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WORKING PAPER

ENDING TROPICAL DEFORESTATION: A STOCK-TAKE OF PROGRESS AND CHALLENGES

THE ELUSIVE IMPACT OF THE DEFORESTATION-FREE SUPPLY CHAIN MOVEMENT

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KEY POINTS

- **Coverage is insufficient.** Deforestation-free commitments do not adequately cover the full range of commodities, geographies, markets, and supply chain segments with forest risks. On the producer side, few small and medium-sized producers are covered by commitments, and on the consumer side, manufacturers and retailers in emerging economies are less likely to have a commitment than larger companies in Europe or North America.
- **The impact is unclear.** The ambition, scope, and specificity of company commitments varies enormously, as do companies' level of effort and approaches to managing deforestation risk. This results in a dearth of information to assess companies' performance in meeting their commitments and the impacts on deforestation.
- **Companies cannot curb deforestation on their own.** Company supply chain efforts can only succeed if complemented by aligned public sector measures that improve land sector governance, enable sustainable rural development, and create incentives to conserve forests.

CONTENTS

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THE ISSUE

Hundreds of companies with exposure to deforestation driven by palm oil, beef, soy, or wood production have committed to addressing deforestation.[1] Many of these commitments have been made in the context of the Consumer Goods Forum Zero Net Deforestation Commitment,[2] the Tropical Forest Alliance 2020 (TFA 2020),[3] and the New York Declaration on Forests (NYDF),[4] and stipulate 2020 as a target year for eliminating deforestation from supply chains of agricultural commodities. As the 2020 deadline approaches, it is timely to review the status of forest-related supply chain commitments and identify implementation barriers and systemic challenges to the effectiveness of company action. This brief summarizes progress made, identifies challenges and evidence gaps, and recommends additional actions for reducing commodity-driven deforestation.

WHY A DEFORESTATION-FREE SUPPLY CHAIN IS IMPORTANT TO FORESTS, CLIMATE CHANGE, AND DEVELOPMENT

The conversion of forests to pastures, crops, and plantations is a major driver of global deforestation. According to statistics from the Food and Agriculture Organization (FAO), tropical forest cover decreased by more than 195 million hectares (ha) between 1990 and 2015, 76 percent (149 million ha) of which occurred in South America, Southeast Asia, and Central and West Africa (Keenan et al. 2015). Commercial operations are estimated to account for 40–70 percent of agriculture-driven deforestation in developing countries (Hosonuma et al. 2012). Four commodities—beef, palm oil, soy, and wood products—were responsible for about 113 million ha of forest loss in tropical regions between 2000 and 2012 (see Box 1) (Henders et al. 2015). From 1990 to 2008, beef and other cattle products were responsible for almost half of all forest clearance attributed to the agriculture sector. In West Africa, cocoa production caused almost 3 million ha of forest loss between 1988 and 2007, and cocoa expansion threatens the remaining forests (Climate Focus 2017). Demand for fuelwood, timber, and pulp motivate conversion of natural forests to timber plantations, or drive repeated cycles of unsustainable, often illegal, logging that severely degrades forests. Land-use change is a major source of greenhouse gas emissions, and land acquisition for commodity production often displaces local livelihoods without respect for indigenous and traditional land rights.

Box 1 | Beef in Brazil

Beef has the largest deforestation footprint of all drivers of deforestation, with 2 million ha of forest cleared in 2011.[a] More than three-quarters of cleared forest in Brazil was directly or indirectly induced by cattle ranching.[b] Brazil is home to 209 million head of cattle, making the country the second largest producer and exporter of beef globally and the fourth largest producer of cow milk. Export volumes of beef increased by nearly fourfold between 2004 and 2013 to 1.5 million tons per year.[c] Most beef (80 percent) is consumed domestically.[d]

The cattle supply chain encompasses many actors and production stages. Animals are often not only transferred from calving ranches to fattening farms, but are also bought and sold by various additional traders before they arrive at the slaughterhouse. Tracking often stops at the level of the last direct supplier, making it impossible to understand an animal's full life cycle, including the farms on which it lived. In the legal Amazon alone, there are over 570,000 smallholder cattle ranchers producing beef on either specialized or mixed dairy systems, or who sell calves to larger ranchers and feedlots. Most producers are not organized and do not belong to associations. Most production is extensive, with limited inputs and management, although industrial feedlots represent a growing share of cattle slaughtered in the country, reaching roughly 12 percent in 2016.[e]

Illegality, land speculation, and corruption remain challenges in the Brazilian cattle sector. Beef is traded less internationally than soy or palm oil, and the coverage of the sector with corporate deforestation-related commitments is comparatively low. Lack of a widely used certification standard makes compliance checks difficult. However, great success has been achieved in Brazil through cooperation between producers, nongovernmental organizations (NGOs), and public agencies in the Brazilian Amazon Soy Moratorium. It remains to be seen whether this success can be replicated for the Cerrado or in the beef supply chain.

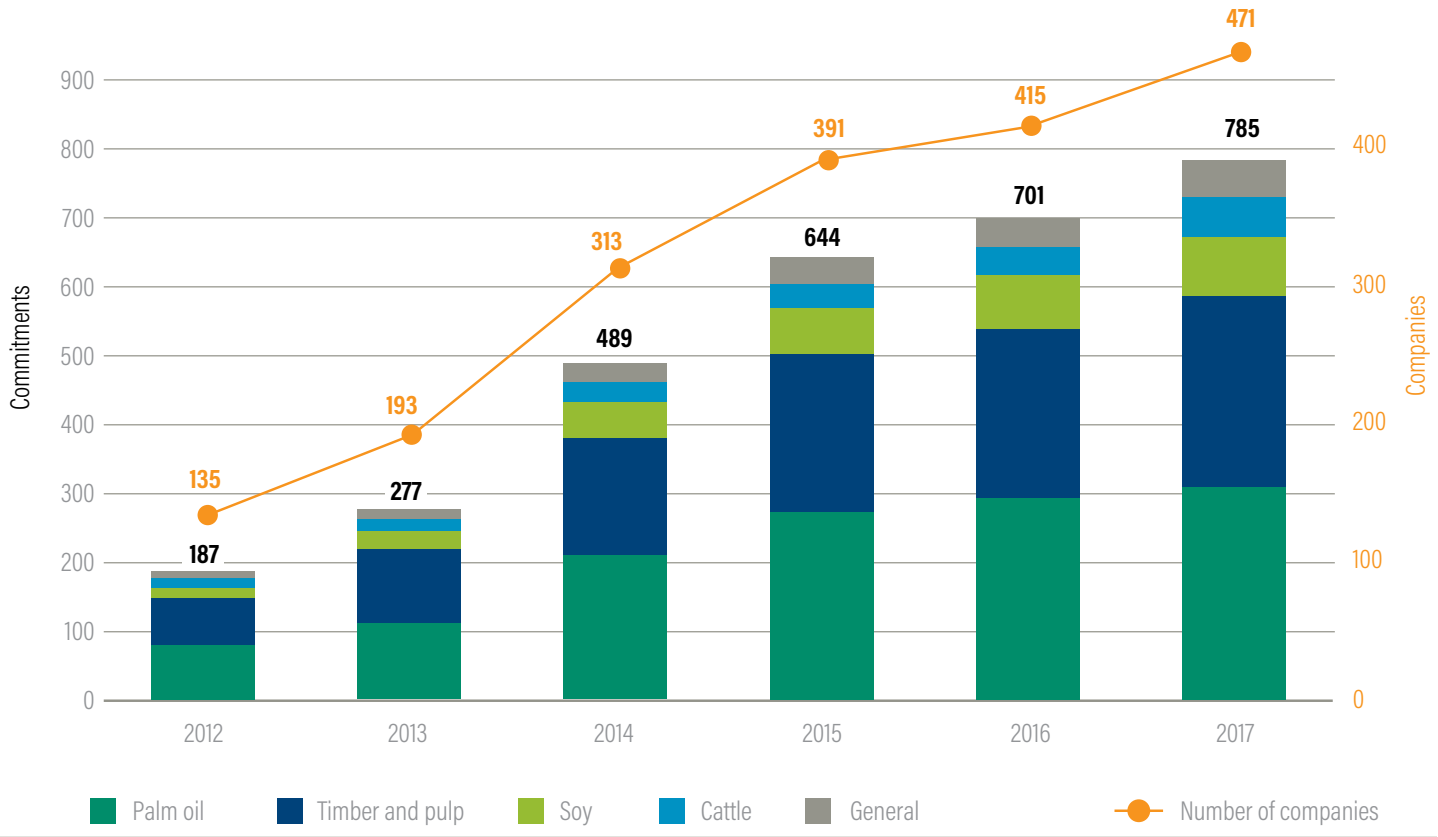
Sources: a. Persson et al. 2014; b. Walker et al. 2013; c. Climate Focus, 2017. d-e. ABIEC et al. 2017.

PROGRESS ACHIEVED

According to 2017 data from Forest Trend's Supply Change Initiative, 471 companies operating in forest-risk food and fiber supply chains (i.e., cattle, palm, soy, timber, and pulp), have committed to eliminating or reducing deforestation associated with at least one commodity, while a smaller portion have made commitments that cover several commodities (Donofrio et al. 2018). Palm oil and wood products are the sectors most covered, while the number of commitments made in the beef and soy sectors is significantly lower (see Figure 1). However, while these statistics point to the growing number of companies with commitments, they shed little light on what share of trade in different commodities is covered by or conforms to the commitments.

A minority of commitments can be considered of robust quality, defined by their reference to a time-bound target and established criteria for sustainable land use. Only between 12 percent and 22 percent of commitments reported to CDP[5] are time-bound and explicitly refer to goals for zero (net) deforestation—excluding areas of high conservation value (HCV), high carbon stock (HCS), or peatland from exploitation (see definitions in Box 2)—and require free, prior, and informed consent of local people to any land-use activity that affects the company (CDP 2017) (see Box 2).

Figure 1 | **Forest-Related Commitments in Agricultural Supply Chains**



Source: Climate Focus, 2017. Based on data presented by http://supply-change.org.

Box 2 | Concepts and Definitions

Companies that make and implement deforestation-free commitments use a wide range of definitions of what constitutes a forest, and hence what constitutes deforestation. In addition, they use different standards to determine what types of forest should be set aside for protection.

Gross vs. net goals for eliminating deforestation

Zero (gross) deforestation (ZD) means that no forest areas are cleared or converted.[a] However, companies use different concepts or may lack a clear definition of what qualifies as a forest area in terms of land cover, tree height, or density, or what counts as conversion.

Zero net deforestation (ZND) means no net loss of forest in a defined geographic area, accounting for both losses from deforestation and gains from forest regeneration and restoration. In this accounting, some clearance or conversion of forest is allowed, provided that the net quantity, quality, and carbon density of forests is maintained within the defined geographic area.[b]

Concepts used to delineate forests to be set aside

High conservation values (HCVs) are biological, ecological, social, or cultural values that are considered outstandingly significant or critically important at the national, regional, or global level.[c] Companies applying this concept typically pledge to avoid clearing areas with HCVs and to maintain and enhance HCVs through their operations.

The high carbon stock (HCS) approach distinguishes viable forest areas to be protected from degraded lands with low carbon and biodiversity values that are potentially suitable for plantations and crops. The approach is designed for use in fragmented forest landscapes and mosaics in the humid tropics, and to be integrated with HCV assessments and processes to respect community rights to lands and to free, prior, and informed consent.[d]

Sources: a. Lake and Baer 2015; b. WWF 2015; c. HCV Resource Network 2013; d. HCS Approach Steering Group 2018.

Most companies rely on a mix of external standards and internal policies that set the relevant conditions and translate commitments into incentives and disincentives for upstream counterparts. The tools that are most commonly used to implement commitments are certification schemes or public-private agreements such as moratoria. Some companies also define their own sourcing criteria, especially for those sectors that do not yet offer established certification standards or other implementation strategies. In addition, companies use traceability systems or work directly with their suppliers to support the implementation of their commitments.

In the palm oil and timber sectors, most companies rely on certification standards. Fewer companies rely on certification in the soy sector. Certification is hardly used in the cattle sector; instead, many cattle companies in Latin America rely on sectoral agreements to implement their commitments. For timber and palm oil, the Forest Stewardship Council (FSC) and Roundtable for Sustainable Palm Oil (RSPO) have offered certification for more than a decade. While certified palm oil and soy are almost entirely produced in tropical forest countries [6] FSC certified areas are mostly located in developed, non-tropical areas.

Ambitious initiatives that address deforestation at jurisdictional scale have started to integrate supply chain commitments with efforts to improve governance and land-use planning (Boyd et al. 2018). For example, the Brazilian states of Mato Grosso and Pará have engaged industry and nongovernmental organizations (NGOs) in promising programs to address deforestation at scale across multiple supply chains. States and regions are also actively cooperating under the Governors' Climate and Forest Task Force to define strategies that combine forest conservation with productive landscapes.

Advances in remote sensing, algorithms, and cloud computing[7] are generating increasingly accurate and timely deforestation alerts. For example, University of Maryland Global Land Analysis & Discovery (GLAD) alerts on Global Forest Watch (GFW) are updated on a weekly basis with 30-meter resolution across the tropical areas of Latin America, Southeast Asia, and the Congo Basin.[8] These alerts offer a means for companies to monitor compliance of suppliers with procurement requirements, NGOs to sound the alarm on new forest clearing activity, and government officials to investigate and prosecute illegal forest clearing in remote locations.

Progress has also been made toward increased transparency on data critical for assessing whether companies are complying with their pledges. For example, stakeholders in the palm oil sector have created a "Universal Mill List" with a unique identification number and precise geographic location for each mill.[9] The Sustainable Palm Oil Transparency Toolkit (SPOTT) generates scores on company sustainability and transparency commitments based on publicly available certification, traceability, and environmental management information.[10] The Transparency for Sustainable Economies (TRASE) tool draws on production, trade, and customs data and modeling to trace commodity flows back to production landscapes while identifying the actors involved.[11]

Methodologies have been developed to delineate forests to be conserved from land that can be cleared and planted in compliance with supply chain commitments. Recent progress includes better integration of HCV and HCS assessments and processes to secure the free, prior, and informed consent of customary rights holders. To increase the reliability and usability of such assessments for new developments, both the RSPO and the HCS approach require these to be done by licensed assessors.

Most global sustainability standards and methodologies require interpretation to fit national circumstances. This builds legitimacy by giving local stakeholders a say in how international principles are interpreted in their context, and creates certainty by cross-referencing related national processes, data sets, and regulations (Putraditama et al. 2015; Taylor et al. 2017). Certification standards have benefited from national interpretations of their international principles and criteria.[12] Governments participating in the TFA 2020 Africa Palm Oil Initiative have agreed on regional principles for responsible palm oil development in West and Central Africa, and several countries have developed national principles (TFA 2017). At the cross-commodity level, more than 20 countries have national definitions of high conservation values (although not all of these are aligned with the most recent global guidance on the HCV concept) (HCV Resource Network 2018).

REMAINING CHALLENGES

Deforestation driven by agriculture needs to be urgently addressed to protect forests' ecological and social functions. Company commitments are an important first step. However, they do not readily translate to reduced deforestation rates. This is because of varied, often vague definitions of what qualifies as deforestation-free production or sourcing; inconsistent monitoring and reporting; inadequate incentives, finance, and technical support to producers, particularly smallholders; limited and indirect ability of downstream brands, retailers, and traders to transform commodity production; leakage to places, markets, or actors not covered by commitments; and unresolved land conflicts, inconsistent or outmoded regulations, illegal forest conversion, and corrupt allocation of permits in many deforestation fronts.

Inconsistent commitment definition and implementation

Supply chain commitments vary widely in scope (e.g., some do not apply to third-party suppliers or exclude one or more commodities), ambition (e.g., no deforestation versus more comprehensive sustainability goals), time frame, and how they define deforestation-free production, sourcing, and investment (Beckam et al. 2014). This variation in commitments leads to a wide range of implementation strategies, from geographic moratoria to reliance on certification. It also sends conflicting signals to suppliers, so far as they have to grapple with a multitude of procurement criteria, traceability systems, and supplier engagement strategies on the part of their customers. Vague commitments provide room for delayed implementation, and the related lack of common performance metrics makes it difficult to assess and compare results. In recognition of this challenge, a coalition of NGOs is developing an Accountability Framework to harmonize and strengthen definitions and systems for monitoring, verifying, and reporting on implementation of corporate forest-related commitments.[13]

Lack of financial and technical support for producers

Price premiums, market access, and offers of technical assistance are typically cited as incentives for producers to improve their practices. However, premiums to farmers are rare**.** From traders to retailers and eventual consumers, there is limited willingness to pay a higher price for more sustainable products. Access to markets, finance, and donor support are all cited as benefits of certification, but these do not always outweigh the costs associated with certification audits, improved practices, and reduced production due to set-asides (Breukink et al. 2015; KPMG 2013; Levin 2012; Ruslandi et al. 2014).

Similarly, agricultural extension services are needed in order for farmers to shift to more sustainable practices and overcome some of the challenges related to technical capacity, especially in the beef sector, which is still characterized by low efficiency and minimum management inputs. Except for pilot initiatives in collaboration with public actors, very few supply chain companies provide technical assistance to farmers in the beef sector, while others look to public sector capacity-building programs. In the absence of public support, this leaves farmers with little incentive to change practices. Finally, farmers often lack access to finance for sustainable production due to lack of formal title to their land, administrative hurdles, complex requirements, and a lack of tailored credit for intensification measures.

Research shows that while large gains could be made in smallholder productivity, the large numbers of actors with different and at times conflicting incentives means that achieving this potential requires coherent approaches to agricultural development. Combining sustainable intensification, restoration of degraded land, and forest conservation measures allows small operations to produce more without having to acquire more land through deforestation. To ensure that financial and capacity support reaches smallholders, small and medium-size producers must be organized and trained. A promising example is the 2017 Cocoa and Forests Initiative that brings together leading cocoa and chocolate companies, as well as the governments of Côte d'Ivoire and Ghana, in a joint effort to promote sustainable smallholder cocoa production, social inclusion, and forest protection (Kroeger et al. 2017).

Critical missing actors

Among financial institutions, safeguards to prevent deforestation are still rare and not yet a standard in lending and investment policies. According to the website Forests & Finance, in 2016 28 banks provided most of the financial services to the forest risk sectors in the Asia Pacific region, and more than half (58 percent) have published specific safeguard policies or environmental, social, and governance (ESG) guidelines (Forests & Finance 2016). However, the coverage of these policies was limited, and few banks applied the policy to their entire portfolio and clients within a company group (Climate Focus 2018).

While producer countries need to enhance policy and strengthen forest governance, consumer countries need to explore regulatory measures and procurement standards to reduce deforestation embedded in imported products. For example, in 2016 the Norwegian Parliament pledged to achieve deforestation-free public procurement. The European Union, the United States, and Australia have regulations that penalize trade in products containing timber implicated in illegal logging in its country of origin (Barber and Canby 2018).

To transform supply chains, action is needed from all buyers (including emerging economy entities that source domestically or import commodities). China is the world's largest importer of soy and pulp and paper products (Henders et al. 2015), and is projected to become the world's second largest importer of beef, after the United States (USDA 2017). India is the world's largest importer of palm oil products, followed by the European Union and China (Henders et al. 2015). The participation of supply chain actors in China and India—including governments, the private sector, and consumers—is therefore key to eliminating deforestation from the four key commodities.

Actors with limited agency

Halting deforestation linked to agricultural commodities requires a "farm-to-fork" approach of coordinated action by producers, traders, processors, manufacturers, and retailers. Many companies with supply chain commitments are downstream companies with limited direct control over commodity production. These companies often implement commitments through sourcing and procurement standards, but do little to help producers achieve those standards. Where a product is

traded via multiple intermediaries, manufacturer and retailers find engagement with actors further up the value chain challenging and cumbersome. Only about one-third of downstream companies conduct meaningful supplier audits (Climate Focus 2018) and verify compliance with sourcing policies through the supply chain. Such compliance checks are particularly relevant for beef or soy, for which certification is not widely adopted.

In recent years a small but increasing number of larger producers has taken on commitments, particularly in the palm oil sector, though it remains challenging to involve smallholder producers. Successful smallholder engagement is especially important for cocoa, as almost 90 percent comes from smallholder production. However, large volumes of beef and palm oil are also produced by smallholders who are unlikely to have the capacity to meet demand for verified deforestation-free commodities without stable support and incentives from procuring companies or governments (see Box 3).

Leakage

If voluntary private sector action is focused narrowly within the boundaries of companies' own operations and commodity sourcing, deforestation can simply move from one supply chain to another, or from one location to another. Leakage from one region or country to another is often due to producers shifting to places where they can take advantage of weak policy frameworks or law enforcement. Success in stopping deforestation in one place can displace land conversion pressures to other forests, or to non-forest ecosystems such as grasslands and wetlands. For example, the Brazilian Amazon Soy Moratorium has led to a significant reduction in deforestation in the Amazon, but deforestation from soy remains high in other areas, such as the Cerrado. Producers of other commodities can expand into the "no-go" zones of sectors that become deforestation-free. Producers can also avoid deforestation by disposing of landholdings that contain forests, leaving those forests' fate in the hands of the next owner. For example, a study focused on palm oil in Indonesia found companies had relinquished HCV forest areas in their initial permits, which could then be reallocated to other companies willing to convert them or become targets for encroachment by migrant smallholders (Colchester et al. 2009).

Box 3 | **Palm Oil in Indonesia**

With a production volume of nearly 35 million metric tons in 2016,[a] Indonesia is the world's largest producer of palm oil, holding 53 percent of the global market share. Continuing expansion of cultivation is a key driver of deforestation, greenhouse gas emissions, and biodiversity loss there. Illegality and corruption remain a problem in Indonesia's palm sector.[b]

Nearly three-quarters of Indonesian palm oil production is exported,[c] and 1.8 million ha are certified by the Roundtable for Sustainable Palm Oil (RSPO).[d] It is essential to further extend the coverage of these commitments. In particular, convincing large producers to adopt commitments, combined with smallholders' transition to more sustainable practices, is critical for transforming the palm oil value chain in Indonesia. Smallholder integration into the supply chain remains a challenge for any extension program. Smallholders' understanding of markets is limited, primarily perceiving them as point of sales and linkage to middlemen and mill companies. For smallholders, mill companies represent the most important buyers, since they usually achieve better prices with them than with agents or middlemen.[e] However, the number of mills with RSPO-certification is still limited, and smallholders do not generally regard certification as a beneficial tool for market access, more likely viewing it as a constraint to accessing mills and selling produce.[f] Incentives to assume the costs and efforts of certification are often lacking. The government's new regulation on sustainable palm oil (Indonesian Sustainable Palm Oil, ISPO) could become a viable alternative to private RSPO certification if institutions and the safeguards on forests and rights in the standard were strengthened.[g]

Sources: a. Palm Oil Analytics 2017; b. Dauvergne 2018; c. USDA FAS 2018; d. RSPO 2018; e-g. Hidayat et al. 2015.

Weak governance and conflicting regulations, spatial plans, and permits

Progress toward deforestation-free supply chains can be hampered by regulatory systems that offer legal permits to convert forests to farms, spatial plans that zone forest land as suitable for agricultural development, and the absence of effective mechanisms to delineate and secure land rights. Regulations that protect forests may also be subverted by lax law enforcement, poor land-use planning, and corruption. In such contexts, companies that incur costs by complying with forest laws may struggle to compete with competitors that avoid those costs by flouting the law.[14]

EVIDENCE GAPS AND AREAS OF CONTROVERSY

There are no comprehensive global assessments on whether and how supply chain efforts have contributed to reducing overall deforestation rates. Answering this question would require new data sets on the following: progress by companies in implementing their supply chain commitments; the share of trade in a commodity that is covered by supply chain commitments; the relative importance of leakage; and the relative impact of commodity production vs. other drivers of deforestation.

Company progress. A comprehensive picture of progress made by individual companies is currently missing, as few companies systematically report on the status of implementation of their commitments. Consequently, most assessments of progress focus on the number of commitments made and their scope. Limited research exists on how far companies have progressed toward achieving their commitments, partially due to a lack of consistent metrics to measure progress.

Portion of market covered. While there is some evidence that deforestation-related commitments cover a significant share of the palm oil and wood product markets,[15] little evidence is available on the degree to which such commitments affect domestic buyers and importers of these commodities in emerging economies such as China, India, Indonesia, and Brazil. For beef and soy, along with second-tier deforestation commodities such as cocoa, rubber, sugar, coffee, and avocados, there is very little evidence of what portion of trade—globally or from deforestation fronts—is covered by deforestation-free commitments. Leakage is more likely where only a small percentage of the trade in a commodity is covered, and rogue suppliers can still find buyers.

Data on leakage. The understanding of displacement effects remains sketchy, and there are very few studies that look at when and where corporate commitments to protect forests have led to a shift in the drivers of deforestation. Studies that examine regional displacement and displacement of one commodity to another would be essential to assess the effectiveness of efforts to increase the sustainability of agricultural production.

Tracking drivers. There is a need to understand the dynamics of emerging drivers of deforestation and to bring new forest-risk commodities into the scope of the deforestation-free supply chain movement. In addition, better mapping of other deforestation drivers could provide useful insights into where supply chain pledges can be expected to have a major impact on deforestation rates and where other approaches are more likely to succeed.

To engage or shun high-risk suppliers. Evidence is lacking regarding the relative impact of different approaches to non-compliant suppliers. Commodity buyers or financiers can minimize reputational risks through zero-tolerance approaches to suppliers and clients that do not meet their standards. However, cutting off such suppliers and clients may ultimately be less effective in motivating them to shift to more sustainable practices than continued engagement and conditional support. Similar questions arise around the relative impact of continuing to do business in jurisdictions struggling to address drivers of deforestation vs. avoiding them altogether. More research is needed on the relative impact on deforestation and other sustainability issues of exclusion vs. the inclusion of non-compliant suppliers in different contexts, and under what timelines and combinations of incentives and penalties.

CONCLUSIONS AND NEXT STEPS

The following priority actions would address the challenges described in this brief:

More harmonized commitments, implementation, and reporting. Greater consensus on what counts as a deforestation-free supply chain, and on how companies should track and report their progress toward such a goal, would make it easier for society to hold companies accountable for their commitments and help to achieve more aligned private sector action to eliminate deforestation from supply chains. In recognition of this potential, a coalition of NGOs is developing an Accountability Framework to harmonize and strengthen definitions and systems for monitoring, verifying, and reporting on the implementation of corporate forest commitments. Through the new Global Forest Watch Pro application, companies could quantitatively measure and report on the amount of tree cover loss occurring in the farms or supply sheds of the mills, silos, or slaughterhouses from which they source.

Reconciling global standards and local realities. More investment is needed in initiatives that enable the effective participation of local communities, farmers, NGOs, experts, and government agencies in the contextualization of international standards and approaches to specific geographies. Giving local

stakeholders and experts a say in how international principles are interpreted in their context builds legitimacy and provides clarity on exactly how international norms are to be interpreted in a particular country. Ideally, such contextualization would be done within the boundary conditions of a coherent global framework to prevent undue "watering down" of international norms.

Integration of public and private sector approaches. Demand for agricultural products can be met without deforesting where coordinated and integrated production and development strategies are in place. Landscape or jurisdictional approaches can take many different forms, but generally focus on combining public land-use planning and governance reforms with corporate programs to promote sustainable commodity production. They can potentially offer more enduring and inclusive solutions than voluntary actions by a subset of actors in an industry. Based on their public-private nature, jurisdictional approaches can enhance data and practice exchange, smallholder aggregation and incentivization, and leakage detection and prevention (Climate Focus 2017). They can also address and reconcile environmental, social, and economic issues driving deforestation within and outside supply chains (AlphaBeta 2017). Jurisdictional or landscape certification may also help to include smallholders where certification requirements are backed with financial support and sustainable intensification. However, because of their scale, the variety of disparate actors and agencies that need to be together, and the fact that they are most needed in places where deforestation is a symptom of weak governance, these approaches are unlikely to be less challenging than working within supply chains. A TFA 2020 report published in 2017 documented 34 jurisdictional programs in tropical forest regions across Asia, Africa, and Latin America that are supporting sustainable sourcing and production strategies within forest-risk value chains (palm oil, soy, coffee, cocoa, pulp, and cattle) (AlphaBeta 2017).[16]

Bring missing actors into supply chain movements. Supply chain efforts need to actively involve those actors that currently remain largely outside of deforestation-free commitments. These actors include smallholders, small and medium-sized enterprises in forest countries, the financial sector, and public and private actors in emerging economies such as China and India.

Since 2010, corporate deforestation-related commitments have grown into a supply chain movement, with hundreds of players engaged, supporting institutions created, and monitoring and accountability mechanisms designed. Yet corporate actors cannot stop deforestation on their own. Future efforts must ensure effective cooperation between public and private actors in both production landscapes and the regulation of trade. To avoid leakage, the movement must expand to cover all significant markets (including domestic buyers, emerging economy importers, and the financial markets) and support smallholders to achieve deforestation-free production practices. The long-term success of efforts to curb commodity-driven deforestation requires improved governance in forested landscapes and stronger incentives to conserve standing forests.

The urgency of achieving an early peak and decline in greenhouse gas emissions, avoiding irreversible declines in biodiversity, and preventing further irremediable displacement of customary rights-holders requires companies, governments, and civil society to redouble their efforts to meet the 2020 forest goals. To this end, a supply chain effort 2.0 that expands the size, scope, rigor, and ultimately effectiveness of action to eliminate commodity-driven deforestation offers the prospect of getting as close as possible to these goals by 2020 and achieving the NYDF's 2030 goal to halt all loss of natural forest.

ABBREVIATIONS

ESG	environmental, social, and governance
FAO	Food and Agriculture Organization
FSC	Forest Stewardship Council
GFW	Global Forest Watch
GLAD	Global Land Analysis & Discovery
ISPO	Indonesian Sustainable Palm Oil
HCS	high carbon stock
HCV	high conservation value
NGO	nongovernmental organization
NYDF	New York Declaration on Forests
RSPO	Roundtable for Sustainable Palm Oil
RTRS	Roundtable on Responsible Soy
SPOTT	Sustainable Palm Oil Transparency Toolkit
TFA	Tropical Forest Alliance
ZD	zero deforestation
ZND	zero net deforestation

ENDNOTES

1. As of October 2017, 469 out of 800 companies with such exposure that are tracked on the Supply-Change.org website had made forest commitments (Donofrio et al. 2018).

2. The Consumer Goods Forum (https://www.theconsumergoodsforum.com/) is a global, member-driven, industry network that encourages the global adoption of practices and standards that serve the consumer goods industry worldwide. For details on the deforestation commitment, see Wensing and Van der Wekken 2017.

3. The Tropical Forest Alliance 2020 (https://www.tfa2020.org/en/) is a global public-private partnership in which partners take voluntary actions to reduce tropical deforestation associated with the sourcing of commodities.

4. The New York Declaration on Forests (http://forestdeclaration.org/) is a voluntary and nonbinding international declaration to act to halt global deforestation.

5. CDP, formerly the Carbon Disclosure Project (https://www.cdp.net/en), runs a global disclosure system that enables companies, cities, states, and regions to measure and manage their environmental impacts.

6. Brazil, Paraguay, and Argentina account for 90 percent of the area under Roundtable on Responsible Soy (RTRS) certification, and Brazil alone accounts for 98 percent of ProTerra-certified soy.

7. For more on forest monitoring, see the companion paper in this series, "Tropical Forest Monitoring" (Petersen et al. 2018).

8. For more, see the GLAD Alerts database: http://www.globalforestwatch.org/map/5/2.36/-67.22/ALL/grayscale/umd_as_it_happens?tab=analysis-tab&begin=2015-01-01&end=2017-11-26&dont_analyze=true. Accessed April 2018.

9. Fore more, see the Palm Oil Mills database: Washington, DC: Global Forest Watch. http://data.globalforestwatch.org/datasets/ed8d-5951b2a4482a9e62c4fe0bc23b5f_27. Accessed April 2018.

10. For more on transparency, see the companion paper in this series, "Mining Global Financial Data to Increase Transparency and Reduce Drivers of Deforestation" (Graham et al. 2018).

11. SPOTT. 2018. Tracking transparency, supporting sustainability. https://www.spott.org/

12. In the timber sector, numerous national standards have been developed under the auspices of the Forest Stewardship Council (FSC 2018) and the Program for Endorsement of Forest Certification standards (PEFC 2018). For palm oil, 15 countries have national interpretations of the Roundtable on Sustainable Palm Oil principles and criteria completed or under public consultation (RSPO 2018); the Round Table on Responsible Soy has national interpretations of its standard for 7 countries (RTRS 2018).

13. The Accountability Framework can be accessed at https://accountability-framework.org/.

14. For more on forest legality initiatives, see the companion paper in this series "Assessing the Timber Legality Strategy in Tackling Deforestation: Accomplishments and Remaining Challenges in Addressing Illegal Logging and Associated Trade" (Barber and Canby 2018).

15. The majority of the 629 companies assessed by Supply-Change.org that source or produce palm oil (59 percent) and wood products (53 percent) had made commodity-specific commitments (Climate Focus 2016).

16. For more on jurisdictional approaches, see the companion papers in this series, "Jurisdictional Approaches to REDD+ and Low Emissions Development: Progress and Prospects" (Boyd et al. 2018) and "REDD+: Lessons from National and Subnational Implementation" (Duchelle et al. 2018).

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World Resources Institute is a global research organization that turns big ideas into action at the nexus of environment, economic opportunity, and human well-being.

Our Challenge
Natural resources are at the foundation of economic opportunity and human well-being. But today, we are depleting Earth's resources at rates that are not sustainable, endangering economies and people's lives. People depend on clean water, fertile land, healthy forests, and a stable climate. Livable cities and clean energy are essential for a sustainable planet. We must address these urgent, global challenges this decade.

Our Vision
We envision an equitable and prosperous planet driven by the wise management of natural resources. We aspire to create a world where the actions of government, business, and communities combine to eliminate poverty and sustain the natural environment for all people.

Our Approach
COUNT IT
We start with data. We conduct independent research and draw on the latest technology to develop new insights and recommendations. Our rigorous analysis identifies risks, unveils opportunities, and informs smart strategies. We focus our efforts on influential and emerging economies where the future of sustainability will be determined.

CHANGE IT
We use our research to influence government policies, business strategies, and civil society action. We test projects with communities, companies, and government agencies to build a strong evidence base. Then, we work with partners to deliver change on the ground that alleviates poverty and strengthens society. We hold ourselves accountable to ensure our outcomes will be bold and enduring.

SCALE IT
We don't think small. Once tested, we work with partners to adopt and expand our efforts regionally and globally. We engage with decision-makers to carry out our ideas and elevate our impact. We measure success through government and business actions that improve people's lives and sustain a healthy environment.