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Jurisdictional REDD+ Bonds: Leveraging Private Finance for Forest Protection, Development, and Sustainable Agriculture Supply Chains

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Forest Trends' Public-Private Co-Finance Initiative

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Norad

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List of Abbreviations

ABC	<i>Agricultura Baixo Carbono</i> (Low Carbon Agriculture)
CCBA	Climate, Community and Biodiversity Alliance
CDM	Clean Development Mechanism of the Kyoto Protocol to the UNFCCC
CERs	Certified Emissions Reductions (under the CDM)
CGF	Consumer Goods Forum
COP19	19 th meeting of the Conference of the Parties to the UNFCCC
CO ₂ e	Carbon Dioxide Equivalent
CDSA	<i>Companhia de Desenvolvimento de Serviços Ambientais</i> (Company for Development of Environmental Services)
DFI	Development Finance Institution
ESS	Ecosystem Services
EU ETS	European Union Emissions Trading Scheme
FAO	Food and Agriculture Organization
FINAGRO	<i>Fondo Para el Financiamiento Del Sector Agropecuario</i> (Fund for Financing the Agricultural Sector)
FNO	<i>Fundo Constitucional de Financiamento do Norte</i> (Constitutional Financing Fund of the North)
GCF	Green Climate Fund (United Nations)
GHG	Greenhouse Gas Emissions
GTPS	<i>Grupo de Trabalho da Pecuária Sustentável</i> (Brazilian Roundtable on Sustainable Cattle)
IFC	International Finance Corporation
KfW	Germany's Kreditanstalt für Wiederaufbau (Reconstruction Loan Corporation)
LED-R	Low-Emission Rural Development
MRV	Monitoring, Reporting and Verification
ODA	Overseas Development Assistance
PES	Payments for Ecosystem Services
PFP	Payments for Performance
PRODES	<i>Projeto PRODES – Monitoramento Da Floresta Amazônica Brasileira Por Satélite</i> (Project PRODES – Brazilian Amazon Forest Monitoring by Satellite)
PRONAF	<i>Programa Nacional de Fortalecimento da Agricultura Familiar</i> (National Program to Strengthen Family Agriculture)
RBF	Results-Based Financing
REDD	Reducing emissions from deforestation and forest degradation
REDD+	Reducing emissions from deforestation and forest degradation; plus conservation, sustainable management of forests and enhancement of carbon stocks
SISA	Sistema De Incentivo A Serviços Ambientais (Acre's Environmental Service Incentives System)
UCEGEO	<i>Unidade Central de Geoprocessamento e Sensoriamento Remoto do Estado do Acre</i> (Central Unit of Geoprocessing and Remote Sensing of the State of Acre)
UNEP	United Nations Environment Program
UNFCCC	United Nations Framework Convention on Climate Change
USD	US Dollar
VCS	Voluntary Carbon Standard

Executive Summary

The economic rationale for the protection of forests – for the value of the local and global ecosystem services that they provide, including carbon sequestration, watershed protection, biodiversity conservation, fertile soil, and resilient food production systems – is well understood. However, while progress in addressing the drivers of deforestation has been made in some regions, it remains very challenging for developing countries, donor governments, or agri-business, by themselves, to value these public goods and to overcome the short-term opportunity costs of preserving forests at scale.

Nevertheless, there is an excellent opportunity to address this situation by coordinating:

- International climate finance under REDD+;¹
- Developing countries' domestic investment in both agriculture and ecosystem services; and
- A growing private sector interest in sustainable and secure agriculture commodity supply.

This paper will propose a Jurisdictional REDD+ Bond as a mechanism by which limited donor funds can effectively leverage new sources of capital and harness the larger financing flows associated with public or private investment in agriculture in order to bring about transformational change in reducing deforestation at a landscape level. The mechanism might be targeted initially at those Brazilian Amazon states with the most advanced levels of capacity for REDD+. But it is intended to be relevant for all tropical forest countries.

Achieving environmental outcomes at the scale of whole landscapes and states can appear daunting and complex. However, it is precisely such a “jurisdictional” approach that has the potential to guarantee reduced deforestation while providing economic and supply chain-scale benefits, thus reducing both the burden on the public purse and other barriers to sustainable development and improved livelihoods.

Successful forest protection is enhanced by improved livelihoods for subsistence farmers and increased productivity from commercial farming. It may be challenging for both donors and businesses, who are investing to support agriculture development via intensification, to have these investments correlated with greenhouse gas (GHG) emission reductions through related decreases in deforestation, since these may be occurring outside of their specific investment programs. A jurisdictional approach provides a framework that can address this issue.

A Jurisdictional REDD+ Bond structure would leverage private capital from institutional investors in order to help overcome the upfront investment costs and financing requirements of protecting forests and improving agriculture practices, and thereby create a framework for zero-deforestation agriculture commodities.

It would create donor commitments to pay for meeting GHG emission reduction targets versus an agreed jurisdictional baseline. (It is envisaged that carbon “credits” associated with the emission reductions bought would be retired rather than used for donor country emission reduction compliance targets). Such payments could, in turn, subsidize or offset all the costs of the coupon/interest on a REDD+ Bond issued by the developing country. Tropical forest country governments might have long-term US\$ borrowing rates of 5-7% which they use to raise funds for investing in their domestic economies. The purpose of the REDD+ Bond is to allow them to invest in sustainable agriculture and conservation at a much lower cost of capital.

Costs for donors and developing countries would be reduced over the medium term because achieving jurisdictional GHG reduction targets would result in the creation of landscape-level sustainable timber and zero-deforestation agriculture commodity supply chains. The infrastructure of monitoring, reporting, and verification (MRV) required to validate emission reductions versus the jurisdictional baseline, after a few years of successful performance, would provide agriculture and timber private sector actors with an entire regional supply chain certified as sustainable ex ante. This could preclude the expense of development and MRV for individual projects or programs and would underpin and hugely expand certification of sustainability beyond niche markets into large-scale and more secure and resilient supply.

¹ UN-REDD Program states that, “‘REDD+’ goes beyond deforestation and forest degradation, and includes the role of conservation, sustainable management of forests and enhancement of forest carbon stocks.” Accessed February 24, 2014. <http://www.un-redd.com/AboutREDD/tabid/582/Default.html>

The Jurisdictional REDD+ Bond structure would support integrated landscape planning and could allow commercial or subsistence farmers to more easily secure preferential commodity off-take agreements with businesses keen to ensure that their supply chains become both more sustainable and secure. Successful jurisdictions would thus have a competitive advantage in accessing markets.

At a local level, capital raised from the Bond would be ring-fenced for investment in Low-Emission Rural Development (LED-R)² and forest protection, helping to support existing programs in developing countries as they seek to shift the multi-billion dollar financing flows in their agriculture sectors onto a more sustainable path.

This could be achieved through, for example, improved and targeted access to credit and agriculture extension; programs that strengthen supply chains; or provision of carbon incentives/“Payments for Ecosystem Services” (PES) to communities, farmers, projects, and businesses at a local level. Additionally, certified zero-deforestation crops would result in more secure revenue lines that would help unlock further lower-cost financing flows from the private sector (e.g., banks and companies in the supply chain). Targeting the value of public good would not only address incremental/opportunity costs but would also help reduce financing barriers to increased agricultural productivity and improved livelihoods.

A REDD+ Jurisdictional Bond structure could be sufficiently large and liquid to attract investment from mainstream capital markets and institutional investors. Investors could have access to similar yields and credit ratings to those of a “plain vanilla” developing country government bond. (Low-income, higher-credit risk countries could have their bonds’ credit rating enhanced by an element of principal protection from Development Finance Institutions). Much of the literature related to international climate finance emphasizes the need to tap the world’s major savings pools (beyond limited bank project finance or alternative investment asset classes) in order to meet the requirements for trillions of dollars in financing flows for low-carbon energy and sustainable food production.³ Bonds have been cited as the ideal instruments to bring this about.⁴ The outstanding volume of bonds explicitly labeled as “green” has increased dramatically to USD15 billion in 2013⁵ and, for example, since 2008 the World Bank has issued over USD 4.5 billion in Green Bonds through 60 transactions and 17 currencies.⁶

Accessing funds from the capital markets will be crucial because, in terms of sequencing, the long-term commitments, infrastructure investment and purchasing agreements from commodity buyers looking to source sustainably are likely to follow the achievement of successful regional REDD+ outcomes, rather than anticipating them or providing sufficient upfront finance to support the necessary transformation.

Relatively small REDD+ incentive payments (predicated on successful GHG mitigation outcomes) could therefore shift the much larger financing flows associated with agriculture investment and markets onto a more sustainable path – not just because of the USD value of such incentives but because of the pathway toward zero-deforestation supply chains that they would help create.

² For a full definition of LED-R see: Nepstad, Daniel, Silvia Irwin, Tathiana Bezerra, William Boyd, Claudia Stickler, João Shimada, Oswaldo Carvalho Jr, Katie MacIntyre, Alue Dohong, Ane Alencar, Andrea Azevedo, David Tepper, and Sarah Lowery. “More food, more forests, fewer emissions, better livelihoods: linking REDD+, sustainable supply chains and domestic policy in Brazil, Indonesia and Colombia.” *Carbon Management* 2, Vol. 6 (2013): 639-658.

³ Kaminker, Christopher, and Fiona Stewart. “The Role of Institutional Investors in Financing Clean Energy.” *OECD Working Papers on Finance, Insurance and Private Pensions*, No.23, OECD Publishing. AND Nelson, David and Brendan Pierpont. “The Challenge of Institutional Investment in Renewable Energy.” Climate Policy Initiative, 2013. Accessed February 25, 2014. <http://climatepolicyinitiative.org/wp-content/uploads/2013/03/The-Challenge-of-Institutional-Investment-in-Renewable-Energy.pdf>

⁴ In relation to forest protection, see for example: Cranford, M., Parker, C. and Trivedi, M. *Understanding Forest Bonds*. Global Canopy Programme, 2011. Oxford, UK. Accessed February 25, 2014. <http://www.globalcanopy.org/materials/understanding-forest-bonds>

⁵ Climate Bonds Initiative. 2012. *Bonds and Climate Change: The State of the Market in 2012*. Accessed February 25, 2014. http://www.climatebonds.net/wp-content/uploads/2012/05/CB-HSBC_Final_30May12-Single.pdf AND <http://www.climatebonds.net/2014/02/2013-overview/>

⁶ See – <http://treasury.worldbank.org/cmd/htm/WorldBankGreenBonds.html>

Donor governments would have fulfilled an obligation to provide measureable financial support for REDD+ at a time when capacity-building efforts and REDD+ “readiness” is confronted by a dearth of “Phase 3”⁷ payment streams. They would also have helped meet their own domestic policy goals to reduce the negative environmental footprint of food imports, created a framework for sustainable supply chains, supported emerging demand for “green bonds” and “impact” investments in mainstream capital markets, piloted an approach that might be widely replicated, providing a model for the UN Green Climate Fund and helping increase the ambition of domestic commitments with international finance.

The Challenge, the Opportunity, and the Need for Scale

With global population expected to reach over 9 billion by 2050, the world will need to produce as much food in the next 50 years as it has since the beginning of civilization. The FAO predicts that global meat consumption alone will increase 65% within the next 40 years, so it will be essential to increase agricultural yields substantially. However, land available for agriculture is limited, and deforestation for agriculture production will further contribute to greenhouse gas emissions, climate change, degraded local ecosystems, reduced watershed protection, and lower soil fertility. Currently, land use, land-use change, and forestry make up about 17% of global Greenhouse Gas (GHG) emissions, and agriculture contributes another 14% of global GHG emissions.⁸

A body of literature has highlighted the link between poverty and the loss of ecosystems and biodiversity, the risk to achieving Millennium Development Goals resulting from the deterioration of natural capital and the need for strong international action to curb GHGs, as well as the potential for forests to sequester carbon.⁹ Transformations are needed in both commercial and subsistence agricultural systems in order to increase production and achieve food security in developing countries, whilst at the same time protecting forests and soils and lowering greenhouse gas emissions from higher production via forest clearing.

The fundamental economics of maintaining and investing in natural capital are persuasive. For example, UNEP has calculated that, for an investment in natural capital of USD198 million a year, the overall economic value – including the value of ecosystem services – is increased by USD293 million per annum¹⁰. And the trend for valuing ecosystem services can be seen growing beyond some developed countries to, for example, parts of Latin America; for instance, we have seen growth in Water Endowment Funds like those sponsored by the sugar growers of Colombia’s Cauca valley or other Public-Private Partnerships such as the Latin American Water Funds Partnership.¹¹

Valuing natural assets and ecosystem services in the public accounts, regulation, reform of subsidies, charges for resource use and Payments for Ecosystem Services (PES) can alter real economy decisions and ensure that LED-R becomes Net Present Value-positive in the context of on-the-ground financial decisions. While the long-term benefits for farmers and for the world from forest ecosystem services are increasingly understood, it is proving challenging for governments to put in place the frameworks and financing mechanisms necessary to overcome the short-term opportunity costs of clearing forests, degrading land and expending natural capital.

Domestic and international climate finance programs have been looking to scale beyond the project level in order to overcome transaction costs and regulatory burdens for small projects and because of the need to reach greater levels of mitigation ambition.

⁷ The 2009 Meridian Report first suggested a three-phase approach for REDD+: Phase 1 for capacity building, Phase 2 for the preparation of national plans and Phase 3 for full implementation of REDD+ activities with payments based on performance. Angelsen, Arid, Sandra Brown, Cyril Loisel, Leo Peskett, Charlotte Streck, and Daniel Zarin. 2009. Reducing Emissions from Deforestation and Forest Degradation. The Meridian Institute. Accessed February 25, 2014. http://www.redd-oar.org/links/REDD-OAR_en.pdf.

⁸ ‘Climate-Smart’ Agriculture; Policies, Practices and Financing for Food security, Adaptation and Mitigation. FAO, 2010.

⁹ See for example: TEEB: *The Economics of Ecosystems and Biodiversity for National and International Policy Makers*. UNEP, 2009.

¹⁰ UNEP. *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication*. 2011.

¹¹ See Tercek, M. and S. Adams. *Nature’s Fortune*. The Nature Conservancy, 2013.

Moreover, for REDD+, a landscape-level approach with an overarching state or federal government framework can better manage issues of “permanence” and “leakage” (i.e., loss of forests subsequent to the project timeline or as a result of emissions shifting outside their project boundary).

Investing in improved agricultural yields runs the risk of increasing the opportunity costs of avoided deforestation (by making farming more productive in the short term). So REDD+ will require a state or national program investing in agriculture to be accompanied by increased forest protection in order to ensure GHG mitigation outcomes.

Furthermore, a regional jurisdictional level structure has advantages for corporations and supply chains actors looking to move away from sustainability at the farm level to a broader focus on landscape-level sourcing.

Global Financial Support for GHG Mitigation and Adaptation – Phase 3 of REDD+

Pricing of carbon is the most widely developed form of PES and, in this context the concept of Results-Based Financing (RBF) or Pay-For-Performance (PFP) for carbon emission reductions under Phase 3 of REDD+ is well established among Parties to the UNFCCC and has been reaffirmed by COP19 in Warsaw. As World Bank President Jim Yong Kim stated: “Achieving a predictable price on carbon that accurately reflects real environmental costs is key to delivering emission reductions at scale”.¹²

The Eliasch Review¹³ estimated that halving deforestation rates has a potential GHG mitigation benefit of 1.5 - 2.7 gigatonnes per annum with costs ranging from USD17.2 – \$33 billion per annum. And the marginal abatement costs of mitigating GHGs from tropical deforestation are recognized as being lower than in many other sectors of the economy (such as Carbon Capture and Storage technology for coal-fired power stations).

Many countries (with notable exceptions such as Brazil) have hoped that the bulk of PFP for REDD+ could come from the private sector via carbon markets rather than from public funds. However, levels of demand from carbon markets are currently low in comparison to projected supply and very low in relation to the mitigation potential of multiple landscape level REDD+ initiatives.¹⁴

There is some emerging compliance carbon market offset demand. For example, California REDD+ credit demand through 2020 is estimated at 71 MtCO₂e.¹⁵ And there are emerging cap-and-trade schemes in São Paulo and Rio de Janeiro with potential demand for REDD+ credits. But, while some new regional markets are developing, in general compliance carbon markets have struggled since the global economic crisis of 2008-2009 and the failure to follow the first compliance period of the Kyoto Protocol. Demand for Certified Emissions Reductions (CERs) from the European Union Emissions Trading Scheme (EU ETS) and Japan has collapsed, and REDD+ credits did not even qualify for the EU ETS.

The Voluntary Carbon Market continues to grow and to provide some limited demand (101 million tonnes in 2012¹⁶ with 28 million tonnes contracted for “Forest Carbon” in 2012)¹⁷ including for innovative projects such as that of the indigenous community of Paiter Suruí in Brazil that has contracted to sell credits to the Brazilian company Natura. But

¹² Jim Yong Kim. Washington Post op-ed calling for action to reduce greenhouse gas emissions (January 25, 2013).

¹³ Eliasch, Johan. The Eliasch Review (Climate Change: Financing Global Forests). 2008.

¹⁴ See for example: Conservation International, 2013. *REDD+ Market: Sending out an SOS- ‘Climate-Smart’ Agriculture: Policies, Practices and Financing for Food security, Adaptation and Mitigation*. AND GCP, IPAM, FFI and UNEP FI, 2014. *Stimulating Interim Demand for REDD+ Emission Reductions: The Need for a Strategic Intervention from 2015 to 2020*. Global Canopy Programme, Oxford, UK; the Amazon Environmental Research Institute, Brasília, Brazil; Fauna and Flora International (FFI) and the UNEP Finance Initiative (UNEP FI).

¹⁵ Peters-Stanley, Molly, Kate Hamilton, and Daphne Yin, *Leveraging the Landscape: State of the Forest Carbon Markets 2012*. Ecosystem Marketplace (A Forest Trends Initiative), 2012.

¹⁶ Peters-Stanley, Molly, and Daphne Yin. *Maneuvering the Mosaic: State of the Voluntary Carbon Markets 2013*. Ecosystem Marketplace (A Forest Trends Initiative), 2013.

¹⁷ Peters-Stanley, Molly, Gloria Gonzalez, and Daphne Yin. *Covering New Ground, State of the Forest Carbon Markets 2013*. Ecosystem Marketplace (A Forest Trends Initiative). 2013.

the market requires significant growth in order just to support 1.4 billion tonnes of forest offsets that already exist in the 5-year pipeline.¹⁸

The carbon markets also continue to be a source of innovation in developing methodologies for accounting and MRV for REDD+ and other sectors. (For example, the state of Acre, in Brazil was chosen as one of the first pilots for the Verified Carbon Standard's Jurisdictional and Nested REDD+ methodology; and, elsewhere, a Standardized Baseline Methodology has recently been approved by the Clean Development Mechanism (CDM)¹⁹ Executive Board for more efficient charcoal production in Uganda). And organizations such as the Climate, Community and Biodiversity Alliance (CCBA) have developed "Carbon Plus" standards that also evaluate community and biodiversity performance of land-based carbon projects.

The International Energy Agency²⁰ and others continue to emphasize the role that trading of carbon can play in reducing the costs of GHG mitigation as a percentage of Gross World Product. However, while it is possible that carbon markets could play a greater role in the future, low levels of demand mean that over the next few years public funds (from donors and developing countries themselves) will need to carry much of the burden of PFP and demand creation.²¹ The intention of this paper is to show that increasing the level of public funds available for structures such as a Jurisdictional REDD+ Bond could be rewarded by significant leverage of private investment and transformational outcomes for avoided deforestation.

Lack of demand in carbon markets is not a reason to abandon REDD+, which has huge potential to help developing countries and private actors to overcome the drivers of deforestation. Despite technical complexities, international institutions have developed sophisticated measurement and monitoring systems with CO₂e as the underlying metric – one that can be fungible across borders and accounting systems. With the proviso that agreements can be reached on defining conservative emission reduction baselines reassessed over time in a dynamic way, REDD+ can act to underpin other metrics and co-benefits (social, health, and biodiversity) and contribute to a broader valuation of natural capital.

It is worth noting that the "Financial Instruments" section of The Governing Instrument for the Green Climate Fund (GCF) stated that the GCF would look to "employ results-based financing approaches including, in particular, for incentivizing mitigation actions, payment for verified results, where appropriate."

Thus far, there has been limited progress in identifying public sources for PFP. Nevertheless, increased donor support would be going with the trend. The Norwegian Government has shown considerable leadership and has pledged USD1 billion to the Brazilian Government's Amazon Fund up until 2015 and has also made USD1 billion available to Indonesia on a PFP basis; the World Bank Forest Carbon Partnership Facility (FCPF) recently committed to spend USD63mm on forest credits from Costa Rica; and Kreditanstalt für Wiederaufbau (KfW) has committed €16 million for REDD+ credits from the Brazilian state of Acre²², as part of Germany's "Early Movers Program."

Several papers have recently highlighted the value of PFP using a CO₂e performance metric as an efficient instrument, in a number of sectors for driving private investment at the level of projects and program,²³ including the G8-

¹⁸ Ibid.

¹⁹ Clean Development Mechanism of the Kyoto Protocol to the UNFCCC.

²⁰ International Energy Agency. *World Energy Outlook 2011*.

²¹ For an extensive analysis of the demand gap, see: GCP, IPAM, FFI and UNEP FI. *Stimulating Interim Demand for REDD+ Emission Reductions: The Need for a Strategic Intervention from 2015 to 2020*. Global Canopy Programme, Oxford, UK; the Amazon Environmental Research Institute, Brasilia, Brasil; Fauna and Flora International (FFI) and the UNEP Finance Initiative (UNEP FI), 2014.

²² WWF. *Environmental service incentives in the state of Acre, Brazil: Lessons for policies, programmes and strategies for jurisdiction-wide REDD+*. 2013.

²³ Edwards, Rupert. *The Green Climate Fund and the implementation of Emission Reduction Underwriting Mechanisms* (2011); Rio+20: *Opportunities for financing the Triple Bottom Line* (2012); *Advance Market Commitments/Emission Reduction Underwriting Mechanisms for climate change finance* (2009). Climate Change Capital ThinkTank. AND

Ghosh, A., Müller, B., Pizer, W. and Wagner, G. Oxford Energy and Environment Brief 2012: *Quantity-Performance Instruments for Public Climate Funds*. AND

Pizer, W. *Seeding the market: auctioned put options for certified emissions reductions*. Duke University, 2011.

sponsored World Bank Methane Finance Study Group's *Using Pay-for-Performance Mechanisms to Finance Methane Abatement* which has been endorsed by Clean Air and Climate Coalition as well as several donor countries.²⁴

An attraction of PFP for donors is that it can allow limited public funds to target tangible outcomes that are unknown under ex ante financing structures (where funds are provided without any assurance of outcomes being achieved); and it can also be structured to minimize costs and rents. On the other hand, multi-year commitments can create accounting issues for some donor governments.²⁵ This could be because of the long tenor of commitments or because of the contingent nature of the liabilities – if performance targets are not achieved, committed cash would not be utilized. This could be overcome by mandating that monies not drawn down are recycled within climate finance facilities or treated in the same way as commitments to fund investments (such as Funds managed by the World Bank).

Emerging bilateral funding sources have started to use Results-Based Finance or Pay-for-Performance as a way to complement development tools such as Output-Based Aid. For instance, the UK has committed £50 million to the World Bank Carbon Initiative for Development Fund to utilize existing CDM and new innovative standardized baseline methodologies for buying CERs to support energy access projects in Least Developed Countries.

At the nexus of ecosystems, energy, food, and water there are windows of opportunity to meet multiple development, climate, and biodiversity objectives.²⁶ PFP aimed at emission reductions can, in some sectors, be correlated with positive health or biodiversity outcomes and thus can be used to help account for other public goods. In this way, mitigation finance can also support adaptation and resilience.

For developing countries, PFP with a CO₂e metric provides a guaranteed revenue stream for achieving emission reduction goals. And utilizing the high credit standing of institutions such as the World Bank to provide PFP contracts targeted directly at private actors is highly effective in reducing credit risk.

Options for distributing PFP incentives include direct distribution of incentives (bilaterally or from institutions such as the World Bank or from the GCF) to projects and programs (as under the Clean Development Mechanism), or directly to national and state governments with a subsequent (indirect) distribution to local stakeholders or via efforts to support access to credit and extension services.²⁷ The latter approach of direct PFP to governments will be the critical element in ensuring that the issuance of bonds for forest protection becomes a reality.

Sustainable and Zero-Deforestation Supply Chains – Support from the Private Sector

A number of actors in agricultural commodity value chains (including producers and agri-businesses) have been addressing the need for greater productivity whilst also conserving forests. For example, the Roundtable on Responsible Soy and Roundtable for Sustainable Palm Oil have each developed international certification systems. The Forests, Farms and Finance Initiative (FFFI) has brought together a wide range of actors to link sustainably produced, Roundtable-certified commodities with sources of finance in order to move a range of agricultural commodities to “no forest loss.”

The Consumer Goods Forum (CGF) – a collaboration of 400 retailers, manufacturers, and service providers with combined annual sales of over USD3 trillion – has announced a commitment to move toward a goal of zero net deforestation in its supply chains by 2020. And individual companies including Unilever and Nestle have ambitious targets for sourcing zero-deforestation raw materials.

²⁴ World Bank Methane Finance Study Group. *Using Pay-for-Performance Mechanisms to Finance Methane Abatement*. 2013.

²⁵ O'Sullivan, R., Lee, D., Zamgochian, A. and Durschinger, L. *US Experience on Results-based Finance*. USAID-supported Forest Carbon, Markets and Communities Program. Washington, DC: 2013.

²⁶ Edwards, Rupert. *Climate Change Capital ThinkTank: Rio+20: Opportunities for financing the Triple Bottom Line*. 2012.

²⁷ Thiago Chagas, Charlotte Streck, Robert O'Sullivan, Jacob Olander and Joerg Seifert-Granzin. *Nested Approaches to REDD+: An Overview of Issues and Options*. Climate Focus and Forest Trends, 2011.

Legislative demand-side measures from the USA and EU aimed at timber supply chains (e.g., the US Lacey Act and the EU Timber Regulation) have created legal obligations for sustainable sourcing and efforts are underway to extend such measures to other agriculture commodities.²⁸ The European Commission, for example, is undertaking a comprehensive review of the environmental impact of imported goods including food, and looking to identify opportunities for policy and legislation to reduce this impact.²⁹

Corporate social responsibility, a desire for secure supply and pressure from policy-makers have encouraged the development of a range of certification tools for businesses to measure social and environmental outcomes.

In this context, a key ambition is to move from improving sustainability at the individual farm level to the landscape level³⁰ to reduce costs and secure supply and, from a REDD+ perspective, to ensure that certification tools are associated with GHG mitigation outcomes. The growing private sector interest in sustainable and secure supply chains is constrained by difficulties in identifying the original source for commodities or in moving beyond niche certification at farm level. This factor is also a constraint on the feasibility of ambitious legislative demand-side measures. And businesses often have broader regional concerns relating to security of supply – loss of crops due to weather events, erosion of the resilience provided by ecosystem services, and poor production techniques.

Achieving regional-, state-, or national-level emission reduction targets would provide a much larger framework in which this private sector interest in sustainability could engage. Zero deforestation or “zero net deforestation” would not be achieved in jurisdictions on day one. However, with donors providing REDD+ payments for regions achieving increasingly ambitious emission reduction and reduced deforestation targets, companies would have credible political cover, based on internationally recognized metrics, to support their own sustainable supply chain goals.

Jurisdictional-level REDD+ could act as the underpinning for business and civil society to develop other social metrics of performance, just as governments, Development Finance Institutions (DFIs) or the GCF could correlate carbon with other co-benefit metrics. And by engaging with companies in this way Jurisdictional REDD+ would ultimately lead to improved off-take contracts, opening the door for increased investment in sustainable production systems and a competitive advantage in accessing markets.

Shifting Business-as-Usual Investment and Overcoming Financing Barriers at the Local Level

Required annual investments in agriculture to meet projected demand in 2050 have been estimated at around USD209 billion.³¹ Average annual investment by domestic private sector actors (largely farmers) in a selection of 76 low- and middle-income countries was calculated at USD168 billion and government expenditures on agriculture in a subsection of 54 of these countries at USD160 billion.³² In Brazil, domestic policies and programs (outside of REDD+) for farmers and agribusiness have been calculated at USD50 billion per annum of which the “ABC” low- carbon agriculture program accounts for only USD1.5 billion.³³

²⁸ Duncan Brack with Rob Bailey. *Ending Global Deforestation: Policy Options for Consumer Countries*. Chatham House and Forest Trends, 2013.

²⁹ Energy, Environment, and Resources Summary. Chatham House Event April (2013): *Deforestation-related commodity supply chain controls*.

<http://www.chathamhouse.org/sites/default/files/public/Research/Energy,%20Environment%20and%20Development/180413summary.pdf>

³⁰ Kissinger, G., A. Brasser and L. Gross. *Scoping Study. Reducing Risk: Landscape Approaches to Sustainable Sourcing*. Landscapes for People, Food and Nature Initiative, 2013.

³¹ FAO. *The State of Food and Agriculture: Investing in Agriculture for a Better Future*. 2012.

³² Lowder, Sarah K., Brian Carisma and Jakob Skoet. *Who invests in agriculture and how much? An empirical review of the relative size of various investments in agriculture in low- and middle- income countries*. ESA Working paper No. 12-09. Agricultural Development Economics Division, FAO. December, 2012.

³³ Nepstad, Daniel, Sylvia Irawan, Tathiana Bezerra, et al. “More food, more forests, fewer emissions, better livelihoods: linking REDD+, sustainable supply chains and domestic policy in Brazil, Indonesia and Colombia.” *Carbon Management* (2013) 4(6), 639-658.

Performance Based Payments through a Jurisdictional REDD+ Bond structure could ease developing countries' fiscal constraints and so help shift these large government and agriculture sector financial flows onto a more sustainable path, leveraging institutional investor capital and new sources of investment from commodity buyers.

These aggregated new sources of capital would help developing countries to overcome not only the opportunity costs of forest protection but also those financing barriers that stifle investment in agriculture and rural development generally (regardless of whether it is sustainable or not). Such barriers include: lack of access to credit (off the radar screen of international capital markets, too large for microfinance, too small for local finance institutions, or requiring long-term investment horizons unsuited to short-term debt), or uncertainty over property rights and legal frameworks.

Costs and barriers mean that it can be hard to attract the financing flows required to make the leap to high productivity and sustainable production for either commercial or subsistence farming. This reinforces the tendency for production increases to be sought through expanding into forested areas rather than from improved practices on existing farmed land. This can be the case even when sustainable practices have attractive economic fundamentals.

For example, research has shown that the large-scale transition from input-intensive cattle grazing on degraded pastures to silvo-pastoralism results in enhanced productivity and payback periods of as short as 4 years, but faces challenges in terms of adoption and upfront costs.³⁴

The proceeds of a Jurisdictional REDD+ Bond can help overcome these challenges, improving access to finance “on the ground” (via loans to farmers or support for local banks) and then secure further investment from commodity buyers. Such investment can support, for example, the combination of forest law enforcement and higher agriculture productivity (e.g., beef yields on pastureland) that has allowed the state of Mato Grosso to combine significantly reduced deforestation rates with higher levels of production.³⁵

Jurisdictional frameworks would help provide the scale, political cover and integrated planning needed to address risks and barriers; and they would provide opportunities for international and local development finance institutions to catalyze this process:

- For example, DFIs could work with local banks to increase access to concessional debt to support early stage investment in sustainable, climate-smart agriculture – e.g., shifting livestock farming to silvo-pastoral or other agro-ecological techniques; insurance to farmers; or partial risk guarantees to supply chain actors that are lending to small cooperatives
- Allow agriculture commodity traders and other supply chain businesses to increase both the volume and contractual tenor of off-take agreements for crops certified as low/zero deforestation.
- And alongside a contractual off-take relationship comes a much greater willingness to lend- for inputs, seeds, fertilizer, irrigation, clean technology equipment, warehouse and storage facilities and logistics infrastructure.

For financial institutions and supply chain lenders creating collateral is key to reducing risk:

- Purchaser contracts themselves create an alignment of interests and increased security of investment. The purchaser can, for example, lend against the value of 40% of agreed deliveries and then purchase the remaining 60% once a loan has been repaid.
- Alternatively, more innovative approaches could be developed: A revenue stream for farmers associated with Carbon/PES could represent lower risk collateral for a financing institution, if a government agency,(potentially supported by a DFI) were to institute a ‘delivery-versus-payment’ system (akin to an

³⁴ Z. Calle, E. Murgueitio and J. Chará. *Integrating forestry, sustainable cattle-ranching and landscape restoration*. CIPAV, 2012

³⁵ Daniel Nepstad, David G. McGrath and Britaldo Soares-Filho. “Systemic Conservation, REDD, and the Future of the Amazon Basin. *Conservation Biology* 25 (2011) pp. 1113-1116.

escrow account or clearing exchange) for PES credits. A commercial farm or co-operative of small farmers might be allocated PES from investing in agro-ecological practices. A lender would be allowed to secure a contractual right to receive the PES at the moment of delivery, as a tier of security, in exchange for provision of debt finance. Such security would have the effect of reducing counterparty default risk. In this way PFP for Carbon or Ecosystem Services (ESS) can not only provide additional funds that target the value of public goods but can also efficiently be utilized to reduce financing risks and barriers and lower the cost of capital.

Example of Jurisdictional REDD+ Bond Structure

Introduction

Jurisdictional REDD+ Bonds could be appropriate for many tropical forest countries including Colombia, Peru and Indonesia. The illustration below is based on an example of a Brazilian state.

Several regions in Brazil have made considerable progress in reducing rates of deforestation. Brazil itself, whose agriculture sector has continued to grow while it has dramatically reduced deforestation, is ahead of schedule in reaching the most ambitious target of its National Climate Change Policy – an 80% reduction in Amazon deforestation by 2020. Some of this can be attributed to low beef and soy prices in several recent years, but much of it has resulted from commendable national government leadership, targeted public policies and law enforcement, as well as increased rejection of crops/cattle grown on deforested land by buyers. However, Brazil's deforestation trend appears to be reversing in 2013, and it is vital that momentum is maintained in supporting stakeholders – governments, farmers, finance institutions and civil society.

The capacity building necessary for REDD+ is complex and challenging (defining baselines, participatory consultation, creating a credible infrastructure for MRV, etc.), and regions that have made progress must now start to see real benefits if momentum is not to be lost because of a lack of incentives.

This section first examines the headline elements of how a REDD+ Bond might be structured and then highlights the general assumptions and some areas for further consultation and research.

Key Elements of a Jurisdictional REDD+ Bond

Illustrative and simplified assumptions:

- In this example, a state in Brazil would issue a \$250mm bond in 2014 to mature after 15 years.
- The REDD+ structure would significantly reduce the cost of borrowing for the state. Additionally, we would propose that the Brazilian federal government consider guaranteeing or itself issuing the bond, as this would reduce the cost of borrowing even further. Individual states do not have the investment grade credit rating easily to access the international capital markets and their ability to borrow is restricted by federal law. Therefore the proposed Jurisdictional REDD+ Bond would be a Federal/State partnership.
- Replicating this structure for a low income country with a poor credit rating would require that an entity such as the World Bank Group boost the Bond's credit rating by providing a degree of principal protection in order to attract investors requiring investment grade bonds.
- The bond denominated in USD would yield 5.5%, (reflecting recent Brazilian long-term bond yields at around 12% in Real and 5.5% in USD. The yield differential reflects forward expectations of Brazilian Real depreciation versus the USD over time.)
- Both Brazilian Real and USD denominated bond markets attract sophisticated institutional investors, domestic and foreign. The World Bank and IFC could work with the government and major Brazilian and international bank capital markets teams to test the most appropriate bond structure.
- Institutional investors would receive prevailing market yields (such as the 5.5% mentioned above) and take on Brazil investment grade counterparty credit risk.

- The Brazilian federal government and the relevant state would agree on the correct split of revenues from payments for REDD+ credits, the baseline, monitoring and accounting approaches (to avoid double counting within the Brazilian national target). Thus state level emission reduction targets would be linked to the national REDD+ strategy.
- Money raised would be ring-fenced for investment into forest protection, increased agriculture productivity and improved livelihoods.
- International donors, in this illustration, pay ex post for verified emission reductions of 40 million tonnes of CO₂e achieved over 15 years versus an agreed-upon baseline (such as the PRODES³⁶-based baseline.) Some states have achieved significant emission reductions versus the proposed baseline in recent years and are projected to do so in the future, assuming significant further investment.
- Illustrative donor payment price of USD5 per tonne of carbon (total cost USD200mm over 15 years which equates to a present value of approximately USD129mm, assuming a donor-developed economy discount rate of 3%).
- It is assumed that “carbon credits” are retired, constitute measurable financial assistance for REDD+ under UNFCCC, are not used for compliance with developed country domestic emission reduction targets (as might have occurred under the Kyoto Protocol) and create no future obligations (such as binding domestic targets) for Brazil under international law. Project based credits bought by private buyers within the state would be registered but not double counted within the overall jurisdictional target.
- Brazil and the relevant state jurisdiction, in this illustration, would be able to borrow in USD in order to invest in agricultural development linked to forest protection at approximately zero % interest, provided funds were utilized successfully toward meeting overall emission reduction outcomes. The illustrative cash flows in Table 1 demonstrate that if the state successfully meets GHG emission reduction targets, the Bond coupon is effectively reduced from 5.5% to almost zero. Investors would continue to receive a 5.5% coupon. However, costs for Brazil/the State would be reduced by the REDD+ payments.
- The cost of a 5.5% coupon on USD250mm of principal is USD13.75mm per annum. Emissions reductions credited per annum of 2.67 million tonnes would generate revenue of USD13.33mm, almost completely offsetting the coupon cost and reducing the overall interest payment for Brazil/the State to 0.17% per annum

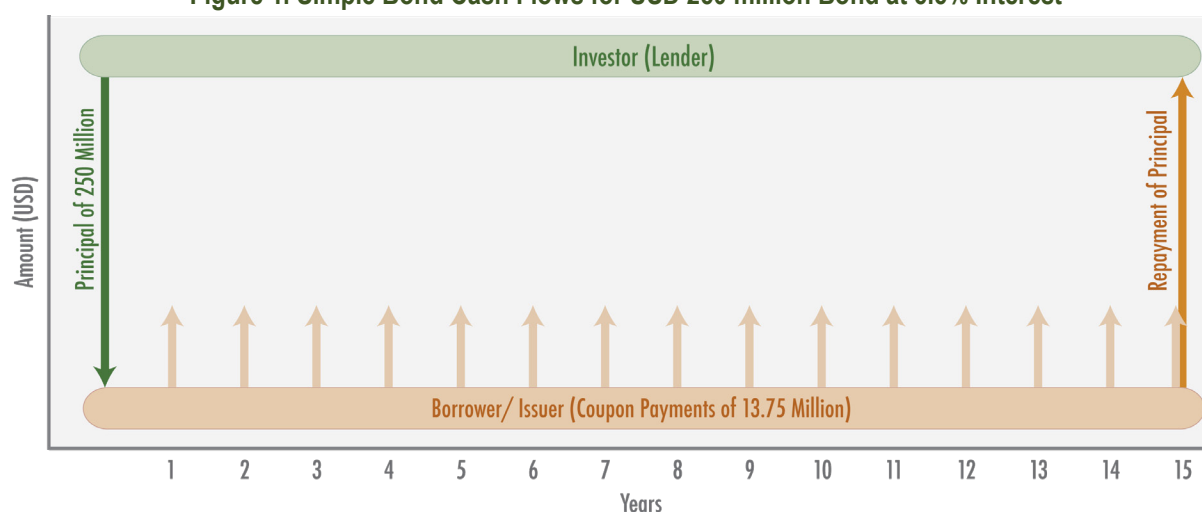
Table 1. Jurisdictional REDD+ Bond Illustrative Cash Flows

		Year 1	Year 2....	Year 15	
		2014	2015	2028	Total
Nominal Size of Bond (USD)	250,000,000				
Coupon cost for Brazil/State Jurisdiction	5.50%	13,750,000	13,750,000	13,750,000	206,250,000
State's Emission Reductions (15 years)	40,000,000	2,666,667	2,666,667	2,666,667	40,000,000
Donor Payment per tonne CO ₂ e (USD)	5	13,333,333	13,333,333	13,333,333	200,000,000
Post Carbon Coupon Cost for Brazil/State		416,667	416,667	416,667	6,250,000
Post Carbon Coupon Costs as %		0.17%	0.17%	0.17%	

Figures 1 and 2 show how REDD+ donor performance-based payments could reduce the interest liabilities for Brazil and the State.

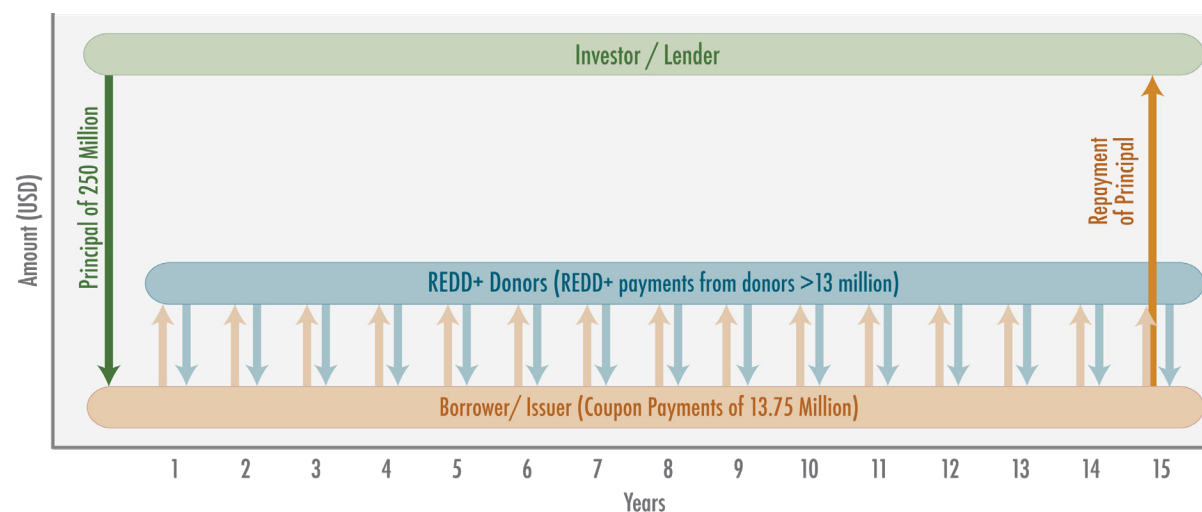
³⁶ Projeto PRODES: Monitoramento Da Floresta Amazônica Brasileira Por Satélite (Project PRODES – Brazilian Amazon Forest Monitoring by Satellite).

Figure 1. Simple Bond Cash Flows for USD 250 million Bond at 5.5% Interest*



* Bonds generally pay coupons semi-annually rather than annually. This figure is simplified to annual payments for illustration.

Figure 2. Jurisdictional REDD+ Bond Cash Flows for USD 250 million Bond at 5.5% Interest



- Table 2 (below) provides a sensitivity analysis where are shown the implied net interest rates on a Jurisdictional REDD+ Bond under differing scenarios for GHG emission reduction outcomes and Bond issuance size, while assuming the same 5.5% coupon and USD\$5 REDD+ payment as in the Table 1 above
- For example, a smaller Bond issuance size of only \$200mm and donor payments for greater emission reductions of 50 million tonnes CO₂e would result in an implied 'negative interest rate' of 2.83%. Donor payments for verified emissions reductions would not only offset interest costs but also help contribute USD85 million toward principal repayment

**Table 2. Implied Net Interest Rate on Jurisdictional REDD+ Bond
(GHG Emission Reduction Payments/ Size of Bond Issue)**

Emission Reductions (tCO ₂ e)	Size of Bond Issue (USD)				
	100 M	200 M	300 M	400 M	500 M
30 M	-4.50%	0.50%	2.17%	3.00%	3.50%
40 M	-7.83%	-1.17%	1.06%	2.17%	2.83%
50 M	-11.17%	-2.83%	-0.06%	1.33%	2.17%
60 M	-14.50%	-4.50%	-1.17%	0.50%	1.50%
70 M	-17.83%	-6.17%	-2.28%	-0.33%	0.83%
80 M	-21.17%	-7.83%	-3.39%	-1.17%	0.17%

- Under a USD denominated bond structure, Brazil/the State would have currency exposure on the principal, implying that returns on domestic investment ought to be in line with forward interest rate differentials between USD and Brazilian Real. An alternative approach would be to issue a Jurisdictional REDD+ Bond denominated in Brazilian Real. This would remove currency exposure on the principal, but the REDD+ payments would create a smaller reduction in ongoing coupon costs, since long-term bond yields in Brazilian Real have been around 12% compared to 5.5% for Brazilian bonds denominated in USD. One way to offset the higher domestic currency interest rate would be to contract for more REDD+ credits with donor governments and, in either case, the federal and state governments could determine the most appropriate currency approach in line with overall treasury management.

General assumptions, areas for further consultation, and research in relation to a Jurisdictional REDD+ Bond structure:

- At maturity of the Bond, after 15 years, Brazil/the State would, in this example, repay the final coupon and the principal of USD250 million to the bondholders. As mentioned above, investing in improved agricultural productivity would generate positive financial returns. A body of literature (such as the CIPAV paper referred to above) has highlighted the opportunity for investing in financially viable sustainable agriculture practices. It is an assumption of this paper, confirmed in bilateral discussions with representatives of Amazonian states, that the proceeds from a Bond could be used to support investment in a wide range of improved agriculture practices that would generate a financial return, that such returns could be used to cross-subsidize “sunk costs” associated with direct conservation, and that individual states could determine the correct balance of direct conservation, support for particular communities and investment for agricultural intensification. A significant portion of use of proceeds from the bond issue would be required for forest protection in national parks and to cover the cost of grants and subsidies that could, for example, be aimed at indigenous communities.
- Where the state/jurisdiction makes investments that would generate a financial return, the assumption in this paper is that these returns could accrue to the state as well as to farmers or other private actors (from providing concessional debt; via equity investments into agricultural or other rural livelihood projects such as sustainable timber or increased tax revenues from greater agricultural output). Analysis is required to ensure that returns to the State from investments are sufficient to repay the principal (obstacles might include, for example, a low tax base for farmers/producers).
- A state could use its public funds to take a subordinate position in the capital structure of LED-R investments, thus catalyzing private debt (including from commodity supply chain businesses) and generating significant financial leverage, while also being structured to generate a reasonable return for the state itself.

- Setting a donor payment of USD5 per tonne, in this illustration, is based on existing literature and practice (e.g., the commitment by KfW to the state of Acre mentioned above). It is also based on analysis of marginal abatement costs in different regions in Brazil. For example, the cost of meeting Acre's emission reduction targets, based on the statewide difference between cattle pasture and forest-based economic activities (timber, Brazil nut and rubber production), has been estimated conservatively at an average value of USD1.64 per tonne of CO₂e.³⁷ It is assumed that states would need support set at a level above an opportunity cost such as USD1.64 in order to overcome the initial upfront costs and financing barriers to increased productivity and forest protection.
- Assumptions on projected returns from LED-R or on marginal GHG abatement costs would benefit from further research and consultation. It may, for example, be necessary to assume an effective negative interest USD rate of interest on a Jurisdictional REDD+ Bond in order to overcome the upfront costs of LED-R.
- The size of a bond issue would be determined by a number of factors. A state/jurisdiction could forecast the financing requirements for a pathway that has an explicit goal of zero net deforestation by a certain date. The pathway could also include targets such as minimum levels of adherence to standards set by commodity roundtables as a way to generate demand from global buyers focused on sustainability commitments. States with advanced levels of REDD+ capacity are already able to project emission reductions versus their baseline scenario and such projections can also help assess levels of carbon revenue that would offset interest costs for a given size of Bond issue.
- A state might not need to utilize all the proceeds of a USD200-250 million Jurisdictional REDD+ Bond within the first 1-3 years after issuance. Therefore, efficient cash management might suggest an approach involving periodic issuance of smaller Bonds. However, given that institutional investors have a preference for larger and more liquid securities, it would appear preferable to issue a larger bond and have the ring-fenced proceeds managed as part of overall federal treasury activity. This might include a drawdown facility made available from federal authorities to the jurisdiction so that it could utilize proceeds as and when needed.
- Jurisdictional REDD+ Bond structures should include strategies for risk mitigation such as "over-collateralization" of carbon credits. For example, if projected emission reductions under a program of investment are assumed to be above 60 million tonnes over 15 years, a jurisdiction could err on the side of caution and contract with donors for 40 million tonnes of verified emissions reductions.
- And for countries with poor credit ratings it might be appropriate to set aside a small percentage of donor REDD+ payments to provide incentives *directly* to private actors for individual projects (taking advantage of the attraction of USD AAA revenue streams for such actors).
- Jurisdictional REDD+ Bonds could be appropriate for an entire nation. A medium term ambition might be for the UN Green Climate Fund to provide Performance Based Payments that back a series of National REDD+ Bonds, financed by sovereign wealth funds and institutional investors. The assumption of this paper is that, in the first instance, such a structure would be piloted either in a small country or at a state or provincial level.
- The state would benefit from federal guarantees, federal LED-R incentives and federal allocation of credits. The federal government would receive an appropriate percentage of REDD+ donor payments and achieve national climate change/deforestation development goals. REDD+ crediting at the state level could be 'nested' within national accounting systems. Further consultation would help to define the relative roles and responsibilities of federal and state institutions.
- An issuance size of much less than USD500 million might result in a slightly higher yield due to lower liquidity characteristics than for a normal government or sovereign bonds.

³⁷ IPAM. *Acre State's Progress Towards Jurisdictional REDD+*. 2012.

- Most institutional investors have a fiduciary responsibility not to pay premiums for environmental themed bonds, although some endowments and philanthropic investors may have a mandate to do so. The base case assumption of this paper is that, while institutions would like to know that their investments are associated with desirable environmental and social “Impacts”, very few are in a position to sacrifice yield to achieve this goal. Nevertheless, donors and developing countries would be able to use a Jurisdictional REDD+ Bond to tap into the growing interest in ‘green bonds’ and it is assumed that supporting this trend is a goal of public policy. There is an opportunity to test out specific structures that could attract investment from sovereign wealth funds and philanthropic investors, particularly for smaller Bond issues with lower levels of liquidity.

A Jurisdictional REDD+ Bond is simply a mechanism that supports an integrated approach to REDD+, LED-R and sustainability in commodity supply chains. Such an approach could be deconstructed into its constituent parts. For example, donor governments could make commitments to pay for verified emission reductions over a number of years and developing countries could simply borrow funds and make investments as per usual without issuing a bond labeled as “Jurisdictional REDD+.” However, the assumption of this paper is that such a mechanism has certain advantages: Although governments would only be committing to payments for ex post outcomes, in doing so they are creating contingent liabilities in their public accounts and might therefore like to see the alignment of interests created by jurisdictions taking on liabilities for repaying bond investors. For the state, a Jurisdictional REDD+ Bond would create a ring-fenced pool of funds to support its LED-R goals. Supply chain actors and commodity buyers, seeing the commitment implied by such a mechanism, should be more likely to take on the costs of shifting their off-take agreements and investments to jurisdictions that are on a pathway to zero-deforestation. And investors would have the opportunity to purchase “green bonds” that have normal market yields and sovereign guarantees and do not imply exposure to the risks of public policy outcomes or forest revenue projections not having been achieved but where use of proceeds has a clearly defined purpose and is clearly additional.

Table 3 (below) summarizes the advantages of a Jurisdictional REDD+ Bond structure, highlights some potential risks and ways to mitigate those risks.

Table 3. Advantages, Risks, and Risk Mitigation for Jurisdictional REDD+ Bonds

	Developing Countries and Jurisdictions	Donors (including the Green Climate Fund)	Private Sector (Commodity buyers and other actors in the supply chain)	Investors (Institutional, private and sovereign wealth funds)
Advantages	<p>Donor incentives for achieving reduced deforestation and GHG emissions</p> <p>Certainty of funds for upfront costs</p> <p>Sourcing capital at implied low interest rates to support LED-R</p> <p>Access to new investors</p> <p>Some autonomy for jurisdictions within constraints set by federal government</p> <p>Creating a competitive advantage for agriculture and timber sectors in accessing global markets</p> <p>Improved livelihoods</p> <p>Adaptation through resilient ecosystem services</p> <p>Scale</p>	<p>Linking of environment and development goals as part of an integrated approach</p> <p>Aligning interests with developing countries</p> <p>Leveraging private sector capital</p> <p>Supporting jurisdictional approaches</p> <p>Enabling development of sustainable supply chains</p> <p>Opportunity to replicate across jurisdictions and nations</p> <p>Opportunity to mainstream sustainable development into capital markets</p> <p>Scale</p>	<p>Demonstration of intent from donors and jurisdictions via integrated approach</p> <p>Security and resilience of supply</p> <p>Sustainability of supply</p> <p>Public risk mitigation funding in capital structure for local investments</p> <p>Reduced difficulties with identifying source for commodities</p> <p>Reduced exposure to legislated demand-side measures requiring responsibility for sustainable sourcing</p> <p>Brand and reputation</p> <p>Scale</p>	<p>Mainstream investment associated with measurable environmental and social impacts</p> <p>Competitive yields</p> <p>Normal sovereign or DFI counterparty credit risk</p> <p>Potential for specialist 'Impact' product for sovereign wealth funds and philanthropic investors</p>
Risks	<p>Failure to achieve verified emissions reductions (and thus failure to offset bond interest)</p> <p>Failure to achieve financial returns on LED-R</p> <p>Skewed benefits to local stakeholders (e.g., to large scale commercial farmers rather than small holders or indigenous communities)</p>	<p>Failure to meet deforestation and GHG emission reduction targets would imply unutilized commitments of fiscal resources</p>	<p>Failure to meet deforestation and GHG emission reduction targets and thus sustainability criteria</p> <p>Failure to meet social criteria beyond GHG reductions for certification standards</p>	<p>Some reduced liquidity</p>
Risk Mitigation	<p>Existing track record</p> <p>Balanced program for distribution of incentives to different stakeholders</p> <p>Overcollateralization of "credits"</p> <p>Initial payment for historical credits</p>	<p>Existing track record</p> <p>Overcollateralization of "credits"</p> <p>Unutilized cash recycled within International Climate Finance budgets/facilities</p>	<p>Existing track record</p> <p>Use verified emission reductions to underpin environmental and social co-benefits and standards</p>	<p>Preference for larger bond issues</p> <p>Smaller issues placed with specialist philanthropic investors</p>

Convertible REDD+ Bond Structures under a Future Carbon Market

Alternative REDD+ Bond structures are possible if donors and recipient jurisdictions anticipate that strong levels of demand might emerge for credits from carbon markets and if developing countries were in favor of exporting credits as offsets for compliance. For instance:

- Donors could guarantee payment at a lower floor price for the future carbon credits and leave open to the REDD+ jurisdiction or government the option to sell into the market. In this case donors would be providing a put option or underwriting mechanism for part of the liability of the bond coupon. Such an approach would be aligned with the emerging concept of an International Carbon Reserve.³⁸
- Another structure would involve private investors and industry with mandatory carbon compliance targets lending via a REDD+ Bond and taking all or a portion of the coupon payment in the form of a carbon credit

Capacity, Baseline Reference Levels, and Use of Proceeds from a Jurisdictional REDD+ Bond³⁹

A Jurisdictional REDD+ Bond structure requires credibility in relation to baseline reference levels for GHG emissions and deforestation, monitoring methodologies, MRV capacity and use of proceeds. Several states and provinces in countries such as Brazil, Indonesia, Mexico, Nigeria, and Peru are developing jurisdictional REDD+ programs. Their progress places them at different points in the process, based on unique opportunities and constraints. The section below highlights Acre and Mato Grosso (Brazil) and Aceh (Indonesia) as advanced jurisdictions that provide opportunities to pilot a REDD+ Bond.

Opportunity for Sub-National Jurisdictions

Acre, Brazil

The State of Acre is regarded as having one of the most advanced jurisdictional REDD+ programs. The state has been building a forest-based economy for 12 years and has retained 87% of its forested areas. Acre consolidated various environmental laws into its Environmental Service Incentives System (SISA) in 2010, which creates a framework for valuing a range of ecosystem services including carbon. Under SISA, Acre established the ISA-C program (its jurisdictional REDD+ program).⁴⁰

Acre has an advanced institutional structure under SISA, including: the Climate Change Institute, which regulates and controls the implementation of the SISA law; its Company for the Development of Environmental Services (CDSA), which is a public-private entity with a mandate to attract funds to support natural capital development/preservation and to implement programs under SISA; the Scientific Committee, which oversees the scientific and technical veracity of Acre's reference level, monitoring system, and assessment of emissions reductions; the Commission of Validation and Monitoring, which oversees the implementation of the law; and the Ombudsman, which hears grievances and complaints related to SISA.

³⁸ See for example: <http://www.worldbank.org/en/news/opinion/2013/05/16/tackling-climate-change-robust-carbon-price>.

³⁹ Unless otherwise indicated, the information in this section draws primarily from: Electric Power Research Institute, Palo Alto, CA. Overview of Subnational Programs to Reduce Emissions from Deforestation and Forest Degradation (REDD) as Part of the Governors Climate and Forests Task Force. 2012.

⁴⁰ IPAM. Acre State's Progress Towards Jurisdictional REDD+. 2012.

Acre will use the national deforestation monitoring system and reference level approach known as PRODES to measure its emissions reductions (see Box 1), and it is also monitoring deforestation at more finely-scaled levels. Acre was chosen as one of the first pilots for the Verified Carbon Standard's Jurisdictional and Nested REDD+ methodology.

Acre has legislated for a system that integrates projects into the jurisdictional program as a whole, minimizing risk of "leakage." Emission reductions accounted for via local level PES could be incorporated into the jurisdictional level registry and accounting system, as would VCS projects. These systems are designed to avoid double counting of project-level and jurisdictional credits.

Acre has attracted REDD+ funding from the Amazon Fund and KfW and has also established early linkages with regional markets such as California, Rio de Janeiro, and São Paulo. The KfW funding through its REDD+ Early Movers' Program includes Performance Based Payments. Seventy percent of these funds are designated directly to pay for emissions reductions and thirty percent will be used to strengthen and improve SISA institutions.

Additionally, Acre has a strong focus on protecting and enhancing the rights of indigenous and traditional communities to assets created through stewardship of forests and ecosystems.

Box 1. Acre's Emissions Reductions

According to the national methodology, Acre reduced its emissions by 97 million tonnes of CO₂e between 2006 and 2012. Achieving its overall target means that Acre would reduce emissions by a total of 153Mt CO₂e between 2006 and 2020. A methodology that did not change the baseline every 5 years would suggest total emission reductions of 251Mt rather than 153Mt CO₂e from 2006-20.⁴¹ However, success in meeting targets is predicated on substantial investment as some of the lower cost mitigation opportunities may have already been utilized.

Mato Grosso, Brazil

The State of Mato Grosso decreased its deforestation rate by 85% from 2005 to 2011 (compared to the its 10-year average) while also increasing agricultural productivity.⁴² In fact, over half of the global emissions reductions from decreasing deforestation that has occurred since 2005 took place in Mato Grosso, Brazil's biggest agricultural producer. Factors that caused this decline include low soy prices and profitability from 2005 onwards, market pressure that discouraged forest conversion to crops and cattle, greater enforcement of forest protection laws by government agencies, and other government actions.^{43, 44} Ranchers have made land-use decisions that have dramatically reduced deforestation, and indigenous communities have suppressed agricultural expansion along their borders.⁴⁵

It is in this context that Mato Grosso is creating its REDD+ program. The main institutional mechanism for doing so is the multi-stakeholder Mato Grosso State Forum on Climate Change, which developed a state REDD+ law that included engaging in consultations with stakeholders such as Indigenous communities, farmers, forestry producers, and smallholders. In January of 2013, the state's governor signed this law (Law No. 9878), which includes provisions for sustainable forest management and the increase of forest carbon stocks. Other policies that are related to forest policy and REDD+ include the rural property environmental licensing system, Legal Mato Grosso, the Plan for Controlling Deforestation and Fires, and the Socio-Economic and Ecological Zoning law.

Mato Grosso has established a reference level that is compatible with the national reference level for the Amazon region, and the state has also set a voluntary target of reducing emissions from deforestation by 89% by 2020. From 2006 to 2010, the state has avoided the deforestation of 26,097 km², which corresponds to 1.3 GtCO₂e emissions. Several REDD+ projects have been developed in the state, including the indigenous Surui Carbon Project (see above).

⁴¹ WWF. *Environmental service incentives in the state of Acre, Brazil: Lessons for policies, programmes and strategies for jurisdiction-wide REDD+*. 2013.

⁴² Macedo, M., et al. *Decoupling of Deforestation and Soy Production in the Southern Amazon During the Late 2000s*, Proceedings of the National Academy of Sciences, 2012.

⁴³ Daniel Nepstad, David G. McGrath and Britaldo Soares-Filho. "Systemic Conservation, REDD, and the Future of the Amazon Basin." *Conservation Biology* 25 (2011) pp. 1113-1116.

⁴⁴ Britaldo Soares-Filho et al. *Role of Brazilian Amazon Protected Areas in Climate Change Mitigation*. Proceedings of the National Academy of Sciences 107 (2010) pp. 10821-10826.

⁴⁵ Ibid.

Mato Grosso has not yet developed a system for issuing REDD+ offsets, nor has it completed the development of a REDD+ registry or a mechanism to set aside a portion of offsets as insurance against reversals.

Mato Grosso currently uses both the national deforestation monitoring system (PRODES) and its own, more-finely grained monitoring system. The latter system allows for deforestation monitoring in smaller areas and covers all three biomes (forest, Cerrado and Pantanal).

While the state has made tremendous progress on decreasing deforestation, actors on the ground have seen very little reward for their positive actions, and there is a serious threat of reversal unless better support and incentives for deforestation are created; in fact, there was an up-tick of 28% in Brazil's deforestation in the Aug 2012 to July 2013 monitoring period, including a 52% increase in Mato Grosso.⁴⁶ Possible ways to incentivize and reward changes in land use practice to conserve – rather than clear – forests are described in Box 2.

Box 2. Financing for Low-Emission Development in Acre and Mato Grosso

Acre's ISA-C program is designed to support incentives targeted at different land-use categories – indigenous lands, protected areas, private properties, settlement projects, classified and unclassified public lands. Incentives will need to be utilised in a flexible way for different sectors with different financing needs and marginal GHG abatement costs.* For instance, direct PES incentives could support indigenous lands with the lowest levels of deforestation or farms under Acre's existing Sustainable Property Certification Program, with an emphasis on helping small holders increase their agricultural yields and income levels.

As agriculture is a primary driver of deforestation in both Acre (extensive cattle ranching on small rural properties) and in Mato Grosso (cattle ranching and soy production), proceeds from a REDD+ Bond could support ranchers who want to or are already increasing production while also decreasing deforestation/restoring forests. Such support could include technical assistance for new practices and/or enhancing their access to credit (e.g., ABC, *Programa Nacional de Fortalecimento da Agricultura Familiar* (PRONAF – National Program to Strengthen Family Agriculture), regional funds like *Fundo Constitucional de Financiamento do Norte* (FNO – Constitutional Financing Fund of the North). Proceeds could also be used to facilitate access to finance offered by banks and supply chain actors by supporting loan applications, providing collateral and partial risk guarantees for farmers without credit history, or clarifying taxation and property rights issues. These ranchers could participate in a cattle program that may be certified as zero-deforestation by the State of Acre or Mato Grosso, the *Grupo de Trabalho da Pecuária Sustentável* (GTPS, the Brazilian Roundtable on Sustainable Livestock), or *Aliança da Terra...* and which would seek better prices or access to markets for their sustainable products. Or they could be farmers within counties that meet their deforestation targets under a state-to-municipal transfer model like the *Municípios Verdes* program in Pará State. (The Pará model of financially rewarding counties that meet deforestation targets has been shown in to create peer-to-peer enforcement of the low-/zero-deforestation agenda but could be strengthened via rewards for performance at the farm level.)

Proceeds from a bond would support conservation units; continued investment in processing facilities for sustainable timber, non-timber forest products such as rubber and Brazil nuts; and/or extension services for semi-intensive production, silvo-pastoralism and agroforestry production. As forest fires represent a threat to efforts to meet deforestation targets in Acre, Mato Grosso and elsewhere in the Amazon,** proceeds from the Jurisdictional REDD+ Bond could also help expand existing programs – e.g., Mato Grosso's Plan for the Prevention and Control of Deforestation and Fires – to prevent forest fires by changing agriculture practices, monitoring and firefighting.

* Acre State's Progress Towards Jurisdictional REDD+. IPAM (2012) and *Environmental service incentives in the state of Acre, Brazil: Lessons for policies, programmes and strategies for jurisdiction-wide REDD+*. WWF (2013).

** Ibid

⁴⁶ DW (Deutsche Welle). "Brazil warns Amazon annual deforestation 'up 28 percent'." Nov 15, 2013. Accessed Feb 12, 2014. <http://www.dw.de/brazil-warns-amazon-annual-deforestation-up-28-percent/a-17229112>

Aceh, Indonesia

The Province of Aceh, on the island of Sumatra (Indonesia), has also made considerable progress in developing its jurisdictional REDD+ program, and the political importance of REDD+ in Aceh is one of the most advanced in Indonesia. After Governor Irwani was elected in 2006 (the first democratic elections in Aceh), his administration adopted an “Aceh Green” development vision, of which REDD+ was a key component.

The two main institutions for implementing Aceh Green are the Aceh Green Secretariat and the Government of Aceh REDD+ Task Force. The Green Secretariat is tasked with implementing and integrating the themes of climate change, renewable energy, land use planning and management, community development, commerce and conservation. The REDD+ Task Force is an inter-governmental group of representatives from provincial government agencies that is responsible for coordinating and advancing REDD+ in the province, attracting financing for REDD+ activities and engaging with Civil Society Organizations, NGOs, forest communities, and local governments.

Aceh’s REDD+ program is a system of laws, policies, agencies and provincial initiatives within the overall Aceh Green vision. These laws and policies include the 2007 logging moratorium, Permenhut No. 36 (2009) that regulates permission procedures for REDD+ projects (such as revenue sharing and procedures to utilize revenues from REDD+ projects), and the 2010 Government of Aceh spatial plan, which provides little room for the timber industry to continue legally.

It is estimated that Aceh Green – especially because of the logging moratorium – has prevented 500,000 hectares of primary forest from being converted. However, Aceh has not proposed a reference level or target of deforestation; and there are ongoing discussions regarding reference levels and emissions reductions targets as part of a national commitment to reduce deforestation (in the context of international climate negotiations). Aceh has not yet developed a system to define, issue, register, or track offsets. The province is working on a complete provincial assessment of deforestation using LANDSAT and MODIS data.

In terms of reference levels and target, Aceh appears less advanced in terms of REDD+ capacity than Brazilian Amazon states such as Acre and Mato Grosso. However, the piloting of Jurisdictional REDD+ Bonds in Brazil could act to accelerate REDD+ ‘readiness’ both in Indonesia and elsewhere.

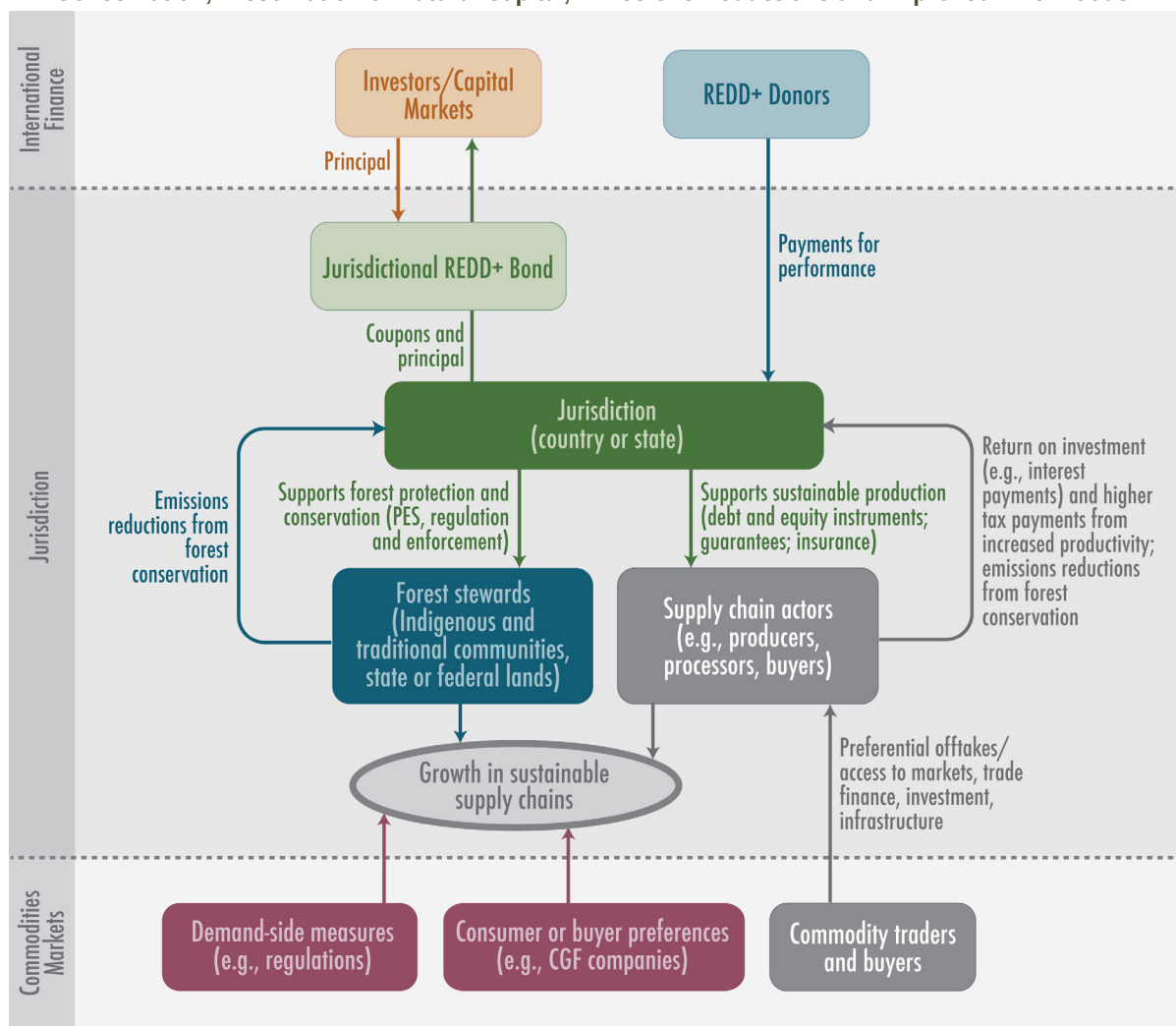
Opportunity for Countries

The assumption of this paper is that although, in the first instance, a Jurisdictional REDD+ Bond would be piloted either in a small country or at a state or provincial level, the structure could nevertheless be appropriate at a multi-state level or for an entire nation. A medium term ambition might be for the UN Green Climate Fund to provide Performance Based Payments that back a series of National REDD+ Bonds, financed by sovereign wealth funds and institutional investors and, in this way, support those countries attempting to combine forest protection and economic development through integrated national and jurisdictional programs.

Colombia

For example: Colombia’s National Development Plan (2010-14) has a National Climate Change Policy that includes a “Low-Carbon Development Strategy” and a “REDD+ National Strategy” with ambitious goals both for economic and social development and environmental sustainability. The REDD+ National Strategy is developing regional and national GHG emission baselines and MRV systems for tracking performance. The Heart of the Amazon program is designed to consolidate protected areas and indigenous territories in the Amazon region while preventing further frontier expansion. And the beef and dairy sectors have the ambitious goal of reducing the amount of pastureland while increasing production. Proceeds from a Bond issue could be used, for example, to help FINAGRO, the government sponsored agriculture finance institution, to support low emission productivity investments by farmers through concessional debt.

Figure 3. Jurisdictional REDD+ Bond – Supporting a Virtuous Cycle of Food Production, Forest Conservation, Preservation of Natural Capital, Emissions Reductions and Improved Livelihoods



Conclusion

There is an exciting opportunity for REDD+ and Performance Based Payments to reinforce developing countries' domestic investment in low emission development alongside the growing private sector interest in sustainable and secure supply chains.

Forest Trends hopes, in this paper, to demonstrate how a Jurisdictional REDD+ Bond structure would be especially well suited to exploit this opportunity. Sourcing funds from mainstream capital markets is a critical goal for low carbon development at scale. A Jurisdictional REDD+ Bond would leverage private capital from institutional investors to help overcome upfront investment costs and financing requirements. A Jurisdictional REDD+ Bond structure also creates a powerful alignment of interests. Donor payments for achieving GHG emission reduction outcomes would support developing countries ambitions for LED-R within a framework that could allow entire regions to be defined as a source for zero-deforestation agriculture commodities. This would, in turn, ultimately secure further private investment from supply chain actors and create a competitive advantage for successful jurisdictions in global markets.

A Jurisdictional REDD+ Bond can therefore support a truly integrated landscape financing approach that is transformational in shifting "business-as-usual" cash flows and overcoming costs or barriers that stand in the way of reduced deforestation, resilient ecosystems, improved livelihoods, and sustainable agriculture production.



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