

# Modalities for REDD+ Reference Levels: Technical and Procedural Issues

Prepared for  
**The Government of Norway**



**Meridian Institute**  
Connecting People to Solve Problems

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# Preface

The Government of Norway commissioned the Meridian Institute to facilitate the assessment of a set of proposed options for critical elements of the REDD+ components of a Copenhagen UNFCCC agreement. In December 2008 this assessment led to a consultative and analytical process whose results were summarized in the REDD-Options Assessment Report, released in April 2009. In July 2009 Meridian Institute conducted a follow-up assessment in the REDD+ Institutional Options Assessment. (Both reports can be found at <http://www.redd-oar.org>). Both reports were well received and proved helpful to UNFCCC negotiators and other stakeholders.

Looking towards COP-17 in Durban, the Government of Norway commissioned the Meridian Institute to undertake a similar process on the development of modalities for REDD+ reference levels to help support and inform UNFCCC parties and other stakeholders. Specifically, the Subsidiary Body on Scientific and Technical Advice (SBSTA) has been mandated to develop modalities relating to forest reference emission levels and forest reference levels for consideration at COP-17.

The assessment of technical and procedural issues pertaining to reference levels aims at informing UNFCCC Parties in the development of modalities for reference levels in the context of the 2011 SBSTA work programme. The assessment will be conducted in a similar fashion to the REDD-OAR and REDD+ IOA, i.e. through systematic analysis and assessment completed by a diverse and independent group of experts and facilitated dialogue among UNFCCC negotiators, experts and other stakeholders.

The Meridian Institute, a nonprofit NGO internationally recognized for convening and facilitating neutral and independent dialogues and assessments, in our view was the ideal facilitator of this process. We are hopeful that the process facilitated by Meridian Institute on Modalities for REDD+ Reference Levels: Technical and Procedural Issues can contribute to this important dialogue.



**Hans Brattskar**  
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# Executive Summary

Reference levels (RLs) are essential in two ways for Reducing Emissions from Deforestation and Forest Degradation, and the Role of Conservation of Forest Carbon Stocks, Sustainable Management of Forests and Enhancement of Forest Carbon Stocks (REDD+).

First, RLs depict business-as-usual (BAU) emissions, thereby providing a benchmark for estimating emission reductions due to REDD+ implementation. Second, RLs are needed to determine eligibility for international, results-based support for REDD+, and to calculate that support on the basis of verified emission reductions.

We define an RL as the BAU baseline developed by taking into account historic emissions and removals, adjusted as required by national circumstances to improve accuracy. We use the term compensation baseline (CB) to refer to the quantity of emissions below which a country may qualify for international financial support within a greenhouse gas results-based REDD+ mechanism.

RLs may be developed to encompass the three land-use categories described by the Good Practice Guidance of the Intergovernmental Panel on Climate Change, namely: forests converted to other lands (covering deforestation); other lands converted to forest (covering expansion of forest carbon stocks by afforestation or reforestation); and forests remaining as forest (covering forest degradation, sustainable management of forests, and conservation of forest carbon stocks—although the latter raises particular challenges because, by definition, it cannot be assigned a rate of carbon flux).

Reliably determining historic emissions and removals requires substantial data and analysis that may lie outside the current capacity of many developing-country Parties to the United Nations Framework Convention on Climate Change (UNFCCC). Relevant national circumstances that vary among these Parties include their stage in the forest transition (as proxied, for example, by their forest cover and/or per capita GDP), the role of commodity prices as a driver of deforestation and forest degradation, and current national development plans. RLs can be developed at national to subnational scales, but establishing a set of national standards for data collection and analyses is essential. An additional step may be to distinguish the CB from the RL to ensure additionality; enhance effectiveness, efficiency, and equitability; and avoid international leakage.

Within the UNFCCC, RLs could be adopted through either (1) a coordinated top-down, single-undertaking process led by political decision makers or technical experts; (2) a country-driven process that involves technical and/or political confirmation at the international level; or (3) a hybrid approach. The procedures for RL adoption should recognize that data gaps and differences in national capacity and circumstances make the simultaneous adoption of RLs for all, or even a significant number of, developing country Parties difficult and unlikely.

National submission of RLs and their assessment by the Subsidiary Body for Scientific and Technical Advice (SBSTA) or an appointed expert committee could occur on a rolling basis, with adoption subject to approval by the Conference of Parties (COP) or delegated to a separately constituted body. In a hybrid

approach, the COP could encourage the disclosure of forest carbon data and adopt guidelines for establishing RLs. Developing-country Parties could be encouraged to communicate preliminary RL values to the UNFCCC Secretariat. RLs could then be further substantiated, justified, and/or revised through a process of technical review and eventual confirmation by the COP.

The process for RL adoption should combine environmental effectiveness in the result with procedural efficiency. The decision points should be few and in line with countries' abilities to elaborate and adopt RLs based on historic emissions and removals and in accordance with their national circumstances and progression through the phases of REDD+ implementation.

The REDD+ RL modalities that SBSTA has been asked to submit for consideration by the seventeenth session of the COP, to be held in Durban, South Africa, in December 2011, could include principles and/or criteria to ensure overall environmental integrity and transparency; guidelines on RL development, taking into account historic emissions and removals and the application of national circumstances; and encouragement for Parties to voluntarily communicate preliminary RLs to the convention, along with explanatory documentation and analytical justification, including a process of review and further substantiation.

While the rules and modalities for international support for REDD+ are still under development, Parties may agree on financing REDD+ through bilateral partnership agreements. REDD+ RLs that are developed in a manner consistent with the modalities to be adopted by the COP may also become benchmarks for results-based compensation within bilateral REDD+ finance agreements.

# Contents

- Preface..... i
- Executive Summary..... ii
- Acknowledgments ..... v
- Acronyms ..... vi
- 1. Why Reference Levels Matter ..... 1**
- 2. Key Terms..... 2**
- 3. Principles ..... 3**
- 4. Technical Issues ..... 4**
  - 4.1 Scope ..... 4
  - 4.2 Historic emissions and removals..... 4
  - 4.3 Adjusting for national circumstances..... 6
  - 4.4 Linking RLs to results-based finance ..... 7
- 5. Procedural Issues ..... 9**
  - 5.1 Process of UNFCCC adoption of REDD+ Reference Levels ..... 9
  - 5.2 Temporal validity of RLs..... 10
  - 5.3 Subnational RLs ..... 10
  - 5.4 Related processes under the UNFCCC and Kyoto Protocol..... 12
- 6. Possible Next Steps ..... 13**
- Annex 1: Steps to Estimate Historic Emissions and Removals..... 14**
- Annex 2: Setting Forest Management Reference Levels..... 15**
- References..... 17**

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# Acronyms

<b>A/R</b>	Afforestation/reforestation
<b>AFOLU</b>	Agriculture, forestry, and other land use
<b>AWG-KP</b>	Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol
<b>AWG-LCA</b>	Ad Hoc Working Group on Long-Term Cooperative Action
<b>BAU</b>	Business as usual
<b>CO<sub>2</sub></b>	Carbon dioxide
<b>CDM</b>	Clean development mechanism
<b>CB</b>	Compensation baseline
<b>COP</b>	Conference of Parties
<b>COP/MOP</b>	Conference of the Parties to the UNFCCC serving as Meeting of the Parties to the Kyoto Protocol
<b>EU</b>	European Union
<b>FC/FU</b>	Forest cover/forest use
<b>FT</b>	Forest transition
<b>GDP</b>	Gross domestic product
<b>GHG</b>	Greenhouse gas
<b>GPG</b>	Good practice guidance
<b>HFLE</b>	High-forest, low-emissions
<b>GOFC GOLD</b>	Global Observation of Forest and Land Cover Dynamics
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>KP</b>	Kyoto Protocol
<b>LULUCF</b>	Land use, land-use change, and forestry
<b>MRV</b>	Measurement, reporting, and verification
<b>QELRO</b>	Quantified emission limitation and reduction objective
<b>REDD</b>	Reducing emissions from deforestation and forest degradation
<b>REDD+</b>	Reducing emissions from deforestation and forest degradation, and the role of conservation of forest carbon stocks, sustainable management of forests and enhancement of carbon stocks
<b>RL</b>	Reference level
<b>REL</b>	Reference emission level
<b>SBI</b>	Subsidiary Body for Implementation
<b>SBSTA</b>	Subsidiary Body for Scientific and Technical Advice
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change



# 1. Why Reference Levels Matter

Reference levels (RLs) are essential for Reducing Emissions from Deforestation and Forest Degradation, and the Role of Conservation of Forest Carbon Stocks, Sustainable Management of Forests and Enhancement of Forest Carbon Stocks (REDD+).

Within the context of the United Nations Framework Convention on Climate Change (UNFCCC or Convention), REDD+ RLs are needed for two purposes. First, RLs establish business-as-usual (BAU) baselines against which actual emissions are compared, thus emission reductions are estimated as the difference between RLs and actual emissions. RLs depict what the emissions scenario would be in the absence of REDD+ implementation, and thus provide the basis for measuring its success. Second, RLs are needed to determine the eligibility of UNFCCC Parties for international, results-based support for REDD+, and to calculate that support on the basis of measured, reported, and verified emission reductions. In this case, RLs are a critical determinant of REDD+ financing.<sup>1</sup> As described in Section 2, the RLs used for these two purposes may differ.

As part of the December, 2010 Cancun Agreements, the UNFCCC Subsidiary Body for Scientific and Technological Advice (SBSTA) was asked to prepare modalities for REDD+ RLs for consideration by the seventeenth session of the Conference of Parties (COP) in December, 2011.<sup>2</sup> In an effort to inform and support the SBSTA process, this report provides a description of the technical and procedural issues that will need to be addressed in developing those modalities.<sup>3</sup> The report includes sections on basic terminology; fundamental principles; technical aspects including scope, historic emissions and removals, national circumstances, and eligibility

for international compensation; procedural aspects including RL adoption, duration of validity, subnational RLs, related UNFCCC processes; and suggested next steps.

An analytical assessment of the tradeoffs inherent in alternative modalities is beyond the scope of this document, but a future assessment may be undertaken by this group of authors, or another, pending determination of the utility of this work, and the structure and content of the 2011 SBSTA work program.

## 2. Key Terms

The terms “reference level” (RL) and “reference emissions level” (REL) are not used consistently in the literature and have not yet been defined in climate negotiations. Within UNFCCC decisions, these terms have been used as follows:

- *Reference emission levels to demonstrate reductions in emissions from deforestation.*<sup>4</sup>
- *Reference emission levels and forest reference levels should be developed transparently taking into account historic data, and adjusted for national circumstances.*<sup>5</sup>
- *Subnational approaches should constitute a step toward developing national reference levels.*<sup>6</sup>
- *Developing country Parties should be supported to develop a national forest reference emission level and/or forest reference level<sup>7</sup> or, if appropriate, as an interim measure, subnational forest reference emission levels and/or forest reference levels, in accordance with national circumstances.*<sup>8</sup>

Within the negotiation process, RLs are generally used in the context of REDD+ to benchmark the amount of emissions from deforestation and forest degradation as well as the amount of removals from sustainable management of forests and enhancement of forest carbon stocks in a geographical area. In contrast, RELs benchmark the amount of emissions from deforestation and forest degradation from a geographical area (REDD only). We use RL as a shorthand notation to indicate both reference levels and reference emission levels unless otherwise specified.

In this report, we define RL as the business-as-usual (BAU) baseline developed by taking into account historic data, and adjusted for national circumstances. BAU baselines refer to the projected quantity of greenhouse gas (GHG) emissions, or the net amount of emissions after subtracting removals, without any REDD+ intervention. Emission reductions then equal the BAU baseline minus actual emissions. Thus the BAU baseline serves as a benchmark to measure the impact of REDD+ interventions.

The quantity of emissions below which a country qualifies for international support in a GHG results-based REDD+ system is defined as the compensation baseline (CB).<sup>9</sup> Compensated emission reductions equal CB minus actual emissions. The CB may be set equal to the BAU baseline or it may be adjusted to reflect national circumstances or other considerations, as discussed later in this report. In this report, RL without a modifier, means the BAU baseline, not the CB.<sup>10</sup>

The term “modalities” is used to specify a detailed set of requirements adopted by the COP or the Conference of the Parties to the UNFCCC serving as Meeting of the Parties to the Kyoto Protocol (COP/MOP), usually in the form of an annex to the relevant decision. Modalities are expressed in prescriptive language and may contain standards and terms of reference. Modalities can also be used to give effect to, and to operationalize, specific provisions or decisions under the Convention and/or the Kyoto Protocol (KP), as in the case of the modalities established in accordance with the financial mechanism of the Convention,<sup>11</sup> the modalities for the operationalization of a loan scheme to support Clean Development Mechanism (CDM) activities,<sup>12</sup> or the definitions, modalities, rules and guidelines relating to land use, land-use change, and forestry activities under the KP.<sup>13</sup>

Under UNFCCC and KP decisions, modalities often appear in conjunction with other terms of related (but not identical) meaning such as “procedures,” “guidelines,” and “rules,” which makes delimiting the exact meaning and reach of the term “modalities” difficult. “Modalities for accounting of assigned amounts,”<sup>14</sup> however, is an example of the term being used in isolation from other related terms, in which it encompasses, *inter alia*, a set of key definitions, steps for calculating initial assigned amounts, requirements for national registries, and rules for transacting assigned amount units.

# 3. Principles

The following principles are applicable to the development of the REDD+ RL modalities that SBSTA has been asked to prepare for consideration at COP 17. We also list principles applicable to REDD+ RLs subsequently submitted by UNFCCC Parties for adoption under the terms of those modalities. Both sets of principles are consistent with prior UNFCCC decisions.

## Principles applicable to the development of REDD+ RL modalities

**Environmental integrity:** The modalities should reflect the agreed outcome of a REDD+ mechanism to slow, halt, and reverse the loss of forest cover and carbon stocks, taking into account the ultimate goal of the Convention to reduce GHG emissions and avoid dangerous climate change.

**Access:** The modalities should create incentives for developing-country Parties undertaking REDD+ actions to participate in and benefit from an international REDD+ mechanism, taking into account their respective capabilities and national circumstances.

**Simplicity:** The modalities should establish a clear and straightforward process. They should limit data and formal requirements to those necessary to ensure the integrity of RLs.

## Principles applicable to REDD+ RLs submitted by UNFCCC Parties for adoption

**Objectivity:** The submissions should rely on sound science and limit the room for bias. Relevant guidelines from the Intergovernmental Panel on Climate Change (IPCC) should be taken into account concerning inclusion of GHG emissions by sources and removals by sinks.

**Empirical Basis:** BAU projections should be based on historic emissions and removals, adjusted to national circumstances as required to improve accuracy.

**Transparency:** Party submissions and the data they contain should be public. Entities approving RLs should publish the rationale for their decisions. Stakeholders should be consulted and their comments taken into account prior to submission.

**Independence:** Conflicts of interest among those developing, reviewing, and approving RLs should be identified and avoided.

# 4. Technical Issues

This section covers the technical issues that are directly applicable to setting RLs. Technical questions relevant to the modalities by which RLs are established and adopted, as well as the processes involved, are considered in Section 5.

## 4.1 Scope

According to the Cancun Agreements, the full scope of REDD+ includes the following mitigation activities in the forest sector:

- (a) Reducing emissions from deforestation
- (b) Reducing emissions from forest degradation
- (c) Conservation of forest carbon stocks
- (d) Sustainable management of forests
- (e) Enhancement of forest carbon stocks

The inclusion of these activities in the scope of REDD+ does not mean that each should have its own separate RL. Rather, RLs correspond to the outcomes of all of these activities, expressed in terms of emissions and/or removals. The full scope of REDD+ is covered by the three categories in the IPCC Good Practice Guidance framework:<sup>15</sup>

- “Forests converted to other lands” is equivalent to deforestation.
- “Forest remaining as forest” includes forest degradation, conservation of forest carbon stocks, sustainable management of forests, and enhancement of forest carbon stocks (through increases in the carbon density of degraded forests).
- “Other lands converted to forest” includes enhancement of carbon stocks through afforestation/reforestation (A/R) of nonforest land.

To reward countries with high forest cover and low emissions, some analysts have proposed stock-based approaches to define RLs for conservation

(see Box 1). If such approaches provided financing proportional to stocks, they would challenge the overall principle of the IPCC to account for carbon flows. That principle is also enshrined in decision 16/CMP1 on accounting for land use, land-use change, and forestry (LULUCF) by developed-country Parties.<sup>16</sup> Stocks could, however, be considered as a national circumstance used in estimating BAU emissions (see Section 4.3).

Another scope ambiguity concerns enhancement of forest carbon stocks, which could include any A/R activity, or be limited to enhancement of carbon stocks within defined forest areas. In the former case, a solution for integrating current and future CDM project activities into REDD+ accounting would need to be defined.

## 4.2 Historic emissions and removals

Developing a BAU scenario of emissions and removals can be seen as a two-step process, as articulated in decision 4/CP.15, which:

*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 this section, we address the data and steps needed to quantify historic emissions and removals. The approaches and data used should be consistent with the system developed for future monitoring of performance. For example, the same carbon pools selected to determine historic values should be monitored over time to assess performance relative to the RL.

Credible estimates of historic emissions and removals are needed. Existing data for most developing countries are of poor quality and limited value.<sup>17</sup> Many developing countries will need to collect and compile new data to establish credible estimates of historic emissions and removals (see Annex 1).

Under the IPCC framework,<sup>18</sup> emissions and removals are estimated from data on area (activity data) and emission factors as follows:

- Forests converted to other lands — based on the sum of carbon transitions from forest to other land uses (deforestation – stock-change approach);
- Forest remaining as forest — based on periodic carbon inventories (stock-change approach) or from the difference between gains (e.g. forest growth) and losses (e.g. timber or fuelwood removal);
- Other lands converted to forest — based on the sum of carbon transitions from other land uses to forest (A/R – stock-change approach).<sup>19</sup>

The data needed to apply these methods to estimate emissions and removals are described in Table 1. The technical capacities required to estimate emissions and removals in the first and third of these categories are broadly shared among many tropical forest countries, although some data are

lacking. The requirements for the second category are technically more demanding, hence more countries are at present unable to provide reliable estimates of BAU emissions for forest remaining as forest.

The steps and data requirements described here are relevant at national or subnational scales. A key step in the process of developing RLs is to establish a set of national standards for the data requirements in Table 1. Countries may opt to work on their historic emissions and removals data in a stepwise fashion, perhaps starting with selected states or provinces where changes in forest cover have historically been high, or on one activity such as deforestation where suitable remote sensing data are freely available, the methods for detecting forest cover change are well established, and carbon stock data can be readily obtained<sup>20</sup> and used as a basis for developing subnational RLs. Standards, principles, methods, and verification processes in relation to the steps needed to develop historic emission and removal estimates exist, thus there is no need to invent new ones.<sup>21</sup>

### Box 1. High-forest, low-emission countries

High-forest–low-emissions (HFLE) countries, such as those of the Congo Basin and the Guiana Shield, have high forest carbon stocks and low deforestation emissions relative to the global average. (We use the term HFLE to distinguish low *deforestation* from low *emissions*, which is the important consideration in climate terms).

Generally these countries are in the first stage of the forest transition (see Figure 1). They have little incentive to participate in a system based on RLs calculated from historical deforestation alone because their emissions are already small and thus have little room for reduction. If these countries do not participate, there is the risk of leakage from participating countries into these countries, which could threaten the environmental integrity of the whole system. This was one of the reasons for moving from REDD to REDD+ at COP 13 in 2007.

There are several options for taking into account the national circumstances of HFLE countries in a REDD+ system:

- Recognizing that emissions from forest degradation may be substantial, even though those from deforestation are not, HFLE countries could demonstrate reductions relative to historic emissions within “forests remaining as forests” (see Section 4.1).
- For “forests converted to other lands,” HFLE countries could have a BAU baseline above historic emissions, based on one or more national circumstances (see Section 4.3). The REDD+ mechanism could be designed partly proportional to stocks and partly proportional to flows. This has been called a “stock-flow” approach (e.g. Cattaneo *et al.*, 2010). It is important, however, to distinguish a system in which stocks are one of the national circumstances used to predict BAU emissions, from a system in which support is based on stocks (see Section 4.3).
- There could be a separate system for rewarding conservation activities in HFLE countries, based neither on stocks nor on flows. For example, it could be based on policies and measures undertaken and achieved. Sustainable management of forests could also be part of such a system.

**Table 1. Data requirements for estimating historic emissions and removals of GHGs**

Data Required	Need Addressed	Issues
Definition of forest <sup>22</sup>	Determines which lands to include in REDD+ activities.	Definition of forests with low thresholds for forest cover, height, and minimum area ensures that practically all lands that contain trees could be eligible for REDD+ incentives. Defining forests in a way that encompasses more lands in the historic period can cost more in future monitoring.
Carbon stocks of forests and nonforests and carbon gains (forest growth) and losses (e.g., extraction of trees for timber and fuel) that represent the historic time period	Estimates the emission factors for each relevant REDD+ activity.	Few countries have robust estimates, with low uncertainty, of carbon stocks in forests at scale (e.g., forest volume inventories are not national; data from research plots do not permit extrapolation to larger scales). Data on extraction of trees for timber or fuel are not well tracked and have large inconsistencies; forest growth after tree removal is very poorly known.
Key category analysis of carbon pools	Determines which of the five IPCC pools to include. <sup>23</sup>	Broad range in the magnitude, variability, and significance (relative to the total stock) of the five forest carbon pools, resulting in different measuring and monitoring costs.
Time period for estimating historic emissions	Establishes an appropriate time over which to account for varying emissions and removals.	Should all countries use same fixed time period that starts after some fixed year? A longer time frame may be needed under special circumstances (e.g. where there have been conflicts > 5 years ago followed by periods of increased economic activity, or the opposite trend).
Interpreted remotely sensed data products for forest cover/ forest use (FC/FU) for the historic time period	Estimates the historic rate and location of FC/FU change.	Deforestation can be measured with existing satellites since 2000 and even better with the launch of newer sensors that can penetrate clouds. Obtaining rates of forest degradation or enhancement of carbon stocks in existing forests is challenging as many changes cannot be detected in commonly available imagery. <sup>24</sup> Areas of A/R generally are well tracked historically by countries.
Key agents or drivers of forest cover change	Estimates how agents/drivers of land cover change impact the change in carbon stocks.	Agro-industry tends to clear large land areas, reduce the carbon stocks in vegetation to near zero, and significantly impact soil carbon stocks. Small-scale farmers tend to clear many small patches of land, often burning the vegetation and leaving remnants behind, and have less impact on soil carbon.
Spatial data on biogeographical factors (e.g. elevation and slope, soil suitability, agroecological zones, natural disturbances, transportation networks, towns)	Useful for verification and quality assessment of activity data and emission factors.	Suitable data bases are not available for all countries or at the appropriate scales.

### 4.3 Adjusting for national circumstances

The second step in developing RLs is to adjust the historic emissions and removals for relevant national circumstances. Although our discussion in this section is framed in terms of emissions from deforestation, analogous considerations apply to forest degradation and removals.

Some studies suggest that historical deforestation is the single most important factor in predicting deforestation because most of the underlying drivers of deforestation change slowly.<sup>25</sup> In some contexts,

it may be appropriate to set the RL equal to the historic deforestation rate. In other contexts, national circumstances may require an adjustment from the historic rate to more accurately project BAU emissions. Numerous analysts have proposed formula-based approaches to make such adjustments.<sup>26</sup> Here, we do not attempt to review these analyses, but simply to summarize considerations that may be relevant to national circumstances.

**Stage in forest transition:** A general temporal pattern of deforestation is predicted by forest transition (FT) theory (Figure 1), which describes the historical pattern in developed countries and a trend observed

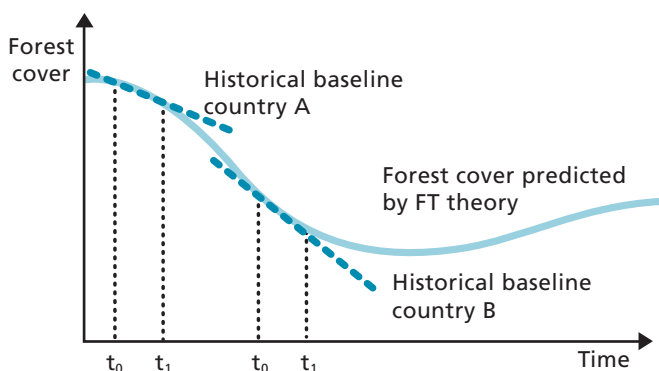
in many developing countries over the past several decades.<sup>27</sup> The FT theory predicts that countries with high forest cover and low deforestation rates (country A in Figure 1) are likely to see accelerating deforestation, whereas countries with lower forest cover and higher deforestation rates (country B) are likely to see decelerating deforestation. Variation in forest carbon density must also be considered because it is possible that deforestation rates could decline but emissions increase as deforestation moves from low carbon-stock forests to higher-carbon stock forests.<sup>28</sup>

High *forest cover* and high *carbon stocks* in forests may therefore be a “national circumstance” argument for adjusting historical rates upwards in predicting future emissions (see Box 1). Forest accessibility could also be taken into account.

The *change in deforestation rates* (trends in deforestation, not just the absolute rate) can also be an indicator of a country’s stage in the FT, and may help determine a realistic BAU scenario.

The rate of FT can also be driven by economic development; hence per capita GDP has been used to approximate a country’s stage in the FT,<sup>29</sup> and as an indicator of national circumstances that may warrant an upward or downward adjustment of BAU emissions.

**Figure 1: Business-as-usual baselines and forest transition**



Source: Angelsen 2008

**Drivers:** Deforestation is primarily caused by conversion of forested land to agricultural uses, thus the predicted future demand and prices for key agricultural commodities should be considered. High and increasing commodity prices can be a strong driver of deforestation, but agricultural land expansion into forests is only one of several ways to meet demand for agricultural products.<sup>30</sup>

Including agricultural commodity prices would add another layer of uncertainty into the BAU predictions, namely the predicted future prices. One possible solution is to make an *ex post* adjustment of RLs at the end of the relevant time period when prices (or other variables) are known.

**Development plans:** A country’s development plans can be relevant because they could reflect a likely future development trajectory, including the rates of forest conversion, use, and planting. Linking BAU projections to development plans helps governments envision the magnitude of the challenge ahead, and to integrate REDD+ into national development strategies. However, since many plans are never implemented due to fiscal constraints or other circumstances, they may not reflect the most likely BAU scenario. Using national development plans as a basis for BAU predictions may also provide incentives for inflating RLs that may be used as a basis for international support and results-based financial support.

#### 4.4 Linking RLs to results-based finance

We use the term “compensation baseline” (CB) as shorthand for a benchmark that may be used in an international mechanism that provides developing-country Parties with results-based financial support for successful REDD+ interventions. The term CB does not prejudice a specific financing mechanism (market, public funds, or hybrid combinations). REDD+ is a voluntary mechanism that should encourage countries to participate while retaining environmental integrity. In this context, we examine whether CB should be set equal to, or adjusted from, BAU.

Four considerations are relevant to the environmental integrity of the REDD+ mechanism.<sup>31</sup>

**Additionality:** This consideration could require that CB be set equal to or below BAU. Additionality can be addressed at different scales: for individual countries (national additionality), for the group of countries participating in an international REDD+ mechanism (aggregate additionality), or for the group of all eligible countries (global additionality). The concept of additionality and its application is elaborated in Box 2.

**Effectiveness and efficiency:** For any fixed amount of REDD+ finance (e.g. in a fund system), lower CBs would yield higher payments per ton of CO<sub>2</sub> because there would be fewer verified emission reductions available, and consequently stronger incentives to further reduce emissions. Countries may still want to

voluntarily participate in such a system, even if they are not fully compensated for all emissions reductions as in the BAU scenario, because the initial reductions are relatively low cost.<sup>32</sup>

**Equitability:** CBs may be adjusted to reflect national circumstances beyond those relevant for setting the BAU scenario. For example, middle-income countries could adjust their CBs downward from BAU, thereby assuming a higher share of the responsibility for implementing REDD+.

**Avoiding international leakage:** Broad participation in a REDD+ system is necessary to limit the potential for international leakage. Lower CBs will reduce countries' potential benefits from REDD+ and thus increase the risk of them opting out, which would increase the danger of leakage.

## Box 2. Additionality

The concept of additionality is important, but how it applies to setting CBs remains unclear. Additionality can be understood to mean that all international finance spent on REDD+ should be for additional mitigation efforts (i.e.,  $CB \leq BAU$ ).<sup>33</sup> A weaker requirement for and definition of additionality is that net emissions should be lower than they would be in the absence of a REDD+ mechanism (i.e., that actual emissions should be below the BAU emissions). In both interpretations, the concept of additionality is closely linked to the concept of BAU.

Additionality can be addressed at different scales. "National additionality" would be the simplest to implement, and can be ensured by setting  $CB \leq BAU$  for each participating country. This rule might also be applied at the subnational level.

"Aggregate additionality" can be defined as a requirement that the sum of the CBs for all participating countries in a UNFCCC REDD+ mechanism should be below the sum of their RLs (alternatively, that the sum of their emissions is less than the sum of their RLs). National additionality for each participating country would guarantee aggregate additionality, thus the latter is a weaker criterion. A complicating factor in implementing a principle of aggregate additionality is that RLs and CBs for participating countries may be approved separately (see Section 5.1).

"Global additionality" considers forest-related emissions from both participating and nonparticipating countries. The main additional issue to consider is international leakage from participating to nonparticipating countries, which could result in additionality for all participating countries taken together but not for all eligible countries taken together.

BAU is influenced by many factors, including some—such as future global agricultural commodity prices—that are unknown and beyond the REDD+ country's control. CBs that are derived *ex-ante* from the BAU projection make REDD+ countries' assume much of the risk inherent in that uncertainty. An *ex-post* adjustment of CBs would limit this risk, and better reflect the country's REDD+ real efforts, thereby providing a more precise basis for results-based, international financial support.



## 5. Procedural Issues

The adoption of RLs will establish a measure of performance by quantifying emission reductions. Monitoring data would be disclosed and submitted to the UNFCCC secretariat to record the progress of Parties in reducing emissions. The process of UNFCCC adoption of REDD+ RLs is the focus of this section of the report.

Based on the RLs, Parties may subsequently agree on a method to define CBs (see Section 4.4) to establish eligibility for international finance in the context of, and in coordination with, agreements on international finance, the procedures of the Green Climate Fund, and support for nationally appropriate mitigation actions (NAMAs) in developing countries. While the rules and modalities for international support for REDD+ are still under development, Parties may agree on financing REDD+ through bilateral partnership agreements. REDD+ RLs that are developed in a manner consistent with the modalities to be adopted by the COP may also become benchmarks for results-based compensation within bilateral REDD+ finance agreements.

### 5.1 Process of UNFCCC adoption of REDD+ Reference Levels

RLs could be adopted through either (1) a coordinated top-down, single-undertaking process led by political decision makers or technical experts; (2) a country-driven process that involves technical and/or political confirmation at the international level; or (3) a hybrid approach. Table 2 summarizes the main features of these approaches.

Under the first approach, final values of RLs could be adopted through a single COP decision listing RLs for all or most developing countries. Such an approach would safeguard the environmental integrity of RLs by enabling Parties to ensure that the sum of RLs remains below aggregate BAU scenarios, leading to an overall reduction of emissions from the forest sector in developing countries. However, as

recognized in the Cancun Agreements, data gaps and differences in national capacity and circumstances make the simultaneous adoption of RLs for all, or a significant number of, developing countries difficult and unlikely.<sup>34</sup> A single-undertaking approach, whether led by political decision makers or experts, would require intensive and probably highly politicized negotiations. Observer participation would most likely be limited.

Alternatively, a country-driven process could apply in which the COP establishes technical guidance through the RL modalities to allow Parties to propose their RLs for review and endorsement by an international body. Such an approach would result in adoption of RLs based on the submission of the relevant Party. Under this option, candidate Parties that are ready to participate in a results-based REDD+ mechanism, could communicate RLs either to SBSTA or to a technical review committee. Data would have to be disclosed and technical experts could be mandated to review the RLs. The final RLs, with or without corrections recommended by the experts, could be adopted by the technical committee or be forwarded to the COP for adoption. Stakeholders could be involved at various stages of the process and transparency ensured through periodic requirements to disclose data both before and after the adoption of RLs.

A hybrid approach could combine elements of the single-undertaking and country-driven approaches. Through the REDD+ RL modalities, the COP could encourage the disclosure of forest carbon data and adopt guidelines on establishing RLs. Developing countries would be encouraged to communicate preliminary RL values to the UNFCCC Secretariat. The preliminary RLs would have to be substantiated by disclosed data. Preliminary RLs could be considered and possibly adopted by the COP. As data availability and reliability increases, RLs would be further substantiated, justified, and/or revised through a process of technical review, with eventual

confirmation by the COP. Agreement on preliminary RLs could help to assess the environmental integrity of the overall value established through the proposed process. In addition, the modalities could require national and/or aggregate additionality of the REDD+ mechanism (see Box 2).

## 5.2 Temporal validity of RLs

RLs may be: (1) renegotiated within a specific timeframe; (2) resubmitted for review and adjustment by an international body for adoption within a specific timeframe; (3) automatically revised in accordance with rules and procedures agreed prior to the adoption of the RLs; or (4) reviewed every X number of years

in the context of national communications (for instance, by an expert review team) and be adjusted if significant changes in circumstances or in the implementation of the RLs are evidenced by MRV data. Table 3 outlines these options.

## 5.3 Subnational RLs

Some Parties may favor a separate process for validating and approving subnational RLs. For instance, a national government may be willing to start implementing REDD+ in a region, province, or state where administrative regions, landscape/vegetation characteristics, and deforestation drivers reasonably coincide and where data

**Table 2. Three procedural options for the approval of RLs**

Policy Option for Approval of RLs	Process	Models
<b>Option 1. Single undertaking coordinated at the international level</b>		
1a. Led by political decision makers	Allocation principles and RLs are discussed internationally through an eminently political consensus-based process.	Ministers setting QELROs <sup>a</sup> for Annex I Parties in Kyoto (1997).  EU Ministers sharing the burden of the joint effort agreed in Kyoto.
1b. Led by government experts	Same as above, but negotiations are handled at expert level, subject to approval by the political level.	LULUCF experts setting forest management caps for Annex I Parties in Bonn (2001).
<b>Option 2 . Country-driven, sequential process</b>		
2a. Sequential adoption based on technical and political recommendations	National submission of RLs and assessment by SBSTA. Adoption on a rolling basis following country submissions, subject to approval at the political level (by the COP).	Submission of Party considerations under the Kyoto Protocol (KP) (Croatia's base-year emissions).  QELRO of Belarus (with COP approval).
2b. Sequential adoption by technical expert teams	National submission of RLs for assessment and endorsement by an international committee of experts. Approval authority is delegated from the COP to this committee, which may be assisted by independent reviewers and panels of experts.	Designated operational entities and the CDM Executive Board validating and registering CDM project baselines.  Confirmation of eligibility to participate in KP mechanisms.
<b>Option 3. Hybrid process: political decision at the international level and consolidation with country submissions</b>		
	Submission of RLs by Parties to the COP. Process of justification, technical review, and political confirmation through Parties, technical expert review teams, and the COP.	Emerging process of establishing Annex I Parties forest management reference levels (as per Annex I and Annex II of Decision 2/CMP.6).

Note: a. QELRO is quantified emission limitation and reduction objective

**Table 3. Review and renewal of RLs**

Policy Option	Process	Models
Renegotiated within time frame	Parties could initiate negotiations on new RLs within a fixed number of years prior to the expiration of their currently valid RLs. Individual adjusted or new RLs would be adopted by a COP decision and listed in an annex to that decision. RLs would be negotiated and adopted all at once.	The negotiation of Annex I Parties' commitments as listed in Annex B to the KP. Under the KP, Parties have agreed to start negotiations for QELROs valid for a second commitment period at least seven years prior to the end of the first commitment period.
Resubmitted for review and adjustment	Parties could re-initiate the country-driven processes following the technical guidance established by the COP (based on recommendations of the SBSTA) within a fixed number of years prior to the expiration of their current RL. RLs would be developed, submitted, and endorsed gradually.	The renewal and revalidation of CDM baselines.
Automatic revision	Parties would agree <i>ex ante</i> to a gradual reduction of their RLs within a specific timeframe. This automatic review mechanism would allow Parties to establish longer periods between revalidation of RLs.	The model adopted for the third phase of the EU Emissions Trading Scheme.
Periodic review	An approved RL could remain valid until a review procedure identifies an issue that an international body determines to be relevant enough to justify a modification or a review of the criteria and elements of this RL.	The verification of eligibility of Annex I Parties for participating in the flexible mechanisms of the KP. An Annex I Party remains eligible to participate in the KP flexible mechanisms until the Compliance Mechanism has determined the occurrence of a noncompliance in relation to a question of implementation raised by an expert review team or by a Party.

availability and technical and executive capacity for developing subnational RLs is comparatively more advanced. In other countries, the national government may lack control over some of its forest areas. The development of subnational RLs allows these countries to start REDD+ monitoring in areas where there is adequate capacity and governance for REDD+ implementation, including monitoring and accounting.

Under an international REDD+ mechanism, Parties would qualify for international results-based support only on the basis of adopted national RLs. Where Parties develop subnational RLs, such RLs would constitute a step toward adopting national RLs. Subnational RLs may help to enhance transparency and construct a robust data base, build knowledge on drivers of emissions and stock changes, test the effectiveness of policy interventions at the

jurisdictional level, and incentivize action at the program and project level prior to the establishment of national RLs. Mention of subnational RLs in the text of the Cancun Agreements suggests that Parties may voluntarily submit subnational RLs for international approval.

If Parties decide to communicate subnational RLs to the UNFCCC or its bodies, they would remain responsible for addressing and avoiding any potential incompatibility between subnational and eventual national RLs through their national strategies. Modalities and procedures for approval of subnational RLs could provide guidance on how governments could address (and avoid) any potential incompatibility between the subnational and national RLs. Such guidance could also inform and advise countries on how to consolidate subnational RLs toward a national RL.<sup>35</sup>

## 5.4 Related processes under the UNFCCC and Kyoto Protocol

### Land use, land-use change, and forestry

The Cancun Agreements include a COP/MOP decision that confirms the LULUCF principles and definitions from the first commitment period. It also contains an annex that lists reference levels for estimating emissions from forest management by developed-country Parties in a possible second commitment period. The forest management reference levels are not yet final and will undergo a review process. The information on the proposed reference levels was to be submitted to the UNFCCC Secretariat by the end of February 2011 for review.

Annex II of the CMP.6 decision on LULUCF contains guidance on the submission of transparent, complete, consistent, comparable, and accurate information that allows a technical assessment of the data, methodologies, and procedures used in the construction of reference levels by developed-country Parties. The annex also formulates the scope and procedures for an expert-level review. The outcomes of the technical review will be considered by Parties at COP/MOP7 in Durban. See Annex 2 for a summary of the process and its potential relevance for a process leading to the adoption of final RLs for REDD+.

The principles that govern the treatment of LULUCF activities in developed-country Parties<sup>36</sup> are a possible model for those guiding the adoption of developing-country RLs for REDD+. The LULUCF principles establish that sound and consistent methodologies should guide the estimation and reporting of emissions, that the activities should not undermine the environmental effectiveness of the KP; that the mere presence of carbon stocks be excluded from accounting;

and that LULUCF activities should contribute to biodiversity protection, *inter alia*. The principles also establish that accounting for removals resulting from: (1) elevated CO<sub>2</sub> concentrations above their pre-industrial level; (2) indirect nitrogen deposition; and (3) the dynamic effects of age structure resulting from activities and practices before the reference year, should be excluded.

### Clean development mechanism

A/R is the only LULUCF activity that can be implemented in developing countries under the CDM. Modalities for baseline determination were determined at COP7 including that establishment must occur in "a transparent and conservative manner regarding the choice of approaches, assumptions, methodologies, parameters, data sources, key factors and additionality, and taking into account uncertainty." As such A/R methodologies have procedures for determining baselines that are stepwise and tightly linked to additionality determination. In recent years, the CDM has embraced program-level activities that create incentives for emission-reduction activities involving many sources and multiple actors. To support such programmatic and, in the future, possibly sectoral approaches, the supporting measurement, reporting, and verification (MRV) systems are moving from project-specific baselines toward standardized baselines that may serve as a basis for regional or national spatially specific baselines.<sup>37</sup>

If the "enhancement of carbon stocks" included under the proposed REDD+ mechanism is clarified to include A/R of lands not currently forested, the COP would have to adopt rules on how to integrate existing and possibly future CDM project activities in broader, jurisdictional RLs to ensure environmental integrity and avoid double counting emission reductions and removals.

## 6. Possible Next Steps for Developing Modalities for REDD+ RLs

Setting RLs is a necessary step for Parties to access the UNFCCC mechanism for the results-based phase of REDD+, and the modalities are critical for ensuring its environmental effectiveness. RLs should provide the basis for credibly quantifying emission reductions and for allocating international financial support to incentivize developing country Parties.

The process of RL adoption should combine environmental effectiveness in the result with procedural efficiency. The decision points should be few and in line with Parties' abilities to elaborate and adopt RLs in accordance with their national circumstances and progression through the phases of REDD+ implementation.

Transparency in setting RLs is essential, especially given the lack of harmonized and reliable forest data in many developing countries. Financial support to enhance Parties' readiness should help increase data availability and monitoring capacities.<sup>38</sup>

Developing-country Parties could be encouraged to communicate preliminary RLs voluntarily to the bodies of the Convention, along with explanatory documentation and analytical justification, to enable discussion of assumptions and to increase the transparency of the process.

Reflecting the analysis and assessments included in this report, the modalities that SBSTA has been asked to submit for consideration by CP-17 could include the following:

**Principles** – Recalling the general principles of the REDD+ mechanism such as overall environmental integrity and the contribution of RLs to the ultimate goal of the Convention.<sup>39</sup> The principles listed in Section 3 of this report aim to ensure that RLs result in the generation and support of real and measurable emission reductions by as many developing countries as possible.

**Guidelines on RL development** – Informing developing-country Parties on the development of BAU scenarios, taking into account historic emissions and removals, and the application of national circumstances. Guidelines could define the methodological standards for data collection and the development of BAU scenarios with reference to existing methods and criteria for establishing their validity, including determination of national circumstances relevant for adjusting BAU projections.

**Data submission** – Encouraging Parties to submit, without further delay, data and analyses of estimates of emissions and removals, *inter alia*, to facilitate information exchange and transparency (cf. Table 1). Such submissions could be periodically updated.

**Notification of preliminary RLs** – Inviting voluntary communication of preliminary RLs to promote leadership and political commitment, facilitate progress toward the final adoption of RLs, and indicate the environmental ambition of individual countries and the aggregate of country pledges. Countries could submit their preliminary RLs to the UNFCCC, including for a process of review and further substantiation as data becomes available. SBSTA-appointed technical experts could assess, review, and enter a dialogue with countries, which may result in modification of the preliminary RLs.

**International adoption of final RLs** – Identifying the body that will finally approve and adopt RLs.

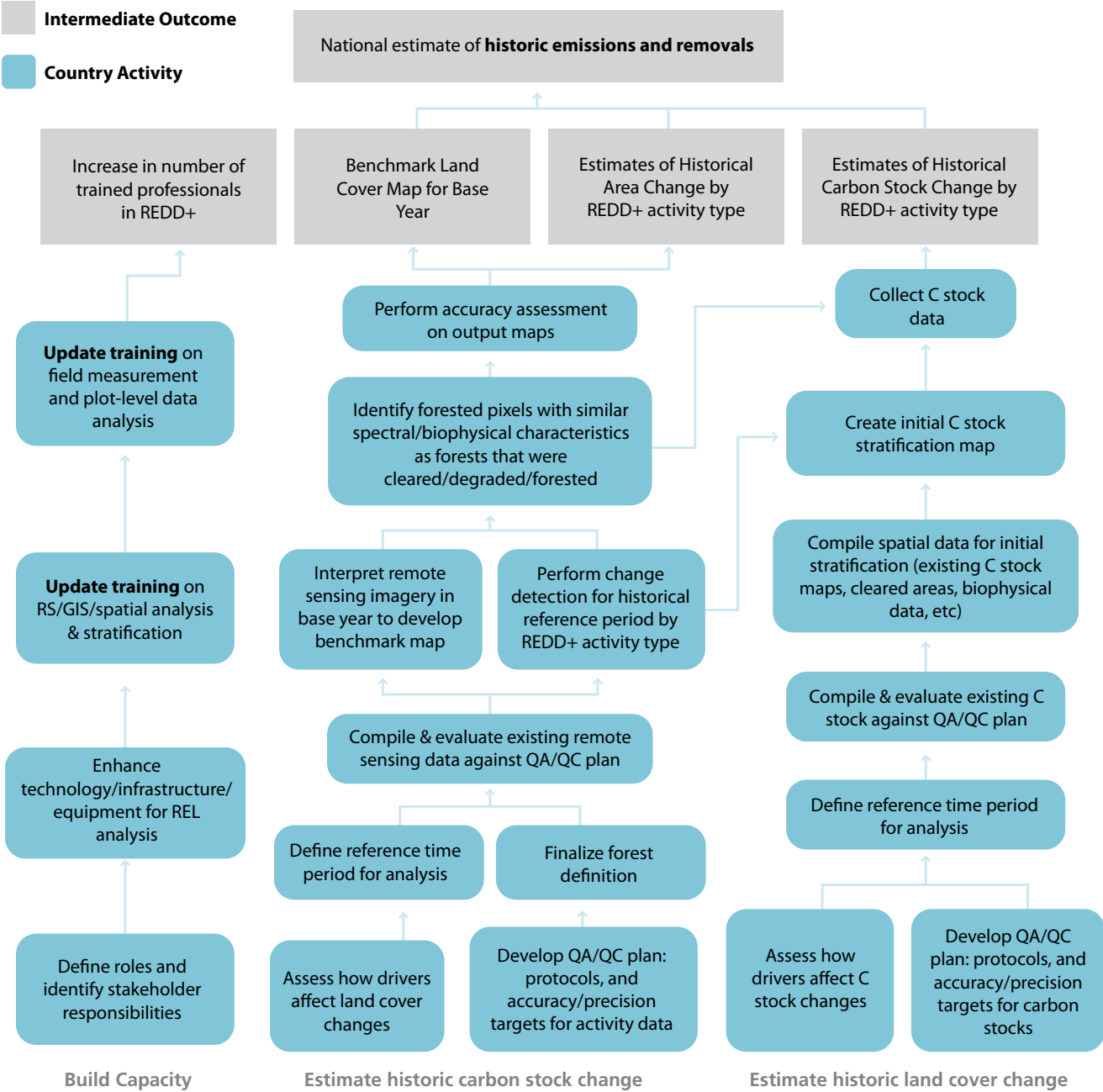
**Data administration** – Requesting the UNFCCC Secretariat to deposit and disclose data, preliminary and final RLs, and other relevant information.

# Annex 1: Steps to Estimate Historic Emissions and Removals

Proposed steps that could be used by a country to develop estimates of historic emissions and removals are outlined in figure A1. These steps can be applied at

a national or a subnational scale. Figure A1 is taken from the R-PPs prepared for the Forest Carbon Partnership Facility for Kenya<sup>40</sup> and Cambodia.<sup>41</sup>

**Figure A1. Steps in preparing a national estimate of historic emissions and removals**



# Annex 2: Experience with Setting Forest Management Reference Levels

The process of establishing forest management reference levels for Parties included in Annex B of the Kyoto Protocol is based on preliminary reference levels proposed by the Parties that will undergo a review process. It followed the path described below in terms of negotiation, data sharing, review, and adoption:

- Agreement that LULUCF activities should continue to be available to Parties as a means to reach emission reductions objectives.
- Consultations and deliberations on modalities, rules, and guidelines for the treatment of LULUCF for a second commitment period under the Kyoto Protocol.<sup>42</sup> A number of different accounting options for forest management were proposed, including: the use of discount factors for additions and subtractions from a Party's assigned amount, the application of a "bar" (above which removals would be credited and below which they would debited), and the use of a "forward looking baseline" that considers current forest inventories, historical data, and BAU management plans.
- To enhance the understanding of the implications of the options and proposals for the treatment of LULUCF, Parties agreed to share, on a voluntary and informal basis, country-specific information and data (where available).<sup>43</sup> A table providing a common format and content was made available to the Parties as a guide to ensure consistency in voluntary submissions and facilitate negotiations. The information submitted by the Parties was made available by the Secretariat on the UNFCCC website.<sup>44</sup>
- In Cancun, the COP/MOP adopted the draft decision forwarded by the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol (AWG-KP) as

Decision 2/CMP 6. Appendix I of this decision lists the forest management reference levels proposed by Annex I Parties and requested the Parties to submit further information on them, including any updates to the proposed values, following the guidelines in Appendix II. The COP/MOP also decided that each submission shall be subject to a technical assessment by a review team as provided for in Appendix II. The outcomes of the technical assessment are to be considered by COP 17.

- The technical assessments will be coordinated by the UNFCCC Secretariat and are expected to be concluded by the end of May 2011. The draft report prepared by each review team will be made available to the Party concerned within eight weeks following the review. Each Party will then have three weeks to respond to the draft report of the review team. After responses have been taken into account, the review teams will prepare final reports, which will be published on the UNFCCC website. A synthesis report will also be prepared by the Secretariat containing key conclusions of the process.

Although the establishment of REDD+ RLs is substantially different from the establishment of forest management reference levels for Annex B Parties, the established process contains procedural elements that can serve as examples for guidance on development and review of REDD+ RLs. Important differences in substance between the two processes include: the voluntary nature of REDD+, the link to international support, the link between LULUCF accounting and Annex B targets, and the greater availability of data for developed countries. The following elements of the process in setting forest management reference levels may potentially be transferred to the context of REDD+:

- The creation of a process for the submission of information of a Party's forest sector, forest carbon data, and proposed reference level (accompanied with a justification). This process would ensure transparency and exchange of data. It would also encourage policy makers to determine preliminary REDD+ objectives at the national level.
- The reporting of such information in a standardized process, pursuant to pre-agreed international guidance on the content and format of submissions. This process would allow Parties to gain better understanding of individual forest sectors, national circumstances, and the assumptions used to construct RLs. The agreement on preliminary reference levels is included in a COP decision. This process would help to ensure the overall environmental integrity of the mechanism.



# References

- Angelsen, A. 2008. How do we set the reference levels for REDD payments? In *Moving Ahead with REDD: Issues, Options and Implications*, ed. A. Angelsen, Bogor, Indonesia: Center for International Forestry Research (CIFOR).
- Bauch, S. and A. Angelsen. 2011. Regressing REDD+ reference levels: The case of Brazil, unpublished draft, Norwegian University of Life Sciences.
- Busch, Jonah, Bernardo Strassburg, Andrea Cattaneo, Ruben Lubowski, Aaron Bruner, Richard Rice, Anna Creed, Ralph Ashton and Frederick Boltz. 2009. Comparing climate and cost impacts of reference levels for reducing emissions from deforestation, *Environmental Research Letters* 4 (Oct.-Dec.).
- Cattaneo, A. 2010. Incentives to reduce emissions from deforestation: A stockflow approach with target reductions. In *Deforestation and Climate Change: Reducing Carbon Emissions from Deforestation and Forest Degradation*, ed. V. Bosetti and R. Lubowski, Cheltenham, UK: Elgar Publications.
- GOFC-GOLD. 2009. A sourcebook of methods and procedures for monitoring and reporting anthropogenic greenhouse gas emissions and removals caused by deforestation, gains and losses of carbon stocks in forests remaining forests, and forestation, GOFC-GOLD Report version COP15-1, Alberta, Canada: GOFC-GOLD Project Office, Natural Resources Canada.
- Intergovernmental Panel on Climate Change (IPCC). 2003. *Definitions and methodological options to inventory emissions from direct human-induced degradation of forests and revegetation of other vegetation types*. <http://www.ipcc-nggip.iges.or.jp/public/gpplulucf/degradation.html>
- \_\_\_\_\_. *National Greenhouse Gas Inventories Programme. Emission Factors Data Base (EFDB)*, homepage, <http://www.ipcc-nggip.iges.or.jp/EFDB/main.php>.
- \_\_\_\_\_. 2006. *Guidelines for national greenhouse gas inventories: Volume 4 Agriculture, forestry and other land use*, <http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.html>
- \_\_\_\_\_. 2003. *Good Practice Guidance LULUCF*, [http://www.ipcc-nggip.iges.or.jp/public/gpplulucf/gpplulucf\\_files/0\\_Task1\\_Cover/CoverTOC.pdf](http://www.ipcc-nggip.iges.or.jp/public/gpplulucf/gpplulucf_files/0_Task1_Cover/CoverTOC.pdf)
- Loarie, S.R., G.P. Asner, and C. B. Field. 2009. Boosted carbon emissions from Amazon deforestation, *Geophysical Research Letters* 36: L14810.
- Meridian Institute. 2009. Reducing emissions from deforestation and forest degradation: An options assessment report, prepared for the Government of Norway, by A. Angelsen, S. Brown, C. Loisel, L. Peskett, C. Streck, and D. Zarin, <http://www.REDD-OAR.org>.
- Rudel, Thomas *et al.* 2005. Forest transitions: Towards a global understanding of land use change, *Global Environmental Change* 15: 23-31.
- Schlamadinger, B., L. Ciccamese, M. Dutschke, P.M. Fearnside, S. Brown, and D. Murdiyarso. 2005. Should we include avoidance of deforestation in the international response to climate change? In *Carbon Forestry: Who will benefit?* ed. D. Murdiyarso and H. Herawati, Bogor, Indonesia: Center for International Forestry Research (CIFOR).
- United Nations Framework Convention on Climate Change. 2010. *Report of the Conference of the Parties on its sixteenth session, held in Cancun from 29 November to 10 December 2010*, <http://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf#page=2>
- Walker, S.M., F. Casarim, N. Harris, and S. Brown. 2010. Cambodia REDD+ roadmap: Development of a reference level and design of a monitoring system, report prepared for the Cambodia REDD+ Readiness Process, Arlington, VA, United States: Winrock International.

<sup>1</sup> In the current set of REDD+ decisions, there is no reference to sources of support (either government or market-based), but there is a mandate to the Ad Hoc Working Group on Long-term Cooperative Action (AWG-LCA) to explore financing options for the full implementation of results-based actions.

<sup>2</sup> Decision 1/CP.16.Appendix 2 (b), <http://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf#page=2>

<sup>3</sup> An earlier draft was prepared and circulated for comments and consultation by UNFCCC negotiators, experts, and other stakeholders (see Acknowledgments).

<sup>4</sup> Decision 2/CP.13 para. 7(a), <http://unfccc.int/resource/docs/2007/cop13/eng/06a01.pdf#page=8>

<sup>5</sup> Decision 4/CP.15, para. 7, <http://unfccc.int/resource/docs/2009/cop15/eng/11a01.pdf#page=11>

<sup>6</sup> Decision 2/CP.13 Annex para. 7, <http://unfccc.int/resource/docs/2007/cop13/eng/06a01.pdf#page=8>

<sup>7</sup> In accordance with national circumstances, national forest reference emission levels and/or forest reference levels could be a combination of subnational forest reference emissions levels and/or forest reference levels.

<sup>8</sup> Decision 1/CP.16, para. 71, <http://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf#page=2>

<sup>9</sup> CB was called "Crediting Baseline" in the 2009 Options Assessment Report (Meridian Institute 2009). We have changed the label in this report because some have interpreted "crediting" as implying market-based financing, an implication we wish to avoid. Financing in a system using a CB can come from either market or nonmarket sources.

<sup>10</sup> See also Meridian Institute (2009).

<sup>11</sup> Article 11.3 UNFCCC, <http://unfccc.int/resource/docs/convkp/conveng.pdf>

<sup>12</sup> Annex III of Draft Decision 3/CMP.6, <http://unfccc.int/resource/docs/2010/cmp6/eng/12a02.pdf#page=2>.

- <sup>13</sup> Annex to Decision 16/CMP.1 on LULUCF, <http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=3>
- <sup>14</sup> Decision 13/CMP.1 KP Article 7, para. 4, <http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=23> <http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=23>
- <sup>15</sup> Meridian Institute (2009).
- <sup>16</sup> United Nations Framework Convention on Climate Change, Decision 16/CMP.1, paragraph 1 (d), (2010). "That the mere presence of carbon stocks be excluded from accounting."
- <sup>17</sup> See, for example, the available Readiness Plan Proposals (R-PPs) submitted to the Forest Carbon Partnership Facility of the World Bank.
- <sup>18</sup> Intergovernmental Panel on Climate Change (2003, 2006)
- <sup>19</sup> There are two different equations in the IPCC guidelines that can be used to estimate emissions, the stock-change approach and the gain-loss approach, both of which result in estimates of emissions or removals over a known time frame, and are usually reported annually.
- <sup>20</sup> GOF-C-GOLD (2009).
- <sup>21</sup> For example, the remote sensing field has developed methodologies for consistent interpretation of imagery, standards for accuracy assessment of interpretation of satellite imagery, and guidance on selecting image resolution for detecting changes in FC/FU for different REDD+ activities. The IPCC GPG for LULUCF (IPCC 2003), the IPCC AFOLU inventory guidelines (IPCC 2006), and the GOF-C-GOLD Sourcebook (GOF-C-GOLD 2009) provide details on methods, principles, and standards for C stock. Similar guidelines and standards also are described in validated methodologies for REDD projects in the voluntary market. Finally, steps for verification of national GHG inventories available at the UNFCCC could serve as a guide for a REDD+ program.
- <sup>22</sup> Many developing countries defined their forest according to the Marrakesh Accords with the idea of engaging in afforestation and reforestation activities under the CDM.
- <sup>23</sup> Above-ground biomass, below-ground biomass, litter, dead wood, and soil organic carbon.
- <sup>24</sup> Although not all activities causing degradation require remote sensing data, being able to use such data would give more confidence to estimated emissions. For example, area of forests undergoing selective logging (both legal and illegal) with the presence of gaps, roads, and log decks are likely to be observable in remote sensing imagery. Emissions from selective logging can also be estimated without the use of satellite imagery (i.e., based on methods given by the IPCC (2006) estimating changes in carbon stocks of "forest land remaining forest land"). Thus historic emissions from degradation by large-scale logging and for forest management could be estimated. Historic removals, either due to regrowth in degraded forests or from direct enhancements (e.g., interplanting), and historic emissions from degradation due to forest fires, overexploitation for fuel wood, and overgrazing by animals, may also be difficult to estimate without considerable effort. (GOF-C-GOLD 2009).
- <sup>25</sup> Bauch, S. and A. Angelsen (2011).
- <sup>26</sup> See Busch *et al.* (2009) for an overview of major proposals.
- <sup>27</sup> Rudel *et al.* (2005).
- <sup>28</sup> Loarie *et al.* (2009).
- <sup>29</sup> Rudel *et al.* (2005).
- <sup>30</sup> Lack of good data has, however, prevented broad research on how, for example, agricultural prices can predict deforestation at the country level. Similarly, drivers of degradation can be relevant to predict future degradation (e.g. demand for timber and fuelwood) but similar data problems arise.
- <sup>31</sup> Adjustment of RLs (making CB different from BAU) is one of several options to accommodate these considerations. Other options include a uniform discounting of creditable emission reductions, or a variable discounting with less discounting (higher compensation) the larger the emission reductions (the "corridor approach," Schlamadinger *et al.* [2005]).
- <sup>32</sup> Meridian Institute (2009). Initial emission reductions tend to be relatively cheap, and paying a fixed (and higher) price for all reductions below BAU will be costly. If CB is set below BAU, the funds saved can be spent on deeper emissions reductions. See also Angelsen (2008), Box 6.1, for an elaboration of this argument.
- <sup>33</sup> This is the way the concept was used in Meridian Institute (2009).
- <sup>34</sup> Decision 1/CP16.73, <http://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf#page=2>
- <sup>35</sup> International rules on subnational RLs must not impede countries from deciding on their own national REDD+ strategy, including the adoption of subnational RLs under national law, and agreement on a domestic sharing of burdens and benefits. International guidelines for subnational RLs would apply only to subnational RLs that are communicated to the Convention.
- <sup>36</sup> Decision 16/CMP.1, para. 1, <http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=3>
- <sup>37</sup> Decision 3/CMP.6, <http://unfccc.int/resource/docs/2010/cmp6/eng/12a02.pdf#page=2>
- <sup>38</sup> Decision 1/CP16 calls for support of readiness activities via existing multilateral and bilateral channels, <http://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf#page=2>
- <sup>39</sup> Decision 1/CP16, <http://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf#page=2>
- <sup>40</sup> Revised REDD readiness preparation proposal, Kenya, submitted to the Forest Carbon Partnership Facility, United Nations REDD Programme. August 2010, <http://www.forestcarbonpartnership.org/fcp/sites/forestcarbonpartnership.org/files/Documents/PDF/Oct2010/Revised%20RPP%20for%20Kenya.pdf>
- <sup>41</sup> Readiness Preparation Proposal for Cambodia, Working Draft Version 5 (revised): submitted to the Forest Carbon Partnership Facility, United Nations REDD Programme, March 4, 2011, <http://www.forestcarbonpartnership.org/fcp/sites/forestcarbonpartnership.org/files/Documents/PDF/Mar2011/Cambodia%20R-PP-Final%20Clean%20Version-%20March%205%2C%202011.pdf>; Walker *et al.* (2010).
- <sup>42</sup> See Paragraphs 22 and 52 of the Report of the AWG-KP held in Poznan from 1-10 December, <http://unfccc.int/resource/docs/2008/awg6/eng/08.pdf>
- <sup>43</sup> See Paragraph 49 of the Report of the AWG-KP on its seventh session, held in Bonn from 29 March to 8 April 2009, <http://unfccc.int/resource/docs/2009/awg7/eng/05.pdf>; <http://unfccc.int/resource/docs/2009/awg7/eng/05.pdf>
- <sup>44</sup> Relevant information submitted on a voluntary and informal basis to the secretariat by Parties is available at [http://unfccc.int/meetings/ad\\_hoc\\_working\\_groups/kp/items/4907.php](http://unfccc.int/meetings/ad_hoc_working_groups/kp/items/4907.php) [http://unfccc.int/meetings/ad\\_hoc\\_working\\_groups/kp/items/4907.php](http://unfccc.int/meetings/ad_hoc_working_groups/kp/items/4907.php)

## About Meridian Institute

Meridian Institute is a not-for-profit organization whose mission is to help people solve problems, make informed decisions, and find solutions to some of society's most complex and controversial issues. Meridian's mission is accomplished through applying collaborative problem-solving approaches including facilitation, mediation, and other strategic consultation services. Meridian works at the local, national, and international levels and focuses on a wide range of issues related to natural resources and environment, science and technology, agriculture and food security, sustainability, global stability, and health. For more information, please visit [www.merid.org](http://www.merid.org).

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Connecting People to Solve Problems

# Modalities for REDD+ Reference Levels: Technical and Procedural Issues