



United Nations
Office on Drugs and Crime

2a

Forest Crime

GLOBAL ANALYSIS ON
**CRIMES THAT
AFFECT THE
ENVIRONMENT**

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The Global Analysis on Crimes that Affect the Environment:

Part 2a – Forest Crimes: Illegal Deforestation and Logging

April 2025

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**SPECIAL POINTS
OF INTEREST**

GLOBAL ANALYSIS ON
**CRIMES THAT
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ENVIRONMENT**

1. Forest crime is especially harmful when it converges with other illegal activities

From illegal deforestation within the timber trade to corruption involving officials in charge of land use, forest crime includes serious offences all along the supply chain. These activities are harmful on their own, but they are especially damaging when they converge with other categories of crime like illegal mining, trafficking in persons, or the drugs market.

Criminal organizations and networks are implicated in forest crimes, but criminal actors can also come from legitimate businesses. Together they create a mutually reinforcing system that amplifies harm to communities, natural resources, and the environment at large.

In recent years, documented violations of fundamental rights in forestry work include the use of child labour and bonded labour in palm oil plantations. Loggers have also used deception to recruit into illegal operations.

The mining industry is also having an impact. Land is often cleared to allow for mineral extraction, and this can lead to illegal deforestation. The mineral extraction process can involve illegal dispersion of toxic chemicals, which can cause forest degradation and increase the risk of deforestation.

It is challenging to distinguish between the effects of legal and illegal mining, but this broad type of deforestation is on the rise, particularly in tropical areas. Between 2000 and 2020, an estimated 62 percent of direct deforestation within mining areas affected tropical rain forests.

There is also growing evidence that illegal drug markets are causing deforestation. Organized Crime Groups (OCGs) in Central America have reinvested drug trafficking proceeds into legal and illegal land acquisition. These groups are also involved in forest clearance, creating pasture for cattle, and soy and palm oil plantations. They also finance accompanying infrastructure from landing strips to irregular roads, all of which affects the integrity of forests and biodiversity. This process has been dubbed “narco deforestation”.

Forest crime cycle



Source: UNODC-DEVIDA, 'PERÚ Cultivos de Coca y Deforestación 2020-2023', ArcGIS StoryMaps, 26 June 2024, <https://storymaps.arcgis.com/stories/5f94b9ab38d344929bac80bdfa5963e4>.

2. Forest crime infiltrates legal processes and supply chains, making it tough to police

Many forms of crime exist mainly outside the legal sphere, but forest crime exploits existing legal frameworks and supply chains, making enforcement complex. Illegally logged timber often enters legal markets through fraudulent permits, bribery, and regulatory loopholes, allowing it to be laundered into the global economy. Corrupt officials and complicit businesses facilitate this process, making it difficult to distinguish between legal and illegal timber.

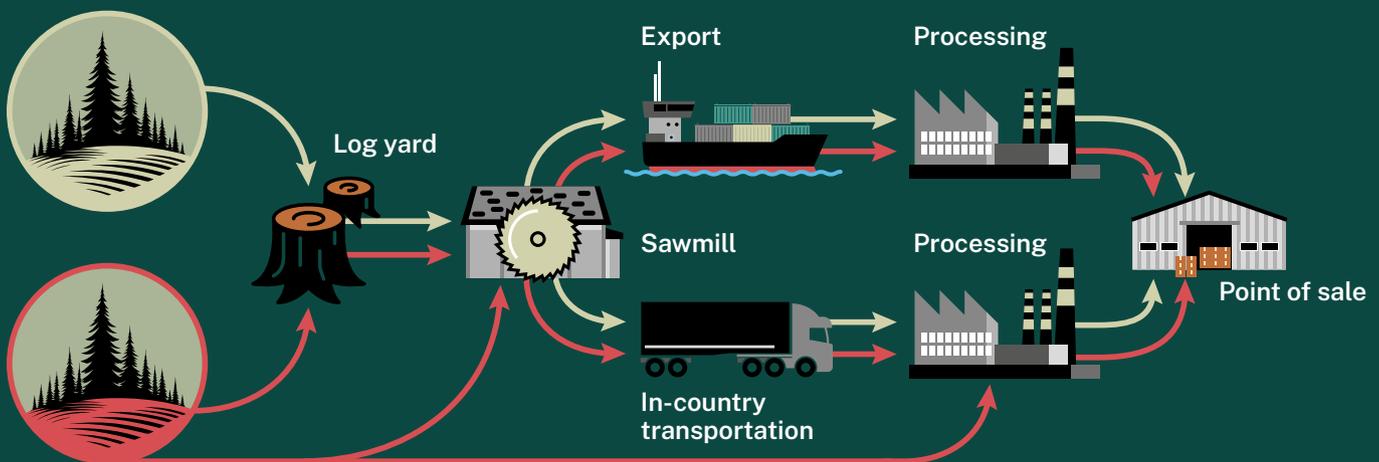
In one such case, a court in South America concluded that a group of private corporations and public officials had colluded to obtain authorization to build a highway through a forest. This had the double effect of deforesting the area directly impacted by the construction, and degrading the nearby areas, opening the possibility for large-scale logging activities.

Other practices involve logging without a licence or with a fraudulent licence, mixing illegally harvested timber and/or protected species with legally harvested timber, and logging beyond the legally permitted volumes.

Once harvested, illegally sourced commodities are transported, processed and traded along with the legal ones. Information that would identify the illegal nature of the product is concealed along the supply chain. This penetration of legal markets not only weakens environmental protections but also undercuts legitimate forestry businesses and fuels deforestation and biodiversity loss.

How illegally extracted timber enters the legal market

Legally harvested timber



Illegally harvested timber

Source: UNODC elaboration based on Lowe, A. J., Dormontt, E. E., Bowie, M. J., Degen, B., Gardner, S., Thomas, D., Clarke, C., Rimbawanto, A., Wiedenhoef, A., Yin, Y., & Sasaki, N., *Opportunities for Improved Transparency in the Timber Trade through Policy Implication*.

3. Regulation has brought both successes and unintended consequences

Market regulations have expanded in recent decades, aiming to reduce the share of illegally sourced products laundered in the international trade. The European Union, United States and China have all passed regulations to control the illegal trade.

Academic studies assessing the impact of such regulations have uncovered both successes and unintended consequences. Demand-side measures can curb the supply of timber at the source. However, such regulations can lead to a “balloon effect” where an enforcement squeeze in one place leads to a bulge elsewhere, with a resulting spread of related harms.

One study found that demand-side measures may have given rise to new laundering strategies, such as mixing timber with bamboo, rattan or metals. The aim would be to change the product classification to something outside the regulation’s coverage.

New regulations and certification schemes can have positive impacts, but the unintended consequences need to be anticipated.

Legislation of the Main Timber Trading Countries

(by Volume)

EUROPEAN UNION TIMBER REGULATION

Certification scheme to tackle illegally sourced timber products.



US LACEY ACT

The first legislation in the world to criminalize the importation of illegal sourced timber. Illegality is determined by the laws of the source country.



FOREST LAW OF THE PEOPLE'S REPUBLIC OF CHINA

Criminalizes transporting and importing illegally sourced timber, and requires anyone interested in timber harvesting to apply for a felling licence.

4. Diverse array of actors implicated in forest crime

Forest crime involves a wide spectrum of actors, from traditional OCGs to individuals and entities in the legal economy. They can act as perpetrators and facilitators, traders, transporters or financiers, or ultimately buyers who may or may not know they are participating in a crime.

OCGs looking to boost profits or increase influence and territorial control have looked to benefit from land use change and deforestation. They have become involved in the timber trade and related profitable markets involving environmentally sensitive commodities, exemplified by the practice of “narco-deforestation”.

Legitimate companies operating in the environmental sector may shift towards illegal business practices and commit forest crime to increase their profits. Cases involving bribery and collusion with corrupt public officials, funding of illegal logging operations, circumvention and violation of existing permits and regulations have all been identified.

Individuals in resident populations may resort to illegal logging to supplement their income and to sustain their livelihoods. Evidence from the illegal rosewood trade has revealed how unemployed youth have become involved in forest crime. Other cases have shown how marginalised members of resident populations, indigenous groups and migrant workers can also get involved, willingly or unwillingly.

There is also evidence that these actors do not operate in isolation. For example, an illegal logging business may sell timber to a corporation that knows that they are potentially buying illegally sourced timber. The relationships between all the actors can be fluid and flexible.

Continuum of corporate engagement in criminal activity



5. Criminal actors illegally deforest by manipulating land-use change and permit issuing

Most countries have a system that categorises land for different uses. Decisions can be made to change the designated use of land at a local level. Criminal actors may seek to influence the decision-making process to allow lucrative practices such as livestock grazing or deforestation. They have used bribery, abuse of power, and arson among other methods.

Once the change in land use is secured, criminal actors then need to gain a permit to carry out deforestation or logging. To get this done, they have employed a wide range of methods, including violence, extortion and falsifying documents.



Manipulating land use change

1. Presenting false or misleading information on the characteristics of the land;
2. Purposely damaging trees so that they can be harvested legally;
3. Bribery and abuse of power to obtain a change in land use designation;
4. Arson;



Manipulating permit issuing

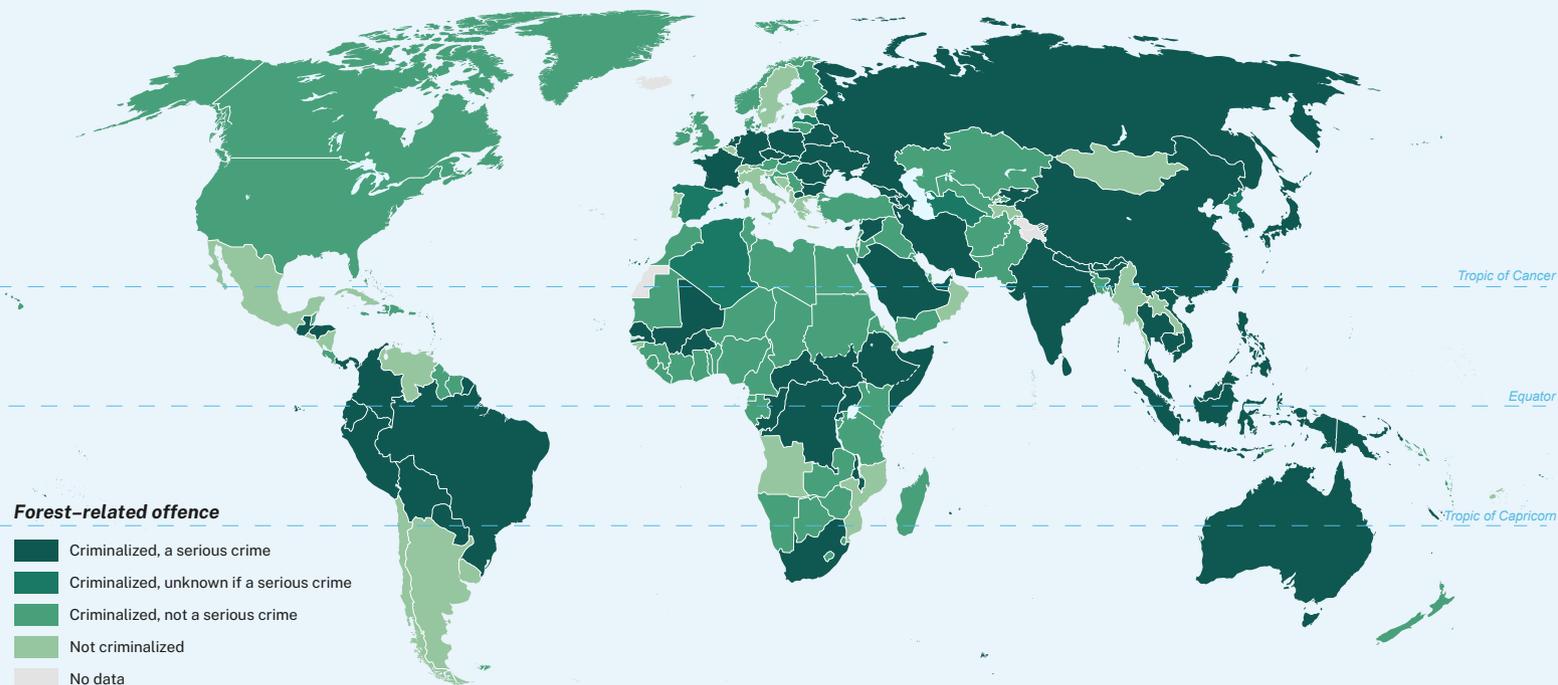
1. Environmental impact assessments (EIAs) not conducted in accordance with legal requirements;
2. Use of violence, extortion and threat to obtain concessions or complacency;
3. Bribery and abuse of power to obtain permit issuing;
4. Use of proxy companies by an entity that would otherwise be ineligible for being granted a permit;
5. Falsifying the content of the permit;
6. Extorting or manipulating landowners through means of violence, threat and coercion to gain their consent;

6. Curbing deforestation in tropical areas is a key environmental challenge with global implications

Tropical forests are at particular risk from environmental harms caused by illegal deforestation and logging. Ninety-one percent of global deforestation between 1990-2020 occurred in the tropical climate domain, despite tropical forests accounting for less than half of the world's forests.

There is no detailed breakdown for illegal deforestation, however one study estimated that some 42 percent of global deforestation due to commercial agriculture was in violation of local laws and regulations.

Criminalization of at least one forest-related offence, excluding illegal trade



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined.

Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties.

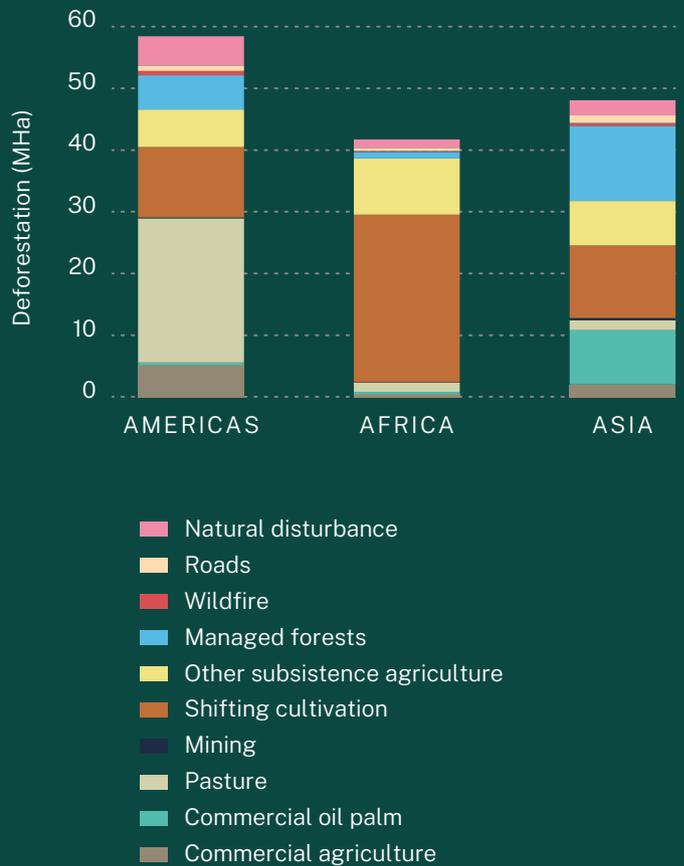
A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Malvinas).

Source: UNODC, Part 1 – Global Analysis on Crimes that Affect the Environment, 2024.

Legal deforestation is driven by different factors in different regions. In the Americas, the biggest driver is pasture, followed by shifting cultivation and other forms of subsistence farming. However, there is also evidence of managed forests, commercial agriculture, natural disturbances, roads, wildfires, mining, and a very small amount of commercial oil palm. In Asia, forest management together with oil palm have the largest share followed by shifting cultivation and other subsistence agriculture. There is also evidence of natural disturbances, pastures, roads, wildfire, and mining as drivers. The patterns are very different in Africa, where shifting cultivation and other subsistence agriculture are the dominant drivers by far.

A global assessment of criminalization of forest-related offences shows that many countries hosting tropical forests have legislation that criminalizes deforestation violations, often as a serious crime. However, criminal justice systems do not necessarily seek to prosecute in this way. The enforcement of these laws and the sanctions or penalties imposed need further research.

Drivers of deforestation by region, 2008–2019



Source: Fritz et al. 2022.

7. Increased demand in timber might fuel forest crime in the future

Land and timber are limited resources, and global timber production is already at record levels. Demand is likely to keep rising, putting increasing pressure on forests and protected areas. This in turn will increase incentives for organised criminal groups to engage in forest crime, and for legitimate businesses to shift towards illegal practices to increase their profits.

Practices such as illegal logging, timber laundering, and manipulation of land use and permit issuing schemes could become more prevalent, undermining sustainable forestry. This might not only lead to

significant environmental damage and a reduction in biodiversity, but also threaten the livelihoods of local communities that depend on forests for sustenance and income.

Further, deforestation and forest degradation pose a threat to global biodiversity and ecosystem health, sustainable carbon sequestration, and the millions who depend on forests for their livelihood. As forests annually absorb more CO₂ than some of the world's greatest emitters release, protecting forests is essential for climate change mitigation.

World Roundwood Production, 1961–2022 (billion m³)



Source: FAOSTAT.

An aerial photograph of a forest. The left side of the image is dominated by a thick plume of white smoke or steam rising from the ground, partially obscuring the trees. The rest of the forest is visible, with various types of trees, including some that appear dead or skeletal. The overall color palette is dark, with the smoke providing a stark white contrast.

**POLICY
IMPLICATIONS**

**GLOBAL ANALYSIS ON
CRIMES THAT
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1. Government agencies must coordinate better to tackle criminal networks

The convergence of forest crime and other criminal activity gives rise to criminal networks operating across multiple illegal spheres. To disrupt these, governments need enhanced coordination. Environmental agencies, law enforcement, labour regulators, and financial crime units all have a part to play. Equally, strengthening anti-corruption measures, improving due diligence in supply chains, and enforcing stricter penalties for businesses complicit in forest crime can help dismantle the mutually reinforcing system of organized crime and environmental damage. Integrated approaches encompassing such elements have been successfully implemented, for example in Latin America, where strengthening national administration and deforestation registration were combined with real-time geospatial monitoring, rural community engagement, and the provision of accessible information for effective decision-making and sustainable forest management.

Documented cases of vulnerable people being exploited in forestry and mining underscore the need for stronger labour protections and alternative livelihood programs. Expanding monitoring mechanisms can help detect and prevent exploitative recruitment practices linked to illegal deforestation and mining operations.

Money laundering intimately connects drug trafficking and illegal deforestation, amplifying the environmental impact of forest crime. Tax fraud, money laundering and illicit financial flows fuel the cycle of corruption that expands criminal activities. To respond effectively, law enforcement and criminal justice systems should target those causing the greatest environmental harm – whether they are corporations, companies or individuals hiding in those structures – by focusing on the operators who make significant financial transactions. Law enforcement should investigate the systematic use of corruption and money laundering in the commission of these crimes.

2. Improved monitoring and enforcement can root out crime along the timber supply chain

Greater accountability, monitoring, and oversight, including through traceability and verification mechanisms at the processing stage, can reduce illegality along the whole timber supply chain. Bilateral trade arrangements between consuming and producing countries have been a key factor in preventing imports of illegally extracted timber. However, such agreements can lead to displacement of illegal flows to other economies, while putting small and medium enterprises at a disadvantage.

Improvements in information management systems related to trade, and law enforcement alerts in timber processing countries can make a difference to the prevention of illegal logging at a global level. Harmonizing legislation, including criminalization where appropriate of forest and timber-trade related offences, would also address illegality at the stages of the supply chain with the most risk for criminal activity. These stages include the processing of timber, and its transport or export.

Monitoring and interventions must involve regulatory bodies or law enforcement rather than being left to the industry to oversee. Furthermore, international buyers should be incentivized to carry out greater due diligence, and legal consequences should follow for those who purchase indiscriminately.

3. Existing regulations on forest protection need strengthening with tougher obligations and constant evaluation

Demand-side solutions can be scaled up by introducing requirements for products to be free from illegal deforestation all along the supply chain. In addition, moves could be made to improve transparency for agricultural commodities, timber and derived products, metals and minerals.

Criminal actors seek to obtain permits through illegal means, or exploit unclear land tenure rights, making it imperative to improve transparency in these areas. Also, reducing complexity in the procedures regulating forest use could ensure access for rural communities and promote small-scale uses.

There is a need for enhanced monitoring and enforcement mechanisms, including increased international cooperation and the use of advanced technologies for tracking and verifying the legality of timber sources and other commodities. Policy frameworks need to be responsive to emerging illegal strategies, with continuous evaluation of regulations to close any loopholes.

4. Wider outreach and maximizing the use of existing laws can help tackle forest crime

Responses to forest crime must factor in the diversity of actors implicated and affected by it. Human rights-based law enforcement approaches must go hand-in-hand with community-based actions and wider outreach involving non-governmental organizations.

Law enforcement should better utilize existing tools, such as the United Nations Convention against Transnational Organized Crime, which can address corporate crime as well as traditional OCGs. The most serious forms of forest crime should be treated as serious offences. To achieve this, legislation should be amended, and specialized organized crime units should be drafted in. Policies aimed at countering forest crimes should be mainstreamed into national strategies against OCGs, alongside anti-corruption policies.

However, enforcement is only part of the solution. Consideration must also be given to community-based actions. Non-governmental organizations should be involved in forest management, and monitoring and related activities. Building the capacity of forest community members would encourage sustainable resource management. Coalitions and associations of small operators would act as a useful counterweight to the influence of powerful actors.

Alternative livelihoods must be found for communities vulnerable to illegal deforestation and logging. And the risk of providing financing for illegal products should be avoided by enhancing due diligence processes related to activities associated with illegal deforestation, such as cattle ranching and high-value agricultural products.

On the corporate side, extractive industries must be encouraged to comply with just and fair distribution of natural resources.

5. Responses should be adapted to local contexts

Law enforcement and criminal justice responses aimed at tackling illegal deforestation and logging need to be adapted to regional contexts to target the key driver of the crime.

For instance, in South America, agriculture and livestock appear to be the main industry behind illegal deforestation. To tackle the specific industries connected to agriculture and cattle ranching, authorities should push normative developments, monitoring, and capacity-building initiatives. Demand-side initiatives aimed at improving traceability of specific products linked to these industries—beef, oil palm or soy among others—may improve legality along the supply chain.

In Africa, on the other hand, charcoal production has been linked to illegal deforestation. Here the provision of sustainable, alternative fuels for energy production is needed in combination with appropriate law enforcement measures to reduce illegal deforestation.

6. Better knowledge sharing and increased understanding are vital for the future

Preventing illegal deforestation could reduce forest loss by millions of hectares per year. So it is incumbent on the international community to stop OCGs and other criminal actors from benefiting from the loss. To achieve this, it will be necessary to advance understanding of the role forest crime plays in climate change and biodiversity loss. Bolstering sustainable practices in the timber industry will also be vital.

As global demand continues to rise, timber production must strive to minimize environmental harm. Deforestation and logging, whether legal or illegal, can be harmful to the environment. The legal industry needs to be properly managed to be sustainable, and illegal acts must be stopped.

Private and public sectors can foster transnational cooperation by exchanging more detailed trade information covering, for example, the species, volumes or origins of materials. This can play a major role in preventing crime, particularly if accompanied by alternative development solutions for low-level actors engaged in logging operations.

This kind of transnational cooperation is also key to ensuring the success of demand-side solutions such as the adoption of deforestation-free requirements along the supply chain.

Definitions

Forests are defined as land spanning more than 0.5 hectares with trees higher than five metres and a canopy cover of more than 10 per cent, or trees able to reach these thresholds in situ. This definition does not include land that is predominantly under agricultural or urban land use.¹ Forests are exposed to at least two harms which have interlinked causes – deforestation and forest degradation.

The Food and Agriculture Organization (FAO) defines **deforestation** as the permanent conversion of forest to other land use, including areas where, for example, the impact of disturbance, over-utilization or changing environmental conditions affects the forest to an extent that it cannot sustain a canopy cover above the 10 per cent threshold set.² This includes permanent forest conversion to agriculture, pasture, water reservoirs, mining and urban areas. The term specifically excludes areas where the trees have been removed by harvesting or logging, and where the forest is expected to regenerate naturally or with the aid of silvicultural measures. The loss of an old-growth forest to a plantation would not be deforestation. A broader definition that includes harvesting and logging is used in the legislation of many Member States. When referring to Member States' legislation the study uses Member States' definitions.

Forest degradation entails “a reduction or loss of the biological or economic productivity and complexity of forest ecosystems resulting in the long-term reduction of the overall supply of benefits from forest, which includes wood, biodiversity and other products or services”.³

Illegal logging is the process of harvesting, processing, or transporting of wood and derived products in violation of a Member State's legislative framework.⁴ It typically includes but is not limited to the following regulated activities:⁵

- Logging of protected or endangered species.
- Logging in protected or prohibited areas.
- Excessive logging beyond what is permitted.
- Logging without permits or with fraudulent permits.
- Obtaining logging permits illegally.
- Non-payment of taxes and other forest fees.

Deforestation and forest degradation stem from legal and illegal activities. Here the focus is on illegal activities and the aim is to provide the first global overview of the nature and scope of forest crime, with a specific focus of the state of knowledge of nature and scope on illegal deforestation and illegal logging. Forest crimes encompass all types of serious offences along supply chains, from high-level corruption in land use decision making, to illegal deforestation and illegal timber trade, as well as cross-cutting issues like corruption and money laundering in the context of forest crimes.

Introduction

In the last 50 years, nature has changed at a rate unprecedented in human history.⁶ Between 1990 and 2020, 420 million hectares of forest were lost, an area equal to losing two and a half Amazon rainforests.⁷ Nearly 75 per cent of the planet's land, particularly forests as well as range- and wetlands, are negatively impacted by degradation and transformation and this is expected to increase to 90 per cent over the next 30 years.⁸ In 2020, forests covered 31 per cent of the Earth's land surface (4.1 billion ha) and contained most of the terrestrial biodiversity.⁹ The life of many species of flora and fauna, as well as humans and their well-being, depend on forests.^{10, 11} In 2019, four billion people (out of the world's 7.7 at that time¹²) lived within five kilometres of a forest, and around three billion lived within one kilometre.¹³

In 2017, the United Nations Economic and Social Council (ECOSOC) recognized that "forests are among the world's most productive land-based ecosystems and are essential to life on Earth".¹⁴ Human-induced climate change has already caused widespread losses and damages to nature and people and is now a global emergency.¹⁵ In 2021, the Glasgow Leaders' Declaration on Forests and Land Use (GDFLU) was launched at the United Nations Climate Change Conference (COP26). A total of 145 parties signed the declaration, their territories accounting for 90 per cent of the world's forests. This effort aimed to "halt and reverse forest loss and land degradation by 2030 while delivering sustainable development and promoting inclusive rural transformation".¹⁶ This is important since recent studies have shown that forests absorb a net 7.6 billion metric tonnes of CO₂ per year, 1.5 times more than some of the world's greatest emitters, providing a significant contribution to climate change mitigation.¹⁷

Furthermore, deforestation and forest degradation are now recognized among the greatest drivers of biodiversity loss.¹⁸ (See more on how illegal deforestation and illegal logging contribute to the triple planetary crisis in the full *Global Analysis on Crimes that Affect the Environment*.)

As mentioned on page 7, deforestation and forest degradation stem from legal and illegal activities and are related to one another (Figure 1). While logging precedes all these activities, the focus here is on illegal timber production as the reason for the logging, along with illegal deforestation. Other forest crimes will be the focus of future research.

Unsustainable agriculture,^{19, 20} unsustainable forestry practices,^{21, 22} including forms of (il)legal logging,²³ urbanization and climate change²⁴ are the main drivers of land degradation. Ecosystems affected by land degradation mainly contain forests.²⁵ Forest degradation can also be the result of deforestation and pave the way for (further) illegal logging activities. Once the ecological integrity of a forest is compromised to an extent that justifies a change in land use designation, agriculture or logging activities can be authorized in previously protected areas.^{26, 27} While forest degradation can happen independently from illegal activities and changes in land use can be legitimate, forest can fraudulently be declared degraded so that land use change is allowed. Such change in land use appears legal unless a link can be proven between the newly established commercial activities and the causes of the forest degradation. Such practices were recently unveiled in a case investigated in South America, where a court judgement concluded that a group of private corporations and public officials had colluded to obtain the authorization to build a highway in the forest with the double effect of deforesting the area directly impacted by the construction works and degrading the nearby areas, opening the possibility for large scale logging activities.²⁸

Once a forest is degraded, its land use designation may be changed, potentially authorizing large scale logging through clear cutting techniques.^{29, 30} When such activities involve corruption and fraud, they amount to illegal logging. Illegal logging can also be logging that is conducted without a permit. In these cases, illegal logging is a driver of illegal deforestation, along with illegal agriculture and illegal mining.

One study found that illegal agriculture activities may be the main driver of illegal deforestation worldwide, with some notable differences across regions.³¹ The contribution of mining to forest loss has been traditionally considered minimal,³² but recent studies have suggested that the direct and indirect effect of mining activities may be more substantial,³³ especially in specific geographies³⁴ even if their impact in terms of forest loss is likely to be minimal.³⁵

The complexity of the legislative frameworks regulating forest management at local, regional and national level, along with the lack of an international, standardized definition of forest crimes and standardized information and information tools, including on traceability, continues to challenge the production of comprehensive and comparable data on forest crimes. The areas that are most affected by deforestation or forest degradation are often hard to reach and difficult for state authorities to monitor. While available geospatial information technology offers a good account of forest loss, it cannot distinguish between legal and illegal activities, cannot capture forest degradation, and plantations and forest management initiatives may be incorrectly identified as illegal. Therefore, while the exact nature and scale of illegality is unknown, the data available provide insights into the different types of illegal acts, how they are carried out and by whom, as well as their links to corruption and conflict.

This study takes stock of the state of global knowledge on illegal deforestation and illegal logging. Furthermore, it is the first overview of the impact of organized crime related to deforestation and forest degradation, focusing specifically on illegal logging. Specific sections focus on the geographies and drivers of forest utilization, deforestation, and forest degradation to set the scene for discussion of related illegal activities (such as illegal cutting, burning or destroying of forest trees and the illegal digging or blasting of forests, as well as any other offences that Member States have criminalized).

The study has a particular focus on the market dynamics behind illegal logging, as well as on the criminal actors and their *modus operandi*. Key vulnerabilities and state responses are discussed, with specific attention on legislative protection, enforcement, corporate governance, and resources. This study is part of the *Global Analysis on Crimes that Affect the Environment*.

Methodology and limitations

The analysis presented in this study is based on an extensive literature review conducted between July and November 2023 and correspondence with one UNODC field office. The desk research was largely conducted in English, with the occasional inclusion of resources in Spanish, Portuguese, French, Latvian, and Chinese. The findings are also based on the analysis of six court cases published on the UNODC SHERLOC knowledge portal and two court cases publicly available on official government websites, as well as 45 court case summaries and one dataset of administrative data on illegal logging shared by Member States with UNODC via an official request for information specifically conducted for the *Global Analysis on Crimes that Affect the Environment*.

The lack of harmonized definitions and specific data on law enforcement and criminal justice actions severely limits the comparability of the sources used in this study (see Box 1). While aiming at ensuring the widest geographical coverage possible, regional representation in this study is highly influenced by the data collection technique adopted, largely relying on convenience gathering of information depending on UNODC's presence.

Global overview of deforestation and forest degradation

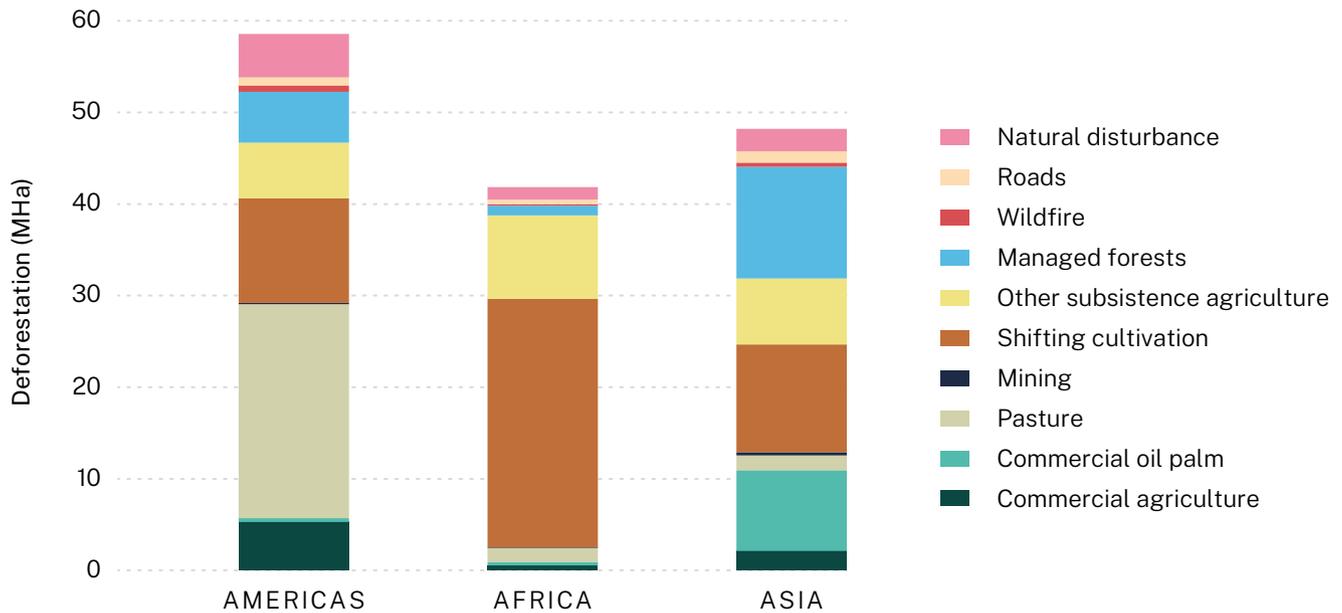
The largest proportion of the world's forests is in the tropics (45 per cent), followed by the boreal, temperate and subtropical climatic domains.³⁶ However, the tropical climate domain experienced 91 per cent of the total deforestation between 1990 and 2020, which is estimated to have been 420 million ha.³⁷ Two-thirds of the global forest area can be found in ten countries: the Russian Federation, Brazil, Canada, the United States of America, China, Australia, the Democratic Republic of the Congo, Indonesia, Peru and India.

In recent years, the rate of deforestation has started declining at the global level, with some differences across regions.³⁸ Deforestation occurred at a rate of 15.8 million ha per year between 1990 and 2000, 15.1 million ha per year between 2000 and 2010, 11.8 million ha between 2010 and 2015 and 10.2 million ha per year between 2015 and 2020.³⁹ Since then, significant reductions were registered in Indonesia, where deforestation is estimated to have declined by 8.4 per cent from 2021 to 2022, and Brazil, where a 50 per cent decline was registered in the Legal Amazon⁴⁰ in 2023.⁴¹

One study on tropical forest estimated that 60 per cent of deforestation between 2013 and 2019 was due to commercial agriculture and some 42 per cent of it in violation of local laws and regulations, also with stark regional differences.⁴² In Latin America, 77 per cent of tropical forest loss was estimated to be because of commercial agriculture (for example shifting cultivation and pasture), out of which 88 per cent were

estimated to be likely violating the legislative framework at the time deforestation took place (illegal). In Africa, commercial agriculture (not agriculture for subsistence) accounted for 10 per cent of forest loss (the study noted that this might be an underestimate), out of which 66 per cent were likely illegal; and in the Asia Pacific region, commercial agriculture (for example palm oil, pulp plantations, rice, beef, and rubber) accounted for 76 per cent of forest loss and 41 per cent were likely illegal.

Another study has also pointed to the role of agriculture as a major driver of deforestation worldwide, with some regional variation.⁴³ The largest share of deforestation recorded in South America was attributed to pasture, followed by shifting cultivation and other subsistence agriculture (see Figure 1).⁴⁴ By contrast, in Asia, shifting cultivation together with commercial oil palm were estimated to account for the largest share, while in Africa shifting cultivation and other types of subsistence agriculture were flagged as the dominant drivers.⁴⁵

Figure 2 – Drivers of deforestation by region (2008–2019)

Source: Fritz et al. 2022.

Other activities such as logging and mining appeared to be minor drivers of deforestation, as they rarely resulted in a permanent conversion of the forest to other land use.⁴⁶ They do however contribute to substantial forest degradation that has dramatic effects on the ecosystem and eventually leads to deforestation.^{47, 48} One study estimates almost 75 per cent of the planet's land, particularly forests, are negatively impacted by degradation and transformation, with the expectation this will increase to 90 per cent over the next 30 years.⁴⁹ According to the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES),⁵⁰ the drivers of degradation vary by region, but centre on the management of: grazing livestock; cropland and agroforestry; forests and tree plantations; non-timber resource extraction; fire regimes; extractive industries; and infrastructure, industry and urbanization. Introduction of invasive species may also lead to degradation.

Global timber production (logging)

According to the Food and Agriculture Organization (FAO), global timber production is at a record level and is likely to keep rising.⁵¹ World roundwood removals have amounted to about 4 billion m³ annually in recent years, around half of which has been used for fuel, either directly (as fuelwood) or in the production of charcoal and pellets. Most of the remaining 2 billion m³ of timber removals per year has been used as raw material (i.e., industrial roundwood) to produce sawnwood, wood-based panels and woodpulp.⁵² Between 2020 and 2050, global roundwood⁵³ demand

could increase by as much as 49 per cent.⁵⁴ Unpredictable supply chain distributions and trade regulation can, however, still influence these predictions. For instance, in 2020, the global production and trade of almost all major timber-based products declined, following the entry into force of COVID-19 prevention measures and the consequent supply chain disruptions.⁵⁵ The impact was, however, short lived. In 2021, production quickly recovered and reached a record high.⁵⁶ In 2022, log export restrictions introduced by the Russian Federation prompted decline.⁵⁷

Figure 3 – World Roundwood Production, 1961–2022 (billion m³)



Source: FAOSTAT.

Note: Including “Industrial roundwood, coniferous (export/import)”, “Industrial roundwood, non-coniferous tropical (export/import)”, “Industrial roundwood, non-coniferous non-tropical (export/import)”, and “Wood fuel, all species (export/import)”.

While half of the global timber harvest in 2022 was for industrial roundwood, 90 per cent of African production was directed to the woodfuel market.⁵⁸ When looking at the world timber trade, import statistics depict a highly fragmented market, dominated by the timber processing industry and non-linear trade routes. The largest flows of international legal trade in wood and derived products takes place between countries where the demand has prompted the emergence of a solid timber processing industry rather than between the largest timber producing economies and global importers. In 2022, countries of the European Union Schengen area⁵⁹ and China largely surpassed other countries for roundwood imports, with 56 and 44 million m³ respectively (India ranked third with 5 million m³).⁶⁰

In 2022 for instance, the European Union mostly imported timber and articles of timber⁶¹ from China, Ukraine and the Russian Federation, while China's top three partners were the Russian Federation, New Zealand and Viet Nam.⁶² This demonstrates that timber production takes place globally and not only in the tropics, although the tropics often receive the most attention.

In response to the harms caused by deforestation and forest degradation, of which unsustainable and illegal logging are only part, countries have established differing legal protections for forests. Experts suggest that improvements in information management systems related to trade and law enforcement alerts in timber processing countries could contribute to the prevention of illegal deforestation and illegal logging at a global level.⁶³

Legal frameworks for forest protection

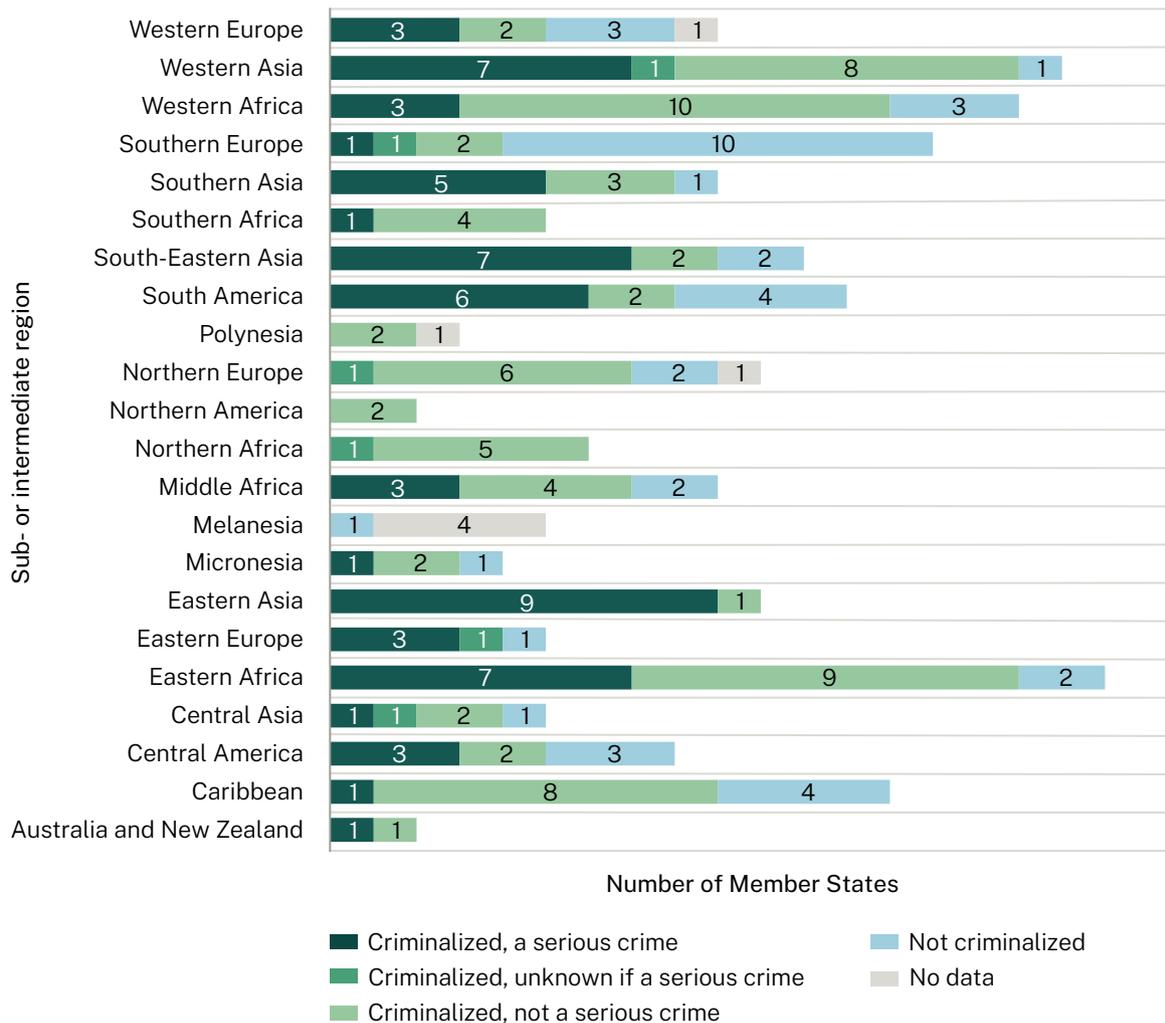
Legislation may regulate activities at each stage of the timber supply chain. Thus, land use designation, permit issuance for timber extraction, timber harvesting, transportation, trade, processing, and sales are usually subject to official oversight. In order to understand the acts of criminality at the various stages of the timber supply chain, it is important to understand the legal protections for forests.

Most UN Member States (139) apply criminal penalties to forest-related offences, with criminalization being complemented by or alternative to administrative offences.⁶⁴ Forty-nine of those countries have penalties that meet the UNTOC definition of a serious crime (a maximum custodial sentence of at least four years). The custodial penalties have a great deal of variability with some prescribing incarceration from 15 to 30 days while others prescribe up to 14 years depending on the type and severity of the offence. Likewise, criminal fines range significantly. At the low end, fines are less than USD 500; at the high end, fines can be tens of thousands of USD. Often fines are calculated by penalty units determined by the national minimum wage and occasionally per tree.

Confiscation of equipment, forest products, money and other items is provided for in the environmental legislation of 19 Member States. Restoration or restitution is more prevalent here, perhaps, than in other environmental areas (24 Member States). Sanctions also include loss of licence and prohibition from logging for set periods of time.

The lack of criminalization of legal persons (in 20 Member States) warrants further scrutiny since forestry is a highly industrialized sector where corporations may be among the main perpetrators of offences.⁶⁵ A large portion of forestry legislation focuses on administrative requirements, fees, taxes and property rights of which violations are considered “illegal” for the purposes of this publication, even though they might not constitute a crime in the sense of UNTOC.

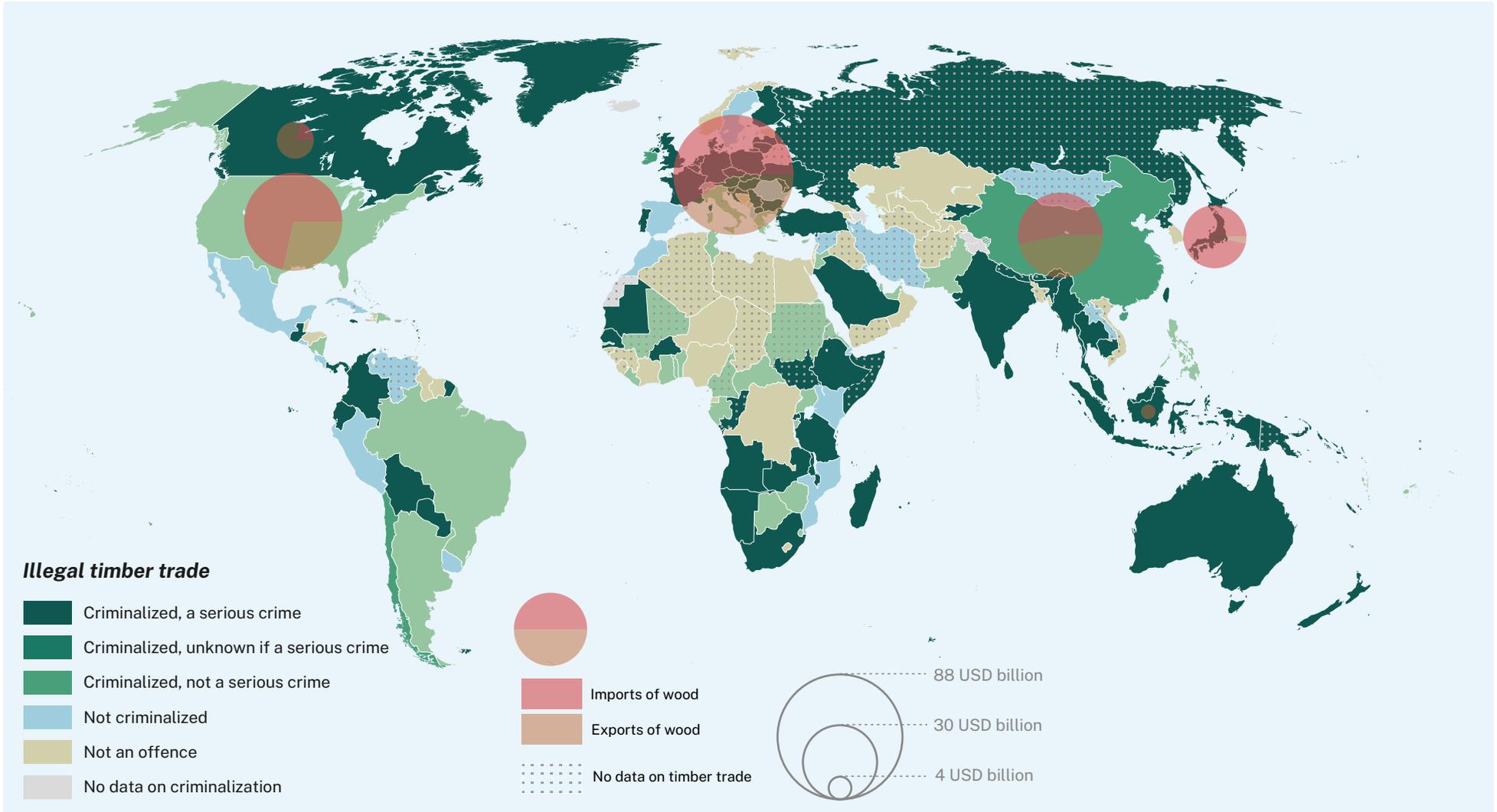
Figure 4 – State of criminalization for forest-related offences



Source: UNODC *Part 1 – the Landscape of Criminalization* from the *Global Analysis on Crimes that Affect the Environment*.

This figure from *Part 1 – the Landscape of Criminalization* shows the sub- or intermediate regional difference of criminalization for forest-related offences. Map 1 illustrates the regional variations, indicating where a forest-related offence may be considered a crime, a serious crime or not a crime. Even though a violation of legislation can be charged as a crime or serious crime, it does not mean this is the approach taken by criminal justice systems. The enforcement of these laws and the sanctions or penalties actually imposed are in need of further research.

Map 1 – Illegal timber trade criminalization and wood import/export flows* in 2023 (European data are aggregated**)



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined.

Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties.

A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Malvinas).

Source: UNCOMTRADE, UNODC.

* Only overall trade values (import + export) above 4 USD billion are displayed.

** Data on Europe is an aggregate of import and export figures for each country, including intra-European trade, rather than reflecting flows in and out of Europe as a whole.

BOX 1: LEGAL FRAMEWORKS FOR TRADE IN WOOD AND DERIVED PRODUCTS IN MAJOR IMPORT ECONOMIES

The U.S. Lacey Act: under this statute, it is unlawful to acquire and dispose of any plant, animal species, or derivative products from foreign and interstate trade that violate federal, state, tribal, or foreign laws; plants were added in 2008, which meant the Lacey Act was the first legislation in the world to criminalize import of illegally-sourced timber.⁶⁶

The European Union Timber Regulation (EUTR) (No 995/2010) aims to prohibit illegally harvested timber and the resulting products from entering the EU market.⁶⁷ It does so by obliging operators to exercise due diligence and thus minimize the risk in their timber supply chains. On 30 December 2025, the EUTR will be superseded by the Deforestation-Free Products Regulation (EU Regulation No 2023/1115). This new regulation will require companies trading in specific commodities (such as: cattle, cocoa, coffee, oil palm, rubber, soya, timber) and derived products to conduct due diligence on supply chains and ensure that goods do not derive from recent (post 31 December 2020) deforestation, forest degradation, or breaches of environmental laws.

The Forest Law of The People's Republic of China (amended in 2019) requires businesses or individuals interested in timber harvesting to apply for a felling licence (Art. 56).⁶⁸ The legislation also criminalizes the purchase, process, and transportation of timber conducted in full awareness of its illegality, including imports from other countries. The Law requires organizations or individuals transporting wood and derived products to provide relevant licences, permits and certifications to import/export management authorities. Failure to abide by the law will result in the immediate cessation of illegal activities, confiscation of the illegal timber purchased or revenue from its sale, and a fine (Art. 78).

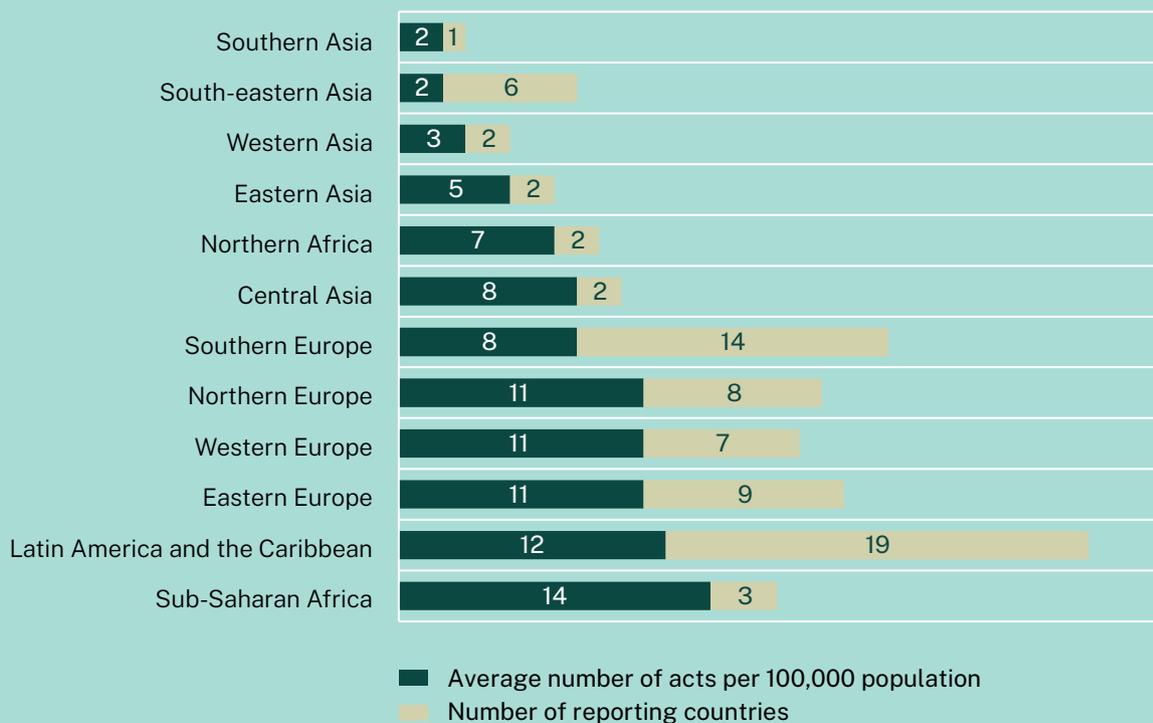
Analysis of forest legislation has revealed that offences related to timber trade are not always evident. Therefore, an expanded analysis focused specifically on the criminalization of the trade of illegally sourced and traded timber. This analysis combined several sources of legislation. In the first instance, legislation related to deforestation was examined, as indicated in the earlier section on illegal harvesting. Some countries include trade-related violations in forest legislation by including unlawful transport of logs. In other cases, regulation of timber trade is covered in separate legislation. Sometimes that legislation only addresses species listed in the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). As seen in Maps 2 and 3, not all countries appear to have specific offences related to the illegal trade of timber, CITES-listed species or otherwise (parts of Europe, Central Asia and Northern Africa). The diversity in national legislation leads to the targeting of weaker jurisdictions and the creation of the risk of targeting geographical hubs where illegally harvested timber can be more easily laundered through countries without timber-trade related offences (i.e., related to its transport, import/export, sale, or purchase).

BOX 2: ADMINISTRATIVE DATA ON ILLEGAL LOGGING

Administrative crime statistics (based on police, prosecution and conviction records) on forest crimes are sparsely available. The only consolidated source is the United Nations Survey of Crime Trends and Operations of Criminal Justice Systems (UN-CTS). Between 20 and 47 Member States from ten world subregions submitted data during the bi-annual reporting to the UN-CTS on the number of acts that resulted in the depletion or degradation of natural resources, between 2014 and 2021. In those countries, an average of five such acts for every 100,000 people were recorded over the seven years, for a total of 290,499 reported offences in 47 countries. High reporting rates to

the UN-CTS usually reflect the quality of countries' police registries and their capacity to share data with UNODC, rather than the true incidence of the crime. UN-CTS data only include offences for which data are collected, in line with the International Classification of Crime for Statistical Purposes (ICCS). Figures do not account for offences which did not come to the attention of law enforcement authorities, which in some countries may account for most of the acts committed. A rapid assessment of other sources of data found that 26 Member States appear to have publicly available criminal justice data.⁶⁹

Figure 5 – Number of reported acts that resulted in the depletion or degradation of natural resources per 100,000 population and number of reporting countries, per subregion 2014–2021



Source: UN-CTS and World Population Prospects data 2024.

Note: figures include acts reported under the ICCS categories: “10041 Illegal logging, 10042 Illegal hunting, fishing or gathering of wild fauna and flora, 10043 Illegal mining, 10049 Other acts that result in the depletion or degradation of natural resources.” For 22 countries, 2021 data points are imputations done on the basis of the most recent data point. Sub-Saharan Africa now appears first because Namibia reported a large number of acts compared to the population.

Addressing illegality through regulation

Market regulations have expanded in recent decades to reduce the share of illegally sourced products (laundered) in international trade. The Forest Law Enforcement Governance and Trade Action Plan (FLEGT) Regulation (European Council Regulation No 2173/2005)⁷⁰ was one of the first attempts of this kind and has since been widely studied to better understand the impact of regulations on illegal markets. For instance, recent studies have shown that the EU regulation reduced imports of illegally sourced wood and derived products from Indonesia to the EU.^{71,72} This is claimed to have been the result of better forest management, greater traceability of products and increased regularization in the country.⁷³ However, timber being exported from Indonesia to areas other than the EU was not included in the studies and may or may not have been as well managed.

The European Union Timber Regulation (EUTR) has also attempted to tackle the demand for illegally sourced products, in this case, by imposing due diligence of supply chains.⁷⁴ The regulation requires first that operators provide documentation, inter alia about the origin of timber, the supply chain and the respective timber species. Second, they must conduct a risk assessment to determine whether the risk of importing a timber product from an illegal source is negligible or not. Third, risk mitigation measures must be carried out by the operator if the risk is considered not to be negligible. A study conducted in Germany has, however, highlighted that market operators still struggle to ensure adherence to these measures, and compliance rates are likely to be low. Micro and small enterprises operating in Germany have implemented all measures to a significantly lower extent than medium and big enterprises. The study furthermore shows that the EUTR has provided a significant im-

pulse for importers to adopt a risk-based approach to internal supply chains. A third of the market operators surveyed in the study reportedly changed trade partners for timber supply following the entry into force of the regulation.⁷⁵ Furthermore, audits of operators who initially demonstrated a lack of awareness of the EUTR or deficiencies in its implementation have revealed that they have since introduced and are implementing an appropriate due diligence system. Another academic study concluded that the EUTR seems to have also disproportionately favoured larger and better-equipped corporations over smaller enterprises in areas outside of Europe. Some timber product manufacturers have reportedly quit their timber businesses due to the cost of following all the verification protocols and related regulations.^{76,77} Significant human and financial resources are indeed associated with compliance to the EUTR, which may be prohibitive for small and medium enterprises (SMEs).

The example of the EU legislation shows that demand-side measures for the legal market can shape the supply of timber at the source. However, regulations like these may lead to a “balloon effect” with a geographical displacement of the illegally sourced timber trade.⁷⁸ A study conducted in two key exporting countries found that, according to producers and regulators, the regulation may have also led to an increase in timber smuggling. New laundering strategies, such as mixing timber with other products like bamboo, rattan or metals, were reportedly used to alter the product classification so that it is beyond the scope of the regulation.⁷⁹

However, according to the Government of Indonesia, the implementation of legislation meeting EUTR standards is not a barrier for SMEs in the wood industry but rather provides assurance to business actors and

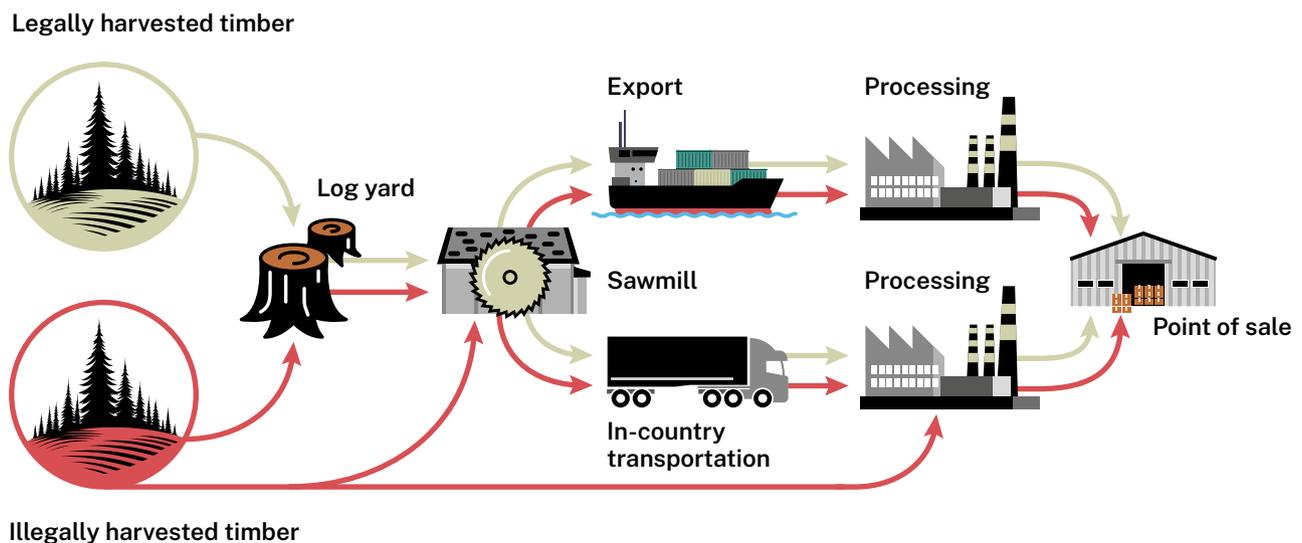
the market that wood products come from legitimate sources and forest areas that are managed sustainably. Furthermore, in the case of Indonesian procedure, it has been equipped with a feature that adds geolocation information, making it possible to track the source of wood raw materials, so that the source of wood is clear and can be traced. For this reason, drawing a conclusion that the SME industries are exposed to potential crime is still considered premature and requires further analysis. Such an approach aims to address timber smuggling and laundering.⁸⁰

The fast adaptation of traders to new timber trade regulation is also evident in the impact of new CITES regulations affecting rosewood. Sawmill owners interviewed during UNODC research in Sub-Saharan Africa for example, reported having swiftly changed to new rosewood species as soon as the ones they were harvesting were listed among the species protected under CITES.⁸¹

In addition, various voluntary forest certification schemes have been established globally that allow consumers to direct their demand towards sustainably and legally sourced products. There are currently more than 50 active certification schemes serving as third-party voluntary, market-based mechanisms to promote the sustainable use of forest resources.⁸² Among them are the Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification (PEFC), both established in the 1990s. According to one NGO study, these certification schemes (as well as other initiatives on forest management) have limited market penetration at a global scale.⁸³ Finally, a report produced for FAO analyzes the possible impact of public procurement processes on ensuring timber has not been illegally sourced.⁸⁴ While the approach has the potential to improve the integrity of the supply chain, only seven importing countries have instituted such practices. Furthermore, public purchasing of wood and derived products is limited so the direct impact of such policies in some timber producing areas is likely to be limited.⁸⁵

The illegal timber and derived products supply chain

Figure 6 – How illegally extracted timber enters the legal market



Source: UNODC elaboration based on Lowe, A. J. and others., Opportunities for Improved Transparency in the Timber Trade through Scientific Verification.

The timber market is highly fragmented and the timber processing stage largely determines the flows and trade routes. The dynamics of the legal trade are important to understand as no evidence of a completely separate parallel illegal market for wood and derived products has been identified.

The global timber market is widely spread out across many importers and exporters. In terms of crime, this means there are numerous opportunities to launder and hide illegal logs within this extensive, unconcen-

trated market. Thus, as recently shown in two court cases adjudicated in Europe (one in 2022 in a Dutch court involving three corporations circumventing regulations by creating a shell company and the other in 2023 in a French court involving a company failing to meet its due diligence requirements^{86, 87}) illegally-sourced timber can easily follow the same trade routes, meaning there is no need for an (expensive) separate, illegal infrastructure.

Market concentration can be measured by the Market Concentration Index, defined as follows:

The market concentration index measures the degree of concentration of exports and imports of a product around few markets, or whether it is traded more homogeneously by a larger number of countries. A value close to 1 indicates that export or imports for the analyzed product are highly concentrated around few markets. On the contrary, a value closer to 0 reflects a more homogeneous distribution of market shares among economies.⁸⁸

The Market Concentration Index value globally for wood and derived products (wood, charcoal, articles of wood, pulp, paper, paperboard and articles thereof, furniture, prefabricated buildings (partial dataset), musical instruments, and other) has remained near to zero since 2010: the average Market Concentration Index for exports of wood and derived products between 2010 through 2022 is .154 and for imports of wood and derived products between 2010 through 2022 is .159.⁸⁹ The variance between the derived products within the broad category is minimal. For instance, in 2022 paper, paperboard and articles thereof are the lowest at .13; pulp is the highest at .29.

As evidenced later in the study, “laundering” of timber is key. The term is used to identify a range of activities committed along the supply chains where illegally harvested timber is mixed with legally sourced timber. Laundering requires varying levels of complexity depending upon the species and supply chain as discussed below.

BOX 3: MIRROR TRADE ANALYSIS

Despite representing only legal flows, trade data has been used to identify routes at risk of criminal activities. Trade account balances offer an overview of the main international flows in wood and derived products. Discrepancies between import and export statistics may be due to many factors including data gaps and lack of comparability. While these discrepancies cannot be taken as a measure of illegal or unregulated trade, they can still help to spot geographical areas potentially at risk. By comparing imports and exports accounts, the use of “mirror data” has enabled national authorities to carry out targeted checks for customs fraud and irregularities.^{90, 91, 92}

This analysis is only indicative of potential irregularities as several factors unrelated to criminal activity can explain differences in trade data.⁹³ Discrepancies may be due to the following factors: (i) data quality may vary among countries, (ii) for a given country, imports are usually recorded with more accuracy than exports because imports generally generate tariff revenues while exports do not, (iii) a same good may be recorded in different categories by the exporter and the importer,⁹⁴ (iv) timing and currency valuation may change across countries: long sea cargo, delayed customs processing or storing in warehouses can lead to trade being recorded in different years and goods being valued at different prices due to exchange rate volatility, (v) storage in bonded warehouses and downstream transformation in industrial free zones leads to mismatch.⁹⁵ Finally, literature suggests that such analysis should be carried out at the finest possible level of detail and complemented by qualitative analysis.⁹⁶

As an example, UNODC conducted a mirror trade analysis of log import and exports between Papua New Guinea and China.⁹⁷ While the exact reason for the USD 1.5 billion discrepancy (see Box 4) between export values from Papua New Guinea and import values to China between 2018 and 2022 is unknown, the amount of the difference raises the suspicion of trade-based money laundering. In such instances, values are manipulated to avoid import and/or export duties and tariffs thus saving costs for the corporations involved but negatively impacting governments which lose out on revenue.

BOX 4: DISCREPANCIES BETWEEN LOG IMPORT AND EXPORT COUNTRIES

Since 2010, Papua New Guinea has exported logs to China. During the sample period from 2018 to 2022, China remained the top destination for Papua New Guinea's timber exports, as reported by SGS Log Export Monitoring Monthly Reports. Throughout this period, 84 per cent of all Papua New Guinea logs exported went to China, with the remainder distributed among 11 other destinations.

The data from the SGS reports were compared with official statistics provided by the General Administration of Customs of the People's Republic of China (PRC), below:

Given that China represents the major market for Papua New Guinea's log exports, a comprehensive analysis of the discrepancies between the data reported by the two countries was deemed essential.

The World Bank claims⁹⁸ that:

In a perfect world, country A reported imports from country B would match with country B reported exports to country A. Consequently, this would make mirroring (using information from the partner when a country does not report its trade) a transparent and error-free process.

However, this is not the case for the following reasons:

- In UN COMTRADE, imports are recorded cif (cost insurance and freight) while exports are fob (free on board). This may represent a 10 per cent to 20 per cent difference.
- Despite all efforts made by national and international agencies, data quality may vary among countries.
- For a given country, imports are usually recorded with more accuracy than exports because imports generally generate tariff revenues while exports don't.
- At a detailed level, a same good may be recorded in different categories by the exporter and the importer.

The table on the next page shows a volume discrepancy of 61,839 m³ between SGS recorded log exports of Papua New Guinea and China's recorded imports from 2018 to 2022, amounting to 0.44 per cent. As the volume is not affected by differences in CIF and FOB figures, which only apply to values, this volume difference may be due to shipments reported by SGS at the end of 2022 but recorded in China in early 2023. A study on discrepancies in Chinese logs suggests that analyzing quarterly data and including shipment duration between import and export countries can better reveal discrepancies in international timber trade.⁹⁹ Although detailed data were limited, the research concluded that the 0.44 percent difference in a total of five can be considered close to zero and normal. However, unaccounted shipments might also contribute to this discrepancy.

In contrast, the values reported by the two countries show significant differences. Papua New Guinea reported US\$ 1.3 billion in value, while China reported US\$ 2.9 billion, a discrepancy of US\$ 1.6 billion, or 125 per cent of the value reported by SGS for Papua New Guinea in the same period (2018 to 2022) for nearly the same volume.

The World Bank suggested that differences in CIF and FOB values might explain 10-20 per cent of this discrepancy. Data on CIF values for Papua New Guinea's shipments is unavailable, as SGS records only FOB values, and detailed CIF values for logs imported to China were also unavailable.

The International Monetary Fund (2018) in its working paper on "New Estimates for Direction of Trade Statistics" suggests that:

Exports and imports of non-reporting countries are estimated based on the assumption of symmetry with the values of imports and exports, respectively, declared by their counterpart countries. A CIF/FOB adjustment of 6 percent is used for non-reporting countries. The value of exports

Table: Comparison of data for exports from Papua New Guinea and imports in China

YEAR	EXPORTS FROM PAPUA NEW GUINEA TO CHINA		IMPORTS IN CHINA FROM PAPUA NEW GUINEA	
	Volume (m ³)	Value FOB* (US\$)***	Volume (m ³)	Value CIF** (US\$)
2018	3,604,959	342,543,204.18	3,236,213	803,781,530.00
2019	3,258,674	311,887,688.54	3,271,121	605,407,579.00
2020	2,354,743	213,127,788.93	2,894,936	523,338,687.00
2021	2,335,814	221,949,046.28	2,179,162	493,398,524.00
2022	2,432,748	235,027,784.28	2,343,667	548,809,665.00
Total	13,986,938	1,324,535,512.21	13,925,099	2,974,735,985.00

Note: (*) FOB: free on board. (**) CIF: cost insurance and freight. (***) Values in US\$ for each different destination are not provided in the SGS reports which instead provide the average price in US\$ for each country and for all species. The values for exports in US\$ in this table have been calculated multiplying the total exported volume to China by the average US\$ price for the same destination for all species.

Source: SGS; General Administration of Customs of the PRC.

is equal to the value of imports from a partner divided by 1.06; the value of imports is equal to the value of exports multiplied by 1.06.

Given the limited data on CIF-FOB margins for the two countries, a 6 per cent adjustment is advisable for more accurate estimates. For the period 2018-2022, the export value of Papua New Guinea should be calculated by dividing China's imports (US\$2,974,735,985.00) by 1.06.

The estimated value of Papua New Guinea exports for the 2018-2022 period is US\$ 2,806,354,702.83, calculated by dividing China's imports US\$ 2,974,735,985.00 by 1.06. According to the IMF methodology, which references OECD research, there is a discrepancy between the SGS reported value (US\$ 1.3 billion) and the imports recorded in China (US\$2.8 billion after CIF/FOB adjustment). This discrepancy amounts to US\$ 1.5 billion over five years, accounting for 113 per cent of the FOB values recorded by SGS.

It can be estimated that there is a gap in terms of value declared at export for logs shipped from Papua New

Guinea to China, with the discrepancy amounting to around 113 per cent of reported FOB. During 2018-2022, it can be estimated that Papua New Guinea may have lost the opportunity of collecting revenues, with related taxation and foreign currency remittances, for a value of US\$ 1.5 billion.

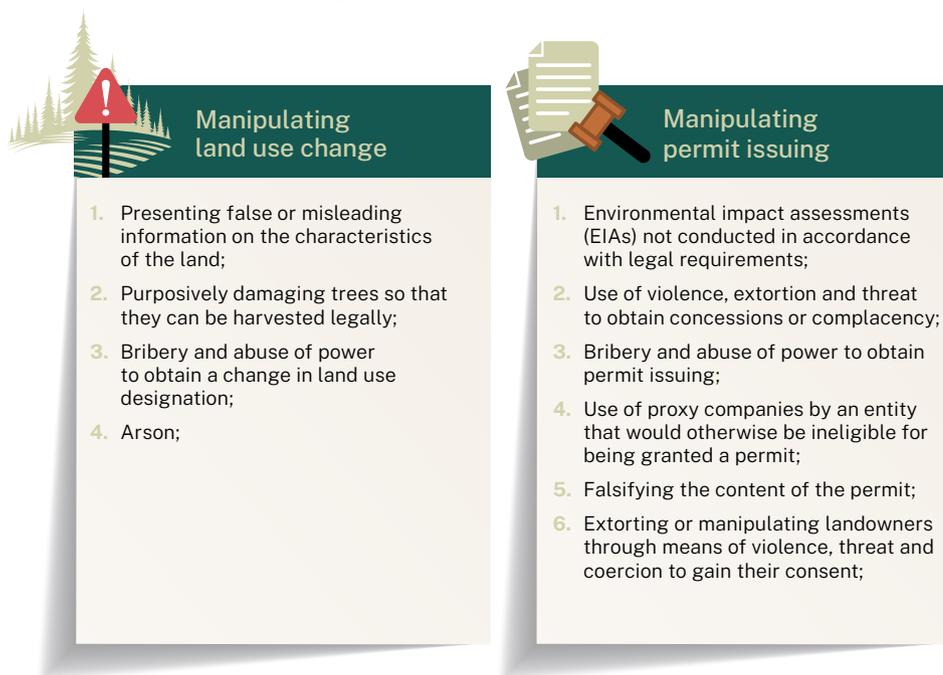
The presence of discrepancies in trade data may suggest the involvement of offshore intermediaries facilitating the Papua New Guinea-China log trade. These intermediaries would presumably generate taxable income from buying logs in Papua New Guinea and selling them in China. However, it appears that the Chinese importers have direct, long-standing relationships with Papua New Guinea exporters.¹⁰⁰ One of the possible supply chains, specifically between Papua New Guinea and China, is that exporters purchase logs directly and then sell them to Chinese sawmills after import. This suggests that there are likely no additional intermediaries inflating the value of Papua New Guinea logs before they reach China.

Modus operandi: illegal timber supply chains – from logging to the processing of illegal timber

Unlike with some other crimes, the illegal timber trade does not seem to rely on parallel illegal markets but rather penetrates national and international legal supply chains. As illegally sourced commodities are transported, processed and traded along with legal ones, the information on the source that would identify their illegal nature is concealed along the supply chain.¹⁰¹ The *modus operandi* adopted responds to the need to place the illegal product on the legal market, by concealing its source and eluding or circumventing existing regulations.

Supply chains of illegal timber and related products are long and start with initial land use changes (if needed), continue with the harvest of timber, its transportation and then processing. Along each link of the supply chain, illegal practices and vulnerabilities to launder timber into the legitimate trade can be identified.

Figure 7 – Practices associated with illegal deforestation



Illegal deforestation through manipulating land use change

Most countries adopt land management practices that rely on a categorization of public and private land that foresees different and often exclusive use, depending on the characteristics of the ecosystems that exist on that land.¹⁰²

Actors interested in the financial gain linked to extraction of timber (and natural resources in general) may have an interest in influencing the decision-making process on land use change at the local constituency to their advantage. This can be done by presenting false or misleading information on the state of the land, in order to prevent its classification as a protected area or to allow for agricultural activities. Bribery and abuse of power can be employed at this stage to drive existing procedures towards a favourable decision. When the paperwork does not suffice, local workers may be tasked to purposively damage trees so that they can be harvested legally.¹⁰³ When the ecological integrity of the forest is degraded, the land use designation can be changed to allow agriculture and/or logging.

Human-induced fire can be a facilitator of forest crime, as it allows deforestation of vast areas with minimal effort and cost. The frequency and intensity of wildfires is globally increasing, including in areas not previously affected, particularly due to climate change and land-use change.¹⁰⁴ Between 2003 and 2018, between 29 and 37 per cent of the global forest was lost due to fires.¹⁰⁵

Human-induced fires globally mostly result from land management practices.¹⁰⁶ In many areas, fires can be a result of land use demands.¹⁰⁷ Wildfires in tropical forests have increased sharply since the 1980s when fire started being increasingly used in large-scale deforestation generally driven by more industrial uses. Globalization of commercial trade for timber, oil palm, beef, and crops is often pointed to as a major driver for this type of deforestation. For example, in the Amazon the use of fire, often illegally, is a leading means of clearing land for oil palm and wood fibre plantations.¹⁰⁸ Globally, 90 per cent of forest fires are human induced, resulting from either negligence or arson.¹⁰⁹

Illegal land use change and illegal logging through manipulating permit issuing

Once the land use change has been set, logging companies typically need to apply for a permit to carry out deforestation or logging activities. An illegal practice identified includes a false declaration from the applicant, mirrored by a lack of due diligence from the affiliated public official. False declarations may concern the landowner's consent, the location of the declared area, the type of species present, the volumes to be harvested or the harvesting techniques used, and the intended use of the natural resources.^{110, 111}

The role of businesses carrying out environmental impact assessments in this phase can be key, as they can enable the actor requesting the permit to circumvent the complex web of regulations in place that are designed to prevent illegal logging and deforestation. These assessments can be misused to legitimize to what in reality is illegal. A study conducted in Viet Nam, for example, where environmental assessments are required for logging or land clearing permits to be issued, showed that these assessments may misrepresent rich forests as poor ones, either by deliberately selecting poor zones in the forests to sample forest quality, and/or skipping some of the required procedures, influencing the forest evaluators or bribing officials that serve as evaluation supervisors.¹¹² On the other side, corrupt public officials may fail to conduct due diligence on the information provided, either by breaching or ignoring existing law.¹¹³

False declarations also can concern the consent of the landowner, whether a corporation, a community, or an indigenous group. International legislation on the rights of indigenous communities, along with some national legislation, require the Free, Prior and Informed Consent (FPIC) of landowners to decide on the use of the resources in the area of interest.^{114, 115} In order to circumvent this requirement, permit requestors may either fail to obtain consent from landowners, or use fraud, deceit, threats or coercion to extort it.¹¹⁶

Corruption and fraud appear as key enablers of crime at this stage, where interested actors infiltrate public procedures to obtain permits. Businesses and other beneficiaries of land use change and illegal logging resort to bribery and abuse of power to circumvent

legally required processes for the award of permits, manipulate environmental impact assessments, and influence the selection of bids.¹¹⁷

The use of proxy companies by entities that would otherwise be ineligible has also been identified among the adopted *modi operandi*, suggesting a high level of professionalization of those engaged in such activities. Proxy companies also engage in cover activities. In some countries in South-eastern Asia for instance, a high proportion of exported timber is harvested under agricultural permits.¹¹⁸ In such instances, permits are often issued for plantation purposes, but crops are never planted because the primary purpose is to harvest and export timber that would have not been accessible through logging permits.¹¹⁹

In such cases, illegal deforestation and logging come under the disguise of licit agriculture or livestock activities. A recent study conducted in the Lao People's Democratic Republic found half of the forest loss registered in recent years took place under commercial agriculture permits that were not compliant with national laws and regulations. The main types of illegality included size exceeding maximum limits, lack of environmental impact assessments, clearance of forests beyond concession boundaries, corruption in granting concessions, and failure to pay compensation due to villagers.¹²⁰

Practices associated with illegal timber harvesting

Figure 8 – Harvesting practices associated with illegal timber harvesting



Source: UNODC consolidation of evidence from the sources cited throughout this study.

Timber is either harvested through clear or selective cutting techniques. Clear cutting practices bear a high risk of erosion, landslides, and severe degradation of the soil, which can lead to forest loss. Selective cutting refers to the harvesting of highly valued tree species, which, if done unsustainably, can lead to loss of biodiversity and cause long-term changes to forest.¹²¹ Where selective cutting techniques are used, harvesting techniques can start with the construction of small clearings in rich areas, and long phases of identification and marking of the species of interest for later harvest.

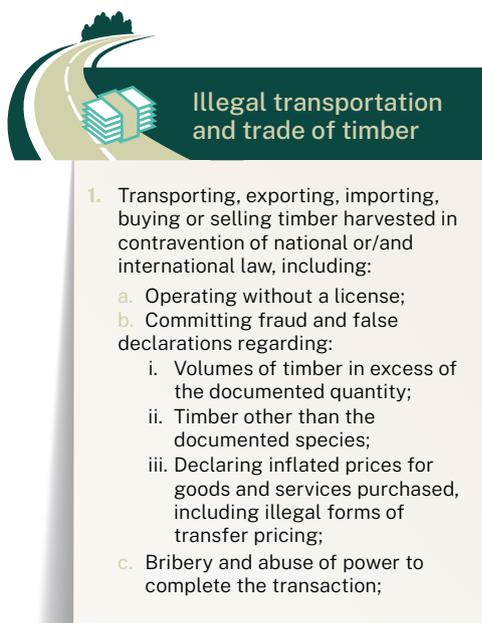
According to one study conducted in Latin America, loggers may adopt different tactics to reduce the risk of detection when harvesting timber illegally. This includes cutting timber out slowly rather than accumulating large quantities, operating when aerial views are obscured (at night or in the rainy season), or cutting only the most valuable timber while leaving the bulk of the forest coverage intact.¹²² Where clear quotas for log harvesting are established and regularly

monitored, professional loggers can divide the illegal timber volumes into small fractions for each individual logger, to circumvent controls and risk only administrative fines if detected.¹²³

According to another study, additional tactics are used in Viet Nam when logging is conducted in protected forests where checkpoints may regulate access of visitors and equipment. In such settings, small-scale activities are conducted by hiding dismantled chainsaws inside backpacks and passing off petrol as drinking water.¹²⁴ When the target trees are positioned in such a way that makes cutting difficult, they can be poisoned or burned slowly, which means the timber cannot be sold, but enables the deforestation of the land for later use.¹²⁵

Transportation and trade of illegal timber

Figure 9 – Illegal transport and trade of timber



Source: UNODC consolidation of evidence from the sources cited throughout this study.

Once harvested, timber is transported via land or river from the harvesting area to a log yard and/or a sawmill. To avoid the risk of detection of illegal timber being transported, various techniques to conceal illegal timber have been adopted. At the border between Guatemala and Mexico for instance, one study found

that logs are transported via land on modified pick-up trucks, designed to conceal the type or quantity of logs. Further, transportation companies have been found to facilitate timber laundering and commercialization and may sometimes also be responsible for administering bribes to forest and border guards when they perform routine checks.¹²⁶ In the case of Colombia, one study found that a few timber supply chains have been infiltrated by organized crime groups (OCGs), which have imposed illegal levies on transportation, indicating their influence over some specific segments of the timber supply chain.¹²⁷

Moving logs along less monitored trade routes is another way to reduce the detection of trade in illegally sourced timber and derived products. For instance, one study in Cambodia identified the role of Special Economic Zones (SEZ) – created in part to streamline inspections – in offering additional opportunities for laundering the timber and concealing it among licit products.¹²⁸ Corruption can also play a part in lowering the risk of detection; in UNODC’s field research in Nigeria, interviewees indicated bribes were paid along the transportation route of illegal logs to ensure the authorities would look the other way.¹²⁹

Processing of illegal timber

Figure 10 – Illegal activities in timber processing



Source: UNODC consolidation of evidence from the sources cited throughout this study.

The processing of illegal timber may take place either in sawmills or in primary and secondary processing enterprises. Processing legally and illegally sourced timber together provides an opportunity to ‘launder’ illegal timber, by introducing it into the legal supply chain. Once processed, products are then either moved from processing to the point of sale or exported for further processing and then reimported, often across multiple economies, before reaching the final point of sale. At each stage, illegally harvested timber and derived products can enter the legal supply chain. The complexity of these supply chains offers a conducive environment for criminal practice.¹³⁰

Timber laundering serves to hide illegally sourced timber in the legal supply chain as well as to avoid taxes by misreporting species, value, volume, etc. In Peru, for example, timber laundering can be accompanied by tax fraud, as companies falsify their accounts in order to hide the illegally extracted timber; women and men who work as accountants in sawmills and other primary and secondary processing enterprises may be directly involved in the fraud.¹³¹

Actors

A diverse array of actors is involved in forest crimes, ranging from traditional organized crime groups to actors in the legal economy and individuals. They may serve as perpetrators, facilitators, or unwilling complicit buyers, traders, transporters or financiers. As in any other type of crime that affects the environment, the profile of perpetrators of illegal deforestation and logging tend to have structures that reflect the complex stages needed to acquire the timber or the product resulting from illegal deforestation or illegal logging, process it, transport it, and sell it. On the one hand, traditional organized crime groups expand and/or diversify their illegal activities to benefit from land use change/deforestation, the timber trade and related profitable markets involving environmentally sensitive commodities. These criminal groups usually have a hierarchical structure with a centralized command.

On the other hand, legitimate companies operating in the environmental sector shift towards illegal business practices and commit forest crime to increase their profits. From an organizational perspective they appear more flexible with decentralized chains of indi-

vidual suspects or clusters of various companies/criminal groups. Such structures better serve the purpose of timber trafficking and related crime. It is important to distinguish between OCGs that create and manipulate legal business facades (that are created and dissolved depending on the trafficking activities) and legal businesses that have parallel illegal businesses, businesses who may not do due diligence, those that unknowingly absorb illegal timber, and businesses that intentionally do so (see Figure 10 below).

In relation to illegal deforestation and logging, there is some evidence—detailed in the sections below—that organized criminal groups with and without legal front companies, legal corporations that engage in illegal practices, corrupt public officials, and individuals in resident populations can be involved to varying degrees. The evidence also indicates that these actors may not operate in isolation; for example, an OCG may sell timber to a corporation that knows that they are potentially buying illegally sourced timber. The relationships between all the actors can be fluid and flexible.

Figure 11 – UNODC elaboration of corporate engagement in criminal activity based on evidence in this study



The involvement of organized crime groups in forest crime is complex, and differs by motivation and degree of organization

There is a great variety within OCGs involved in forest crime. There are groups which are mainly profit oriented, groups that are politically motivated, and loosely connected networks. Some focus on one particular objective, e.g., trade in protected species, others are involved in multiple crimes, such as drug trafficking and illegal deforestation.

Organized crime groups in South America link drug trafficking and illegal deforestation

Recent studies have pointed to the potential involvement of OCGs in illegal deforestation in South America. While the direct impact of coca cultivation on deforestation has so far been negligible, a study recently conducted in Peru found clear signs of crime convergence and a potential uptick of these types of activities.¹³² The 2023 World Drug Report signalled that money laundering and financial crimes intimately connect drug trafficking and illegal deforestation. Through a process called “narco-deforestation”, drug trafficking profits are laundered into land speculation, the agriculture sector, cattle ranching and related infrastructure, posing a growing danger to the Amazon Forest.¹³³ According to one study, the reverse is also happening in the Amazon, where the profits from illegal logging made by an OCG are invested into coca cultivation and timber companies.¹³⁴

In the forest rich areas of Mexico and Guatemala, OCGs are involved in the extraction of both tropical and temperate tree species.^{135, 136} According to one recent study from Latin America, OCGs actively engage in the identification of forest areas of interest and approach the landowners to negotiate access. They resort to violence and threats to force the landowners to accept the terms of the agreements, which often include very low compensation. In some instances in which landowners did not accept the offer, the OCG performed the timber harvesting anyway, without offering any compensation. Despite these intimidations, landowners submitted several reports to national authorities, prompting inspection visits. Through a mix of threats, kidnappings and bribery, OCGs obtain the

silence and the complicit support of resident populations, corporations and state structures.¹³⁷

Examples of politically motivated organized crime groups in Africa

Politically-motivated organized crime groups are motivated by profit just as other OCGs, but the money typically funds their activities to maintain territory and challenge the government. Their role in illegal deforestation has not been documented, but an example of the involvement of politically-motivated OCGs in illegal logging and related trade can be found in the Democratic Republic of the Congo.¹³⁸ The Congo Basin holds the second-largest tropical forest in the world. This region has traditionally recorded low deforestation rates compared to other tropical forest, with a minor increase registered in 2021 (five per cent compared to the 2018-20 period).¹³⁹ The forests of the Congo Basin are also rich in rosewood, a CITES-protected species, which requires controlled exploitation through licensing. Politically-motivated organized crime groups control access to natural resources as part of their territorial presence. In such settings, these groups adopt state functions, regulating the entrance of resident populations for subsistence use and entering into agreements with intermediaries and traders for the larger exploitation of the trees.¹⁴⁰ Rosewood originating from these areas has been exported to Eastern Asia and Eastern Africa.¹⁴¹

Unlike illegal logging, illegal charcoal is largely provided to local markets.¹⁴² Politically-motivated organized crime groups are directly involved in the production of charcoal along the Congo Basin, with part of this production located inside the Virunga National Park.¹⁴³ In 2017, the UN Group of experts reported that the

most stable source of income generation for FDLR (Forces Democratiques de Liberation Du Rwanda, one of the largest foreign armed groups listed in the Sanctions List of individuals and entities subject to the measures imposed by the Security Council and adopted under Chapter VII of the Charter of the United Nations¹⁴⁴) remained the illegal taxation of charcoal.

The charcoal is either produced by local populations and/or local companies and then taxed by the FDLR or the FDLR sells charcoal it has produced itself.¹⁴⁵ The Acacia trees and bushes cover most of the green

areas in Somalia. Among them, the *Acacia bussei* is an evergreen, drought-tolerant hardwood which is especially used to produce high-quality charcoal. Besides domestic consumption, Somali charcoal fills a regional demand for low-scale household energy as well as the luxury market for shisha pipes and has become the country's second most-important export, after livestock.¹⁴⁶ In the first decade of the 2000s, part of these revenues financed Al-Shabaab activities through a taxation system. In 2011, the UN Monitoring Group on Somalia and Eritrea estimated that Al-Shabaab was generating “between \$35 million and \$50 million per year from port revenues, of which at least \$15 million based on trade in charcoal and sugar”.¹⁴⁷ In order to cut this stream of revenues, since 2012, the United Nations Security Council has adopted several resolutions imposing a ban on the import and export of Somali charcoal.^{148, 149, 150} Al-Shabaab's role in illegal charcoal trade is now peripheral. Domestic transportation of legally extracted charcoal is taxed at Al-Shabaab checkpoints, like any other economic activity, but it does not account for a large share of the group's revenues.¹⁵¹

Examples of loosely organized criminal networks

Loosely organized criminal networks, or disorganized crime,^{152, 153} work in a structured manner but without a strong hierarchical organization. For instance, in Nigeria farmers reportedly often organize in networks and cultivate cannabis close to each other (confirmed by satellite imagery). A UNODC study found “a clear relationship between cannabis cultivation and deforestation; 39 per cent of all cannabis fields detected in 2019, were cultivated on forest area cleared in the same year” in the country.¹⁵⁴ Other evidence of criminal networks comes from a study conducted in Viet Nam, which analysed the experience of professional loggers from resident populations and indigenous communities ensnared in wider networks involving timber-related businesses (wholesalers and brokers) and corrupt government officials.¹⁵⁵ In this case, a network of distinct but cooperating criminal actors controlled illegal trade in timber. Similarly, another study in Viet Nam identified networks of criminal actors rather than OCGs or other entities as the controlling party.¹⁵⁶

One case in Australia also provides evidence of criminal networks. Three defendants pleaded guilty to an offence relating to the aiding, abetting, counselling or

procuring of 208.5 tonnes of sandalwood (a protected tree species) for export.¹⁵⁷ No licence for export had been granted, in violation of section 11.2 of the Criminal Code Act 1995 (Cth) and section 8(3) of the Export Control Act 1982 (Cth). There is no indication of a larger structure or hierarchical organized crime structures behind the defendants in the illegal export; hence, in this case, the perpetration profile fits the definition of a criminal network.

Examples of legal corporations or businesses involved in illegal activities

Legitimate corporations or businesses running logging operations, or employees thereof, may engage in illegal activities to further their profits. In addition, companies may be established specifically for the purpose of profiting from the illegal market of timber. The latter can be seen as a distinct form of structured OCG that operates as a legal entity engaged in illegal activities.

In a case investigated in South America, a court judgement concluded that a group of private corporations and public officials had colluded to obtain the authorization to build a highway in the forest with the double effect of deforesting the area directly impacted by the construction works and degrading the nearby areas, opening the possibility for large scale logging activities.¹⁵⁸ In a different case investigated in South America, women employed in sawmills and timber processing industries are suspected of playing coordinating roles in an organized criminal group dedicated to illegal logging.¹⁵⁹

Evidence from the most recent *World Wildlife Crime Report* on rosewood trafficking in Nigeria also points to legitimate corporations as actors in illegal logging. Field research conducted in connection with this and previous UNODC reports has shown that rosewood traders from Asia were playing an active role in the country and that these traders were a heterogeneous group. Many of them were poor people who borrowed heavily to try their luck in the “frontier” of Africa and felt unable to return to their home country empty handed. In some parts of the region, they had engaged in the manual labour of logging themselves, while others had the resources to finance or equip sawmills of varying sophistication. During the rosewood boom,

better-resourced groups appeared primarily as buyers and traders from the larger urban areas, including some that appeared to be representatives of Asia-based timber firms, ranging from family-owned companies to larger corporations.¹⁶⁰

Beyond logging companies, other industries have also been investigated for illegal deforestation and logging. A government official from Latin America has claimed that construction companies deforest and open paths

to then allow illegal logging, as unveiled in a recent case in South America.¹⁶¹ Likewise in Viet Nam, the police laid criminal charges on a company which, after having obtained permission to log in areas designed for construction, logged outside the authorized zone. The logs illegally harvested were then mixed with the legal ones,¹⁶² providing another example of laundering of illegal timber into legal supply chains.

BOX 5: EXAMPLES OF TIMBER TRAFFICKING AND LACK OF COMPLIANCE WITH DUE DILIGENCE REQUIREMENTS INVOLVING CORPORATIONS

In a case recently first adjudicated in a Western European court, a lead company in the retail market for timber products for home and construction was convicted of importing illegally harvested wood from South America. The company failed to comply with the EU regulation on due diligence (the EUTR) and imported large quantities of high value timber, notably species recently listed in Appendix II of the Convention on the Illegal Trade in Endangered Species of Wild Fauna and Flora (which requires export permits and may be subject to quotas).¹⁶³ The financial transactions were mostly paid in cash and mediated by two timber processing companies. While the French retailer acquired the timber from a processor based in Northern America, the timber had been previously processed and exported in South America by another processing company acquiring timber from different providers.¹⁶⁴ The company was convicted of importing illegally harvested timber without complying with the necessary due diligence procedures. At that time, the company had a yearly turnover of more than 200 million euros.¹⁶⁵ Even in less concentrated markets, large numbers of SMEs of landowners, loggers, transporters or timber processors are eventually linked to large intermediaries and sellers at some point of the supply chain. The complexity of the trade flows adds several

layers of separation between the harvesting and retail process, which offer conducive grounds for fraud and timber-laundering activities when not duly tracked.

Private corporations dedicated to trade in illegal timber and derived products may seek to minimize the risk of detection by moving logs along less monitored trade routes. A recent case adjudicated by a Dutch court showed how three international corporations tried to circumvent regulations by creating shell companies in less monitored import areas. In 2018, trade authorities imposed an order for incremental penalty on one of the companies as it had failed to comply with the due diligence requirements. In order to avoid the increased monitoring that followed this penalty, the companies set up a shell company based in another European country. In 2022, the three corporations and their legal representatives (all men, aged 55+) were found guilty of having imported and commercialized illegally harvested teakwood from South-eastern Asia and from South America between 2017 and 2019. The courts found that the European traders had failed to comply with the principle of the due diligence system when importing teakwood into the EU, especially considering the high risk of corruption and the complexity of the supply chain.¹⁶⁶

Examples of misconduct and corruption by government officials

There are also examples of compromised government or public officials involved in illegal deforestation and logging. This may be as leaders of criminal activities or as facilitators for other criminal operations. Two court cases offer examples of how corruption of government officials has led to large scale illegal deforestation and logging activities.

In the first, public officials from regional and local governments in Peru were suspected to have led two large organized criminal groups. The groups counted on more than 30 members to commit illegal deforestation and logging offences in the Amazon until their arrest in 2023. They included men and women, aged between 25 and 57, originating from different regions within the country where the crime was committed. They had moved to the forest area for employment opportunities years before committing the crime. While most were men, the groups were led by fewer than five women serving in the public administration. The majority were public officials (23 out of 31) while the remaining members were employees or legal representatives of private enterprises. A court judgement concluded that these public officials had colluded to obtain the authorization to build a highway in the forest with the double effect of deforesting the area directly impacted by the construction works and degrading the nearby areas, opening up the possibility for large scale logging activities.¹⁶⁷

In the second case, in 2019, a law enforcement operation in Brazil led to the arrest of several members of an organized criminal group active in both timber harvesting and trade phases. High-level public officials (men) from different government agencies in charge of issuing permits, inspection and monitoring of forest management plans, and customs monitoring were suspected to be part of the organization, whose exact chain of command was still under investigation at the time of writing. The group also counted on independent experts providing their expertise to the businesses requesting the harvesting permits. The suspects issued permits for timber harvesting to several private enterprises of different sizes in violation of existing regulations, in exchange for bribes.¹⁶⁸ The fraudulent permits allowed several private enterprises to extract timber from federal public lands, including protected

areas, agriculture land and land under the ownership and management of an indigenous community. In addition to high level officials, lower-level public servants were also involved in the crime, expanding the circle of corruption, through active bribery schemes. Some analysts and technicians (of unknown gender) acted with deliberate slowness in the execution of their functions and requested bribes in exchange for their prompt collaboration. The group also facilitated transport and trade of the illegal timber by providing fraudulent transportation documents concealing the real origin of the timber for more than 60 private enterprises. The public officials used their technical expertise and public function to act as intermediaries between the private and the public sector. When in the first law enforcement operation timber cargoes were seized in 2017, the group's connection to other high-level officials and politicians was revealed. The public officials were waiving checks on the cargoes carrying the illegal timber by producing fraudulent inspection documents in exchange for bribes. In total, 22 people, including several public officials, were accused of being involved in the scheme.¹⁶⁹

Investigations have also shown the involvement of compromised government officials in illegal logging. In the early 2000s, investigations revealed evidence of involvement of the military in logging operations in Cambodia. Their level of involvement in organized crime spanned from directly running illegal logging operations, to providing security and cover for the operations. Members of the military were involved in a large, organized criminal group, which also included members of other security forces, private companies, and other government officials. Family and professional ties allowed the harvesting, processing, transportation and trade of high-value logs of CITES-listed species.¹⁷⁰

In a case in Viet Nam, engagement in illegal logging activities allowed local officials to acquire significant financial gains compared to other actors involved in the industry, suggesting the relevance of economic motives. Local officials managing permit issuing and checkpoints in forest areas received around 34 per cent of the total income accrued by the selling of illegal logs. Timber processors would need to work five days and loggers ten days to acquire the money that public officials were making in one day of illegal activity.¹⁷¹

Individuals of resident populations may engage in illegal timber harvesting for profit and/or to sustain their livelihoods

Individuals of resident populations and local communities may also engage in illegal harvesting activities under different conditions and with different levels of involvement. For instance, in Nigeria a traditional leader interviewed for the *World Wildlife Crime Report*, while lamenting the loss of trees, noted that illegal harvesting of rosewood provided employment to youth, and thus lowered crimes rates in the area.¹⁷² In one study in Viet Nam, the individuals illegally logging were not formally employed nor contracted as independent professionals, they worked in groups, and were well connected with different traders.¹⁷³ Earlier studies have revealed that sometimes loggers can only operate if they agree to enter exclusive relationships with specific organizations that protect them from forestry officials.¹⁷⁴

Court cases in SHERLOC and those shared with UNODC suggest that people arrested for illegal logging are mostly marginalized members of resident populations, indigenous communities or migrant workers.¹⁷⁵ ¹⁷⁶ Individuals who engage informally in timber harvesting and procure timber for several traders are the most prevalent offenders in the one set of administrative data and court cases reported to UNODC via an official request for information specifically conducted for the *Global Analysis on Crimes that Affect the Environment*. It is unknown whether these data reflect actual perpetration of illegal logging or reflect law enforcement response or some other factor.

In Albania for instance, between 2021 and 2022, 234 defendants were registered and 192 sent for judgement for crimes related to illegal cutting of forests (Art. 205, Criminal Code), destruction of forests by fire (Art. 206/a, *Ibid.*) and forest destruction by carelessness with fire (Art. 206/b, *Ibid.*). Most suspects and defendants were men, unemployed, with primary or secondary education, and originating from rural areas. The large majority of them had no criminal record at the time of the arrest.

BOX 6: WOMEN IN THE FORESTRY SECTOR

Almost 8.1 million people are estimated to be employed in the forestry and logging sector worldwide.¹⁷⁷ This figure cannot fully account for those in informal employment, which in some countries may represent 77 per cent of the forest related workforce.¹⁷⁸ Women comprise less than a quarter of total employment in forest related activity. Available statistics suggest that women workers are mostly engaged in administrative duties, the gathering of non-timber forest products or producing charcoal.¹⁷⁹ In Viet Nam, the dearth of data on women's participation in the sector has been considered an indication of the higher level of informality and limited recognition characterizing women's work vis-à-vis that of men.¹⁸⁰

Recent studies conducted in Honduras and Viet Nam show that while most workers employed in the timber harvesting and processing industry are men, women also participate in the industry and often hold roles at high risk of engagement in criminal activities. In Honduras, a regional study showed that women hold administrative, accounting, legal and management positions in timber processing SMEs. In a surveyed village in Honduras, women accounted for 32 per cent of hired labourers in the timber industry and 40 per cent in sawmills, or other small-scale primary and secondary processors. They oversee quality control in sawmills and are responsible for the acquisition of timber harvesting and processing permits. Women working in the analysed SMEs had reduced access to labour rights compared to their male colleagues, with some working without a contract or earning significantly less.¹⁸¹ Similarly, a study in Viet Nam found that women employed in the timber industry engage in key accounting and management roles but have lower job security, less remunerated jobs, less decision-making influence, less access to credit and technical assistance, and less opportunity to be represented in trade associations compared to their male colleagues.¹⁸² As mentioned, in a recent case investigated in South America, women employed in sawmills and timber processing industries were suspected to play the leading roles in an organized criminal group dedicated to illegal logging.¹⁸³

In Southern Africa, in the largest case shared with UNODC (available on SHERLOC), a group of 35 loggers was arrested in a national park in 2016. They were using equipment brought from neighbouring states worth half a million USD. The group included members of various nationalities from other countries in Southern Africa and East and South-eastern Asia. Some of the accused had also violated immigration regulations, suggesting that they might be residing irregularly in the country and potentially vulnerable to coercive practices by their employer.¹⁸⁴

Crimes associated with forest crimes and crime convergence

Illegal mining, violence, labour rights violations and corruption

The practice of illegal deforestation is rarely an end in itself; the objective of the perpetrator is not only to remove the tree cover or cause harm to the ecosystem, but to extract the valuable natural resource, and/or clear space for agricultural/livestock production and/or steal the land. As such, illegal deforestation and logging may be a byproduct of other illegal activity that has motivated deforestation in the first place.

Legal and illegal mining activities can occur in conjunction with illegal deforestation and illegal logging

Both legal and illegal mining activities can occur in conjunction with illegal deforestation and illegal logging. Studies have identified a strong connection between deforestation and mining activities, transcending their legal or illegal nature¹⁸⁵ and the rising demand for many mineral commodities may lead to an increasing risk of deforestation and forest degradation due to mining.¹⁸⁶ The lack of a universally accepted definition of illegal mining, however, poses challenges when it comes to assessing the link between illegal deforestation and illegal mining activities.

Mining-related, illegal deforestation can be due to both the extraction of minerals and the mining activities at large. Firstly, the extraction of minerals is frequently preceded by land clearance, to dig the pit where the minerals will be extracted. The (illegal) dispersion of toxic chemicals for the extraction of minerals can have a dramatic effect on forest degradation,

increasing the risk of subsequent deforestation. Secondly, the construction of infrastructure for energy production, or for the processing and storage of extracted minerals, as well as the urbanization led by the incoming workforce may lead to deforestation and pave the way for future waves of forest loss, linked to the development of the road infrastructure needed to create access for heavy machinery.

Worldwide, between 10 and 33 per cent of the world's forest are estimated to be at risk of deforestation due to the presence of legal, unregulated or illegal mining activities.¹⁸⁷ Studies conducted in South-eastern Asia and South America have shown that a much higher rate of deforestation occurs in forest areas affected by mining sites compared to other forest areas.^{188,189} In 2015, 44 per cent of all operational large-scale mines (1,539) were active in forest areas. The largest proportion of forest mining (44 per cent of all mining) was found in South Asia. Large mining operations were active in South-eastern Asia and Melanesia, as well as in Eastern Europe, where 26 and 24 per cent of mining sites were located in forest areas respectively at the time of the study.¹⁹⁰

While a distinction between the impact of legal and illegal mining-related deforestation in the tropics is challenging, it has been found that such deforestation has increased in recent years. Between 2000 and 2020, an estimated 62 per cent of the total direct deforestation registered within mining areas affected tropical rain forests, and more than half of it occurred between 2016 and 2020.¹⁹¹ In the Amazon, more than 20 per cent of active mining sites (legal, unregulated

and illegal) are on indigenous lands. Indigenous lands affected by mining activities present a deforestation rate one to three times higher compared to indigenous lands with no mining.¹⁹²

Two commodities are currently driving industrial mining-related deforestation at the global level (71 per cent): gold and coal. Bauxite, iron, and copper also feature prominently in statistics on mining sites in forest areas but are often extracted with other minerals and hence hard to count.¹⁹³ The domestic markets of China, the European Union, and the US were estimated to drive 44 per cent of global deforestation related to mining activities.¹⁹⁴

In Western Africa, a police operation conducted by INTERPOL in 2023 led to the arrest of 52 suspects (among which 11 are considered high-level targets) accused of being part of an organized criminal group dedicated to commercial illegal mining activities. The operation led to the seizure of 18 trucks transporting large quantities of mining products. The investigation also found evidence of instances of child labour, as most people engaged in the mining activities were children aged between 12 and 16. The suspects are also accused of trafficking in mercury, pollution and illegal deforestation caused by the mining activities.¹⁹⁵

One study found that industrial mining-related deforestation also occurred in boreal (13 per cent) and temperate (nine per cent) forests.¹⁹⁶ According to this study, many of the top ten countries affected by such industrial mining-related deforestation are also countries affected by illegal logging.

Links to labour rights violations, trafficking in persons and violence

Illegal deforestation and logging can be harmful to and violent against the environment, resident populations, indigenous communities, and public officials engaged in combating the crime. Evidence from the legal industry documents human rights violations such as trafficking in persons, forced labour and gender-based violence. It is suspected then that illegal deforestation and logging, which have even less oversight, can also be associated with these human rights abuses.

A number of serious violations of fundamental rights in forestry work have been documented in recent years by the ILO, including use of child labour and bonded

labour.¹⁹⁷ Increasing attention has been devoted to the issue of child labour connected to illegal deforestation and illegal logging practices. A UN Report in Malaysia has widely documented the exploitation of children, and especially migrant children, in palm oil plantations resulting from illegal deforestation.¹⁹⁸ Child labour and trafficking in persons were also associated with logging operations in South-eastern Asia and Melanesia, where logging operations account for a large share of the economy and offer unique income-generation opportunities.¹⁹⁹

Deception has been documented as a recruitment strategy for loggers in Latvia and Mozambique.²⁰⁰ The deception can concern the legality of logging activities; after logging has started, it is then revealed as illegal and used as leverage against workers' grievances. The illegal nature of the work, sometimes coupled with the irregular residence status of the worker, can be used as a means of control, including in trafficking in persons. In a study recently conducted in Sub-Saharan Africa, interviewed workers reported being threatened by their employers with arrest.²⁰¹

Trafficking in persons for the purpose of forced labour in the logging industry is further characterized by a mechanism of indebtedness. Studies in Latin America explored how the condition of isolation creates a dependence on the employer and the conditions for abuse. Workers may be requested to pay for a recruitment fee that includes an advance for work clothes and equipment. Once on site, employers and their affiliates are the only providers of food, clothes and other consumption goods including first aid medicine. Workers then are coerced into debt bondage schemes where their salary is used to pay back the recruitment fees or buy food and goods at inflated prices, with excessive interest charges from their employer or recruiter.²⁰²

Logging activities are often conducted in remote areas. Loggers may be required to spend weeks or months in the forest area where the activity takes place. The concentration of adult men in confined areas, and especially in settings characterized by violence and exploitation of nature and people, has been associated in Asia with the emergence of sexual and gender violence targeting women and children.²⁰³ While representing a minor share of the workforce, women engage directly and indirectly in illegal logging activities. In the case of logging camps, trafficking of girls

and young women for the purpose of sexual exploitation has been recently documented in various settings from Melanesia to South America.²⁰⁴

Killings of environmental defenders

Policy and research on the nature and scope of homicides on environmental defenders predominantly rely on data collected by the non-governmental organization (NGO) Global Witness, which has been estimating the number of homicides of environmental defenders globally since 2012.

Despite these limitations, according to Global Witness there have been 1,733 killings of environmental defenders globally since 2012, with 39 per cent of the victims being indigenous and 11 per cent being women. The Americas appears to account for the majority of those homicides, with 68 per cent, Africa, with 6 per cent, and Europe and Oceania, each with less than 1 per cent.²⁰⁵

While it is challenging to estimate the number of killings directly related to illegal deforestation and illegal logging, a case study in the Amazon basin provides evidence of the relevance of homicide to forest crime.

BOX 7: CONVERGENCE OF CRIME IN THE AMAZON BASIN: ILLEGAL MINING, DEFORESTATION AND ATTACKS AGAINST ENVIRONMENTAL DEFENDERS²⁰⁶

In some parts of Latin America, organized criminal groups are involved in an array of illicit activities beyond drug trafficking that have a significant negative impact on the environment and create violence hotspots. The Amazon Basin is a region where drug trafficking organizations perpetrate crimes that affect the environment beyond deforestation.²⁰⁷

The convergence of crime in the Amazon Basin continues to happen in a context where there is limited law enforcement, a diversity of criminal actors and a scarcity of meaningful economic alternatives for the local population. Indigenous people and other minorities are disproportionately affected by the criminal nexus in the Amazon Basin, as they suffer forced displacement and increased exposure to violence and victimization.

In recent years, border areas have been cleared to make way for coca production, illegal logging and gold extraction, which creates a breeding ground for corruption, financial crimes and both lethal and non-lethal violence. The proliferation of criminal activities in border areas gives rise to a host of security and health risks, leaving local populations entangled in criminal enterprises. Young males from impoverished backgrounds who lack stable employment are particularly vulnerable to recruitment by criminal groups.

Many municipalities in the Amazon Basin record rates of criminal violence higher than the national average

of the countries in which they are located. In 2021, municipalities in Brazil's Legal Amazon registered some of the highest homicide rates in the country, which resulted in a regional average of 29.6 homicides per 100,000 population,²⁰⁸ compared with the national average of 21.3. This can be explained in part by competition between rival criminal factions competing for control over the production, distribution and retail of drugs.

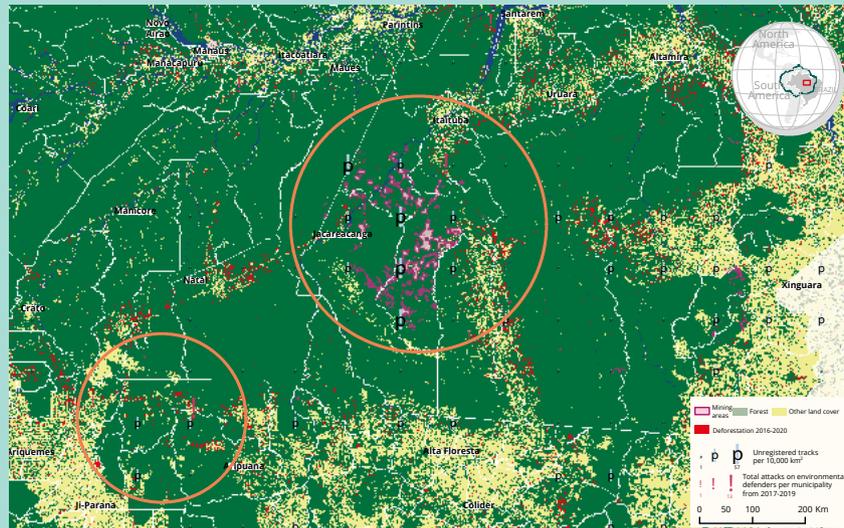
There have been numerous instances in which law enforcement officials, journalists and environmental activists have uncovered how criminal groups have illegally purchased land to support illegal logging operations in countries in the Amazon Basin.²⁰⁹ The media and non-governmental organizations have also reported on escalating disputes between drug trafficking groups and traditional communities in the Amazon, leading to assassinations, assassination attempts, death threats and violent and non-violent protests.²¹⁰ Moreover, killings of and attacks against environmental defenders have been reported in Brazil and Colombia (see maps).

In Brazil, the world's largest indigenous territory is home to the Yanomami people. Mining on indigenous lands in Brazil expanded by 625 per cent between 2011 and 2021²¹¹ and members of *Primeiro Comando da Capital* have become increasingly involved in mining operations across Yanomami territory, as well as

in drug trafficking and sexual exploitation.²¹² This has had devastating consequences for indigenous communities that rely on fish from local rivers contaminated with mercury as a result of the mining activities. Indigenous communities in neighbouring countries in the Amazon Basin have also been affected by the

involvement of criminal groups. Media reports and research studies in Colombia, for example, have documented how armed groups frequently target indigenous and community leaders in the Amazon Basin in relation to land disputes.²¹³

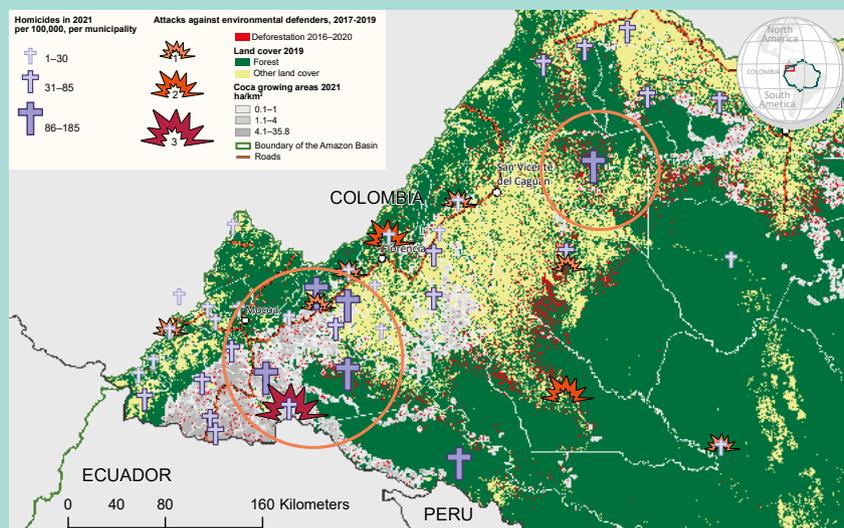
Illegal mining, unregistered airstrips, attacks against environmental defenders and deforestation in Brazil



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Sources: Base Cartography of Brazil and Administrative boundaries: Brazilian Institute of Geography and Statistics (IBGE) and Geoportal Provita, 2023. Boundary of the Amazon Basin: the Amazon Network of Georeferenced Socioenvironmental Information (RAISG, 2020). Forest/land cover: Copernicus Global Land Service, 2019. Attacks against environmental defenders: Tierra de Residentes, 2023. Mining and deforestation data: RAISG, 2020/2021. Unregistered tracks: plataforma.brasil.mapbiomas.org, 2023.

Coca cultivation, violence and deforestation in the eastern part of the Colombian Amazon



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Sources: UNODC survey on coca cultivation 2021; Base cartography of Colombia and administrative boundaries: Agustin Codazzi Geographic Institute –IGAC and the National Geostatistical Framework of the National Administrative Department of Statistics (DANE, 2021). Limit of the Amazon Basin: the Amazon Network of Georeferenced Socioenvironmental Information and deforestation data (RAISG, 2020/2021). Attacks against environmental defenders: Tierra de residentes, 2023. Homicides: Policía Nacional de Colombia.

Corruption

In the cases of illegal deforestation and illegal logging, as well as forest loss more broadly, corruption takes place at every stage.^{214, 215} Corruption linked to forest loss is not only related to trees and land but is more fundamentally related to conflicting interests, which compete for opportunities to utilize forest land, and how these conflicts are handled. The vulnerability of forests to corruption stems from their value, the strong opposing forces of public and private interests seeking to realize this value and the opportunities to profit from exploiting forest management processes.²¹⁶ In regard to illegal logging specifically, a study conducted in the early 2010s suggests that corruption occurs most commonly at the point of harvest (50 per cent of instances), followed by the timber processing (27 per cent) and transportation (23 per cent) phases.²¹⁷

Corruption, taking the form of active and passive bribery, embezzlement, abuse of functions, illicit enrichment and trading in influence, is a necessary element for the crime to be committed.²¹⁸ The main criminal actor employs active and passive bribery to capture public officials and regulatory structures to obtain falsified documents necessary to utilize land (for logging or change in land use). In the case of legal, corporate involvement this might be done with licit funds, in the case of OCGs with illegally obtained money. Other captured public officials can be more peripherally engaged on an ad-hoc basis through trade in influence and abuse of function.

Omissive behaviours—the act of refraining from acting in the exercise of one’s public duty²¹⁹—as well as proactive behaviours enabling crime by public officials are typically the result of either passive or active bribery and trade in influence. In the case of illegal deforestation due to human-induced fire for instance, omissions typically result in the violation of forest fire prevention measures, and include failure to:

- submit regular reports on and equip the required tools for forest fire prevention,
- establish forest fire prevention teams,
- establish forest land usage records.

Proactive behaviours are instead related to the issuing of land concessions that characterize both illegal deforestation and illegal logging activities. In order to force land conversion or initiate logging activities in protected areas, criminal enterprises need to circumvent the forest management regulations. Bribed public officials may abuse their function or position to commit fraud in the land use designation or issuance of logging and/or land conversion permits contrary to the relevant regulations or by waiving the requirements for specific licences.

As is the case for other crimes that affect the environment, such as wildlife trafficking, when the judiciary is captured by organized criminal groups, corruption may lead to acquittals and/or lenient sentences for those rare instances where the perpetrators of illegal deforestation and illegal logging activities are brought to court.²²⁰

Financial interest and profit-seeking behaviours consolidate public-private collusive practices. Corruption practices appear to be sensitive to market dynamics, among others. One study found that sometimes when prices decline, some private entities use corruption to cut costs and maintain returns to investment in machinery and distribution infrastructure.²²¹ On the other side, corruption in forestry governance also has significant indirect effects on tax revenues. As an FAO report recently noted, “it is rare for governments to collect more than 20 per cent of their entitlements due to corruption and systematic evasion.”²²² The World Bank estimates the lost forestry tax revenue in 56 countries – including the world largest producers – to be between six and nine million USD in total, representing a large share of the tax revenues in the sector but a minimal share of GDP in most countries.²²³ Notable exceptions include trade in CITES-listed species from small countries. In a UNODC threat assessment for CITES in The Gambia, for instance, the value of yearly illegal exports of rosewood were estimated to be worth about half of the country’s total export, ten per cent of its GDP, and more than 20 times the budget of the Ministry of Environment.²²⁴ Other types of financial crimes are also instrumental in amplifying the magnitude of the crime both in terms of environmental impact and illegal proceeds: tax fraud, money laundering and illicit financial flows fuel the cycle of corruption necessary to maintain the activities and allow proceeds to be reinvested and the business to expand.²²⁵

Money laundering and other financial crimes

Financial crimes are systematically associated with large-scale illegal deforestation and logging operations. The complexity of the supply chain requires access to and transfer of large financial resources. While logging activities or timber processing may be poorly remunerated, legal and illegal trade is highly lucrative.²²⁶ Perpetrators typically use both the informal and formal financial sectors, relying on a number of intermediaries to move the money through various accounts and financial institutions in order to create as many layers as possible between the commission of the crime and the account where the funds are placed following the sale of the illegal goods.²²⁷ For instance, front companies often related to timber markets are used to commingle gains from the illegal activities (see Spotlight: Brazil – part of the *Global Analysis*). Key actors in this phase are financial institutions and trade regulators, including freight forwarders, insurers and customs brokers.²²⁸

Key *modi operandi* may include:²²⁹

- The concealment of the source of the criminal money through dishonest tax reporting.
- The use of transfer pricing to sell large amounts of illegally harvested goods at artificially low prices to affiliates, for tax evasion purposes. The affiliates then sell the materials to actual buyers at market value.
- The delivering of fake invoices and hedging contracts.
- The exploitation of offshore jurisdictions with less strict or no anti-money-laundering standards.
- The falsification of documentation related to trade transactions to justify financial flows.

Trade-based fraud is also reported as common, including the use of shell and front companies to launder gains or circumvent regulations.²³⁰ In a recently investigated case of illegal logging, financial investigations confirmed that payments from buyers in Northern Europe were channelled through Eastern European and South-eastern Asian countries before reaching the sellers in South-eastern Asia.²³¹

Conclusions and policy implications

Knowledge production

More and better data are needed to ensure the effective protection of the world's forests against forest crime. While environmental assessments offer a clear picture of the devastating effects that illegal deforestation have on nature and people, little is still known about the extent of the phenomenon, the profile and motives of perpetrators, and the effectiveness of the criminal justice response to prevent and combat these crimes.

This study represents a first attempt to consolidate the global knowledge on illegal deforestation and illegal logging. The limited environmental literacy of

the criminal justice system and capacity to collaborate with experts has been pointed out among the factors hampering effective prosecution. Information and data are now essential allies in the fight against crimes that affect the environment.

While effective prosecution may prevent individuals from reoffending, few remedies can be offered to restore the damage to the ecosystem. A better understanding of the crime can drive the shift from reactive to proactive response and prevent the crime from happening in the first place.

BOX 8: INTERNATIONAL LEGAL AND POLICY FRAMEWORK

Despite the lack of a global commitment on forest preservation, in recent decades, several countries have adopted more stringent legal and regulatory frameworks related to the prevention, investigation, and prosecution of illegal deforestation and illegal logging. The different elements of illegality associated with deforestation, logging and timber trade are hence captured by a complex framework of international, national, regional and local legislation. They include those policy instruments that have been driving the global agenda to promote sustainable use of forest and protection of biodiversity, bilateral and multilateral agreements on Biotrade, national and local laws related to land tenure, human rights, exports and conservation of wildlife and forests, as well as administrative laws regulating the terms of licences or concessions for logging or land conversion in specific areas, and international human rights and customary law.

Main international instruments:^{232, 233}

- **The 2030 Agenda for Sustainable Development's SDG 15** focuses specifically on "Life on Land" and aims to protect, restore, and promote the sustainable use of terrestrial ecosystems, including forests. Target 15.2 of SDG 15 specifically addresses the need to promote the implementation of sustainable forest management to combat deforestation, restore degraded forests, and increase afforestation and reforestation efforts.
- **The United Nations Forest Instrument** was adopted by the United Nations Forum on Forests and the General Assembly in 2007. It sets out four shared global objectives on forests and 44 national and international policies, measures and actions to implement sustainable forest management and enhance the contribution of forests to the 2030 Agenda.

- **The UN Strategic Plan for Forests 2017–2030** provides a global framework for action at all levels to sustainably manage all types of forests and trees outside forests, and to halt deforestation and forest degradation. Adopted by the UN General Assembly on 27 April 2017, the plan features a set of six Global Forest Goals and 26 associated targets to be reached by 2030. It includes a target to increase forest area by three per cent worldwide by 2030.
- **The Convention on Biological Diversity [CBD] (1992)** promotes the conservation and sustainable use of biological diversity, as well as the fair and equitable sharing of the benefits arising from the utilization of genetic resources. The CBD encourages conservation efforts through enhanced cooperation, and by setting targets and goals for reducing the rate of biodiversity loss and promoting the conservation and sustainable use of forests.
- **The Convention on International Trade in Endangered Species of Wild Fauna and Flora [CITES] (1975)** is a multilateral treaty to protect endangered plants and animals from the threats of excessive international trade. It includes many forest species of fauna and some timber species among the protected species. Members of CITES are required to ensure their domestic legislation is compliant with the Convention, including by regulating trade of species listed in one of its three appendices.
- **The International Tropical Timber Agreement [ITTA] (2011)** provides a framework for cooperation between tropical timber producers and consumers and encourages the development of national policies aimed at sustainable utilization and conservation of tropical forests.
- **The United Nations Framework Convention on Climate Change** promotes the stabilization of greenhouse gas concentrations “at a level that would prevent dangerous anthropogenic (human induced) interference with the climate system.”
- **The United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa** recognizes the critical role of forests in preventing and mitigating these environmental challenges.
- **The Convention Concerning the Protection of the World Cultural and Natural Heritage (1972)** includes forested areas as designated World Heritage sites.
- **UN’s Guiding Principles on Business and Human Rights**, adopted in 2011, introduced the principle of corporate responsibility to respect human rights in operations and supply chains.

Legislative protection

The legislative-sustainability nexus requires applicable frameworks to not only criminalize illegal deforestation and illegal logging, but to also actively promote sustainable and inclusive forest management practices. In some settings, full compliance with administrative requirements may not guarantee sustainable forest management practices. In others, legislative requirements may be so convoluted as to consistently reduce access to sustainable and legal forest management practices, with detrimental effects on the ecosystem.²³⁴ Normative frameworks must aim at reducing the incidence of illegality in the sector while at the same time promoting sustainable and inclusive forest management.

Lack of transparency in permit issuing and unclear land tenure rights create opportunities for corruption

and fraud. The complexity of administrative procedures regulating forest use are often a barrier to those among resident populations and indigenous communities who wish to engage in forestry activities, further exacerbating their vulnerability vis-à-vis criminal actors.²³⁵ For instance, in Cameroon one study found the costs of procuring a licence discourages many small-scale actors in local communities from registering as an official business, increasing their dependence on more powerful and better-connected operators.²³⁶

Economically resilient communities offer the best protection against criminal activities. Corporations involved in illegal activities and organized criminal groups engaged in forest crime find conducive grounds in communities that have limited access to credit and income-generating activities. In marginal-

ized settings, such actors may be the only provider of credit to those households who engage in small-scale logging activities, with high risks of debt bondage and trafficking in persons for the purpose of forced criminality.²³⁷

INCLUSIVE AND SUSTAINABLE FOREST MANAGEMENT PRACTICES

- Facilitate community control over forests, for instance by ensuring forest and market access for rural communities, and promote small-scale forest use.
- Support the participation of non-governmental organizations in forest management and related activities and promote the formation of coalitions and associations of small operators, as counterweights to the influence of powerful actors.
- Build the capacity of forest community members for sustainable resource management.
- Provide greater availability of forest-adjacent sustainable livelihoods and alternative development opportunities to agriculture, cattle and wood production, and mining extraction in communities vulnerable to illegal deforestation and logging.
- Make access to traceability and forestry oversight information available for all government institutions for greater monitoring and sustainable legal activities in the forest sector.

Public resources lost and resources needed to address the environmental damage

While profit and rent seeking motivate the involvement of private and public actors in illegal deforestation and logging offences, and necessity may motivate many individual actors, national authorities in charge of forest protection and monitoring often lament their limited financial and human resources. Economic losses occur due to tax frauds committed by those involved in illegal deforestation and logging, but also because of the costs associated with redressing the environmental damage caused by such activities and responding to their impact on health and human security, as well as the loss of development opportunities.

Law enforcement

Limited data are available on law enforcement and criminal justice responses to illegal deforestation and logging and their effectiveness. Law enforcement responses should target the major violators and consider carefully the systematic use of corruption and money laundering in the commission of these crimes. Law enforcement approaches aimed at restricting money laundering and trafficking linked to illegal forestry activities should target the actors who are likely to cause the greatest environmental harm, such as legal persons, by focusing on operators who make significant financial transactions.²³⁸

The fight against illegal deforestation and logging has seen a frontline engagement of resident populations, including indigenous communities, forest guards, and journalists.^{239, 240} The law enforcement and criminal justice system should support these efforts through partnerships and effective protection mechanisms for those who protect the world's forests against organized crime.

Corporate governance

Corporations active in agriculture, cattle and timber harvesting, processing, financing and trade have a significant risk of knowingly or unknowingly being associated with or involved in illegal deforestation and related activities. Court cases have unveiled the links of some large multinational corporations with illegal deforestation and logging.

Greater exchange of information between private and public sector actors can foster transnational cooperation in the prevention of the crime, such as more robust sharing and analysis of suspicious transaction reports at financial institutions²⁴¹ and more widely communicating the issuance of fines and notices to businesses. Demand-side solutions include adopting deforestation-free requirements along the supply chain, and improving transparency for agricultural commodities, wood and derived products, metals and minerals. They require transnational cooperation among private and public sectors actors facilitating the exchange of information and transparency on the source of the timber.

Concluding remarks

Forests regulate ecosystems, protect biodiversity, provide livelihoods and play an integral part in the carbon cycle. They also are complex ecosystems, where the loss of individual trees has consequences; trees communicate with and sustain each other through invisible networks of thread-like fungi in their roots;²⁴² so the loss of one tree from logging can impact the remaining trees. Furthermore, forests harbour most of Earth's terrestrial biodiversity.²⁴³ The United Nations Strategic Plan for Forests 2017-2030, provides a global framework for actions to increase the world's forests by 120 million hectares by 2030.²⁴⁴

Tackling forest crimes, including but not limited to illegal deforestation and illegal logging, is key to ensuring the protection and sustainable management of forests. Law enforcement activities dedicated to crime prevention through a human-rights-based approach and legal systems that acknowledge some sense of rights of other species (see Part 1 of the *Global Analysis* for the latter²⁴⁵) can make a difference for the preservation of the world's forests. Action needs to be rooted in more structural changes, aimed at strengthening the legality-sustainability nexus and promoting sustainable practices and inclusive development through normative reforms, capacity building and alternative development options.

In order to be successful, initiatives aimed at tackling illegal deforestation and illegal logging need to be rooted in anti-corruption strategies. As the motivations behind the involvement of public officials and the private sector in such crimes are likely to be context-dependent, more research is needed to truly understand the drivers of their engagement, and the role played by gender, age and ethnic determinants in shaping those relations.

As this study has shown, despite the number of countries that have criminalized forest offences and the increasing action by law enforcement authorities, the world's forests continue to be vulnerable to criminal activity. It is critical to understand how the criminal justice response, alternative and holistic approaches or a combination of the two can be most effective at preventing illegal deforestation and illegal logging and providing an effective and coordinated response to the triple planetary crises.

Regional Groupings

Africa

Eastern Africa – Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Malawi, Mauritius, Mozambique, Rwanda, Seychelles, Somalia, South Sudan, Uganda, United Republic of Tanzania, Zambia, Zimbabwe

Middle Africa – Angola, Cameroon, Central African Republic, Chad, Democratic Republic of the Congo, Equatorial Guinea, Gabon, Republic of the Congo, Sao Tome and Principe

Northern Africa – Algeria, Egypt, Libya, Morocco, Sudan, Tunisia

Southern Africa – Botswana, Eswatini, Lesotho, Namibia, South Africa

Western Africa – Benin, Burkina Faso, Cabo Verde, Cote d'Ivoire, Gambia (Republic of The), Ghana, Guinea, Guinea Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Togo

Americas

Caribbean – Antigua and Barbuda, Bahamas, Barbados, Cuba, Dominica, Dominican Republic, Grenada, Haiti, Jamaica, Saint Kitts and Nevis, Saint Lucia, Saint Vincent the Grenadines, Trinidad and Tobago

Central America – Belize, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama

Northern America – Canada, United States of America

South America – Argentina, Bolivia (Plurinational State of), Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay, Venezuela (Bolivarian Republic of)

Asia

Central Asia – Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan

Eastern Asia – China, Democratic People's Republic of Korea, Japan, Mongolia, Republic of Korea

South-eastern Asia – Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Singapore, Thailand, Timor-Leste, Viet Nam

Southern Asia – Afghanistan, Bangladesh, Bhutan, India, Iran (Islamic Republic of), Maldives, Nepal, Pakistan, Sri Lanka

Western Asia – Armenia, Azerbaijan, Bahrain, Cyprus, Georgia, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, Türkiye, United Arab Emirates, Yemen

Europe

Eastern Europe – Belarus, Bulgaria, Czechia, Hungary, Poland, Republic of Moldova, Romania, Russian Federation, Slovakia, Ukraine

Northern Europe – Denmark, Estonia, Finland, Iceland, Ireland, Latvia, Lithuania, Norway, Sweden, the United Kingdom of Great Britain and Northern Ireland

Southern Europe – Albania, Andorra, Bosnia and Herzegovina, Croatia, Greece, Italy, Malta, Montenegro, North Macedonia, Portugal, San Marino, Serbia, Slovenia, Spain

Western Europe – Austria, Belgium, France, Germany, Liechtenstein, Luxembourg, Monaco, Netherlands (Kingdom of the), Switzerland

Oceania

Australia and New Zealand – Australia, New Zealand

Melanesia – Fiji, Papua New Guinea, Solomon Islands, Vanuatu

Micronesia – Kiribati, Micronesia (Federated States of), Marshall Islands, Nauru, Palau

Polynesia – Samoa, Tonga, Tuvalu

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