Reference Levels and Payments for REDD+
Lessons from the Recent Guyana–Norway Agreement

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A Report of WWF Projects:
Institutions and Funding Arrangements for REDD+ and
Building MRV Capacity and Tools for REDD+

This is a joint technical report of two ongoing WWF projects: "Institutions and Funding Arrangements for REDD+" and "Building MRV Capacity and Tools for REDD+." These projects are part of a larger three-year WWF program titled "REDD+ for People and Nature," which supports local-level REDD+ activities in three countries (Democratic Republic of the Congo, Indonesia, and Peru) and technical developments in several REDD+-related thematic areas, including the two mentioned above.

This report (a) discusses the various definitions proposed for REDD+ reference levels (RLs) and reference emission levels (RELs) and (b) asserts that an RL to track REDD+ progress is not necessarily the same as a reward or crediting line and that the two concepts can and should be separated. Our analysis assesses (c) the pros and cons of several proposals of RLs/RELs to track REDD+ progress, as well as (d) the pros and cons of several schemes to reward REDD+ countries. We (e) refer to the recent Guyana–Norway agreement to discuss how these REDD+ reward schemes could be implemented on the ground. The paper (f) concludes with lessons regarding the establishment of RLs and the future of REDD+ financing.

We are thankful to WWF colleagues who commented on a previous version of this paper. We have done our best to address all those comments here. Any remaining glitch is the sole responsibility of the authors.

Likewise, this is a technical document, the sole purpose of which is to contribute to the discussion among REDD+ practitioners. Hence, it does not purport to represent the official positions of WWF or its donors.

1. The issue

A "reference level" (RL) or "reference emissions level" (REL) is a benchmark or baseline against which the world, a country, or a region can measure its future progress (or lack thereof) in reducing emissions and sequestering carbon.

Over the past several years, there have been varying proposals, both within and alongside the UNFCCC, regarding the establishment of such reference levels for forest-related emissions (REDD+). This debate is complicated by the fact there is no consensus among various REDD+ parties on the definition of the RL/REL terms (see section 2 below). Furthermore, the discussion on reference levels has been intertwined with the issue of compensating developing countries for their REDD+ achievements.

This discussion accelerated with COP16 Cancun Agreement inviting developing countries to prepare their RLs and/or RELs and requesting SBSTA (the UNFCCC technical advisory body) to develop modalities for RL and REL, presented at COP17 in November 2011.[1] Accordingly, during 2011, SBSTA requested UNFCCC parties and experts opinions, convened an experts' workshop (Bonn, November 2011) and produced recommendations on RLs/RELs that were adopted by COP17 at Durban (December 2011).[2]

In a nutshell, the COP17 "Guideline for submissions of information on reference levels" reiterates the COP invitation to developing countries to submit their RLs or RELs estimates; avoids defining what RLs or RELs are, or proposing a specific methodology to estimate them, and instead gives developing countries total freedom to define and estimate their own RLs or RELs, provided that they comply with past and future COP and IPCC guidelines, and that submissions include complete information on how the RL/REL estimates were made. Furthermore COP17 asked SBSTA to develop guidelines to put in place a procedure to technical assess the RLs/RELs submitted by the parties[3].

In the meantime, the March 2011 Guyana–Norway agreement has moved the discussion on reference levels from theory to practice, demonstrating how bilateral partnerships are progressing as the international REDD+ mechanism is under development.[4]

This report (a) discusses the various definitions proposed for REDD+ RLs and RELs and (b) asserts that an RL to track REDD+ progress is not necessarily the same as a reward or crediting line and that the two concepts can and should be separated. Our analysis assesses (c) the pros and cons of several proposals of RLs/RELs to track REDD+ progress, as well as (d) the pros and cons of several schemes to reward REDD+ countries. We (e) refer to the recent Guyana–Norway agreement to discuss how these REDD+ reward schemes could be implemented on the ground. The paper (f) concludes with lessons regarding the establishment of RLs and the future of REDD+ financing.

[1] In UNFCCC parlance, modalities are more stringent than guidelines.
[2] See UNFCCC (2011b) and also SBSTA sites at the UNFCCC website www.unfccc.int
[3] See UNFCCC (2011b)
[4] See Guyana–Norway (2011).

2. What do RLs and RELs include?

The UNFCCC discussions have introduced RLs and RELs as two related terms, yet there is still no clear definition for either one or an explanation of how they differ.[5] Some UNFCCC documents and parties' submissions propose that RELs would track only REDD (that is, deforestation and degradation, sometimes referred to as gross emissions), while RLs would track REDD+ (deforestation and degradation, plus conservation, sustainable management of forests, and enhancement of forest carbon stocks, sometimes referred to as net emissions).[6,7] However, such interpretation is far from accepted and the UNFCCC has pressed ahead with these and many other examples of what some negotiators call "constructive ambiguity."

Outside the climate change negotiations, experts have thus far avoided the RL vs. REL debate by declaring the two terms synonymous. Meanwhile, most technical proposals focus on RED, that is, measuring forests and emissions from deforestation, and occasionally including emissions from degradation. Still, most technical proposals suggest that their approaches could eventually be extended to track other parts of REDD+.

This paper follows the technical convention that RLs and RELs are tantamount and that their purpose is to initially track emissions from deforestation with the aim of eventually encompassing all other components of REDD+. From now on we will refer to RL/RELs as RLs.

Box 1. Some UNFCCC references to RL and REL :

- Reference emission levels to demonstrate reductions in emissions from deforestation. (Decision 2/CP.13, para. 7(a), http://unfccc.int/resource/docs/2007/cop13/eng/06a01.pdf#page=8)
- Reference emission levels and forest reference levels should be developed transparently taking into account historic data and adjusted for national circumstances. (in Decision 4/CP.15, para. 7 http://unfccc.int/resource/docs/2009/cop15/eng/11a01.pdf#page=11)
- Subnational approaches should constitute a step toward developing national reference levels. (in Decision 2/CP.13 Annex, para.7, http://unfccc.int/resource/docs/2007/cop13/eng/06a01.pdf#page=8)
- Developing-country parties should be supported to develop a national forest reference emission level and/or forest reference level or, if appropriate as an interim measure, subnational forest reference emission levels and/or forest reference levels in accordance with national circumstances. (in Decision 1/CP.16, para. 71, http://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf#page=2)
- Agrees that in accordance with decision 1/CP.16, paragraph 71(b),forest reference emission levels and/or forest reference levels expressed in tones of carbon dioxide equivalent per year, are benchmarks for assessing each country's performance in implementing the activities referred in decision 1/CP.16, paragraph 70 (in paragraph 7 of Methodological guidance for activities relating to REDD+ /Decision 4/CP.15" (UNFCCC 2011b)

[5] See UNFCCC (2010,2010b, 2011, and 2011b).
[6] Decision 2/CP.13, para. 7(a), http://unfccc.int/resource/docs/2007/cop13/eng/06a01.pdf#page=8.
[7] See Papua New Guinea (2009) and also the discussion in Meridian (2011).

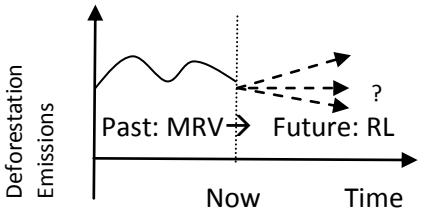
3. RL and REL are not the same as MRV

Monitoring, reporting, and verification – an MRV system-- measures historical or current event, including tracking carbon densities and estimating emissions from deforestation and degradation. Clear guidelines for MRV already exist (e.g., IPCCC 1996 and 2006 versions).

Some parties equate establishing a reference line with having in place a good MRV system. A functional MRV system will generate important data required to establish a sound reference level, but the MRV is not the RL itself. On the one hand, MRV is about tracking change, and in the case of historical emissions, it is about tracking past changes, while RLs are about deciding on the appropriate benchmark to assess future emissions (see Figure 1).

On the other hand, the monitoring component of the MRV system generates the necessary historical data that is in turn used, following different approaches discussed in the sections below, to define the RLs. Hence, it would be appropriate to say that a good MRV system is a necessary but not sufficient condition to establish and use a sound RL. Regarding future emissions, a good MRV system would allow us to measure actual changes and see how they differ from a reference level, whatever that reference level may be.

Figure 1. Relation between a MRV system and the establishment of RL



4. RL and REL between past trends and future scenarios

Following the forest transition model, da Fonseca et al. (2007) proposed a classification of forest countries based on (a) the percentage of the country covered by forest and (b) the pace of deforestation.[8] Griscom et al. (2009) have used this approach to perform a cluster analysis of FAO 2010 forest data for 56 tropical forest countries, resulting in a forest classification system consisting of five groups: high forest-cover, low-deforestation-rate countries (HFLD); high forest-cover, medium-deforestation-rate countries (HFMD); high forest-cover, high-deforestation-rate countries (HFHD); medium forest-cover, medium-deforestation-rate countries (MFMR); and low forest-cover, low-deforestation-rate countries (LFLD) (see Table 1 for details on the classes).

[8] The forest transition model predicts that forested countries would go through an initial period of low deforestation rates followed by accelerated deforestation that would strongly reduce the size of their forests, then followed by dwindling forest cover and low deforestation, and ending on modest forest increases. See Rudel et al. (2005).

Table 1. Country classification based on forest cover and deforestation rate

1.Group	2. Forest cover	3. Annual deforestation	4. Number of countries	5. Predominant location	6. Accounting for how much of tropical carbon stocks?
HFLD	85%–100%	0%–0.1%	6	Latin America	10.5%
HFMD	50%–85%	0.04%–0.8%	11	Latin America	63.7%
HFHD	50%–95%	0.8%–1.5%	6	Southeast Asia	5.2%
MFMR	35%–50%	0.3%–0.8%	7	Scattered	5.0%
LFLD	1%–35%	0%–0.3%	26	Africa	15.5%

Source: Griscom et al. (2009), Table 2 and Figure 4.

The above classification and the forest transition theory on which it is based has been used in two overlapping REDD+ discussions, one referring to what should be an appropriate RL to track progress in attaining REDD+ and the other on how to allocate payments among high- and low-deforestation countries. We turn to these two issues in the following points.

5. A reference level to track absolute or relative REDD+?

Countries that have committed to an absolute reduction in their emissions (known as a "cap") use a historical benchmark as a reference level (e.g., the 1990 emissions level in the case of Annex 1 countries' first commitment period of the Kyoto Protocol). Meanwhile, most developing countries have thus far committed to relative reductions, namely reductions below a business as usual (BAU) scenario.[9]

Although developing countries' pledges to reduce emissions from deforestation and forest degradation are part of their BAU-based pledges, the REDD+ discussion is about achieving absolute reductions in global emissions. The Cancun Agreement, for instance, states the "… collective aim to slow, halt and reverse forest cover and carbon loss."[10] Major forest countries have tabled absolute reduction goals. For example, in Brazil the government has established the ambitious goal of reducing forest emissions by 70% of annual levels between 1996 and 2005 by 2018.[11] In addition, a significant number of ministers from developing countries (Indonesia, Peru, and Paraguay, to name a few) have endorsed the global target of achieving zero net emissions from deforestation and degradation by 2020.[12,13]

In this context, three types of approaches to a REDD+ reference level have been proposed: the strictly historical, the BAU scenarios, and an intermediate historically based with adjustments (also referred to as a hybrid approach). Although these proposals aim to track emissions, they are actually based on basic deforestation rates.[14] We illustrate this point in Table 2 and Figure 2 below.

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[9] See COP decision 1/CP.16 on pages 9/10: "Agrees that developing country Parties will take nationally appropriate mitigation actions in the context of sustainable development, supported and enabled by technology, financing and capacity-building, aimed at achieving a deviation in emissions relative to 'business as usual' emissions in 2020" (http://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf#page=2).

[10] See UNFCCC (2011) title C.

[11] Quoted in *The Guardian* 12/3/2008; see http://www.guardian.co.uk/environment/2008/dec/03/forests-brazil-amazon-carbon-emissions.

[12] See http://wwf.panda.org/what_we_do/how_we_work/conservation/forests/news/?135381/Ministers-commit-to-zero-net-deforestation-by-2020.

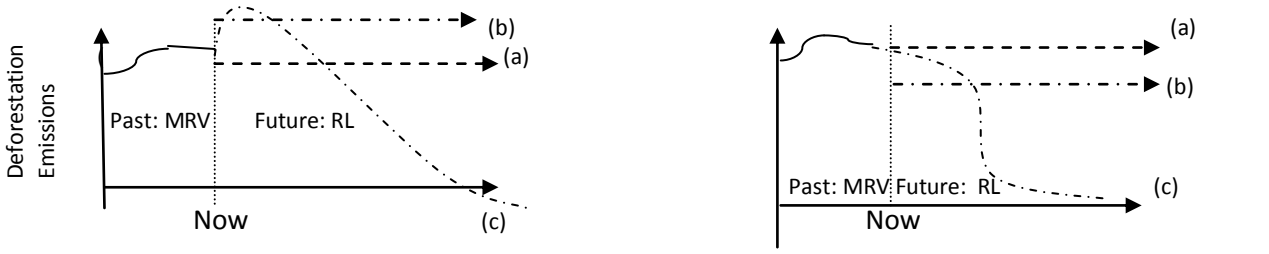
[13] FCCC/AWGLCA/2011/INF.1. page 8. http://unfccc.int/resource/docs/2011/awglca14/eng/inf01.pdf.

[14] Deforestation rates (DR) are then used to estimate emissions of CO_2 by multiplying them by the country forest size in hectares (F_h), by an estimate of tons of carbon stock per hectare ($C_{t/h}$), and then by 3.67 to convert tons of C into tons of CO_2 so that Emissions in tons of $CO_{2)}$ = DR (Fh. $C_{t/h}$.3.67).

Table 2. Reference levels

Approach	Examples
(a) Strictly historical: For example, to establish an RL for 2011–2015 based on strictly historical values, a country could set the RL based only on its average annual rate of deforestation for the 2000–2010 period.	• Santilli et al. (2005) suggest a strictly historical RL to be revised every three or five years to include more recent historical rates of deforestation. • Joanneum Research et al. (2006) propose, instead of the average value for the reference period, a corridor approach with minimum and maximum values. Maximum and minimum values are established based on observed past maximum and minimum values.
(b) Historical adjusted: In this scenario, the RL is based on historical emissions but adjusted to take account of "national circumstances."[15]	• Achard et al. (2005) advocate establishing higher-than-historical rates for countries with HFLD. • Mollicone et al. (2007) suggest raising the RL for low-deforestation countries to half the global historical deforestation rate. • Strassburg et al. (2008) explore the outcomes of establishing a universal RL equal to the global average rate of deforestation. In this case, the RL will be above the historical RL of low-deforestation countries and below the historical RL of high-deforestation countries.
(c) Reference level based on modeling a BAU future: This approach is based on either a variant of the forest transition model or other types of modeling or analytical approaches.	• Strasburg and Creed (2009) introduce the Terrestrial Carbon Project methodology, which applies three levels of analytical filters to estimate the "at risk" portion of a country's forests and then assumes a BAU scenario where the "at risk" forests will be deforested in 20 years.

Figure 2. Examples of possible RL in countries with low or high levels of deforestation



RL: (a) Strictly historical; (b) Historical adjusted upward; (c) Based on modeling (see Table 2).

There is no agreement yet in the UNFCCC on which of these three approaches or their variants would render the best RL or if the same approach should be embraced by all countries. Thus far, the majority of parties' submissions to the UNFCCC, in addition to most technical proposals, support an RL that is based on historical values (see a and b in Figure 2 and Table 2) and is periodically updated.[16,17]

Keeping RL/REL equal to historical values is the only yardstick that enables us to assess if we are actually achieving REDD+—that is, tracking if we are achieving real, absolute emission reductions. Plus, a historical

[15] See the Cancun Agreement (UNFCCC, 2011), article 71, point b.
[16] See the Little REDD Book at http://www.theredddesk.org/ for UNFCCC parties' proposals on RLs.
[17] For example, COP decision 4/CP.15 "Recognizes that developing country Parties in establishing forest reference emission levels and forest reference levels should do so transparently taking into account historic data, and adjust for national circumstances, in accordance with relevant decisions of the Conference of the Parties"
http://unfccc.int/resource/docs/2009/cop15/eng/11a01.pdf#page=11.

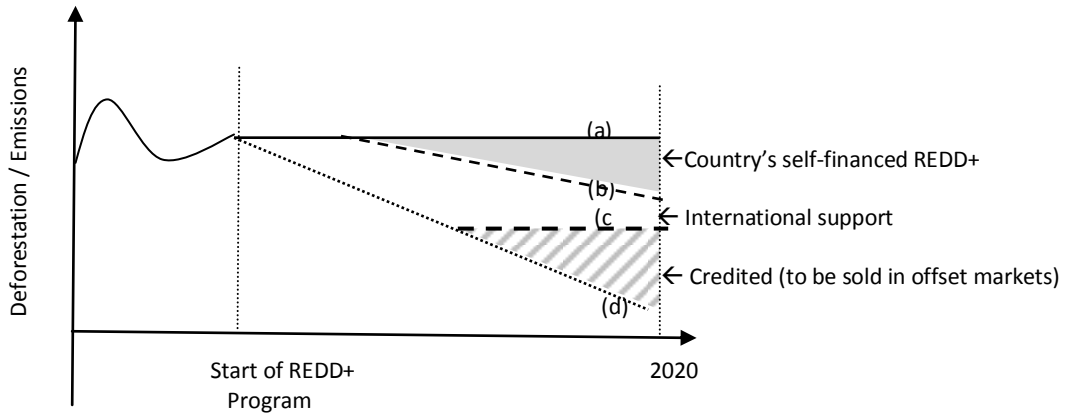
RL/REL can still be forward looking, in that the past is usually a good predictor of the short-term future, and periodic recalculation of the RL/REL with most recent information would enable historical RLs to be accurately updated to reflect real-time changes.

In addition, a historical RL/REL is a simple and transparent approach. More complex models have their supporters too, but skeptics point to their opacity, low predictive capacity, and, as has been pointed out for the forest transition model, the danger of overestimating deforestation and emission risk.[18]

6. Moving from establishing an RL to the discussion on how to compensate REDD+ countries

Basically, a reference level is not a crediting line. Consider Figure 3 below, which depicts a developing country's REDD+ progress. Following our previous discussion, the one and only RL line here is "a," the baseline against which the country can measure its progress in reducing emissions. Still, in many discussions, this RL is equated to line "b," the benchmark to claim international support, or, worst of all, with "c," the benchmark to ask for crediting of emission reductions to be sold in markets for carbon offsets.

Figure 3. Reference level and other benchmarks



(a) Country reference level (RL or REL); (b) Benchmark to trigger international support; (c) Benchmark to trigger crediting of emissions to be sold in the offset market; (d) Country REDD+ pledge (i.e., percentage of emission reductions below the baseline by target year).

Defining the RL does not necessarily address who is going to pay for achieving emission reductions below it—the REDD+ country? International financial support? Or offset markets? In Figure 3, any emission reductions below "a," the reference level, are REDD+ progress regardless of who pays for it.

Certainly, lines "b" or "c" could disappear and "a" remain, meaning that any REDD+ cost would be internationally funded or credited to be sold in would-be offset markets. Yet, this is just one alternative, and it is not what we are seeing right now on the ground, as in the case of the Guyana–Norway agreement. Regarding an agreement on RL/REL for tracking REDD+, it would be better for the UNFCCC to keep this discussion separate from the issue of forest carbon financing (see below for more detail on this issue).

[18] For example, Griscom et al. (2011) point out that the "forest transition is modeled on the XIX century patterns of deforestation in Europe and the US and is not transferable to deforestation trends in XXI century developing countries."

Going back to lines "b" and "c" in Figure 3, the lines that would trigger international payments, early in the international discussions on REDD it was acknowledged that paying exclusively for REDD below the historical reference level would provide little incentive to low-deforestation countries. It became clear that some kind of additional payments to low-deforestation countries for the conservation of existing forest stocks may be needed in order to avoid leakage from high-deforestation countries or regions (Angelsen, 2008) and not penalizing countries that have been effective in stemming deforestation (e.g., Costa Rica).

The issue of how to reward low-deforestation countries came to the forefront of the COP14 climate negotiations. These discussions, which established the framework for the Bali Road Map and laid the foundation for REDD+, were shaped by:

- Developing countries' expectation that all or most REDD+ should be voluntary and foreign paid. Consider the alternative: if REDD+ were part of nationally established mitigation targets, then low deforestation would be its own reward. If you have little deforestation, you have less mitigation to do, and you save a lot of mitigation expenditures.

- Developed countries' insistence that eventually most payments for REDD+ should come from "MRVed" emission reductions.[19] This introduces a new problem: protecting existing carbon stocks may result in no emission reductions and hence offer no real credits that could be used as offsets. Therefore, paying for carbon stocks out of would-be offset markets may render deals difficult or even impossible.

- Environmental organizations' interest in funding for the conservation of natural forest stocks that provide many other valuable ecological services beyond carbon sequestration. Additionally, NGOs have expressed that rewarding forest conservation should be done in a way that secures environmental integrity so that no bogus emission reductions (hot air) are credited in the process.

7. Moving from establishing an RL to the discussion on how to compensate REDD+ countries

Over the last five years there has been a rich technical discussion on alternative approaches to rewarding REDD+ countries and on how different reference levels enter into these approaches. Table 3 presents them divided in two groups: "without redistribution of payments" and "with redistribution of payments." This classification facilitates several important insights into the ongoing RL discussion.

- Both groups show there is no need to manipulate historical RLs in order to bring additional payments to low-deforestation countries. Most proposals achieve this by combining countries' historical RLs and other yardsticks, like the world-average historical RL or the size of existing forests.

- Proposals "without redistribution of payments" reward low-deforestation countries above their historical deforestation levels and do this without subtracting from payments to high-deforestation countries. There is nothing intrinsically wrong with this approach, provided that funds are available and that these additional payments are not used to create "hot air." These are two major caveats that will be discussed further below.

- Approaches in the second group, "with redistribution of payments," also reward low-deforestation countries well above their historical RLs but do so by subtracting from payments for emission reductions

[19] This is sometimes called the third phase of the three-phased approach to REDD+ that was recently adopted by the Cancun Agreement per article 73 of UNFCCC (2011).

in high-deforestation countries and could therefore ensure environmental integrity and additionality. In the stock-and-flow approach, these attributes are self-evident because payments for stock conservation are made out of a levy on payments for hard emission reductions assessed against historical RLs. The downside of this approach is that if there are no hard emission reductions, there is no money to distribute for forest stock payments.

Table 3. REDD+ rewarding schemes

<table>
<tr><td rowspan="3">Without Redistribution of Payments</td><td>a) Compensated reduction (Santilli et al., 2005): This approach will reward LDCs if they keep deforestation below a negotiated baseline that, for LDCs, is placed above historical deforestation rates.</td></tr>
<tr><td>b) EU Joint Research Council (JRC) (Achard et al., 2005): This scheme rewards LDCs if they keep deforestation below half the global average deforestation rates.</td></tr>
<tr><td>c) Terrestrial Carbon Group (Strasburg and Creed, 2009): Under this scheme, LDCs are rewarded if they keep deforestation below a BAU scenario that would be above historical deforestation rates.</td></tr>
<tr><td rowspan="2">With Redistribution of Payments</td><td>d) Combined incentives (Strasburg et al., 2009): All forest countries are rewarded based on a combination of their own achievements against their historical reference lines and their performance against world average deforestation:

CI: α (CHRL - CAD) + (1 - α) (WHD - CAD).

CHRL=country historical reference line; WHD=world historical reference line; CAD=country actual deforestation or emissions in the year in question; α=weighting factor $0 < \alpha < 1$.

Note:
a. The second element in CI formula will be negative for countries with deforestation rates higher than the global average and will be positive for countries with deforestation rates lower than the global average.
b. If the weighting factor “α” is the same for all participant countries, the sum of all country payments would be equal to payments for hard emission reductions, hence ensuring environmental integrity and additionality.
c. As in the stock-and-flow approach (see below), if there is no hard emission reduction going on in high-deforestation countries, there is no money to be redistributed to LDCs.</td></tr>
<tr><td>e) Stock and Flow (Cattaneo, 2008 and 2009): This approach withholds a percentage of payments for emission reductions relative to the historical RL to pay for forest stocks:

(1-β) (CHRL - CAD) + $\sum \beta$ (CHRL - CAD).CF/$\sum$CF.

CHRL=country historical reference line; CAD=country actual deforestation or emissions in the year in question; β=deduction to payments for deforestation reduction; $\sum \beta$ (CHRL - CAD) fund made up with all the collected deductions; CF=country forest area (ha); $\sum$CF=world forest area that composes part of the REDD scheme (ha).

Note: If there are no hard emission reductions going on in high-deforestation countries, there are no payments to be taxed and redistributed to LDCs.</td></tr>
</table>

There is a substantial amount of comparative analysis considering the pros and cons of several of these reward systems in terms of, among others, efficacy (amount of emission reductions that they could achieve), efficiency (cost per unit of emission reductions), and equity (distribution of payments among forest countries). These assessments favor redistribution schemes, in particular the stock-and-flow approach.[20]

Notice, though, that by definition, redistribution schemes can only work if a large number of high-deforestation countries are participating in a worldwide REDD+ scheme and are delivering substantial emission reductions below their historical RL/RELs. Otherwise, there is nothing to redistribute. Hence, in the real world of country-to-country agreements and low advances in REDD+ achievements, the following apply:

- The stock-and-flow approach cannot be applied to a bilateral REDD+ agreement with a low-deforestation country because there are no hard emission reductions to impose a levy on. Alternatively, the stock fund could be made up from other sources (e.g., government payments), but then the system would fall back into being a "without redistribution scheme."

- The combined incentives approach can be applied to a bilateral REDD+ agreement with a low-deforestation country; however, if there are no high-deforestation countries involved, it would also fall back into being a "without redistribution" approach.

Even if all or a substantial number of REDD+ countries agree to participate in a "with redistribution scheme," there will be a considerable period—decades probably—of shortfalls. That is because low-deforestation countries (or countries with large forests in the stock-and-flow approach) are immediately qualified to claim all their reward, while it will take decades before substantial emission reductions are achieved in high-deforestation countries to allow the redistribution schemes to work.

The bottom line is that reward schemes with redistribution are probably the best long-term solution for a world-wide REDD+ scheme. However, the political feasibility could be in question, and furthermore, establishing these systems will require putting in place nonredistribution reward schemes for some considerable period of time. This raises the issues of where the money will come from and what it will be paying for. The recent Guyana–Norway agreement illustrates this discussion.

8. Guyana's search for REDD+ payments

Guyana is an example of a high-forest-cover, low-deforestation country. Recent estimates indicate that Guyana has 18.4 million hectares (approximately 76% of the country) covered by tropical forests and annual deforestation rates as low as 0.01% to 0.067% per year (Guyana–Norway 2011). Guyana was and remains an early and committed REDD+ mover. As early as 2006, President Bharrat Jagdeo made a pledge to protect all of the country's forests in exchange for international support for Guyana's green development programs.[21]

In 2008 the Government of Guyana hired consulting firm McKinsey to estimate Guyana's future deforestation rates, hoping to elicit international payments for keeping deforestation rates below predicted future scenarios. McKinsey delivered an apocalyptic scenario in which deforestation climbed to over 4% a year.[22] The study

[20] See Busch et al. (2009); Cattaneo et al. (2010); Cracknell (2010); and Griscom et al. (2009 and 2011).
[21] Quoted by the BBC, see http://news.bbc.co.uk/2/hi/science/nature/7603695.stm.
[22] This would be more than 100 times Guyana's current deforestation rate but still in the realm of possibility, as demonstrated for example, by past bouts of high deforestation in Brazil's Amazonian state of Pará.

claimed that all of Guyana's forests outside protected areas would disappear in 25 years unless the world paid Guyana some USD 580 million a year for forgone opportunity costs.[23] Unfortunately for Guyana, international reviewers rejected McKinsey's report as unrealistic. Recognizing the pitfalls of a BAU approach, Guyana negotiated with Norway on a different basis.

Like Guyana, Norway was and remains an early and committed REDD+ champion. Norway has invested more in on-the-ground support for REDD+ countries than has any other developed nation. In November 2009 both countries signed a Memorandum of Understanding by which Norway would provide Guyana with financial incentives to undertake a countrywide REDD+ program during 2010–2015. An initial payment was made in October 2010, and a second payment was due in March 2011. In the interim, Guyana and Norway have been discussing how much, and for what, the payments would be, and in early 2011 the two countries signed a Joint Concept Note (JCN) to that effect (Guyana–Norway, 2011).

The reward mechanism adopted by the JCN is based in the combined incentives approach as depicted in Table 3 above. Under the terms of the JCN, Norway will make annual payments to Guyana based on twofold criteria: one part of the payments will be for Guyana's reduction of its annual deforestation rate below its historical reference level of 0.03% a year, and the other part of the payments will pay for Guyana to maintain its deforestation rates below the global historical reference level, estimated at 0.52% a year. Additional clauses in the JCN include adjusting payments to take account of forest degradation and drastically reducing payments to Guyana if its annual deforestation rate goes above 0.056% (the 2010 deforestation rate) and stopping payments if the deforestation rate reaches 0.09%. Table 4 below provides information required to estimate the annual payments.

The Guyana–Norway deal is important because it is the first agreement to support a countrywide REDD+ program in an HFLD country and to adopt one of the several reward formulas recently tabled.

- On the buyers' side, Norway has a deal to secure the conservation of Guyana's 18.4 million hectares of forests at a not trivial cost (approximately USD 75 million to 90 million per year), yet still at one-seventh of McKinsey's proposed figures.[24]
- Guyana is positioned to receive USD 73.9 million from Norway in 2011 (based on a 2010 deforestation rate of 0.056%). Payments could grow to USD 93 million per year if Guyana attains zero deforestation or could drop heavily if deforestation rates increase above 0.056% and stop completely if deforestation rates increase to 0.09% or greater.
- Under this arrangement, Guyana receives payments above what it could expect from REDD alone (based on its historical RL of 0.03%). For example, should Guyana decrease its deforestation rate to zero, selling the resulting emission reductions at USD 5 per ton of CO_2 (the reference price adopted by the JNC) would gross only USD 10 million per year. In the current arrangement, Guyana receives eight times more—and without incurring the costs of actually trying to reduce deforestation.

By the same token, what Norway is paying for is mostly forest conservation, not emission reductions. This is evident in the combined incentives formula (see last row in Table 4 above) but also in the penalty clauses of the JCN that would stop all payments if Guyana deforestation climbs to 0.1% a year, a figure still five times lower than the global deforestation average.

[23] McKinsey estimated compensation payments to Guyana to be between 0.4 billion to 2.3 billion dollars a year, with a "most probable value" of 0.58 billion; (see Office of the President, Republic of Guyana (December 2008).
[24] See Table 4 below for the Guyana–Norway payments and footnote 16 for McKinsey figures.

Table 4: The Guyana–Norway REDD+ agreement in figures

Combined incentive formula

CI_x: $[\alpha (GHD - GAD_{x-1}) + (1 - \alpha) (WHD - GAD_{x-1})] (C.P.GF_{x-1})$

Values adopted by the JCN

- **CI_x**: Incentive in year "x" in million US dollars
- **α**: 0.5
- **GHD**: Guyana historical deforestation RL: 0.03%
- **GAD_{x-1}:** Guyana deforestation rate in year x-1
- **WHD**: World historical deforestation RL: 0.52 %
- **C**: Estimated CO_2 per ha: 367 T
- **P**: Price per ton of CO_2: USD 5
- **GF**: Guyana 2010 forest cover = 18.4 million ha
- **D**: Deduction if actual deforestation is over 0.056%

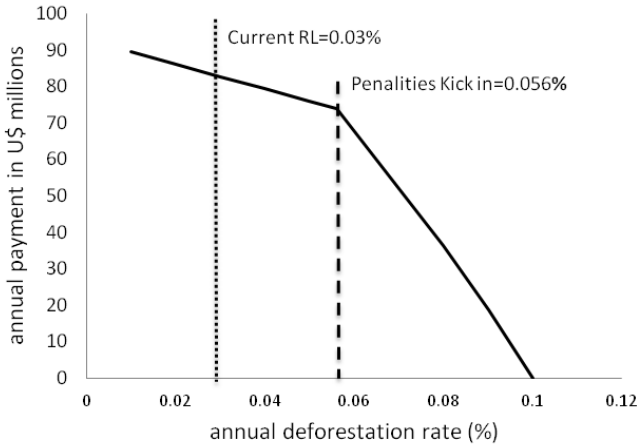
With the above values annual payment in year x =
[0.5 (GHD - GAD) + (1 -.5) (WHD - GAD)] (C.P.GF) (1 - D)

or

$CI_{x-1} = (0.275 - GAD_{x-1})(C.P.GF_{x-1}) (1 - D)$

Deduction factor (D)

If deforestation rates "GAD" are	payments are reduced by this factor for each 0.0015% of increase in "GAD"
up to 0.056%	no reduction
0.057% up to 0.062%	1.5
0.063% up to 0.080%	2.0
0.081% up to 0.090%	2.5
0.091% up to 0.099%	3
0.1% and up	no payment



2011 annual payment if the 2010 actual deforestation rate has been* →	0%	0.03%	0.056%	Higher than 0.1%
Annual payment (USD millions)	92.9	82.7	73.9	0
Absolute emission reductions below the historical average of 0.03% deforestation rate (in million tons of CO_2)	2.0	0	**(-1.8**)**	**(x <-4.0**)**
Difference between the annual payment for stock conservation and payment for actual deforestation reductions below the historical deforestation rate	89%	All	All	No payment

*Values are for the initial 2011 year except for the case of Guyana achieving zero deforestation and degradation; in all other cases, values would decrease thereafter as Guyana's forest would be reduced, albeit at a very slow pace.
**No reduction; actually an increase in emissions as the deforestation rate jumps from 0.03% to 0.056% to 0.01% and above.

All in all, we think that the Guyana–Norway agreement is a good one and that it should be welcomed by the REDD+ community and replicated elsewhere as possible. At the same time, it helps answer some questions

regarding the selection of reference levels and invites other questions regarding the future of REDD+ financing and the role of carbon offset markets. We discuss all this in the following section.

9. Lessons from the Guyana–Norway deal for establishing RL and financing for REDD+

Regarding the selection of RLs

Thus far, the selection of appropriate REDD+ RLs has been hampered by conflating the issues of identifying the appropriate RL/REL to track emission reductions and compensating developing countries' REDD+ efforts. These are related but different concerns.

The only appropriate RL benchmark to measure countries' progress (or lack thereof) in reducing emissions is a historical RL; it is the only yardstick that allow us to measure real, absolute emission reductions. A historical RL can still be forward looking, in that the past is usually a good predictor of the short-term future. Periodic recalculation of the RL based on most recent information would update the historical RL to reflect on-the-ground changes. Moreover, an RL equal or close to historical figures has a strong appeal because it is a simple, reliable, and transparent approach.

The Guyana–Norway agreement demonstrates that there is no need to manipulate historically based RL/REL in order to increase payments to low-deforestation countries. This can be achieved by methods that combine payments based on historical RL and payments based on other yardsticks such as the country's forest size or the world average deforestation, as is the case in the Guyana–Norway agreement. Furthermore, combined methods of rewarding are superior to a manipulated BAU because they better depict what the payments are for—actual emission reductions or forest conservation.[25]

Regarding financing for REDD+

Once an international REDD+ system is in place and substantial REDD has been achieved, redistribution schemes, like the combined incentives used by Guyana and Norway or the stock-and-flow approach, will have the potential to pay for forest conservation by subtracting from emission reductions payments. This redistribution of payments will ensure environmental integrity and additionality and at the same time will direct a significant part of the carbon payments to forest conservation.[26]

Alas, it will take time before an international REDD+ system is in place and achieves substantial REDD. However, low-deforestation countries are moving ahead of international negotiations in developing REDD+ schemes. In Table 5, we have used the 2010 FAO FRA information for 19 developing countries that are currently participating in REDD+ readiness programs and have annual deforestation rates between zero and the global average. If these 19 countries were able to strike deals similar to the Guyana–Norway JCN, they would be entitled to receive over USD 2.7 billion per year simply for maintaining their deforestation rates at or near the level of the past five years.

[25] For the latter purpose, the stock-and-flow approach is superior to the combined incentives approach, in that the former clearly differentiates payments for absolute emission reductions from payments for forest stock conservation. The combined incentives approach, on the other hand, although it achieves very similar on-the-ground results, may give some support to the ambiguous category of theoretical emissions saved, or avoided emissions, through the second part of the compensation formula that compares a country's actual deforestation against the global average rate of deforestation (see as column "e" in Table 5).

[26] Redistribution schemes may increase the market price of REDD+ offsets, but for many climate change practitioners, this would count not as a problem but as an added virtue.

Where would that money come from in the next 10 years, while REDD is taking off to eventually allow for redistribution schemes to work? It cannot come from offset markets because these are not payments for emission reductions. Allowing forest conservation to count as emission reductions available for offsets would result in the largest hot air scheme in history, over 0.5 billion tons of CO_2 a year of hot air just for the 19 countries (see Table 5, column "e").

Table 5 Applying the Guyana–Norway JCN to 19 LDCs

Country	Remaining area (thousands of ha) (a)	Average def rate 05-10 (b)	CO_2/ha (c)	Guyana-like reference level (d)	Theoretical emissions saved tons of CO_2 (e)	Value of emissions saved in millions (f)
Bangladesh	1,442	0.0018	202.00	0.00350	495,182	2.48
Brazil	519,522	0.0042	443.67	0.00470	115,247,297	576.24
Central African Republic	22,605	0.0013	465.67	0.00325	20,526,470	102.63
Colombia	60,499	0.0017	410.67	0.00345	43,478,614	217.39
Congo	22,411	0.0005	561.00	0.00285	29,545,541	147.73
Democratic Republic of the Congo	154,135	0.002	465.67	0.00360	114,840,850	574.20
Gabon	22,000	0	451.00	0.00260	25,797,200	128.99
Guyana	18,394	0.0003	367.00	0.00275	16,539,394	82.70
Kenya	3,467	0.0031	502.33	0.00415	1,828,669	9.14
Lao People's Democratic Republic	15,751	0.0049	249.00	0.00505	588,299	2.94
Madagascar	12,553	0.0045	476.67	0.00485	2,094,258	10.47
Mexico	64,802	0.0024	117.00	0.00380	10,614,567	53.07
Nepal	3,636	0	487.67	0.00260	4,610,205	23.05
Panama	3,251	0.0036	414.33	0.00440	1,077,598	5.39
Papua New Guinea	28,726	0.0049	293.33	0.00505	1,263,944	6.32
Peru	67,992	0.0022	462.00	0.00370	47,118,456	235.59
Solomon Islands	2,213	0.0025	300.67	0.00385	898,256	4.49
Sudan	69,949	0.0008	785.00	0.00300	120,801,923	604.01
Zambia	49,468	0.0033	179.67	0.00425	8,443,363	42.22
TOTAL					562,807,086	2,829.05

Source: Columns (a), (b), and (c) taken from FAO FRA 2010. Column (d) based on Guyana–Norway JCN compensation reference level = 0.5[0.0052+(b)]. Columns (e) and (f) based on Guyana–Norway JCN compensation formula, assuming that all countries maintain their average annual deforestation rates as per column (b).

Different from payments for emission reductions, which could come from offset markets, payments for forest conservation are bound to be, for a considerable time, the responsibility of governments, as is the case in the Guyana–Norway agreement. This conclusion puts in question the common presumption that in a not-so-distant future REDD+ payments will be driven by private buyers' demand for carbon offsets.

Thus far, little thought has been given to the costs of paying for the conservation of carbon stocks. These costs are difficult to categorize into top-down opportunity cost estimates or bottom-up abatement costs calculations because in the end they are not cost-driven payments but reward-driven payments. For example, the recent

and quite complete review of REDD+ financing gaps and overlaps by M. Simula (2010) omits any discussion of forest stock conservation payments. Still, payments for forest stock conservation may end up being an important addition to the REDD+ bill in the short and medium terms. This discussion suggests that how to pay for the conservation of forest stocks surely deserves more study.

A possible way forward could be the creation of a Forest Stabilization Fund (or a window in the Green Climate Fund) that would receive several streams of resources. In its inception, this fund could be mostly supported by public money (as is now the case for Norway in the Guyana–Norway agreement). In the long term, a levy on REDD market transactions and/or other sources of climate financing could be included, transitioning the Forest Stabilization Fund toward a self-sustained "redistribution scheme" of the combined incentives or stock-and-flow type.

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