FOREST TRENDS | PUBLIC-PRIVATE FINANCE INITIATIVE



Toward a Financial Architecture to Protect Tropical Forests: The Case of Brazil

Rupert Edwards

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About Forest Trends

Forest Trends works to conserve forests and other ecosystems through the creation and wide adoption of a broad range of environmental finance, markets and other payment and incentive mechanisms. Forest Trends does so by: 1) providing transparent information on ecosystem values, finance, and markets through knowledge acquisition, analysis, and dissemination; 2) convening diverse coalitions, partners, and communities of practice to promote environmental values and advance development of new markets and payment mechanisms; and 3) demonstrating successful tools, standards, and models of innovative finance for conservation.

About Forest Trends' Public-Private Finance Initiative

Conserving forest and ecosystems and transforming land use at scale to sustainable low-emissions production systems requires substantial investment. Our Public-Private Finance Initiative is strategically focused on creating architectures that increase the amount of capital flowing to land-use practices which reduce emissions from deforestation and degradation, improve the productivity of agricultural and livestock systems, and enhance livelihoods of rural populations. Toward a Financial Architecture to Protect Tropical Forests: The Case of Brazil

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SUPPORTERS









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Acronyms

| ABC | Low-Carbon Agriculture (Programa para Redução da Emissão de Gases de Efeito Estufa na Agricultura) |
|--------------------|--|
| APP | Areas of Permanent Protection (under the Forest Code) |
| BNDES | Brazilian Development Bank (Banco Nacional de Desenvolvimento Econômico e Social) |
| CAR | Rural Environmental Registry (under Forest Code) (Cadastro Ambiental Rural) |
| CRA | Environmental Reserve Quotas (under Forest Code) (Cotas de Reserva Ambiental) |
| DFI | Development Finance Institution |
| GATT | General Agreement on Tariffs and Trade |
| IBA | Brazilian Tree Industry (Industria Brasileira da Arvores) |
| LR | Legal Reserve (under Forest Code) |
| NDC | Nationally Determined Contribution (under UNFCCC) |
| PES | Payments for Ecosystem Services |
| PFP | Payments for Performance (results-based financing under REDD+) |
| PCA | Priority Conservation Area (officially identified by Ministry of Environment) |
| PLANAVEG | National Plan for Restoration of Native Vegetation |
| PRA | Environmental Compliance Program (under the Forest Code) (Programas de Regularização Ambiental) |
| PRODES | Brazilian Amazon Forest Monitoring by Satellite (Monitoramento Da Floresta Amazônica Brasileira Por Satélite |
| PRONAF | National Program for Strengthening Family Agriculture (Programa Nacional de Fortalecimento da Agricultura Familiar) |
| REDD+ | Reducing Emissions from Deforestation and Forest Degradation (under UNFCCC) |
| SICAR | National System for the Rural Environmental Registry (Sistema Nacional de Cadastro Ambiental Rural) |
| SNCR | National Rural Credit System (Sistema Nacional do Credito Rural) |
| tCO ₂ e | Metric tons of carbon dioxide equivalent |
| UN FAO | United Nations Food and Agriculture Organization |
| UNFCCC | United Nations Framework Convention on Climate Change |
| UN GCF | United Nations Green Climate Fund |
| WTO | World Trade Organization |

Foreword

We have outlined in this report an architecture of finance for the protection of tropical forests that brings together an array of approaches into one integrated strategy. Our recommendations link three fundamental pieces of this architecture:

- Enhancing the effectiveness of REDD+;
- Supporting the implementation of forest country policies and legislation for forest protection;
- Harnessing private sector funding for forest protection from commodity buyers, agribusiness, and consumers.

More specifically, we have recommended:

- The use of put options/price floors for public REDD+ payments to support the development of carbon markets, harness private REDD+ funding and thus help capture additional "option value" from forest carbon assets;
- Enhanced bond structures, explicitly linked to REDD+ payments, to align interests between donors and forest countries so that both feel able to commit a greater scale of resources and thus catalyze upfront investment at low cost from the capital markets;
- Linking REDD+ in a concrete way to support implementation of Brazil's powerful Forest Code legislation and more ambitious outcomes for avoided deforestation;
- Support for jurisdictional REDD+ from not only energy-intensive industries seeking to offset a portion of their potential compliance obligations, but also from commodity buyers/agribusiness needing to meet zero or "zero net" deforestation commitments.

Some good examples of blended finance for sustainable land-use projects demonstrate the benefits of linking increases in agriculture/timber productivity with conservation. However, a financial architecture will need to support the implementation of the broader enabling environment of public policy and regulation to catalyze a much larger scale of pro-forest investments than could be achieved through focusing only on discrete project activities with bespoke blended finance structures.

Therefore, the primary intention of these recommendations is to reduce the fiscal burden on forest countries of achieving ambitious Nationally Determined Contributions (NDCs) outcomes, allowing them to implement effective policy, to generate incentives to private investment, and to expand their support for successful blended finance models on the ground that combine forest conservation, sustainable forest management, and improvements in agriculture productivity.

We have focused in this report on Brazil specifically in relation to implementation of its Forest Code legislation. Other forest countries face different conditions. In Peru, for example, the primary driver of deforestation has been from small farmers rather than large-scale agriculture. Also, export markets for agriculture commodities are less developed and the Forest Law is a relatively new piece of legislation. On the other hand, Peru has achieved higher recent economic growth rates and has an investment-grade sovereign credit rating. Still, the approaches we recommend are intended to be adaptable in other forest countries, even if they face different conditions to Brazil. They could support implementation of, for example, the Forest Law in Peru, which is also pursuing an ambitious NDC and jurisdictional REDD+ goals and where regional governments are developing Production-Protection strategies.

This is an ambitious vision for integration that will require: a) political will and opportunity; b) real leadership from the international donor community to support committed forest countries; c) bold partnership from the private sector; d) creative acumen from the finance sector; and e) opportunities large enough to bring together these different actors. The urgent forest and climate crisis as well as future generations demand nothing less.

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1. Executive Summary

Ambitious NDC¹ goals for conservation and restoration of forests will require the mobilization of multiple US\$10s of billions in additional investment. The aim of this report is to outline an architecture of finance for protection of tropical forests that might better align and integrate policies and resources (public and private, international and local) for forest conservation and restoration, and more productive agriculture and forestry sectors, and that is better able to finance the requisite transitions at scale.

Discussion of a financial architecture for forests must acknowledge the importance of basic enabling conditions in forest countries without which the financial "tail" cannot wag the real economy "dog." Market risks, poor legal, and regulatory conditions or lack of institutional commitment can constitute an insurmountable barrier to large-scale financing. Nevertheless, many countries have sufficient capacity, but face challenges from fiscal constraints and insufficiently compelling terms for private sector investment.²

This report will focus on Brazil both as a critical forest country and in order to describe an architecture of finance based on a particular framework of law and existing institutional efforts to protect forests. Despite a challenging macroeconomic environment, Brazil has the most developed legislative framework for tropical forest protection in the Forest Code,³ powerful institutional capacity including in its large public agriculture finance institutions, and high levels of foreign investment and trade in commodities associated with deforestation.

We will address two integrated dimensions of a comprehensive strategy to stabilize the forest frontier. There is currently a major focus on commercial approaches to improving productivity on the agricultural side of the frontier. While this focus is important, there needs to be a parallel investment into the protection of forests, ensuring that the public goods forests provide (climate, water, biodiversity) have real value. Building a successful market and policy strategy to effectively stabilize the forest frontier will necessarily require the building and connecting of three fundamental pieces of the architecture.

Recommendations: Towards an Integrated Strategy

1. Enhancing the Effectiveness of REDD+

The central challenge for forest country governments is that investments related to Nationally Determined Contributions (NDCs) for forest protection have lower economic returns and come at greater fiscal cost than business-as-usual over the short to medium term (even if forest ecosystem services may be crucial to long-term economic resilience). This limits the ability of governments to undertake public NDC activities and create real economy signals that would result in commercial financial returns and greater levels of investment from private actors shifting from "grey" to "green."⁴

International support in the form of traditional development finance tools (grants, loans, and guarantees) does not by itself mobilize sufficient investment for ambitious NDC goals. REDD+⁵ results-based finance is seen as having the most potential for scale, is central to the Paris Agreement,⁶ would form the bulk of significantly scaled-up international climate finance and will be critical in reducing fiscal costs for forest countries.

There are two key challenges in relation to the deployment of REDD+ results-based finance in countries that have reached a good stage of "readiness" in terms of their enabling conditions:

• There is a need for very large-scale REDD+ results-based funding commitments. This reflects the fact that NDC forest and "jurisdictional" REDD+ programs require something of a "leap of faith" with a major long-term investment commitment of the kind that limited REDD+ funding may struggle to encourage. Bilateral

¹ NDC: Nationally Determined Contribution under the UN Framework Convention on Climate Change (UNFCCC).

² World Bank. 2017. The Potential Role of Enhanced Bond Structures in Forest Climate Finance. Washington, DC, World Bank.

³ The Forest Code or Native Vegetation Protection Law.

⁴ World Bank (2016): Support to the Implementation of the Brazilian INDC: Brazil's INDC restoration and reforestation target, The World Bank, Brasilia, November 2016.

⁵ REDD+: Reducing Emissions from Deforestation and Forest Degradation under the UN Framework Convention on Climate Change (UNFCCC).

⁶ Under the UN Framework Convention on Climate Change (UNFCCC).

or multilateral public "Payments for Performance" (PFP) alone appears unlikely to provide the scale of financing required for the achievement of ambitious NDC outcomes in all tropical forest countries.

• There are also challenges in linking future results-dependent REDD+ revenue streams with current financing flows for forest protection. There remains an upfront funding gap with the risk of insufficient investment available to achieve the results for which payments would be made. The challenge is not just that payments occur after results. Capital expenditure financing generally can take a long time to generate revenue in other sectors, such as energy production. But achieving jurisdictional reduced-deforestation outcomes and associated revenues can appear to potential financiers less proven and more uncertain than for other sectors.

Therefore, two developments would address these challenges:

- Firstly, stimulating demand for REDD+ credits from markets and private actors would reduce the burden on public budgets, although significant public funding will be required to underpin the development of the UN architecture of REDD+ carbon markets, and also to catalyze demand from private actors.
- Secondly, complementary private financial flows outside of carbon markets will also be essential, enabled by appropriate financing instruments.

We therefore recommend:

- The use of put options⁷/price floors in place of the fixed-price purchase agreements currently used for verified emissions reductions under REDD+: The use of put options would support the development of carbon markets, supplement public with private REDD+ funding, and thus help capture additional "option value" from forest carbon assets.
- Enhanced bond structures, explicitly linked to REDD+ results-based finance, to attract upfront private capital toward forest-based NDC activities at a much greater scale than might be achieved through currently available financing instruments.



2. Supporting the Implementation of Forest Country Policies and Legislation for Forest Protection

A financial architecture will need to work with the grain of local conditions, supporting the implementation of public policy and regulation as a means to catalyze a much larger scale of pro-forest investments than could be achieved through focusing only on discrete project activities with bespoke blended finance structures.

With this in mind, we focus on two approaches that could efficiently improve the linkage between REDD+ and forest protection measures on the ground by supporting implementation of Brazil's powerful Forest Code legislation and utilizing the capacity of its public banks, as well as supporting more ambitious outcomes for avoided deforestation:

- Expanding the capacity of Brazil's public banks to provide loans, at significantly lower rates of interest, for farmers to invest in reforestation as part of regularization programs to comply with the Forest Code;
- The opportunity for a range of public and private actors to buy and retire quotas permitted to landowners under the Forest Code, valuing "surplus" forest to compensate farmers for avoided legal deforestation and thus supporting more ambitious targets overall for avoided deforestation in Brazil.



3. Harnessing Private Sector Funding for Forest Protection from Commodity Buyers, Agribusiness, and Consumers

There are substantial opportunities for private actors in profitably improving agriculture and timber productivity on already deforested lands, including among smallholders. Doing so is critical for development goals, would reduce the need for forest conversion, and could take pressure off existing forests, provided it is accompanied by implementation of legal frameworks for conservation.

⁷ The writer (seller) of a put option has an obligation to buy the underlying security at the strike price if the option is exercised.

Policymakers in forest countries and internationally are focused on integrating investment in "Production" with "Protection," and we analyze some successful examples of blended public-private finance projects linking improvements in agriculture productivity with conservation outcomes. We also analyze the potential for scaling up private investment in Sustainable Forest Management in order to meet NDC goals for forest restoration. And we discuss the importance of building economic enterprises among forest-based communities. However, we note that, with revenue streams from forest conservation generally weak or absent, scaled-up public funding remains essential to achieving Protection outcomes.

A critical question, therefore, is the extent to which private actors might reduce the fiscal burden on forest countries and international donors of paying for the public goods associated with forest protection.

With the exception of a very limited pool of philanthropic capital, institutional investors are not in a position to subsidize costs if it means accepting sub-economic rates of return, given their fiduciary responsibilities to pension holders and other savers. Such investors will require bonds and private equity or blended public-private finance structures to generate risk-adjusted returns that are competitive. Other financial institutions such as banks have similar obligations to shareholders. The onus thus remains on public policy and public resources to value public goods.

Although producers, agribusiness, and food companies also require commercial returns, the sustainable commodity/zero deforestation supply chain agenda, a response to the role of agriculture as the primary driver of deforestation, could represent an opportunity to reduce costs for forest countries and donors. However, the significant increases in pledges for corporate zero deforestation commitments are very much struggling to stay on track.

The prioritization of purchasing agreements from private agribusiness actors for commodities from sustainable/zero deforestation supply chains would improve the competitive position of producers. But such purchasing agreements largely represent ex post sources of revenue and cannot finance the needed transition to sustainable production.

Moreover, businesses emphasizing the commitments to take deforestation out of supply chains need to be complemented by government, jurisdictional, and policy support to help achieve results. However, there are limitations to which government policy and legal options in commodity consumer countries can level the playing field for private actors and ensure the success of these commitments.

A mechanism needs to be developed by which commodity buyers, agribusiness, and consumers of food or wood products, even in competitive global markets, can help fund payments for public goods associated with forest conservation. A willingness to do so must ultimately be the central test of supply chain commitments to zero deforestation.

We therefore recommend a mechanism for integrating Production, Consumption, and Finance by explicitly linking investment from commodity buyers and agribusiness (representing a very small percentage of the total value of their commodity purchases) to support jurisdictional REDD+ outcomes and implementation of the Forest Code.



Conclusion: Piecing the Puzzle Together

The intention of these recommendations is to combine international public support for forest countries with payments for REDD+ credits from private actors (both energy-intensive industries seeking to offset a portion of their potential compliance obligations and commodity buyers/agribusiness needing to meet zero or "zero net" deforestation commitments).

This would have the effect of reducing the fiscal burden on forest countries as they seek to achieve ambitious NDC outcomes, allowing them to implement effective policy, to generate incentives to private investment, and to expand their support for successful blended finance models on the ground that combine forest conservation, sustainable forest management, and improvements in agricultural productivity.

2. Introduction

The aim of this report is to outline an architecture of finance for protection of tropical forests that might better align and integrate policies and resources (public and private, international and local) for conservation, restoration and more productive agriculture and forestry sectors, and that is better able to finance the requisite transitions at scale.

In September 2014, the UN New York Declaration on Forests (NYDF) announced commitments to cut global forest loss in half by 2020 and to end it by 2030; to eliminate all deforestation from commodity production by 2020; and to restore 350 million hectares (ha) of deforested land by 2030.

Since then, the Paris Agreement has provided a framework to halt and reverse tropical deforestation through Parties' Nationally Determined Contributions (NDCs) and a commitment to scaled-up climate finance for REDD+, in particular for results-based finance.

Ambitious NDC goals for conservation, restoration of forests and degraded pastures will require mobilization of multiple US\$10s of billions in additional investment. This will necessitate ambitious financing mechanisms and moving beyond microlevel development for projects to structuring approaches and instruments that can be scaleable, replicable, transferrable and relevant at national and international level.

Discussion of a financial architecture for forests must acknowledge the importance of basic enabling conditions in forest countries, without which the financial "tail" cannot wag the real economy "dog." Market risks, poor legal, and regulatory conditions or lack of institutional commitment can constitute an insurmountable barrier to large-scale financing. Nevertheless many countries have sufficient capacity, but face challenges from fiscal constraints and insufficiently compelling terms for private sector investment.⁸

This paper will focus on Brazil both as a critical forest country and in order to describe the architecture of finance based on a particular framework of law and existing institutional efforts to protect forests. Despite a challenging macroeconomic environment, Brazil has the most developed legislative framework for tropical forest protection in the Forest Code,⁹ powerful institutional capacity including in its large public agriculture finance institutions and high levels of foreign investment and trade.

There is increasing focus from donors and forest countries on the need for integrated "Production and Protection" goals that combine increases in agriculture productivity and improvements in livelihoods with conservation and forest regeneration— and to do so at a landscape level, regionally and nationally. Targeting "jurisdictional" outcomes also helps address the problem of "leakage" (i.e., of deforestation simply shifting from a project area to another area.)

Another advantage of supporting such jurisdictional approaches is that commodity buyers and food companies need to develop regional level strategies to make possible their sustainable sourcing commitments at a scale above farm level certification. Having international and domestic public funds support Protection outcomes at a jurisdictional scale could help commodity buyers see entire states as sustainable sourcing regions.

However, generating Return on Investment from Protection is a greater challenge than for improvements in Production, since revenue streams from forest conservation are generally weak or absent.

There are substantial opportunities for profitably improving agriculture and timber productivity on already deforested lands, including among smallholders. Doing so is critical for development goals, would reduce the need for forest conversion and could take pressure off existing forests, provided it is accompanied by implementation of legal frameworks for conservation. We analyze some successful examples of blended public-private finance projects to link improvements in agriculture productivity with conservation outcomes.

However, it remains challenging internalizing the public goods benefits of tropical forest ecosystems in the real economy. The drivers of deforestation (including agriculture and timber demand), consequent opportunity costs of avoided deforestation and the upfront investment requirements of transitioning to more efficient practices and green growth are considerable.

Goals 8 and 9 of the NYDF are respectively to "provide support for the development and implementation of strategies to reduce forest emissions" and to "reward countries and jurisdictions that, by taking action, reduce forest emissions—particularly through public policies to scale-up payments for verified emission reductions and private-sector sourcing of commodities."

⁸ See also: World Bank. 2017. The Potential Role of Enhanced Bond Structures in Forest Climate Finance. Washington, DC, World Bank.

⁹ The Forest Code or Native Vegetation Protection Law.

Climate Focus¹⁰ has calculated that roughly US\$20 billion has been made available for these goals since 2010, but has pointed out that this is a low percentage of total climate finance of US\$170 billion for all sectors in the period, given the importance of forests as part of the climate solution, and is marginal compared to the US\$777 billion in "grey finance" for the land sector. Public international finance for agriculture in deforestation countries is nearly 40 times greater than mitigation finance for forestry. Similarly, while there has been growth in philanthropic investment for forests seeking environmental and social benefits in addition to returns, (with cumulative commitments estimated at US\$2.7 billion for Latin America, Asia, and Africa),¹¹ green private investment remains a tiny fraction of grey finance in the sectors that drive deforestation. The total value of private investment (capital stocks) in farming, forestry, and fisheries sectors in deforestation countries in recent years is estimated at a cumulative US\$414 billion¹² and the production value of the four key agricultural commodities in tropical countries exceeds US\$1 trillion.¹³

A recent paper has suggested that "natural climate solutions," in particular "forest pathways," can provide 37% of cost effective CO₂ mitigation needed through 2030 for a >66% chance of holding warming to below 2 $^{\circ}$ C.¹⁴

Forests provide a range of other public goods including biodiversity habitat, air and water filtration, flood control, and enhanced soil fertility. And local beneficiaries of forest ecosystem services (such as water users) can contribute to the costs of forest conservation.

Numerous reports on tropical forest conservation or sustainable land-use conclude with the observation that "much more investment is needed" or that "the government should provide financial incentives" or that "blended finance and public-private initiatives are needed."

From the perspective of forest country governments, the central challenge is that forest NDC investments have lower economic returns and come a greater fiscal cost than business-as-usual over the short to medium term (even if forest ecosystem services may be crucial to long-term economic resilience). This limits the ability of governments to undertake public NDC activities and create real economy signals that would result in commercial financial returns and greater levels of investment from private actors.¹⁵

For example, the Brazil's Forest Code requires the government to provide incentives to help landowners to comply, but fiscal constraints from a challenging macroeconomic environment have prevented sufficient action on this front. Regulation has played a major role in reducing deforestation rates, but this trend has reversed in recent years indicating that implementation of the Forest Code is facing barriers.¹⁶

Achieving Brazil's NDC goals as they relate to land use and forests, and the successful implementation of the Forest Code would represent a major element of global GHG mitigation, ecosystem-based adaptation and biodiversity protection to 2030 and beyond; and could be achieved alongside strong growth in agricultural production. (Brazil's forest restoration targets could sequester between 1.4 and 2.3 billion tCO₂e according to the World Bank).¹⁷

¹⁰ Climate Focus. (2017). *Progress on the New York Declaration on Forests: Finance for Forests—Goals 8 and 9 Assessment Report.* Prepared by Climate Focus in cooperation with the New York Declaration on Forest Assessment Partners with support from the Climate and Land Use Alliance.

¹¹ Private finance based on: Hamrick, K. (2016). State of private investment in conservation 2016. A landscape assessment of an emerging market. Washington, DC: Ecosystem Marketplace.

¹² Climate Focus. (2017). *Progress on the New York Declaration on Forests: Finance for Forests—Goals 8 and 9 Assessment Report*. Prepared by Climate Focus in cooperation with the New York Declaration on Forest Assessment Partners with support from the Climate and Land Use Alliance: (Capital stocks in deforestation countries: Climate Focus analysis based on FAOSTAT data for gross capital stocks in agriculture, forestry and fishing of the value of assets held by the producer).

¹³ Tropical Forest Alliance 2020. (2017). The role of the financial sector in deforestation-free supply chains.

¹⁴ B.W. Griscom et al. (2017). Natural Climate Solutions. Proceedings of the National Academy of Sciences http://www.pnas.org/content/early/2017/10/11/1710465114.

¹⁵ World Bank (2016): Support to the Implementation of the Brazilian INDC: Brazil's INDC restoration and reforestation target, The World Bank, Brasilia, November 2016.

¹⁶ See for example: *Collaboration Toward Zero Deforestation Aligning Corporate and National Commitments in Brazil and Indonesia*. Dana Miller, Breanna Lujan (Environmental Defense Fund); Brian Schaap (Forest Trends). 2017.

¹⁷ See for example: *Collaboration Toward Zero Deforestation Aligning Corporate and National Commitments in Brazil and Indonesia*. Dana Miller, Breanna Lujan (Environmental Defense Fund); Brian Schaap (Forest Trends). 2017.

A financial architecture will need to work with the grain of local conditions, supporting the implementation of public policy and regulation as a means to catalyze a much larger scale of pro forest investments than could be achieved through focusing only on discrete project activities with bespoke blended finance structures.

Therefore, this report, which draws on recent and new work that Forest Trends has undertaken with partners, considers examples of how concretely to harness and combine international climate finance, forest country resources and private investment at greater scale to address this challenge and to support these goals.

3. Summary of Financial Architecture

International public resources will have to be successful in lowering the cost of capital for forest country public and private actors to undertake forest NDC goals.

Internationally, public support could come from:

- The Paris Agreement commitment to scaled up REDD+ finance, including large-scale results-based finance;
- Provision of concessional debt and risk guarantees from Development Finance Institutions (DFIs)/ Multilateral Development Banks (MDBs);
- Policy or legal measures (e.g., from OECD countries and major emerging markets) that incentivize commodity buyer and agribusiness to source from low/zero deforestation regions.

Private investment could come from:

- Agribusiness focused on sustainable/zero deforestation commodity supply chains. Demand for sustainably produced commodities domestically could improve the competitive position in global markets of regions considered to be low/zero-deforestation jurisdictions and result in increased revenues, technical support and financing flows;
- Self-financing by producers and supply chain financing, seeking opportunities for financial returns from improved yields in agriculture and productive forestry;
- Institutional investors (e.g., sovereign wealth, pension and endowment funds);
- Payments from local private users of ecosystem services toward conservation of forests (such as water companies);
- Philanthropic investment.

Finance will need to flow to:

- Conservation/avoided deforestation;
- Reforestation/regeneration;
- Improvements in agriculture productivity on existing farmlands or degraded lands.

The purpose of this report is not to attempt a complete architecture for all circumstances, but rather to analyze examples of how different sources of investment could be more effectively integrated to overcome identified challenges, aligning the interests of stakeholders in such a way that they are able to commit to a much greater scale of pro-forest finance.

In this context, we consider:

- The "superstructure" of: international climate finance, tropical forest governments and multilateral agencies, and then two examples:
 - The potential for use of put options/price floors as a tool for public REDD+ results-based finance to harness more forest country resources and private investment, including by expanding carbon markets;
 - Explicitly linking REDD+ results-based finance commitments to upfront investment via enhanced bond structures with the aim of generating large-scale low cost capital to pursue NDC goals.
- Supporting the "Protection" element of "Production and Protection" strategies via implementation of Brazil's Forest Code with two approaches:
 - Expanding the capacity of Brazil's public banks to provide significantly lower cost loans for farmers to invest in reforestation as part of "PRA" programs to comply with the Forest Code;
 - The opportunity for a range of public and private actors to buy and retire "CRA" quotas, valuing "surplus" forest under the Forest Code to compensate farmers for avoided legal deforestation and thus supporting more ambitious targets for avoided deforestation in Brazil.

- Sustainable Production (the Supply Side):
 - Opportunities and challenges: sustainable forest management (SFM) and linking of development finance tools for agriculture to environmental outcomes.
- Consumption (the Demand Side):
 - The sustainable commodity supply chain agenda;
 - Policy and legal options in countries consuming commodities associated with deforestation.
- Integration of Production, Consumption and Finance:
 - Example: Linking jurisdiction REDD+ to co-investment from commodity buyers and agribusiness.

International public resources such as REDD+ results-based finance will help reduce the fiscal burden for forest countries.

On the private investment side:

- With the exception of a very limited pool of philanthropic capital, institutional investors are not in a position to subsidize costs if it means accepting sub-economic rates of return. Such investors will require bonds and private equity or blended public-private finance structures to generate risk-adjusted returns that are competitive for pension holders and endowment funds. The onus to ensure returns are competitive remains with public policy and public resources
- Although producers, agribusiness and food companies also require commercial returns, the sustainable commodity/zero deforestation supply chain agenda, a response to the role of agriculture as the primary driver of deforestation, could represent an opportunity to reduce costs for forest countries and donors.

Both public REDD+ results-based finance and the prioritization of purchasing agreements from private agribusiness actors for commodities from low/zero deforestation supply chains represent ex post sources of revenue. In other words, reduced rates of deforestation are required before new commodity off-take or REDD+ payments can occur. Therefore, an additional critical challenge is to address the upfront investment gap: how to generate the low cost capital needed to finance the transition that would generate the results in terms of reduced deforestation, which would in turn enable these revenues?

The challenge is not just that payments occur after results. Capital expenditure financing generally can take a long time to generate revenue in other sectors, such as energy production. But achieving jurisdictional reduced deforestation outcomes and associated revenues can appear to potential financiers less proven and more uncertain.

Before discussing this financial architecture, in the section below we provide some background on Brazil's NDC goals, the Forest Code and its public agricultural finance programs, as well as data on REDD+ finance flows.

4. Background on Brazil

Description of Brazil's NDCs

Brazil's NDC aims to reduce emissions below 2005 levels by 37% in 2025 and 43% in 2030. In the land-use and forest sectors, Brazil plans to achieve the following goals by 2030:

- Strengthen and enforce the Forest Code;
- Zero illegal deforestation in the Amazon and compensation for legal deforestation;
- Restoration of 12 million hectares of forest;
- Sustainable native forest management;
- Sustainable agricultural development, including restoring 15 million ha degraded pastureland and 5 million ha of integrated cropland-livestock-forestry systems.

Description of the Forest Code

The Forest Code requires that private properties maintain a Legal Reserve (LR) of 80% forest cover in the Amazon biome, 35% in the Cerrado, and 20% in other areas and to maintain Areas of Permanent Preservation (APPs), including environmentally sensitive areas such as riparian areas. Landowners also must register their properties with the Rural Environmental Registry (CAR). If landowners have a deficit of LR, they have two options for compliance: They can a. restore native vegetation on their properties under an Environmental Regularization Program (PRA) or b. acquire Environmental Reserve Quotas (CRAs) from a property with excess LR within the same biome and preferably the same state. APPs must be restored in sensitive areas.

Successful implementation of Brazil's new Forest Code will be critical to achieving NDC goals. However, although passed by the Brazilian Congress in 2012, the Forest Code still lacks sufficient regulatory clarity, enforcement and economic incentives for farmers. Only 66% of rural properties were registered in the Rural Environmental Registry (CAR) as of January 2016 (i.e., 135 million ha still need to be registered). The Environmental Reserve Quota (CRA) and Conservation Offset (UC) systems are not fully defined. Many states have not regulated their Environmental Regularization Program (PRA) legislation, with the result that landholders cannot initiate the compliance process in order to benefit from the Forest Code's flexible compliance mechanisms.

Around 4 million properties or around 21 million ha have insufficient land set aside for Areas of Permanent Protection (APPs) and Legal Reserves (LRs) (78% in LRs and 22% in APPs). Significantly, this shows that the restoration targets implied by the Forest Code are greater than the 12 million ha NDC goal. Smaller farmers have some exemptions for forest cleared pre-2008. Otherwise landowners have 20 years to achieve compliance in implementation of the Terms of Commitment of the regularization strategy (10% every 2 years).¹⁸

Description of Brazil's Public Agriculture Finance

Brazil has a strong existing architecture of public agriculture finance including subsidized credit designed to incentivize sustainable production. However, there are challenges preventing uptake of credit or incentives by commodity producers that require increased public resources from a fiscally constrained government.¹⁹

- Agriculture's share of the Brazilian economy is large and increasing at around 25% of the Gross Domestic Product.
- The National Rural Credit System (SNCR) has historically been the central instrument of agricultural policy to promote productivity and development.

¹⁸ See: Research and Financial Innovations in Support of Brazil's INDC Process. Earth Innovation Institute and Forest Trends (2015); Brazil's New Forest Code. INPUT (Iniciative Para O Uso Da Terra) and Climate Policy Initiative (2015); Environmental reserve quotas in Brazil's new forest legislation: An ex ante appraisal. CIFOR (2015) May PH, Bernasconi P, Wunder S and Lubowski R.; Brazil's New Forest Code: a guide for decision-makers in supply chains and governments / Frederico Machado, Kate Anderson ; translations Marcel Viergever.—Brasília (DF): WWF Brazil, 2016.

¹⁹ Rural Credit in Brazil: Challenges and Opportunities for Promoting Sustainable Agriculture. D. Lopes and S. Lowery. Forest Trends. 2015.

- The National Program for Strengthening Family Agriculture (PRONAF)²⁰ provides finance to small producers at relatively low interest rates.
- The official public banks, which channel SNCR and PRONAF, are BNDES, Banco do Brasil, Caixa Econômica Federal, Banco da Amazônia and Banco do Nordeste.
- The budget made available to producers and agribusinesses under SNCR for July 2015 to June 2016 was US\$61 billion.
- Below-market interest rates are made possible through equalization payments from the Brazilian Ministry of Finance. This comes at a fiscal cost to the government. For example, in 2012/2013 the Treasury committed US\$470 million to Banco do Brazil to support the disbursement of ABC²¹ Program credit.²²
- Of the total rural credit disbursed in the 2013/2014 in Brazil (US\$58 billion), the amount of sustainability-related rural credit disbursed represented only 1.9%.²³

Challenges include difficulty in receiving or providing technical assistance, complying with the Forest Code or land tenure requirements, understanding available credit lines, lack of familiarity with sustainable agricultural practices and the fact that most of the available credit is designed for working capital rather than investment.²⁴

Financial Flows for REDD+ in Brazil

A recent Forest Trends report has tracked the following financial flows for REDD+:²⁵

- Over US\$2.2 billion was committed to the development of REDD+ activities in Brazil from 2009 through September 2016.
- The total amount of funds transferred to the Amazon Fund between 2009 and 2015 was US\$1.037 billion by Norway, Germany and Petrobras. Out of this total, 50% of these funds have been committed to national and subnational governments, and 25% has been disbursed.
- The total committed to the Amazon Fund (US\$1.037 billion) represents the payment for results of only 5.9% of emission reductions generated through lowering Amazonian deforestation between 2006 and 2015.
- The report was also able to track US\$80 million in financial flows aimed at promoting low-carbon agriculture in the Amazon. E.g., donations from foundations towards non-profit organizations for the dissemination of sustainable practices, technical assistance, and public policies.
- The states of Amazonas and Acre are pioneers in the creation and implementation of REDD+ Jurisdictional Programs. Between 2012 and 2015, US\$394 million and US\$413 million have been committed to the states of Amazonas and Acre, respectively, from domestic sources (federal and state governments, the private sector and the Amazon Fund) as well as international sources (World Bank, Inter-American Development Bank [IDB] and the German Development Bank [KfW]).
- For the state of Amazonas, domestic sources contributed to a larger share of mapped resources (85%), and the primary source was the state government itself (US\$188.2 million or 48% of the committed total).
- The government of Acre received the bulk of its funding from the German government (via KfW), the Amazon Fund and the federal government, which together committed US\$174 million (42%), followed

²⁰ PRONAF: Programa Nacional de Fortalecimento da Agricultura Familiar.

²¹ ABC: Programa para Redução da Emissão de Gases de Efeito Estufa na Agricultura.

²² Rural Credit in Brazil: Challenges and Opportunities for Promoting Sustainable Agriculture. D. Lopes and S. Lowery. Forest Trends. 2015.

²³ BCB. Banco Central do Brasil. Matriz de Dados do Crédito Rural—MDCR. 2015b. Available from: http://www.bcb.gov.br/pt-br/sfn/credrural/sicor/matrizinformacoes/Paginas/default.aspx.

²⁴ Rural Credit in Brazil: Challenges and Opportunities for Promoting Sustainable Agriculture. D. Lopes and S. Lowery. Forest Trends. 2015; Stabile, M; Azevedo A.; Nepstad D. Brazil's "Low-Carbon Agriculture Program": Barriers to Implementation. Brasilia: Amazon Environmental Research Institute, 2012.

²⁵ Mapping Financial Flows for REDD+ and Land Use in Brazil: National and Subnational Analysis for the Period 2009 through 2016. Ana Carolina Bastida, Mariano Colini Cenamo, and Gustavo Silva Chávez. Forest Trends and IDESAM 2017.

by international multilateral agencies, such as the World Bank and IDB, at 37%. State resources represent 20% of the committed total at US\$82 million.

Implications of the NDCs, Forest Code, Public Agriculture Finance, and REDD+ Funding

The World Bank has suggested that full implementation of the Forest Code should be the central element in achieving sustainable land-use in Brazil. It also states that forest restoration targets over 15 years require investments ranging from R\$48 billion (US\$14.8 billion)²⁶ for 12 million ha to R\$85 billion (US\$26.2 billion) for 20 million ha.²⁷

While this is equivalent, annually, to only 1.6% to 2.8% of the public credit for agriculture, and would bring positive social and environmental benefits, revenues would be lower than the costs, suggesting negative financial returns, with corresponding implications for Brazil's public expenditures.²⁸ Hence the critical role for international climate finance, including REDD+ results-based finance, to reduce the public expenditure burden.

Full compliance with Brazil's revised Forest Code is a minimum requirement for achieving a zero deforestation economic development model, since the Forest Code could be achieved while still leaving a theoretical potential for legal clearing of 88 million hectares of native vegetation.²⁹ This represents that area of native vegetation exceeding the Forest Code requirements that could legally be deforested. Although much of this theoretical potential is in remote areas where deforestation is unlikely, it is nevertheless three times greater than the 28 million ha required for the projected expansion of all croplands, bioenergy crops and forestry. Brazil already has sufficient converted lands to accommodate the expansion of agriculture, commercial forestry, and livestock, while restoring 20 million ha and reducing or eliminating deforestation. Intensified pastures closer to their potential sustainable carrying capacity could at least double levels of production. Therefore, Brazil should aim for more ambitious targets for avoided deforestation than simply "zero illegal deforestation."³⁰

ABC program and other sustainability-related subsidized credit needs to be offered at lower interest rates and complemented with greater technical assistance-hence the need to expand the capacity of public banks (and other entities) to supply credit.³¹ Successful implementation of the PRA is critical- via reforestation or, for forests cleared pre 2008, via compensation. The Forest Code commits the government to supporting farmers with technical extension services and provision of concessional credit to support registration under the CAR and to implement PRA.

Importantly, a system for trading CRA quotas provides an opportunity to harness additional funds (i.e., beyond those available from farmers utilizing compensation mechanisms), as a way to reach more ambitious targets for avoided deforestation.

Restoration of forest under the Forest Code should be more economically challenging than protection of existing forests (requiring 20 times more investment per ha according to one study).³² However, policy interventions need to support both restoration and avoided deforestation. Natural regeneration of forests is required for increasing carbon sequestration on deforested land. And there would be social and economic benefits from the development of commercial and sustainable management of forests, at a time of growing demand for forest products globally.

Therefore, we analyze how international climate finance can reduce the burden for Brazil in terms of public expenditure, harness more domestic public resources including from public banks, and leverage private investment including from agribusiness for Protection as well as Production.

²⁸ Ibid.

²⁶ Based on US\$/R\$ is 1/3.25.

²⁷ World Bank (2016): Support to the Implementation of the Brazilian INDC: Brazil's INDC restoration and reforestation target, The World Bank, Brasilia, November 2016.

²⁹ B. Soares-Filho, R. et al: Cracking Brazil's Forest Code. Science, 344 (6182): 363 DOI: 10.1126/science.1246663, 2014.

³⁰ World Bank (2016): Support to the Implementation of the Brazilian INDC: Brazil's INDC restoration and reforestation target, The World Bank, Brasilia, November 2016.

³¹ Rural Credit in Brazil: Challenges and Opportunities for Promoting Sustainable Agriculture. D. Lopes and S. Lowery. Forest Trends. 2015; Stabile, M; Azevedo A.; Nepstad D. Brazil's "Low-Carbon Agriculture Program": Barriers to Implementation. Brasilia: Amazon Environmental Research Institute, 2012.

³² See *Challenges for Low-Carbon Agriculture and Forest Conservation in Brazil.* Britaldo Soares-Filho, Letícia Lima, Maria Bowman, and Letícia Viana. Inter-American Development Bank Environmental Safeguards Unit (VPS/ESG) TECHNICAL NOTES No. IDB-TN-385 February 2012; See also: *Research and Financial Innovations in Support of Brazil's INDC Process.* Earth Innovation Institute and Forest Trends (2015).

5. The "Superstructure:" Enhancing the Effectiveness of REDD+ and International Climate Finance

Background on REDD+ and International Climate Finance

The Paris Agreement Article 5 has a strong commitment to results-based finance/payments for performance (PFP) for REDD+. And Article 6 also opens up the possibility of mechanisms for markets and carbon pricing.

Grants, concessional loans and guarantees from bilateral and multilateral institutions will play an important role in international climate finance. However, if donor finance is to be significantly scaled up, PFP for achieving jurisdictional REDD+ outcomes will become the major source of public support in the coming years, because donors are able to commit more resources to verifiable results where the risk of achieving those results is transferred predominantly to the countries responsible. Another advantage is that forest countries themselves are better able to choose their own pathways to achieving goals, avoiding the conditionality often associated with "input" based aid programs. And, from a scale perspective, this can help avoid the bottleneck of due diligence process than will accompany development finance in the form of grants or loans for specific projects.³³

Norway, the World Bank Carbon Funds and Germany's REDD+ Early Movers Program (REM) have pioneered REDD+ PFP. Under the Paris Agreement, a central role is envisaged for the UN Green Climate Fund. (In July the 17th meeting on the Board of the UN GCF announced a US\$300-500mm pilot to pay for forest emission reductions at US\$5/tCO₂e).³⁴

In Brazil, jurisdictional REDD+ PFP has occurred at the national level (via Norway's commitment to the Amazon Fund) and at the sub-national level via REM's commitment to the state of Acre and more recently to Mato Grosso.

There are two key challenges in relation to the deployment of REDD+ PFP in countries that have reached a good stage of "readiness" in terms of their enabling conditions:

- There is a need for very large-scale REDD+ PFP funding commitments. This reflects the fact that jurisdictional programs require something of a "leap of faith" with a major long-term investment commitment of the kind that limited PFP funding may struggle to encourage. Bilateral or multilateral public PFP alone appears unlikely to provide the scale of financing required for the achievement of ambitious NDC outcomes in all tropical forest countries.
- There are also challenges in linking future results-dependent REDD+ revenue streams with current financing flows for forest protection. There remains an upfront funding gap with the risk of insufficient investment available to achieve the results for which payments would be made.

Therefore, two developments would address these challenges:

- Firstly, demand for REDD+ credits from markets and private actors would reduce the burden on public budgets, although significant public PFP will be required to underpin the development of the UN architecture of REDD+, carbon markets and to catalyze demand from private actors. (In the long-term, limiting warming below 2°C and certainly 1.5°C will require a rapid transition to net-zero emissions across all sectors, potentially resulting in a small role for cross-sector or cross-jurisdictional offsets in the long run. However, in the short- to medium-term, carbon market mechanisms would accelerate land-use greenhouse gas mitigation and provide more time for the international community to develop next generation clean energy and transport technologies).
- Secondly, complementary private financial flows outside of carbon markets will also be essential, enabled by appropriate financing instruments.

³³ Look to the Forests: How performance payments can slow climate change. A report of the Working Group on Scaling Up Performance-Based Transfers for Reduced Tropical Deforestation. Nancy Birdsall and Pedro Pablo Kuczynski, co-chairs. Michele de Nevers, Working Group manager; Why Forests, Why Now. The science, Economics and Politics of Tropical Forests and Climate Change. Frances Seymour and Jonah Busch. Center for Global Development. (2016).

³⁴ https://forestsnews.cifor.org/50548/green-climate-fund-steps-up-to-reduce-deforestation-and-forest-degradation?fnl=en.

Hence we examine:

- Put options/floors prices for jurisdictional REDD+ credits as a means to support the development of carbon markets and to maximize the inherent "optionality" of forest carbon assets in protecting against climate change; and
- Enhanced bond structures that seek to use REDD+ PFP for to attract upfront private capital toward forest-based NDC activities at a much greater scale than might be achieved through currently available financing instruments.

Carbon Markets

Prior to the Paris Agreement, the UNFCCC agreed on a technical and policy framework for REDD+ in 2013 and significant funding has been made available for "readiness," while several tropical forest jurisdictions have instituted new programs to support protected and indigenous areas and to implement low-emission rural development.

California has initiated the necessary regulatory process to accept REDD+ credits into its existing carbon market, is already linked with Quebec and may also link with Ontario and Mexico. The Republic of Korea is also exploring the use of international offset credits within its compliance carbon market. The International Civil Aviation Organization (ICAO) has agreed upon a global market-based measure, requiring air carriers to use credits, possibly including REDD+, to offset emissions from international flights starting in 2021. This could generate demand for offsets of at least 2.5 billion tCO₂e through 2035. Companies likely to be regulated in the future are beginning to develop their compliance strategies and are seeking to secure high quality credits that they can use to meet their future compliance obligations.³⁵

However, considerable regulatory uncertainty remains. Forest countries need a clear signal that public and private demand will be sufficient and compliance market actors and regulators need confidence that high-integrity REDD+ credits will be available.

Financing Instruments

Currently available financing instruments have not proven capable of overcoming fundamental challenges:³⁶

- Upfront grant payments have been used by donors for "readiness activities" to prepare countries to deliver emissions reductions from forest-related activities in return for payments, with a focus on ensuring adequate MRV systems are in place to assure donors of the achievement of result.³⁷ Grants will continue to have a role in creating the enabling conditions for investment in challenging geographies (such as the forest frontier). But mixed results have limited donors' willingness to rely on grants in the future.
- Green loans have had difficulty integrating REDD+ PFP owing to the complexity and costs of project monitoring, reporting and verification, and higher transaction costs relative to capital markets for larger actors. As we discuss further in Section 7, MDB senior loans are not well suited to Sustainable Forest Management. And, donor willingness to increase the element of upfront payments for project-by-project loans is limited given the high risk of ineffectual outcomes.
- Green equity funds investing in forest-based NDC actions exist but remain relatively very small. From a
 borrower perspective, beyond a certain amount of capital (essential to reducing credit risk), equity will
 reduce the expected rate of return and increase transaction costs, limiting its ability to directly provide
 financing at scale. DFIs and MDBs have a low appetite for equity which has a high-risk profile and provides
 no guarantee of results.³⁸

³⁵ For a discussion of the potential for market-based measures in the aviation sector, see: Environmental Defense Fund: http://blogs.edf.org/climatetalks/2016/10/06/ icaos-market-based-measure-could-cover-80-of-aviation-emissions-growth-in-mandatory-phase/?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+EdfTalksGlobalClimateAviation+%28EDF+Talks+Global+Climate+-+Aviation%29.

³⁶ World Bank. 2017. The Potential Role of Enhanced Bond Structures in Forest Climate Finance. Washington, DC, World Bank.

³⁷ Forest Trends. (2016). *View from the Understory: State of Forest Carbon Finance* 2016. A. Goldstein and F.Ruef.

³⁸ World Bank. 2017. The Potential Role of Enhanced Bond Structures in Forest Climate Finance. Washington, DC, World Bank.

- There have been some notably successful examples of blended finance supporting sustainable agriculture, which are discussed later in this paper, in Section 7. However, since these examples rely on public support from forest countries or donors or philanthropic organizations, the question of how significantly to scale such approaches returns once again to the need for reducing the fiscal burden on forest countries.
- The Center for Global Development has highlighted challenges for scaling "input-based aid" to this end and suggested that significantly increased donor support will take the form of REDD+ PFP.³⁹ Indeed the central role of REDD+ PFP is explicit in the NYFD and Paris Agreement.
- Given the limitations of green equity and loan funds to catalyze at-scale forest-based NDC activity, some attention has turned to the bond markets. However, simple "green bonds or "climate bonds," unenhanced by public subsidy, do not lower capital costs below plain vanilla bonds and can finance only commercial investments.⁴⁰

Hence, we focus below on a large-scale blended finance approach, utilizing REDD+ PFP, to incorporate a subsidy for global public goods and linking this subsidy explicitly to enhanced bond structures in order to help overcome the upfront funding gap.

(Money is fungible and governments, public banks. or private actors can issue bonds for general budget purposes and in the future receive PFP, without necessarily having any explicit link between those payments and the issuing of bonds. Nevertheless, unblended PFP schemes to date have not proven as effective as hoped in harnessing forest country public resources nor in achieving private sector leverage to drive results, so an explicit link should allow for a greater commitment of resources on all sides).

Put Options for Public Jurisdictional REDD+ Results-Based Finance

In economic terms the international community is vulnerable to rapidly escalating costs to Gross World Product (GWP) of achieving both 2 degrees Celsius and more ambitious targets. If costs to GWP are expressed in terms of a global carbon price requirement for meeting climate targets then, as the Environmental Defense Fund has highlighted, in financial terms the international community can be seen as short a call option on the price of carbon and thus vulnerable to an abatement cost "short squeeze."⁴¹

In this context, it can be helpful to analyze forest carbon in terms of its high "optionality" or "option value."

Thus, expanded and rapid action on the implementation of the Paris Agreement and NDC forest goals can be seen as a hedge—with a strong case for increased ambition to go beyond NDC goals in order to give the international community more time to develop next generation low carbon energy production and transport systems. (While the potential for lower cost compliance options can delay mitigation investment decisions on the part of governments or regulated industries, such delays can be economically beneficial by providing more time for R&D into new technologies.)⁴²

How Might REDD+ PFP Better Target the Value of this "Optionality"?

REDD+ PFP can take different forms:

- To date it has taken the form of a straight off-take agreement as under a traditional Emissions Reduction Purchase Agreement (ERPA) of the kind developed by the World Bank and in CDM markets, or of the kind agreed for national or regional REDD+ under bilateral arrangements such as the Amazon Fund or Germany's REM, where donors "buy and retire" credits and they do not count toward domestic compliance targets.
- It could also take the form of put options, which would provide forest countries with a floor price, but allow them opportunity to retain the upside optionality of their carbon "assets" and sell into carbon markets if and when they emerge. These put options would be provided "for free" i.e., without the forest country paying a premium for the option.

³⁹ Look to the Forests: How performance payments can slow climate change. A report of the Working Group on Scaling Up Performance-Based Transfers for Reduced Tropical Deforestation. Nancy Birdsall and Pedro Pablo Kuczynski, co-chairs. Michele de Nevers, Working Group manager; Why Forests, Why Now. The science, Economics and Politics of Tropical Forests and Climate Change. Frances Seymour and Jonah Busch. Center for Global Development. (2016).

⁴⁰ World Bank. 2017. Demystifying Forest Bonds: Assessing the suitability of bonds as a financing instrument to meet forest-based NDC targets. Washington, DC, World Bank.

⁴¹ Escaping the policy uncertainty trap: REDD+ options. (2016). Golub, A., Fuss, S., Lubowski, R., Hiller, J., Khabarov, N., Koch, N., Krasovskii, A., Kraxner, F., Laing, T., Obersteiner, M., Palmer, C., Piris-Cabezas, P., Reuter, W.H., Szolgayová, J., Taschini, L. Wehkamp, J.

⁴² Ibid.

There is some precedence for the use of put options: over the last three years they have successfully been auctioned by the World Bank Pilot Auction Facility for methane and nitrous oxide emission reductions from projects developed by private actors.⁴³ However, unlike for private project developers, we do not propose that forest countries should pay a premium for a REDD+ put option.

Put options for jurisdictional REDD+ PFP would increase the effectiveness of public funds in leveraging private investment and harnessing forest country resources. For forest countries, the "strike price" of the put would, as under a straight off-take agreement, represent a potential revenue stream that would improve the economics of pursuing NDC goals. At the same time, the retained optionality to sell credits at higher prices into carbon markets would further increase the value of conserving forests by sending the signal that deforestation was akin to giving away a call option on potential future carbon demand.⁴⁴

Put options could therefore stimulate mitigation investment and increase the supply of future REDD+ credits. This could have secondary positive political economy effects, since a large-scale supply of credible REDD+ credits could make more likely the acceptance of compliance targets by industries where those targets allowed for the partial use of those credits as offsets.⁴⁵ Increased supply could thus have the effect of increasing demand.

Donor funds could be recycled in the event that the forest country did not exercise the put option, which could represent a highly effective leverage ratio for public to private investment.

If governments and multilateral organizations, such as the UN GCF, fund REDD+ put options at a scale and price sufficient to ensure significant reductions in deforestation (and generation of REDD+ credits), it would improve the credibility of REDD+ credits as a potential future compliance tool for private actors and compliance regimes, help implement Article 5 of the Paris Agreement and underpin the development of carbon markets and the architecture of methodologies for carbon accounting and MRV under Article 6.

A Clearinghouse for Jurisdictional REDD+ Credits

Scaled up REDD+ results-based finance and the use of put options could also provide an opportunity for leading donors such as Norway and the UN GCF to develop a global clearinghouse and registry for REDD+ credits, with strong environmental integrity, as a precursor to the development of a full UN system. A clearinghouse could be used to collect REDD+ credits from different countries and multiple regions or jurisdictions within those countries. This could provide visibility on significant volumes of supply, making it easier for pre-compliance, compliance or voluntary buyers to commit to substantial mitigation targets and substantial purchases of REDD+ credits. Such a clearinghouse could also potentially reduce currency and credit or delivery-versus-payment risk for different counterparties.

Public REDD+ Put Options Catalyzing Private Investment in REDD+ Call Options⁴⁶

During such time that market mechanisms are developing, private actors (such as ICAO or in compliance trading regimes such as California) will continue to have uncertainty as to the regulations governing whether REDD+ credits might be considered an acceptable form of compliance, as well as the extent of their future compliance obligations, future abatement costs or carbon prices. Under this situation, such actors could be reluctant to purchase REDD+ credits under straight off-take agreements. However, they might consider the lower risk option of buying call options on such credits for their potential to protect against the high financial impact scenario of tough future compliance legislation and high carbon prices.⁴⁷ Once regulators in com-

⁴³ Paul Bodnar, Caroline Ott, Rupert Edwards, Stephan Hoch, Emily F. McGlynn & Gernot Wagner (2017): Underwriting 1.5°C: competitive approaches to financing accelerated climate change mitigation, Climate Policy, DOI: 10.1080/14693062.2017.1389687 1.50C.

⁴⁴ Escaping the policy uncertainty trap: REDD+ options. (2016). Golub, A., Fuss, S., Lubowski, R., Hiller, J., Khabarov, N., Koch, N., Krasovskii, A., Kraxner, F., Laing, T., Obersteiner, M., Palmer, C., Piris-Cabezas, P., Reuter, W.H., Szolgayová, J., Taschini, L. Wehkamp, J.

⁴⁵ Paul Bodnar, Caroline Ott, Rupert Edwards, Stephan Hoch, Emily F. McGlynn & Gernot Wagner (2017): Underwriting 1.5°C: competitive approaches to financing accelerated climate change mitigation, Climate Policy, DOI: 10.1080/14693062.2017.1389687 1.50C.

⁴⁶ The writer (seller) of a call option has an obligation to sell the underlying security at the strike price if the option is exercised.

⁴⁷ Golub, Alexander, Ruben Lubowski, and Pedro Piris-Cabezas. 2017 "Balancing Risks from Climate Policy Uncertainties: The Role of Options on Reduced Emissions from Deforestation and Forest Degradation," *Ecological Economics* 138: 90-98.

pliance trading regimes confirm the eligibility of REDD+ credits the value of this call option would increase significantly. The higher the value of this call option, the lower the opportunity costs for forest countries of avoided deforestation.

Public REDD+ Puts and Private Investment

One proposed model for leveraging private investment from donor funded put options for jurisdictional REDD+ credits is to harness the put options to create a blended fund structure that also incorporates purchases of call options from private sector buyers of offsets (either pre-compliance or voluntary). The "REDD+ Acceleration Fund" strategy, developed by the Environmental Defense Fund and Encourage Capital, would also include a profit-share with the forest country jurisdiction supplying credits (which would allow them to share in any upside of carbon prices above the strike price of the call option).⁴⁸ A forest country could prioritize the sale of call options on jurisdictional REDD+ credits to blended finance vehicles able to commit upfront capital in support of NDC goals.

Reverse Auctions

Where there are opportunities for multiple actors to compete to generate emissions reductions, using reverse auctions results in price discovery and cost minimization. Auctioning of put options could combine the benefits of a reverse auction with the flexibility of an option.⁴⁹ From a donor perspective, reverse auctions could reduce costs, while from a forest country perspective the put option would allow the forest country to retain exposure to potential higher future carbon prices.

A recent GCF request for public inputs on results-based payments for REDD+ showed that six of 14 inputs from UN GCF Board members suggest reverse auctioning as a possible approach.⁵⁰ However, the public inputs to the GCF Board suggest that forest countries seem likely to resist this approach in the absence of significantly scaled-up international support, except in the case of historical emissions reductions. Nevertheless, with increased investment and higher levels of supply and demand over time, competitive auctions could become a useful tool for minimizing costs to donors.

Challenges

Developed countries can have accounting challenges for their aid budgets committing to PFP beyond periods of 5 years, given the uncertainty as to whether payments will be made. This problem is accentuated with put options, since an additional uncertainty is added. Not only might the forest country not deliver the results required to receive a payments but also, if the results are achieved, the forest country might decide to sell the credits to another counterparty. However, given the central role of scaled-up PFP for REDD+ under the Paris Agreement, and given the desirability from a donor perspective of having put options unexercised because credits are sold instead to private actors, developed countries should consider alternative approaches to accounting for this aid spending-or, more simply, commit the relevant funds to a ring-fenced account and treat them as spent.

Enhanced Bond Structures for Forest Climate Finance: Linking to REDD+

The World Bank recently published a report, co-authored by Vivid Economics and Forest Trends, which analyzed how enhanced bond structures could demonstrate improvements in the mobilization of resources both for donors funding the necessary enhancements and issuers taking on the risk of greater scale financing for NDC forest outcomes.⁵¹

⁴⁸ Environmental Defense Fund (EDF) and Climate & Forest Capital LLC (CFC), with support from the Rockefeller Foundation, are designing a REDD+ Acceleration Fund.

⁴⁹ As developed by the World Bank Pilot Auction Facility (PAF) for methane and nitrous oxide mitigation; see also: Paul Bodnar, Caroline Ott, Rupert Edwards, Stephan Hoch, Emily F. McGlynn & Gernot Wagner (2017): Underwriting 1.5°C: competitive approaches to financing accelerated climate change mitigation, Climate Policy, DOI: 10.1080/14693062.2017.1389687 1.50C.

⁵⁰ Green Climate Fund. (2017). GCF Consultations on REDD+ Results-Based Payments. Retrieved from https://www.greenclimate.fund/reddplus-results-based-payments.

⁵¹ World Bank. 2017. *The Potential Role of Enhanced Bond Structures in Forest Climate Finance*. Washington, DC, World Bank; See also Edwards, R., Tepper, D., & Lowery, S. (2014). *Jurisdictional REDD+ Bonds: Leveraging Private Finance for Forest Protection, Development, and Sustainable Agriculture Supply Chains*. Nepstad, D., Tepper, D., McGrath, D., Seroa da Motta, R., Edwards, R., Swette, B., & Shimada, J. (2015). Research and Financial Innovations in Support of Brazil's INDC Process. Earth Innovation Institute.

The aim would be to overcome some of the challenges described above, including in relation to scale and the upfront funding gap- by lowering the cost of capital for public or private actors undertaking forest-based NDC activities, improving the overall risk-adjusted rate of return to those activities and providing better certainty and value for money for donors. These activities would cover a broader gamut of approaches to forest protection than current green-labeled forest bonds, which are strongly commercial in nature.

The paper identifies six underlying potential improvement mechanisms from the perspective of the different counterparties.

- From the perspective of issuers and investors, an improved bond structure would: a. increase the rate of return, e.g., by improving the level or certainty of expected revenue streams b. reduce credit risk of default and c. reduce the transaction costs associated with identifying appropriate activities and MRV. Such improvements would aim to ensure investors can achieve their required market rates of return, and hence ensure that issuers can raise capital at lower cost and sufficient scale.
- From the perspective of donors and recipients, committing PFP streams for future performance to support an NDC bond would: a. increase value for money through efficient leverage of private capital or better targeting of resources b. reduce risk of underuse of PFP through efficient disbursement and a clear link to future mitigation performance, and c. achieve low cost and effective MRV, ensuring the "additionality" of projects supported by the proceeds of the bond.

The paper recommends three enhanced bond structures, using scaled up international support (e.g., PFP and upfront grants), as offering potentially significant improvements on existing financing instruments in light of these criteria. These enhanced bond structures seek to use PFP for future mitigation performance to attract upfront private capital toward forest-based NDC activities at a much greater scale and lower cost than might be achieved through currently available financing instruments.

- 1) National-level or sub-national outcomes for REDD+: A bond issued by the government with proceeds ringfenced for the full breadth of NDC forest activities, with or without commercial return- for protection, reforestation and sustainable agriculture. The bond integrates REDD+ PFP alongside a smaller upfront grant to provide credit enhancement to increase issuers' expected economic return and reduce their cost of capital. Credit enhancement may not be necessary for some countries, especially those with an investment grade credit rating. However, combining REDD+ PFP with credit enhancement could in some circumstances be a cost-effective way to bring down capital costs. The upfront credit enhancement also reduces the issuer risk, and hence increases their willingness to take on leverage. The bond provides donors with greater certainty that PFP will achieve an increase in forest-based mitigation action by the government, effectively mobilizing domestic resources.
- 2) REDD+ PBP to support concessional lending for reforestation: A bond issued by a sovereign-backed public bank with proceeds rind-fenced for concessional lending that supports NDC forest activities with sub-commercial return. The bond integrates REDD+ PFP, channeled from the government to the public bank, to allow the bank to provide concessional finance to landowners implementing activities that increase forest-related mitigation, while still achieving the bank's target return on capital. This structure could again also include a smaller upfront grant from donors to contribute to the cost of credit enhancement. The bond provides donors with greater certainty that PFP will achieve an increase in forest-based mitigation action through a well-established financing institution.
- 3) Corporate sustainable forest management bond issued via a special purpose vehicle (SPV): A privately issued bond with proceeds usable for a relatively narrow set of large-scale NDC forest activities with sub-commercial return (e.g., sustainable forest management). The bond integrates REDD+ PFP, channeled from the government to the SPV, to enhance issuers' expected return on investment. It also includes support for credit enhancement through subordinate debt into the SPV. The bond provides donors with greater certainty that PFP will achieve an increase in forest-based mitigation action through well-defined, at-scale activities.

For all three of the bond structures, the fundamental dynamic of performance improvement is similar:

• The issuers (whether forest country government, public bank or private company) take on more risk and transaction costs than they do today by committing large pools of funding at relatively low financial return, to achieve uncertain emissions reductions.

- The donors offset some of this risk and transaction cost by committing to PFP at a pre-agreed price, and potentially supplementing this with a small upfront grant toward credit enhancement.
- The investor is provided with the simplest financial instrument possible that meets market requirements for risk-adjusted returns, primarily through a suitable combination of coupon and credit rating.

The aim would be to drive a virtuous cycle in which issuers deepen their capacity to identify and manage NDC-related projects pushing greater underlying efficiency, while donors feel more confident in the value for money of their payments and hence increase the size of those commitments.

FIGURE 1: BOND STRUCTURE 1



Note: Arrows represent contractual financial flows (PFP is dependent on verified results).

Source: Vivid Economics.52

An Illustrative Example of Bond Structure 1

The table below shows a simplified illustration of the reduction in cost of capital for a given number of emissions reductions and PFP for different nominal bond issuance sizes. It assumes a US\$-denominated 10-year bond maturity with a coupon of 6 per cent (close to recent market rates for Brazil US\$ sovereign bonds) and PFP of US\$6/tCO₂e (slightly higher than recent donor payments of US\$5/tCO₂e). This shows that for a bond issuance size of US\$1 billion, cumulative emissions reductions of 100 MtCO₂e would bring the net cost of capital down to 0 per cent, while 60 MtCO₂e would reduce the cost of capital to 2.4 per cent.

⁵² World Bank. 2017. The Potential Role of Enhanced Bond Structures in Forest Climate Finance. Washington, DC, World Bank.

| BOND ISSUANCE SIZE | | | | | | |
|--------------------|-------------|-------------|---------------|---------------|--|--|
| | | 800,000,000 | 1,000,000,000 | 1,200,000,000 | | |
|) ₂ e | 60,000,000 | 1.50% | 2.40% | 3.00% | | |
| S | 80,000,000 | 0.00% | 1.20% | 2.00% | | |
| une | 100,000,000 | -1.50% | 0.00% | 1.00% | | |
| 1 <u>o</u> | 120,000,000 | -3.00% | -1.20% | 0.00% | | |

TABLE 1: BRAZIL FOREST NDC REDD+-LINKED US\$ 10-YEAR BOND

Note: (Coupon=6%; PFP=US\$6).

A US\$600 million REDD+ PFP commitment over 10 years (around US\$450 million in present value terms for developed countries) would in this case leverage immediate upfront institutional investor capital of US\$1 billion, while only committing to paying for demonstrable results. In addition, this US\$1 billion should in turn leverage a further multiple of private investment "on the ground."

More research is needed to understand the relationship between the cost of credit enhancement and its impact on risk premiums. A full 100 per cent AAA guarantee or "credit wrap" could reduce the 3.5 per cent risk premium of a 10 year US\$ Brazilian sovereign issue down from around 6 per cent toward that of US Treasury Bonds at 2.5 per cent. If the cost of credit enhancement is significantly lower than this 3.5 per cent risk premium, donors could contribute to the cost of credit enhancement. An upfront grant used in this way would carry greater risk for donors than the PFP element in the case that results are not achieved. On the other hand, the improved credit rating and lower bond yield could be cost effective in reducing the amount of PFP ultimately required from the donor to offset the bond coupon costs. If this reduction in PFP outweighed the cost of credit enhancement, the grant would increase the overall leverage ratio of international climate support to upfront bond investor capital

If use of proceeds were directed to reforestation (e.g., for PRA under the Forest Code) then 1 million hectares of reforestation could potentially be funded at zero cost of capital to the issuer. Based on costs of reforestation of US\$1,000 per ha,⁵³ US\$1 billion could reforest 1 million ha. With cumulative carbon sequestration per ha of 100 tCO₂e,⁵⁴ emissions reductions could reach 100 MtCO₂e over 10 years, while reducing the cost of capital to 0 per cent for the issuer.⁵⁵

Further modelling and negotiation is required to ascertain the viability of these assumptions and optimal balance between issue size, bond maturity and PFP (and credit enhancement in those countries where this is a consideration).

Enhanced bonds represent one of many possible instruments for catalyzing forest-based NDC action, but may have the greatest potential to overcome the challenges described above. The World Bank report involved discussions with a number of critical stakeholders, including Brazilian ministries and public banks as well as donors and MDB officials who have expressed an interest to pilot such an approach.

⁵³ A recent estimate from the Instituto Escolhas estimates the cost of restoration of 12 million ha ranges from R\$31 to 52 billion or a median of US\$1,051/ha (Jornal do Brasil, 2015).

⁵⁴ The World Bank has suggested that if 20 million hectares were reforested, up to 2,300 MtCO₂e would be sequestered: a restored area can sequester from 22.5 tC/ ha (Caatinga) to 97 tC/ha (Amazon) implying an average of 115 tCO²e/ha, where tCO₂e is equivalent to 3.67 tC.

⁵⁵ The assumption is that PFP would be made in US\$ at national- or state-level but public banks would lend to landowners in R\$ and that currency risk is borne ultimately by the federal Ministry of Finance as part of normal management of its currency reserves.

6. Supporting Protection via Implementation of the Forest Code

We now focus on two mechanisms that could efficiently improve the linkage between REDD+ PFP and Protection by supporting implementation of the Forest Code and more ambitious outcomes for avoided deforestation:

- REDD+ Payments for Performance supporting public banks to provide concessional credit to landowners for compliance with the Forest Code via reforestation
- REDD+ Payments for Performance enhancing the use of the compensation mechanisms of the Forest Code (such as "CRA" quotas) in order to generate a net environmental benefit including in Priority Conservation and Protected Areas⁵⁶

REDD+ PFP-supporting public banks to provide concessional credit to landowners for compliance with the Forest Code via reforestation

Above, we described how the ABC program and other sustainability-related subsidized credit needs to be offered at lower interest rates and complemented with greater technical assistance.

There is a good opportunity for REDD+ PFP to help Brazilian public banks lower the cost of credit for landowners seeking compliance with the PRA. Multilateral DFIs could also support public banks in Brazil with concessional finance and partial risk guarantees on loan defaults. However, climate finance is likely to be available at a much greater scale if it includes a large PFP element based on actual results. Such an approach can create a greater alignment of risks and responsibilities between donors and Brazilian institutions. (For example, the latter would have to manage the risks of default or failure to comply by farmers).

The aim would be to subsidize (on a performance basis):

- The "equalization" payments born by the federal government when banks lend to farmers under ABC or other concessional programs, making possible greater lending at rates well below 7.5% in R\$;
- The loan default risk across the portfolio and implementation costs of the lending banks.

PFP could be made when landowners achieve compliance as determined by the national SICAR monitoring system but payments would be made in some appropriate combination to the relevant institutions rather than to the landowner (e.g., Ministry of Finance, Amazon Fund, public banks and state government). Payments are therefore not being made to landowners simply to comply with the law. But they are being made to assist Brazilian public institutions to overcome barriers to providing the concessional credit to which landowners are entitled under the law. The landowner would have benefited from the ex ante access to concessional credit prescribed by the Forest Code legislation. But he could also receive discounts on borrowing rates over time having achieved hurdles including, finally, successful compliance.

Monitoring of compliance with PRA at a local level as assessed by the SICAR⁵⁷ system could link to jurisdictional and national level monitoring systems such as PRODES and landscape level REDD+ outcomes of interest to the international community.⁵⁸

REDD+ PFP funding directed in this way would have the advantage of utilizing the powerful infrastructure of Brazil's public lending institutions, pushing the development of SICAR monitoring capacity, and underpinning government efforts at establishing land tenure and quota (CRA) trading by ensuring full compliance with PRA and registration in CAR.

Having the vast majority of landowners registered under CAR and engaged, where necessary, in PRA would allow commodity buyers and private finance institutions to know that farmers in states such as Mato Grosso taken as a whole were "legal."⁵⁹ This would scale up private investment, technical support and commodity off-take agreements.

⁵⁶ See also: Linking REDD+ to Support Brazil's Climate Goals and Implementation of the Forest Code. Rupert Edwards. Forest Trends. 2016.

⁵⁷ National System for the Rural Environmental Registry.

⁵⁸ Projeto PRODES: Monitoramento Da Floresta Amazônica Brasileira Por Satélite (Brazilian Amazon Forest Monitoring by Satellite).

⁵⁹ For a discussion of the extent of illegality in commodity supply chains see: *Consumer Goods and Deforestation: An Analysis of the Extent and Nature of Illegality in Forest Conversion for Agriculture and Timber Plantations.* Sam Lawson. Forest Trends. 2014.



FIGURE 2: REDD+ AND PRA REFORESTATION: FLOW OF FUNDS

As we described above in relation to enhanced bond structures, based on simplified assumptions:

Emissions reductions of 100 MtCO₂e over 10 years across 1 million hectares could be achieved via PRA at cumulative carbon sequestration per hectare of $100tCO_2e$.⁶⁰ At a cost of reforestation per hectare of US\$1,000,⁶¹ this could be funded by US\$1 billion. PFP of US\$6 CO₂e would offset all the interest costs of borrowing.

Challenges

Since the basis for performance for REDD+ payments will remain jurisdictional, and since such payments will come via the government to the public bank, there is an underlying "basis risk" associated with this approach. That is, the public bank's interventions could achieve its target outcomes, while the jurisdiction could fail to deliver overall performance. To eliminate this risk for the bank a separate agreement between the government and the bank would be needed in which PFP for bank-driven outcomes are defined, and corresponding MRV arrangements are agreed. Nevertheless, it should be possible for such MRV arrangements to be relatively efficient and less costly than project-level REDD+ MRV to date, since these secondary MRV arrangements are not tied directly to donor PFP.

⁶⁰ The World Bank has suggested that if 20 million hectares were reforested, up to 2,300 MtCO₂e would be sequestered: a restored area can sequester from 22.5 tC/ ha (Caatinga) to 97 tC/ha (Amazon) implying an average of 115 tCO₂e/ha, where tCO₂e is equivalent to 3.67 tC. World Bank (2016): *Support to the Implementation* of the Brazilian INDC: Brazil's INDC restoration and reforestation target, The World Bank, Brasilia, November 2016.

⁶¹ A recent estimate from the Instituto Escolhas estimates the cost of restoration of 12 million ha ranges from R\$31 to 52 billion or a median of US\$1,051/ha (Jornal do Brasil, 2015).

Our illustrative assumption is that PFP would be made in US\$ at national or state level but public banks would lend to landowners in R\$ and that currency risk is borne ultimately by the federal Ministry of Finance and Treasury as part of normal management of currency reserves.

REDD+ PFP enhancing the use of the compensation mechanisms of the Forest Code (such as "CRA" quotas) in order to generate a net environmental benefit including in Priority Conservation and Protected Areas

As outlined above in the section describing Brazil's Forest Code, as an alternative to restoration, farmers have the option of compensation via purchase of a CRA quota; lease or registration of a surplus area of Legal Reserve or environmental easement; or donation to the state or federal government of an area in a Conservation Unit.

These flexible compensation mechanisms can reduce compliance costs for farmers (e.g., those with high opportunity costs of shifting land-use to regeneration or reforestation) and create value for farmers who are in legal compliance with a surplus of forested land.

However, CRA trading does not by itself create net environmental benefits in terms of hectares of protected land, since an area of surplus simply offsets an area of deficit. One way of ensuring a net environmental benefit would be if the government imposed rules insisting on CRA trading ratios where a landowner would compensate a deficit of 1 ha by purchasing a surplus CRA for 1.5 hectares. This would also help address the fact the CRA market is "oversupplied." But trading ratios of this kind would have the effect of reducing landowner acceptance of the Forest Code legislation.⁶²

The potential oversupply in the CRA market is large, since the Forest Code could be achieved while still leaving a theoretical potential for legal clearing of 88 million hectares of forests.⁶³ Hence the need for Brazil to aim for more ambitious targets for avoided deforestation than simply "zero illegal deforestation."

However, the market for CRAs also creates an opportunity for a range of public and private actors to buy and retire such quotas from the market (i.e., extending demand beyond farmers utilizing compensation mechanisms). This would support government efforts to reach more ambitious targets for avoided deforestation. Efforts could be concentrated on Priority Conservation Areas including those with high biodiversity values or of value to users of watershed services.

In a recent paper, Soares-Filho et al simulated current land use trends to 2030 and suggest an investment of US\$8.4 \pm 2.0 billion to purchase low-cost CRAs could cut legal deforestation (19 million ha) in half by 2030 and would reduce CO₂ emissions by as much as 3.8 \pm 0.8 billion tons. This would imply an average CRA cost of US\$884/ha, 400 tCO₂e/ha and US\$2.2 per tCO₂e.⁶⁴

In this context, how might REDD+ finance support Brazil to develop a market valuing surplus forest, reduce the potential for legal deforestation and direct additional funding to priority ecosystems? And how might such international support leverage private investment: for instance harnessing the sustainability agenda in commodity supply chains or underpinning emerging local PES schemes, such as for watershed services?

Donors, including the UN GCF, could contribute to a Brazilian federal or state fund and acquire CRAs or easements under a range of scenarios.

For example, each time that a farmer needing to achieve compliance adopts one of the compensation options, the fund would secure easement of an additional half-hectare of land in an area defined by the federal or state government as a "Priority Conservation and Sustainable Use Area" (PCA).⁶⁵ This could have the benefit of making CRA trading and other compensation mechanisms a net positive for the environment, conserving 1.5 hectares for every 1 hectare remaining in deficit on the property looking to achieve PRA compliance.

⁶² For a discussion of the pros and cons of trading ratios see: Bernasconi P, Wunder S and Lubowski R. *Environmental reserve quotas in Brazil's new forest legislation:* An ex ante appraisal. CIFOR (2015).

⁶³ B. Soares-Filho, R. et al: Cracking Brazil's Forest Code. Science, 344 (6182): 363 DOI: 10.1126/science.1246663, 2014.

⁶⁴ Brazil's Market for Trading Forest Certificates, Soares-Filho et al (June 2016) http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0152311.

⁶⁵ See e.g., WWF call for "Smart Compensation" in A guide to Brazil's new Forest Code. WWF-Brazil and WWF-USA (2016).

REDD+ PFP made in this way (i.e., for outcomes measured at the per ha level) would also contribute to state and national reduced deforestation outcomes as measured by PRODES (i.e., at the level of state/national reductions in emissions versus the baseline defined by the National Policy on Climate Change).

Donors may continue to prefer to target REDD+ PFP at jurisdictional outcomes, rather than outcomes measured at the per hectare level. Nevertheless, donors could explicitly set aside funds for a program of CRA purchases, but only make payments when the program's success is demonstrated across a large landscape.

Funding such a mechanism could focus resources on Priority Conservation Areas and, from an equity perspective, reward landowners who have achieved a surplus. (This latter equity element is important. As EII has outlined, in Mato Grosso there are 7 million ha of forests that can be legally cleared for agricultural expansion. Corporate zero deforestation pledges can reduce land values for those landholders who have maintained more than the legal requirement of forest on their land. There is currently no viable mechanism in place to compensate farmers who forego their legal right to clear forests on their properties. This has undermined support for the Soy Moratorium, since it imposes a restriction on forest clearing on private land that is more onerous than the Forest Code, but provides no mechanism for compensating law-abiding farmers for the opportunity costs associated with these restrictions).⁶⁶

Leveraging Private Sector Contributions

An additional option would be for the federal or state fund to acquire a half-hectare of land in a PCA provided that a private sector actor (such as an agribusiness firm) contributes to a further acquisition. This would involve the private actor committing capital ex ante to supplement donor REDD+ funding via a public-private fund structure. This would have the advantage of matching REDD+ finance with supply chain businesses seeking to ensure their sourcing of commodities was both legal and had a zero deforestation footprint. We discuss this option further in Section 9 below.

⁶⁶ Earth Innovation Institute. 2016. *Making Corporate Deforestation Pledges Work*. earthinnovation.org.

7. Sustainable Forest Management and Sustainable Agriculture Production

In this section, we address productive forestry and agriculture including:

- Investment for productive forestry to underpin Brazilian (and other country) programs for reforestation/ restoration, including through enhancing the competitive position of sustainable forest management;
- Initiatives and development finance tools linking agriculture to positive environmental outcomes;
- Goals and limitations of the sustainable/zero deforestation commodity supply chain agenda;
- Challenges to scaling finance for sustainable/zero deforestation commodity supply chains.

Sustainable Forest Management (SFM)

Background for SFM Internationally

A recent paper scientific paper led by The Nature Conservancy, has pointed out that while reforestation is more expensive than "avoided forest conversion" it represents the largest pathway in terms of "natural climate solutions" and deserves more attention in order to identify low-cost mitigation opportunities.⁶⁷

The UN Strategic Plan for Forests⁶⁸ is focused on the opportunity for forests and trees outside forests to contribute to the 2030 Sustainable Development Agenda.

The Global Forest Financing Facilitation Network of the United Nations Forum aims to:

- a) Promote and assist Member States in designing national forest financing strategies to mobilize resources for sustainable forest management, including existing national initiatives;
- b) To assist countries in mobilizing, accessing and enhancing the effective use of existing financial resources from all sources for sustainable forest management, taking into account national policies and strategies.

According to the UNFF-CPF Advisory Group on Finance 2012 Study on Forest Financing, the required financing for SFM amounts to between US\$70 and US\$160 billion per annum globally.⁶⁹

Demand for wood products is growing rapidly, with the demand for global industrial round wood predicted to quadruple by 2050.70

Private capital is more naturally suited toward investments in productive forestry than in forest conservation because of revenue from the sale of timber or agroforestry commodities.

International timberland investment by fund managers for institutional investors has emerged as a new source of financing for sustainable wood production. Total assets under management have already reached US\$80 billion globally, largely in developed countries.⁷¹

The area under international forest management certification schemes increased from 14 million ha in 2000 to 438 million ha in 2014, of which 58 percent was under the Program for the Endorsement of Forest Certification (PEFC) scheme and 42 percent was under the Forest Stewardship Council (FSC) certification scheme.⁷²

⁶⁷ B.W. Griscom et al. (2017). *Natural Climate Solutions*. Proceedings of the National Academy of Sciences http://www.pnas.org/content/early/2017/10/11/1710465114.

⁶⁸ See: http://www.un.org/esa/forests/wpcontent/uploads/2016/12/UNSPF_AdvUnedited.pdf.

⁶⁹ AGF (Advisory Group on Finance). 2012. 2012 Forest Financing Study. Collaborative Partnership on Forests. Available at http://www.un.org/esa/forests/pdf/ yearGF_Study_July_2012.pdf.

⁷⁰ Indufor. 2012. Strategic Review on the Future of Forest Plantations. Report prepared for the Forest Stewardship Council. Helsinki.

⁷¹ Private Financing for Sustainable Forest Management and Forest Products in Developing Countries—Trends and Drivers. Washington, DC: Program on Forests (PROFOR).

⁷² ITTO (2015) Voluntary guidelines for the sustainable management of natural tropical forests. ITTO Policy Development Series No. 20. International Tropical Timber Organization, Yokohama, Japan.

Industrial scale forest plantations of eucalyptus, even though they have a role in sequestering carbon and reducing the pressure on natural forests from increasing demand for timber and even when certified, do not by themselves have the biodiversity, pollination, and other ecosystem service characteristics of multiple species native forests.

One business model for SFM is continually to maintain or rebuild standing timber and wood product inventories and overall ecosystem complexity and vitality. A second business model involves dividing up forested land into a mix of high-intensity, fast growing plantations for commercial returns and set-asides of natural forest or areas of ecological value such. In both models, the overall goal is for the forest system as a whole to readily regenerate without a significant loss of complexity or biodiversity, and with minimal, transitory impacts to other forest resources, such as water quality, soil productivity or habitat quality.

Background on Reforestation and Commercial Forestry in Brazil

The World Bank has described Brazil's NDC goal of restoring and reforesting 12 million ha (7 Mha of tree plantation plus 5 Mha of restoration) as laudable but suggests that it could be even more ambitious, since the Forest Code and the National Plan for Restoration of Native Vegetation (PLANAVEG) target up to 20 Mha of restoration. An ambitious combination might be therefore 20 Mha of restoration, alongside 7 Mha of tree plantations.⁷³

The lack of clear legal definitions of what is a forest has impeded forest restoration initiatives within Brazil, with 50% of Legal Reserves (LRs) permitted to comprise exotic species, and restoration defined as including agroforestry, commercial plantations, natural regeneration and ecological restoration.

Although legal mandates apply to areas within APPs and LRs of privately owned farms, forest vegetation can also be restored within the broad framework of landscape restoration in coordination with federal- and state-managed protected areas and reserves.⁷⁴

Total private sector plantation investments in developing countries are estimated at US\$1,763 million in 2011, with Latin America accounting for 83% of this total amount, and Brazil accounting for more than 80% of the regional total.⁷⁵

Brazil has been able to reforest large expanses of land for the purposes of industrial production, primarily for pulp and paper. By 2015, it had established 7.8 million ha of planted forest, of which 37% was independently certified via FSC, with fiber production mostly from large-scale industrial development outside the Amazon. Brazil has become the developing world's leader in plantation forestry, with eucalyptus growth rates having quadrupled in the past 40 years to reach an average annual volume growth of 40 m³/ha. This has resulted in the plantation industry accounting for 1.2% of Brazil's GDP.⁷⁶

Despite the divergence of goals between forest plantations and restoration of native vegetation, both can and already do co-exist. According to the Brazilian Tree Industry (IBÁ), the Brazilian forestry sector is responsible for the protection of at least 5.43 million ha of native forests. This amounts to 0.65 ha of native vegetation per ha of commercial forest, compared with only 0.07 ha in the agricultural sector.

Therefore the architecture of finance for forest protection could support both the sustainable business models described above: multi-species SFM and plantations with high ratios of conservation/restoration of native vegetation.

Challenges for Financing of SFM

SFM faces a number of financing barriers compared to conventional plantations, resulting in a lack of both domestic and foreign equity and loan financing. SFM has relatively large upfront costs, such as investment in set-aside areas to preserve ecosystem services, the cost of foregone logging (where forest clearing precedes planting), and the costs of certification and

⁷³ World Bank (2016): Support to the Implementation of the Brazilian INDC: Brazil's INDC restoration and reforestation target, The World Bank, Brasilia, November 2016.

⁷⁴ Ibid.

⁷⁵ Castrén, Tuukka, Marko Katila, Karoliina Lindroos, and Jyrki Salmi. 2014. Private Financing for Sustainable Forest Management and Forest Products in Developing Countries: Trends and drivers. Washington, DC: Program on Forests (PROFOR).

⁷⁶ World Bank (2016): Support to the Implementation of the Brazilian INDC: Brazil's INDC restoration and reforestation target, The World Bank, Brasilia, November 2016.

technical assistance.⁷⁷ Sustainable wood production value chains focus on maximizing total return from management of the forest ecosystem, and increasing harvested wood product yields through time, rather than generating revenues from, for example, real estate conversion. The result of this is a relatively long payback-period for return on investment.

In this light, PROFOR makes a number of recommendations to unlock private financing opportunities including: strengthening land tenure systems; reducing investment risks through guarantees and innovative financing; improving forest sector governance and transparency; research and technical assistance.⁷⁸

MDB financing, however, has faced challenges in supporting private investments in forestry: The primary instrument used by MDBs (of long-term senior loans) does not suit forestry projects since revenue generation from tree growth takes many years and cannot meet short-term loan repayments and collateral assets are often absent as trees have to reach maturity before they have significant value. Agroforestry projects can provide earlier cash flows (from agricultural products) while trees mature but a common problem for agroforestry as well as forestry is lack of equity capital. There is low institutional tolerance among MDBs for equity risk. Sub-ordinated debt and equity need long-term and viable investments, with a reasonable path for scale-up. And global timber companies whose practices are seen as only marginally socially/environmentally positive do not in any case lack access to capital. At the same time, the World Bank Forest Investment Program (FIP) has had to spread its resources across a large number of forest countries and given the above challenges has focused on support to the public sector and enabling environments.

Scaling up SFM Finance

The UN Food and Agriculture Organization (FAO) has pointed out the need to subsidize some of the costs of sustainable wood production because of the public benefits derived from forests.⁷⁹ And New Forests has described how such public support can de-risk investments into new geographies or technologies, addressing pre-commercial barriers to investment and underwriting social and environmental outcomes.⁸⁰

How then to use public resources to incorporate global and local public goods and to better scale private investment in SFM, including for institutional investors?

1. Concessional Equity

One model is for DFIs to support SFM project developers with concessional equity to leverage private institutional equity investment:

- For example: A sustainable timberland investment fund might target overall returns of 10% real net in a private equity fund with a 10year lock up, plus the option to extend for 5 years. Private investors needing commercially competitive returns might target 12% and would make up 70% of the committed capital in the fund. Donors/DFIs would make up 30% of committed capital and would target a 5% return, thus boosting the 10% overall fund return to ~12% for private investors.
- As with subsidizing debt finance via loans or bonds, donors/DFIs would need to see strong evidence that such SFM projects were delivering identifiable public goods.

2. Debt Linked to REDD+ PFP

Given the reluctance of donors and MDBs to use equity finance at a large scale, an alternative model, described in Section 5 for Bond Structure 3, links REDD+ PFP to a private Special Purpose Vehicle for SFM investments.

⁷⁷ The Role of the Financial Sector in Deforestation-Free Supply Chains is published by the Tropical Forest Alliance 2020 based on research by Vivid Economics within the framework of the Tropical Forest Alliance 2020 secretariat, hosted at the World Economic Forum. January 2017.

⁷⁸ See https://www.profor.info/knowledge/private-financing-sustainable-forest-management-and-forest-products-developing-countries-.

⁷⁹ FAO (2012) Broadening the Financial Basis for Sustainable Forest Management. Committee on Forestry: 21st Session. The Food and Agriculture Organization of the United Nations. Rome, Italy.

⁸⁰ New Forests (2017) Timberland Investment Outlook—2017. New Forests Asset Management Pty Ltd. Sydney, Australia.

3. Forest Country Incentives Supported by International Climate Finance

The World Bank Climate Investment Funds (outside of the Forest Investment Program) have been able successfully to use long-term loans to support renewable energy infrastructure projects in many developing countries, in large part because the existence of Feed-in-Tariffs (i.e., subsidies from the domestic government) has made such projects commercially viable.

In this light, the World Bank Forest Investment Program and ITTO are currently examining the potential for international climate finance to reward forest countries that create an enabling environment for SFM. In this case the signals would not be Feed-in-Tariffs but could be tax subsidies or export tariff adjustments or PES.⁸¹

Just as Feed-in-Tariffs (or similar incentives) have been more important to the development of renewable energy infrastructure globally than bespoke blended finance interventions for specific projects, so driving private investment at scale for pro-forest investments will ultimately be dependent on real economy signals in the forest country.

International climate finance to support forest countries to develop these incentives could potentially come from a second generation World Bank Forest Investment Program. However, at a large scale it will need to come from broader sources of REDD+ finance including the UN GCF. In this paper, we have proposed in Section 5 that Bond Structure 1 would enable forest countries to utilize REDD+ finance to put in place a broad range of incentives for NDC goals of their own choosing, including for SFM.

Sustainable Agriculture Production

Introduction

Improving agriculture productivity has for decades been a central goal of public policy for developing countries, including tropical forest countries, as described above in relation to Brazil's public banks and SNCR. MDBs have longstanding experience of supporting agriculture development.

Concessional debt, technical assistance and other tools for catalysing improvements in productivity are well established. However, improvements in agriculture productivity do not guarantee improved forest protection. Improvements in productivity may take pressure off forests and may be a pre-condition for forest protection by helping countries to improve livelihoods and meet development goals, but may also simply increase the opportunity cost of avoided deforestation. Public international finance for agriculture in deforestation countries is nearly 40 times greater than mitigation finance for forestry.⁸² Hence, the recent focus on combining Production with Protection and hence too the importance for the architecture of forest finance increasingly to link agriculture investment to Protection outcomes.

There are emerging examples of notable successes in Brazil and elsewhere, of public policy and finance using both "sticks" and "carrots" to support agriculture practices that are sustainable at the farm or project level and, importantly, at the landscape or regional level.

"Sticks"

• In 2008, the Brazilian National Monetary Council made rural credit in the Amazon biome conditional on proof of compliance with environmental regulation, legitimacy of land claims and legality of rural operations. A 2013 study by the Climate Policy Initiative showed that this action prevented the clearing of more than 2,700 square kilometres of forest, representing a 15% decrease in deforestation between 2008 and 2011.⁸³

⁸¹ See: http://www.un.org/esa/forests/wp-content/uploads/2017/05/Poverty_Panel_Gerhard_Dieterle.pdf.

⁸² Climate Focus. (2017). Progress on the New York Declaration on Forests: Finance for Forests—Goals 8 and 9 Assessment Report. Prepared by Climate Focus in cooperation with the New York Declaration on Forest Assessment Partners with support from the Climate and Land Use Alliance.

⁸³ Assunção, J., et al. (2013), Does Credit Affect Deforestation? Cited in Commodities and Forests Agenda 2020: Ten priorities to remove tropical deforestation from commodity supply chains. TFA2020 2017. World Economic Forum.

"Carrots:" Linking Investments in Productivity to Conservation Outcomes in Brazil⁸⁴

- Novo Campo: An ICV led multi-stakeholder initiative for sustainable cattle ranching in Mato Grosso: Technical assistance and long-term off-take agreements from private companies such as JBS, as well as purchases from McDonalds that previously prohibited sourcing of beef from the Amazon, and investment from the Althelia Climate Fund has led to a 30% increase in stocking rates. The initiative has zero deforestation, restoration and Forest Code compliance requirements.⁸⁵
- Sao Felix do Xingu (SFX) pilot program: led by TNC in collaboration with state and municipal governments, the rural producers' association and private companies such as Marfrig, Walmart and Cargill, it has resulted in an 80% reduction in deforestation and 80% registration in the CAR, while supporting sustainable cattle and cocoa agroforestry. Incentives have come also from the government of the state of Para, with Green Value Added Tax revenues allocated to municipalities based on compliance with the Forest Code and PES from the Green Municipality Program, as well as a grant from the Amazon Fund.
- SFX is part of a larger program, the "Collaboration for Forests and Agriculture" (CFA) for Brazil, Argentina and Paraguay, designed to complement corporate pledges to take deforestation out of supply chains and trigger an industry shift towards verified deforestation-free beef and soy production—saving 2 million ha from habitat conversion by 2020.⁸⁶
- The Sustainable Trade Initiative (IDH) has helped Mato Grosso as part of its Norway supported Initiative for Sustainable Landscapes⁸⁷ with a de-risking facility for private investors. The goal is increased intensification of cattle production combined with reforestation via a blend of public and private capital. IDH and Agroicone found intensification-reforestation could generate positive financial returns with an 8–11 year payback period. Farmers are obliged to be in compliance with the Forest Code within 5 years. This initiative has been part of the development of the *"andgreen fund."*⁸⁸
- The "andgreen fund" aims to grow to US\$400 million in commitments and to trigger US \$1.6 billion in private capital investments. Unilever has contributed US\$25 million to the fund.⁸⁹ The mission is to prove that financing inclusive, sustainable and deforestation-free commodity production can be commercially viable and replicable. The lending philosophy includes providing credit facilities only in jurisdictions with progressive forest and/or peat protection agendas and sustainable development strategies.

These examples demonstrate the benefits of linking increases in agriculture/timber productivity with conservation. They combine incentives from the federal and regional governments of Brazil, donor funding, philanthropic investment and support from private supply chain actors. Public actors therefore have a range of tools to make investment in sustainable production viable for the private sector.

Forest Frontier Community Supply Chains and Conservation

Reducing exogenous pressures from the major agriculture commodities on tropical forests is only part of the production challenge. Investment is needed to support actors on both sides of the forest frontier-not only for farmers and ranchers on deforested lands but also for indigenous and other rural communities within predominately forested territories and with forest-based livelihoods. Significant efforts to declare and strengthen protected areas, indigenous territories, and forest-based community land rights have worked to stabilize the forest frontier and put the brakes on agricultural encroachment.

⁸⁴ See *Collaboration Toward Zero Deforestation Aligning Corporate and National Commitments in Brazil and Indonesia* Dana Miller, Breanna Lujan (Environmental Defense Fund) Brian Schaap (Forest Trends). 2017.

^{gs} Marcuzzo, S.F. (2015). Novo Campo Program—A Strategy for Sustainable Cattle Ranching in the Amazon. Instituto Centro de Vida (ICV).

⁸⁶ https://www.nature.org/ourinitiatives/regions/latinamerica/lands.xml.

⁸⁷ https://www.idhsustainabletrade.com/news/norway-partners-idh-conserve-forests-2/.

⁸⁸ See http://www.andgreen.fund.

⁸⁹ https://www.idhsustainabletrade.com/uploaded/2017/01/A-Tropical-Forest-and-Agriculture-focused-fund.pdf.

Building economic enterprises among forest-based communities remains a critical challenge. Without sustainable economic alternatives, legally recognized community forest rights can be sold off for timber or mining access. But the nature of investment in forest-based community economies, including high transaction costs, is fundamentally different than for e.g., largescale soy production, which argues for a key role for public investment, leveraged where possible by private funds. Small economic improvements in local incomes can have a huge impact on forest protection and cultural survival.

As an example of incubating community forest-based enterprises, EcoDecision has partnered with the Coordinator of Indigenous Organizations of the Amazon River Basin (COICA), the Environmental Defense Fund and Forest Trends to develop a publicly accessible on-line database to help improve access to markets and finance for Amazonian indigenous peoples, including in Brazil.⁹⁰

Summary

A key question, therefore, is how to help forest country governments expand programs on both sides of the forest frontier, and the extent to which the sustainable/zero deforestation commodity supply chain agenda can generate complementary investment at a much greater scale, so that support for forest countries does not rely too heavily on public international climate finance.

The Demand Side: Sustainable/Zero-Deforestation Commodity Supply Chains

This section provides some background on the emerging sustainable/zero deforestation/"zero net" deforestation commodity supply chain agenda. We highlight examples of successful commodity agreements in Brazil; but also how corporate deforestation commitments globally have struggled to stay on track; and some of the challenges in relation to the role of the finance in deforestation free supply chains.

We then consider the potential for international policy and legal actions in consumer countries (e.g., from OECD or other governments) to take forward this agenda and to help overcome the costs of combining improvements in agriculture productivity with forest protection.

Brazil Commodity Agreements

- The Soy Moratorium: In 2006, companies representing 90% of the soy trade in the Amazon, agreed not to purchase soy that contributed to deforestation, forming the Soy Moratorium, which has been very successful in contributing to significant reductions in rates of deforestation. However, challenges remain: deforestation from soy production has accelerated in the Cerrado and although not actively deforesting, farmers may not be meeting the reforestation requirements of the Forest Code.⁹¹ Additionally, farmers' support for the Soy Moratorium is undermined by the fact that it does not permit permitted legal deforestation. Hence our suggestion above in Section 6 to use CRA purchases as a way to compensate such farmers.
- **Cattle Agreements:** In 2009, following pressure from government and civil society, meatpacking companies signed zero-deforestation agreements in the Amazon, known as the Cattle Agreements. Although these agreements have limitations and there is still evidence of illegal deforestation, they have resulted in much higher rates of registration under the CAR.⁹²

⁹⁰ See http://ecodecision.com.ec/?portfolio=putting-amazon-indigenous-producers-on-the-map.

⁹¹ Collaboration Toward Zero Deforestation Aligning Corporate and National Commitments in Brazil and Indonesia Dana Miller, Breanna Lujan (Environmental Defense Fund) Brian Schaap (Forest Trends). 2017.

⁹² Ibid.

Challenges for Sustainable Commodity Supply Chains and Related Finance

With commercial agriculture responsible for well over half of all deforestation, recent years have seen much focus on the high risk of deforestation associated with four major supply chains—beef, soy, palm oil, and pulp & paper, whose combined production is worth US\$180 billion annually in tropical forest countries, of which 45% is exported.⁹³ It has been estimated that 40-90% (depending on the jurisdiction) of the deforestation linked to these supply chains is illegal and further expansion through illegal means continues.⁹⁴

This is the context for the commitment to take deforestation out of supply chains initiated in particular from the Consumer Goods Forum and the New York Declaration on Forests. As of September 2017, **Supply-Change.org** has tracked more than 470 companies making public commitments to address commodity-driven deforestation.⁹⁵ And private-sector initiatives on sourcing sustainable agricultural commodities are under way from organizations such as the Roundtable on Sustainable Palm Oil and Roundtable on Sustainable Soy and Bonsucro.

However, it is acknowledged that the target of the New York Declaration for eliminating commodity-driven deforestation by 2020 will be missed (by a long way) and that significant efforts will be required to achieve such an ambition in the years beyond. Private sector actors are emphasizing that they are not able meet 2020 goals without support from governments in producer countries.

A recent report from Climate Focus for the Prince of Wales' International Sustainability Unit describes the problem starkly: "Despite a rapid increase in pledges and government efforts to reduce deforestation, no clear evidence exists that the various initiatives are having their intended impacts."⁹⁶

The Tropical Forest Alliance has therefore pointed to the need for:⁹⁷

- Eliminating illegality from supply chains;
- Growing and strengthening palm oil certification;
- Scaling up pilot programmes of sustainable intensification of cattle grazing;
- Sustainably increasing smallholder yields in palm oil and cocoa;
- Achieving sustainable soy production (e.g., in the Cerrado);
- Accelerating the implementation of jurisdictional programs;
- Addressing land conflicts, tenure security and land rights;
- Mobilizing demand for deforestation-free commodities in emerging markets;
- Redirecting finance towards deforestation-free supply chains;
- Improving the quality and availability of deforestation and supply chain data.

In relation to the financing of commodity supply chains, another Tropical Forest Alliance report, authored by Vivid Economics (to which Forest Trends contributed) has described how:⁹⁸

⁹³ The Role of the Financial Sector in Deforestation-Free Supply Chains is published by the Tropical Forest Alliance 2020 based on research by Vivid Economics within the framework of the Tropical Forest Alliance 2020 secretariat, hosted at the World Economic Forum. January 2017; Commodities and Forests Agenda 2020: Ten priorities to remove tropical deforestation from commodity supply chains. TFA2020. 2017.

⁹⁴ Consumer Goods and Deforestation: An Analysis of the Extent and Nature of Illegality in Forest Conversion for Agriculture and Timber Plantations. Sam Lawson. Forest Trends 2014.

⁹⁵ Stephen Donofrio, Philip Rothrock, and Jonathan Leonard, *Supply Change: Tracking Corporate Commitments to Deforestation-free Supply Chains*, 2017 (Washington, DC: Forest Trends, 2017).

⁹⁶ Zero-deforestation Commodity Supply Chains by 2020: Are We on Track? Background Paper prepared for The Prince of Wales' International Sustainability Unit October 2017. Authors: Franziska Haupt, Charlotte Streck, Haseebullah Bakhtary, Katharina Behm, Alan Kroeger, and Ingrid Schulte (Climate Focus).

⁹⁷ Commodities and Forests Agenda 2020: Ten priorities to remove tropical deforestation from commodity supply chains. TFA2020. 2017.

⁹⁸ The Role of the Financial Sector in Deforestation-Free Supply Chains is published by the Tropical Forest Alliance 2020 based on research by Vivid Economics within the framework of the Tropical Forest Alliance 2020 secretariat, hosted at the World Economic Forum. January 2017.

- Redirecting existing financial flows into sustainable production methods is essential for the introduction of more sustainable landscapes. Every year, more than US\$100 billion in fixed and working capital and trade finance flows into the production of beef, soy, palm oil, pulp and paper in tropical forest countries. In comparison, funds that specialize in investing in sustainable agriculture and food systems currently only have US\$500 million in assets under management.⁹⁹
- All four of the major commodities have a large degree of integration, with fixed capital finance predominantly provided by self-financing (through revenue, corporate debt and equity), supply-chain financing, and credit from public banks.
- Smaller producers have significant difficulty accessing credit due to a lack of collateral (often including a lack of clear land tenure), more volatile cash flows and high transaction costs etc. Given these conditions, small producers rely most heavily on public bank lending.
- In general, international financial institutions are much more actively involved in commodity trade finance than they are in lending to the agriculture sector.
- Removing government subsidies for agricultural practices that drive deforestation is critical.

In terms of emerging models of deforestation-free finance the report has highlighted the following models:

- Compliance requirements applied by integrated or midstream players;
- Revision of financial institutions' risk-assessment methods to incorporate the benefits of deforestation free supply chains;
- Innovative and green-labeled instruments that reduce the cost or increase the pool of finance;
- Sustainability-linked off-take agreements tied to finance;
- Publicly-funded facilities to provide long-term capital to enhance returns or reduce risk.

In broad terms, the first two models represent negative incentives towards deforestation-free standards, in the form of constraints to those not meeting sustainability requirements. The next two models represent market-driven mechanisms that leverage the potential commercial benefits of deforestation-free production. The final model represents a publicly funded means to support the above.

However, a number of factors present ongoing challenges to deforestation-free financing methods: the opportunity costs of avoided deforestation; a lack of price premiums in commodity markets; as well as the costs of sustainability certification and technical assistance. And, while good corporate initiatives exist, many relate to captive supply chains, and may often represent relatively small corporate social responsibility projects rather than mainstream business strategy.

Public-sector actors will have a key role to play in overcoming these barriers in order to catalyze greater investment. However, as we have repeated above, publicly funded facilities to pay for ecosystem services or to subsidize the provision of credit (including under Brazil's SNCR) are constrained by underlying fiscal limitations. And if the prioritization of commodity sourcing agreements to sustainable producers and regions will occur largely after sustainability or low/zero deforestation outcomes have been achieved, there remains a gap in terms of upfront finance for the needed transition.

Hence, we now examine legal and policy options in consumer countries that might leverage the sustainable/zero deforestation commodity supply chain agenda for greater private investment to overcome these barriers.

⁹⁹ McMahon, P., (2016). *The investment case for ecological farming*. Cited in ibid.

8. The Demand-Side: Legal and Policy Options for Consumer Countries

A European Commission study in 2013 noted that, of that proportion of crops and livestock traded internationally and associated with deforestation in the countries of origin, the EU imported and consumed 36%—equivalent to a deforested land area of 9 million ha over the period 1990–2008.¹⁰⁰

In this context, and given the limitations of private actions described above, there has been focus in recent years on government policy and regulatory options that could be applied in consumer countries to reinforce voluntary measures and level the playing field for private actors.¹⁰¹

The 2013 Commission study identified a number of promising policy measures: extending the sustainability criteria for biofuels for other uses of the same crops (food, feed, products, materials); promoting and strengthening the EU's Forest Law Enforcement, Governance and Trade (FLEGT) Action Plan and expanding it to other commodities; mandatory labeling of the forest footprint of food products; increasing the import tariffs of commodities that are associated with deforestation; and attaching sustainability criteria to the import of commodities associated with deforestation. However, the study noted that these evaluated policy proposals were judged in terms of their desirability rather than in terms of feasibility, including from a legal point of view.

A report by Chatham House and Forest Trends in 2013 also identified options: extending to agriculture commodities the use of measures that have been successful in excluding illegal timber from much international trade—including public procurement policy, licensing systems, legal due diligence requirements and free trade agreements with environmental provisions. The report describes legislation, such as the US Lacey Act, the EU Timber Regulation or the Australian Illegal Logging Prohibition Act, as difficult to adapt to trade in agricultural commodities (given the way in which soy, palm oil and sugar are processed). And a key challenge for many of these options is how best to promote "deforestation-free" commodities with many different certification systems, but some criticized as flawed and with promotion potentially problematic under WTO or EU procurement rules. Tariff reductions for sustainable commodities were also seen in this 2013 report as not likely to offer a way forward, mainly as tariffs are so low on most commodities already (with the exception of beef).¹⁰²

A 2016 report by Climate Focus for the European Commission has also examined the question of providing tariff preferences for zero deforestation agricultural or forestry products, with the initial priority being key imports to the EU of soya and palm oil. In the case of soy, Brazil would be the most relevant country, since the other major exporters to the EU—Bolivia and Paraguay—are already eligible for zero tariffs from the EU. Soy in Brazil is primarily an "indirect driver" of deforestation (e.g., by replacing livestock production which then results in deforestation elsewhere), and so only a scheme that incorporates these indirect emissions is seen to have impact. Brazilian firms pay tariffs of approximately US\$65 million each year on soybean imports into the EU, which could provide an incentive to negotiate a bilateral agreement in conjunction with other incentives—at a cost to the EU but with significant potential for reducing emissions.

A forthcoming Forest Trends paper has considered the potential for applying preferential tariffs on the basis of producer compliance with the Forest Code or for "sustainable territories"—the latter perhaps based on jurisdictional REDD+ and appropriate government regulation. The paper also considers additional border measures including an increased tariff for imports or, at the most extreme level, a prohibition on imports from outside "sustainable territories," but considers the latter approaches to be unfeasible given legal, political and economic obstacles. Bilateral, preferential trade agreements are seen as a potential way forward with room in these for environmental aspects such as support for compliance with Forest Code or establishment of "sustainable territories."¹⁰³

The concern remains that preferential tariffs measures might face a WTO challenge, even if in principle they could be justified under the General Exceptions clause in GATT Article XX, and there may be negative reactions from competitor countries that already enjoy tariff preferences. Climate Focus has again highlighted the weaknesses of voluntary certification schemes and the problem of "leakage" and the suggests the importance of looking at national/jurisdictional level agreements with forest countries, in part to overcome the challenge of production being an "indirect driver" of deforestation.¹⁰⁴

¹⁰⁰ The impact of EU consumption on deforestation: Proposal of specific Community policy, legislative measures and other initiatives for further consideration by the Commission (2013) by Vito, IIASA, Cicero, K.U. Leuven and IUCN-Netherlands.

¹⁰¹ Ending Global Deforestation: Policy Options for Consumer Countries Duncan Brack with Rob Bailey. September 2013. Chatham House and Forest Trends.

¹⁰² Ibid.

¹⁰³ Trade measures to encourage legal and sustainable agriculture in Brazil. (Forthcoming) Josh Gregory. Forest Trends.

¹⁰⁴ Fostering Climate Action through Trade-Related Policy Instruments for European Commission, DG Climate Action. Authors: Darragh Conway, Hannes Schloemann, Moritz von Unger, Matthew Smith. Climate Focus . July 2016.

Another approach has recently been recommended specifically in relation to timber, using sustainability certificates such as FSC as the basis for a tax on unsustainable forestry practices. When timber is imported, customs authorities would default to applying a "tax for unsustainable production" which starts from the assumption that the timber is not sustainable. The burden of proof is on the taxpayer to prove the sustainability through showing a recognized certificate and the customs authority of the importing state responds by issuing a tax discount. This approach is seen as not violating extraterritoriality constraints because forest country entities would only be affected through contract law. The approach also has the strong advantage of raising funds to help co-finance REDD+.¹⁰⁵ However, the concerns about certification schemes discussed above may prevent adoption of such an approach, in particular for agriculture commodities.

A more recent European Commission conference, in June 2017, again focused on opportunities for future demand-side action in tackling deforestation and illegal logging, examining:

- Due diligence regulation for forest risk commodities;
- Public procurement policies for sustainably produced forest risk commodities;
- Lower import duties for sustainably produced commodities;
- Encouragement for similar actions by other consumer countries;
- Support for a sustainable agricultural commodity trader platform;
- Encouragement for private sector initiatives on forest risk commodities;
- Strengthening and expanding existing transparency platforms through voluntary reporting and data compilation;
- Consumer information campaign in partnership with industries and NGOs;
- Incubating new certification schemes via partnerships with industry and NGOs;
- Encouragement for lower consumption of forest risk commodities in food;
- Promotion of trade in legal and sustainable forest risk commodities through free trade agreements;
- Sustainability criteria for bioenergy feed-stocks.

And again were highlighted challenges for these demand-side actions: the limited ability of certification to drive changes in the supply chain; the differences between legality, sustainability, and zero (or zero net) deforestation (e.g., legality does not necessarily guarantee sustainability); the need for more robust auditing of certification systems and company commitments and the question of whether lowering or raising of import duties would comply with EU and WTO rules.

The European Commission conference also examined:

Supply-side actions: To reduce deforestation associated with major forest-risk commodities, including by improving governance and land enforcement, and promoting sustainable agricultural practices in producer countries, including via:

- Best practice support to smallholder producers in risk geographies via technical assistance;
- Technical Assistance to jurisdictions to improve governance, monitoring and law enforcement and prepare for REDD+ and FLEGT participation;
- Partnership agreements for forest risk commodities.

Investment and Finance: To promote public and private investment and financial support, which promotes sustainable land-scapes and prevents harmful flows of investment and finance associated with deforestation, including via:

¹⁰⁵ Heine, Dirk and Faure, Michael G. and Lan, Chih-Ching, Augmenting Forest Sustainability Certificates with Fiscal Instruments (November 13, 2017). Rotterdam Institute of Law and Economics (RILE) Working Paper Series No. 2015/7. Available at SSRN: https://ssrn.com/abstract=2617815 or http://dx.doi.org/10.2139/ssrn.2617815.

- Sustainable financing mechanisms;
- Mandatory disclosure of information on deforestation proofing of financial investments linked to production or processing of forest risk commodities.^{106, 107}

On the supply-side the conference emphasized: action by the private sector needs to be complemented by government, jurisdictional and policy support to help achieve results; the importance of public-private partnerships given the limits of private sector actions; the need to work at jurisdictional level where land use decisions are taken and production is taking place; and the potential to use REDD+ and other investment tools to support an enabling environment for deforestation-free commodity production.

And for finance, in terms of supporting jurisdictional approaches, it was highlighted that REDD+ PFP could connect with supply chain investments to achieve the transformational change required to reduce deforestation.

Given the limitations of policy and legal actions from governments in consumer countries, how better to integrate Production (Supply) with Consumption (Demand) and Finance/Investment and how better to promote synergies between them?

¹⁰⁶ Summary Report of European Commission conference of 21–23 June: Tackling Deforestation and illegal logging: progress made and opportunities for future action. http://ec.europa.eu/environment/forests/pdf/conf_21_06_2017/TDIL_FINAL_REPORT_FLEGT_PART.pdf.

¹⁰⁷ JUNE 2017 DRAFT Feasibility study on options to step up EU Action against Deforestation PART I (PROBLEMS, DRIVERS, OBJECTIVES, INTERVENTIONS) http://illegallogging-deforestation-conference.eu/wp-content/uploads/2017/06/Draft_Feasibility_Study-PART_I-.pdf.

9. Integrating Production (Supply) with Consumption (Demand) and Finance/Investment

In this section we address the opportunity, highlighted by the European Commission conference, of linking REDD+ with supply chain investments in order to integrate Production (Supply) with Consumption (Demand) and Finance/Investment.

Given the importance of international public climate finance in reducing the fiscal costs to forest country governments of undertaking NDC forest activities, a key question is: Can additional private sector funding from commodity buyers and agribusiness ease the burden on donors and forest countries and thus allow more effective implementation of national/regional policies or incentives and the release of additional funds to support blended finance vehicles for SFM and sustainable agriculture?

As we noted in the Introduction Section 2, the production value of the four main agricultural commodities associated with deforestation (soy, palm oil, beef, pulp and paper) in tropical countries exceeds US\$1 trillion.¹⁰⁸ Extracting a very small percentage of this production value from the consumers could reduce the fiscal burden on public actors. Renewable energy infrastructure investment has been driven by public subsidy, but some of the costs of clean energy production have been passed on to private consumers of electricity (businesses and households) in the form of higher energy prices. Can an economically viable way be found for consumers of agriculture commodities to shoulder some of the costs of transitioning to more sustainable land-use practices?

There is some limited evidence of agribusiness (and end-consumer) willingness to pay premiums for sustainable commodities—for example, for specialist organic cacao and coffee. Additionally, among commodities such as palm oil, soy and sugar (where tracking farm origins is extremely challenging given processing from multiple sources) some certification schemes such as RSPO allow a certificate to be detached from the underlying commodity and have adopted "mass balance" and "book and trade" systems to allow buyers to offset consumption of purchases which cannot be certified. However, the volume of transactions has been relatively low. Additionally, with the uncertainties described, certification schemes do not seem likely to receive additional donor subsidies.

The Paris Agreement is focused on jurisdictional outcomes for reduced deforestation. And we have seen the importance of national/jurisdictional level agreements with forest countries to help overcome "leakage" and the challenge of agriculture production often being an "indirect driver" of deforestation. This is the context for the European Commission conference proposal to link REDD+ PFP with commodity supply chain investments.

Below, we therefore outline a potential model for making this link in a concrete and explicit way—with private investment from commodity buyers and agribusiness, targeting priority regions for commodity purchases, supplementing REDD+ PFP to support jurisdictional reduced deforestation outcomes and doing so at scale.

Linking REDD+ PFP with Commodity Supply Chain Investments

Commodity buyers and agribusiness could demonstrate their commitment to supporting the goals of a jurisdiction to become a zero deforestation supply chain by committing funds ex ante to purchase REDD+ credits from that jurisdiction via a public-private fund structure. We propose that this fund structure also receives a public put for REDD+ credits from bilateral donors or the UN GCF.

Public support from donors to a particular jurisdiction in the form of REDD+ put options could allow commodity buyers and agribusiness to participate in such a fund in their target commodity sourcing regions (alongside compliance buyers of carbon from energy intensive industries).

In this case, agriculture commodity buyers would not be under a compliance carbon regime (although they might over time be subject to legal due diligence requirements). They would be voluntary buyers of credits investing in the REDD+ outcomes of their key sourcing regions. Having a clear line of sight toward future REDD+ payments from private actors as well as donors at scale would enable the jurisdiction to invest with more confidence in the transition to sustainable Production and Protection.

Institutionally, the public-private fund structure could take the form in Brazil of, for example, the Amazon Fund, or a state reforestation/conservation fund. The Ministry of Environment and some state governments in Brazil have plans for funding vehicles to compensate landowners with legal rights to deforest, as well as for supporting reforestation.¹⁰⁹

¹⁰⁸ Tropical Forest Alliance 2020. (2017). The role of the financial sector in deforestation-free supply chains.

¹⁰⁹ Collaboration Toward Zero Deforestation Aligning Corporate and National Commitments in Brazil and Indonesia Dana Miller, Breanna Lujan (Environmental Defense Fund; Brazil case studies); Brian Schaap (Forest Trends; Indonesia case studies). 2017.

These national/sub-national entities would also be able to use the value of the REDD+ put option to support the development of privately managed funds that leverage financial investors for additional upfront finance.

For agribusiness and food companies, supporting jurisdictional REDD+ and Forest Code compliance is a useful way to align corporate zero deforestation pledges with regional government plans, and to ensure that they promote best practice rather than cause unintended consequences (like freezing small farmers out of markets).¹¹⁰

Below we provide a simplified illustration of the economics of the above model. We show how soy buyer commitments to purchase REDD+ credits could support jurisdiction-wide reforestation and conservation outcomes. And we base this on data from a case study for soy production in Mato Grosso.

A simple model would be for public and private actors to commit to acquire jurisdictional REDD+ credits. In addition, as we have suggested earlier in this report, the Amazon Fund or a state forest fund could develop more specific programs for reforestation via PRA or conservation via purchase of "surplus" CRAs, and private actors might be attracted to engaging in these more specific programs.

Mato Grosso soy production (a 2015 paper based on 2008 prices):¹¹¹

- Mato Grosso soy bean harvest 17.8 million tons, across 6.2 million ha, at a yield of 3.15 tons/ha and with the price of soy per ton of US\$415 (716 R\$);¹¹²
- Production costs US\$668/ha (1153 R\$); statewide gross profits US\$3.6 billion;
- Single farmer with 1000 ha had a US\$0.5 million gross profit (or rental value US\$250,000 per annum);
- Buyers in total paying US\$7.386 billion for all supply in one year.

As discussed in Sections 5 and 6, based on costs of reforestation of US\$1000/ha, a US\$6/tCO₂e REDD+ payment could offset all the costs of borrowing over 10 years for PRA reforestation programs (assuming cumulative carbon sequestration per ha of 100tCO₂e).

Agribusiness could reduce the costs to donors of supporting such a program by, for example, themselves committing to pay US\$6tCO₂e or US\$600/ha for reforestation outcomes, supplementing the donors' own commitments. Across 620,000 hectares, representing 10% of the total soy production area in Mato Grosso, this would amount to an apparently daunting US\$372 million. However, spread over a 10 year period, US\$372 million would represent only 0.5% of total payments for soy from the state, given that buyers in total were paying in one year US\$7.386 billion for all supply. Or, an annual premium of 1% of the soy price could, over 10 years, be used to fund a reduction to zero of the costs of borrowing to reforest 1.24 million ha of degraded lands—some 20% of the entire land area devoted to soy production. This would dramatically reduce the impact of soy production as an "indirect driver" of deforestation.

Alternatively, buyers of soy could fund the acquisition of CRAs that represent 10% of the total land area devoted to soy production, at a cost below 1% of soy market price, if spread over 10 years.

- With avoided deforestation generating 367tCO₂e/ha, across 620,000 ha this would equate to 227.5 million tCO₂e. At US\$5/tCO₂e this would equate to US\$1.137 billion or US\$1,835/ha. This US\$1.137 billion could be spread over 10 years and would represent 1.5% of the annual cost of soy purchases. If the cost of CRAs was lower at US\$884/ha as suggested by Soares-Filho et al.,¹¹³ the total cost would be US\$548 million which spread over 10 years would represent 0.74% of the annual cost of soy purchases.
- (Soy farmers' opportunity costs may be higher than US\$1,835ha. Over 30 years US\$1,835 is the Present Value of US\$177 per annum at a discount rate of 10%. In the paper cited above implied rental income in 2008 was US\$250/ha. But sellers of CRAs including in Priority Conservation Areas will often have much

¹¹⁰ Earth Innovation Institute. 2016. Making Corporate Deforestation Pledges Work. **earthinnovation.org**.

¹¹¹The data is taken from a 2015 paper based on 2008 prices. Richards P, Pellegrina H, VanWey L, Spera S (2015) Soybean Development: The Impact of a Decade of Agricultural Change on Urban and Economic Growth in Mato Grosso, Brazil. PLoS ONE 10(4): e0122510. doi:10.1371/journal.pone.0122510.

¹¹² US\$/R\$=1/1.72 in 2008.

¹¹³ Brazil's Market for Trading Forest Certificates, Soares-Filho et al. (June 2016) http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0152311.

lower opportunity costs with lower corresponding land valuations. It is worth noting how such a payment compares to existing PES schemes in Brazil. For example, Bolsa Verde in Minas Gerais has paid US\$100 per ha per year to landowners who conserve or recover native vegetation on their land.¹¹⁴ This equates to a Present Value of US\$1,037 per hectare over 30 years with a discount rate of 10%).

Private Payments for Ecosystem Services

Private payers for ecosystem services are another potential source of funding for forest conservation. And private sector commitments to conserving Priority Conservation Areas, via CRA purchases and easements, could also come from local beneficiaries of ecosystem services and watershed protection (such as water utilities, municipal authorities, hydro companies and downstream commercial farmers) or from philanthropic investors. This could complement the emerging growth of water funds for green infrastructure.¹¹⁵ For example, the Conservador das Águas program has since 2005 contributed to the conservation and restoration of over 3000 ha of Atlantic Forest in the Extrema municipality, harnessing payments from water users (including tariff funded payments) to support implementation of the Forest Code in riparian zones and watersheds.¹¹⁶

The Role of China

The TFA and the European Commission, among others, have emphasized the importance of mobilizing demand for deforestation-free commodities in emerging markets. A concern has been that the continued shift to China and other developing economies, and toward greater domestic consumption within developing countries, may result in little to no emphasis on certification, legality or zero deforestation.

China is Brazil's most important trading partner. In 2016 China imported US\$35.1 billion of goods (19.2% of Brazil's total exports by value) including 75.7% by value of Brazil's soybean exports.¹¹⁷

Given the importance to China of a secure supply chain for soy and other products, there is a strong case to engage with China's National Development and Reform Commission (NDRC) in relation to support for public-private funding vehicles of the kind described above.¹¹⁸

Summary

The model that we propose is intended to be scaleable and able to attract large-scale funding commitments from multiple actors for jurisdictional outcomes, rather than for smaller specific projects. Organizations of buyers for soy, palm oil and other key commodities could work with the relevant producer organizations and governments in jurisdictions for a coordinated approach. And commitments of capital to public-private fund structures, to supplement public REDD+ funds, could help private actors to meet due diligence reporting requirements.

Public-private jurisdictional approaches might also help supply chain actors to address the differing goals of sustainability, legality and zero (or "zero net") deforestation. Jurisdictional approaches do address the challenge of "leakage" (at least within countries or sub-national regions) and in a Brazilian context will require progress on compliance under the Forest Code, and should thus help meet legality requirements. Supporting the jurisdictional REDD+ outcomes of forest countries and donors could be a much more scaleable version of "book and trade" offset approaches to certification.

¹¹⁴ Challenges for Low-Carbon Agriculture and Forest Conservation in Brazil. Britaldo Soares-Filho, Letícia Lima, Maria Bowman, and Letícia Viana. Inter-American Development Bank Environmental Safeguards Unit (VPS/ESG) TECHNICAL NOTES No. IDB-TN-385 February 2012.

¹¹⁵ Green Infrastructure in the Drinking Water Sector in Latin America and the Caribbean: Trends, Challenges, and Opportunities. Marta Echavarria, Paola Zavala, Lorena Coronel, Tamara Montalvo and Luz Maria Aguirre. (2015). Ecodecision, Forest Trends, The Nature Conservancy.

¹¹⁶ Governing a pioneer program on payment for watershed services: Stakeholder involvement, legal frameworks and early lessons from the Atlantic forest of Brazil. Ryan. C. Richards et al. Ecosystem Services Volume 16, December 2015 pp23–32.

¹¹⁷ https://atlas.media.mit.edu/en/profile/country/bra/ Cited in: *Trade measures to encourage legal and sustainable agriculture in Brazil.* (Forthcoming) Josh Gregory. Forest Trends.

¹¹⁸ Supported by the Earth Innovation Institute, a memorandum of understanding was signed in April 2016 between the China Soy Industries Association and Brazilian producer groups APROSOJA and ABIOVE.

We examined in Section 3 the different potential sources of financing for forest protection and we noted that the fiduciary responsibilities of institutional investors (to pension holders and other savers) leave no room to support public actors in paying for public goods without a commercial financial return.

A critical question for the protection of tropical forests is the extent to which other private actors–commodity markets, agribusiness and consumers of food or wood products are able to help fund public goods payments. Indeed, a willingness to do so must ultimately be the central test of zero deforestation commodity supply chain commitments.

For competitively priced globally traded commodities there may be little room for commodity buyers and agribusiness to pay price premiums on sustainability/zero-deforestation grounds. Nevertheless, for commodities that can be very volatile in price terms, a very small percentage of the total price, targeted to supporting avoided deforestation and reforestation via public-private fund structures, could represent an efficient way for agribusiness to meet sustainability goals and access secure long-term supply. Government policy tools in consumer countries should be available to support such an approach via, for example, favorable tax-credit treatment, an approach that would not fall foul of WTO rules. Governments could also consider mandatory approaches via the imposition of taxes on imports of commodities associated with deforestation, where tax revenue raised is hypothecated to support public jurisdictional REDD+ programs.

10.Conclusion

We have outlined in this report an architecture of finance for the protection of tropical forests that brings together an array of approaches into an integrated strategy. Our recommendations link three fundamental pieces of this architecture:

- Enhancing the effectiveness of REDD+;
- Supporting the implementation of forest country policies and legislation for forest protection;
- Harnessing private sector funding for forest protection from commodity buyers, agribusiness and consumers.

More specifically, we have recommended:

- The use of put options/price floors for public REDD+ payments to support the development of carbon markets, harness private REDD+ funding and thus help capture additional "option value" from forest carbon assets;
- Enhanced bond structures, explicitly linked to REDD+ payments, to align interests between donors and forest countries so that both feel able to commit a greater scale of resources and thus catalyze upfront investment at low cost from the capital markets;
- Linking REDD+ in a concrete way to support implementation of Brazil's powerful Forest Code legislation and more ambitious outcomes for avoided deforestation;
- Support for jurisdictional REDD+ from not only energy intensive industries seeking to offset a portion of their potential compliance obligations, but also from commodity buyers/agribusiness needing to meet zero or "zero net" deforestation commitments.

There exist good examples of blended finance for sustainable land-use projects that demonstrate the benefits of linking increases in agriculture/timber productivity with conservation. However, a financial architecture will need to support the implementation of the broader enabling environment of public policy and regulation to catalyze a much larger scale of pro forest investments than could be achieved through focusing only on discrete project activities with bespoke blended finance structures.

Therefore, the primary intention of these recommendations is to reduce the fiscal burden on forest countries of achieving ambitious NDC outcomes, allowing them to implement effective policy, to generate incentives to private investment and to expand their support for successful blended finance models on the ground that combine forest conservation, sustainable forest management and improvements in agriculture productivity.



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