policy brief

NICHOLAS INSTITUTE FOR ENVIRONMENTAL POLICY SOLUTIONS
DUKE UNIVERSITY

NI PB 09-08 | June 2009 | www.nicholas.duke.edu/institute

*International Forest Carbon and the Climate Change Challenge Series – Brief No. 4**

Fundamentals for an International Forest Climate Policy

Lydia Olander, Nicholas Institute for Environmental Policy Solutions, Duke University
with
John O. Niles, Tropical Forest Group
William Boyd, University of Colorado Law School
Erin Myers Madeira, Resources for the Future; Center for International Forestry Research
Kathleen Lawlor, Nicholas Institute for Environmental Solutions, Duke University

Key Messages

- The integrity of forest carbon credits (additionality, leakage, non-permanence) can be addressed through careful policy design, the most important feature of which is crediting reductions that are quantified relative to a national baseline.
- Financing for forests is likely to follow a phased approach with early funding, primarily from public donors, focused on capacity and institution building in developing countries. This would be followed by financing generated through the climate policies of developed countries to pay for verified reductions in forest emissions in tropical forest nations.
- It is important to leave the door open for all land-use activities to be included in climate policy over time. This will become easier as our measurement and monitoring capabilities improve with new remote sensing technology.
- Successful forest carbon policy will promote a range of actions in tropical forest countries—from changes in national and regional policies (e.g., clarification of property rights; agricultural subsidies; logging concessions; infrastructure planning; enforcement of logging laws) to place-specific projects (e.g., improved or new protected areas), which will likely be achieved through a variety of institutions and buyer-seller arrangements.

Tropical forests have moved to the forefront of recent climate policy discussions in the United States and abroad. The latest policy proposals suggest that payments for reduced emissions from deforestation and forest degradation will be conditional upon demonstration of emission reductions by tropical forest countries. This type of emissions-based approach can link payments for forest conservation to a global carbon market and bring in significant and sustained financing, but it also requires credible measurement, monitoring, and accounting to ensure that forest carbon emission reductions are real. This brief describes a number of the critical issues and choices in designing international forest carbon policy.

Environmental integrity: How do we ensure that forest emissions reductions are real?

A number of features in the design and implementation of a forest carbon policy are critical for ensuring that the policy contributes effectively to climate change mitigation. These features are not unique to forest carbon and apply to emissions reduction strategies for any sector. Given that forest carbon programs will likely move forward in phases, progress towards addressing the following issues is expected to move forward in tandem, with the possibility of linking to the global carbon market achieved once these pieces are in place.

* Each brief in this series corresponds to a chapter in the Nicholas Institute's report on forest carbon, titled *International Forest Carbon and the Climate Change Challenge: Issues and Options*. The full report, and each brief in the series, can be found at http://www.nicholas.duke.edu/institute.

Robust Measurement, Monitoring, and Verification (MMV)

Remote sensing can measure and monitor deforestation with confidence.[4] It can provide easily accessible data at a lower cost, and this data can be shared on websites (such as Google Earth) to provide a transparent measure of reduced deforestation over time. Linking area of forest loss to total emissions is a bit more difficult as different types of forests store (and emit when deforested) different amounts of carbon. Ground measurements are needed to complement and calibrate data from remote sensing, and emerging protocols are being developed to ensure that field measurements will harmonize with remote sensing applications. In the short term, scientists have pulled together data from research and forestry around the world to develop look-up tables that do a pretty good job of estimating carbon storage in different forest types. These methods provide sufficient information for measuring, monitoring, and verifying deforestation[5]—the largest source of land-use-based emissions. Measuring and monitoring carbon fluxes from forest management, forest degradation, and other land-use changes is more challenging, but techniques are being developed. As new remote sensing technologies are developed to improve our capabilities to measure greenhouse gas impacts from these other land-use changes, standardized measurement approaches agreed upon by the Intergovernmental Panel on Climate Change (IPCC) and accepted by UNFCCC negotiators can be used.[6]

Addressing leakage

Leakage is the phenomenon in which efforts targeted at reducing emissions in one place simply shift them to another location or sector where they remain uncontrolled or uncounted. Although leakage is caused by demand for commodities (food, wood), it is essentially an accounting problem. Continued or increased demand for a product causes production and the emissions associated with it to shift, but it is only when it shifts into territories where it is unaccounted for that it becomes leakage. The potential for leakage arises when rules, regulations, and incentives affect only part of the potential participants or emissions sources. Thus, leakage has and will continue to be a challenge for various types of policies.

Any near-term forest carbon policy is likely to be voluntary and thus will only include some countries. As a result, leakage can occur across countries. International leakage is an issue for all climate policy, but those reducing emissions in other sectors have not been required to pay for potentially leaked emissions overseas. With emissions from deforestation highly concentrated in two or three countries, participation of just these few countries would likely reduce international leakage from forests significantly. The main concern about international leakage is that only countries with high deforestation rates will participate in a forest carbon program, causing drivers of deforestation to shift to countries that currently have low rates of forest loss. The design of the program can help address this concern (see more in section on baselines below). Leakage can also occur within a country (*subnational* leakage) when local projects are developed in a country without any national measurement to account for shifting or leakage. A forest emission reduction project (e.g., a new park) can displace emissions to another forest area. Alternatively, emissions may be displaced from one land type (e.g., clearing forests for agriculture) to another (e.g., clearing grassland for agriculture).

Studies of leakage suggest a wide range for potential carbon leakage, with the results largely depending

How do forests affect climate change?

Forests are the most significant terrestrial carbon reservoir, containing 77% of all carbon stored in vegetation and storing roughly twice as much carbon as the atmosphere. Forests also constantly cycle carbon: photosynthesis turns atmospheric carbon into biomass and sugars, while respiration burns up some of these sugars, returning carbon back to the atmosphere. Globally, forests are a net sink, meaning that they absorb more carbon out of the atmosphere than they emit. However, of the 2.6 billion tons of carbon that forests annually absorb, 60% (or 1.6 billion tons) is emitted back into the atmosphere by deforestation.

Deforestation leads directly to carbon emissions in the same manner as a coal-fired power plant or any other emissions source. Further, if forests are converted to nonforest land uses, the new land cover will absorb less carbon from the atmosphere. Even if forests are allowed to regenerate after clearing occurs, it will take decades to rebuild the carbon once stored in the original forest, and the loss of biodiversity and indigenous forest cultures is irreversible.

Terminology

Policy discussions about forest carbon principally refer to deforestation and degradation, the two processes under which forest carbon stocks can be emitted to the atmosphere. The other main components are conservation—which maintains forest carbon stocks—and afforestation, reforestation, and forest management—which can build carbon stocks by removing CO_2 from the atmosphere. The international community is actively working to develop policy mechanisms that will incorporate tropical forests into a post-2012 climate regime. The current terminology in that process uses the phrase ***reduced emissions from deforestation and forest degradation*** or ***REDD***. Negotiations are under way regarding whether REDD will include other forest sector and land-use activities such as those mentioned above. When not referring specifically to the international negotiations, we will use the broader terms ***international forest carbon*** and ***forest carbon*** in this brief.

on the coverage of the policy. These studies suggest leakage can be quite large if left unaddressed.[7] Thus where possible, policies should be designed to address leakage, by expanding policy coverage so there are fewer places to leak to, adjusting projects or programs for leakage by discounting, or replacing the supply of commodities at a level comparable to those eliminated elsewhere on the landscape. Expanding policy coverage is the most effective of these approaches and is being considered in U.S. and international policy proposals. These proposals trend toward requiring national accounting of forest emissions which will account for all subnational leakage. Projects or programs that occur before national accounting is in place can use discounting. The number of credits generated can be discounted based on the expected leakage from a particular program (e.g., if a program reduced 100 tons of CO_2, but expected leakage was 20%, it would be credited for only 80 tons of CO_2).[8] Alternatively, if the forest-based emission reductions are not being used to offset fossil fuel emissions elsewhere and non-market-based financing is used for early stage projects, it may be best to ignore leakage to ease the development of a fully effective program over time, especially when the total emissions under consideration are small.

Baseline/reference level

The notion of reduced emissions from deforestation and forest degradation raises the question, "reduction compared to what?" The term baseline refers to a level of emissions that would occur in the absence of a forest carbon policy and is used as a reference case for quantifying mitigation performance. Baselines are used to assess how a particular project or policy enhances emission reductions.[9] Baselines, or reference levels, can also be used at the national level for national-level accountability. How baselines are set affects how much compensation is received and is thus a critical issue for projects and for countries. When considering national

Box 4.1. Setting national-level baselines.

While there has been significant experience with project-level baselines for forest based activities, approaches for national-level baselines or reference-levels for reduced deforestation and associated emissions are a relatively new part of policy discussions. Ideally, national reference levels will reflect real risks to forests and thus provide incentives for countries with high deforestation rates to reduce these rates and for those with low deforestation rates to maintain or conserve existing forest carbon. If baselines do not reflect the real risks of deforestation, countries will either not be sufficiently compensated to avoid real risks, or they will obtain credits for carbon stocks not in danger of deforestation. This is known as "hot air"—it occurs when baselines are set too high and carbon credits are awarded to a country or entity without a corresponding reduction in emissions.

Table 4.1. Alternative approaches for setting national emission reference levels for forest carbon.[10]

Approach	Advantages	Concerns
1. Historical reference period – for example, emissions from deforestation from 1995–2005[11]	Transparent, simple	Historic rates may not predict future rates well
2. Projected business-as-usual (BAU) – models likely emissions from deforestation based on historic rates, development trends, and likely demand for timber and agriculture	May be better aligned with future risks and rates of forest emissions; can be more inclusive of low-deforestation countries that will be at risk of greater loss and leakage from other countries	Requires more data; more subjective; not well-tested; high-deforestation countries will prefer an approach based only on historic rates
3. Add credit for forest stock – values standing forest stock, like a rental payment, in addition to emission reductions[12]	Inclusive of low-deforestation countries	Can result in hot air if value for standing forest does not reflect risk of deforestation or degradation
4. Adjust credit for forest stock – values standing forest stock by shifting financing from payments for emission reductions in other countries[13]	Inclusive of low-deforestation countries; reduces risk of "hot air" by reducing compensation to high-deforestation countries to balance compensation to low-deforestation countries (approach #2 above would have a similar outcome)	High-deforestation countries will prefer an approach based on historic rates alone giving them a greater share of compensation
5. Tie to global average deforestation – if below global average, country receives extra credit for remaining below[14]	Transparent, simple, inclusive of low-deforestation countries	Will likely result in some hot air
6. Adjust for national circumstances – negotiated baselines that ratchet down; low-deforestation countries can have inflated baselines that are credited through a fund rather than the market[15]	Inclusive of low-deforestation countries; reduces risk of hot air by compensating low-risk countries outside the market	
7. Favor least developed countries – greater credits to least developed countries (LDCs) to increase their participation	Addresses equity issues	Will result in hot air; may be politically difficult as other countries will have less to gain

Box 4.2. Impact of non-additional projects under national accounting.

Suppose Country X has 20 projects and each is expected to reduce 100 tons of emissions, but only 10 of the projects are additional. The country expected to see 2,000 tons of reduction, but only finds 1,000 when it reconciles its national account. Therefore it will end up paying projects half of what they expected or paying them the full amount and having to take the difference out of the national budget or some type of reserve it created to address such risks.

targets, baselines will impact overall environmental effectiveness, cost efficiency, political viability, country participation, and the distribution of funding among countries. Baselines need to balance achieving real reductions with incentives for broad participation so that leakage is low and significant global reductions in deforestation result.

When establishing national-level baselines, it is important to consider that if a historical rate of deforestation is the primary basis for compensation, those countries with the highest deforestation rates can reduce emissions most, and thus profit most. In contrast, countries with significant forest remaining but lower current rates of deforestation may not have sufficient incentives to reduce forest loss. If historic baselines are used, these highly forested countries may not participate unless they are compensated for potential future deforestation and sequestration activities. And if they don't participate, they could become a haven for leakage. A variety of approaches for setting baselines are under discussion, and many of them address this special challenge posed by countries with low historic rates of deforestation (see Box 4.1).

Ultimately, reference levels will be a political decision negotiated between countries. Given that two countries, Brazil and Indonesia, are by far the greatest sources of forest emissions, they will likely hold significant leverage in negotiations. Historic rates and knowledge about the drivers of deforestation and their impact on deforestation rates will help inform the

Table 4.2. Options for addressing permanence in terrestrial carbon management.

Option	Effectiveness	Efficiency	Equity
1. Temporary crediting – credits valid for limited period; need to be recertified for additional time periods; if carbon lost it must be replaced	**LOW** Startup option for small overall carbon volumes and isolated activities	**LOW** Complex accounting, high transaction costs and low-value credits result in minimal use (has been a problem for forestry in the CDM[19])	**LOW** High transaction costs benefit large projects
2. Ton-year accounting – assumes a limited residence time of CO_2 in the atmosphere; after set period (e.g.,100 yrs), carbon is permanently removed	**LOW** Low upfront pay and low net present value (which depends on discount rate); limited incentives	**LOW** Leads to heavy discounts in credits, which causes cash flow problems	**LOW** High financing costs exclude poorer participants
3. Project credit buffers – a share of credits sold, rest held in escrow for predetermined period	**MEDIUM** Effectiveness depends on project credibility and maintenance of buffer	**LOW** High unaccounted share of credits, late cash-flow	**HIGH** Easy and transparent implementation
4. Risk pooling – a portion of credits from projects are set aside and pooled (from several projects up to a whole country) to create a risk buffer	**MEDIUM–HIGH** Effective instrument, depending on pool's size and distribution	**MEDIUM–HIGH** Smaller relative buffer size per project because sharing risk	**MEDIUM** Organizational capacities required; risk of free-riding, but fairly equitable
5. Commercial insurance – a third party holds the pooled credits and manages replacement; hedged by financial instruments and reinsurers	**HIGH** Outsourced liability, instrument for mature markets; low hurdles if commercial companies willing to take on these risks which is still not certain	**MEDIUM–HIGH** Low transaction costs through outsourced risk assessment and management; will require some regulation/oversight	**MEDIUM** May be equitable if socially desirable 'bad risks' are subsidized
6. Shared liability – a partnership between buyer and seller countries where buyer takes on some of liability in return for preferential access to credits; motivates buyers to invest in good governance and management	**HIGH** Will give additional incentives to support readiness and capacity building, thus preparing the ground for effective REDD	**HIGH** Will make REDD insurable, as country risk is minimized	**HIGH** Depending on the motivation of Annex I parties involved, may contribute to fostering investment in high-risk countries

Source: Based on figure in Dutschke and Angelsen 2008.

setting of reference levels. Trends in deforestation rates and how they change as countries develop may also help predict risks (see Figure 5.1 in Chapter 5 of full report). A number of approaches for setting national emission reference levels are described in Table 4.1. Many of them may be used in combination.

Additionality

If credits from forest carbon projects and programs are used by developed countries to meet their compliance targets, it is essential that emission reductions generated by the forest projects be additional—that is, they would not have occurred without the new forest carbon financing. For reduced emissions from deforestation, additionality requires a forest area would have been lost if not for the new carbon-oriented project or program. As a result, local trends in deforestation and assessments of drivers of deforestation (e.g., a planned road or logging concession) are often used to establish additionality for projects. National-level accounting helps address additionality, since reductions are only credited if they are below a national reference emissions level. If non-additional projects are occurring the national system will not be fully efficient and it will cost more to achieve the expected emissions reductions at a national level (see Box 4.2).

Non-permanence/reversal risk

Since carbon stored in saved forests or by improved management can later be lost through intentional acts (logging) or unintentional events (drought, pests), the mitigation achieved may not be permanent. Non-permanence is not only a feature of land-use-based activities but also applies to fossil fuels (coal not burned today may be burned tomorrow). While it is prudent to try to reduce reversals and account for non-permanence, it is also important to recognize that forest carbon can provide substantial short-term benefits even if storage of the carbon is not ensured forever. First, maintaining forest carbon may be the only way to produce large emissions reduction rapidly to buy time for technological development in other sectors. Second, some activities initiated by forest carbon finance may result in permanent reductions. Reducing deforestation will require investments in new governance institutions and forestry management systems that once in place could result in long-term and permanent reductions in deforestation rates.[16] For example, improved road and infrastructure planning that avoids opening new forest areas could have long-lasting benefits for forest conservation in these areas.

Policies can encourage management that minimizes the risks of reversal. For example the risks of deforestation in a new protected area may be reduced by engaging and addressing the needs of nearby communities.[17] For participation in a compliance market, forest programs and projects can address risks of non-permanence by using one or a combination of the approaches described in Table 4.2. Accounting for reversals requires that someone be liable for losses, paying for or replacing carbon that was released after being credited as a reduced emission. There are a number of viable alternatives, so concerns about permanence need not be a barrier to forest carbon.

Financing: What needs funding and how could it be funded?

Recent international climate agreements (e.g., UNFCCC Bali Action Plan) suggest that developed nations should finance developing nations' efforts to reduce emissions from deforestation and forest degradation. Both groups have much to gain from this arrangement. If it works well, the developed nations have lower costs for achieving mitigation targets, and the developing nations receive a substantial new source of revenue for sustainable development. Financing is needed for (1) upfront capacity building; (2) management, monitoring, and transaction costs; and (3) compensating for forgone profits of alternative land use, i.e., opportunity costs (see Table 4.3).

Financing could come through traditional overseas development assistant approaches such as investments in the World Bank or multilateral negotiations. This funding has always been limited in quantity and may not be sustained over the long term. Given past experience, this approach to and level of funding seems unlikely on its own to result in a significant decline in forest loss. Financing can also be generated in a binding commitment tied to a cap-and-trade proposal either through some fee or fine associated with trading, or by allocating some portion of allowances to a forest fund. The committee-passed version of the Waxman-Markey bill sets aside 5% of allowances to fund capacity building and supplemental reductions associated with efforts to reduce deforestation in developing countries.[20] This could provide sustained and substantial funding ($US billions per year). But there are lingering concerns that any allocation of U.S. emissions allowances is politically vulnerable given that this is a zero-sum game (there are a finite number of allowances available) and the funding could just as easily go to other activities depending on political priorities. Thus, it is possible that the set-aside for forest protection activities will

Box 4.3. A characterization of the phases for implementing forest carbon policy and programs.[24]

Phase 1. Development of a national forest carbon strategy which includes national dialogue, strengthening of institutions, and demonstration activities mostly funded by voluntary contributions through such mechanisms as the World Bank's Forest Carbon Partnership Facility (FCPF),[25] UN REDD,[26] and other bilateral arrangements.

Phase 2. Implementing policies and measures proposed in the national strategies using sustained funding from a global facility supported by binding financial commitments from developed countries. These binding commitments may be tied to allowance allocations from a national cap-and-trade policy. Developing country use of these funds would be based on demonstrated commitment and continued performance assessed using indicators of emission reductions.

Phase 3. Paying for performance on the basis of forest emission reductions relative to an agreed-upon national reference level. Financing can come through global compliance markets tied to national cap-and-trade policies or through other compliance-linked mechanisms.

Countries would move through these phases at different speeds.

be cut or diminished as the U.S. legislation works its way through the political process. At the same time, however, a powerful coalition of U.S. businesses and NGOs have mobilized in support of these provisions.[21]

Financing for forest protection activities could also be linked directly to compliance under a cap-and-trade program if avoided forest emissions are recognized as eligible offsets for use by regulated entities. The Waxman-Markey bill contains robust provisions along these lines (see Chapter 2 in full report). The quantity of financing available through an offsets market will be tied to the level of greenhouse gas commitments set by the developed country (the U.S. in our case). While this could generate substantial revenues ($US tens of billions per year; the same magnitude of funding needed to see large-scale reductions in deforestation[22]), it also increases the demand for high-quality forest credits given that the integrity of the compliance system (and the overall effect on the atmosphere) would be negatively impacted if low-quality credits were allowed into the system. Of course, an offsets mechanism is a politically popular approach with capped sectors since it provides additional compliance options and lowers the overall cost of achieving mitigation targets.

Consensus is growing that a climate policy approach to international forest carbon should be implemented through a phased approach.[23] This might align with shifting sources of financing over time—from voluntary development assistance, to binding financial commitments, to compliance-linked markets or funds (see Box 4.3).

U.S. leadership on climate commitments and forest carbon is likely to be critical for broad international acceptance and sufficient global funding. A number of developed countries are currently funding capacity-building and demonstration activities in developing countries, and some are considering setting aside a small proportion of annual emissions allowance auction proceeds, but none except the U.S. have yet indicated a willingness to allow forest carbon credits to trade (like allowances) in their national emissions

Table 4.3. Financing needs for an international forest carbon policy.

	Capacity building	Management	Opportunity costs
Description	Train personnel and build institutional, governance and systems infrastructure necessary to develop and manage a forest carbon program; Develop carbon stock and flux estimates.	Recurrent costs for new national land management, monitoring, and enforcement programs; Initial contract design or certification to set up qualified program or project	Compensation for the forgone profits of an alternative use of land.
Examples	Monitoring network; new national land-use plan and infrastructure plans; initial forest carbon inventory and establishment of baseline deforestation rate; government agency or body to oversee programs;	Annual forest inventories; tracking compliance (registry); salaries for additional program managers and enforcement officers	Profits from logging and agricultural production (e.g., oil palm, soybean, beef)
Documented examples	Set up monitoring system in India and Brazil (US$0.5–2 million) Set up forest inventory for 25 nations (US$50 million) Land tenure reform for one country (US$4–20 million based on estimates from Rwanda, Ghana, and Solomon Islands) Capacity building for 40 nations over 5 years (US$4 billion)	Forest inventories for 25 countries (US$7–17 million per year)	Forgone profits for reducing deforestation by half over 30 years for 8 countries (US$7 billion annually)

Source: Adapted from Dutschke and Angelsen 2008.[18]

markets in the near term (see Chapter 2 in full report).[27] Launching an international forest carbon program heightens the need for capacity building because the scale of the undertaking and the potential outcome are so much greater. U.S. government agencies have historically been involved in capacity building for sustainable forest management and could engage actively in this new effort. The U.S. is well positioned to expand its leadership by enhancing existing programs.

Scope: Should policies focus only on avoiding emissions?

Initially, the UNFCCC REDD proposals focused only on reduction of emissions from deforestation and degradation.[28] Subsequent agreements (the Bali Action Plan[29]), however, encouraged broadening the framework to include enhancing sequestration (afforestation, reforestation, and forest management) and maintaining carbon stocks (preservation of low-risk forests). Expanding policy to include these other activities would greatly broaden mitigation opportunities and potential participation. The U.S. and a few other countries have raised the idea of broadening the framework even more, to cover all land-use change (e.g., conversion of shrublands, grasslands, wetlands, and management of agriculture).[30] Expanding scope may expand political support by bringing in the interests of additional countries. It can increase total mitigation by bringing in new activities, which also helps to reduce leakage. Including all land-use change can help balance the greenhouse gas tradeoffs of competing demands for land such as agriculture and biofuel production. On the other hand, it adds complexity. For example, measurement may be more difficult and less transparent, and baselines for various land uses would have to be integrated or complimentary. It also raises concerns that native vegetation landscapes lower in carbon but higher in other environmental service value (e.g., clean water, abundant wildlife) may be replaced with high-density, fast-growing tree plantations with high carbon sequestration potential but lower value in other aspects.

Given the undeniable complexities expanding scope brings, there is a strong preference among critical players like the internationally influential Coalition of Rainforest Nations[31] to focus first on deforestation and degradation. They would prefer that a UNFCCC-based REDD mechanism and a U.S. forest carbon policy focus on reduced emissions from forests alone and that separate mechanisms be used for sequestration and other land uses. Given the urgency to slow tropical forest loss and associated emissions, and the greater confidence in measurement and monitoring of deforestation, it makes sense to start with forests. But because of the significant potential benefits of an inclusive policy, it is important to leave the door open to other land uses in the future.

The U.S. was the first industrialized country to ratify the UN Framework Convention on Climate Change and gained experience conducting full land-use accounting of greenhouse gases as part of its national accounting and reporting requirements.[32] During negotiations, the U.S. has consistently supported maximum use of forestry and land-use measures as part of global climate change policy. The committee passed Waxman-Markey bill has a program focused on reduced emissions from deforestation, and appears to leave the inclusion of other land uses over time up to the development of international programs through the UNFCCC or other agreements.[33]

Scale: How do national, subnational, and project-scale activities fit together?

A successful forest carbon policy should promote a range of actions in tropical forest countries—from changes in national and regional policies (e.g., clarification of property rights; agricultural subsidies; logging concessions; infrastructure planning; enforcement of logging laws) to development of place-specific projects (e.g., improved or new protected areas). This will likely be achieved through a variety of institutions and buyer-seller arrangements, some exclusive country-to-country transactions and others that actively involve the private market.[34] How institutional arrangements are structured will largely be up to the tropical forest nations who decide to participate. As indicated below, private transactions (projects) are structured by investors with government consent.

A centralized national-level forest carbon mechanism would entail payments to national governments or a nationally designated authority for the successful reduction of emissions from land use. National governments would receive credits and credit revenues, likely keeping revenue for lands held by the government, and, ideally, distributing the rest appropriately to states, regions, municipalities, communities or individual landowners based on how effectively these areas control emissions from deforestation. At this time many investors and donors may be reluctant to invest directly in tropical forest governments given concerns about governance and related risks for their investments. The introduction of an official intermediary—a sanctioned, nationally designated authority with sufficient governance and transparency in place or an

Box 4.4. A brief description of the basic components of a market-based financing structure and some of the key issues to resolve.

Commodity definition: To ensure fungibility with the broader carbon market, the traded commodity should be greenhouse gas emission reduction units, denominated in metric tons (t) of CO_2 equivalent at a given point in time.

Buyers: Buyers will be capped entities in countries with emission reduction commitments and perhaps entities not subject to a cap who decide to offset emissions voluntarily. The Kyoto Protocol provides the most extensive international driver of mandatory greenhouse gas reduction demands and allows international trading of emissions to meet commitments. The United States currently has a voluntary approach to greenhouse gas reductions, but now seems more likely to adopt a mandatory program, which would greatly expand the emissions market if it is based on a cap-and-trade system, as most of the current proposals are.

Sellers: International forest carbon compensation would be received at the national level or at a subnational level but with national-level accounting. Countries must decide how to achieve national reductions using the mix of policies deemed most appropriate to national circumstances (internal compensation schemes, enforcement of laws, integrating in subnational privately brokered projects, etc.). As intermediary, the national government could verify the reductions and provide performance guarantees to the international market.

Market-clearing platform: Some means will be necessary to bring buyers and sellers together at an agreed-upon price. Right now the European Union's Emissions Trading Scheme (EU ETS) performs this market-clearing function for mandatory UNFCCC commitments of the EU countries. Currently, the UNFCCC is considering a registry for Nationally Appropriate Mitigation Actions, and depending on negotiations, this could serve as such a market-clearing platform for REDD credits. Ideally, these platforms can link with other countries and other emission sources and offset institutions. It could at least, in principle, be extended to markets for voluntary reductions from unregulated sources (e.g., the Chicago Climate Exchange in the U.S.). But whether or how these markets and others that develop will link together and whether the new markets will also be buyers of forest carbon credits is uncertain at this time.

Oversight: Some international body must be responsible for ensuring the integrity of the trades and enforcing the legal framework that connects them to the regulatory or voluntary frameworks driving the market.

The emerging global carbon market has created the impetus for financial innovations to make these markets work more efficiently, such as electronic trading, brokering, derivatives, and other financial instruments. As trading volumes increase, this can bring down transaction costs and ensure that more of the value goes to sellers and buyers.

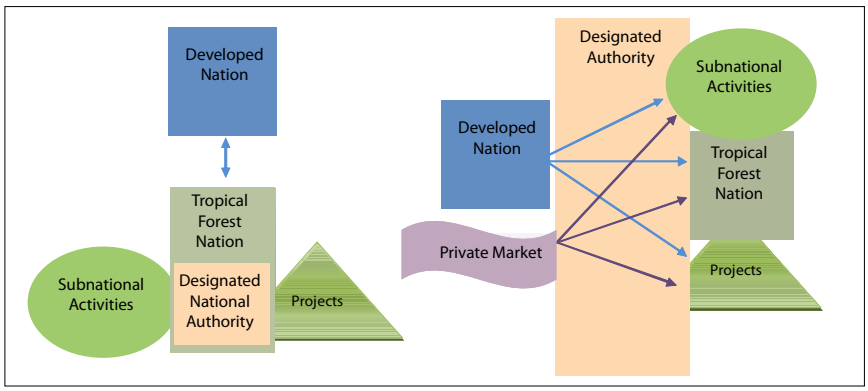
—Edited excerpt from Olander and Murray 2007[35]

international body—that can link donor/buyer governments or private investors to national, subnational, or local projects may address some of the uncertainties and risks leading to more investment (see Figure 4.1).

This designated authority can play a number of different roles. It can (1) measure and monitor emissions from deforestation at a national level, (2) accredit project verifiers, (3) reconcile national and project accounts against a national baseline or reference emissions level, (4) oversee risk management mechanisms such as risk buffers, and/or (5) oversee various standards and safeguards for local participation, fair compensation, and biodiversity protection that are required by the seller nation, the buyer nations, or any international agreements.

National-level accounting for carbon emissions will likely be required for forest carbon crediting tied to a compliance market because it addresses concerns about within-country leakage; any shifting of emissions from one location to another within a country is counted. National accounting also addresses additionality of projects within countries. However, from a project standpoint a national accounting framework can create additional risks. Even if a project is successful and achieves its goals, payments are contingent on future reconciliation with a national baseline and

Figure 4.1. Possible institutional arrangements for forest carbon transactions.



thus could be undermined by leakage or inconsistent performance of other projects and land uses outside of projects that occur across a country. Countries may need to establish risk management mechanisms, like setting aside credits in a buffer to help address these concerns.

Any successful approach to create forest carbon credits at scale will require (1) agreed-upon rules for monitoring, measurement, accounting, and verification; (2) agreed-upon reference levels (baselines for determining performance); (3) a system for ensuring that payment flows to the proper parties; and (4) institutions at the national and international level for tracking and supervising the process.

Equity, co-benefits, and safeguards: How do we maximize benefits and avoid harm?

Conflict with local and community land tenure, restricted access to forest resources, and unfair distribution of carbon revenues have all been identified as possible outcomes if forest carbon programs are poorly designed. Other concerns include the displacement of native forests with plantations of nonnative species and negative impacts on water and other natural resources upon which people depend. International agreements may have little ability to influence how sovereign nations deal with these issues. While incorporating guidance or safeguards in international agreements may be worth pursuing, another, perhaps more immediate tool exists. Developed countries that are donating financing or allowing tropical forest carbon into their compliance markets could develop their own requirements or standards. In the voluntary market the Climate Community and Biodiversity (CCB) standards[36] address issues for local communities and biodiversity. The recently introduced Waxman-Markey bill in the U.S., has detailed requirements for local participation and the use of native species. If countries that dominate demand for forest carbon (the U.S., Canada, Japan) all had similar requirements, these requirements would likely become the global market standard. One concern about this approach is that the standards could be so strict as to make certifying forest credits too expensive,[37] potentially reducing the use of forest carbon as a tool to reduce emissions. To date, the CCB standards have been applied to most existing pilot and voluntary carbon market projects. At the moment this approach appears advantageous in helping to identify projects with lower risks or recognizing attributes for which there is additional value or willingness to pay.[38]

Conclusion

If the U.S. moves first in creating a market for international forest carbon, it may influence how other developed nations create forest carbon programs and how an international program develops. U.S. policymakers may want to include enough flexibility to link to the international agreements as they develop. An effective international forest carbon policy must account for different tropical forest country circumstances and consider the roles that both nation-to-nation transactions and the private market can play, while building a structure that can generate forest carbon in which we have sufficient confidence to integrate it into a compliance market.

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The authors acknowledge the support of the David & Lucile Packard Foundation and the helpful comments of Dan Zarin at Packard. We also appreciate the review comments of Evan Notman, Lou Verchot, Christine Johnson, Phil Ovitt, and Brian Murray, as well as the assistance of Paul Brantley of the Nicholas Institute. This policy brief is part of a series of briefs based on the report *International Forest Carbon and the Climate Change Challenge: Issues and Options*. The full report and other briefs are posted on the Nicholas Institute website at http://www.nicholas.duke.edu/institute.