

The Economic Impacts of Illegal Agro-Conversion on Tropical Forest Countries

A new framework supports national and global cost estimates

This paper summarizes a new analysis of the costs of illegal conversion of tropical forests for export-driven industrial agriculture. It synthesizes a proposed theoretical framework for exploring impacts of illegal conversion on financial capital, natural capital, political capital, and human/social capital. A global minimum cost per hectare to forest countries of illegal agro-conversion is estimated, along with lessons learned from applying the framework in Brazil, Indonesia, Costa Rica, and Liberia.

Summary

Half of all tropical deforestation is the result of illegal conversion of forests to industrial agriculture.¹ This process creates financial losses as it undermines a country's natural resource management objectives, including economic activity to generate jobs, investment and tax revenue; production of timber and non-timber forest products; the maintenance of ecosystem functions like water provisioning; and protection of the rights of indigenous people. Governments pursue these objectives through legislation, law, and regulation that—when effective—serve to limit operators who pursue private interest counter to national interest. When the rule of law is violated, the common good suffers. Illegalities undermine peace, security, and democracy itself, as agri-business corrupts local elections, and forest clearing generates grievance among locals, often fueling violent conflict.

Illegal deforestation costs host countries at minimum \$4,000 per hectare from just three major classes of loss: tax evasion, the loss of ecosystem function, and conflict with forest communities. **Globally, illegal deforestation for industrial agriculture generated losses of more than \$17 billion per year** during the early 2000s to forest countries, excluding the value of climate stabilization.²

In Indonesia, these costs topped \$4.9 billion per year, excluding the impact of forest and peat fires on economic activity and human health – which are as much as \$16 billion in high-fire years like 2015. In contrast, Brazil has prevented as much as \$8.4 billion per year in previous losses by reducing illegal forest clearing for soy plantations and cattle pastures after its peak in 2004.

While the costs of deforestation to a nation are substantial, they are rarely borne by agricultural operators. However, often wealthy and politically powerful agriculturalists incur the costs of compliance when effective policies and laws to serve the common interest are in place and enforced. This conflict of interest between individual actors and the national good makes enforcement necessary, but rarely sufficient. Case studies suggest that **halting illegal deforestation requires both enforcement and incentives** – either positive incentives such as payments for environmental services, or negative incentives such as limiting market access to deforesters through supply-chain approaches such as deforestation moratoriums. **If forest countries follow this model in aggressive campaigns to halt illegal forest conversion for industrial agriculture, they would reap major economic benefits.**

¹ Sam Lawson et al., *Consumer Goods and Deforestation: An Analysis of the Extent and Nature of Illegality in Forest Conversion for Agriculture and Timber Plantations* (Washington, DC: Forest Trends, 2014), http://www.forest-trends.org/documents/files/doc_4718.pdf

² Arthur G Blundell et al., *The Economic Impact at the National Level of the Illegal Conversion of Forests for Export-Driven Industrial Agriculture* (Washington, DC: Climate Advisers, Natural Capital Advisers, and Forest Climate Analytics, 2017), [insert link]

A Framework for Understanding the Impacts of Illegal Agro-Conversion

Governments establish a legislative framework – policies, laws, and regulations – in order to best manage their resources. This framework should be developed to incorporate “good governance” principles, including: participatory and equitable policies and laws; transparent and efficient processes, reinforced by monitoring and evaluation; effective implementation that achieves policy objectives, including through enforcement where necessary; and accountability, including anti-fraud and anti-corruption mechanisms; all underlain by the application of the rule of law.

National Objectives for Forests and Land

A country’s legislative framework should advance four primary and legitimate objectives of the state with respect to its forests and land.

First, the legislative framework should **foster a stable economy** through rational land use and the promotion of investment in optimum use of natural resources. The natural resource sector – and land in particular – can be used for purposes that are capable of delivering sustained value over time through self-regeneration. This might be achieved through sustainable forest management, including timber extraction, extraction of non-timber forest products, and promotion of eco-tourism; or through the conversion of forests to other uses, including agriculture, when achieved with consideration of land rights, social and environmental impact, economic benefits, and food security. Good governance encourages investment that supports a stable economy, while its absence encourages risky practices with short time horizons that degrade the environment, inflame tensions with local communities, and exacerbate corruption, and land speculation that fails to generate the promised economic outcomes.

Second, a legislative framework will **maintain ecosystem and cultural services**, as forests for example provide clean water and air, generate raw materials and food, reduce soil erosion, provide habitat for pollinators and other species, and provide cultural and spiritual services for many communities and indigenous peoples. While not often part of the formal economy, the economic value of these services can be quite large (see below), meaning they significantly contribute to citizens’ well-being.

Third, the legislative framework should **protect the rights of citizens** whose lives and livelihoods depend on natural resources, including statutory and/or customary rights to ownership, use, and/or access to forests or forest products. Not only does this provide for and improve the lives of citizens – which is a primary purpose of government – it also serves to reduce internal conflict.

Finally, an effective legislative framework may **generate tax and other revenues** from sustainable and equitable land management that can be used to provide goods and services to enhance the welfare of its citizens. In the land sector, this may include both taxes (income, corporate, etc.) and royalties paid by operators to government for the right to use a public asset, including stumpage fees in the forestry sector and concession fees and land rental fees for conversion of forest to field. If the taxes, royalties, and fees are less than the value of the lost asset (market, ecosystem service, etc.) then the sector is effectively subsidized, and the “public good” suffers – even if someone is making money and/or creating employment.

When these objectives clash, trade-offs must be made, and this decision-making is inherently political. Such political decisions are made through a **legislative framework** where objectives become policy, which generates law, which in turn requires regulations for elaboration and implementation. These regulations serve as countermeasures to individual self-interest, necessary to prevent the occurrence of actions that would adversely affect the “common good.” Thus, the legislative framework is a fundamental component of risk management meant to ensure the achievement of the national objectives. As such, violations—like illegal deforestation—undermine the national good. It is not only the violations themselves that do this, but also the failure on the part of government to enforce its laws and regulations. Where individual behavior is at odds with this national interest/common good, compliance with the legislative framework is costly, thus requiring enforcement.

Failures in Governance

The government’s proper institutional objectives are not always the sole, or even the primary, drivers of decision-making regarding how and when the “rule of law” is enforced. This is because “government” is made up of individual actors—politicians, bureaucrats, civil servants—whose self-interest, or interest as a member of a privileged group, is often in conflict with the national interest. Corruption—the use of an official position for private gain—is one such conflict of interest. Corruption includes decisions by individual actors in government to manipulate the legislative process—including failing to invest in enforcement—in order to create conditions that allow them to exploit the system. This may include elite capture of the policymaking process so as to weaken regulations in a way that benefits the elites.

Corrupt politicians, bureaucrats and law enforcement undermine compliance with the law and thus the national interest in natural resource management by accepting or demanding inducements to allow commission of crime or for omission of duty, including *inter alia*:

- **Inefficient revenue collection**, when rent-seeking or rent-seizing officials use their positions to solicit bribes in exchange for permits, licenses, concessions, stakeholder interest, or allowing unrecorded/undervalued production;
- **Failure to implement best practices and sustainable management** reduces long-term availability of resources, ecosystem and cultural services;
- **Inequitable distribution of costs and benefits**, when investor protection is given primacy over human rights, property rights, and environmental policy; and,
- **Financial crime and organized crime** resulting from the above illicit activities or attracted to the forest sector for other reasons.

In other cases, operators undermine the national interest even without the compliance of corrupt officials. Where enforcement is lacking, fraud—the intentional deception, through concealment and/or misrepresentation, in order to gain an unfair or illegal advantage—can rob the state of revenue and result in unacceptable social and/or environmental impacts. In this way, weak governance feeds on itself, undermining democracy more broadly.

Legitimate Governance Pathway for Agricultural Forest Clearing

We now turn to the “rule of law” related to forest clearing for industrial agriculture by developing an “idealized” pathway, beginning with policy-formulation, through to the actual harvest and removal of trees. With respect to industrial agriculture, a legislative framework based on the principles of good governance and implementing best practices with respect to industrial agriculture covers all steps in the following process, *inter alia*:

- **Land-use planning** sets out why certain uses may occur in certain areas but not others, with participation of landowners, affected populations, and different levels of government.
- **Changes of zoning**, e.g., to allow conversion of forest to agricultural land uses, may be in the national interest. Such changes must be transparent and include public consultation.
- **Land rights assessment**, facilitated by a land rights cadaster (registry), ensures that there are no pre-existing claims. Communities affected by proposed forest clearing are entitled under international law to **free, prior, informed consent**.
- A **preliminary impact assessment** ensures that the proposed use will not unacceptably undermine ecosystem services and/or community interests.
- **Permitting** is how government selects an operator. A competitive tendering process may be required, including financial, technical, and legal pre-qualification; a performance bond may ensure companies meet their responsibilities.
- **Environmental and social impact assessment (ESIA)** follows with more detail and further consultations with affected communities. An avoid/mitigate/offset hierarchy is employed to optimize harm reduction. It should be in a company’s interest to align public expectations with reality to generate and maintain social license to operate.
- **Mapping and field delineation** demarcate the exact boundaries of operations, including setbacks where operations are to be avoided or are prohibited, and to map forest clearing blocks and assess timber volume and value.
- Prior to ground operations, companies report **detailed annual plans**, including impacts on communities, labor, security, and environment.
- **Forest clearing** takes place according to regulations related to the use of fire (usually prohibited), slash removal, appropriate soil preparation, and sale of wood.
- Government will **require companies to pay taxes and royalties** of various types throughout operations.
- Companies are required to **compensate communities affected by operations**, including those with usufruct rights. Some countries also require “**benefits sharing**” with affected communities.

In the following section, we explore where and how along this pathway illegalities can intervene in the process of deforestation for industrial agriculture.

Typology of Illegalities

In land use as in other sectors, laws and regulations may be weakened by elite capture of the policymaking process, and the principles of “good governance” violated through capture of officials who weaken oversight, provide unnecessary tax breaks in the guise of incentives, and/or allocate permits to certain individuals over others—both in contravention of the public good.

Once the legislative framework is established, however, compliant behavior—for good or bad—is, by definition, legal. Illicit operators may, however, offer—or corrupt officials may demand—payment (e.g., bribery, extortion, grease payments, hush money) in order to allow violations of law and regulations. Here we develop a typology of such crimes, in the rough order that they occur, related to deforestation for industrial agriculture.

1. Operators and officials may pervert the law or regulation **in the allocation of conversion rights** by:

- Manipulating the zoning process in order to improperly open up forests for conversion, including those with high conservation value and/or claimed by local people;
- Failing to follow gazettement procedures, including failing to investigate pre-existing use/ownership rights, and/or ignoring indigenous/customary rights;
- Failing to consult and obtain community consent;
- Failing to compensate parties affected by industrial agriculture;
- Providing unfair advantage in the bidding/permit allocation process; and,
- Allowing fraud and/or failure in environment & social impact assessments (ESIA), mitigation efforts, and/or other management requirements.

2. Operators and officials may undermine **the permitting process** by, *inter alia*:

- Committing fraud in ESIA management, including the actual assessment, as well as the avoidance and mitigation of harms, and in monitoring and reporting;
- Committing fraud in surveys of timber volume/value;
- Failing to map concession boundaries, including failing to identify and avoid set-asides;
- Providing false information to communities and/or coercing/intimidating them;
- Failing to craft adequate social agreements and benefit sharing agreements; and,
- Failing to comply with labor laws.

3. Operators and officials may pervert the law/regulation during **land clearing** by:

- Clearing in advance of obtaining all licenses/permits;
- Illegal use of heavy machinery without proper licenses;
- Illegal use of fire to clear forest and slash, or accepting claims that third-parties are responsible for fires related to agricultural concession areas rather than the concessionaires themselves;
- Illegal use of mechanical soil treatment;
- Clearing outside concession areas and/or harvesting protected species;
- Clearing more than the legal maximum area of the concession;
- Clearing steep slopes, culturally important trees, and/or other no-go areas; and,
- Trafficking illicit timber felled from any of the above areas.

4. Operators and officials may **undermine law enforcement**, including by, *inter alia*:

- Failing to inspect, monitor, and, where appropriate, indict law-breakers;
- Manipulating evidence/witnesses/court cases;
- Violating judicial independence; and,
- Failing to enforce penalties (e.g., fines, court-ordered compliance plans, jail time).

5. Operators and officials may **commit tax evasion and other financial crimes**, including:

- Fraud in reporting and tax returns such as false declarations or self-assessments;
- Failure or falsification of audits;
- Improper transfer pricing;
- Underpayment of tax/royalties/fees & other penalties; and,
- Money laundering.

When any of these violations are committed, operators (even if they possess otherwise valid licenses/permits) are, in fact, operating illegally, undermining the “rule of law” and, thus, the ability of the state to achieve its objectives.

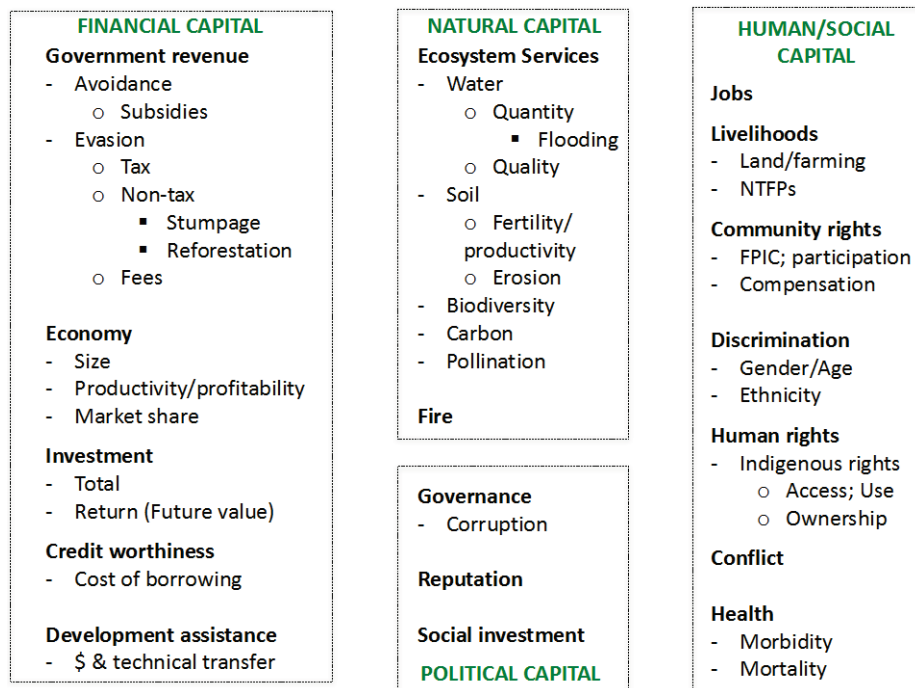
Costs/Impacts of Illegal Deforestation

Illegalities translate into direct and indirect losses, many of which have financial implications that can be thought to impact four major types of capital: financial capital, natural capital, political capital, and social/human capital (Figure 1). While many losses are global, decisions related to land use and forest clearing are the sovereign right of forest countries and, thus, we focus on the costs to the forest-rich tropical nations themselves where the illegal clearing for industrial agriculture occurs.

This section attempts to quantify the costs of illegal deforestation for industrial agriculture in the hope that recognizing these costs will help strengthen the constituency demanding the halt to such activity. We recognize the risk of under-valuing the severity of losses, but it is not our intention to suggest that only quantifiable impacts are worth addressing. We also make no attempt to quantify the benefits of what is an illegal activity: if the state believes that clearing is justified, it should amend its legislative framework to first de-criminalize the activity.

The full costs do not readily lend themselves to robust measurement due in large part to the clandestine nature of the activities, but also because some of the costs, such as those related to lost ecosystem services or social displacement, are also difficult to quantify even under the best of circumstances. Nevertheless, the literature does offer some parameters that provide an order of magnitude of various types of costs. We focus on Brazil and Indonesia as together they represent half of the loss of tree cover over the past 15 years (Hansen et al. 2013). Here we offer only those “headline” losses; as we aim to be conservative, these estimates should be considered minimums.

Figure 1: Capital at Risk from Illegal Forest Clearing for Industrial Agriculture



Source: Blundell et al, 2018.

Financial Capital

Financial impacts are primarily due to lost tax and non-tax revenue such as royalties, the money paid to the state for the use of its assets including sale of harvested timber and annual land rents. Illegal operators evade some (or all) of these royalties, although such evasion may require bribes to corrupt officials. A second set of financial impacts is less direct: poorly implemented rule of law drives away investment, and those who do invest generally require greater return (often leading them to “cut corners,” where the violation of laws/regulations generates greater social and environmental harms). Furthermore, increasing perceptions of risk undermine the reputation of a country and the companies operating therein, decreasing their credit worthiness, access to markets, and the willingness of donors to assist. These financial impacts damage the economy and undermine development.

The most direct cost to governments is that of revenue lost, including unpaid taxes and royalties linked to timber harvests, as well as other fees tied to securing rights to clear forests for conversion. Gutierrez-Velez and MacDicken (2008) estimated lost government revenue from illegal logging in Brazil at \$2,880/ha. For Indonesia, Blundell et al (2018) estimates that losses averaged around \$4 billion per year between 2009-2013. Assuming that half of this tax loss is from timber produced during clearing for oil palm and pulp plantations, then this suggests lost fees and taxes of around \$3,848/ha for these two commodities. Based on case studies elsewhere, we use a global average of \$2,300/ha for the rest of the world.

Natural Capital

The loss of forest undermines natural capital in many direct ways. As watersheds are degraded, water quality and quantity decreases, soils erode and fertility is lost. The loss of forest and the habitat it provides leads to a loss of species, which can have immediate financial impacts on adjacent farms, for example, when pollinators are lost. The loss of the trees impacts climate change, through decreased sequestration and more immediately through massive inputs of greenhouse gases when the trees are cleared using fire. We exclude the “climate-protection” value of forests from this economic analysis because most of that value goes to other countries—but it is important to note that some of the value of avoided climate-impact is enjoyed by the forest country itself.

Ecosystem services: Costs linked to environmental damage caused by illegal forest clearing impose a direct burden on government and on the wider economy. Costanza et al. (1997) offered a global average value for tropical forest ecosystem services as \$2,007/ha/yr, more than half (\$1,167/ha/yr) for erosion control and nutrient cycling. Removing \$223/ha estimated climate-regulation services (much more of a “global” rather than “national” service) yields an adjusted value of \$1,784/ha.³ More recently Carrasco et al. (2014) carried out a spatially explicit meta-analysis based on 30 studies of ecosystem service values in tropical forests from The Economics of Ecosystems and Biodiversity (TEEB) database, while controlling for economic, environmental, and methodological variables. They found a mean value of \$1,312/ha/yr, but with considerable variation across the tropics including higher values consistent with or exceeding Costanza et al. (1997) in areas of Brazil and Indonesia most subject to agricultural conversion. Costanza et al. (2014) reanalyzed their data in response to critiques and concluded that actual losses were, in fact, twice their 1997 estimate. Finally, we note that these valuations are recurring costs: 1,312/ha and \$1,784/ha are the amounts of loss felt each and every year once forests are lost. To be conservative, this analysis treats the cost as one-time, incurred in the year of clearing, and uses \$1,784/ha/yr.

Forest fire: The World Bank (2015) estimated that in 2015 fires in Indonesia used illegally for forest clearing caused losses of \$16.1 billion, or more than \$6,700/ha. Removing the World Bank’s estimate of lost revenue from logging (included in the Financial Capital losses, above), the fire losses still amount to more than \$5,092/ha. The largest single component of the loss was carbon storage (based on a carbon market at \$5/tCO₂e, as opposed to the impact of emissions on global climate change). The World Bank noted that the use of fire remains widespread and substantial each year. And while fires are still a relatively common occurrence in Indonesia, 2015 was exceptional due to the severe El Niño-related droughts. While nowhere near as severe as Indonesia’s fires, Brazil has also suffered widespread forest fires associated with land clearing. Without attaching a financial value, Reddington et al. (2015) calculated that since 2004, reduced deforestation has led to a reduction in aerosolized particulates that has saved between 400 and 1,700 premature adult deaths across South America.

Social/Human Capital

When the country fails to protect a community’s rights to forests, people’s lives and livelihoods are threatened. In the most egregious cases, and often in violation of customary, if not statutory, law, countries have ignored peoples’ rights of ownership of the land and the forests they contain, allowing companies to clear community-owned land for ranches and plantations. Communities see such losses as a threat to their wellbeing, if not their very existence, and conflicts have become widespread, often turning violent (de Leon et al. 2003). When fire is used in clearing, illegal deforestation further threatens life and health, and education suffers when schools are closed. These impacts are most acute for those living closest to the deforestation (Mullan 2014), and even in these communities, impacts are not equal. Women are disproportionately affected by forest loss—even more so if the plantations that take the place of forests preferentially hire young men. But even local men may be disadvantaged if plantations prefer to hire non-local labor (who are often seen as more “reliable” because, living on-site and not subject to “community obligations,” they are more easily “managed”).

³ This estimate is not inflation-adjusted; doing so would raise the value from \$1,784/ha in 1997 US\$ to nearly \$2,800 in 2018 US\$.

Like environmental damage, land conflicts associated with illegal forest clearing impose direct costs on government and the economy as a whole. Direct costs include those relating to physical intervention (e.g., to protect lives and property) and the mediation of disputes (e.g., between communities and agricultural concessionaires), as well as foregone tax revenues due to disruption in legitimate production. The extent of overlap between indigenous territories and agricultural/forestry concessions in several countries, including Brazil and Indonesia, and the value of production placed at risk by such overlap, provides one measure of the cost of disrupted production from conflict. Extrapolation from these estimates by the Munden Project yields average costs of \$172/ha/yr for soy in Brazil and \$498/ha/yr for oil palm in Indonesia. Globally, conflicts over land rights can increase operating costs by a factor of 29; the overlap between concessions and community lands may affect around \$5 billion of agricultural production annually; and the average loss for all commodities was \$113/ha/yr (de Leon et al. 2013). These figures reflect only the value of agricultural production at risk, not the total costs incurred, thus dramatically underestimating the true cost of conflict over illegal deforestation for industrial agriculture.

Political Capital

All the impacts noted above undermine the trust of people in their government, as well as the faith of the international community. This loss of trust makes governments vulnerable, leading the elite to take steps to reinforce their power, often through corruption, which serves to further undermine democracy more broadly. It also can be expected to have the general effect of weakening the investment climate in a given country. Various authors examine how corruption undermines investment, and link reduced investment to reductions in economic growth. For example, Udenze (2014) finds that a 1 percent increase in Transparency International's corruption perceptions index for low- and middle- income countries is associated with a 0.88 percent decrease in foreign direct investment (FDI) as a share of GDP. Similarly, Mathur and Singh (2013) found that a 1 percent decrease in corruption can increase FDI by 9 percent in emerging economies. However, the degree to which illegal forest clearing for industrial agriculture weakens the investment climate cannot be isolated from corruption writ large; weak governance will be accompanied by corruption across the economy as a whole, not just in the forest sector. These estimates are thus excluded from the summary below.

Summary of Costs

Summarizing the costs above (Table 1) suggests that: a) for Brazil (when illegal deforestation was high), illegal clearing of forests for soy and cattle pasture cost over \$8.5 billion each year based on costs of more than ~\$4,600/ha, and b) clearing for oil palm and pulp plantations in Indonesia costs well over \$3.2 billion each year based on costs of more than ~\$6,100/ha. Adding in some of the costs associated with other agricultural commodities, and more importantly, with fires and haze, the total losses for Indonesia climb to more than \$9 billion in 2015.

Expanding to the area lost for all industrial agriculture each year, estimated losses for just these two countries amount to considerably more than \$13.4 billion each year. Applying a conservative \$4,000/ha in losses to the area cleared illegally each year worldwide (estimated by Lawson et al. [2014]) suggests that illegal deforestation for industrial agriculture globally imposes costs of over \$17 billion per year, of which more than \$8.5 billion is linked to exports. As the analyses employ a number of conservative assumptions, the true costs are likely to be substantially greater.

Table 1: Major Annual Losses to Indonesia & Brazil Generated by Deforestation for Industrial Agriculture: a) lost government revenue; b) environmental damage (and in the case of Indonesia, the economic impact of fires used in land clearing); and, c) conflict with local communities over land.

Indonesia

Annual Losses	Conversion To		
	Oil Palm	Pulp	All Industrial Agriculture
Tree Cover (estimated)	313,500 ha	206,250 ha	825,000 ha
Direct loss of revenue	\$1.2 billion	\$800 million	\$3.2 billion
Environmental damage	\$560 million	\$370 million	\$1.5 billion
Land conflict	\$156 million	\$100 million	\$260 million
TOTAL COST/YEAR	\$1.9 billion/yr	\$1.3 billion/yr	\$4.9 billion/yr
Per hectare losses	\$6,130/ha	\$6,130/ha	\$5,946/ha
Economic impact of fires	\$1.6 billion	\$1 billion	\$4.2 billion
TOTAL COST FOR 2015	\$3.5 billion	\$2.3 billion	\$9.1 billion
Per hectare losses	\$11,118/ha	\$11,118/ha	\$11,104/ha

Brazil

Annual Losses	Soy	Pasture	All Industrial Agriculture
Tree cover	307,417 ha	1,374,333 ha	1,808,333 ha
Direct loss of revenue	\$885 million	\$4 billion	\$5.2 billion
Environmental damage	\$550 million	\$2.5 billion	\$3.2 billion
Land conflict	\$53 million		\$53 million
TOTAL COST/YEAR	\$1.5 billion/yr	\$6.4 billion/yr	\$8.5 billion/yr
Per hectare losses	\$4,836/ha	\$4,664/ha	\$4,693/ha

Source: See text; tree cover loss from Lawson et al. (2014)—average annual tree loss between 2000-2012.

Conclusion

While these costs of illegal deforestation are substantial, they are rarely borne by the agricultural operators themselves. Yet, if the operators were to stop illegal land clearing, then they would incur all the costs of compliance, including the foregone expansion. This makes enforcement necessary.

The lessons learned in case studies of Blundell et al. (2018) suggest that albeit necessary, enforcement is usually not sufficient to ensure compliance; incentives are also necessary. In Costa Rica, for example, positive incentives, especially payments for environmental services, drove change that led to a policy to forego deforestation altogether—both legal and illegal—for agriculture. In Brazil, consumer-campaigns drove producers to commit to zero-deforestation. In both cases, while the incentives were critical, most operators nonetheless said that without law enforcement, they likely would have continued clearing forest for expansion. Moreover, successful enforcement is likely frequency-dependent. When the vast majority of the industry is in violation of the “rule of law,” as it was in Brazil prior to the mid-2000s for example, it is likely difficult to begin to enforce the law. It undoubtedly helps enforcement if incentives can pull “good actors” into compliance so that government enforcement capacity is sufficient to push the remaining illicit operators into the legal, or out of business. Without incentives, there may just be too many illicit operators for enforcement officers to tackle.

In the end, halting illegal forest conversion is both an environmental and a core economic issue. We conclude that forest countries would reap major benefits, through the avoided costs, from aggressive campaigns to halt illegal forest conversion for industrial agriculture. Costa Rica took that step 30 years ago and has seen their GDP quintuple while forest cover has doubled. Indonesia, in contrast, has sunk massive resources into incentives to expand oil palm. While the expansion has been significant, much of the incentive has been wasted with forest cleared without successful subsequent planting. In the end, Indonesia has allowed massive human and environmental harms, and in doing so, has lost billions in unproductive incentivizes. Indonesia—mostly those rural

communities closest to the deforestation—has suffered the losses without experiencing the anticipated gain. With a greater understanding on these costs, it is our hope that countries will assess the importance in reversing trends in illegal deforestation with respect to industrial agriculture.

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References

- Blundell, A. G., E. W. Harwell, E. T. Niesten, and M. Wolosin, *The Economic Impact at the National Level of the Illegal Conversion of Forests for Export-Driven Industrial Agriculture* (Washington, DC: Climate Advisers, Natural Capital Advisors, and Forest Climate Analytics, 2018), <https://www.climateadvisers.com/publications/discussion-draft-the-economic-impact-at-the-national-level-of-the-illegal-conversion-of-forests-for-export-driven-industrial-agriculture/>
- Carrasco, L. R., T. P. L. Nghiem, T. Sunderland, and L. P. Koh. "Economic valuation of ecosystem services fails to capture biodiversity value of tropical forests." *Biological Conservation* 178 (2014): 163-170.
- Costanza, Robert, Ralph d'Arge, Rudolf De Groot, Stephen Farber, Monica Grasso, Bruce Hannon, Karin Limburg et al. "The value of the world's ecosystem services and natural capital." *Nature* 387, no. 6630 (1997): 253.
- Costanza, Robert, Rudolf de Groot, Paul Sutton, Sander Van der Ploeg, Sharolyn J. Anderson, Ida Kubiszewski, Stephen Farber, and R. Kerry Turner. "Changes in the global value of ecosystem services." *Global Environmental Change* 26 (2014): 152-158.
- De Leon, Ramon, Tin Garcia, Gordon Kummel, Lou Munden, Sophia Murday, and Leonardo Pradela. "Global capital, local concessions: a data-driven examination of land tenure risk and industrial concessions in emerging market economies." The Munden Project (2013).
- Gutierrez-Velez, Victor Hugo, and Kenneth MacDicken. "Quantifying the direct social and governmental costs of illegal logging in the Bolivian, Brazilian, and Peruvian Amazon." *Forest Policy and Economics* 10, no. 4 (2008): 248-256.
- Hansen, Matthew C., Peter V. Potapov, Rebecca Moore, Matt Hancher, SAA Turubanova, Alexandra Tyukavina, David Thau et al. "High-resolution global maps of 21st-century forest cover change." *Science* 342, no. 6160 (2013): 850-853.
- Lawson, Sam, Art Blundell, Bruce Cabarle, Naomi Basik, Michael Jenkins, and Kerstin Canby. "Consumer Goods and Deforestation: An analysis of the extent and nature of illegality in forest conversion for agriculture and timber plantations." *Forest Trends Report Series* 131 (2014).
- Mathur, Aparna, and Kartikeya Singh. "Foreign direct investment, corruption and democracy." *Applied Economics* 45, no. 8 (2013): 991-1002.
- Mullan K. 2014. The Value of Forest Ecosystem Services to Developing Economies. Center for Global Development Working Paper No. 379. <https://ssrn.com/abstract=2622748> or <http://dx.doi.org/10.2139/ssrn.2622748>
- Reddington, C. L., E. W. Butt, D. A. Ridley, P. Artaxo, W. T. Morgan, H. Coe, and D. V. Spracklen. "Air quality and human health improvements from reductions in deforestation-related fire in Brazil." *Nature Geosciences* 8, no. 10 (2015): 768.
- Udenze O. 2014. "The Effect of Corruption on Foreign Direct Investments in Developing Countries." *The Park Place Economist* Vol. 22. <http://digitalcommons.iwu.edu/parkplace/vol22/iss1/17>
- World Bank. 2015. Reforming amid uncertainty. Indonesia Economic Quarterly (December).