A Nested Approach to REDD+

Structuring effective and transparent incentive mechanisms for REDD+ implementation at multiple scales

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Executive Summary

- In order for REDD+ to be successful, incentives will need to reach the actors responsible for addressing the drivers of deforestation and for shifting land use to a more sustainable and low-carbon model. These actors span multiple scales, from international commodity buyers to national governments to sub-national governments to indigenous peoples and forest-dependent communities to individual landowners/users.

- Devising effective and transparent carbon accounting systems and incentive mechanisms that motivate both national and sub-national actors will be critical to successfully implementing REDD+.

- A nested approach to REDD+ is one way to structure such a system. Under a nested approach the national government could set up a national accounting framework and establish a nation-wide monitoring system. The national government could implement certain policy reforms that would lead to verifiable emission reductions and therefore earn incentives from an international system (or a bilateral arrangement). Meanwhile, implementation of REDD+ activities could also occur at the sub-national level led by local/regional governments, communities, NGOs, or private developers. These activities would account for emission reductions at the sub-national level and earn incentives directly from the international (or bilateral) system based on those reductions. Under the approach proposed in this paper, the sub-national accounting would need to be "trued-up" to the national level (i.e. all credits issued in any given year are based on the performance of the nation as a whole relative to its reference emission level).

- A nested approach to REDD+ has the potential to address many of the drawbacks of pure national or pure sub-national approaches by accounting for in-country leakage, engaging national governments, and taking advantage of certain economies of scale, while also motivating sub-national actors to participate in REDD+ and attracting greater private investment. A nested approach may also provide for a more transparent distribution of the benefits from REDD+ since local actors could own and transact credits directly rather than relying on a national system of benefit-sharing. However, a nested approach will likely require more complex carbon accounting methodologies, clearly defined systems for sharing risk between actors, and defined institutional arrangements for managing the flow of incentives.

- Nested carbon accounting should include the following elements: a clear national reference emission level, defined sub-national reference regions (non-overlapping areas that cover the entire land mass of the country designated based on common drivers of deforestation and political jurisdictions), and, in some cases, nested projects whose reference emission levels add up to the reference region and hence the national reference emission level.

- Under the nested approach we propose in this paper, there is a risk that sub-national actors may not receive compensation for successful activities in the event that the country as a whole fails to perform. This risk will need to be minimized in order to promote sub-national participation and private investment. This paper outlines several options for risk management among actors,

including insurance products, a global self-insurance fund, performance reserve accounts, or contracts between parties for replacement of REDD+ credits.

- These options could be combined to meet the needs of particular country circumstances. The set of options chosen could lead to a greater assumption of risk by the national government, an even distribution of risk between actors, or a greater assumption of risk by sub-national actors. Several plausible arrangements exist, and the set of options chosen will greatly influence the level of sub-national involvement and private investment.

- Given the potential advantages of a nested approach to REDD+, an international agreement on REDD+ and domestic legislation in the U.S. and other developed countries should allow developing countries the option to pursue a nested approach to REDD+ backed by adequate risk management strategies. Developing country governments should consider a nested approach to REDD+ when devising their national REDD+ strategies.

Introduction

There is now broad recognition of the need for tropical forests to make a significant contribution to national and global greenhouse gas emissions reduction goals over the next two decades. Deforestation and forest degradation release approximately 15% of global greenhouse gas emissions annually. Substantial emissions reductions from the forest sector are therefore critical to meeting the scientifically-based goal of limiting temperature increases to 2°C. Reducing emissions from deforestation and forest degradation and enhancing removals of greenhouse gases by forests ("REDD+") was included as an important element in the Copenhagen Accord, with which more than 100 countries have associated. REDD+ has broad support within the UNFCCC negotiations, and was included in both the U.S. climate legislation that passed the House of Representatives in June of 2009 and the draft Senate legislation introduced in May of 2010.

In order to maximize the mitigation benefit of the world's tropical forests, innovative and effective incentive mechanisms are needed to change the economic model on the ground to make preserving standing forests a rational economic choice for governments, landowners, local communities, and the private sector. Without that basic, yet profound, paradigm shift, REDD+ efforts will not likely achieve success at a meaningful scale. This effort will require significant and sustained investment deployed across multiple jurisdictions throughout the world in a highly efficient manner. The challenge is daunting, but success would mean avoiding the release of nearly 5.8 billion tons of carbon dioxide annually and achieving a lower-cost means to comply with domestic greenhouse gas reduction targets, while protecting the resources that millions of people depend upon for survival, creating new sources of income and livelihoods for local communities, conserving the world's storehouses of biodiversity, and protecting valuable ecosystem services such as water quality and quantity.

How to best structure a mechanism to achieve these goals is the topic of vigorous debate in both international and U.S. domestic policy processes. This paper is based on the premise of a mechanism in which REDD+ credits – for tons of emissions avoided or carbon sequestered – would derive monetary value from an international and/or bilateral system that recognizes such credits. Such a system might be created by international treaty or through domestic legislation in an industrialized country that establishes a market for fungible carbon assets.[3] This paper focuses on one important aspect of the design of the mechanism: the scale at which incentives (credits and/or funding) are granted.

In order for REDD+ to be successful, incentives will need to reach the actors responsible for addressing the drivers of deforestation and for shifting land use to a more sustainable and low-carbon model. These actors span multiple scales, from international commodity buyers to national governments to sub-national governments to indigenous peoples and forest-dependent communities and individual landowners/users. Successful implementation of REDD+ will require motivating all of these actors. Yet to

[3] In the latter case, the market for a REDD+ credit may be somewhat more limited to the extent the credit represents a unit of compliance under only one country's laws. However, a domestic market could ultimately be linked to an international market in order to avoid this result.

Definition of Terms

National Scale: Incentives (credits and/or funding) flow to the national government based on performance against a national reference level.

Sub-national Scale: Incentives flow to a sub-national governmental entity (e.g. a state, municipality, province, or district) based on performance against a sub-national reference level.

Project Scale: Incentives flow directly to project developers based on performance against a project baseline. A project will not necessarily coincide with a governmental jurisdiction.

Nested Approach: Incentives can flow directly to sub-national entities and/or project developers as well as to national governments based on a dual accounting system that has been "trued up" at the national level.

date, much of the focus of policy discussions on REDD+ has been on national governments in developing countries.

While national governments have a critical role to play in the implementation of REDD+, other actors such as sub-national governments, indigenous peoples and communities, landowners/users, and investors also have a key role to play. In federal systems, sub-national governments (such as municipalities, states, districts, or provinces) may traditionally hold a great deal of power and may have the authority to make land-use decisions within their jurisdictions. Additionally, in many cases, communities and individual land users often have *de facto* control over land use even though they may not have legal land tenure. Much of the actual implementation of REDD+ activities can therefore be expected to take place at the sub-national level. Sub-national actors will thus be likely to seek some ownership over the carbon rights within their jurisdictions and/or seek to ensure that they are fairly compensated by the national government for their success in reducing emissions or enhancing removals. Therefore, devising effective and transparent carbon accounting systems and incentive mechanisms that motivate both national and sub-national actors will be critical to successfully implementing REDD+.

In addition to the need to motivate participation of sub-national and local actors, channeling incentives directly to sub-national actors is critical to generating private investment in REDD+, an important source of revenue. Investing directly in sub-national activities is perceived as more attractive for most private investors because it affords greater control over the outcomes than investing in national government initiatives. However, the political context in international negotiations and within many donor countries is heading toward a long-term mechanism with incentives based on purely national accounting frameworks. National accounting frameworks are seen as necessary over the long-term to ensure sufficient scale and reliability of REDD+ climate benefits, to motivate necessary large-scale policy reform, and to take advantage of economies of scale. Given this context, REDD+ approaches that function within national accounting frameworks, but also promote private investment are needed.

A "nested approach" to REDD+ has been proposed[4] as an option for balancing these needs and creating incentives for action at multiple scales. Under a nested approach, the national government would set up a national accounting framework and establish a nation-wide monitoring system. The national government could implement certain policy reforms that would lead to verifiable emission reductions and therefore earn incentives from an international system (or a bilateral arrangement). Meanwhile, implementation of REDD+ activities would also occur at the sub-national level led by local/regional governments, communities, NGOs, or private developers. These activities would account for emission reductions at the sub-national level and earn incentives directly from the international (or bilateral) system based on those reductions. Under the approach proposed in this paper, the sub-national accounting would need to be "trued-up" to the national level accounting and no credits would be issued in any year unless the nation as a whole has achieved emission reductions relative to its reference emission level. Basing the flow of international incentives on national-level accounting is necessary over the long-term to ensure the environmental integrity of the mechanism. However, this creates a risk that sub-national actors may not receive compensation for successful activities in the event that the country as a whole fails to perform. This risk will need to be minimized in order to promote sub-national participation and attract private investment.

A nested approach to REDD+ has the potential to address many of the drawbacks of pure national or pure sub-national approaches by accounting for in-country leakage, engaging national governments, and taking advantage of certain economies of scale, while also motivating sub-national actors to participate in REDD+ and attracting greater private investment. A nested approach may also provide for a more transparent distribution of the benefits from REDD+ since local actors could own and transact credits directly rather than relying on a national system of benefit-sharing. However, a nested approach will likely require more complex carbon accounting methodologies, clearly defined systems for sharing risk between actors, and defined institutional arrangements for managing the flow of incentives. Greater clarity is needed on how to structure a nested approach to REDD+ in order to deal with these complexities and take advantage of the potential opportunity nesting offers. This paper analyzes some of the options for managing these complexities in order to more fully understand the pros and cons of such approaches and how they may benefit various actors. The paper concludes with some policy recommendations for an international REDD+ agreement, U.S. legislation, and national frameworks in developing countries on the appropriate scale of REDD+ accounting and crediting.

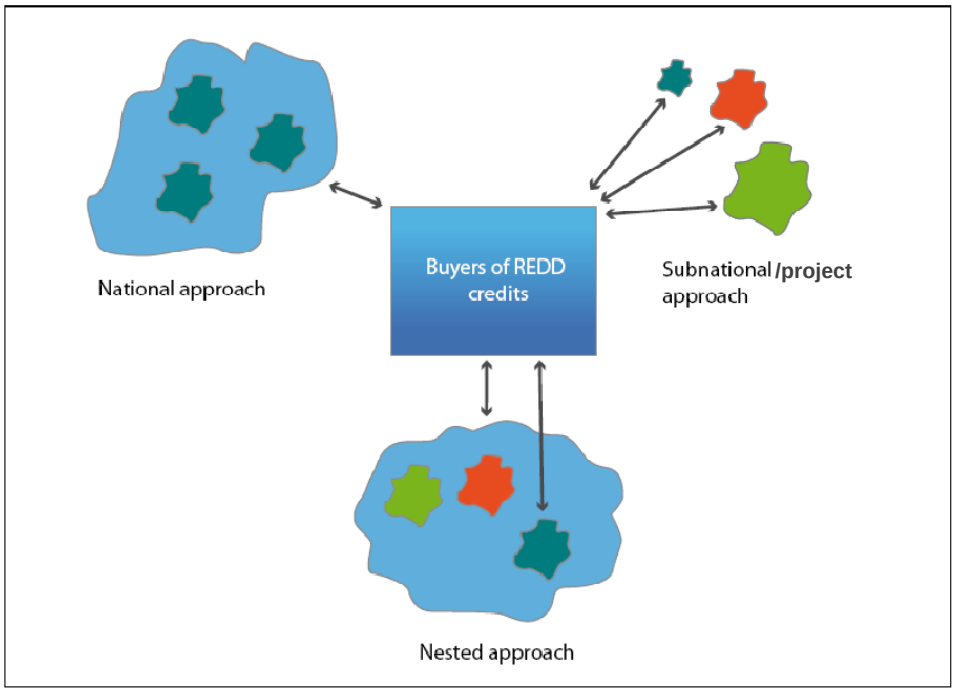
REDD+ Incentives Across Scales

The scale at which incentives are granted for REDD+ activities is one of most contentious issues in the REDD+ negotiations under the UNFCCC and in debates on pending U.S. legislation. The core question in this debate is whether national governments are the sole entities with access to international incentives (a national approach), whether sub-national activities and projects undertaken in the absence of a national accounting framework can interact directly with an international mechanism (a sub-

[4] Pedroni, L., M. Dutschke, C. Streck and M. Estrada, 2009. Creating incentives for avoiding further deforestation: the nested approach. *Climate Policy*, 9:207-220.

national/project approach[5]), or whether it would be possible for both scales to interact simultaneously with the international system (a nested approach) (see Figure 1).

Figure 1: Possible scales of crediting REDD+[6]



Those who favor allowing only national governments to receive direct REDD+ incentives assert that national level interventions for REDD+ are essential to achieving the large-scale systemic reforms across ministries within the national government that are needed to effectively reduce deforestation and forest degradation. Additionally, many are concerned that sub-national approaches face greater challenges with addressing leakage and permanence than national-level approaches.

Proponents of crediting sub-national activities see those actions as a way for countries to build capacity to eventually create national accounting frameworks, while taking near-term steps to reduce deforestation and forest degradation. Additionally, investing directly in sub-national activities is perceived as more attractive for most private investors. Finally, and perhaps most importantly, many recognize that providing direct incentives to sub-national activities will motivate greater participation by actors with direct control over land-use decisions, including sub-national governments, indigenous peoples and forest-dependent communities, and landowners/users. Such widespread involvement of stakeholders in REDD+ initiatives is essential for sustained success.

[5] While we recognize that there is a difference between "projects" and "sub-national programs" (as defined in the sidebar), we will use the term "sub-national" for ease of communication from this point forward to refer to BOTH activities undertaken at the level of a sub-national political jurisdiction AND smaller-scale projects, unless otherwise specified.

[6] Adapted from: Angelsen, A., C. Streck, L. Peskett, J. Brown, and C. Luttrell. 2008. *What is the right scale for REDD?* In: Moving Ahead with REDD: Issues, Options and Implications

Much of the debate on this issue to date has focused on whether sub-national activities can be credited in the absence of national accounting frameworks. Some countries oppose any crediting of sub-national actions in the absence of a national accounting framework while other countries support a time-limited role for crediting projects. These time-limited approaches are referred to here as "transitional approaches" and could be complementary to a long-term nested approach. Determining the role (if any) of transitional approaches is critical to finalizing an international REDD+ policy framework and we discuss this issue more in depth in Appendix 1. The focus of this paper, however, is on the scale of crediting **after** a national accounting framework has been established.

There has been very little discussion internationally about how sub-national actors will receive incentives within a national accounting framework. There are two basic ways this could be structured: a national government could choose to own and transact all credits generated from activities within the country or they could choose to devolve credit ownership to sub-national governments or project level implementers, landowners, and/or communities (i.e. take a nested approach). The choice of which approach to undertake within a given country falls under the authority of the national government to decide.[7] If the national government chooses to transact all credits, it would have the responsibility to market those credits to international buyers and distribute the funding and/or other benefits to relevant actors in a transparent and equitable manner. While some developing countries may have transparent systems for benefit sharing already in place, others lack the institutional capacity and legal safeguards to ensure that a centralized REDD+ regime would equitably allocate incentives to local actors.[8] Alternatively, the national government could choose to pursue a nested option under which sub-national actors could own REDD+ credits and be allowed to sell them directly to international buyers. A nested approach has the potential to provide for a more transparent distribution of the benefits from REDD+ since local actors could own and transact credits directly rather than relying on a national system of benefit-sharing.

A nested approach may involve greater complexity however. A carbon accounting system would be needed in which both national governments and sub-national actors would need to account for emissions reductions at various scales. A process to "true-up" the sub-national accounting with the national accounting would need to be undertaken before credits were generated. Additionally, risk management mechanisms would need to be developed in order to mitigate the risk of revenue loss by sub-national entities in the case of non-performance of the country. Finally, the legal and institutional structures needed to make a nested approach operational may be more complex than in pure national approaches. The next section explores some of these complexities in order to determine whether a nested approach could be a viable option for REDD+ in certain countries. It should be noted that even if countries choose to adopt a purely national approach to REDD+, the following sections offer useful ideas on how to credibly, transparently, and equitably distribute benefits to actors on the ground.

[7] In some cases, however, the national government may not have complete authority or control over its entire forest estate. In these cases, a nested approach may actually be essential.

[8] Costenbader, J. 2009. *Legal Frameworks for REDD: Design and Implementation at the National Level.* International Union for Conservation of Nature and Natural Resources (IUCN)

Box 1: The Role of Private Finance

Many in the international community are calling for emissions from deforestation and degradation to be cut in half by 2020. Meeting this goal would represent avoided forest destruction of 6 million hectares annually and emissions reductions of 3 billion tons CO_2 annually – a significant contribution to the estimated 17 billion tons of reductions needed annually from all sectors by 2020 to stay within the 2^{o} C goal. By all accounts there is a funding gap between the financing currently proposed for REDD+ and the actual cost of achieving these reduction goals. We estimate the annual cost of reducing deforestation emissions to meet this target to be approximately $30 billion per year.[1] Yet current public funding commitments for REDD+ fall far short of this goal. The sustained, annual financial support needed for REDD+ far exceeds traditional funding sources. ODA and other public funding mechanisms, such as the International Deforestation Reduction Program (IDRP) proposed in U.S. legislation, are critical to the ultimate success of REDD+ activities, but will be insufficient on their own to adequately prepare forest countries for deep reductions in forest sector emissions by 2020 and sustain those reductions over time. To fill this funding gap and achieve the reductions needed from the sector, substantial private investment will be necessary. The level of private investment that will flow to REDD+ will depend greatly on how the mechanism is structured.

Much of the costs associated with REDD+ programs occur in the early years of the program, while the benefits accrue over the lifetime of the program. These up-front costs include incentives to landholders to compensate for the opportunity cost of not clearing land, financing to expand and strengthen protected area systems, identification and preparation of degraded land for productive use, and capital to promote low carbon development strategies as an alternative to traditional forest-intensive industries. Significant up-front capital will be needed to undertake these activities and many expect that capital to flow through private sector investments. However, many potential private sector investors are hesitant to invest up-front capital in programs run by national governments because of concerns over controlling risks and managing the return on investment due to perceived risks of non-transparency, poor governance, corruption, and historic past performance failing to achieve forest sector preservation goals. Discrete sub-national activities are much more attractive to private investors because the financial flows are more transparent, the asset rights can be defined in clear contractual arrangements, and the investor has greater control over the outcome. Therefore, in order to maximize private sector capital flows for REDD+, it is important to optimize long-term opportunities for discrete and manageable investments.

[1] Various estimates (Meridian Institute, 2009; Boucher, 2008; European Commission, 2008; Busch et al, 2009; Eliasch, 2008) exist for the cost of reducing emissions by 50%. The range of those estimates is $12-35 billion per year. Based on experience from our demonstration activities, we believe funding on the higher range of those estimates will be needed.

The Nested Approach

There are three main areas – carbon accounting, risk management, and institutional arrangements – in which a nested approach would require methodologies or structures that are distinct from those needed in a purely national approach to REDD+. This section describes possible options in each of these areas.

Carbon Accounting

Carbon accounting methodologies for a nested approach will need to ensure that the total incentives that flow to a country are based on overall performance against a national reference level while also ensuring that incentives can flow directly to sub-national actors in a transparent and credible manner. An accounting system that sets reference levels at the country and sub-national scales and accounts for emission reductions against each scale will be needed. This section describes some of the basic steps for structuring a nested accounting framework.

1) The national government establishes a national reference emission level (REL) according to standards set in a future international agreement on REDD+ and/or in future bilateral agreements the country may enter into with investor countries.

2) The national government, together with sub-national governments and technical experts, delineates "reference regions" for accounting. These reference regions would need to be non-overlapping and would need to cover the entire land area of the country. The reference regions should be drawn to follow the boundaries of political jurisdictions such as a states/provinces or municipalities/districts in order to simplify the political and administrative aspects of nested carbon accounting. The appropriate political jurisdiction will depend upon which level has authority for making land use decisions. Additionally, reference regions should be drawn to take into account the drivers of deforestation in order to best limit inter-regional leakage. For example, a topographically rugged province that is subject to commercial logging and small-scale subsistence deforestation, but is not well-suited for intensive export crops should be delineated as a different reference region than an adjacent lowland province that is vulnerable to large-scale conversion for mechanized export crops. Likewise, areas might be delineated into separate reference regions if they are separated by a mountain range that limits movement of labor and access to infrastructure, or if they are separated by state boundaries that are subject to different legal restrictions. While reference regions should not cut across political boundaries, it may be beneficial to combine several political jurisdictions into a single reference region in order to create shared incentives to work together to combat common drivers of deforestation. By dividing the country into reference regions for accounting in this way, the majority of accounting complications caused by sub-national leakage among project and non-project areas can be avoided and/or controlled. We present two examples of reference region delineation in Figures 2 and 3.

3) Each reference region would establish an REL for that region as a whole. These RELs should be based on estimates for business-as-usual emissions using historical data and, where appropriate, employing credible models of future deforestation and degradation. The reference

regions would need to negotiate their RELs with the national government to ensure that the sum of all the reference regions' RELs add up to the national government's REL. These negotiations will likely be difficult and will involve trade-offs between regions. For example, a reference region with high levels of historic deforestation may be facing declining deforestation rates in the future (as a result of declining forest resources perhaps) and would therefore need to set its REL lower than the historic rate to accurately reflect the future business-as-usual scenario. In turn, a reference region with low past deforestation but increasing pressures could establish an REL that is higher than historic rates. These negotiations need to be coordinated at the national level given that the national government is responsible for considering the needs of all stakeholders while covering the cost of implementing both umbrella policies to facilitate a national REDD+ program as well as regionally-focused policies that may apply to some reference regions (and project areas) more than others. This negotiation process should consider both the most credible estimate for projected business-as-usual emissions from different regions, as well as issues of equity, perverse incentives, and leakage.

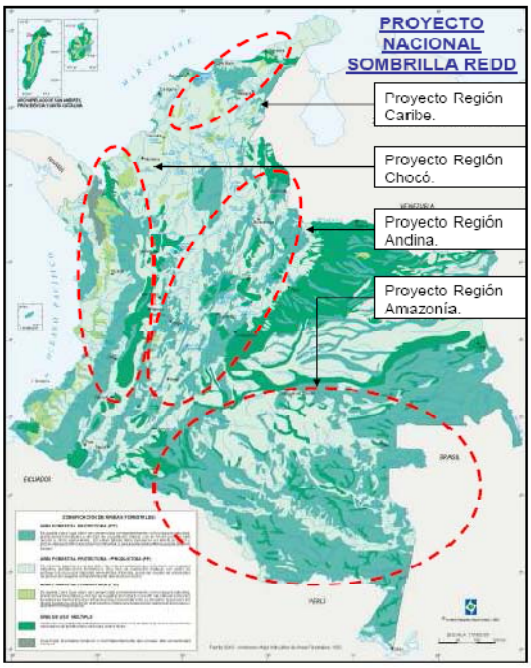
4) The reference regions, delineated based on leakage dynamics and political boundaries, serve as large-scale accounting areas that simplify the challenge of adjusting project-level accounting as a function of sub-national leakage. In many cases, implementation of activities to reduce emissions can be taken at the level of the reference region as a whole. In some cases, however, it may make more sense to make interventions to reduce emissions at smaller scales. These "projects" would be required to adopt one of these pre-determined reference regions as their accounting area (for the purposes of assessing RELs, leakage, and permanence). Project areas (where REDD+ project interventions take place) should not be overlapping unless a legally binding revenue-sharing (and/or credit sharing) agreement has been established. Within a given reference region, there should be a process for open dialogue related to projects' proposed leakage deductions, since displacement of deforestation and forest degradation is expected to primarily impact other stakeholders within that reference region, both directly and in terms of emissions reductions associated by each stakeholder group.

5) Projects should have both an *absolute* REL and a *proportional* REL verified by an independent third party and approved by the government. An *absolute* REL is measured in $MtCO_2$/yr across the project intervention area, while a *proportional* REL is the percentage of a given reference region's REL that is claimed for a project's intervention area. Proportional RELs will be used for any adjustments needed to ensure that project-level RELs true up with the national REL. Exceptions to strictly proportional RELs should be permitted where additional sources of emissions can be successfully measured at the project level. For example, if a project proponent is willing to invest in accurate, credible, and verifiable measurement of degradation emissions (e.g. due to logging) while the national government has decided to ignore degradation emissions, then degradation emissions could supplement the proportional project REL for deforestation emissions.

A "nesting protocol" or standard methodology for nesting should be established for each country that chooses to adopt a nested approach to clarify the issues raised above, and to detail one or more carbon

accounting methods that apply to projects and reference regions within a country. The protocol may need to describe more than one method for establishing RELs, monitoring change, and assessing leakage and permanence, because it may be appropriate for methods to vary depending upon scale, region, and carbon pools involved. For example, historic mean emissions may be appropriate for establishing a national REL where changes in deforestation dynamics are evened out over the nation as a whole; however, historic mean emissions may not be appropriate for establishing a project REL, especially in cases of frontier deforestation where future emissions at the project level are expected to be much higher or lower than past emissions. Nevertheless, the logic behind assignment of a given method to a given project (or reference region) should be structured and clear. The protocol will need to specify details such as (i) permissible sources of data (e.g. remote sensing data sources, field inventory methods), (ii) methods for analyzing data, (iii) minimum levels of accuracy and precision, (iv) methods for establishing RELs, as well as estimating additionality, leakage, and permanence. Validation and verification of project design documents (PDDs) as consistent with the nesting protocol will be necessary, and should be conducted by a designated administrative entity. It is important to note that, to the extent sub-national activities interact directly with an international system, there may be a second level of methodological review/verification, as discussed below.

The result of this nesting protocol is a clear national REL, defined sub-national reference regions nested within the national REL, and nested projects whose RELs add up within each reference region and hence also with the national REL. Approval of each level of accounting flows downward from the national government to the reference region, and, where appropriate, from the reference region to the projects. This nested protocol is intended to contribute to a nesting framework that is rigorous and credible while minimizing the level of administrative and accounting complexity and structuring a transparent negotiation process among stakeholders. Balancing these needs for efficiency, credibility, transparency, and equity is the fundamental challenge that countries face in nesting sub-national REDD+ activities within a national REDD+ program. We suspect that those countries capable of establishing a nesting process that balances these issues will be more successful in raising external public and private investments in REDD+ and implementing successful emissions reductions outcomes.

2a) 

2b) 

Figure 2: Identifying reference regions in Colombia

The national government of Colombia has identified four large scale REDD project areas (2a). While this is a promising first step towards a coordinated and nested national REDD initiative, the nesting of carbon accounting for these project areas within a national REL will be problematic unless non-overlapping and comprehensive reference regions are delineated and linked with project accounting. We present an example of such reference region delineation on the right (2b). Zones were delineated using multivariate statistical analysis (cluster analysis, Wards linkage) based on the following landscape variables associated with deforestation drivers and leakage dynamics: soils, slope, elevation, climate, grazing pressure, crop suitability, percent forest cover, and night lights. Thus most leakage is expected to be absorbed within reference regions. If each of the proposed project areas use the associated reference region for their carbon accounting, the nesting of accounting at the national level will be simplified. All boundaries follow sub-national political jurisdictions so that accounting and implementation can leverage existing administrative bodies.

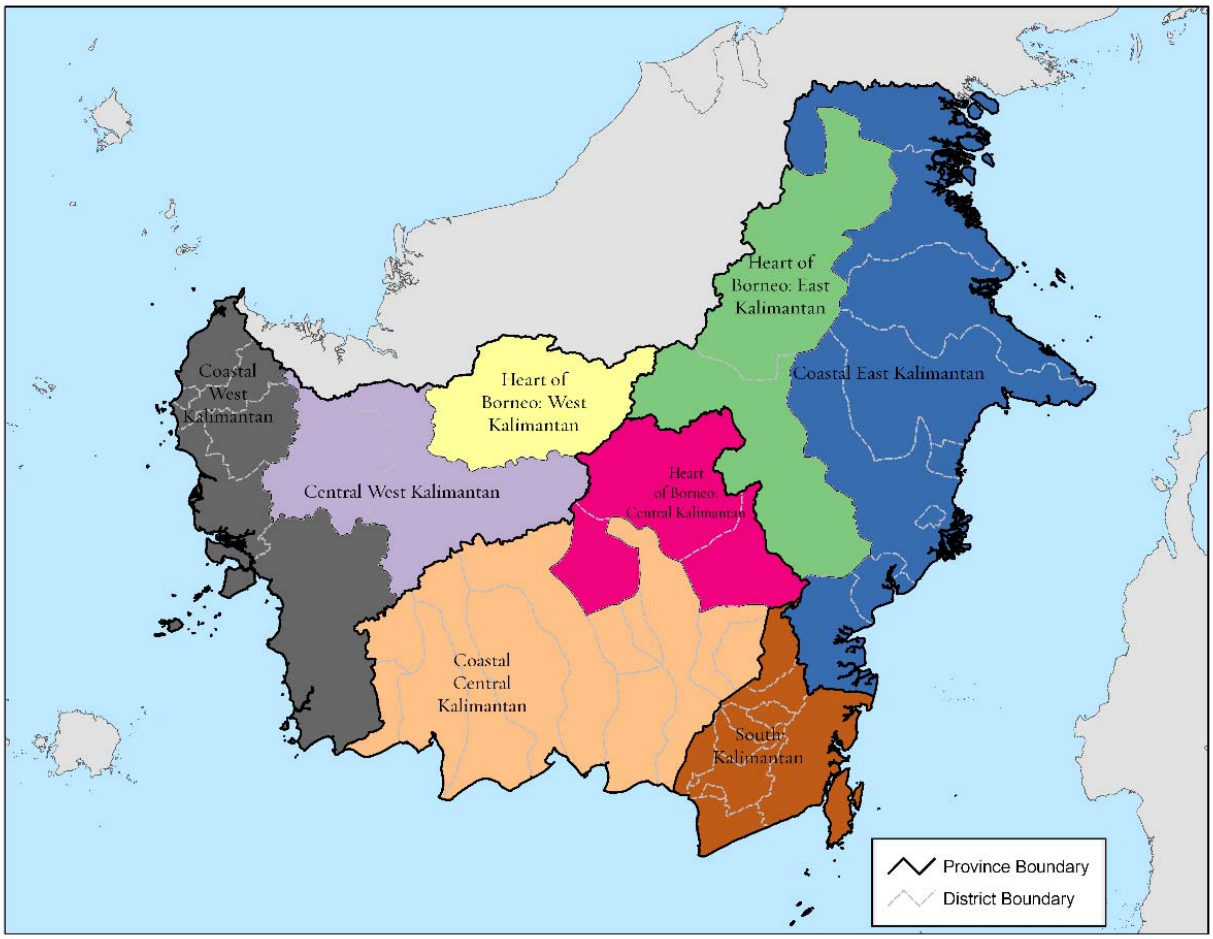


Figure 3: Identifying reference regions in Indonesian Borneo

The government of Indonesia is developing a national REDD initiative with multiple official REDD project areas, many of which are in Borneo; however, coordinated accounting for these projects has yet to be resolved. We propose here a delineation of reference regions for use in nesting project carbon accounting. The delineation employed multivariate statistics (cluster analysis, Ward's linkage) to analyze the following landscape variables associated with deforestation drivers and leakage dynamics: soils, slope, elevation, percent forest cover, climate, sawmill density, road density, distance from navigable rivers, distance from cities, night light intensity.[9] All reference region boundaries follow sub-national political boundaries, lumping similar districts within each of the four provinces of Indonesian Borneo.

[9] Note that not all variables used in this analysis are identical to those used in the analysis for Figure 2. This is due to both actual differences in relevant variables and data availability.

Box 2: Joint Implementation under the Kyoto Protocol

One example of another flexible emission reduction mechanism in which both country and project are accounted for within the same national reference level is the Joint Implementation (JI) mechanism under the Kyoto Protocol. Given the inherent structural differences between JI and REDD+, however, the applicability of the JI accounting and crediting process to a nested REDD+ program is somewhat limited.

The JI mechanism enables Annex I (developed) countries, along with private-sector investors, to develop emission reduction projects in other Annex I countries and to apply emission reduction credits from those projects, known as Emission Reduction Units (ERUs), toward their own national emission reduction targets. Rather than debiting the amount of emission allowances issued to the host country, known as Assigned Amount Units (AAUs), the JI mechanism requires the host country to convert a portion of its AAUs into ERUs and issue those credits to the JI project sponsor for project-level reductions. The project sponsor can then use those ERUs to meet its own emission target compliance requirements or market the credits to other Annex I countries.

The key difference between the JI crediting scenario and the nested REDD+ crediting scenario is that under JI, a host country issues ERUs from a pre-allotted pool of credits freely delivered to the host country by an international body whereas under a nested REDD+ program a country's credit allotment depends entirely on its verified reductions. National AAU amounts under Kyoto reflect a political decision at an earlier point in time about a country's allowed emissions during the Kyoto commitment period. Credit issuance under a nested program on the other hand reflects actual reductions achieved during a crediting period at two different levels of performance. The accounting problem posed by a nested program is therefore whether actual reductions at the national level are equal to actual reductions at the project level. JI accounting simply does not address this issue because it trades a country's allowed emissions (the result of a political decision) for actual project-level reductions.

Also, JI projects are not directly credited by an international body. Rather, the country issues credits to projects out of its pre-allotted pool of emissions. Again, this scenario differs markedly from the nested REDD+ scenario in which a country's actual allotment is contingent on verification of actual reductions. In the REDD+ context, private investors are wary of being entirely dependent on a national government where gains at the national level are uncertain and failure of a national program might make a host country government less likely to deliver credits to a successful project. Furthermore, requiring forest countries to independently issue or transfer credits to projects would unnecessarily decentralize the crediting process and impose an additional administrative burden on forest country authorities.

In short, despite outward similarities, the existing JI model is ill-suited to address key methodological issues raised by a nested REDD+ program.

Managing Risk in a Nested Approach

Under the nested approach we propose in this paper, incentives from an international (or bilateral) REDD+ regime flow to a country based on performance against a national reference emission level. If the country as a whole does not succeed in reducing emissions below the national reference emission levels, no international incentives will flow to that country or to the sub-national activities within that country. This is critical for the long-term environmental integrity of the mechanism, as well as for motivating large-scale policy reforms and taking advantage of economies of scale, but it introduces an element of risk for sub-national actors. Specifically, a question arises as to the extent to which national non-performance should negatively impact a sub-national actor's ability to receive incentives for its own performance. This section will discuss various options to address risk sharing between national governments and sub-national actors in order to better understand ways in which a system that enables broad, secure investment in forests by national and sub-national governments and private investors could be put in place.

Assuming certain countries will allow some level of sub-national implementation of REDD+ activities even after they commit to a national accounting framework, sub-national actors and investors and national governments should share risk for sustained emission reductions and work together to allocate that risk effectively. Without proper risk-sharing measures in place, investors and sub-national entities would likely not be willing to assume the unmitigated risks of country non-performance and other in-country policy risks. Similarly, national governments may not be willing to take on the risk that poor sub-national performance reduces the national level performance outcomes.

Commercial Risks for Sub-national Actors under the Nested Approach

There are various risks associated with REDD+ activities, which are summarized in Table 1. Many of those risks are not specific to REDD+ or to nested approaches to REDD+. The principle risk unique to a nested approach to REDD+ is the risk that a host country's failure to perform will negatively impact a sub-national entity's ability to receive incentives for its own performance. The risk management options laid out in this section are meant to address this specific risk. While several of the policy options developed to address other risks in the REDD+ context can also be applied to mitigate risks unique to the nested approach it is important to keep these two risk types conceptually separate.

Table 1: Types of Risk Associated with REDD+ Programs

Type of Risk
1. Delivery risk
a. Ability of program to effectively reduce emissions
b. Ability to address leakage
c. Ability to credibly measure emissions reductions
d. Ability to generate emissions reductions at or below market prices
2. Reversal risk: Ability to sustain emissions reductions over time
3. Legal risk: Ability to obtain and enforce clear legal rights to the emission reductions
4. Regulatory risk: Lack of clarity on acceptable standards and methodologies
5. Market risk: Demand and price fluctuations
6. Political/policy risk: Long-term government commitments to REDD+ policies and programs
7. **Nested risk: Host country non-performance**

Performance Scenarios

There are several scenarios for how performance or non-performance at various scales could impact various actors' level of compensation (see Table 2). For simplicity, imagine a country with one project. If both the country as a whole and the project succeed in reducing emissions below their respective reference emission levels, both will receive full credits for their actions. Similarly, if neither succeeds, neither would receive credits. If the country as a whole manages to reduce emissions below the national reference emission level, but the project fails to credibly show reductions against the project reference emission level, the country would receive its due credits while the project would receive none. These are all fairly straightforward scenarios. The complicated scenarios are ones in which either (1) the project succeeds in credibly reducing its emissions (while accounting for leakage), but the country as a whole does not reduce emissions against the national reference emission level; or (2) a national-level program credibly reduces emissions, but a non-performing project keeps emissions in the country as a whole above the national reference emission level. In either case, no credits would flow to the country from the international system. Since both the project and the country depend on each other's performance, sub-national incentives are contingent on country-level performance and vice-versa. Tools for distributing nested performance risk among actors are therefore needed. Some such tools are detailed in the following sections.

Table 2: Performance Scenarios

	Sub-national/Project-Level Performance	Sub-national/Project-Level Non-Performance
Country-Level Performance	REDD+ Authority[10] issues credits to country equal to extent of performance. REDD+ Authority issues credits to project equal to extent of performance based on an up-front agreement.	REDD+ Authority issues credits to country equal to extent of performance. Project receives no credits. Compensation to country for margin of sub-national non-performance is based on one or more of the risk arrangements described below based on an up-front agreement.
Country-Level Non-Performance	No new credits issued to project or country. Compensation to project is based on one or more of the risk arrangements described below based on an up-front agreement.	No credits issued.

Risk Management Options

There are a variety of risk mitigation tools, described below, that may be utilized individually or in combination to manage risk to various actors in a nested approach to REDD+. In all cases, the goal of these tools is to provide sub-national governments and project investors with enough confidence to make long-term investments in REDD+ and to make national governments receptive to that investment. A scaled REDD+ solution will ultimately require a greater level of cooperation between public and private actors than has been achieved to date. This new model of private-public partnership should draw on a full arsenal of risk mitigation tools that is broad and comprehensive, but also tailored and flexible to meet the needs of individual REDD+ countries and private actors.

Sub-National Actors Assume Risk of National Non-Performance

The most straightforward way to manage risk under a nested approach would be to require the sub-national actors to take on all the risk associated with national under-performance. This may be possible in countries with a track record of good performance. However, in the early stages of REDD+, and for most countries, this option is unlikely to be attractive for public and private developers and investors.

[10] The role of the REDD+ authority is detailed in the following section

Insurance

Insurance products are another risk management tool that could be applied to REDD+. Insurance products could be developed to offer tailored solutions to mitigate specific risks of non-performance. For example, a sub-national actor could purchase a specific insurance policy against the risk of future regulatory change at the national level, or a policy to mitigate the risk of the national government's failure to meet certain contractual obligations. This type of insurance package for forestry activities is still being developed. However, once a REDD+ mechanism is established in some form, commercial insurance products for REDD+ activities could begin to multiply. As noted below, insurance could complement the performance reserve account or the provision of replacement credits options.

Insurance products have already been developed to share risks between investors and national governments in other contexts. For instance, the Multilateral Investment Guarantee Agency (MIGA), a part of the World Bank Group, offers risk assistance and insurance products for project investors in developing countries.[11] There are several ways in which a guarantee product like those offered through MIGA might benefit REDD+ developers in forest countries. First, MIGA offers coverage for sovereign breach of contract and non-honoring of sovereign obligations that might compensate developers in case of sustained non-performance at the national level. MIGA would also offer coverage for government expropriation of rights in the sub-national investment, as well as coverage in case of war, terrorism, and civil disturbance. MIGA leverages the World Bank's relationships with stakeholder governments in order to help avoid and resolve dispute in the first instance. In this way, the organization provides some of the institutional support that has been cited as crucial to long-term sustainability of sub-national activities (see African IPP case study below).

MIGA products would require some degree of contractual specificity between national governments and sub-national entities concerning liability for overall performance, but MIGA's Standard Guarantee program likely already covers REDD+ investments in many important forest countries.[12] It would also be possible to develop new MIGA products more tailored to the specific risks inherent to investment in a REDD+ project. Provided acceptance of liability in the event of country non-performance is clear, a MIGA product might be developed to provide monetary compensation to a sub-national activity for reductions when the sub-national activity is performing and the country is not or vice versa.

Another insurance product that could be useful in the context of REDD+ is the Partial Risk Guarantees provided to countries that are eligible for loans from the World Bank's International Bank for

[11] MIGA recently guaranteed an equity investment of more than $150 million by Spanish infrastructure development firms and a shareholder loan from a Spanish bank to build in a new toll road in Costa Rica. MIGA is providing 15-year coverage for the equity against the risk of transfer restriction. The debt will be covered for up to 18 years against the risks of transfer restriction, expropriation, war and civil disturbance, and breach of contract. Individuals associated with the project cite MIGA's participation in negotiations between the government, the concessionaire, and the local councils as crucial to the achievement of the country's first public-private partnership project.

[12] Creed, A., Havemann, T. 2009. *A System to Deliver Terrestrial Carbon Mitigation (REDD+ to AFOLU).* This report by Terrestrial Carbon Group also identifies GuarantCo, a European private-public financial institution, as a potential guarantor of REDD+ investments, but notes that GuarantCo coverage would need to be scaled up to adequately address REDD+ risks.

Reconstruction and Development (IBRD). Partial risk guarantees (PRGs) cover private lenders against the risk of a public entity failing to perform its obligations with respect to a private project. They ensure payment in the case of default resulting from the non-performance of contractual obligations undertaken by governments or their agencies in private-sector projects. PRGs are structured to provide minimum coverage necessary to mobilize private financing and employ various financing structures such as a letter of credit, privatization guarantees, and local currency guarantees.

PRGs can cover a range of risks relating to government non-performance which are relevant to REDD+, including: changes in law; failure to meet contractual payment obligations; obstruction of an arbitration process; expropriation and nationalization; non-payment of a termination amount or an arbitration award following a covered default; and failure to issue licenses, approvals, and consents in a timely manner.

Insurance policies are not yet widespread, so premiums may be high, making it less desirable for a national government to enter into an insurance policy for REDD+ non-performance. In addition, there may be some concern regarding moral hazard relating to national governments that hold an insurance policy as a primary risk mitigation option. In other words, national governments may have less incentive to perform if an insurance policy will cover any non-performance. The existing insurance products that employ deductibles and other penalties to deal with this issue may make such policies less attractive to national governments as a cost effective tool.

Project developers, investors and sub-national governments would likely be favor of an insurance approach, but only when combined with other mitigation options discussed in this paper. The scale of the risk across the sector would be very significant if insurance was the primary risk mitigation tool and not supplemental to other policy design parameters. This could call into question the credit risk of even the largest underwriters.

Performance Reserve Account

Another option to mitigate nested performance risks is the creation of a performance reserve account. Under this option, a portion of credits issued to the country or sub-national actor during times of performance would be retained in a reserve account and could not be traded or retired. Each time a sub-national activity or a country as a whole achieved reductions and earned credits, a certain percentage of those credits would go directly into the performance reserve account. The performance reserve account would be composed of credits that have been verified and represent real emission reductions. The percentage of credits that must be retained in the performance reserve account would likely be determined by a country's domestic REDD+ policy or regulations.

In the event of sub-national performance and country non-performance, credits from the country's performance reserve account would be automatically issued to the sub-national entity by the REDD+ authority. The amount of credits issued to the sub-national activity would be equal to (or a proportion of) the amount of credits earned by the sub-national activity that would have been credited if the country had performed. The proportion of credits that would be guaranteed to a sub-national activity could be determined with the country's domestic REDD+ policy. The performing sub-national activity

would therefore be less impacted by the fact the country did not perform and thus did not receive any credits for that particular year.

In the event of national-level performance and sub-national non-performance, credits from the sub-national activity's performance reserve account would be automatically issued to the national entity by the REDD+ authority. The amount of credits issued to the national entity would equal to the margin of the project non-performance.

The sub-national actors do carry some risk with this option. It is possible that the country's performance reserve account could be depleted in the event of significant and sustained non-performance. If the performance reserve account was depleted, then neither the country nor the sub-national entity would be assured full (or even partial) credits for its performance. This scenario becomes more likely if the country or sub-national activity does not perform in the early years of the program before it can build up sufficient credits in its performance reserve account or if a country or sub-national activity has sustained non-performance over many years. This risk can be alleviated by building up the performance reserve account during a transition phase (before national accounting frameworks are in place), as described in Appendix I. The sub-national activities that are credited during the transition would allocate a certain portion of credits to the performance reserve account for use under the future nested regime.[13] Those early-mover projects could then be granted special drawing rights from the reserve account once it is in use under a nested framework.

It should be noted that the performance reserve account is a temporary risk management tool (comparable to a debt service reserve account in project finance). It can address shortfalls in particular years, but cannot address longer term non-performance issues as a significant and sustained failure of performance could potentially deplete the reserve account in a matter of a few years. However, this temporary protection can provide valuable time to get back on track with longer term REDD+ plans.

There are several alternatives that may be implemented to safeguard against a depleted performance reserve account. First, the country and the sub-national actors could periodically revisit the percentage of credits retained in the performance reserve account to ensure it remains protective against the risk of non-performance at both scales. If the country or sub-national activity was experiencing sustained non-performance after re-negotiation, however, it would not result in additional performance reserve account credits because the country or sub-national actor would not be earning any credits at all. Alternatively, the performance reserve account option could be combined with insurance that would provide credits in the event the performance reserve account became depleted.

Sub-national actors would likely be in favor of the performance reserve account option. This option (especially when combined with insurance) provides a greater degree of certainty regarding the provision of credits to performing sub-national activities. Successful sub-national actors will be less negatively impacted by the fact a country may not be able to meet its reference level, which is largely outside of the control of project developers, investors and sub-national governments. National

[13] The authors of this paper credit this concept to in-person discussions with Lucio Pedroni on April 6, 2010 in Washington DC.

governments may also be in favor of this approach because it would likely attract private investors and sub-national participation within the country while providing a degree of comfort that the country would be made whole if its non-performance is due largely to non-performing projects.

This option is the only one analyzed that would involve the intervention of an international body. The international body would issue credits as necessary from the country's or sub-national activity's performance reserve account (refer to the next section for more discussion on this mechanic). Appendix 2 provides a scenario analysis of various sizes of performance reserve accounts and draws some key conclusions about structuring such accounts.

A disadvantage of the performance reserve account is that both the country and the sub-national activity would be receiving fewer credits for performance. A percentage of eligible credits would be withheld in the reserve account and thus unable to be sold to generate revenue.

Provision of Replacement REDD+ Credits

Another option is for a non-performing country or sub-national actor to procure replacement REDD+ credits from other countries or sub-national activities to cover any in-country reductions nullified by its failure to perform. Sub-national activities that are successful and performing would receive credits from the country in an amount that is equal to (or a proportion of) their level of performance. National activities might also receive credits from a project equal to the marginal impact of a project's non-performance on the country's overall reduction. This measure could be negotiated between the country and the sub-national actor on a case-by-case basis.

As a practical matter, it may be difficult to gain the endorsement of countries or sub-national actors for such direct financial accountability for national-level non-performance, especially during the early years of the REDD+ program. If credits are in short supply and thus are trading at high prices, this may be an expensive requirement, depending on the amount of credits needed to be purchased. Insurance may be an option to lessen the upfront costs to the country, but the insurance market related to REDD+ remains under-developed at this time. In addition, international negotiations are focusing on incentive-based options and the replacement of credits may be viewed more as a penalty.

Sub-national actors may be in favor of this option to the extent it would provide credits equal to (or a proportion of) their respective performance. For example, if a sub-national actor performs and the country does not, the country could provide replacement credits through the exercise of call options entered into with third party emission credit providers. This measure comes with its own risks, of course, which include supply and price risks, especially if the country does not effectively hedge its contingent liability to supply credits and is forced to procure them on the spot market at then current market prices. In addition, given the express contractual nature of this risk mitigation tool, the recurring theme of a concern over the enforceability of contracts against a sovereign is noteworthy here.

National Government Guarantees of Payment for Performance

Another way to manage risk is for the national government to take on all or most of the risk associated with national under-performance. This option may be feasible if the national government sees a large advantage in doing so for motivating sub-national implementation and attracting private investment. In

such an arrangement, the national government would guarantee that sub-national actors would be fully (or partially) compensated for their performance even in the event of national under-performance. Various mechanisms could be used to accomplish this. For example, national governments could enter into emissions reductions purchase agreements with sub-national developers, similar to Power Purchase Agreements in the power sector. Under these agreements, the government would agree to purchase all or a portion of the emission reductions from successful sub-national activities, in the event that the international system does not issue credits to that country due to non-performance. Alternatively, governments could guarantee to supply developers with credits in the event of national non-performance, possibly using one of the risk mitigation options described above to ensure they could compensate successful nested activities in the absence of international crediting.

Sub-national actors and investors would likely find this option to be favorable in that it provides a further guarantee that the sub-national activity will receive compensation so long as it performs. There remains a significant risk in enforcing such guarantee against a country in the event the country did not honor its guarantee. This risk would be mitigated to the extent the country backed the guarantee with an escrow fund, credit set aside, or insurance, which would be directly accessible by the sub-national entity under a pre-determined set of circumstances. Partial risk guarantees (such as those offered by the World Bank and described in greater detail below) could also be used to mitigate the risk of national governments not making good on their commitments.

This option would also be less administratively burdensome than other options like a performance reserve account, which would require more accounting. This option would not involve an international body in the guarantee of compensation to a performing sub-national activity because that body would only issue credits in the event of a performing country and would not issue any credits to non-performing countries.

The likelihood of a national government's support for this option would depend on its level of interest in attracting private investment and providing incentives for sub-national actors. In addition to providing an incentive for nested activities in the country, this option would also allow the national government to maintain flexibility in funding successful nested activities in the event of national non-performance. A country might also only guarantee a sub-national activity's performance up to a point, or only guarantee early sub-national activities.

Box 2: CASE STUDY: Independent Power Projects in Africa[1]

In the early 1990s, several African countries began to augment state-run power generation systems with independent power projects (IPPs), often operated by foreign firms using a mixture of private and public investment. This "unbundling" of national power systems was in large part due to a lack of sufficient funding at the national level, as well as the poor operational track record of state-owned utilities. Projects were ensured a market for their power through the execution of long-term power purchase agreements (PPAs) with state-owned utilities, with contract terms averaging around 20 years. These contracts were generally demanded by equity providers for the projects at the outset as a prerequisite to investment.

Several illustrations from the experience of the African IPPs are instructive in the context of REDD+ projects. First, the establishment of an independent regulator within the host country to manage the power sector, as well as the interface between private and public power sources greatly reduced the need for changes to IPP PPAs in some cases, providing a more stable and consistent return on IPP investment. Second, where IPPs were not effectively built into national power plans, failures and power shortages resulted, in some cases leading to multi-year arbitration proceedings to unwind the relationship between the country and the project. Third, the level of involvement of development finance institutions, such as the World Bank, proved to be a critical characteristic of the long-term sustainability of an IPP. Development institutions generally helped to maintain PPA terms against host country pressures to renegotiate in light of changed circumstances, e.g. a devaluation of Egyptian currency or a series of droughts in Kenya.

Drawing on these illustrations, the formation of independent regulator to manage the forestry sector within the host country might be seen as an important part of a national REDD+ policy, if not a prerequisite for REDD+ participation. The role of the World Bank and other development institutions in preparing forest countries for REDD+ participation and mediating between project sponsors and countries also cannot be understated. The World Bank's Forest Carbon Partnership Facility (FCPF), in particular, might build on its early experiences with capacity-building in forest countries to act as a facilitator between private investors and host countries. Although countries may be less likely to enter into traditional security agreements with forest projects—given that, unlike IPPs, REDD+ projects are not dependent on the host country for a market— alternative assurances of country-level support for project-level activities should be obtained. The use of MIGA insurance products for REDD+ in particular in this context would enable nested activities to leverage the World Bank's relationships with stakeholder governments in order to help avoid and resolve dispute in the first instance. Countries and projects should also establish, by contract, modes of dispute resolution, as well as *force majeure* definitions and liabilities.

[1] Katherine Nawaal Gratwick and Anton Eberhard, An Analysis of Independent Power Projects in Africa, Development Policy Review, 2008, 26 (3): 309-338.

Global Fund

Finally, another option would be to use a portion of a levy placed on sub-national activities and/or national-scale activities to fund a global facility to protect sub-national actors against country-level non-performance and vice versa. The levy would be pooled into a global facility which could be used to purchase REDD+ credits to cover non-performance or compensate for non-performance through other means (e.g. insurance).

National governments and sub-national actors may favor this approach because both are essentially providing some self-insurance. Pooling the insurance globally also shares risks much more broadly. Spreading the risk this broadly could introduce a moral hazard, however, which could lead to greater underperformance. This would need to be mitigated through penalties or deductibles.

Sub-national actors may disfavor the global fund approach to the extent it places a certain portion of the risk of country non-performance on the sub-national activities. As such, sub-national participation and investment may not occur in countries that rely solely on a global fund to address the risk of country non-performance. In addition, the facilitation of a global fund would likely require more significant coordination effort by the REDD+ Authority in comparison to other risk mitigation options.

This section has presented a variety of options for mitigating the risks associated with a nested approach to REDD+. Table 3 evaluates the risk management options from the perspective of various actors.

Table 3: Evaluation of Risk Management Options

Risk Management Option	**International System**	**National Government**	**Sub-national Actors**
Sub-national actors assume all risk on national non-performance	**Pros:** Limited administrative burden **Cons:** May deter any action at all in high-risk countries	**Pros:** Assumes no risk **Cons:** May deter private investment and sub-national involvement	**Pros:** May not be required to insure country against project risks **Cons:** Risks of non-payment are high
National government guarantee payment to sub-national actors for performance	**Pros:** Limited administrative burden **Cons:** May deter any action in countries not willing to take on this risk	**Pros:** Encourages private investment and sub-national involvement **Cons:** High risk of having to cover performing projects	**Pros:** Sub-national actors take on a low level of risk **Cons:** Difficult to enforce the guarantee
Performance reserve account	**Pros:** Transparent and organized system for addressing potential conflicts for REDD+ actors at multiple scales **Cons:** Requires involvement of an international body	**Pros:** May attract greater private investment and sub-national participation **Cons:** Country receives fewer credits up front for its performance	**Pros:** Good level of certainty regarding provision of incentives to performing activities **Cons:** Project receives fewer credits up front for its performance

Provision of replacement REDD+ credits	**Pros:** Positive feedback for market by creating additional demand for credits **Cons:** More variables, e.g. market volatility and credit availability, could increase risk of conflict among actors	**Pros:** Receive full credits for performance **Cons:** Potentially high financial burden; risk that sufficient credits are not available	**Pros:** Receive full credits for performance **Cons:** Payments may be delayed; difficult to enforce; where project also required to provide credits for non-performance could be high financial burden.
Insurance	**Pros:** Limited administrative burden **Cons:** Creates a moral hazard for national governments	**Pros:** Successful examples exist **Cons:** Insurance products not yet widespread for REDD+; Potential for high premiums esp. in early years	**Pros:** Externalizes guarantee of performance outside of national government, to the extent premium is prepaid or maintained **Cons:** Country may pass through costs via levies or other administrative fees to cover premium /deductibles and project may also be required to procure insurance
Global fund	**Pros:** Pooled fund limits potential for depletion and mitigates risk of conflict between actors **Cons:** Needs significant coordination	**Pros:** Risk shared broadly **Cons:** More difficult to require sub-national guarantees of performance	**Pros:** May not need to guarantee sub-national performance **Cons:** Risk shared broadly

Plausible Risk Management Arrangements

The set of options chosen by any given country will greatly impact the level of sub-national involvement and private investment in that country. Specific types of risk mitigation structures could be established as part of a bilateral or multilateral agreement and be augmented by national legislation and/or agreements between governments and sub-national actors where necessary. For example, for particularly large or risky sub-national activities, investors might request that a country backstop default risk mitigation mechanisms with additional assurances for the activity sponsors. National governments seeking to attract a lot of private investment may be willing to assume a greater level of risk than governments relying more heavily on public funding. Allowing for each government to structure its own approach to managing nesting risk will help create a competitive environment for promoting sub-national participation and attracting private investment. Additionally, private investors may compete within this context to take on more risk.

Though there may be several plausible combinations of the risk management options that will work within distinct country circumstances, we have highlighted three promising options below. These

options differ in the level of risk taken on by different actors and certain arrangements will thus work better for different country circumstances.

National Government Purchase Agreement with a Partial Risk Guarantee

Under the first arrangement, a national government could enter into a emissions reduction purchase agreement (ERPA) with a sub-national entity. Under such an agreement, the national government would provide a guarantee to the sub-national entity that it would receive compensation for any successful emissions reductions regardless of the performance of the country as a whole. This option can be strengthened by combining it with a partial risk guarantee from the IBRD, to cover the risk that the national government does not follow through with its contractual obligations, which would provide greater assurance to the sub-national actor.

Performance Reserve Account combined with an Insurance Policy

A second plausible arrangement is the creation of a performance reserve account combined with an insurance policy. The insurance policy would be tailored to cover specific risks, such as a change of law or a breacj of contract. The performance reserve account would be created through witholding a certain portion of credits from both national and sub-national actors (thereby sharing the risk) and the insurance policy covered through premiums paid by the national government. Under this arrangement the national government takes on some of the risk of depleting the reserve account through an insurance premium, but the sub-national actor would still also face some risk that national government would significantly underperform over an extended period of time to the point of depleting the reserve account.

Global Fund

The third option we would like to highlight is the creation of a global fund established through premiums paid by both national and sub-national actors. This global insurance pool shares the risk relatively evenly between different types actors and shares risk over a broader pool of actors than the national performance reserve. This broadly shared risk has advantages, but could create a moral hazard for governments that would need to be managed through penalties or deductibles. The global insurance pool could be strengthened if it were backed by an entity such as the Global Environment Facility.

Structuring a Nested REDD+ Program

The nested approach to REDD+ can be structured around the concept of direct crediting at the national and sub-national levels based on distinct, but interdependent scales of performance. In order to illustrate this approach, it is helpful to consider how one unit of value in the system—a REDD+ credit, equivalent to one metric ton of avoided (or sequestered) GHG emissions—would be created, verified, issued, and eventually surrendered for compliance or retired at both the national and sub-national scales of REDD+ activity. The REDD+ credit itself derives its monetary value from an international and/or bilateral system that recognizes it, and only according to the terms of that system. Such a system might

be created by international treaty, or through domestic legislation in an industrialized country that maintains or intends to establish a market for fungible carbon assets.[14]

Primary authority for overseeing a REDD+ mechanism could be delegated to an administrative entity, similar to the CDM Executive Board in the treaty context, or, in the case of a bilateral REDD+ program, a national Environmental Protection Agency (in either case this entity is referred to here as the REDD+ Authority or RA). The RA acts as the administrator and international crediting body for the program. The RA also facilitates the entry of both national- and sub-national-level REDD+ activities into the program. This stage in the creation of a REDD+ credit can be broadly referred to as "program entry."

Program entry at the national level would involve a forest country's satisfaction of certain eligibility criteria, including environmental and social safeguards. For example, current U.S. climate legislation (ACES) requires showing that a forest country has capacity to monitor, measure and report forest carbon fluxes; maintains strong forest governance mechanisms to equitably distribute REDD+ resources for local actions; and has developed a land use or forest sector strategic plan that assesses national and local drivers of deforestation and identifies reforms to national policies needed to address them.[15] International or bilateral/multilateral safeguards related to the full and effective participation of indigenous peoples and forest-dependent communities as well as their right to free, prior, and informed consent related to activities that affect them should be included within eligibility criteria. Additionally, safeguards related to protecting natural forests and the biodiversity and ecosystem services that they provide should also be included. Finally, the forest country would have to demonstrate formulation of a credible national REL. Evaluation of a country's satisfaction of this criteria may take place through the RA itself, the RA in consultation with other

Box 3: Assumptions

The structure described in this section assumes the following:

- The environmental integrity of a nested REDD+ program will be addressed in the country and international agreements establishing the program.
- Permanence risks will be addressed through the use of buffer reserves whereby a portion of a country's and sub-national activity's credits are withheld in a buffer account.
- Leakage will be addressed through the use of reference regions and leakage assessments performed before credits are issued.
- Appropriate environmental and social safeguards will be in place and assessed prior to program entry (i.e. before a country or project is approved).
- An independent auditor will be used to validate and verify the generation of the credits at the national and sub-national level in order to ensure environmental

[14] In the latter case, the market for a REDD+ credit may be somewhat more limited to the extent the credit represents a unit of compliance under only one country's laws. However, a domestic market could ultimately be linked to an international market in order to avoid this result.
[15] American Clean Energy and Security Act (ACES) § 743(d)(2).

agencies and organizations, or the RA with the assistance of a third party operational auditor (OA). The operational auditor is similar to project auditors that currently validate projects for the voluntary market. The use of a third-party operational auditor may be a requirement of a treaty or bilateral agreement, or may be an optional step that a host country government could choose to undertake to lend additional transparency and credibility to its program.

Program entry at the sub-national level would involve "validation" of the proposed sub-national REDD+ activities. In a sense, a nested project-level activity has a dual validation process: it must be approved both by the host forest country and the RA. The initial step in the project validation process would involve submission of a Project Design Document (PDD). A PDD would be reviewed by both the host country government as part of the in-country validation process, as well as the RA, and possibly the OA, during the donor/buyer country approval process. In-country validation would involve consideration of the various "nesting standards" described in the Carbon Accounting section and agreement between the host country and the sub-national proponents as to how those standards should be applied to the proposed sub-national activity.[16]

The Operational Auditor's validation of the sub-national activity would consist in large part of an assessment of the PDD and ultimate recommendation concerning the viability of the project activity. The RA might also require evidence of the host forest country's approval of the sub-national activity in the form of a letter of approval or a signed agreement between the host country and sub-national activity sponsors.

Figure 4: Program Entry

From the dates of RA approval, REDD+ performance at both the national and sub-national level in a forest country would be monitored (by satellite and/or other technology or procedures as required by the program) to determine the extent of any land-use change that might occur. REDD+ rules developed by the RA would stipulate that any reductions in the rate of land-use change within a country or sub-national area must be "verified" within a certain period after RA approval (5 years is the period stipulated under the Voluntary Carbon Standard (VCS)). This stage in the creation of a REDD+ credit can be broadly referred to as "monitoring and verification."

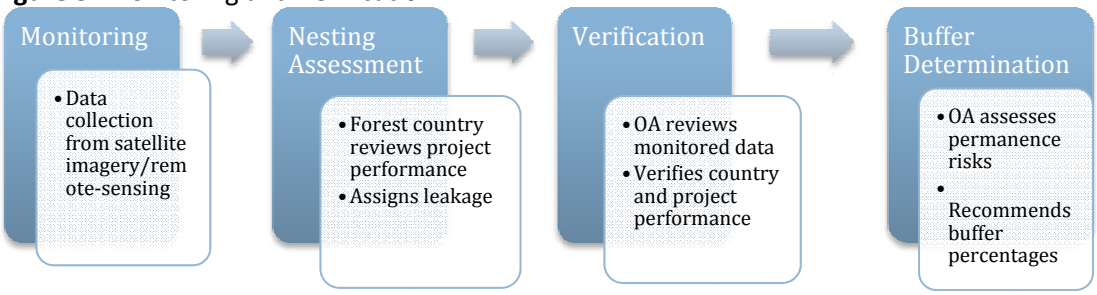
Verification of REDD+ reductions would be a two-step process in a nested system. First, nested REDD+ activities would submit a report to a national government entity in the forest country detailing reductions in observed rates of deforestation against a project/sub-national REL. Based on this information, a forest country can determine the number of gross REDD+ credits that the sub-national activity ostensibly generated and the proportionality of that reduction to the country's national

[16] The process described in this section contemplates REDD+ activities occurring at both the national and sub-national levels and occurring *after* a host country has a national reference emission level and accounting system in place. We note in Appendix 1 the vital role of sub-national level activities during the period prior to when a country has such systems in place.

reduction portfolio. The forest country would also assess leakage from nested activities through the use of reference regions and assign an amount in metric tons for any leakage attributable to the sub-national activity.[17]

Next, the forest country and the nested activity would be required to submit independent reports to an OA for verification.[18] An OA would verify the information contained in the country- and sub-national-level reports through an assessment of monitored land use changes during the verification period and report its findings to the RA.

Figure 5: Monitoring and Verification



As part of the verification process, an OA might also be tasked with reviewing permanence risks associated with both national and sub-national-level activities. This review would result in a recommendation to the RA as to the percentage of credits that should be withheld from issuance to the country and sub-national activity respectively and placed into permanence buffer reserves.

The RA would then analyze the reports submitted by the OA reflecting the reductions achieved at the national and sub-national level, as well as the recommended permanence buffer percentages for both scales of performance. The RA must also take into account any risk mitigation measures agreed to as between the country and the nested activity and incorporate those into the final credit totals for the verification period.[19]

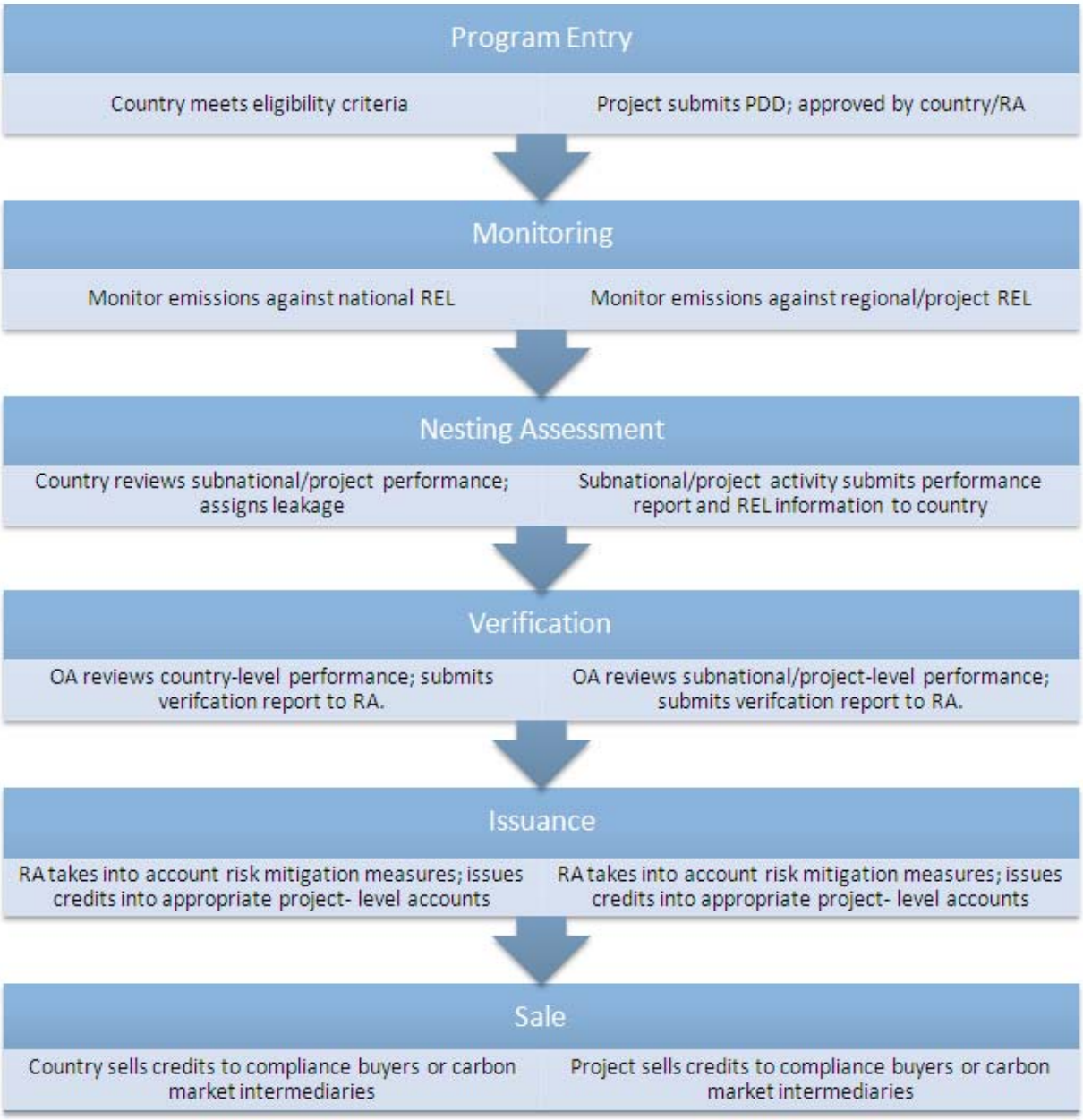
Once the RA determines the appropriate credit totals for the verification period, it would issue credits separately and directly to both the country and the sub-national activity. The RA would "issue" a REDD+ credit by creating the credit in the account of the credited party on a REDD+ registry. A registry is a data platform that can be used to organize credits into different accounts so that market participants can

[17] The extent to which a nested activity would be bound by a country's determination of its leakage factor would need to be determined. While a country might have jurisdiction over this determination in the first instance, the determination might also be made subject to review by an OA and perhaps administrative challenge by the project before the RA or a dispute resolution body connected with the RA. In any case, subnational/project proponents must have some level of certainty up front as to the range of a potential leakage assessment by the host country.
[18] In general, the relationship and division of authority between entities within and independent of a forest country will need to be carefully considered. The need to respect a forest country's sovereignty must be balanced with the need to ensure environmental integrity and uniform application of REDD+ program rules.
[19] This could also be done just between the host country government and sub-national actor. The level of involvement and extent of authority of the RA will ultimately be determined in multilateral or bilateral agreements.

receive, track and manage emission units from a centralized location. Both the forest country and the sub-national entity would maintain accounts on the registry, as well as sub-accounts for buffers. Importantly, a country or sub-national proponent would only have access to credits issued into their main account. The RA would control all credits issued into buffer sub-accounts and would be responsible for cancelling or transferring credits from the reserves into a main account as necessary.

Once credits are issued into a main account, the country or the sub-national proponents would be free to sell those credits to compliance buyers in capped, industrialized countries as offsets for the buyer's annual emissions; to compensate early investors for sub-national- or country-level funding; or to otherwise sell or dispose of the credits as they saw fit. An example of how this system would operate in a hypothetical country is provided in Appendix 3.

Figure 6: Summary of the Nested REDD+ Process



Recommendations

The debate on the scale at which incentives are granted needs to be resolved in the international negotiations on REDD+, within domestic legislation in the U.S. and other developed countries, and by national governments in developing countries. Policymakers will need to decide whether the incentives generated through the financial architecture of an international or domestic agreement will flow directly to national governments or sub-national entities within developing countries, or a combination of both. National governments in tropical forest nations will need to decide whether they will own and transact the credits generated by all activities within their countries or whether they will devolve some of that ownership to sub-national governments, individual landowners, and/or project-level actors and allow them direct access to international markets.[20] As we discuss in this paper, we believe that flexibility in the scale of REDD+ crediting embodied within a nested approach could help get REDD+ off the ground and is important for generating the level of finance needed to sustain the mechanism over time.

This paper has highlighted some ways to structure a nested approach to REDD+ in order to ensure credible carbon accounting; encourage private sector investment and participation of sub-national actors; and foster an efficient, transparent, and equitable allocation of incentives. Nested approaches may therefore be beneficial under certain country circumstances and developing countries should have the option to pursue nesting sub-national activities within their national frameworks. International agreements and U.S. (and other developed country) domestic policy should be structured to allow developing countries to choose a nested approach to REDD+ (though should not mandate that they establish such an approach). Below are some recommendations for including a nested option in an international agreement and in U.S. domestic policy. Additionally, we provide some general recommendations to developing countries on how best to structure a nested approach should they choose to do so.

International Policy

As discussed above, the role of sub-national actions in REDD+ frameworks is still under negotiation within the UNFCCC. The debate on this issue has primarily focused on whether sub-national actions can be credited outside of a national accounting framework. There is little discussion about the role sub-national actors may play within a national accounting framework and how incentives may be channeled to them. This question is considered to fall under the authority of each individual country to decide.

While each country does have the authority to decide whether it will choose to implement a nested approach to REDD+ or not, the international agreement will at least need to allow the sub-national activities to interact with the international incentive structure once they have been granted credits through the allocation process at the national level. Therefore, an international agreement should specify that sub-national entities are allowed to receive direct incentives (i.e. credits and/or funding)

[20] As mentioned above, in some cases, the national government may not have complete authority or control over its entire forest estate. In these cases, a nested approach may actually be essential.

from the international system if and when the national government has allocated those rights to them and an auditor has determined the quantity of credits to be allocated to various actors.

U.S Policy

The American Clean Energy and Security Act (ACES), passed by the House of Representatives on June 26, 2009, addresses the issue of REDD more thoroughly than any U.S. policy measure to date. It establishes a substantial role for and focus on preserving forests as part of the broader U.S. climate change policy through the dual approach of setting aside direct public funding for REDD and allowing REDD offset credits to be used for compliance. A supplemental emission reduction program established under ACES and funded by an allowance allocation seeks to achieve reductions of at least 720 million metric tons of GHG emissions from forest destruction and degradation by 2020 and six billion tons by 2025.[21] In addition, actors with compliance obligations in the U.S. may utilize 1 billion tons of international offset credits in the aggregate and perhaps up to 1.5 billion tons if domestic offset usage is low. The approach taken in ACES provides a solid foundation from which to build a comprehensive REDD policy that can achieve the required investments over time in forest preservation.

However, ACES does not clearly allow countries to choose a nested approach to REDD. It stipulates that once an initial interim period has ended, a country is required to establish a national baseline and no credit for sub-national activities may be directly assigned, either to companies or to the U.S. government's supplemental program. The draft legislation introduced in the Senate in May of 2010 differs from the House bill on this respect. The American Power Act, as the draft bill is called, allows for states and provinces to receive direct credits for the first five years of the program. During those five years, no smaller-scale activities can receive direct crediting (i.e. projects cannot "nest" within state or province accounting frameworks and receive direct credits). After five years, countries must establish national accounting frameworks. The draft legislation, does, however, allow states and provinces to continue to receive direct credits once they are nested within that national accounting framework.

As this paper describes, a nested approach can be beneficial and developing countries should have the option to pursue them as a way to transparently allocate incentives and promote implementation at multiple scales. Allowing sub-national activities to continue to receive direct crediting after a national baseline is established not only increases the likelihood that reductions will be sustained; it also attracts higher levels of investment because such activities will generate more credits over time, creating higher returns (and environmental benefits). We recommend that final U.S. legislation clearly state that sub-national activities are able to receive credits after the establishment of a national baseline recognizing that the ultimate decision on whether suitable sub-national activities would be eligible to receive direct credits is that of the host country. Additionally, we recommend that project level activities be allowed to nest within state and province-level baselines and, where appropriate, be allowed during the interim transition period prior to the establishment of such baselines.

[21] ACES, Title III, Part E, Sec. 753(b)(1).

Developing Country National Frameworks

Every developing country will need to establish a national strategy for REDD+ that works for its unique national circumstances and complies with future international standards. A nested approach to REDD+ may provide the opportunity for countries to motivate a greater level of involvement by sub-national actors in the implementation of REDD+; attract greater private investment; and efficiently, credibly, and transparently channel incentives to actors on the ground without the need for major new national institutions for benefit-sharing. Therefore, countries should have the option to establish a nested approach to REDD+ if such an approach is effective for them (though should not be required to do so). We recommend that each country consider whether a nested approach is the best option for them when developing their national strategies.

In this paper, we have provided some options for establishing a nested carbon accounting framework, sharing risk among actors, and establishing institutional arrangements for nesting. The exact approach may be different in different countries, depending on their unique circumstances. Each country that chooses to implement a nested approach to REDD+ should therefore choose a specific set of risk management options that works for its unique circumstances.

Topics for Further Research

This paper describes some of the main options for structuring nested approaches to REDD+ and provides an analysis of those options. A more in-depth analysis of the options, and specifically, how they would play out financially for different actors, would allow for a better understanding of the circumstances under which a nested approach would be an appropriate framework for allocating REDD+ incentives. Specifically, the following research would be beneficial:

- Financial modeling of the risk management options to evaluate how each option would allocate incentives to various actors under various non-performance scenarios;
- Case studies in various countries in order to better understand the legal and institutional contexts that govern incentive allocation in each country;
- Surveys of private investors, project developers, sub-national governments, and national governments to ascertain the levels of risk that they are willing to take on; and
- A more in-depth assessment of how combining various risk management options could lead to effective arrangements in specific country circumstances.

Appendix 1: The Role of Sub-national Activities in the Absence of National Accounting Frameworks (A Transitional Approach)

National level interventions for REDD+ are essential to achieving the large-scale systemic reforms across ministries within the national government that are needed to effectively reduce deforestation and forest degradation. Some examples of national-level policy interventions that could lead to emissions reductions and/or enhanced removals include legal, tax, and other policy reforms; increasing law enforcement capability; improved land-use planning; institutional strengthening; and land tenure and forest governance reforms. National level accounting frameworks are also important because they capture in-country leakage, which improves the environmental integrity of the mechanism. Finally, national level initiatives have the potential to reduce large amounts of emissions and therefore bring the overall effort up to the scale of reductions needed from the sector. Project level interventions would not be expected to reach the same amount of total global emissions reductions (though some sub-national interventions could generate large amounts of emissions reductions). National-level efforts may also enjoy certain cost savings associated with economies of scale that make the overall effort more cost-effective. An effective and efficient global REDD+ mechanism should therefore require participating forest countries to develop national strategies, monitoring systems, and accounting frameworks.

However, it will take some time and a good deal of effort for national governments to establish these systems, build the necessary capacity to participate in an international REDD+ framework, and create the transparent institutions for sharing the proceeds gained from trading emissions reductions. For example, Indonesia envisions a six-year national-level process in which they will go through phases of preparation, capacity building, and eventually reach a stage of national-level implementation.[22] As another example, Brazil has invested decades in building its satellite monitoring capacity and developing their national-level forest monitoring system. Other countries lag behind Brazil in monitoring capacity. Therefore, we can expect an interim period in which many countries will need to invest in preparing their national systems, but may not be able to implement the nation-wide activities needed to achieve emissions reductions or enhanced removals at scale. There is therefore a need to balance the urgency of stopping emissions from deforestation and forest degradation with the constraints on how quickly countries are able to set up necessary national systems. To balance these needs, many existing draft policy frameworks[23] envision a transition period in which sub-national activities can generate credits for sale in compliance markets while national governments are still in the process of setting up national accounting frameworks.

A defined interim period for crediting sub-national activities outside of national accounting frameworks could be beneficial in a number of ways. First, the interim period provides tropical forest countries with the opportunity to "learn-by-doing." Implementing REDD+ comprehensively at a national or even sub-

[22] National Strategy REDD-Indonesia Readiness Phase 2009-2012 and Progress in Implementation. Jakarta. February, 2010.
[23] ACES; FCCC/CP/2010/2

national level requires extraordinary effort, and is largely without precedent. Beginning at a sub-national level will show how REDD+ can succeed in a select set of specific places in order to create the experience and confidence to expand more broadly. Large-scale demonstration activities with national government engagement can pilot methodologies for establishing reference levels, build monitoring capacity within government agencies, test different mechanisms for benefit sharing, build understanding of REDD+ among local communities, and increase the engagement of local actors in REDD+ frameworks, among other things. These learning opportunities are critical on the pathway toward developing functional and efficient REDD+ programs at the national level.

Second, sub-national activities can generate the near-term emissions reductions that benefit the climate. These reductions could also provide credits that can be used immediately in the U.S. (and other developed countries) to help covered entities meet their compliance requirements under an emissions cap in a cost effective manner. To achieve these cost savings, early supply of emissions reductions will be needed, and sub-national activities are better suited to providing that supply in the near-term.

Third, crediting sub-national activities will allow REDD+ actions to take place in countries with very low capacity within the national government, especially in countries where the national government may not have control over large areas of their land. In many countries, national programs are a very long-term endeavor. Yet deforestation in those countries may threaten high carbon forests and/or high conservation value forests (those forests that contain exceptional environmental and/or social value). Crediting sub-national activities in those countries provides an incentive to protect valuable areas during the period in which national governments build capacity.

Finally, sub-national activities have been, and will continue to be, instrumental in developing the standards and methodologies for REDD+ that add up to a proof-of-concept that will build confidence among public and private investors. An interim period for crediting sub-national activities may be attractive to private investors because the financial flows are more transparent, the asset rights can be defined in clear contractual arrangements, and the investor has greater control over the outcome. These activities, if implemented appropriately, can leverage large amounts of future investments needed to scale up the mechanism.

The interim period for crediting sub-national activities would need to be structured to ensure that the emissions reductions are real and verifiable and are not double-counted under the future national accounting system. Sub-national interventions would be required to account and discount for leakage according to agreed standards. Finally, the interim period could include incentives for countries to move as fast as possible toward creating national level programs.

An interim period for crediting sub-national activities while countries are developing national accounting frameworks could transition fairly easily into a nested approach. Existing sub-national activities would continue to receive direct crediting even after the national framework was in place, but they would need to comply with the nested protocol. The interim period could even potentially be structured so that sub-national accounting during that period matched with the future reference regions. Additionally, sub-national activities implemented during the transition period could be required to withhold a certain

portion of their credits and place them in the performance reserve account, thereby building up that account before it may be needed under the future nested approach. Building up the performance reserve account during the transition phase will help make the reserve account more useful during the early years of the nested program.

Appendix 2: Scenario analysis for a performance reserve account

The size of the reserve account will impact how many credits a country can actually sell and will also determine the level of risk that sub-national actors would face in the case of country non-performance. A large performance reserve account would imply low risk to sub-national actors of non-payment on performance but would reduce the quantity of credits a country would be able to sell. A small performance reserve account would imply a higher risk to sub-national actors that the account would not be sufficient to cover the risk of non-performance but would place less of a burden on the national government. The appropriate size of the performance reserve account will depend upon various factors, including past performance of a country, level of risk of future non-performance, and the level of risk sub-national actors are willing to accept.

Below we have modeled two different sizes for a performance reserve account and drawn some initial conclusions.[24] The analysis includes a country that succeeds in reducing its deforestation by 50% each year. There are three sub-national activities in the country. Each activity also succeeds in reducing deforestation by 50% within the activity area. Under scenario 1, the country places 10% of its emission reductions into a performance reserve account until the account reaches 10% of total carbon stocks. Under scenario 2, the country places 50% of its emissions reductions into a performance reserve account until the account reaches 10% of total carbon stocks.

Key conclusions:

- The performance reserve account is not very useful at the beginning of the mechanism. If the nation does not perform, there are no emission reductions in the reserve account that can be used to compensate sub-national actors for their performance. Therefore, there may be a need for initial public investment in performance reserve accounts to build them up. Alternatively, the reserve account could be built up in advance through withholdings from sub-national activities during the transition phase, as described in Appendix 1.
- It will likely be important to front-load the creation of the performance reserve account (scenario 2), as this provides much greater security than smaller, incremental contributions. This will need to be balanced with the country's desire to monetize a larger share of its earlier credits.
- A key issue will be the position of different sub-national actors with respect to their claims on the reserve account. Senior claimants who are "first in line" for the reserve account will have greater security. Alternatively, claims could be distributed pro rata to the different parties.
- The performance reserve account is a temporary risk management tool (comparable to a debt service reserve account in project finance). It can address national shortfalls in particular years, but cannot address longer term non-performance issues as the reserve account would be consumed in a few years. However, this temporary protection can provide valuable time for the government to get back on track with its longer term REDD+ plans.

[24] This analysis only includes deduction of credits for the performance reserve account and does not include any other deductions that may be required (i.e. for a permanence buffer).

Year	1	2	3	4	5	6	7	8	9	10
National										
Baseline (stocks)	1000	970	941	913	885	859	833	808	784	760
Performance	1000	985	970	956	941	927	913	900	886	873
ERs		15	29	43	56	68	80	92	102	113
Reserve Account Scenario 1: Contribute 10% of ERs until reserve account reaches 10% of carbon stocks										
Reserve total		1.5	4.4	8.7	14.3	21.2	29.2	38.4	48.6	59.9
Annual contribution		1.5	2.9	4.3	5.6	6.8	8.0	9.2	10.2	11.3
Marketable ERs		13.5	26.4	38.7	50.4	61.6	72.3	82.5	92.1	101.3
Reserve Account Scenario 2: Contribute 50% of ERs until reserve account reaches 10% of carbon stocks										
Reserve total		7.5	22.2	43.7	71.7	85.9	83.3	80.8	78.4	76.0
Annual contribution		7.5	14.7	21.5	28.0	14.2	(2.6)	(2.5)	(2.4)	(2.4)
Marketable ERs		7.5	14.7	21.5	28.0	54.3	82.9	94.1	104.8	114.9
Sub-National A										
Baseline (stocks)	100	97	94	91	89	86	86	81	78	76
Performance	100	99	97	96	94	93	91	90	89	87
ERs		2	3	4	6	7	8	9	10	11
Sub-National B										
Baseline (stocks)	150	146	141	137	133	129	125	121	118	114
Performance	150	148	146	143	141	139	137	135	133	131
ERs		2	4	6	8	10	12	14	15	17
Sub-National C										
Baseline (stocks)	50	49	47	46	44	43	42	40	39	38
Performance	50	49	49	48	47	46	46	45	44	44
ERs		1	1	2	3	3	4	5	5	6
Total Sub-National ERs		5	8	13	17	21	24	27	31	34
Nationally-controlled ERs		10	21	30	39	48	56	64	72	79
Total Country ERs		15	29	43	56	68	80	92	102	113
Reserve Total 1		1.5	4.4	8.7	14.3	21.2	29.2	38.4	48.6	59.9
Reserve Total 2		7.5	22.2	43.7	71.7	85.9	83.3	80.8	78.4	76.0

Appendix 3: The Nested Approach Crediting Cycle Applied

In this section, we assume that a multilateral treaty is signed in 2012 creating an international REDD+ mechanism, which allows countries to choose a nested approach as discussed here. In 2015, a forest country in South America (FC1) becomes the first country in the world to have its national REDD+ program approved by the RA. Later that same year, FC1, as well as the RA, approve a privately-sponsored REDD+ project (P1) in a forest area in the mountainous northwest region of FC1. REDD+ program rules stipulate that all REDD+ activities must be verified within 5 years of RA approval.

In Years 1 through 5, FC1 continues to implement forest policies developed in the period leading up to RA approval and/or pass new laws to further restrict the destruction of forest area in the country. At the same time, P1 successfully protects forest within its project area through the creation of a forest preserve, while also minimizing leakage from the project area by promoting sustainable land use practices in the area around the project. At the end of Year 5, P1 submits a report to FC1 detailing reductions in observed rates of deforestation within the project area against its REL and calculating the related emission reductions.

FC1 also assesses leakage from P1 into surrounding areas. As reflected in Figure 7, FC1 notes an uptick in deforestation to the east of the P1 project area, as well as an increase in deforestation to the north. FC1 does not attribute the increased deforestation to the east of P1 because the project area is mountainous and the increased deforestation took place in an adjacent lowland that is part of a different reference region. The deforestation to the north, however, is determined to reflect some leakage from P1 because it was caused by commercial logging (previously the main driver of deforestation within the P1 project area) and takes place within the same leakage zone (defined as the NW Province). The amount of credits for which P1 is eligible according to FC1 is reduced commensurate with this determination.

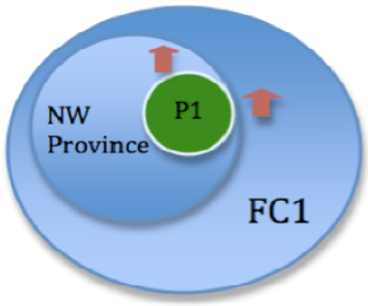


Figure 7: Leakage Assessment

After FC1 completes its assessment of P1's performance, it incorporates this information into an overall review of the national FC1 REDD+ program. At this point, both FC1 and P1 submit independent reports to a private, third party OA. In this case, both FC1 and P1 have elected to use OA International, a global auditing firm.

OA International verifies the information provided in the project- and country-level reports by reviewing satellite imagery of FC1 forest cover during the verification period. OA International also reviews FC1's assignment of leakage to P1 and determines that it was reasonable and within the rules agreed to by both the project and the country at the start of the program. Finally, OA assesses permanence risks at both scales of REDD+ activity in FC1.

OA International then compiles its findings and submits a report on FC1 to the RA. The OA's report reflects a 20 million ton reduction by P1 (including leakage) and a 100 million ton reduction overall in

FC1 during the verification period. Referring to P1's PDD and letter of approval, the RA incorporates an agreement by FC1 to place an additional 5 percent of its portion of credits into a performance reserve each verification period to guard against non-performance[25] in future verification periods. The RA also notes that P1 has agreed to maintain an independent insurance policy to insure FC1 against P1 non-performance.[26]

Based on the above, the RA issues 76 million REDD+ credits into FC1's main account on the REDD+ Registry (100 Mt minus P1's reduction, minus 5% performance reserve = 76 Mt). The remaining 40 million credits earned by FC1 during this verification period are issued into a sub-account performance reserve controlled by the RA.

The RA also issues 20 million REDD+ credits into P1's main account on the Registry Accounting and issuance for the verification period described above, as well as the organization of credits into accounts on the REDD+ Registry is reflected in Figure 8.

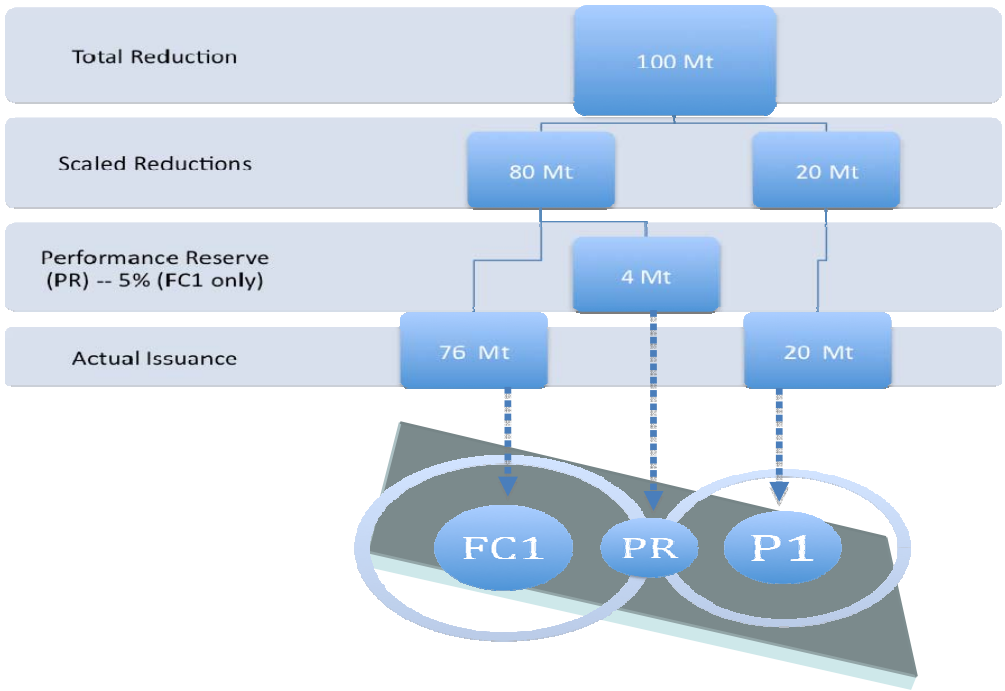


Figure 8: Issuance and Registry Accounts

[25] This additional "performance reserve" refers to the portion of credits that a country may agree to reserve in the event its performance in a future verification period is not sufficient to generate credits. While a buffer reserve can also be used to protect the environmental benefit of the REDD+ program, the performance reserve protects the ability of a project to receive credits (up to a point) despite non-performance at the national level.

[26] Note that this combination of risk mitigation options— a performance reserve at the national level, and an insurance policy at the project-level— reflects only one potential option for addressing nested performance risks from the list of mitigation tools described in preceding sections.

Upon receipt of its 20 million REDD+ credits, P1 immediately sells a third of its credits to an electric utility in the United States. The transfer from P1 to the utility is affected through a transfer from P1's main account on the REDD+ Registry to a U.S. registry created to support emission allowance and offset trading under the country's recently enacted comprehensive GHG emission reduction scheme. The following year, the electric utility surrenders the REDD+ credits purchased from P1 to the U.S. Environmental Protection Agency (EPA) to offset a portion of its annual emissions and reduce the overall number of emission allowances it must surrender for compliance with domestic emission reduction requirements. EPA in turn retires the REDD+ credits and the related serial numbers are cancelled forever.

P1 transfers most of its remaining credits to the investors that helped to fund the project.

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