Creating a Multilateral Wealth Fund for a Global Public Good: A Proposal for a Tropical Forest Finance Facility

Michele de Nevers, Kenneth Lay, Michael Wolosin, and Patricia Bliss-Guest

Abstract

The Tropical Forest Finance Facility is an attempt to generate significant new finance to fund pay-for-performance incentives for tropical forest conservation. The TFFF proposal includes two key innovations: 1) the way it will raise funds, by converting low-cost sovereign credit from mission-driven investor countries and companies into cash that can be used to drive change in developing countries, through an instrument similar to a sovereign wealth fund; and 2) the way it will distribute funds, using the Cash-On-Delivery aid approach that supports country ownership and only pays for results as they are achieved and verified. The performance payments would be provided as part of a global offer, available to all countries with extensive tropical forests. The overarching goal of the Tropical Forest Finance Facility (TFFF) would be to slow and reverse tropical deforestation. The facility structure would be akin to a multilateral sovereign wealth fund whose investment returns would accrue to tropical forest countries for their performance in reducing, and eventually halting, deforestation. Performance would be measured using satellite monitoring data against a benchmark, specified in advance by investors who are funding the offer, that would be consistent across countries.

This paper is one of four papers describing the Tropical Forest Finance Facility. This overarching paper, "A Proposal for a Tropical Forest Finance Facility," presents all the components of the proposal: the financing strategy, performance measurement and allocation of investment returns, and proposed governance arrangements. Three CGD companion papers describe in greater detail each of the three components. For the reader's ease, so as not to have to refer to the other papers, each companion paper includes a brief summary of the overall proposal so they can be read without reference to the other papers.

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This initiative is the result of the generous and immensely valuable input of many people over the last three years. We are grateful for valuable feedback on the ideas presented here and on initial drafts of the paper by a long list of people, too numerous to include here. We were able to share and discuss the ideas outlined here with a wide range of people in CGD, other think tanks and NGOs and government representatives, particularly from forest countries and from potential sponsor investor countries. Their guidance and outreach were critical to the enhancement and refinement of the proposal. We appreciate how much the analysis and design were improved by people who gave their expertise and encouragement at consultation meetings at CGD and in Belgium, California, Canada, Denmark, France, Germany, Norway, Switzerland, the UK, and the US and with officials at the IMF, International Forum of Sovereign Wealth Funds and the World Bank.

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Any remaining errors are our full responsibility.

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Contents

I. Introduction

Reaching the Sustainable Development Goals will require new investments estimated well into the trillions of dollars annually, an order of magnitude greater than total global annual foreign aid. This investment will be needed in traditional development sectors, such as education and health, as well as in global public goods like climate change mitigation.

Given the scale of the challenge, there is a keen recognition that public sector funding will not be sufficient to achieve the SDGs, and scarce public resources must be leveraged effectively to deliver development returns. Recognizing the strains on national budgets and new demands on foreign assistance and climate change finance, CGD's work in sustainable development finance explores how to maximize the efficient use of public credit and to structure effective partnerships between public and private investors.

Catalyzing "massive transformative investments" is at the heart of the discourse on sustainable development and global public goods.[1]

This paper sets forth an innovative financing proposal aimed at addressing a critical environment and development challenge: reducing the loss of tropical forests, both for national development benefits and to promote the global public goods they provide, including biodiversity and climate mitigation. The proposed financing mechanism would generate substantial resources to provide an incentive for action to halt deforestation without encumbering national budgets nor drawing on foreign aid budgets.

The proposal is to establish a long-term investment fund, akin to a multilateral sovereign wealth fund. Investors (sovereigns and private investors) would provide low cost loans to the fund, which would then be invested in a diversified portfolio of higher return assets. Drawing on CGD's work on Cash-on-Delivery aid, the excess returns on the investment fund, above the cost of the loans and fund management, would be used to reward tropical forest countries for their successful performance in reducing deforestation. While the proposal outlined here utilizes an innovative financing mechanism to address environmental goals, the ideas could as well be applied to other sustainable development priorities and global challenges.

Why Forests?

Healthy forests are a cornerstone of sustainable economic growth across the tropics.[2] Halting and reversing tropical forest loss yields large-scale development and ecosystem

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[1] Kristalina Georgieva, "Why and How Change is Coming to the World Bank," interview with Rajesh Mirchandani, *Center for Global Development*, podcast audio, April 13, 2017, https://www.cgdev.org/media/why-and-how-change-coming-world-bank-new-ceo-kristalina-georgieva

[2] Frances Seymour and Jonah Busch. *Why Forests? Why Now? The Science, Economics, and Politics of Tropical Forests and Climate Change.* Washington, DC: Center for Global Development, 2016.

service benefits, including protecting biodiversity, local and global water cycling, carbon sequestration and climate protection, reduced flooding and landslides, health, food, and pollination. Furthermore, local communities and indigenous peoples often depend on forests for their livelihoods, health, food security, culture and safety. Ecosystem approaches, including the maintenance of forest cover, can also strengthen resilience and adaptation to climate change. Maintaining forests and other ecosystems to buffer the impacts of climate change is often less costly than having to replace lost ecosystem functions through infrastructure or technology.

Although tropical forests generate both local development benefits and global public goods, such as biodiversity and climate mitigation, tropical forest countries face significant political and economic pressures to convert forest lands to other uses. Cleared forest land often can be "repurposed" for agriculture or other uses that quickly produce steady streams of much-needed income for individuals, businesses, local communities, and provincial and national governments. Globally, the annual rate of deforestation remains unacceptably high, with an area the size of Austria being cleared every year.[3] Unless deforestation is halted, it is likely that an area the size of India will be lost by 2050.[4]

Why Pay for Results?

The Development Case

Results-based payment approaches focus on structuring incentives to change behavior. CGD has carried out research and developed policy advice on results-based approaches in a range of sectors. An extension of these ideas, Cash-on-Delivery (COD) aid[5], aims to change the behavior not just of recipients but also of funders. COD aid provides funding for the achievement of results aimed at addressing constraints to development at the national level. COD aid differs from other programs in that it eschews the imposition of pre-conditions and does not require agreements between funders and recipients on strategies to achieve results. The only "preconditions" relevant to COD aid are a good measure of progress and a credible way to verify it.

One of the key features of COD aid is that the funder embraces a hands-off approach, emphasizing country ownership and the power of incentives to drive outcomes, rather than financing projects that provide guidance or technical assistance. Many tropical forest countries may lack capacity to deliver results; TFFF may provide an additional incentive for these countries to fully utilize, invest in and seek success on capacity building work that may be financed by the various traditional mechanisms of support. Building on the goals

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[3] Ibid.

[4] Jonah Busch and Jens Engelmann. "Cost-effectiveness of reducing emissions from tropical deforestation, 2016–2050." *Environmental Research Letters* 13, no. 1 (2017). http://iopscience.iop.org/article/10.1088/1748-9326/aa907c/meta

[5] Nancy Birdsall and William Savedoff. *Cash on Delivery: A New Approach to Foreign Aid*, 2nd edition. Washington, DC: Center for Global Development, 2011.

articulated in the 2005 Paris Declaration on Aid Effectiveness[6], COD aid aims to foster accountability among funders, recipients and their constituents, build local ownership and rely on local institutions, permit learning by doing, experimentation and assessment. Without information about whether goals are being met, it is difficult to determine whether programs are successful. COD aid also seeks to attract new funders, including private sources, enable better funder coordination, reduce administrative and reporting burdens and generally promote the expansion of aid.

Under the COD aid model, at no point does the funder specify or monitor inputs. Similarly, the funder does not impose conditions or restrictions on the use of funds (rewards payments). It provides recipient countries with full authority and flexibility to undertake interventions or address policy issues that will lead to the desired results, even if such interventions and policies are outside the domain of the relevant sector ministry or sub-national government entity. It does this by recognizing and further encouraging the recipient country's inherent ownership and responsibility over strategies and implementation, and then paying for measured and verified results.

Results-Based Payments for Forests

A major incentive is needed to encourage the governments of the countries in which tropical forests are located to protect and conserve them. With the exception of a few large bilateral programs between Norway and countries with large forest resources, until now, almost all the money spent by governments and aid organizations to reduce deforestation is channeled through traditional aid approaches that focus on inputs such as technical assistance for "readiness," analytical studies, project-based financing and staff salaries, rather than paying for actual results—reduced forest loss. Toward this end, CGD has been working with tropical forest countries and potential investors to create a multilateral wealth fund, similar to a sovereign wealth fund (SWF), whose proceeds, after costs, would reward tropical forest countries for their results in reducing deforestation and protecting forests.

Forests lend themselves to pay-for-performance funding approaches because recent advances in satellite monitoring technology make results measurement relatively straightforward, transparent and consistent, compared to other sectors where there may be less agreement on outcomes and performance measures, and where assessing outcomes would require expensive on-the-ground surveys.

In the case of forests and climate, a results-based payments mechanism called REDD+ has been developed through more than a decade of efforts by dedicated professionals around the world under the aegis of the UNFCCC. This framework for international partnerships to support forest country efforts to protect and enhance forests has been codified and embodied in a series of international climate agreements, including most recently the sections relating to REDD+ in the Paris Climate Agreement. The idea is that by offering

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[6] "The Paris Declaration on Aid Effectiveness." High Level Forum on Aid Effectiveness, 2005. http://www.oecd.org/dac/effectiveness/34428351.pdf

serious and reliable funding to reward successful efforts to reduce deforestation, a major incentive can be provided to developing countries to move forward with the necessary actions.

Like COD aid, REDD+ recognizes that macro decisions that are in the purview of national governments, such as prices, taxes, and land use policies, shape actions on the ground and that the problem of deforestation cannot be addressed simply by building capacity and enforcement at the local level. A large and visible payment for reducing deforestation can help to strengthen public institutions and motivate politicians, not just technocrats, triggering helpful changes in political and bureaucratic arrangements. The incentive payment complements conventional forest assistance programs and motivates countries to draw on the range of other forest finance programs already in place (FCPF, Profor, UN REDD+, etc.).

While there is widespread agreement that a financial incentive to tropical forest countries to reduce deforestation is essential, until now, the large-scale, results-based finance initially envisioned for REDD+ has yet not materialized.[7] Finance for forests in tropical forest countries accounts for less than 2 percent of global mitigation-related development funding, with total REDD+ assistance of about USD 1.7 billion and results-based commitments of USD 4.1 billion cumulative since 2010.[8] Total finance for forests is insufficient, and is dwarfed by private investments and public-sector subsidies in agriculture and other deforestation drivers.[9]

Furthermore, even if the REDD+ mechanism were dramatically scaled up, carbon-based payments would still be insufficient to generate economically optimum forest protection. According to one recent estimate, carbon and climate regulation services make up only about 39 percent of the total ecosystem services value provided by a hectare of tropical forest.[10] There is no major performance-based financing supporting the non-carbon public goods from forests. TFFF is being proposed in the context of an international forest financing landscape that is fragmented and insufficient:

- Foreign assistance to promote the development benefits of forests is limited;
- Support for forests' global public goods is limited in scope to just carbon;

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[7] Look to the Forests: How Performance Payments Can Slow Climate Chante, Working Group on Scaling Up Performance-Based Transfers for Reduced Tropical Deforestation, Center for Global Development, 2015, https://www.cgdev.org/publication/ft/look-forests-how-performance-payments-can-slow-climate-change

[8] Climate Focus (2017). "Progress on the New York Declaration on Forests: Finance for Forests - Goals 8 and 9 Assessment Report." *Climate Focus*. October 24, 2017. http://forestdeclaration.org/wp-content/uploads/2017/10/2017-NYDF-Goals-8-and-9-Assessment-Report.pdf

[9] Ibid.

[10] Robert Costanza et al. "Changes in the Global Value of Ecosystem Services." *Global Environmental Change* 26 (2014): 152-158. https://doi.org/10.1016/j.gloenvcha.2014.04.002

- Even for carbon services, forests are globally underfunded through REDD+ compared to the value of those services;
- Progress in "greening" the trade and investment in forest-risk commodities is slow.

II. A Tropical Forest Finance Facility

TFFF is at heart an attempt to generate significant new finance to generate pay-for-performance incentives for tropical forest conservation. The TFFF proposal includes two key innovations: 1) the way it will raise funds, by converting low-cost sovereign credit from mission-driven investor countries (and companies) into cash that can be used to drive change in developing countries, through an instrument similar to a Sovereign Wealth Fund; and 2) the way it will distribute funds, using the Cash On Delivery Aid approach that supports country-ownership and only pays for results as they are achieved and verified.

2.1 Goal of TFFF

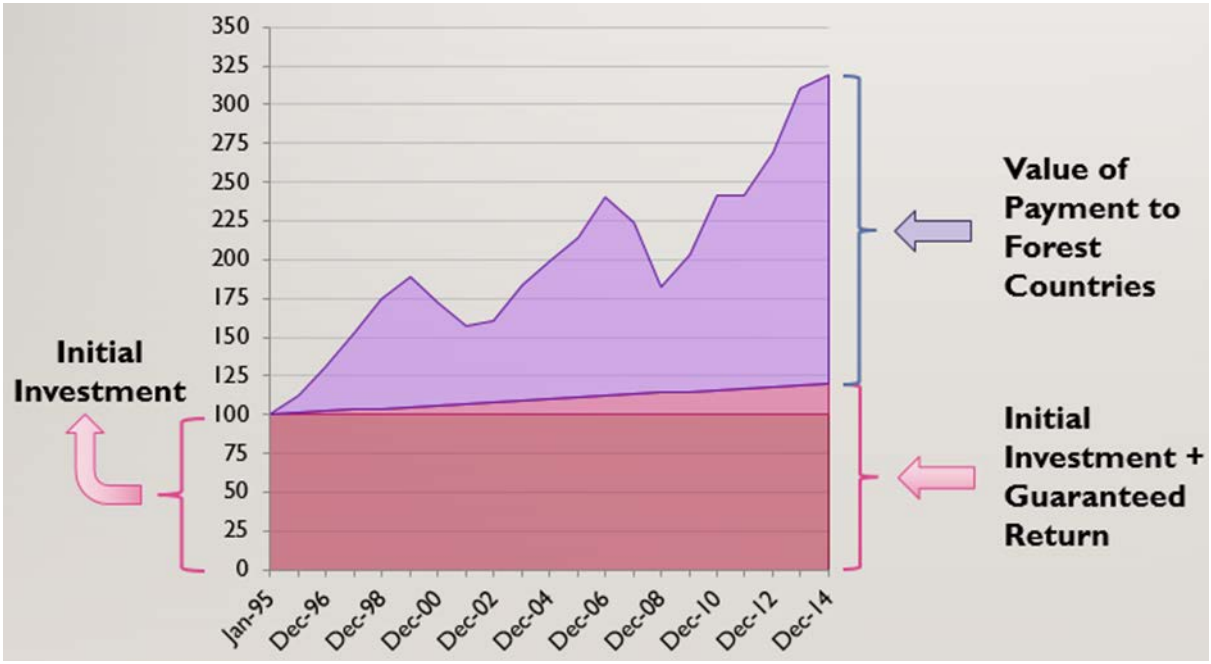
The overarching goal of TFFF would be to slow and reverse tropical deforestation. The theory of change is that certainty in the availability of large-scale results-based payments to governments will raise the domestic political priority of forest protection by giving it financial value, and that the transparency associated with a global assessment—including payments that were earned or not—would support additional domestic public pressure in forest countries for conservation. Together these could catalyze a shift in economic development pathways away from deforestation-intensive practices. Too often perceived short-term profits accruing to some groups favor cutting trees; this would shift the balance of power towards domestic and global public goods that benefit all groups.

In creating the multilateral wealth fund, the immediate operational objectives are to: (1) maximize the returns on the invested capital to generate significant funds that can be used as performance payments, and (2) ensure that payments to tropical forest countries are made in accordance with a performance measure that is credible, sustainable, objective, and comparable across countries with reference to an agreed global benchmark.

2.2 The Proposal

The TFFF proposal is for a group of sovereign investor sponsors—with the potential participation of private investors, as well—to establish a large investment fund to generate financial rewards for tropical forest nations that succeed in maintaining or enhancing their forests. These rewards would be comprised of the investment returns on TFFF, net of payments to investors to cover the cost to them to finance their sponsorship or a return equivalent to that of sovereign debt in the currency in which they make their investment. This "excess return" is the foundation of TFFF's value proposition. Figure A, below, illustrates TFFF "value proposition," based on excess returns that could have been generated over a 20-year horizon had it been established in 1995. Over extended periods, developed-country borrowing costs have been greatly exceeded by the returns on diversified portfolios of equity, debt and other investments.

Figure A. Illustrative example of TFFF investment proposition



This proposed financing mechanism can offer a sizable and reliable reward for successful efforts to reduce deforestation that can spur developing countries to undertake the actions needed. Like COD aid, the principle underlying TFFF is that a large financial incentive can spur dramatic actions within a country, in this case to preserve forests and halt deforestation. TFFF would fund such an incentive, and it would provide large and highly visible performance payments for countries that meet the performance criteria. Also like COD aid, it would not impose pre-conditions as to how results are achieved nor conditions on how the funds are used, so as to promote strong ownership by national and local actors. However, TFFF is not aid. It is a combined development mechanism and global public goods facility, generating returns from forest protection to both the host country and to the rest of the world.

TFFF is also not a substitute for the existing REDD+ mechanism, but rather would be complementary to REDD+. Unlike current REDD+ programs, TFFF would not undertake capacity building or other project-based activities. It would only reward successful outcomes. Countries that rise to the challenge of TFFF will be motivated to seek out REDD+ resources to achieve their goals and meet their REDD+ objectives—allowing TFFF to "supercharge" REDD+. TFFF is also complementary to REDD+ in scope and in timing: it is focused on the full suite of ecosystem service values of forests, not just carbon; and its 20-year timeframe, running through 2040 or so, will generate returns well beyond the timeframe of current REDD+ commitments.

2.3 The Global Offer

The global offer itself would be put forth by a group of investors. These can be governments of donor countries, philanthropies, or private investors for whom reducing deforestation is a high priority. See Section III and the the CGD policy paper "Creating a Multilateral Wealth Fund for a Global Public Good: Proposed Financing Strategy for a Tropical Forest Financing Facility" for details on how TFFF could mobilize funding from different types of investors. The global offer will clearly specify how performance is to be measured and how the annual returns on the invested funds are to be allocated to forest countries. See section IV and the companion paper on performance measurement for a discussion of country eligibility and approaches to defining results, performance measurement and allocating shares of investment returns. This paper provides options for the fund sponsors regarding performance measurement and allocation of performance payments. See Section V and the companion policy paper "Creating a Multilateral Wealth Fund for a Global Public Good: Proposed Governance Arrangements for a Tropical Forest Finance Facility" for details on the process by which investors/other stakeholders would establish and agree on parameters for performance assessment.

III. Financing Strategy

3.1 Mobilizing Funding.

Countries or companies funding TFFF could choose one or more of several approaches to mobilize funding:

- Countries with substantial reserves in, e.g., a sovereign wealth fund, central bank reserves or other savings could simply lend to TFFF, in which case they would receive returns commensurate with investments in the sovereign debt of the countries the currencies of which they lend to TFFF.

- Other countries could lend to TFFF from the proceeds of their own government borrowing, in which case they would receive from TFFF periodic interest payments and a final principal repayment equal to the terms and amount of their borrowing.

- Another option is for countries to permit TFFF to gather assets from its commercial banks or other depository institutions drawn from deposits that benefit from government deposit insurance programs. Depositors would be free to make daily deposits and withdrawals; the government guarantee protects TFFF (as it does other deposit-taking institutions) from a "run" on deposits, thus insuring the long-term sustainability of TFFF. This would produce extremely low-cost funding (lower cost that the foregoing two options), but it would require TFFF to maintain a modest cash portfolio to manage potential withdrawals and may require it to take on a different legal form.

- A further approach would be for TFFF to borrow in global capital markets in its own name, but with the benefit of sponsors' sovereign guarantees. This would require TFFF to be set up as an independent legal entity and likely would be

somewhat more costly for TFFF than the foregoing options, which would reduce excess returns to reward forest countries, but it would, nevertheless, provide an adequate foundation for the TFFF business model.

Each of the foregoing approaches would produce extremely low-cost financing for TFFF and thus effectively monetizes the sovereign credit of the countries that fund it. This would enable the funding countries to reward forest countries for effective custodianship of a key global resource without encumbering their public finances.

Obviously, the particulars of each countries' respective budget accounting protocols and other financial management policies would have an effect on their decision with respect to the manner in which they choose to fund TFFF. Based on conversations with central banks, debt management personnel and budget accounting authorities, primarily in Europe, it appears that TFFF would have no material impact on sovereign accounts.

3.2 Investing the TFFF Portfolio

TFFF would invest its low-cost funds over a long horizon in a diversified, endowment-like portfolio of relatively riskier assets with higher expected returns, akin to the portfolios of major universities, endowments and foundations, sovereign wealth and pension funds. The cost of servicing the return on bank deposits or bond payments would come from the returns on the invested funds, so investment in the fund would not entail any annual out-of-pocket costs for investor countries.

Over time the invested funds would generate a growing pool of earnings that would be allocated to tropical forest countries based on annual performance in slowing and reversing forest loss. The annual earnings would not be paid out each year but would be reinvested in TFFF. Each year tropical forest countries would be allocated a share of the earnings based on performance so their participation, or ownership, of the fund would be adjusted each year. TFFF would operate for a fixed period, e.g. 20 years, after which the original capital contribution would be returned to investors. The pool of earnings beyond this would be distributed to forest countries on the basis of their accumulated shares, either at the end of the period or potentially much sooner through a range of mechanisms. (It would also be possible to structure the TFFF as a permanent vehicle in support of tropical forest protection backed by a fund without a fixed expiration. This approach could involve periodic capital raises and would allow TFFF to pursue a more aggressive investment allocation over time with potentially higher returns.)

3.2.1 Size of fund and expected returns.

TFFF will need to be big enough to generate earnings that create real incentives for forest countries. As starting point, we have contemplated TFFF having a target size of USD 100 billion. For the last decade (based on the average return to U.S. university endowments and the average cost of short-term U.S. government borrowing) a dollar-based fund would have returned on average about 5.5 percent, net of estimated expenses including the cost of borrowing. The fund could be scaled up to generate larger returns if needed. Annual returns

of $5 billion per year would substantially exceed the current global annual commitment of results-based finance for REDD+. This amount would be only 25 percent or less of current global estimates of the annual cost of halving or eliminating tropical forest loss, but we have been assured by forest countries that this would be large enough to make it interesting for them.

3.2.2 Eligible investment assets

While the details of portfolio structure would await adoption of an appropriate investment policy and a comprehensive strategic asset allocation, this proposal assumes that, after setting aside a cash reserve sufficient to meet the short-term cash needs associated with any money-market deposits funding it (if such a mechanism is part of the funding portfolio), TFFF would invest in the full array of asset classes customary for long-term endowments or pension funds. The essence of this proposal is the willingness of investors to forgo the excess returns associated with the higher returns (and of course volatility) of this long-term diversified portfolio.

Accordingly, we anticipate that the fund would invest in a variety of assets including, inter alia:

- Publicly traded equities worldwide;
- Publicly traded debt worldwide, and across the risk spectrum;
- Private equity, via limited partnership interests or co-investment;
- Real estate, whether through traded vehicles (for example, REITs), limited partnerships, co-investment, or direct ownership;
- Infrastructure, again through any of the various vehicles customary in sound investment practice; and
- Currencies (solely for risk-management purposes).

As an example, the average asset allocation for US college and university endowments over $1 billion during FY2017 included 13 percent publicly traded US equities, 19 percent publicly traded non-US equities, 7 percent publicly traded fixed income, 4 percent short-term securities and 57 percent alternative strategies. This final and largest category include, among other things: private equity via limited partnership interests or co-investment; and infrastructure through customary vehicles.

3.2.3 Portfolio "tilts"

While the proposal contemplates a fully diversified, conventional endowment portfolio of the kind maintained by major universities, foundations, and pension funds, investors could request that TFFF emphasize certain kinds of investments. These could include, for example, those that would accelerate the flow of investment into opportunities related to climate change mitigation or adaptation, or other environment-enhancing opportunities (a so-called "green tilt"), or more narrowly into investments that would themselves help tropical forest countries deal with deforestation or other forms of land degradation (a "REDD+ tilt"). However, each of these decisions could have an effect on risk-adjusted

return and in the length of time required to build the investment portfolio to reach the envisioned scale. In general, as constraints increase, risk rises, often without a concomitant increase in return, and the time required to build the portfolio would also increase. This proposal does not lend itself to using the portfolio for direct financing in forest countries of the kind carried out by multilateral development banks and other international financial institutions. The financial and nonfinancial transactions costs necessarily associated with such activity, even if the investments themselves were otherwise competitive, would undermine the basic value proposition of this proposal, which is to generate funds simply to reward easily measurable, on-the-ground, results in tropical forest countries' REDD programs.

In the CGD policy paper "Creating a Multilateral Wealth Fund for a Global Public Good: Proposed Financing Strategy for a Tropical Forest Finance Facility," we analyze four different portfolio alternatives, ranging from a conservative portfolio which invests solely in money market and bonds to an endowment portfolio. See that paper for a full analysis, including simulations over a 20-year horizon.

3.3 Expected Returns and Volatility of Returns

While past performance can never guarantee future outcomes, the past decade—encompassing as it does the 2007–09 financial crisis—offers a useful perspective on the dynamics of the proposed vehicle. During this period, diversified endowments in the United States earned an average of 8.5 percent, while one-month certificates of deposit (a good proxy for the rates at which the fund would borrow in money markets) averaged 1.56 percent. Assuming a total of 1 percent in fees and costs and a 10 percent cash reserve for the ins and outs of deposits, that leaves an average annual accretion of 5.25 percent on participation units in the endowment. If Brazil, for example, were to have a 25 percent interest in a US$100 billion fund, that's an average of US$1.3 billion per year as long as it continued qualifying. Last year, that figure would have been US$3.4 billion.

Expected annual volatility accompanying this return would be about 11 percent, with an approximately 1 in 3 chance that returns in any given year would be less than TFFF's money-market financing cost and thus result in a net loss to the fund.

3.3.1 Portfolio valuation

The TFFF portfolio would be marked to market monthly, both for general reporting purposes and to value the interests of forest countries in the return on the endowment.

3.3.2 Financial dynamics of the TFFF

The key to what, for potential sponsors, may appear to be an implausible "free lunch" is that the risks that the returns on the diversified endowment portfolio funded by their borrowings may be lower than anticipated are born primarily by forest countries in the form of lower accruals of performance payments. It is extremely unlikely that sponsors would have to call on other resources to pay the interest on, or repay principal of, the debt they incur, or to make good on the guarantees they offer, to fund TFFF.

This analysis seeks to quantify TFFF's potential risks and return for both its investors and forest countries. For simplicity, it uses data and examples grounded in the U.S. dollar-denominated markets. The TFFF portfolio—as with those of other sovereign wealth funds such as those of Norway, the UAE, New Zealand, etc.—can be diversified across markets and currencies without fundamentally altering the financial dynamics described herein.

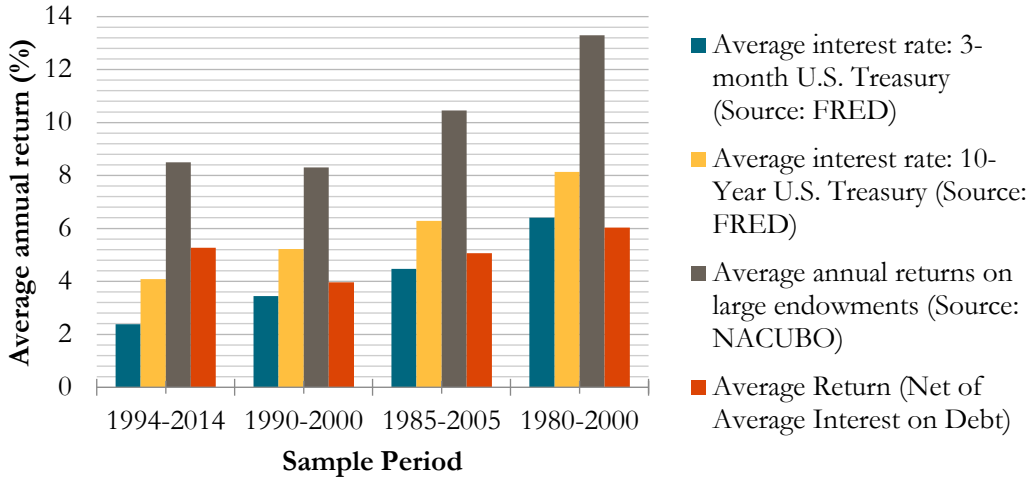
Simple Illustration: A 20-year TFFF Funded in the US Money Market

We start with a simple illustration to help illustrate TFFF's financial dynamics. The following chart assumes establishment of a USD 100 billion TFFF on January 1, 1995, and that it repays investors and pays out its net gains to forest countries on December 31, 2014. The illustration assumes a U.S. dollar endowment funded at short-term interest rates prevailing in the U.S. during the life of the facility, using the yield on the 3-month U.S Treasury bill as a proxy. It assumes returns on the endowment equal to the average returns of large U.S. university endowments, using data provided by the National Association of College and University Business Officers (NACUBO), which is the generally accepted source for such information.

In this example, the annualized financing cost for TFFF (interest on its debt funding) would have averaged about 2.4 percent, bringing its annualized net return to 5.4 percent per year. For forest countries, assuming a $100 billion initial funding, this would have resulted in a net distribution of nearly $200 billion at the end of the 20-year period, after repayment of the debt funding the endowment.

Returns would vary, of course, depending on the timeperiod involved. The following chart provides comparisons over different 20-year periods, based, again, on 3-month Treasury bill and NACUBO endowment-return data for the pertinent period.

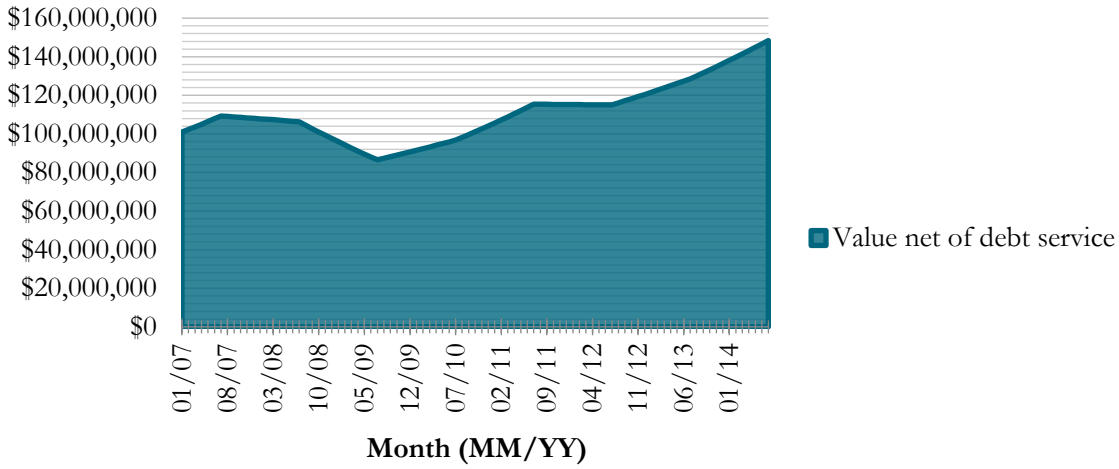
Figure B. Forest Foundation Fund: notional returns over 20-year periods (1980-2014)



What is notable about the foregoing examples is the consistency of the net return that would have accrued to forest countries. Finance practitioners will not be surprised by this: The results illustrate the well-understood principles of risk and return in the financial markets. Rich-country governments are rewarded for their high credit ratings with low borrowing costs, while investors (TFFF in this case) are rewarded with high long-term returns for their willingness to tolerate fluctuations in the value of a diversified portfolio of riskier investments.

Obviously, there can be circumstances in which, at points during its life, the value of the endowment falls below the principal amount of the debt funding it. An example of this would have occurred if TFFF had been established early in 2007. After a short period of net gains, the dramatic decline in prices for assets other than high-grade sovereign debt that began late that year would have caused the value of TFFF endowment to fall to roughly 85 percent of the principle amount of the debt funding it.

Figure C. Notional value of a $100 billion endowment (financial crisis and beyond: 2007-2014, $000)



These mark-to-market losses in the TFFF portfolio, however, would not have required investors to make good on guarantees or cover other debt funding the endowment. This is because, during crisis periods such as occurred during 2008 and 2009, investors increase—they don't reduce—demand for high-grade sovereign debt. Even after experiencing major losses, the endowment easily could pay the interest owed on the sovereign debt and guaranteed deposits funding it.

Forest countries, however, would have seen unrealized losses in the value of the endowment intended to reward them for avoided deforestation. Since the bottom of the market early in 2009, however, the performance of the endowment would have more than recovered those losses. And this would have been only eight years into the expected 20-year life of TFFF.

The probability that investors would be required to cover repayment of the funds they borrow or guarantee to establish TFFF—while not zero—is extremely low. In the U.S.

dollar financial markets, for example, there has been no 20-year period in the past 88 years in which even a basic diversified portfolio of 70 percent public equities and 30 percent bonds would have been unable to cover principal and interest on the government debt or guaranteed deposits funding it. If the fund were to go seriously into deficit at the time sponsors are scheduled to recover the principal amount of their investments, the contributor countries/investors could take the hit on their contributed assets. The benefit of TFFF is that it pools investments/loans across many contributors so the risk of loss is spread widely. Moreover, the size of TFFF relative to global assets of similarly structured funds is small. The proposal to raise $100 billion is modest in comparison with $6,200 billion in bank deposits guaranteed by the US Government alone and with investment funds such as the California Public Employee Retirement System ($295 billion) or the Abu Dhabi Investment Authority ($775 billion estimate). Thus, across many contributors the pool can be constituted without substantially endangering sovereign financial stability.

The following are some additional observations respecting TFFF finances:

A long-term investment horizon is essential. TFFF is a form of shared sovereign wealth fund for its forest countries. As with any sovereign wealth fund (and other long-term investment portfolios such as endowments and pension funds), a multi-year investment horizon is essential to maximizing returns and minimizing the possibility that forest countries would not be rewarded for success in their avoided-deforestation efforts.

The risk that TFFF could fail to reward forest countries, while small, is not zero. Forest countries bear the investment risk associated with the volatility of TFFF endowment, as they would for any sovereign wealth fund invested in a similarly diversified portfolio.

For investors, TFFF requires no net expenditure of scarce public resources and is a highly efficient use of public credit. For a sovereign, it is "balance-sheet neutral." While sponsorship could require borrowing and thus create a sovereign liability, the proceeds would remain on the investors' books as a sovereign asset, namely, the investor's first call on the earnings of the fund and the proceeds of its ultimate distribution.

Obviously, there is no assurance that the historical relationships described in this paper, and elsewhere, will be sustained. Indeed, some financial analysts and market participants are concerned that the macroeconomic factors that have contributed both to slower global growth and extremely low interest rates may warrant a significant decline in long-term return expectations across major asset classes in typical endowment portfolios. The higher returns associated with these diversified portfolios however, remain substantial compared with high-grade sovereign debt and continue to exceed expected inflation in developed economies. This leaves intact the basic financial dynamic underlying TFFF, while warranting forward-looking financial modeling based on varying assumptions to better assess the probabilities of differing outcomes.

3.4 Investor Decision-making, Management, and Payout

The choice of which option(s) to use to capitalize TFFF would be made by the appropriate authorities in investor countries or other funders contemplating TFFF sponsorship. Among potential sovereign investors, of course, the formalities of authorization and the details of government budget accounting vary. While the choice of how to fund TFFF likely would be made by the appropriate finance ministry or borrowing authority in each investor country, the decision to do so would in the first instance requires leadership, encouragment and endorsement from other relevant ministries such as those concerned with development, foreign affairs, climate or environment.

These sectoral ministries would validate the importance of an innovative financing mechanism to accelerate performance payments for reduced deforestation and would confirm that such a mechanism would further the achievement of the investor country's international development and climate change goals and commitments.

To maximize capitalization of the TFFF, the facility must be financially sound and professionally managed, aligned with the goals of the potential investor countries, simple, transparent, and effective. Developed country treasuries or borrowing authorities will assess the financial model of TFFF carefully against these criteria. See Section V and the accompanying CGD policy paper, "Creating a Multilateral Wealth Fund for a Global Public Good: Proposed Governance Arrangements for a Tropical Forest Finance Facility," for details.

Shares of the returns on the facility's investments (net of the cost of the funds) would be allocated or transferred annually to tropical forest countries based on their performance in reducing deforestation against a benchmark. Performance would be assessed as simply as possible and would be consistent across countries, transparent, public, and independently verified. Performance would be measured using publicly available satellite data using a transparent and globally comparable methodology that covers the entire tropics. See section IV below and the accompanying CGD working paper, "Creating a Multilateral Wealth Fund for a Global Public Good: Proposed Approach to Assessing Performance and Awarding Returns for a Tropical Forest Finance Facility," for details on performance measurement.

IV. Measuring Performance and Allocating Investment Returns

The approach to performance assessment and rewards allocation should follow from the objectives and role of TFFF within the landscape of international forest finance. At the most basic level, what you measure is what you value. In this sense, the performance measurement and rewards allocation approaches are the very heart of the TFFF proposal. They will also help determine—in part—whether TFFF is able to generate sufficient investor interest and trust to move towards implementation. The performance assessment and allocation approaches together will also determine how successful TFFF is in achieving its objective: reducing and reversing tropical forest loss.

Researchers have invested more than a decade of work on how to measure success in reducing and reversing forest loss through results-based payments in the context of REDD+. While TFFF will have a broader set of objectives than REDD+, it is useful to build on existing REDD+ frameworks for understanding the elements and implications of TFFF proposal. A compendium of REDD+ proposals by NGOs and Parties to the UNFCCC, compiled to help negotiators understand their different approaches and elements, provides such a framework. Four building blocks are compared for each proposal: scope (which activities are eligible), reference level (how reductions are calculated against a baseline), financing (where the money comes from), and distribution (where the money goes). An approach to monitoring is a fifth building block, which TFFF seeks to achieve through global satellite data. Together, these elements determine a proposal's impacts, including its political feasibility, environmental effectiveness, economic efficiency, and equitable distribution. Certain elements of the TFFF proposal will drive the designs proposed for each specific building block.

4.1 High-level Design Drivers

The *financing approach* for the TFFF is clearly defined: investors provide funding at low cost (competitive bond market rates) through a range of potential mechanisms. The funding is invested in a diversified endowment-like portfolio. Excess returns over debt service and facility costs are the source of pay-for-performance rewards to forest country nations for protecting and expanding forests. They accumulate shares in the eventual distributions each year based on performance. There are implications of this financing approach for the performance assessment and rewards allocation approaches, which include:

- Investors will demand a **high level of confidence** in the performance assessment approach. Excess uncertainty or large errors in measurement could create financial liabilities for the TFFF, which investors will seek to avoid.

- The need to **minimize overhead costs**, to maximize the amount of funding available for payments. This would suggest, for example, using the same data sources and processing for all countries, potentially through partnerships with other forest monitoring efforts, and avoiding lengthy negotiations and costly appeals processes regarding baselines or input data.

- The need to **distribute the bulk of payments at the end** of the fund's life. Given market volatility, the chances that the fund is unable to pay back investor capital increases as annual withdrawals increase, even though this probability is small in most scenarios. The expected total amount available for payments also decreases as annual withdrawals increase (see below).

Political feasibility will place additional demands on the TFFF's performance assessment and asset allocation approaches. The finance ministries holding the purse strings in potential investor countries will consult with climate, environment, and development ministries—including experts on forest monitoring and those heavily invested in existing REDD+ instruments—to ensure buy-in for the TFFF concept and design details. Investors will also

want to avoid reputational risks from domestic stakeholders, such as environmental and human rights NGOs. This will have some predictable impacts on the performance assessment and asset allocation approaches, and is certain to also raise issues that will require negotiation by likely investors as the TFFF moves forward. These include:

- The need to **align with interests of constituencies in investor countries**, to help give the TFFF the best chance of raising funds. This would suggest, for example, excluding plantation forestry, which is problematic for some investors; and capturing reforestation and forest degradation to the extent possible, which are of great interest to many investors.

- The need to **create buy-in among forest countries** for performance measurement and allocation approaches. While the instrument is structured as a global offer, investor sovereigns will need the TFFF to be viewed by tropical forest countries as helpful and well-designed, supporting country systems and priorities.

- The need to **address concerns about alignment and/or overlap** with REDD+ and existing ODA programs. In particular, the performance assessment and allocation proposal for the TFFF should address the benefits of using satellite monitoring rather than country-based national forest monitoring systems, and of setting baselines using a common formula for all countries rather than having countries propose their own baselines.

- The question of how to **address social and environmental safeguards** before payments are made, to avoid incentivizing damaging policies that are nevertheless successful at reducing forest loss (e.g., community displacement).

As proposed above, the TFFF will be focused on providing incentives for countries to maintain and expand the public goods provided by their tropical forests for domestic development purposes and to enhance global well-being. This suggests that the *scope* of the TFFF's performance assessment approach should:

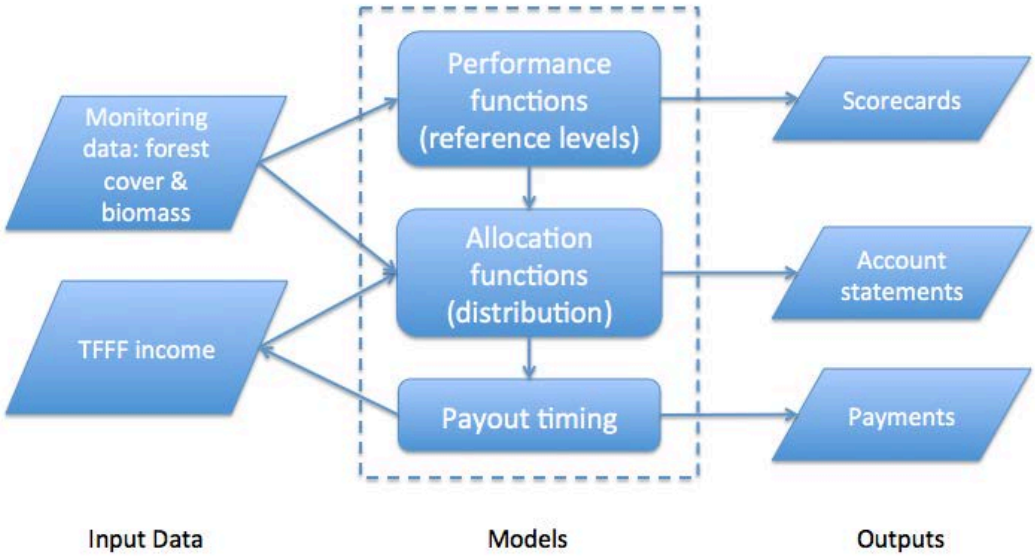
- **Focus on natural tropical forests**, both dry and humid, but generally excluding industrial-scale plantation forests. Natural forests are where the biodiversity and other ecosystem services, carbon benefits, and social and cultural benefits are greatest, and where there is the greatest market failure requiring intervention. If technically feasible, agroforestry and small-scale plantations could be included in performance assessment to the extent that they provide non-market benefits.

- **Utilize indicators closely correlated with ecosystem services**. Monitoring would capture, to the extent possible, a wide range of forest transitions and forest health changes that impact ecosystem service provisioning: deforestation, forest degradation, reforestation and forest restoration.

The remainder of this section provides an outline of proposed options for monitoring data, for performance functions including reference levels, for allocation functions to determine distributions of rewards between countries, and for payout timing approaches (Figure D). These proposed options are aligned with the above design drivers, and seek to maximize the

environmental effectiveness, economic efficiency, and equity of the TFFF while balancing necessary tradeoffs.

Figure D. TFFF performance evaluation flow diagram



4.2 Monitoring Data

4.2.1 Data Source

One key tradeoff in the design of the TFFF is between measuring performance using global versus national approaches to monitoring deforestation rates. In the former, internationally consistent satellite data, generated using common definitions and algorithms, is used to assess and monitor forest loss for each country by a third party; in the latter, national definitions of forest and national inventories are be combined with various satellite inputs to estimate forest cover change by the country itself. The following table outlines several advantages and disadvantages of these two options.

Table 1. Satellite monitoring versus country systems

	Advantages	Disadvantages
Global approaches	- Generates greater investor confidence - Avoids moral hazard in country reporting - Avoids negotiating data quality with each forest country - Avoids conflict between forest countries due to zero-sum distributions - Is verifiable by third parties - Can be designed to meet TFFF objectives - May provide additional data and incentives for alignment between national systems and third-party observations - Allows consistent approach to baselines across all countries	- May be less accurate or biased in some locations compared to country systems that account for unique monitoring challenges
National approaches	- Provide additional incentive to build domestic monitoring capacity - Account for domestic forest definitions and align with country reporting in other contexts, including REDD+ - May reduce errors by matching monitoring to forest types and properties (e.g., to account for shifting cultivation, or scale of disturbances) - May reduce errors by including ground-based sampling techniques	- Subject to perverse incentives - Viewed with skepticism by some potential international investors - Review and external verification would require additional processes and overhead costs - Would be nearly impossible to assign consistent baselines to all countries using country data

Recommendation: Emerging evidence shows that global approaches are sufficiently accurate to use for deforestation rate monitoring, and that the large differences observed between global data and national data for some countries can often be explained by aligning the spatial scope.[11] We believe that the advantages of a global satellite monitoring approach in the design and implementation of the TFFF so far outweigh the disadvantages that it would be difficult to generate investor interest with a national approach to monitoring. Therefore, we recommend that performance in maintaining and expanding natural forests should be measured by the TFFF using global satellite data that is, to the greatest extent possible:

(a) *comparable* across all countries,
(b) *accurate* in measuring natural forest loss,
(c) *consistent* across time,
(d) *complete* by including all areas of natural forest without exclusions,
(e) *transparent* so that results can be reproduced and share allocations can be verified by investors, forest countries, and independent researchers, including being made *publicly available* to all if possible.

[11] Harris et al. (*forthcoming*).

4.2.2 Data Inputs

It is not possible to directly measure the value of forest ecosystem services of a particular forest area from satellites. Pantropical time series are currently available that can map tree canopy cover from high resolution Landsat visual imagery (0.09 ha pixels), and aboveground biomass from medium resolution MODIS multispectral imagery (21.5 ha pixels). Tree canopy cover change and forest biomass change can be estimated from these products, and new products are in the research and production pipeline.

With these existing and expected future satellite-based forest products, the TFFF faces a choice: it could base performance on estimates of forest area, forest biomass and/or carbon[12], or a combination of both. Forests provide many services (e.g., biodiversity and watershed protection) in addition to carbon storage that benefit local communities, states, regions and global populations. Ideally, the underlying measure of performance would be as closely related as possible to total ecosystem services rather than just climate services. There is a longer historical record of imagery that has been processed to estimate forest area, although new methodologies are being developed to use similar visual imagery to estimate biomass and new satellite products are being developed that measure biomass stocks and stock changes directly. The value of many ecosystem services provided by forests are more closely related to biomass density than to the mere presence or absence of tree cover above a threshold (e.g., forest area), especially over local and regional spatial scales.[13] A biomass-based perforance measure for the TFFF would also be sensitive to forest degradation, rewarding countries for maintaining the health of their forests, while an area-based measure would focus solely on avoiding conversion of forest. Only carbon-based reference levels are allowed under the UNFCCC for REDD+, although some countries have used a simple calculation of area change multiplied by an average carbon density (or emissions factor) in their proposed reference levels.

In brief, an area-based performance measure would likely:

- Require fewer conversion factors and assumptions to translate satellite observations into assessed forest statistics, compared to carbon stocks and flows;
- Send a signal that carbon is not the only ecosystem service benefit provided by forests;
- Increase differentiation between the TFFF and existing REDD+ finance tools;

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[12] The ratio of biomass to carbon content is relatively consistent in forests around the world, at about 2:1, and estimates of observed aboveground biomass are commonly used to estimate carbon content. We focus in this paper on biomass, in recognition that carbon sequestration is only one of the ecosystem services forests provide.

[13] This is of course the case with carbon storage services, and there is significant evidence that biodiversity and ecosystem functioning are also related to biomass.

- Provide relatively greater benefit to countries with dry forests versus moist forests; and
- Provide equal benefit for maintenance of all natural forest area, regardless of forest health, thus providing as large an incentive to preserve degraded forest fronteirs as remote forest interiors.

A biomass-based performance measure would likely:

- Be more complex, although new datasets are being released that estimate biomass changes directly;
- Correlate better with ecosystem service benefits than area alone;
- Increase the similarity between the TFFF and existing REDD+ instruments, and the potential concerns of investors about double paying for deforestation reductions;
- Increase the ability of investors to recognize the grant-equivalent value of TFFF investments as climate finance;
- Provide relatively greater benefit to countries with moist forests versus dry forests;
- Provide greater benefit for maintenance of healthy (less degraded) forests, providing an incentive for governments to direct any necessary forest loss to degraded areas with lower ecosystem service value.

Additional research is needed to investigate the correlations between satellite-based tree cover and forest biomass estimates and independent estimates of various ecosystem service values. We expect that changes in biomass will be the best correlate at local to national scales to changes in forest ecosystem services, and should be the core dataset for the TFFF's national performance evaluations. At the pantropical scale, we expect that some combination of forest biomass and tree cover area will be needed for an equitable distribution of awards between countries. The cost of obtaining wall-to-wall annual biomass estimates may be prohibitive, and could potentially be reduced by using tree cover maps for change detection and concentrated sampling.

> ***Recommendation:*** We therefore recommend that the TFFF pursue using both forest biomass and tree cover area data as inputs. Ideally, the TFFF would obtain

national-scale annual[14] observations of natural forest area[15] and biomass[16] contained in natural forests using consistent satellite sources and data processing methods, either pantropically or for every country with significant tropical forest cover.[17] The net first difference series for both core data streams would also be calculated (annual net change in natural forest area and annual net change in natural forest biomass).

Natural forests are proposed to be the focus of the TFFF, as opposed to plantation forests, to be consistent with the proposed objectives of the facility as a forest public goods facility, and to ensure political feasibility of the instrument among investors who may be sensitive to providing an incentive for expanding plantation forests. Only a small proportion of the ecosystem services provided by natural forests is valued by markets, while most of the economic value of plantation forests is already monetized. The market failure associated with the provisioning of forest ecosystem services therefore impacts natural forest cover much more than plantation forest cover. The properties of natural forests of relevance for the TFFF include a predominance of native species, along with diversity in age and canopy structure and intact and functioning soils and root systems. These properties are not currently measured directly by satellites.

Net change is proposed to be the focus for performance measurement in the TFFF, as opposed to gross loss, in order to reward countries that both maintain and expand forests and to capture progress in avoided deforestation, avoided forest degradation, and reforestation. There are risks to applying a measure of net change—for example, net biomass can increase even in the face of deforestation if unmanaged lands gain more carbon than is lost. Additional research is needed to better understand how to combine both area and biomass together to assure that the TFFF avoids perverse incentives by using a net loss approach.

Both area- and biomass-based pantropical forest datasets are available with historical estimates stretching back more than a decade. The tree cover dataset by Hansen *et al.* included in WRI's Global Forest Watch (GFW)[18] uses Landsat 30-m visual imagery to

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[14] We recognize that cloud cover and phenology differences between countries complicate annual estimates. If biomass data is significantly more expensive to obtain than area data, the biomass series (and its first difference) could be less frequent than annual.

[15] Generally speaking, by "natural" we mean non-plantation and non-agricultural forests with some age-class and biological diversity and structural complexity. A natural forest area estimate could be achieved with current technologies by applying polygon maps of plantation forests as a mask. By "forest area" we mean a tree-canopy cover definition of forest rather than a land-use definition, preferably at a low tree cover threshold in the range of 10-20 percent, in line with the definition of forest used by the FAO and in most countries.

[16] Likely just above-ground live biomass (AGB) due to data limitations, although we recognize that other pools (e.g., below-ground biomass, coarse woody debris, etc) vary significantly across different forest types and may be important indicators of ecosystem function and services.

[17] See section below on "Country participation" for discussion.

[18] Hansen et al. (2013). National data available through Global Forest Watch from: www.globalforestwatch.org

generate maps of tree cover in 2000 and 2010 and annual estimates of gross tree cover loss from 2001-2016, both at a range of tree cover thresholds; and an estimate of gross tree cover gain from 2000-2012 at 50 percent cover threshold. More recently, Baccini *et al.* published a pantropical time-series of net annual changes in aboveground carbon density from 2003-2014 based on MODIS satellite data calibrated with field measurements and aerial LiDAR data.[19]

Neither of these currently available sources is ideal, however. The Hansen *et al.* series has a number of known issues, including a greater sensitivity to cover losses than gains, thus failing to provide an adequate estimate of net tree cover change. The Baccini *et al.* estimates provide net biomass change, but not stocks. Currently, no globally consistent dataset exists that distinguishes between natural and plantation forests, although advances in the Hansen and GFW data are expected in the next few years to achieve this distinction (concurrent with establishment of the TFFF), and alternative satellite-based tree cover products are also becoming available. These developments will likely allow the TFFF to accurately and transparently mask out plantation areas and focus on natural forests from the start.[20]

For the purposes of modeling the peformance and allocation functions (below), Hansen *et al.* is used to estimate forest area change, and biomass estimates are from GFW-Climate, derived by combining Hansen et al. tree cover loss estimates with a carbon density map estimated by Baccini et al.[21]

4.2.3 Country Participation

There are over 100 tropical countries in the world, most of which have at least some forest area. A significant proportion of these countries have shown an interest in pay-for-performance forest conservation in the context of REDD+, with 67 unique countries engaged to some extent in either the Forest Carbon Partnership Facility or in the UN-REDD program. There are several reasons the TFFF might limit the global offer to a subset of countries with tropical forests:

- The TFFF as proposed above would include a development objective within its core mission, and sovereign investor countries will likely seek to account for their support of forest countries through excess TFFF returns as climate finance and/or potentially ODA. As such, high-income economies should be excluded from the recipient pool.

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[19] Baccini et al. (2017).

[20] WRI's Global Forest Watch (GFW) is actively pursuing a major project to identify plantation forests.

[21] This dataset was used in Zarin et al. (2016). It is available on through GFW on climate.globalforestwatch.org.

- There will likely be fixed costs to the TFFF for each additional country included in the global offer. The cost of including countries with very small amounts of tropical forst area may exceed the value of their participation.

- Several countries—including China, Chile, and Argentina—are home to some tropical forests, but most of their forests are non-tropical. These countries should be excluded, as national-scale incentives based only on tropical forest area would likely be too small to significantly impact national land use planning, and could generate perverse outcomes such as leakage of forest loss from tropical areas to environmentally important non-tropical forests.

- Other countries, like India, Bangladesh, Mexico, and Paraguay, have substantial forest area, a significant proportion of which is tropical. Investors may want to address these countries on a case-by-case basis.

- A more limited set of countries may be included if the TFFF raises less than the target capital in order to maintain a politically relevant scale for payments to participants. The scope of participants could be narrowed based on a gap analysis of existing pay-for-performance commitments, to a specific region or income group, or to countries with ambitious deforestation reduction and reforestation commitments.

The TFFF's structure as a global offer using satellite-based global monitoring platforms suggests a very low barrier to entry by tropical forest countries. The "hands off" pay-for-performance approach proposed for the TFFF has also been attractive to tropical forest country representatives during initial consultations, compared to the common perception that existing REDD+ results-based instruments have a very high administrative burden including limitations on the use of payments. Furthermore, the small scale of existing finance for forests compared to the scale of need and mitigation opportunity suggest that forest countries would gain from participating in the TFFF even if they are actively engaged in other pay-for-performance modalities for REDD+ (as many of the larger tropical forest countries are). For these reasons, it is not expected that tropical forest countries would decline to participate in the TFFF, ratherit is expected that they would choose to participate in a well-designed global offer.

> ***Recommendation:*** The TFFF should target tropical forest countries with significant tropical forest area that together represent at least 80 percent of global tropical forest area, and where 50 percent or more of the country's forests are tropical, excluding high-income countries. Smaller countries that have been significantly engaged in tropical forest protection may be considered for inclusion. Performance evaluation and monitoring should cover all natural forest areas of included countries, both tropical and non-tropical, to avoid perverse incentives.

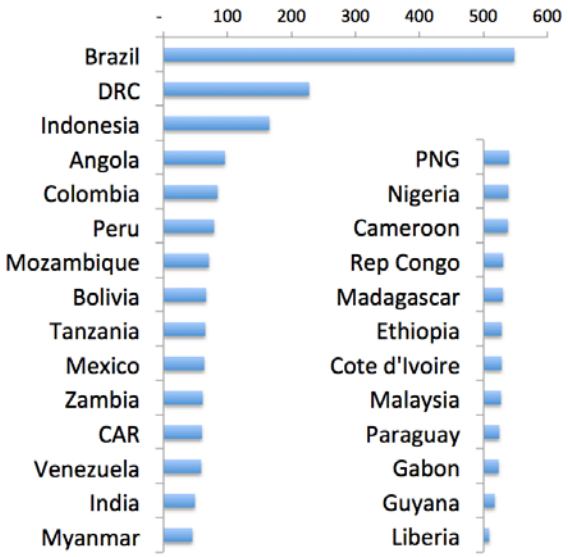
Twenty-seven countries (Figure E) were included in the TFFF modeling of peformance and allocation functions (below). They were selected by constructing a list of candidate tropical forest countries according to the recommendations above (e.g., excluding high-income countries, excluding China and countries where the majority of forests are non-tropical), then selecting them by area rank using 2000 tree canopy area at 10 percent cover threshold

from Hansen *et al.* sufficient to exceed 80 percent of total forest area in candidate countries. Gabon would have been selected using this proceedure if a higher tree cover threshold were applied, so it was included along with Paraguay, which was ranked above Gabon at 10 percent threshold, to avoid biasing the analysis based on the cover threshold used for selection. In this way, the sample included every country that would have been included as necessary to reach 80 percent of forest cover in tropical countries selected by any cover threshold from 10 percent up to 75 percent. Finally, Guyana and Liberia were added to expand the sample of countries with high forest cover and very low deforestatoin (Guyana) and very high deforestation (Liberia). Altogether, these 27 countries represent:

- 82-86 percent of year 2000 forest cover in tropical countries;
- 81-82.5 percent of gross forest cover loss from 2001-2014;
- 88-89 percent of standing carbon stock.

This set of countries provide an illustration of the potential coverage of the TFFF, and illustrate that a very large proportion of tropical forest cover can be subject to incentives with a limited number of participants. For the purposes of modeling, this set includes moist and dry tropical forests, low to high historical deforestation rates, and all three major tropical forest zones.

Figure E. Tree cover in countries selected for TFFF modeling (million ha)



4.3 Baselines (Reference Levels)

While the TFFF as proposed will be complementary to REDD+ rather than being itself a REDD+ mechanism, much of the research on REDD+ reference levels is applicable to the performance assessment approach for the TFFF. Over a decade of research shows that "REDD+ reference levels have profound implications for the climate effectiveness, cost efficiency, and distribution of REDD+ finance among countries, involving tradeoffs

between different interests and objectives."[22] This will be equally true for the implications of baselines on the effectiveness, efficiency, and distribution of payments for the TFFF.

First let us define terms. A reference level or baseline is simply a benchmark scenario against which future changes can be measured and potentially rewarded.[23] In the context of REDD+, a distinction is made between business as usual (BAU) baselines, which are technical predictions of what would happen without REDD+, and crediting baselines, which are benchmarks against which a country's reductions are measured to receive "credit" under the UNFCCC REDD+ mechanism.[24] An historical baseline is sometimes used as a proxy for a BAU baseline in the absence of modeling, assuming that past deforestation rates over a given period are the best proxy of future behavior. A compensation baseline may be distinct from a crediting baseline, for example if some forest sector emissions reductions are used by a country to receive credit for domestic commitments (e.g., Paris NDCs), while compensation is only sought from the international community for additional reductions beyond a more stringent compensation baseline. In this paper, we will use ***reference level*** to represent the level of performance a country must exceed to earn compensation from the TFFF, and ***historical baseline*** to mean an average observed net forest loss rate over some period of time. We also introduce the term "***global benchmark***" to mean a common pan-tropical measure of performance for all tropical forest countries.

In the context of REDD+, a baseline is usually constructed in relation to a specific type of activity (the scope). For example, a country may have one baseline for deforestation to assess performance on forest area loss or emissions from forest area loss, and a separate degradation baseline to assess performance on (and potentially receive payments for reducing) the loss of carbon in forests that remain forests. However, the TFFF would not be an activity-based instrument: it would ideally reward countries that both maintain and expand forests. This would include avoided deforestation (conversion of forest to non-forest), avoided forest degradation (loss of ecosystem services in forests remaining forests), and reforestation (new forest establishment), as all three processes impact forest ecosystem service provisioning. If the TFFF were to assess performance against forest biomass as a proxy for the amount of undervalued public goods provided by natural forests, irrespective of the activities that change forest biomass, only a single reference level for biomass loss is needed. The scope of the TFFF, while implicit, would thus cover all activities that impact this observed proxy.

Also relevant for considering reference levels is the context provided by forest transition theory. Alexander Mather coined the phrase "forest transition" to describe an observed pattern of forest cover loss, stabilization, and recovery over time as an area develops economically.[25] A country with high forest cover and low deforestation rates (HFLD) may see its deforestation rate accelerate (HFHD) and its forest cover diminish (LFHD) until

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[22] Meridian Institute, 2009.
[23] Parker et al, 2009.
[24] Meridian Institute, 2009.
[25] Mather (1992).

forest cover stabilizes (LFLD) and possibly recovers. To the extent that this pattern holds, an historical baseline will underestimate BAU deforestation for HFLD countries at the early stages and overestimate it for LFHD and LFLD countries at late stages of this typical transition curve.[26]

Adjustments to historical deforestation rates are addressed in methodological guidance to forest countries on the establishment of reference levels for REDD+. Countries should establish reference levels "transparently taking into account historic data, and adjust for national circumstances…"[27] In part, such adjustments have been introduced to increase the effectiveness of the mechanism by constructing baselines that more accurately reflect BAU, either with broad adjustments in line with forest transition theory (using forest cover or income as proxies) or potentially by directly accounting for drivers of forest loss such agricultural prices or existing development plans.[28] Addressing these divergences between historical deforestation rates and expected future rates can increase the effectiveness of a proposed reference level.[29]

But effectiveness is not the only concern. Adjustments to reference levels have also been proposed to address national circumstances vis-à-vis equity, for example wealth adjustments or to account for forest countries' contributions to global climate effort. Finally, a range of models have proposed applying a global additionality adjustment to country reference levels to ensure that the sum of REDD+ baselines across all eligible countries does not exceed the expected BAU global loss or to ensure even deeper cuts.

Econometric models of REDD+ reference levels for deforestation[30] have generated lessons that are applicable to setting reference levels for the TFFF's performance assessment. Most notably, they have shown:

- Stock-based approaches that assess performance based on total forest area or total carbon stock are much less effective than flow-based approaches based on change in forest area or carbon.
- Reference levels are important, but there is a much bigger difference between expected deforestation with or without payments than there is between expected deforestation with one versus another approach to setting baselines.
- The effectiveness of an instrument drops when country reference levels add up to more than the global BAU baseline. In other words, any upward adjustments to reference levels for HFLD countries should be counter-balanced by downward adjustments elsewhere.

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[26] After Meridian Institute, 2009.
[27] FCCC/CP/2009/11/Add.1, Decision 4/CP.15 Par.7
[28] Meridian Institute, 2009.
[29] Busch et al. (2009); and Meridian Institute, 2009.
[30] In particular the OSIRIS model results as cited in Busch et al, 2009 and in Meridian Institute, 2009.

- Reductions in forest loss *increase* as the global total of country reference levels becomes more stringent than global BAU, as long as there is sufficient finance available. Downward adjustments to reference levels over time could thus incentivize gradually deeper emission reductions.

- Reference levels that are set too high lead to payments for non-additional action, reducing effectiveness, while many countries decline to participate at all if reference levels are set too low (the rewards seem out of reach).

- Effectiveness and efficiency require a reference level approach that provides incentives to a broad range of countries, including those that have had both high and low historical deforestation.

- Setting reference levels to historical deforestation without any adjustment fails to provide an incentive for HFLD countries, and may cause their rates of forest loss to increase through non-participation and international leakage from HFHD countries that reduce losses.

Beyond the guidance provided by these "lessons learned" from models of REDD+ reference levels, the proposed structure of the TFFF imposes additional considerations. In particular, the same features of the TFFF that suggest use of globally-consistent satellite data rather country-based systems for forest monitoring—the global offer approach, zero-sum division of proceeds, and need to minimize overhead—also suggest that reference levels should not be subject to adjustments based on other types of country-based data, nor to negotiation by participants.

These considerations and the research on REDD+ reference levels outlined above suggest the following *recommendations*:

- It is proposed that a single formula for baselines (reference levels) and performance be applied consistently and transparently to all countries to ensure fair and non-biased allocation of shares in the facility, and to avoid lengthy negotiations or challenges.

- The primary measure of performance for the TFFF should be the rate of change in forest biomass from one period to the next. The rate of change is recommended rather than total stock in each period to maximize the economic efficiency of the TFFF as a global Payment for Ecosystem Services system; while biomass is recommended as the core underlying measure as it is expected to correlate well with a broad suite of forest public goods.

- Reference levels for the TFFF should be based on recent historical biomass loss rates in each country, to create an incentive for all participating countries to improve performance regardless of recent historical forest loss rates.

- The TFFF should adjust reference levels or performance scores towards a global benchmark. Such an adjustment will ensure that HFLD countries have an incentive

to maintain forests; that investors will not be excessively exposed to criticism for payments to countries with high rates of forest loss; and that collective global progress will be assured.

- The global benchmark should be set initially to the pan-tropical average net biomass loss rate, but should ratchet down over time consistent with zero net deforestation in 2030. Models suggest that this type of declining global benchmark would be economically efficient. A mixture of a tightening global benchmark and country historical averages will create an incentive for every country to maintain a "glide path" towards zero net deforestation. Countries with very low recent deforestation rates will receive incentive payments for maintaining these low levels, even if they don't decline substantially; while countries with high recent deforestation rates will have an incentive to bring them down immediately, but will be expected to improve quickly over time to continue receiving payments.

A proposed set of performance assessment formulas is outlined below for this recommended approach to setting reference levels for the TFFF, following an outline of an approach to awarding investment returns.

4.4 Allocating Investment Returns

Investment returns should be awarded in a way that maximizes their incentive function, while minimizing the financial risk to investor sponsors. It is proposed that the TFFF achieve this by applying the principles of "Cash on Delivery"—an aid idea[31] developed at the Center for Global Development. Each year a proportion of the earnings of the TFFF will be allocated to tropical forest countries as shares in the facility. The share of earnings allocated to each country will be based on a formula that takes into account a country's performance as measured by its rate of forest biomass loss over an assessment period compared to a reference level, and the extent of the country's forests.

Why does extent matter? The value of reduced natural forest loss rates in a country depends not just on the change in rate, but also on the total amount of forest loss avoided. Performance payments should therefore be larger for countries with large preserved forest stocks, given equal performance in reducing forest loss rates. In other words, payments to Brazil should be bigger than payments to Liberia even if both countries have the same starting deforestation rate (e.g., 1 percent per year of loss) and both cut that loss rate in half (to 0.5 percent per year).

It is proposed that the TFFF allocation formula achieve this by including a country weight (or size multiplier), based on the extent of forest as defined by either biomass, forest area, or some combination of the two. For example, if Brazil has 50 times as much forest biomass as Liberia, one might set its default allocation for a given level of performance (e.g., cutting loss in half from 0.3 percent per year to 0.15 percent per year) to be 50 times larger than

[31] See "Cash on Delivery Aid: FAQ." http://www.cgdev.org/page/cash-delivery-aid-faq

Liberia's. However, the optimal weighting factor may not be as simple as this 1:1 ratio based on forest extent, for four primary reasons.

First, there may be economies of scale that require less payment per unit of forest biomass preserved to induce change in a larger country (or conversely, there may be common fixed costs that make it more expensive to induce change in a smaller country). Second, the amount of forest area or forest biomass at high risk of deforestation—and thus the amount of payment necessary to forego that deforestation—is related to the fragmentation or compactness of a country's forests. Countries with much greater continuous forest areas are likely to have more interior and remote forest areas that are not subject to substantial deforestation pressure than those with fragmented forest areas with a large exposure and forest frontiers. Third, a larger proportion of the global and regional ecosystem service value of a country's forests will flow to other countries (rather than benefit domestic populations) for smaller countries, again suggesting that small-country payments will need to be proportionally larger per unit of performance. And finally, the ecosystem service value of a given amount of forest areas is likely higher in a smaller or less-forested country, as there is less substitutability with other forest areas—suggesting a higher value of forest ecosystem services to domestic populations and greater development benefit to maintaining these forest areas. Additional research is needed to investigate these differences and set an appropriate country weighting factor for the TFFF.

The allocation formula could include a weighting factor for global performance, with the goals of creating incentives for cooperation and avoiding huge payouts to one or two countries while the rest of the world's tropical forests disappear. If not all of the TFFF's excess earnings are allocated in a give performance assessment period, they could be held over for later allocations.

As discussed below, fund allocations may have greater impact on political decision making if countries are able to monetize them prior to disbursement, especially if the bulk of disbursements are made at towards the end of the fund's planned 20 year time span. Countries will be less able to monetize their fund allocations if the TFFF can "take back" allocations due to declining performance in later years, so only positive or zero allocations should be made. However, a strictly positive fund allocation formula risks providing a perverse incentive for high variability in loss rates: country could game the system by concentrating forest loss in fewer years, and still earn substantial rewards for high performance in other years. Two mechanisms are proposed to mitigate this risk: using a moving average of loss rates over 2 or 3 successive years for short term or annual performance assessments, and introducing a longer-term performance assessment and allocation cycle based on loss rates over a period of 5 or more years (or potentially over the lifetime of the mechanism) in additional to annual assessments and allocations.

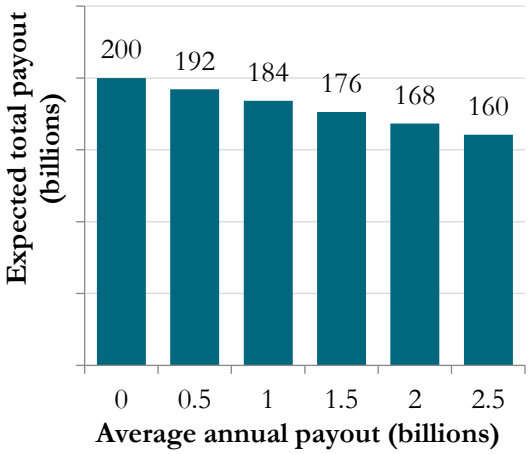
4.5 Delivering Rewards

The TFFF faces a fundamental tradeoff in the timing of payouts.

A long investment horizon is necessary for the proposed endowment-like financial structure to succeed: it is almost certain that a fully-diversified portfolio will significantly outperform government bonds over the long term, but the fund value *could* dip below the capitalization in the near term. Early withdrawals and/or large regular withdrawals to make payouts to successful forest countries would significantly reduce the expected total value of all payouts from the fund (Figure F), and would increase the risk that investors would not receive promised interest or lose some of their initial capital. Investors are not likely to participate if this risk is not managed carefully.

However, more immediate payouts may be more effective at generating results in some countries. The success of the TFFF depends on political will responding to a global offer of payments for performance, and the opportunity to earn a payout that only comes 10 or 20 years hence will likely be of little political relevance; politics is notoriously short-sighted. While there may be exceptions (for example, countries with existing performance-based payment agreements that only cover the near term may see a longer term horizon as a useful complement), it is well-understood that successfully earning shares of the TFFF will need to be made political relevant on a much shorter timeframe.

Figure F. Expected total payout to forest countries of a USD 100 billion fund after 20 years at 5.65 percent annual return after costs, with different levels of planned annual payouts.



The TFFF will need to utilize some combination of approaches to address this tradeoff, reducing the risks for the long-term return while still providing some near-term incentive, including potentially:

- *Allocating shares, not dollars:* The TFFF will allocate shares of the total future excess value of the fund (beyond debt service and costs). For example, if the fund were established for a fixed 20 year period, it could divide the final excess returns into 2,000 shares and allocate 100 of them each year to countries based on performance. While the dollar value of shares would fluctuate from year-to-year, a current value

and expected final value could be calculated any time the fund were "marked-to-market." This approach will maximize the total earnings of the fund, and will decouple the interannual variability in returns from the annual performance allocations.

- *Monetizing earned shares more quickly:* Short-term performance-based allocations of future rewards will be structured to allow countries to monetize earnings prior to final disbursal, for example by granting legal ownership of a proportion of final excess returns that could be used as collateral for bank loans, or as a complement to emerging instruments such as forest bonds or sustainable land bonds.[32]

Early payouts: The TFFF may seek to distribute a small amount of the rewards earned by forest countries on an annual or biennial (every-other-year) basis. The risk to investor capital can be managed if only a small proportion of the total average expected return is withdrawn from the fund each year for payouts. Risk management would include operating the fund for several years prior to making any payouts, and by establishing market-based triggers for making or withholding short-term payouts (for example, if the total fund value drops below a threshold). What should the TFFF do with fund proceeds if few or no tropical forest countries perform sufficiently well? The "zero-sum" nature of the TFFF was discussed above, suggesting that the pool of proceeds would be divided between as many tropical forest countries as are successful, and greater success by one country will diminish the funding available to others. However, the TFFF should consider setting a maximum proportion of shares that can be earned each year by each country (for example, 2 to 3 times higher than their proportional share if all countries perform equally well), and should also designate an alternative for distributing proceeds if there are unallocated shares when the fund fully disperses (for example, to support global adaptation).

4.6 Performance Assessment Timing

A related question to the timing of rewards is the timing of performance assessments. Again there are a few key tradeoffs. More frequent performance assessments provide an opportunity for more immediate accountability—and for success to generate public rewards rapidly for political leaders. On the other hand, longer intervals between performance assessments will reduce uncertainty in the monitoring data and the potential for measurement errors, especially to the extent that biomass and forest area are monitored for regrowth as well as gross loss. There is also a moral hazard in allocating rewards to countries in the early years, especially if shares can not be "clawed back"—which will be necessary if countries are to be able to monetize their shares up front. Longer performance assessment intervals may help to reduce this moral hazard. To balance these tradeoffs, we recommend that the TFFF consider a mixed schedule of annual or biennial performance assessments and longer-period (e.g., 5 years or more) assessments. The longer-period assessments could monitor change in forest cover and/or biomass just over the period since the last

[32] See, for example, Wheeler and Clenaghan (2018).

assessment, or from the first year of the fund to reward longer-term performance. More frequent assessments would be accompanied by smaller-than-proportional share allocations, and longer-period assessments would allocate the balance. For example, 40 percent of the shares could be allocated in annual assessments, with 15 percent allocated in years 5, 10, 15 and 20.

V. Proposed Governance Arrangements for TFFF

TFFF would establish a multilateral sovereign wealth fund to generate significant funds through investment gains on the initial capital investments. In designing the pay-for-performance mechanism, a few key principles guide the governance structure. These derive from CGD's Cash-on-Delivery aid model and from the *Santiago Principles*[33] which are principles and practices for the management of sovereign wealth funds.

5.1 Constructing the Global Offer.

As a global offer, investors would be expected to agree on the scope and terms of the offer. Investors can be governments of donor countries, philanthropies, or private investors for whom reducing deforestation is a high priority. TFFF's rules and formulas for measuring performance and allocating funds to forest countries would be agreed in advance of the facility's establishment and clearly stated as part of the global offer. The intention is to make sure that the offer is transparent, credible, and insulated from political revisions. (See companion CGD working paper, "Creating a Multilateral Wealth Fund for a Global Public Good: Proposed Approach to Assessing Performance and Awarding Returns for a Tropical Forest Finance Facility.")

5.2 Defining Performance Criteria.

To define the methodology for performance assessment, one approach would be for potential investors to commission a group of recognized experts with expertise in forest monitoring and remote sensing, forest health and ecosystem services, forest management, forest conservation, REDD+ or national forest monitoring systems and international reporting. The experts would prepare an assessment of alternative options for measuring country performance. Alternatively, investors could opt to set formulas for performance assessment and fund allocation through a deliberative process that engages a range of stakeholders, including the investors, tropical forest countries and others. But the final decision on the performance measurement and allocation approach would be made by the investors who are making the global offer. They would determine what kind of performance they are willing to reward, and eligible tropical forest countries could then choose whether or not to take advantage of the offer.

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[33] Santiago Principles, International Forum of Sovereign Wealth Funds, 2008. http://www.ifswf.org/santiago-principles-landing/santiago-principles

The global offer would constitute a "contract," with independent verification, between investors and tropical forest countries. Acceptance of the offer by a tropical forest country would be completely voluntary—it is neither a demand nor a requirement. By gathering the capital for the investment vehicle up-front, TFFF will provide a high level of assurance to tropical forest countries that the resources for the reward payments will be available as and when the countries meet the performance targets, thus overcoming one persistent critique of foreign assistance: that political and economic cycles in funder countries increase volatility in funding and hinder planning and implementation by recipients. In keeping with "cash on delivery" aid principles, once a country receives a performance payment, the funds can be used in any way determined by the country, without conditions or restrictions imposed by the investors.

5.3 Principles.

The *COD aid model* reflects the following principles:

a) **Payments for outcomes**: TFFF would make direct payments to the national level, based on changes in national natural forest biomass. TFFF would not specify how a country uses the funds.

b) **Hands-off approach for funders, and recipient discretion**: Tropical forest countries would have full ownership and responsibility for achieving the result of reduced deforestation.

c) **Independently verified country progress**: Measuring performance success will be done by a third party but results should be challengeable and build on national systems and inputs.

d) **Transparency**: The measured performance of the tropical forest countries and each country's accrual of TFFF's returns would be published annually in a Global Score Card. This will provide an element of competition between forest countries.

5.3.1 Recipient Discretion.

Tropical forest countries would have full ownership and responsibility for achieving the result of reduced deforestation, and they would have complete discretion and full flexibility to try various interventions or to address policy issues that would be needed to reduce deforestation. The investors would not specify, monitor or fund inputs as part of TFFF. (They may fund complementary programs to help countries reduce deforestation through their aid and forest/REDD+ programs.) There is thus no need for operational procedures and policies to govern the use of the funds because TFFF funds are a reward for success, not financing for specific actions.

5.3.2 Performance at the National Level.

Measuring performance success at a national level implies that countries can successfully implement effective policy, legal and institutional reforms nationwide. TFFF would direct payments to the national treasury, based on changes in national forest cover. The performance financing can provide additional political and financial leverage to those in the country who are seeking to implement policies and actions to maintain the forests. It is imperative for success that action be taken at the appropriate level, and each country will need to determine how internal incentives can be used to reward good performance. Governments may determine that success in achieving performance targets will require them to pass on some portion of the financial incentive to sub-national entities.

The *Santiago Principles* for the management of sovereign wealth funds provide guidance on appropriate governance and accountability arrangements and the conduct of investment practices necessary for sound long-term investment results. The *Santiago Principles* are:

a) **Legal soundness of TFFF**: Once investors have agreed on the parameters of the global offer, a governance agreement would be developed to support the objectives and effective operation of TFFF. The agreement would be agreed by initial investors, in consultation with tropical forest countries, prior to the establishment of TFFF. The governance agreement will address, among other things, the governance structure, roles, responsibilities, and accountability of each entity in the structure. It will provide guidelines and criteria regarding investment, performance measurement, and allocation of investment returns. Given the potential financial and contracting responsibilities of TFFF, investors may want to establish TFFF as an independent legal entity in a conducive national system. Alternatively, it may be sufficient for the facility to derive its legal personality from an entity that would "host" it.

b) **Expertise and independence**: With respect to decision-making within a SWF, accountability and operational independence are key. Thus it is proposed that the TFFF Board be small and its members be selected for their personal qualifications and skill and not their affiliation with an investor or a potential beneficiary. Unlike most global environmental partnership organizations, like the Global Environment Facility (GEF), the Climate Investment Funds (CIF) or the Green Climate Fund (GCF), it is proposed that the TFFF Board not be made up of representatives of investor or tropical forest country governments. Recognizing the objectives of TFFF, it is proposed that a majority of board members should have finance/investment expertise, while remaining members should have expertise in forest monitoring. The primary responsibility of a Board member would be to act in the best interest of TFFF. The process for appointing board members should be "double arm's length"[34] to underscore the independence of board members. The

[34] Double arm's length autonomy is a concept employed by the New Zealand Super Fund. The first "arm" of independence is that the Government does not decide the pool of Board candidates. The second "arm" of independence is that investment decisions are made by the Board and Management. https://www.nzsuperfund.co.nz/documents/double-arms-length-autonomy-explained

goal is to underscore independence from investors and tropical forest countries, and insulate TFFF from subjective political considerations.

The Board will be responsible for overseeing the application of the objectives and criteria of the global offer. The ability of the Board to amend or modify the performance and allocation criteria will be limited in accordance with agreed parameters to circumstances where technological or scientific changes are required to maintain their effectiveness in measuring deforestation. The performance benchmark and the criteria for assessment of performance will be clear, agreed as part of the initial offer, and publicly disclosed. Measurement will be based on satellite monitoring and a measurement formula agreed in advance. All countries will be assessed against the same criteria utilizing independent data.

c) **Clear accountability**: The accountability framework for TFFF's operations should be clearly defined in its constitutive documents. The accountability of TFFF Board and its committees, outsourced providers and the secretariat would be clearly articulated in the governance agreement of TFFF. It is proposed that Board members be accountable to: (i) investors with respect to exercising good faith and due care in approving investment policies and overseeing the facility with a view to preserving initial capital and paying debt service, (ii) to tropical forest countries with respect to seeking to maximize and protect reward payments, taking into account the intent of the investors, and (iii) to both investors and tropical forest countries to oversee fair, transparent and consistent application of performance measurement and allocations as incorporated in the global offer.

d) **Understanding risks**: TFFF will need to clearly articulate and monitor the Facility's risks and its investment risk tolerance. TFFF's Board will be responsible for approving a risk management framework that identifies, assesses, and manages the Facility's risks. It is proposed that the investment risk tolerance should be similar to that of major university endowments, foundations, sovereign wealth funds and pension funds if TFFF is to generate a robust return to be used for performance payments. With respect to financial risks, investors will assume the risk that their capital investments may not be preserved or debt service not paid, although modeling shows that this risk is small when the life of the fund is twenty years or longer. The tropical forest countries will assume the risk that TFFF investments generate lower returns than expected or are lost due to market volatility, and thus the reward for their performance in reducing deforestation is not as large as anticipated. Again, the modeling shows that even under conservative estimates of returns, this risk is small. Both investors and tropical forest countries assume risks associated with performance measurement, such as inadequacy of satellite monitoring or inaccurate data.

e) **Transparency**: TFFF needs clear and publicly disclosed policies, rules, procedures or arrangements in accordance with recognized international or national accounting standards. Governance decisions, performance measurement, financial and forest-related performance, and evaluations would be made public. Annual reports would

be made available on financial performance and an annual Global Scorecard will show tropical forest countries' performance in halting deforestation.

5.4 Proposed Governance Structure

It is proposed that TFFF's structure would include the following:

(a) Governing Board
(b) Two standing committees (Expert Investment Committee, Performance Monitoring Committee)
(c) Office/Secretariat
(d) Monitoring Authority (outsourced)
(e) Investment Management (outsourced)
(f) Treasury Manager (outsourced)

5.4.1 Governing Board

The Governing Board would be responsible for strategic oversight of the TFFF and for the elaboration of policies and adoption of decisions and procedures that ensure the effective achievement of the goals and objectives set forth in the governance agreement. A key responsibility of the Governing Board would be to safeguard the independence of TFFF with respect to financial decision-making, performance measurement, and allocation of returns.

Clear procedures for appointing the Board will be established. Consistent with the "double arms length" approach, for the first Board, investors (and possibly representatives from tropical forest countries) would agree upon a nominating committee. The nominating committee would be requested to propose a slate of candidates for the Board that meets the qualifications agreed in the governance agreement. It is proposed that a qualified majority of the Board members (e.g., at least two thirds) should have expertise in investing financial assets, managing investments and/or corporate governance. Some members of the Board should have expertise in forest monitoring. Once the nominating committee proposes candidates, the investors would then be invited to approve the slate of Board members recommended by the nominating committee. This would be an "up-or-down" vote, and if the recommended slate is not approved by the investors, the nominating committee would be requested to recommend a new slate.

The Governing Board will be responsible, among other things, for:

a) Maintaining strategic oversight of TFFF,
b) Appointing the Fund Asset Manager(s) and approving guidelines for selection of additional investment fund managers to invest parts of TFFF,
c) Appointing the Monitoring Authority,
d) Appointing the Treasury Manager,
e) Approving and keeping under review the investment strategy, and related policies, standards and procedures of TFFF,

f) Reviewing an annual statement of investment performance expectations and an annual assessment of actual performance, monitoring the performance of the Fund Asset Manager(s) and taking action to change any Fund Asset Manager if appropriate,
g) Keeping the methodology for measuring performance under review, and approving revisions consistent with agreed parameters for such revisions,
h) Endorsing the Global Scorecard and allocation of net returns to tropical forest countries,
i) Approving and overseeing a risk management framework,
j) Ensuring annual audits,
k) Approving an annual report, including financial statements, and
l) Clearly defining and approving professional and ethical standards.

The Board would have authority to establish committees, with membership from Board members and/or independent members, and to delegate to committees such powers, duties and functions as the Board decides. To provide additional independent and expert-based decision making, at least two standing committees may be considered as described below. The two committees (expert investment committee and performance monitoring committee) would be accountable to the Board, and the Board would have the authority to make final decisions should it disagree with a decision or recommendation of a committee. Outsourced providers for financial management, investment and performance monitoring, would be accountable to Board through its committees.

5.4.2 Expert Investment Committee

The TFFF capital should be invested in a fully diversified portfolio constructed to maximize risk-adjusted returns commensurate with TFFF's long investment horizon. An Expert Investment Committee would be established as a standing committee of the Governing Board. The Committee would comprise members of the Board and independent experts with substantial expertise, training and experience in the investment and management of financial investments.

The Expert Investment Committee would be responsible for recommending to the Board for approval: (a) investment policies, standards and procedures consistent with the agreed investment strategy, and (b) the outsourcing to third party asset managers responsible for investing TFFF's assets.

The Expert Investment Committee would keep under review: (a) the financial performance of TFFF, (b) its conformity with the approved investment strategy, policies, standards and procedures, (c) financial risks, and (d) performance of the outsourced investment services, and would report to the Board at least annually. The Expert Investment Committee would be responsible for alerting the Board of any strategic concerns.

5.4.3 Performance Monitoring Committee

A Performance Monitoring Committee would be established as a standing committee of the Board. It would comprise members of the Board and independent members with expertise,

training and experience in: (a) forest monitoring and remote sensing, (b) forest health and ecosystem services, (c) forest management, (d) forest conservation, (e) REDD+ as a complementary instrument under the UNFCCC, and (f) national forest monitoring systems and international reporting.

The Performance Monitoring Committee would be responsible for: (a) overseeing the monitoring and measurement of performance, (b) keeping under review the methodology for measuring performance with a view to suggesting updates as technology and science evolves, (c) keeping the work of the Monitoring Authority under review, (d) approving a Global Scorecard prepared by the Monitoring Authority, and (e) recommending to the Board the allocation of shares based on performance every year according to the principles, criteria and procedures in the governance agreement.

5.4.4 Office/Secretariat

A small office/Board secretariat would be established. The head of the secretariat would be accountable to the Board. The office would be responsible for: (a) servicing and preparing proposals for the Board and its committees, (b) ensuring regular communication with investors, tropical countries that may be beneficiaries of the facility, and other partners, (c) sharing knowledge and information, including through the preparation and publication of an annual report, (d) publishing and publicizing the Global Performance Scorecard, (e) representing TFFF externally, and (f) building trust and facilitating resolution of differences.

5.4.5 Outsourced functions

Key functions for performance monitoring, investment of assets, and financial management of the facility would be outsourced to third party professionals. Such a structure would add to the independence of the Facility as well as its cost effectiveness.

a) **Monitoring Authority**: The Board would appoint a Monitoring Authority, based on a recommendation by the Performance Monitoring Committee, to be responsible for assessing the performance of participating tropical forest countries in maintaining and expanding natural tropical forests, according to the principles, criteria and/or formulae specified in TFFF governance agreement and/or elaborated by the Performance Monitoring Committee and Board. The Monitoring Authority would have the capacity to process forest remote sensing data for the purposes of performance assessment. The Monitoring Authority would prepare an annual Global Scorecard reporting on the performance of tropical forest countries.

b) **Investment management and asset managers**: The Board, based on the recommendation of the Expert Investment Committee, would approve guidelines for selection of third party asset managers and would subsequently approve a process for appointment by the Board of one or more third party asset managers that would be responsible for investing and managing the funds of TFFF.

   The Board would approve an investment policy, proposed by the Investment Committee, to guide the asset managers. The investment policy would build on the

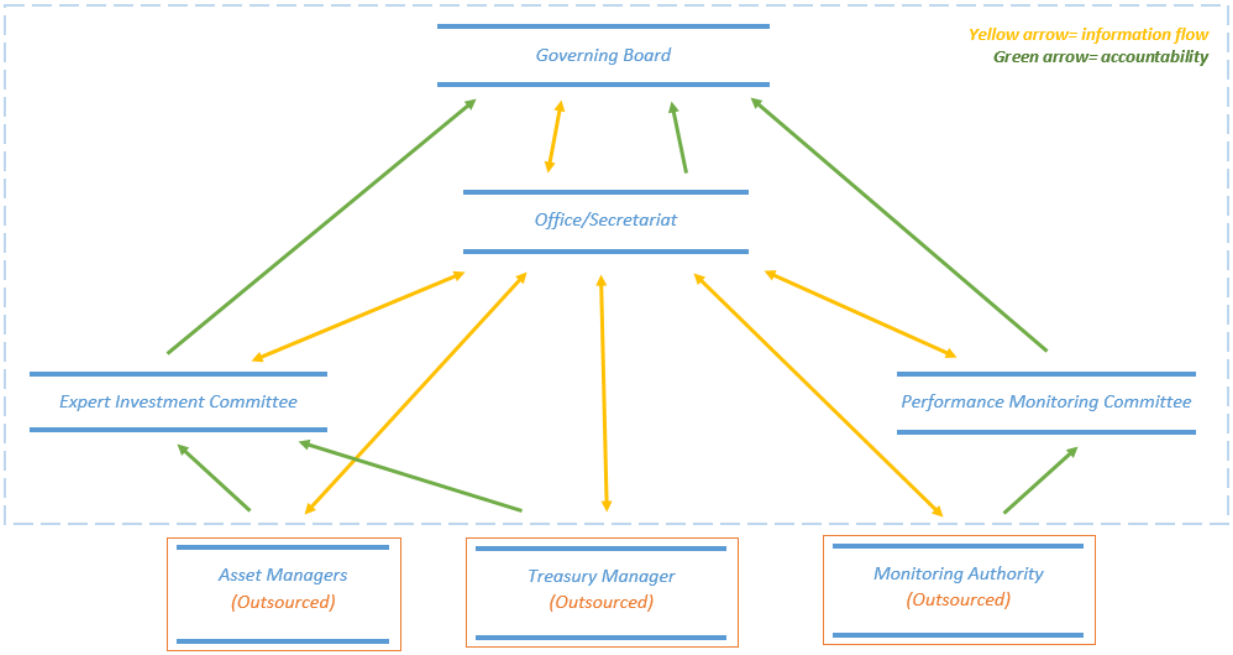
investment principles agreed in the governance agreement, and it would establish or reconfirm the risk tolerance of the fund, the asset classes in which it may invest, and required reporting and auditing standards. The Expert Investment Committee and the TFFF office would provide necessary and relevant information on TFFF's investment performance for publication in an annual report.

National or subnational sovereign wealth funds might be strong candidates to manage the assets of TFFF. (For example the New Zealand Super Fund). These funds, which are increasing in number, tend to have the ability, experience and skills to manage large investment portfolios as are envisaged for TFFF. Working with sovereign wealth funds would be complementary to the goals of the TFFF and would enhance the credibility and reputation of TFFF.

c) **Treasury manager**. It is proposed that an existing organization, with the required skills and experience, be requested to serve as the Treasury Manager. An existing financial institution with experience in mobilizing and managing resources from governments and other partners, such as the IMF, World Bank or another multilateral development bank, may be considered. Other public sector financial institutions could also be considered.

The Treasury Manager would engage initially to help secure capital contributions to TFFF. It would manage TFFF's finances and would work with the Expert Investment Committee to keep TFFF's investments under review, and would advise the Committee on capital markets, rating agency and investor outreach, hedging transactions and investment management. The Treasury Manager would also coordinate with the Board and the Secretariat in the preparation of financial reports, with investors on their investments and with tropical forest countries with respect to their performance payments.

(d) **Figure G. Proposed TFFF governance structure**



VI. Conclusion

With greater global integration, developing countries face increasing risks over which they have little or no control and which no one country has the incentive nor the ability to tackle on its own. Hence there is a need to provide additional international financing to developing countries to address those challenges.

TFFF is a proposal to mobilize significant low cost resources which can be invested in private markets to generate a financial return for rewarding successful actions that contribute to achieving a global goal, reduced deforestation. If it works, it could be an example of a new approach to delivering international financing for achieving the SDGs, and the sustainable delivery of international finance for securing global public goods.

TFFF borrows from the experiences and cultures of both the public sector and the private sector. Utilizing primarily public funds to generate investment profits from the private sector that in turn provide international finance for public goods could serve to move beyond the finite borders of overseas development aid.

We propose that the first such financing facility be established to generate resources to protect tropical forests due to the crisis of reversing deforestation trends. Without urgent action, there will be few remaining forests to protect. But if successful, this model would demonstrate a pathway to unlock a reliable and significantly enhanced flow of funds that could be used to address the SDGs and other critical global needs. The advantage of starting with forests is that modern satellite technology provides a relatively easy way to measure success, unlike other outcomes at the domestic level, which are more granular, subjective

and expensive to measure. The high quality of satellite data allows shareholders in TFFF to agree on what success means ex ante and to pool their resources to measure it. Each agency does not need to mobilize its own satellite system.

A key challenge will be to align the culture and governance principles associated with achieving greater societal goals with the culture and principles associated with generating profits through the private sector—a challenge that sovereign wealth funds are successfully addressing.

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