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Protecting Forests From Conversion: The Essential Role of Supply-Side National Laws

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The growing demand in global markets for commodities like palm oil, soy and cocoa has a disastrous impact on forests, carbon emissions, as well as the lands and livelihoods of forest-dependent people. Governments, private sector, civil society and forest-dependent people have, separately or jointly, committed to voluntary actions to protect forests (e.g., pledges, zero deforestation commitments, certification standards). However, recent research shows that these voluntary commitments and standards have neither halted nor slowed deforestation. This demonstrates that they cannot stand alone. Alongside voluntary action, national legal frameworks that regulate forest conversion are crucial. This research explores the importance of national laws for reducing deforestation from forest-risk commodities and the legal options available to national law-makers to address competing demands for forested lands.

Keywords: forest conversion, law, supply chain, deforestation, land, voluntary commitments, forest risk commodity

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INTRODUCTION

Global demand for commodities like soy, cocoa, palm oil, beef, and minerals drives global tropical deforestation (FAO, 2016). Forests are being cleared and permanently converted to other land uses, predominantly agriculture but also mining and urbanization (Kissinger et al., 2012)—a process referred to in this paper as forest conversion. Forest conversion is the largest cause of global deforestation (Curtis et al., 2018) and intact forest landscapes[1] are not spared from land use change (Potapov et al., 2017).

Demand for forest-risk commodities[2] comes from both domestic and international markets (FAO, 2016). Therefore, policy measures to reduce forest conversion should come from both commodity-producing countries (supply-side) and commodity-consuming countries (demand-side) (Walker et al., 2013). On the demand side, the European Union (EU) is one of the major global importers of meat, soy and palm oil, and it is exploring ways to tackle its impact on deforestation (COWI A/S, 2018). However, the EU has yet to establish a binding regulation targeting forest-risk commodities.

[1] An intact forest landscape (IFL) is a seamless mosaic of forest and naturally treeless ecosystems with no remotely detected signs of human activity and a minimum area of 500 km^2 (Potapov et al., 2017).

[2] Forest-risk commodities are "globally traded goods and raw materials that originate from tropical forest ecosystems, either directly from forest areas, or from areas previously under forest cover whose extraction or production contributes significantly to global tropical deforestation and degradation" (Rautner et al., 2013).

In the current absence of international binding regulatory measures that directly address forest conversion, many actors on both the demand and supply side have adopted voluntary measures (COWI A/S, 2018). They include international policy declarations—such as Goal 15 of the Sustainable Development Goals and the 2014 New York Declaration on Forests; private-sector zero-deforestation commitments—such as the Consumer Goods Forum resolution to achieve zero net deforestation; public-private initiatives—such as the Tropical Forest Alliance 2020; and private certification standards—such as the Roundtable on Sustainable Palm Oil. Voluntary measures rely mostly on sustainability criteria, encompassing economic, social, and environmental requirements.

Voluntary measures have not yet proven effective in reducing deforestation [Donofrio et al., 2017; Food and Agriculture Organization of the United Nations (FAO), 2018; Haupt et al., 2018; Jopke and Schoneveld, 2018]. On their own, they have been found insufficient due to *inter alia* (i) the selective adoption of commitments and (ii) leakage. First, not all companies have adopted voluntary measures; some question the business need and others the costs of complying with sustainability criteria (Lambin et al., 2018). Small companies and farmers, in particular, face unmanageably high costs and administrative burdens. They are, therefore, not signing up to voluntary commitments, which can exclude them from profitable international markets (Jopke and Schoneveld, 2018; Lambin et al., 2018). Second, leakage is the displacement of deforestation from one location to another or from certain actors to others, due to measures that restrict deforestation within a limited geographic or production scope or among a limited group of actors (Delacote et al., 2016). Leakage is likely to occur when demand for forest-risk commodities is not reduced (Lambin et al., 2018).

Despite the limits of voluntary measures, they have a role to play. Voluntary measures fit within a policy mix that also includes demand-side regulations and national supply-side laws (see **Table 1**). Nonetheless, as demand-side regulations have been slow to materialize and voluntary measures are not yet achieving their aims, this article analyses opportunities presented by national supply-side laws to protect forests from conversion. National laws can particularly address the abovementioned failings of voluntary measures. First, national laws set a (minimum[3]) standard that all actors within a jurisdiction must adhere to, thereby preventing selective adoption (Brack and Wolosin, 2018). Focusing on national laws also grants producer countries the ability to set standards based on national context (COWI A/S, 2018). Setting this minimum standard also avoids leakage between actors. If designed to encompass all conversion activities, national laws can also minimize leakage between commodities. Nevertheless, stringent regulations in one country are a significant factor in leakage to others with less stringent standards (Gan and McCarl, 2007). This is because, depending on the rules established, national laws can either set up a framework to reduce or halt forest conversion, or encourage it (FAO, 2016).

ClientEarth's research analyzed national legal frameworks governing forest conversion in nine tropical countries, which all have a significant rate of deforestation: Brazil, Cameroon, Cote d'Ivoire, Gabon, Ghana, Liberia, Peru, Republic of Congo, and Vietnam. The research identified areas of legal weakness, including ambiguities, overlaps, and gaps that create risks for national forests. It found that supply-side legal frameworks involve laws of several different sectors, such as land, forest, agriculture, environment, mining and investment. This opens up the potential for laws to be unclear, incomplete or contradictory, which means forest conversion is ineffectively regulated (ClientEarth, 2018).

While recognizing differences between countries, and complexities of creating a unique set of rules, ClientEarth identified several key legal areas that require specific attention in all countries in order to achieve a comprehensive and clear national framework that regulates forest conversion and protects forests (ClientEarth, 2018). Section 2 describes ClientEarth's research findings on three of these areas: laws governing land allocation, forest clearance and protection of the environment. However, laws on paper are only the beginning. Therefore, we also identify complementary policy processes that enable supply-side laws to function. Section 3 draws out actionable recommendations for supply-side law reform to strengthen national laws for forest conversion.

POLICY OPTIONS AND IMPLICATIONS: NATIONAL SUPPLY-SIDE LAWS FOR REDUCING DEFORESTATION

Achieving a cohesive supply-side legal framework governing forest conversion across all sectors is challenging (Hewitt, 2013). Through a process of legal reform, national law-makers and other actors can undertake an exercise of balancing economic growth, food security, protection of forests and climate change mitigation. Acknowledging the importance of natural resources for development in many forested countries but considering the need to protect intact forests, this review concentrates on legal options for forest protection and their implications.

Allocation of Land—The Need for Clarity

Before implementing a project that includes forest conversion, all nine countries analyzed require a developer to have a right to use the land. When the government grants a land title for a project, the land may include forests. ClientEarth's legal analysis found that before allocating land, it is essential that the relevant authority has a clear understanding of whether the land under consideration contains forest, and if so, which areas of forested land cannot be allocated to land-use change and which can be converted, and under what conditions.

One legal instrument which can assist countries to map the forested land in their territory is land-use planning (de Wasseige et al., 2010). A land-use plan is a national document that provides information on the most appropriate use(s) of land [UN Economic Commission for Europe (UNECE), 2008]. The zoning of forested land is particularly important because it has to balance economic, sustainable development, food security, as well as environmental interests and equity considerations. It should be acknowledged that achieving this balance in practice

[3]See e.g., the discussion in Brack and Wolosin, 2018 of how a legality approach can "act as a stepping-stone" to sustainability.

TABLE 1 | Complementarity of policy options for deforestation.

Policy measures and their roles	Binding nature	Select challenges	How can voluntary measures address the selected challenges?	How can national supply-side laws address the selected challenges?	How can demand-side laws address the selected challenges?
Voluntary measures Role: Frontrunner actors make a commitment to zero deforestation from their supply chains.	Voluntary	Selective adoption of commitments by countries and companies. Leakage, where deforestation from one region/area, commodity or actor is displaced to another.		Set a standard for forest conversion to which all actors within a jurisdiction must adhere. A single standard aligns requirements across different sectors, minimizing leakage.	Set a standard to which all companies wishing to sell products to that country or region must adhere. If covering all/most deforestation-risk commodities, aligns requirements, minimizing leakage between sectors.
National supply-side laws Role: set a nationally-determined standard to which all actors involved in forest conversion must adhere.	Mandatory	If national laws are not ambitious, clear nor comprehensive, there may be no reduction in forest conversion. Weak enforcement limits impact of laws. Leakage, where companies move production to countries with weaker laws and/or enforcement.	Voluntary measures that are more stringent than national laws can build the ambition of national actors to strengthen laws.		Incentive to strengthen national laws if countries wish to remain competitive in markets applying demand-side standards. If covering all/most deforestation-risk commodities, aligns requirements, minimizing leakage between sectors.
Demand-side laws Role: Reduce demand for products associated with deforestation, ensuring trade is used as a means of reducing deforestation in supply chains.	Mandatory	Slow to materialize (French law on the corporate duty of vigilance one of the few) Leakage, where companies sell commodities at risk of deforestation to regions and countries with weaker standards.	Voluntary measures that are more stringent than demand-side laws can build the ambition of demand-side actors.	Frontrunner supply-side countries reduce deforestation from their supply chains. Strong legal frameworks supply-side countries may increase the ambition of demand-side standards.	

has proven a challenge for many tropical forested countries (Nana Inkoom et al., 2017).

In the absence of, or in addition to land-use planning, sectoral laws on forestry, land, agriculture and mining may address land allocation; however, these laws are often contradictory and open to conflicting interpretations (Sartoretto et al., 2017). For instance, forest laws may clearly specify which forested lands should remain permanently forested. In Liberia, the Protected Forest Areas Network Law prohibits prospecting, mining and farming in national parks, nature reserves, communal forests and cultural sites (Republic of Liberia, 2003). However, in other countries, such as Gabon, the forest legislation does not provide for any permit to convert forests, which makes it more difficult to know whether particular forests can or cannot be converted (Sartoretto et al., 2017).

Even where forest laws provide protection from conversion to certain categories of forests, laws from other land-use sectors may contradict them. In Ghana, laws and policies across sectors give contradictory information on whether mining is permitted in forest reserves. The National Land Policy bans mining outright in forest reserves (Ghana Ministry of Lands and Forestry, 1999). The Forest and Wildlife Policy implies that mining is permitted in forest reserves, within limits (Ghana Ministry of Lands and Natural Resources, 2012). The Minerals and Mining Act limits the land available for mineral rights, however, these limits do not include a restriction on mining in forest reserves (Republic of Ghana, 2006). This legal confusion has meant some mining exploration has already begun. We, therefore, suggest it is essential that forest land banned from being allocated to conversion projects under forest law is also recognized in other sectoral laws.

Coherent laws that clearly specify which forests may not be converted offer an opportunity to protect intact forests or forests with biologically important ecosystems. Research has demonstrated that the loss of intact forests were lower in protected areas where enforcement was strong, than outside protected areas (Potapov et al., 2017). Where strong enforcement is lacking, land may be granted to conversion projects even in designated protected areas and national parks, as has been seen in Gabon (Gabonese Republic, 2012).

Clearing Forested Land—The Need for a Permit

A clearance permit provides the right to deforest in order to use forested land for another purpose (Hewitt, 2013). ClientEarth's research found that a clearance permit can represent a crucial step in the forest-conversion process if it requires due consideration of whether it is appropriate to clear an area of forest for another use.

ClientEarth's legal analysis found that it is important for the law to establish clear rules about where, when, how and by whom clearance can take place – but that this has been challenging in practice. Without clarity, state authorities can operate under different mandates and according to different rules. In Liberia, for example, the Minerals and Mining Law gives authority to the Minister for Mines to authorize clearing trees and shrubs "necessary for the mineral rights holder's activities outside the boundaries of his license or licenses" (Republic of Liberia, 2000). This is incoherent with the forest law, which designates the forestry administration as the representative of Government in any matter concerning the use of forest (Republic of Liberia, 2006).

ClientEarth's research also found that clearance permits may be inappropriately used for the sole aim of selling the timber, particularly if they are easier or quicker to obtain than a selective logging permit. This is undesirable as clear-cutting a forest for timber is more environmentally destructive than selective logging (Edwards et al., 2014). For example, in the Republic of Congo, a conversion project can access rights to clear timber more easily than a logging concessionaire (Sartoretto et al., 2017), and may freely dispose of the timber stemming from forest clearance (Republic of Congo, 2000). According to the country's Independent Monitor[4], five companies obtained a forest clearance permit and have been found to use this permit simply to commercialize high-value timber, seemingly without the intention to undertake the planned agricultural activities (Independent Monitor of the FLEGT-VPA in the Independent Monitor of the FLEGT-VPA in the Republic of Congo, 2017). In order to avoid this, clearance permits can include a requirement to develop the land within a certain timeframe. Companies in violation of this requirement may face a penalty.

Environmental Protection—The Need for Consideration

Environmental protections can be established in law to reduce forest loss, and anticipate and mitigate environmental impacts of agricultural, mining or infrastructure projects. While many environmental legal tools may impact upon forests, two are of interest here.

The first is the environmental (and social) impact assessment (ESIA) that grants an opportunity 1) to assess a conversion project in its proposed form before decisions are made to commit to that project, and 2) to investigate mitigating measures to reduce environmental issues identified in that assessment (Morgan, 2012; FAO, 2016). ESIA laws should also establish clear grounds on which to refuse an environmental permit. However, to be effective, the practical details of how the ESIA process should proceed and what it should include must be explicit in the law itself. In Gabon, by contrast, details of the ESIA process are established in the Manual of Procedures for ESIAs and in the Guidance on Implementation of the Manual of Procedures, neither of which are legally binding (Biotope, 2015; Gabonese Republic, 2015). This can make it harder to enforce implementation.

While not traditionally considered environmental law, our research found that access to environmental information can support protection of forests. Legal rights to access environmental information, such as final decisions and documentation on land allocation, clearance permits and ESIA approvals can empower citizens and NGOs to monitor and seek government enforcement of companies' obligations (Gouldson, 2004). For example, in Liberia, the law establishing the Liberia Extractive Industries Transparency Initiative requires a national depository of mining, oil, logging, agriculture and forestry concessions, as well as the right to audit the process by which each concession, contract, license, and other right is granted (Republic of Liberia, 2009; Liberia Extractive Industries Transparency Initiative (LEITI), 2013).

Complementary Policy Options to National Supply-Side Laws

National laws in supply-side countries cannot work alone. This section considers two complementary policy options that enable laws to function: participatory law reform and enforcement.

Firstly, to achieve a comprehensive legal framework that mitigates environmental and social damage from forest conversion, countries may need to undertake a legal reform process. Research has shown that legal reform involving a participatory approach, including civil society, local communities, and indigenous peoples in decision-making processes can better achieve environmental aims (Newig and Fritsch, 2009). The EU's Voluntary Partnership Agreement negotiations with forested countries are one example of how this participatory approach has been applied to the forest sector, with encouraging results for improved forest governance and clearer laws (Overdevest and Zeitlin, 2018).

Secondly, strong enforcement is a necessary complement to strong laws, in order to regulate and reduce deforestation (FAO, 2016). When laws are implemented consistently and when authorities detect and penalize violations, the law on paper is more likely to translate into results on the ground (Downs, 2013). Even so, law enforcement can exacerbate socio-economic inequalities, as informal activities (often by the poorest people) become criminalized (Colchester et al., 2006).

In many of the tropical forested countries analyzed, there is a complex enforcement environment, with overlapping mandates across different government agencies, which weakens the governance system (Hoare, 2015). Moreover, many forestry and environmental agencies are under-resourced and therefore struggle to operate effectively (ClientEarth, 2017). ClientEarth's research found that it is necessary for national governments and judiciaries to have the appropriate financial and human capacity as a first step toward strong law enforcement.

[4]The Independent Monitor is a component of the Forest Law Enforcement Governance and Trade (FLEGT) Voluntary Partnership Agreements with timber-producing countries. It is independent of a country's forest sector regulatory bodies and aims to provide credibility to the FLEGT licensing scheme by checking that all relevant aspects of a country's forest laws are operating as intended [European Commission (EC), 2007].

ACTIONABLE RECOMMENDATIONS

Tropical countries may need to undertake review or reform of national laws to ensure that the legal framework facilitates balancing of competing demands for land. As an initial step in the legal reform process, all relevant laws and institutional mandates across different sectors should be assessed for consistency and harmonized as necessary (Blaser, 2010; ClientEarth, 2018). The following recommendations offer guidance to legal reform:

- Land-use plans that identify which forested land is allowed or prohibited from clearance can assist land-use agencies to grant appropriate areas of land for projects at risk of conversion.
- Coherence of prohibitions on clearing certain areas of forest land across sectoral laws, particularly those that give a mandate for land allocation, can help to streamline forest protection.
- In order to ensure that clearance permits are not used as a loophole to clear the land for the sole aim of selling the timber, clearance permits can include a requirement to develop the land into the planned agricultural, mining or infrastructure project within a certain timeframe.
- Making the practical details of how environmental assessments proceed and what they should include explicit in the law itself can strengthen the effectiveness and enforceability of ESIAs.
- Strong enforcement of laws is important to translate the law on paper into forest protection on the ground, but requires clear enforcement mandates and appropriate financial and human capacity.

CONCLUSION

The risk to forests from the global demand for agricultural is firmly understood (Heino et al., 2015; Potapov et al., 2017) and is driven by a global demand for forest-risk commodities (Hosonuma et al., 2012; Curtis et al., 2018). To address this risk, policy solutions need to match the scale of the issue: they need to encompass the demand side, as well as the supply side. The nature of the policy measures—voluntary or binding—also has to match the need for an effective framework that is able to lead to behavioral change.

The current situation remains far from this goal. Many voluntary measures have emerged over the past decades, but have not achieved the aim of reduced deforestation, and demand-side regulations have been slow to materialize. National supply-side regulations offer an opportunity for forested countries to establish a framework to reduce deforestation taking into account each national context. However, ClientEarth's research has shown that supply-side regulations are still often unclear, contradictory and incomplete.

ClientEarth's research has identified the details of what a supply-side national framework should include, in order to regulate forest conversion. Clear, complete, and comprehensive legal frameworks involve coordination across a complex array of sectoral laws and institutional mandates to create a set of rules to be followed by those involved in forest conversion. If well-developed, these rules determine (i) what will be authorized, (ii) what is forbidden, and (iii) what conditions need to be followed for rights to access forested land and clear it for another use to be granted.

We acknowledge that laws on paper are not enough. Laws must be implemented and enforced (FAO, 2016). Moreover, laws must be accepted by the citizens of a country, and a participatory process of law reform can be crucial to reaching this acceptance (Newig and Fritsch, 2009).

AUTHOR CONTRIBUTIONS

CaH and ClH contributed to the design and implementation of the research, to the analysis of the results and to the writing of the manuscript.

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REFERENCES

Biotope (2015). *Guide d'application du Manuel de Procédures pour L'instruction des Études D'impact Environnemental, Et le Suivi des Projets, Dans les Zones Tampons des Parcs Nationaux*. Direction Générale de l'Environnement et de la Protection de la Nature du Gabon and Agence Nationale des Parcs Nationaux du Gabon. Available online at: http://www.biotope.fr/gabon/PROD/BIOTOPE_PAGOS_Guide_Manuel_ZTPN_V01_20150409.pdf

Blaser, J. (2010). *Forest Law Compliance and Governance in Tropical Countries: A Region-by-Region Assessment of the Status of Forest Law Compliance and Governance, and Recommendations for Improvement*. Food and Agriculture Organization (FAO) and International Tropical Timber Organization (ITTO). Available online at: http://www.fao.org/3/al044e/al044e00.pdf

Brack, D., and Wolosin, M. (2018). *Getting the "Bads" Out of Goods: Evolution From Voluntary to Regulated Approaches in Reducing the Undesirable Impacts of Global Trade*. Fern and Forest Trends. Available online at: https://fern.org/sites/default/files/news-pdf/Getting%20the%20Bads%20out%20of%20Goods_FINAL_WEB_Light.pdf

ClientEarth (2017). *Addressing Risks of an Inadequate Legal Framework Governing Forest Conversion in Ghana*. Available online at: https://www.documents.clientearth.org/library/download-info/addressing-the-risks-of-an-inadequate-legal-framework-governing-forest-conversion-in-ghana/?preview=true

ClientEarth (2018). *Legal Toolkit on Forest Conversion*. Available online at: https://www.documents.clientearth.org/library/download-info/legal-toolkit-on-forest-conversion-full-report/

Colchester, M., Boscolo, M., Contreras-Hermosilla, A., Del Gatto, F., Dempsey, J., Lescuyer, G., et al. (2006). *Justice in the Forest: Rural Livelihoods and Forest Law Enforcement*. Bogor: CIFOR.

COWI A/S (2018). *Feasibility Study on Options to Step up EU Action Against Deforestation: PART I: Background Analysis: Scale and Trends of Global Deforestation and Assessment of EU Contribution and PART II: A Potential EU Initiative on Deforestation: Possible Interventions*.

Curtis, P. G., Slay, C. M., Harris, N. L., Tyukavina, A., and Hansen, M. C. (2018). Classifying drivers of global forest loss. *Science* 361, 1108–1111. doi: 10.1126/science.aau3445

de Wasseige, C., de Marcken, P., Bayol, N., Hiol Hiol, F., Desclée, B., Nasi, R., et al. (2010). *Les Forêts du Bassin du Congo - Etat des Forêts*. Luxembourg: Publications Office of the European Union.

Delacote, P., Robinson, E. J. Z., and Roussel, S. (2016). Deforestation, leakage and avoided deforestation policies: a spatial analysis. *Res. Energy Econ*. 45, 192–210. doi: 10.1016/j.reseneeco.2016.06.006

Donofrio, B., Rothrock, P., and Leonard, J. (2017). *Supply Change: Tracking Corporate Commitments to Deforestation-Free Supply Chains, 2017*. Forest Trends. Available onlie at: https://www.forest-trends.org/wp-content/uploads/2017/03/2017SupplyChange_FINAL.pdf

Downs, F. (2013). *Rule of Law and Environmental Justice in the Forests: The Challenge of 'Strong Law Enforcement' in Corrupt Conditions*. U4 Issue June 2013:6. Available online at: https://www.cmi.no/publications/file/4834-rule-of-law-and-environmental-justice-in-the.pdf

Edwards, D. P., Magrach, A., Woodcock, P., Ji, Y., Edwards, F. A., Larsen, T. H., et al. (2014). Selective-logging and oil palm: multitaxon impacts, biodiversity indicators, and trade-offs for conservation planning. *Ecol. Appl*. 24:8. doi: 10.1890/14-0010.1

European Commission (EC) (2007). *Guidelines for Independent Monitoring*. FLEGT Briefing Note 6. Available online at: https://ec.europa.eu/europeaid/sites/devco/files/publication-flegt-briefing-note-series-2007-7-200703_en.pdf

FAO (2016). *The State of the World's Forests 2016 - Forests and Agriculture: Land-Use Challenges and Opportunities*. Rome. Available online at: http://www.fao.org/3/a-i5588e.pdf

Food and Agriculture Organization of the United Nations (FAO) (2018). *Zero-Deforestation Commitments: A New Avenue Towards Enhanced Forest Governance?* Forestry Working Paper 3. Available online at: http://www.fao.org/3/i9927en/I9927EN.pdf

Gabonese Republic (2012). *Plan Strategique Gabon Emergent – Vision 2025 et Orientations Stratégiques 2011-2016*.

Gabonese Republic (2015). *Manuel de Procédure Générale des Études d'impact sur l'environnement*.

Gan, J., and McCarl, B. A. (2007). Measuring transnational leakage of forest conservation. *Ecol. Econ.* 64:423–432. doi: 10.1016/j.ecolecon.2007.02.032

Ghana Ministry of Lands and Forestry (1999). *National Land Policy, Section 4.4 (b and d) and 4.5(a)*.

Ghana Ministry of Lands and Natural Resources (2012). *Ghana Forest and Wildlife Policy, Section 5.1.1, Article 1.1.2*.

Gouldson, A. (2004). Risk, regulation and the right to know: exploring the impacts of access to information on the governance of environmental risk. *Sustain. Dev*. 12:136–149. doi: 10.1002/sd.237

Haupt, F., Streck, C., Bakhtary, H., Behm, K., Kroeger, A., and Schulte, I. (2018). *Zero-Deforestation Commodity Supply Chains by 2020: Are we on Track? Background Paper Prepared for the Prince of Wales' International Sustainability Unit*. Available online at: https://climatefocus.com/sites/default/files/20180123%20Supply%20Chain%20Efforts%20-%20Are%20We%20On%20Track.pdf.pdf

Heino, M., Kummu, M., Makkonen, M., Mulligan, M., Verburg, P. H., Jalava, M., et al. (2015). Forest loss in protected areas and intact forest landscapes: a global analysis. *PLoS ONE* 10:e0138918. doi: 10.1371/journal.pone.0138918

Hewitt, D. (2013). *Potential Legality Issues from Forest Conversion Timber. Forest Trends*. Available online at: https://www.forest-trends.org/wp-content/uploads/imported/conversion-timber-and-legality_-12-3-13_final-pdf.pdf

Hoare, A. (2015). *Tackling Illegal Logging and the Related Trade. What Progress and Where Next?* Chatham House. Available online at: https://www.chathamhouse.org/sites/default/files/publications/research/20150715IllegalLoggingHoareFinal.pdf

Hosonuma, N., Herold, M., De Sy, V., De Fries, R. S., Brockhaus, M., Verchot, L., et al. (2012). An assessment of deforestation and forest degradation drivers in developing countries. *Environ. Res. Lett*. 7:4009. doi: 10.1088/1748-9326/7/4/044009

Independent Monitor of the FLEGT-VPA in the Republic of Congo (2017). *'Rapport N°13 /* CAGDF'.

Jopke, P., and Schoneveld, G. C. (2018). *Corporate Commitments to Zero Deforestation: An Evaluation of Externality Problems and Implementation Gaps*. CIFOR Occasional Paper 181. Available online at: http://www.cifor.org/publications/pdf_files/OccPapers/OP-181.pdf

Kissinger, G., Herold, M., and De Sy, V. (2012). *Drivers of Deforestation and Forest Degradation. A Synthesis Report for REDD+ Policymakers*. Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/66151/Drivers_of_deforestation_and_forest_degradation.pdf

Lambin, E. F., Gibbs, H. K., Heilmayr, R., Carlson, K. M., Fleck, L. C., Garrett, R. D., et al. (2018). The role of supply-chain initiatives in reducing deforestation. *Nat. Clim. Change*. 8, 109–116. doi: 10.1038/s41558-017-0061-1

Liberia Extractive Industries Transparency Initiative (LEITI) (2013). *Post Award Process Audit Final Report*. Available online at: http://www.leiti.org.lr/uploads/2/1/5/6/21569928/leiti_post_award_process_audit_final_report.pdf

Morgan, R. K. (2012). Environmental impact assessment: the state of the art. *Impact Assess. Proj. Appraisal*. 30, 5–14. doi: 10.1080/14615517.2012.661557

Nana Inkoom, J., Frank, S., and Fürst, C. (2017). Challenges and opportunities of ecosystem service integration into land use planning in West Africa – an implementation framework. *Int. J. Biodivers. Sci. Ecosyst. Serv. Manage* 13, 67–81. doi: 10.1080/21513732.2017.1296494

Newig, J., and Fritsch, O. (2009). Environmental governance: participatory, multi-level – and effective? *Environ. Policy Gov*. 19, 197–214. doi: 10.1002/eet.509

Overdevest, C., and Zeitlin, J. (2018). Experimentalism in transnational forest governance: implementing European Union forest law enforcement, governance and trade (FLEGT) voluntary partnership agreements in Indonesia and Ghana. *Regul. Gov*. 12, 64–87. doi: 10.1111/rego.12180

Potapov, P., Hansen, M. C., Laestadius, L., Turubanova, S., Yaroshenko, A., Wynet Smith, C. T., et al. (2017). The last frontiers of wilderness: tracking loss of intact forest landscapes from 2000 to 2013. *Sci. Adv*. 3:e1600821. doi: 10.1126/sciadv.1600821

Rautner, M., Leggett, M., and Davis, F. (2013). *The Little Book of Big Deforestation Drivers*. Global Canopy Programme. Available online at: https://www.globalcanopy.org/publications/little-book-big-deforestation-drivers-24-catalysts-reduce-tropical-deforestation.

Republic of Congo (2000). *Loi ° 16-2000 du 20 Novembre 2000 Portant Code Forestier*.

Republic of Ghana (2006). *Minerals and Mining Act (Act 702), Section 3-5*.

Republic of Liberia (2000). *Minerals and Mining Law*.

Republic of Liberia (2003). *An Act Establishing the Protected Forest Areas Network Law*.

Republic of Liberia (2006). *National Forestry Reform Law*.

Republic of Liberia (2009). *An Act Establishing the Liberia Extractive Industries Transparency Initiative* (LEITI).

Sartoretto, E., Henriot, C., Bassalang, M.-M., and Nguiffo, S. (2017). *How Existing Legal Frameworks Shape Forest Conversion to Agriculture. A Study of the Congo Basin*. FAO Legal Papers No. 102. Available online at: http://www.fao.org/3/a-i7947e.pdf.

UN Economic Commission for Europe (UNECE) (2008). *Spatial Planning: Key Instrument for Development and Effective Governance with Special Reference to Countries in Transition*. UN Doc ECE/HBP/146.

Walker, N., Patel, S., Davies, F., Milledge, S., and Hulse, J. (2013). *Demand-Side Interventions to Reduce Deforestation and Forest Degradation*. London: The International Institute for Environment and Development (IIED).

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