THE GRADUATE INSTITUTE | GENEVA
CENTRE FOR INTERNATIONAL
ENVIRONMENTAL STUDIES

→ Research Paper **7** | **2011**

REDD+ WITHIN THE POST- KYOTO CLIMATE CHANGE REGIME

Ensuring Equity without Creating 'Tropical Hot Air'

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EXECUTIVE SUMMARY

This paper discusses strategies to make the global program for Reducing Emissions from Deforestation and Forest Degradation and Enhancement of Forest Stocks (REDD+) an effective and equitable part of the post-Kyoto Climate Change Regime. This work submits that, in order for any global REDD+ strategy to succeed, it must be transparent in design and must also provide results-based financing that is appropriate to different developing country situations. It is further argued that the current proposals for REDD+ results-based financing either do not offer suitable incentives for countries with high forest cover and low historical rates of deforestation (thereby essentially rewarding poor past performers), or they seek to address equity concerns in a non-transparent manner that could exacerbate problems of "tropical hot air" by paying for artificial achievements.

This paper proposes an alternative solution that, if correctly implemented, would encourage all developing countries to participate, irrespective of their past rates of deforestation and the size of their existing carbon stocks. It would also provide a transparent basis for the determination of future awards. Instead of relying upon artificially negotiated crediting baselines or reference stocks, this work recommends that REDD+ programs simply adjust compensation levels in favor of those countries that have a good track-record. This could be achieved through an award bracketing system that offers higher per-unit incentives to those countries with low historical rates of deforestation or large existing forest stocks. Such a solution would address issues of equity and would be consistent with the recent decisions taken on forest sector mitigation efforts within the Cancun Agreement. Furthermore, it could help to reduce the risk of regional and global emissions leakage, as well as ensure permanence. Finally, and considering the lessons learned from previous results-based incentive schemes, such a solution would account for the reality that further achievements in deforestation reduction and

stock expansion will likely cost more for countries that are already high performers.

It is submitted that the most successful REDD+ strategy will integrate two major types of program activity, each with their own funding streams. They are: 1) reducing emissions from deforestation and conservation of existing stocks; and 2) the enhancement of forest stocks. [1]

INTRODUCTION: CARBON SINKS AS AN ESSENTIAL PART OF CLIMATE CHANGE MITIGATION

Forest conservation, management and expansion efforts are now seen as an essential component to any strategy to address climate change. Not only can they offer a substantial reduction in greenhouse gas (GHG) emissions, they may be significantly cheaper than most other types of measures.[2] The potential impact of REDD+ efforts has been extensively covered elsewhere. For the purposes of this paper, it suffices to recall a few of the most pertinent findings.

According to the Stern Review, 18% of global emissions are driven by changes in land use, of which, the majority are emissions from deforestation in developing countries.[3] At present, just eight countries are responsible for an estimated 70% of land-use emissions,[4] and only two (Brazil and Indonesia) account for a stunning 50%.[5] Furthermore, "continued deforestation at current rates in Brazil and Indonesia alone would equal four-fifths of the annual reductions targets for Annex I countries in the Kyoto Protocol."[6] Understandably, the existing

[1] At present, REDD+ also includes input-based strategies, as well as strategies for the reduction of forest degradation and sustainable management. These are not discussed in this paper.
[2] *See* Nicholas Stern, The Economics of Climate Change: the Stern Review, at 245 (Cambridge Univ. Press 2007). *See also* Arild Anglesen and Stibniatia Atmadja, *Introduction*, in Moving Ahead with REDD: Issues, options and implications, at 1 (A. Angelsen, ed., CIFOR 2008).
[3] Stern, *supra* note 2, at 196.
[4] Id. at 245.
[5] Id. at 196.
[6] *See* Marcio Santilli, Paulo Moutinho, Stephan Schwartzman, Daniel Neptsad, Lisa Currans, and Carlos Nobre, *Tropical Deforestation and the Kyoto Protocol*, 71 Climatic Change, 267, 268 (2005).

proposals to address emissions from deforestation have largely focused on addressing these major sources of emissions. However, it has also become clear that in order for global REDD+ targets to be met, a majority of developing countries must take part in the effort. This means that program incentives must be attractive to all countries, not just the historically poor performers. This paper aims to provide recommendations on a transparent and equitable incentive scheme that can help achieve this goal, particularly for activities dealing with reducing emissions from deforestation and the enhancement of carbon stocks.[7]

LESSONS LEARNED FROM OTHER RESULTS-BASED FINANCING SCHEMES

Although projects geared to reduce deforestation are not a novel idea, the concept of creating a truly global, comprehensive REDD+ program with the climate change regime (CCR) is relatively new. Participant governments, donors and agencies are now in the early stages of program design, and many details – including the incentive scheme to be used – have yet to be established. This paper first submits that REDD+ policy makers should draw upon lessons learned from other, older results-based funding mechanisms. One particularly pertinent example is that of The GAVI Alliance[8] and its flagship results-based incentive scheme. In 2000, GAVI set out to increase immunization coverage in developing countries with a relatively simple, yet innovative new program called "Immunisation Services Support" (ISS).[9] It offered participating countries $20 for each additional child reached with diphtheria, tetanus and pertussis combination vaccine (DTP). Each participating country's rewards were calculated on an annual basis, against a historical baseline, which was adjusted at the end of each year. After just a few years, ISS was billed as an overwhelming success, and high country demand for the program, as well as increased vaccine coverage in many countries demonstrated the power of results-based incentives. However, the $20

[7] The paper does not make particular recommendations for activities relating to reducing emissions from forest degradation, or land use change.
[8] Formerly the Global Alliance for Vaccines and Immunization (GAVI). See http://www.gavialliance.org/
[9] Details provided at http://www.gavialliance.org/support/what/iss/index.php (last accessed: 6 April 2011).

per child incentive seemed to have little affect on countries that began the program with baseline coverage above 65%.[10] Following an evaluation of the first five years of ISS, GAVI had to face the fact that its one-size-fits all incentive scheme rewarded countries with higher population growth and low starting coverage rates.[11] GAVI also found that the cost of immunizing additional children was greater, the higher a country's starting coverage rate.[12] The evaluation demonstrated that, for a country with a 50% rate of coverage, it would cost an estimated $23 to fully immunize an additional child. By comparison, a country with an 80% coverage rate would need to spend an estimated $53 to reach an additional child.[13]

GAVI's ISS program is not analogous to REDD+. If anything, REDD+ poses additional challenges and complexities that GAVI did not face (particularly the issues of permanence and leakage). But this is all the more reason to take the REDD+ incentive scheme seriously. As with immunization coverage, historically strong performers – those with high levels of existing forest cover and low rates of deforestation – may very well face higher costs for to achieve additional gains in avoided deforestation, reforestation and afforestation.[14] The REDD+ incentive scheme will need to take this into account in order to be effective.

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[10] Lu Chunling, Catherine Michaud, Emmanuela Gakidou, Kashif Khan, and Christopher Murray, *Effect of the Global Alliance for Vaccines and Immunisation on diphtheria, tetanus, and pertussis vaccine coverage: an independent assessment*, 368 The Lancet, 23 Sept. 2006, at 1088.

[11] *See* Grace Chee, Vivikka Molidrem, Natasha Hsi and Slavea Chankova,. *Evaluation of GAVI Phase I Performance*, Abt Associates Inc, (21 Oct. 2008), http://www.gavialliance.org/resources/GAVI_Phase1_Report_FINAL_to_SC_Oct21.pdf.

[12] Id. At 45.

[13] Id.

[14] As Alston and Andersson ("Why Governments Often Fail to Protect Forest: the Hidden Costs of Intervention" - undated working paper) point out, "rather than simply offer all land owners the global market price of carbon, it would be more cost effective to offer an amount that corresponds more closely with the value the land owner places on alternative land uses." *See* p. 4.

A BRIEF HISTORY OF FORESTRY INITIATIVES WITHIN THE CLIMATE CHANGE REGIME

Since the negotiation of the Kyoto Protocol in 1997, efforts to address emissions from forestry have followed two separate tracks. The first track, managed within the United Nations Framework Convention on Climate Change (UNFCCC) and Kyoto architecture has, until recently, focused solely on the expansion of carbon stocks through afforestation and reforestation. The second track, which seeks to reduce emissions through the conservation and management of forest stocks, is currently being addressed through bilateral projects and a new global initiative, UN-REDD.[15]

UNFCCC & Kyoto Forestry Efforts. The consideration of forest "sinks" as part of Kyoto was controversial from the start. While it was clear that sinks could have a major impact on overall emissions reductions, a number of negotiating countries objected to including them within UNFCCC carbon accounting because they posed problems of calculation, measurement and permanence.[16] In addition, there was concern that Annex I countries would be able to resort to forestry projects as a way to avoid making any real changes in their fossil fuel-based emissions.[17] This deadlock was eventually broken during the seventh Conference of the Parties (COP7) in 2001. The Marrakesh Accords of COP7 set the ground rules for the integration of forest sinks in industrialized (Annex I) country emissions accounting, and also introduced some forestry projects as part of the Clean Development Mechanism (CDM). Under the CDM, Annex-I countries could fund afforestation and reforestation projects in developing (non-Annex I) countries, and use the resultant emissions reductions to generate credits to meet their own national targets. However, they could only use these credits for 1 percent or less

[15] A collaborative initiative launched in 2008, and hosted by the Food and Agriculture Organization of the United Nations (FAO), the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP). See www.un-redd.org

[16] *See* Sebastian M. Scholz and Ian R. Noble, *Generation of sequestration credits under the CDM*, Legal aspects of implementing the Kyoto Protocol mechanisms: making Kyoto work 265 (D. Freestone and C. Streck, eds., Oxford Univ. Press, 2005)

[17] Imke Sagemüller, *Forest Sinks under the United Nations Framework Convention on Climate Change and the Kyoto Protocol: Opportunity or Risk for Biodiversity?* 31 Colum. J. Envtl. L. 189, 2006, at 193.

of their total obligations in the first Kyoto commitment period.[18] Projects geared to avoid deforestation were not included within the CDM.[19] Lessons from CDM offer helpful guidance for the development of future REDD+ schemes.

COP11, held in Montreal in 2005, signaled a turning point in negotiations on REDD+ within the UNFCCC. Papua New Guinea and Costa Rica, along with eight other Parties, tabled a formal proposal that called for "compensated reduction" projects – an approach that would reward developing countries for maintaining existing forests and reducing their deforestation rates. Achievements would be measured against historical baselines.[20] The Bali Action Plan, adopted by the COP13 in 2008, took the first step toward incorporating REDD+ programs within the UNFCCC. The Plan acknowledged the need for "policy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation in developing countries."[21] Although REDD+ still remains outside the UNFCCC, the Parties at the COP16 in Cancun agreed on decision text that urged countries to begin developing and implementing REDD+ strategies, and provided some general guidance on implementation.[22] Relevant decisions from the Cancun Agreements provide essential parameters for the design of any global REDD+ program, and are discussed further below.

The UN-REDD Program. In parallel to negotiations under the UNFCCC, the UN-REDD partnership has already initiated programs in 29 partner countries, with a total funding approval of $51 million as of end-2010.[23] UN-REDD is to be implemented in three phases, namely: an inception or "readiness" phase; a

[18] Scholz and Noble, *supra* note 15, at 265. *See also* UN Doc FCCC/CP/2001/13/Add.2, Decision 17/CP.7, § 7(a) and (b).
[19] Scott Barrett, *A Portfolio System of Climate Treaties*, in Post-Kyoto International Climate Policy, 252 (J. Aldy and R. Stavins eds., Cambridge Univ. Press 2009).
[20] Charlie Parker, Andrew Mitchell, Andrew, Mandar Trived and Niki Mardas *The Little REDD+ Book*, Global Canopy Program, http://unfccc.int/files/methods_science/redd/application/pdf/the_little_redd_book_dec_08.pdf (2009).
[21] Decision 1/CP.13(b)(iii) of the Bali Action Plan. FCCC/CP/2007/6/Add.1
[22] COP 16 Draft Agreement text, Arts. 68-76.
[23] UN-REDD 2010 Year in Review, http://www.un-redd.com/Publications/tabid/587/Default.html (March 2010), at 4.

second "implementation" phase in which countries introduce policies and measures (PAMs) to reduce climate change; and finally, a "compliance" phase in which countries are compensated for emissions reductions and increased carbon stocks.[24] As of end-2010, only four UN-REDD partner countries[25] had entered the "implementation" phase.[26] Three had commenced the "inception" phase.[27]

Lessons learned from early implementation. Givne its initial experiences with forestry project implementation, the CDM offers the most fertile ground for lessons learned. Forestry efforts under the CDM have had only mixed success, and have exhibited a number of problems that could challenge their legitimacy and effectiveness in the future. But it is important to emphasize that these problems are not necessarily unique to the CDM. They will need to be taken into consideration and addressed under any future scheme.

The principle of *additionality*, which is enshrined within Kyoto, requires that every project prove that carbon sequestration and emissions reductions would not have occurred without the project investment.[28] This "but-for" counterfactual will be a necessary part of any future performance-based forestry scheme, but CDM experience show that this is difficult to demonstrate in practice. First, it is challenging to establish reliable emissions baselines for the measurement of future reductions,[29] creating the fear that investors may be paying for illusory gains, or what is commonly referred to as "hot air". Linked to this is the difficulty of adverse selection, whereby the most profitable projects, "which are most likely to occur anyway, are also the most likely to be credited."[30] While these problems are certainly exacerbated by weaknesses in data availability, monitoring capacity

[24]Arild Anglesen and Shelia Wertz-Kanounnikof, *What are the key design issues for REDD and the criteria for assessing options?*, in Moving Ahead with REDD: Issues, Options and Implications 11, 15 (A. Angelsen, ed., CIFOR, 2008).
[25] DRC, Indonesia, Tanzania and Viet Nam.
[26] UN-REDD 2010 Year in Review, *supra* note 28, at 4.
[27] Id. Bolivia, Panama and Zambia.
[28] *See* Charlotte Streck and Sebastian M. Scholz, "The Role of Forests in Global Climate Change: Whence we Come and Where We Go", 861, Int. Affairs 82 (5) (2006), at 868.
[29]Joseph E. Aldy and Robert N. Stavins, *Lessons for the International Policy Community,* in Post-Kyoto International Climate Policy, 924 (J. Aldy and R. Stavins eds., Cambridge Univ. Press 2009).
[30] Aldy and Stavins (2009), *supra* at note 28.

and technical constraints,[31] project design – specifically when it comes to the choice of baselines and the appropriate incentive scheme – can have a major impact upon the ability of a forest carbon initiative to show additionality.

Another major critique of the CDM approach relates to the problem of *leakage*, which occurs when there is "a change in activities or behavior outside the project area that partially or totally offsets the climate gains of the project."[32] In effect, forest conservation efforts in a given locale could increase the likelihood that deforestation will simply shift elsewhere. Leakage may not just be a regional concern; depending on the success of REDD+ programs on a larger scale, global leakage could present problems in the future.[33]

The problem of *permanence* refers to the risk that emissions reductions created through forestry projects will not endure beyond the project period.[34] Forests that have been planted or conserved one day, can simply be felled the next, leading to the release of significant amounts of previously sequestered carbon. Successful forest carbon initiatives will need to offer incentives for participating countries to conserve and expand their forest stocks, and maintain these achievements over the long-term.

The inability of exiting projects to guarantee additionality and permenance, while avoiding leakage, has limited the attractiveness of credits generated by current forestry projects. Due to uncertainties associated with their value and liquidity,

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[31] *See* Baker et. al., "Achieving Forest Carbon Information with Higher Certainty: A Five-Part Plan", 249 Environmental Science & Policy 13 (2010), for a discussion of the data, capacity-related and technical challenges associated with forest carbon projects, as well as possible solutions. As this paper focuses solely on issues of program design particular to performance-based incentive schemes, further discussion of technical solutions for measurement and reporting remain beyond the scope of this work.

[32] See Streck and Scholz (2006), *supra* at note 27.

[33] Indeed, Silva and Chavez (2005), have argued that the current approach taken under the Kyoto Protocol may actually shift timber harvesting activities from Annex I to non-Annex I countries, a trend that could ultimately accelerate global deforestation. Likewise, efforts to tackle deforestation in only a handful of priority non-Annex I countries could have the same effect, and simply shift deforestation to other non-participating countries.

[34] Aldy and Stavins (2009), *supra* at note 27.

they tend to fetch far lower prices than credits from other types of offset programs. [35] At present, the EU does not even allow CDM forestry credits to be used within its regional emissions trading scheme.[36] Finally, the Kyoto focus on afforestation and reforestation, to the exclusion of projects that encourage the maintenance of *existing* forests, has also generated concern that there will be perverse incentive "for increased destruction of old-growth native forests, which would then be replaced by fast-growing industrial-scale plantations."[37] Not only would such an outcome undermine the objective such projects, it could have a major, negative impact on the protection of biodiversity.[38]

IMPLEMENTING GLOBAL REDD+ UNDER THE BANNER OF THE UNFCCC – PARAMETERS SET AT CANCUN

The negotiations at the Cancun Summit have created new hope of a global REDD+ program as part of the post-2012 UNFCCC. Indeed, the Cancun Agreements include an entire chapter on "Policy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries."[39] The decision text encourages countries to "contribute to mitigation actions in the forest sector" through a range of activities, most notably "reducing emissions from deforestation," the "conservation of forest carbon stocks," and the "enhancement of forest carbon stocks,"[40] the two most important activities for the purposes of this paper. The text further requests developing countries to prepare a national strategy or action plan, a national forest reference emission level and/or forest reference level, a robust and transparent national forest monitoring system, and an information system for a series of safeguards that are

[35] *See* Paroma Basu, *A Green Investment*, 457 Nature, Jan. 8, 2990, at 146.
[36] Barrett, *supra* note 18, at 253
[37] Sagemüller, *supra*, note 16, at 198.
[38] Id.
[39] 1/CP.16, III C
[40] Id, § 70(a), (c) &(e)

to be respected in implementation.[41] Implementation is to be undertaken in phases, in order to allow for adequate planning and capacity building.[42] All of the requested actions, including the development of reference emission levels and/or forest reference levels are to be carried out "as deemed appropriate by each Party and in accordance with their respective capabilities and national circumstances."[43]

The text appears to allow for a substantial degree of flexibility for each country in calculating its reference levels and stocks, however the "guidance and safeguards" for forestry policy approaches and incentives (found in Appendix I to the decisions) set several important parameters that must be considered for any performance-based REDD+ scheme. For our purposes, it serves to highlight four of these. First, positive incentives are to be "results-based".[44] In other words, in order for a future REDD+ program to be credible, payments should be made for real gains, not "tropical hot air". Secondly, the text states that the actions must be:

> "consistent with the *conservation of natural forests* and biological diversity, ensuring that the actions referred to in paragraph 70…are *not used for the conversion of natural forests, but are instead used to incentivize the protection of natural forests* and their ecosystem services, and to enhance other social and environmental benefits." (emphasis added)

Although the text does not provide any definition of what constitutes a "natural forest",[45] it makes clear that future incentive schemes for REDD+ must not result in the destruction of standing, indigenous forests. Thus, a

[41] Ibid, § 71 (a) – (d)
[42] Ibid, § 73
[43] Ibid, § 70
[44] 1/CP.16, Appendix I, § 1(j)
[45] Indeed, one of the key criticisms of UNFCCC decisions on forestry is that there has been very little definitional guidance on what constitutes a forest generally. While the decisions of the Conference of the Parties taken at Marrakech provides a few very general definitions (see CP/2001/13/Add.1, Annex I), major differences of opinion and gaps remain. These issues, while highly relevant for an REDD+ incentive scheme, are beyond the scope of this paper.

future incentive scheme must retain a balance between avoided deforestation and expansion of carbon stocks.

Finally, Appendix I calls for actions "to address the risk of reversals" and "to reduce displacement of emissions."[46] Thus, an appropriate future REDD+ program will create in incentives to ensure that forests planted or maintained are not felled at a later point in time, and that efforts in one country or region do not indirectly lead to deforestation elsewhere, whether regionally or globally.

The Parties have requested the UNFCCC Subsidiary Body for Scientific and Technological Advice (SBSTA) to propose modalities for the development of forest reference emission levels and reference levels and for forest monitoring systems, as well as to develop guidance for providing information on safeguards. These recommendations will be considered at COP 17.[47] However, these four guidelines already provide strong indication of the types of REDD+ incentive schemes that will qualify for future consideration as part of the UNFCCC architecture. This paper submits that the current proposals under discussion for a global REDD+ incentive scheme will not adequately address these requirements.

CURRENT PROPOSALS FOR REDD+ MEASUREMENT AND INCENTIVE SCHEMES – "STOCK" VS. "FLOW" APPROACHES

Designing a performance-based incentive scheme for the reduction of emissions from deforestation and forest degradation poses an obvious and unavoidable challenge. In order to demonstrate effectiveness, one must be able to determine how much deforestation would have occurred in a "business-as-usual" scenario – that is, in the absence of the incentive. This tricky counterfactual has led to some disagreement about the most appropriate measurement tools, as well as how to

[46] 1/CP.16, Appendix I, § 2 (f) & (g)

[47] To be held in Durban, South AFrica, from November 28 to December 9, 2011.

set baselines. For reasons discussed below, deforestation patterns do not tend to follow a linear progression, and a country's recent rate of deforestation is not necessarily the best predictor of future trends.

There are also differing opinions as to the types of activities that forestry programs should cover. Whereas some schemes propose incentives for the *maintenance* of existing forest stocks, others integrate incentives for the *expansion* of stocks. The debate centers around two major proposals. The first, commonly referred to as the Compensated Reduction (CR) or "flow" approach, seeks to quantify avoided deforestation emissions with reference to a projected baseline. The second, the National Inventory (NI) or "stock" approach measures overall changes in terrestrial carbon relative to a set reference stock. Both options require the establishment of a hypothetical reference level. The major difference between the two is that the NI approach simplifies measurement by counting all increments in a country's forest carbon stocks, both positive and negative.[48] The recommendations of this paper are equally applicable to either approach. In fact, the best outcome will likely be attained through a combination of the two approaches. Thus, both approaches warrant additional exploration.

The compensated reduction or "flow" approach. The compensated reduction (CR) or "flow" approach proposes to provide incentives to maintain existing carbon forest stocks by offering participating countries awards for each unit of deforestation or forest-based emissions that they avoid. It is proposed that CR incentive schemes rely on historical deforestation rates to set projected emissions baselines, to be used in a future commitment period. Countries would receive awards for reductions in deforestation emissions below that baseline

[48] Krister P. Andersson, Andrew J. Plantinga, and Kenneth R. Richards, *The National Inventory Approach for International Forest-Carbon Sequestration and Management*, in The Economics and Politics of Climate Change 302, 305 (D. Helm and C. Hepburn eds., Oxford Univ. Press 2009).

level.[49] The simplest extrapolated historical projection is commonly referred to as the "business as usual" (BAU) baseline.[50] Other types of baselines might also be used, as discussed in further detail below.

CR proposals have several major disadvantages. First, while they create incentives for the maintenance of stocks, and do not provide for the expansion of forest stocks.[51] As a result, countries that have already largely exhausted their forest stocks would have little to gain from participation. Reliance on a projected deforestation baseline is also likely to prove problematic, because historically poor performers would stand to reap the greatest rewards from the program, while countries with low rates of deforestation would not be compensated for their past good performance, and at worst, might find it profitable to increase their deforestation rates before participating. This particular problem is not unique to the CR approach, and is discussed in further detail below.

The national inventory or "stock" approach. National Inventory (NI), or the "stock" approach is the main competitor to the CR method. Rather than compensating countries just for the anthropogenic deforestation that they avoid, CR would measure all changes in carbon stocks, both positive and negative, whether from anthropogenic or natural causes. Proponents argue that this would make measurement and verification more credible (the CR approach tries to distinguish man-made from environmental deforestation and degradation, which is tricky to measure). NI could also cover a wider range of activities, such as "tree planning on non-forest lands (afforestation), reforesting harvested forestland, use of extended rotation modifying harvest practices to reduce soil disturbance," and other efforts.[52] In this way, NI would be "more consistent with, and provide

[49] *See* Arild Anglesen, *How do we set the reference levels for REDD payments?*, Moving Ahead with REDD: Issues, Options and Implications 53 (A. Angelsen, ed., CIFOR, 2008).
[50] Id.
[51] *See* Andrew Plantinga and Kenneth Richards. 2009. *International Forest Carbon Sequestration in a Post-Kyoto Agreement*, in Post-Kyoto International Climate Policy 693. (J. Aldy and R. Stavins eds., Cambridge Univ. Press 2009).
[52] Andersson et al, (2009), 305

specificity for, the concept of 'full carbon accounting.'"[53] NI awards would be issued for net increases in forest stock, and penalties would be levied for net decreases. Enforceability could be ensured through a buffer or banking system that would hold a portion of generated awards as collateral against future performance.[54]

While the NI approach would indeed incorporate a broader range of activities, it shares a mutual flaw with the CR scheme. First, in order to reward countries for avoided deforestation (maintenance of existing stocks), the NI scheme would still rely upon a historical counterfactual. Each program would be assigned a "reference stock" that would be adjusted to account for projected deforestation based upon historical trends.[55] This could mean that, as with current CR proposals, historically poor performers – particularly those with *both* a high level of historical deforestation and a low level of forest cover - would have the most to gain from the NI system.

Another problem may arise if the NI approach only focuses on increases and decreases to net forest stocks, without taking into account the deforestation that may be occurring in particular areas within a country. NI would not necessarily penalize the deforestation of existing natural or primary forest, provided that a participating country could increase its net stocks within a given commitment period. It is foreseeable that a country might continue commercial logging of certain types of forests, but replace their carbon stock value with fast-growing substitutes, accumulating NI awards for any net increases.

[53] Plantinga and Richards, *supra* note 45, at 690.
[54] Dutschke and Anglesen, (2008), 80-82
[55] Plantinga and Richards, *supra* note 45, at 693.

THE BASELINE DILEMMA – ENSURING EQUITY AND COUNTRY PARTICIPATION

Both proposals – whether they seek to measure achievements against a projected reference baseline or a set reference stock – suffer a shared design flaw: Deforestation does not commonly occur as a linear trend, and may instead follow a "forest transition" pattern, in which the rate differs based upon the relative stage of deforestation. "Initially, [a] country is characterized by a high percentage of land under forest cover and a low rate of deforestation. Then deforestation accelerates, slows down, forest cover stabilizes and eventually starts recovering."[56] A country in the early stages of deforestation - for instance, the Democratic Republic of the Congo - would not have much to gain from an incentive scheme that calculates awards against a BAU scenario. This could create the perverse incentive to deforest initially, in order to benefit from a more favorable BAU baseline in the future. Countries that have reached the later stages of forest transition and have more or less ceased to deforest (indeed, some may already have begun rejuvenating forest stocks) may also have a relatively unfavorable reference level, depending upon the period used to calculate the baseline. Countries like China and India would fall into this category.[57] Countries in the middle (those with high existing rates of deforestation), such as Brazil and Indonesia, would stand to gain the most from a scheme that measures future performance against a BAU baseline.

In essence, "focusing on only current deforestation would mean that countries currently removing forest most rapidly could benefit the most."[58] It is estimated that 18% of the world's tropical forest carbon is located in 11 countries that have high forest levels but low historical rates of deforestation.[59] Although the impact of leakage remains very difficult to predict due to the general lack of experience

[56] Ibid, 55.
[57] Ibid.
[58] Stern, (2007), 618
[59] Foncesca et al, (2007), fn. 25

with REDD+ programs,[60] it is not difficult to imagine that efforts to reduce deforestation in one country could encourage logging companies to simply shift to another.[61] A policy with these perverse incentives would not only result in an "increase in atmospheric carbon [but also] a likely loss in biodiversity."[62] Furthermore, a historical baseline or stock approach may not even motivate poor performers to completely halt or even significantly reduce deforestation, as this could render their future baselines less favorable.

At present, most proposals suggest that problem of incentives should be addressed through the calculation of a "crediting" baseline or adjusted reference stock that has been artificially altered to address national circumstances. This would take historical deforestation into account, but would also control for a country's deforestation stage, and potentially other considerations such as the country's poverty level, given that capacity to implement REDD+ may be inversely related to wealth.[63] Some proposals go even further and suggest that baselines should be generated through elaborate modeling tools that incorporate a wide range of variables such as "population density and growth, forest area, economic growth, commodity prices, governance variables, and location (tropical and regional)."[64] Still other proposals suggest that reference baselines and stocks could be negotiated individually, taking historical trends and modeling results into account.[65] Indeed, some see the individually negotiated baseline or stock as a potential tool to "address fairness and equity issues as well as to provide incentive for countries – in particular, countries with historically declining stocks – to participate in the agreement."[66] In practice, this may mean that a given country's negotiated terrestrial carbon stock or emissions baseline "may either

[60] Wunder, (2008), 69
[61] Ebeling & Yasué, (2008), 1920
[62] Foncesca et al, (2007), fn. 25
[63] Angelsen, (2008), 56
[64] Ibid, 57
[65] Plantinga and Richards, (2010), 290-291
[66] Andersson et. al., "International Forest Carbon Sequestration Management", 302 Helm Hepburn 15 (2009) at 308.

be higher or lower than the actual stock" at the start of a reporting period,[67] and that in some cases, investors stand to pay for fabricated achievements or "tropical hot air."

While these solutions might help to address the initial inequity created by baseline incentive schemes, they have their own major problems. The determination of reference baselines and stocks through individual negotiation holds the risk that countries with greater resources at their disposal and strong negotiating teams will secure more favorable outcomes, only resulting in further inequity.[68] Such a country-by-country approach to calculation of baselines would not be transparent, and it remains "questionable whether a 'black box' baseline figure will be acceptable" to UNFCCC parties.[69] Poor countries with a lack of negotiating capacity could stand to lose.

Even more problematic, the modification of baselines and stocks could create "tropical hot air", or emissions reductions that are only illusory.[70] Experience with the CDM has demonstrated that, in order to attract investment, a program's results must be genuine. At the Cancun Summit, the Parties emphasized that global REDD+ programs suitable for the UNFCCC must be "results-based". This will only work if REDD+ incentive schemes eliminate the potential for "tropical hot air" – at least to the greatest degree possible.

Finally, it is surprising that existing discussions on REDD+ incentive schemes do not seem to consider the possibility that the costs of preserving and enhancing stocks may differ for countries in various stages of the forest transition. This paper anticipates that the per-unit marginal cost of reforestation and afforestation is likely to increase the more a country's actual forest stocks expands. If this assumption proves accurate, even with an adjusted reference

[67] Id. at 305.
[68] Angelsen, (2008), 62
[69] Ibid, 57
[70] Ibid, 63

level or reference stock, countries with existing forest levels above a certain threshold might not have much motivation to augment their stocks.

A New Way Forward – Calculating Awards that Account for National Circumstances

The success of global REDD+ program may well hinge upon their ability to offer incentives that work for both historically good and poorer performers. However, policymakers need not resort to non-transparent, negotiated baselines or reference stocks in order to achieve equity and broad country participation. Instead, this paper proposes that REDD+ programs employ a graduated incentive scheme that offers higher awards for historically good performers, and accounts for the increased cost of reaching higher levels of forest preservation and expansion of forest stocks. This could be achieved by assigning countries to "compensation brackets" that determine their relative awards per-unit of avoided deforestation or unit of reforestation/afforestation. Bracketing would be determined on the basis of a country's historical rate of deforestation and existing level of forest cover. Thus, in a CR scheme, the lower a country's rate of historical deforestation, the higher and more favorable its bracket. Similarly, in a NI scheme, the higher a country's existing level of forest cover, the higher the bracket.

Ideally, a global REDD+ program would combine elements of both the CR and NI approaches. As has been discussed in the comparison of the two schemes above, CR is principally focused on maintaining existing stocks, and does not offer rewards for the expansion of stocks. The NI approach, on the other hand, would provide an incentive for countries to increase their stocks, but would not compensate countries for avoided deforestation unless this could be factored into an adjusted reference stock. As discussed above, NI schemes may also effectively encourage participants to continue harvesting of certain existing, natural forests, provided that they are able to expand net stocks with fast-growing plantations. Consequently, this paper recommends that the global REDD+ effort, pursued

under the banner of the UNFCCC, combines the CR and the NI approaches, and compensates countries for both the maintenance of existing stocks, and the reduction of deforestation rates. This is indeed consistent with the decisions taken by the Parties at Cancun, and countries have been urged to undertake both avoided deforestation and stock expansion activities. Even if this approach turns out to be unfeasible for some countries and the two approaches cannot be combined in practice, the recommendations on bracketing would remain valid for both types of activities.

Avoided deforestation and stock expansion – a compensation scheme with two ways to pay. Not all countries with high rates of deforestation also have low rates of forest cover, or vice-versa. Rather, most developing countries are likely to fall into four general categories: 1) high forest cover/high deforestation rate, 2) high forest cover/low deforestation rate, 3) low forest cover/high deforestation rate, and finally, 4) low forest cover/low deforestation rate. In order to ensure value for money as well as equity, it makes sense to compensate these four categories of countries differently. In a REDD+ program that combines the CR and NI approaches, a country might be placed in one compensation bracket for incentives to avoid deforestation of existing forests, and another bracket for the expansion of stocks. Figure 1, below, provides a general overview of the four general categories, along with specific recommendations on compensation.

Figure 1: country categories and options for compensation[71]

Current compensation outlook: • Lower potential to benefit from NI scheme against BAU forest stock • High potential to benefit from CR/AD scheme against BAU deforestation baseline ***Proposed compensation approach***: • Pay more per unit of forest added to BAU forest stock • Pay less per unit of avoided deforestation against BAU baseline	**High Forest Cover High Deforestation Rate** (Ex: Brazil, PNG) An est. 10 countries with 39% total forest area Approx. 48% of all forest carbon Accounts for an est. 47% of all deforestation carbon	**High Forest Cover Low Deforestation Rate** (ex: Guyana, Suriname) An est. 11 countries with 13% total forest area Approx. 18% of all forest carbon Accounts for an est. 3% of all deforestation carbon	***Current compensation outlook:*** • Low potential to benefit from NI scheme against BAU forest stock • Low potential to benefit from CR/AD scheme against BAU deforestation baseline ***Proposed compensation approach***: • Pay more per unit of forest added to BAU forest stock • Pay more per unit of avoided deforestation against BAU baseline
Current compensation outlook: • High potential to benefit from NI scheme against BAU forest stock • High potential to benefit from CR/AD scheme against BAU deforestation baseline ***Proposed compensation approach***: • Pay less per unit of forest added to BAU forest stock • Pay less per unit of avoided deforestation against BAU baseline.	**Low Forest Cover High Deforestation Rate** (ex: Thailand, Madagascar) An est. 44 countries with 28% total forest area Approximately 22% of all forest carbon Accounts for an est. 48% of all deforestation carbon	**Low Forest Cover Low Deforestation Rate** (ex: Angola, India) An est. 15 countries with 20% total forest area Approximately 12% of all forest carbon Accounts for an est. 1% of all deforestation carbon	***Current compensation outlook:*** • High potential to benefit from NI scheme against BAU forest stock • Low potential to benefit from CR/AD scheme against BAU deforestation baseline ***Proposed compensation approach***: • Pay less per unit of forest added to BAU forest stock • Pay more per unit of avoided deforestation

This paper does not make express recommendations on the number of compensation brackets that should be employed, or the specific per-unit award levels to be associated with each. This should be determined on the basis of economic considerations, including the relative cost of activities to countries within different stages of forest transition. For the ease of explanation, the paper assumes that there are only four compensation brackets for avoided-deforestation program elements (CR), and another four brackets for stock expansion elements (NI). Also for purposes of explanation, fictitious values have been assigned to the varying compensation brackets, with USD 20 as the base payment, and USD 5 added each time a country moves up into a higher bracket.

[71] Country categorization adapted from Fonseca et al. (2007)

Figure 2: hypothetical compensation scenario in a bracketing system

	Avoided deforestation (CR) - payment per unit	**Stock expansion – payment per unit**
Bracket 4	USD 35	USD 35
Bracket 3	USD 30	USD 30
Bracket 2	USD 25	USD 25
Bracket 1	USD 20	USD 20

To illustrate how this system would work, we start with the example of a country like Papua New Guinea, which has a high recent rate of deforestation, but that still holds a reasonably large stock of standing forest. Because of its existing high deforestation rate, Papua New Guinea would already stand to reap a large number of award "units" for avoided deforestation under a CR scheme. Thus, a lower per-unit award might still offer a significant incentive for Papua New Guinea to slow its deforestation rate. However, due to its already substantial level of forest cover, Papau New Guinea would be less likely to undertake further forest expansion activities under an NI scheme, unless the per-unit award was sufficient to meet or exceed the marginal costs of per-unit forest expansion. Under our combined CR and NI bracketing system, Papua New Guinea might be placed in bracket 1 for its avoided deforestation activities, and bracket 3 for its stock expansion activities. For every unit of deforestation it avoids, it would receive USD 20, and for every additional unit of forest stock that it adds, it would receive USD 30.

As another example, a country with a very low rate of deforestation and a low level of forest cover (e.g. Angola) might be placed in bracket 4 for its avoided deforestation activities, because it would stand to gain few individual award "units" under a CR scheme. However, it could be placed in bracket 1 for its stock expansion activities, because with very small existing forest stock, it would likely be able to garner significant gains under an NI scheme, but at a relatively low per-unit cost.

Assigning bracket levels and bracket "graduation". It is proposed that, after an initial "readiness phase" during which a country develops a comprehensive REDD+ implementation plan, puts the necessary monitoring and evaluation tools in place, and accurately assesses both its business as usual rate of deforestation and the make-up of its existing forest stocks, a country would then be assigned to its initial compensation brackets and begin its multi-year "implementation phase". Once the first implementation phase is complete, the country would receive the first round of award payments for each unit of avoided deforestation and expanded stock. Verification of gains at the end of the first implementation period could also serve as a basis to revisit the country's position within the bracketing scheme. If deforestation has been reduced below a certain level and stocks have been expanded, the country might be eligible to move into a higher compensation bracket for both types of activities. If the country's performance has worsened, it could be shifted into lower, less favorable compensation brackets. It is debatable whether a country should be able to receive awards for the expansion of forest stocks if the overall rate of deforestation has increased. In such an instance, the country might be required to forfeit its awards for stock expansion gains, or perhaps the awards could be held aside and only disbursed if performance improves in the future. In the case of very high performance, some final provision would need to be made for countries that lower their deforestation rates to zero, or expand their forest stocks to the highest possible level. In this situation, maintenance payments could be issued for such countries, in return for continued preservation of existing forest stocks and the suppression of deforestation.

Establishing deforestation rates and existing forest stock levels. As discussed above, this paper posits that baselines and reference stocks should be set consistently, using clear rules that are applicable to all countries. Negotiation should be avoided, and "tropical hot air" should be minimized to the greatest extent possible. Beyond these general observations, the paper does not provide

specific recommendations on the calculation of baselines. For the purpose of assigning a bracket for avoided deforestation activities, a BAU deforestation rate would suffice.

However, when setting reference stocks for expansion activities, a few additional remarks are warranted. First, not every participating country will have the same topographic and demographic features, thus making the expansion of stocks easier for some and more difficult for others. While it would be unreasonable to try to control for all differences between countries, it is recommended that stocks be assessed against the total volume of a country's territory that is *deemed suitable for forestation*. Consider an arid country that does not have a great deal of standing forest (Burkina Faso would be a good example). It would be unfair to place such a country in a lesser stock expansion bracket just because it has a low total percentage of forested land. The costs to expand stocks in such a country might be much higher than the costs in another with comparable forest cover, but with better conditions for forest cultivation. In order to be equitable and effective, it is proposed that a country's level of forest cover should be compared to its total volume of territory that is suitable for reforestation and afforestation activities. Demographic elements such as population density might also be taken into account. This could also help to avoid negative impacts on fragile ecosystems such as marshland, where afforestation activities could actually be harmful to the preservation of biodiversity. Of course, should the determination of the total volume of territory suitable for stock expansion be subject to individual negotiation, this could again lead to a loss of transparency. It is recommended that a single set of criteria be applied to all countries. Determination of the reference stock could be addressed during a country's "readiness phase" and set out in detail in its national plan.

Adjusting for measurement errors. This paper recommends the creation of a limited number of brackets for REDD+ programs, rather than a progressive or

compensation scale. A set of discrete brackets offers the advantage of a system that is clear, easily communicated and manageable from a forecasting perspective. But it holds the risk that a minor measurement error could unfairly relegate a country to a lower or higher compensation bracket than is actually deserved. There are several possible solutions to this problem. First, the system used to determine a historical deforestation rate or forest stock in a given country could generate an interval estimate, rather than a point estimate. If the values in a country's interval estimate straddle the threshold between two compensation brackets, the country could automatically be assigned to the higher of the two brackets. Although this solution would not correct for a situation of an inflated estimate, it would likely avoid serious injustice for a country that is performing better than its assessment indicates.

As another option, whenever a country's estimate places it on the cusp of another compensation bracket, whether lower or higher, the REDD+ program could make provisions for an interim assessment before the completion of the implementation period. For instance, if a given implementation period is set for seven years, a reassessment of the deforestation rate and stock level could be carried out in year two or three. If the country has conclusively moved up into a higher bracket during that time, it could receive the higher value per-unit award for gains achieved throughout the whole of the implementation period, not just the portion that remains.

Other benefits of the bracketing system. Recalling the guidance set out by the Parties at Cancun, a global REDD+ program should address "risks of reversals", otherwise known as the issue of "permanence", as well as "displacement of emissions", which is often referred to as "leakage". With an equitable compensation scheme, all developing countries will hypothetically have an incentive to participate, and international leakage should not present a major problem. Permanence could also be addressed with this system. If awards are

set correctly, countries will benefit from remaining in the REDD+ program and graduating to higher compensation brackets.

FINANCING FOR GLOBAL REDD+

Although the source of financing is not a major focus of this paper, it some warrants brief discussion due to the nature of the proposed incentive scheme. Current positions on funding for REDD+ are aligned in two broad groups. "One group supports the use of both market and non-market funding, and the other advocates for non-market funding only."[72] Past experience from the CDM shows that buyers have been wary of forest credits because of concerns of liquidity.[73] However, there is also a legitimate concern that reliance on contributions from bilateral donors may not address the full funding need. This paper advocates for a mix of market and donor funding[74]. Under such a scheme, countries in the lowest bracket could receive the average market value of a credit for a given period, whereas countries in higher brackets could receive that same amount, plus a top-up, funded either from remaining credit value or from donor sources. While this is merely a suggestion, the fact remains that a graduated award scheme that attempts to compensate countries for the real costs of program activities could mean that more award funding is needed, and that a market-only approach may not be sufficient.

CONCLUSION

If REDD+ is to be truly successful, it must be global. The upfront costs to countries to participate in REDD+ are likely to be substantial, even with support from donors throughout the inception and implementation phase. Incentives must be set correctly at the start, and must be appropriate for all countries, regardless of where they are in the cycle of deforestation. By using a policy of graduated incentives, REDD+ could address equity concerns, while avoiding non-

[72] O'Sullivan and Saines, (2009), 593
[73] Barrett, (2010), 252
[74] See Stockwell et al, (2009), 163-164

transparent baselines and the risk of "tropical hot air". It would also take into account the rising costs associated with higher levels of performance, thereby avoid the mistakes that characterized GAVI's initial results-base financing scheme. Finally, this solution would address concerns of permanence and global leakage by incentivizing a large variety of developing countries to participate, and by keeping them in the REDD+ program through the promise of greater rewards commensurate with performance.