business of illegal logging. Illegal deforestation is largely incentivised by the continuously high demand for wood products from consumer countries in the Global North and the correspondingly high profit margin that can be achieved with illegal timber on the global timber market. Additionally, the demand for agricultural products such as palm oil, meat, soy and maize needs to be recognised as another indirect driver of illegal deforestation. The focus of any policy aiming to tackle illegal logging and the global illegal timber trade should lie on identifying and reducing these direct and indirect drivers of illegal deforestation. This is particularly important from an environmental and climate protection angle: once the tree is cut, it is no longer able to absorb greenhouse gases and reduce the global carbon footprint. Reforestation initiatives, while certainly important, are laborious and take a long time before the tree's maximum storage capacity is reached. The European Union's initiatives for deforestation-free supply chains and comprehensive mandatory due diligence are positive signals in this regard.[6] Finally, international efforts should be directed at harmonizing the existing heterogeneity of certification schemes, labels and sustainability standards to create more transparency for consumers and ensure consistent legality verification along the entire supply chain.

6 In November 2021, the European Commission unveiled its proposal for a regulation to minimize EU-driven deforestation and forest degradation. The Regulation sets mandatory due diligence rules for operators who place specific commodities on the EU market that are associated with deforestation and forest degradation -soy, beef, palm oil, wood, cocoa and coffee as well as some derived products, such as leather, chocolate and furniture. Its purpose is to ensure that only deforestation-free and legal products (according to the laws of the country of origin) are allowed on the EU market. Each member state will be responsible for implementing the regulation. At the time of writing, the draft legislation has yet to be approved by the EU member states and the European Parliament.

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