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Strengthening Measurement, Reporting and Verification (MRV) for REDD+

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June 2011

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Preface

This discussion paper was prepared for two workshops delivered by the International Institute for Sustainable Development (IISD) and the ASB Partnership for the Tropical Forest Margins at the World Agroforestry Centre (ASB-ICRAF). The workshops, both entitled “REDD+ after Cancun: Moving from Negotiation to Implementation,” took place in Douala, Cameroon, from May 10–12, 2011, and Hanoi, Vietnam, from May 18–20, 2011. The workshops focused on reducing emissions from deforestation and forest degradation, plus the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries (REDD+), aiming to increase understanding of the negotiations, as well as provide information on experiences in the forestry sector to lay the technical and policy foundations for better REDD+ programs. This paper was informed by discussions of the REDD Development Dividend Task Force meeting held January 25–26, 2011. This expert group, comprised of 22 representatives from developing countries, provides direction to the IISD-ASB-ICRAF REDD+ capacity-building project by exploring salient issues in the negotiations and identifying critical research areas.

This REDD+ capacity-building project is delivered with the generous support of the Government of Norway.

Executive Summary

Over the last few years, the stature of REDD+—reducing emissions from deforestation and forest degradation, plus the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries—has grown remarkably. The climate change agreements reached in Cancun, Mexico, in 2010 marked a critical turning point in the development of REDD+. Measurement, reporting and verification (MRV) is included in the Cancun Agreements as one of the most critical elements necessary for the successful implementation of any REDD+ mechanism.

The United Nations REDD (UN-REDD) Programme (2009, pp. 3–4), which supports countries in the development of cost-effective, robust and compatible national monitoring and MRV systems, defines MRV as:

- **Measurement** – The process of data collection over time, providing basic datasets, including associated accuracy and precision, for the range of relevant variables. Possible data sources are field measurements, field observations, detection through remote sensing and interviews.
- **Reporting** – The process of formal reporting of assessment results to the UNFCCC [United Nations Framework Convention on Climate Change], according to predetermined formats and according to established standards, especially the IPCC [Intergovernmental Panel on Climate Change] Guidelines and GPG [Good Practice Guidance].
- **Verification** – The process of formal verification of reports, for example, the established approach to verify national communications and national inventory reports to the UNFCCC.

The MRV for REDD+ text in the Cancun Agreements specifically mentions the need for guidance on methodologies for developing national forest reference emission levels (RELs) and/or forest reference levels (RLs). The agreements also call for a robust and transparent national system for forest monitoring and reporting. Reference levels can be developed at the subnational level as an interim measure. The modalities and processes of MRV for the REDD+ mechanism constitutes a main agenda item for UNFCCC negotiators in the lead-up to the 17th Conference of the Parties (COP) to be held in Durban, South Africa, in December 2011. Examples of outstanding issues include the scope of REDD+, definition of “forest,” classification of land-use categories, development of RELs and RLs, modalities for REDD+ activities, modalities for MRV, and linkages between MRV and nationally appropriate mitigation actions (NAMAs).

A consistent MRV system requires clarification of the definition of the various ranges of activities of REDD+ and a common and clear understanding of what constitutes a “forest” and its boundaries at multiple scales. The definition of forest determines which lands to include in REDD+ activities and is a key component of the reference scenario and MRV system. What is included or not included in REDD+ is still subject to much debate. Technical discussions need to continue to determine what is being measured, reported and verified. Thus far, the scope of REDD+ is based on individual country resources and monitoring capacities. In accordance with the *2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories*, the ASB Partnership suggests considering whole-landscape approaches to reducing emissions, using the full accounting scheme for Agriculture, Forestry and Other Land Use (AFOLU) because it does not depend on the operational definition of forest.

A major challenge is developing modalities for RELs/RLs. These are key elements in defining and quantifying the mitigation objectives that countries would like to reach through the implementation of REDD+ and in measuring the performance of REDD+ policies and actions. (Please note that after this paragraph, “RL” used alone is a shorthand notation to indicate both RL and REL.)

Of first concern is the choice of the RL approach and scale. The choice of the RL approach is very strategic because it will affect countries differently, depending on their forest cover and deforestation rate. Regarding the scale and given the complexity and time required to implement and manage relevant systems at the national level, envisaging a nested approach becomes increasingly relevant. The nested approach is “a mechanism which allows countries to start REDD efforts through subnational activities and gradually move to a national approach, or the coexistence of the two approaches in a system where REDD credits are generated by projects and governments, thus maximising the potential of both approaches” (Angelsen et al., 2008). Developing a nested approach for baseline deforestation rates will require consistency and coherence in the multiple baselines needed at different levels. The nested approach still needs clarification and guidance on linking subnational RLs with national RLs and implementation.

With regard to the accuracy of the MRV system, questions remain as to how to consider all eligible carbon pools in MRV, which currently is based mainly on each country’s circumstances and capabilities. The various tiers recommended by the IPCC provide for progressive MRV processes and capacity development in REDD implementation. It is important to determine how countries can best design a stepwise MRV approach along the lines of IPCC Tiers 1, 2 and 3 for progress toward greater accuracy.

An inventory of existing capacities in terms of institutional framework, technical capacities, costs and financing requirements might be a good starting point for designing, implementing and

improving an MRV system in many developing countries. Establishing an MRV regime should include designating the regulatory entities to be responsible for overseeing, approving and coordinating MRV at local, subnational and national scales. Existing MRV regimes provide opportunities for learning, and lessons learned from early implementation can inform other countries and should be communicated at the international level. Local community and indigenous peoples involvement, including through participatory processes, must be an important element of MRV programs to ground-truth “top-down” measurements and improve accuracy. There also appears to be the potential for regional cooperation in REDD+ monitoring. Technical capacities require staff expertise, technology transfer and capacity building, especially in geographic information systems (GIS) and remote sensing.

The funding of MRV remains a challenge. The more information quality increases, the higher the required costs and capacity for the MRV system. This leads to countries making tradeoffs between cost and accuracy. Financing of REDD+ MRV activities is a key issue in the negotiations. Mobilizing sources from various initiatives, programs and projects is important in building a robust, rigorous and transparent national inventory and associated MRV system. Without credible and accurate MRV, there can be no REDD+ credits. Eventually, guidance will be needed on how MRV for REDD+ is to be consistent with MRV for NAMAs.

Participants at the IISD and ASB-ICRAF REDD+ capacity-building workshops held in Douala, Cameroon, and Hanoi, Vietnam, in May 2011 discussed these and other issues related to MRV in REDD+ programs and activities. A summary of the main messages of the workshops on MRV is included in the table below. Establishing the RL against which to benchmark reductions in deforestation and degradation is a prerequisite, and modalities require further support and clarification. Definitions need to be clarified, as the choice of definitions will affect baselines, monitoring methods and potential credits. Procedures for MRV and supporting development of nested approaches, with assistance to scale up project and subnational RLs to the national level, are major components of MRV for REDD+. Capacity building, identification of domestic skills and capacities, transfer of technology and involvement of all stakeholders—governments, local communities, civil society and the private sector—are key factors for successful MRV system development and implementation. Pilot projects, regional information sharing, and demonstration activities are valuable in building knowledge and lessons about MRV.

Main messages on REDD+ MRV

Measurement, Reporting and Verification

- Countries need support and assistance to determine available domestic skills, capacities, information and data, which will be the building blocks for developing effective MRV systems.
- Countries need to develop MRV REDD+ modalities, which include technical definitions and procedures, such as definitions of forest, RL, REL and nested approach.
- The development of RELs, RLs and baselines should be flexible and based on the circumstances of countries. Many countries will require assistance to scale up project and subnational RLs to the national level.
- Local community and indigenous peoples involvement, including through participatory processes, must be an important element of MRV programs to ground-truth “top-down” measurements and improve accuracy.
- Capacity building (e.g., forest assessments, monitoring forest cover change, information management systems) and technology transfer (e.g., GIS, remote sensing) is critical and needed.
- Developing countries should consider appointing MRV experts to UNFCCC technical and expert groups.
- Guidance is needed on how MRV for REDD+ is to be consistent with MRV for NAMAs.
- Further exploration is needed on the issue of linking of MRV and safeguards information systems.

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Abbreviations and Acronyms

AFOLU	Agriculture, Forestry and Other Land Use
ASB-ICRAF	ASB Partnership for the Tropical Forest Margins at the World Agroforestry Centre
CDM	Clean Development Mechanism
COMIFAC	Central African Forest Commission
COP	Conference of the Parties
DRC	Democratic Republic of Congo
FCPF	Forest Carbon Partnership Facility
GCP	Global Canopy Programme
GHG	Greenhouse gas
GPG	Good Practice Guidance
IISD	International Institute for Sustainable Development
IPCC	Intergovernmental Panel on Climate Change
LULUCF	Land use, land-use change and forestry
MRV	Measurement, reporting and verification
NAMA	Nationally appropriate mitigation action
NGO	Non-governmental organization
REALU	Reducing emissions from all land uses
REDD	Reducing emissions from deforestation and forest degradation in developing countries
REDD+	Reducing emissions from deforestation and forest degradation in developing countries, plus the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries
REL	Reference emission level
RL	Reference level
R-PP	Readiness Preparation Proposal
SBSTA	Subsidiary Body for Scientific and Technological Advice
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change

1.0 Introduction

1.1 REDD+ Mechanism

REDD+—a global mechanism for reducing emissions from deforestation and forest degradation, plus the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries—has been growing in importance over the last few years. The climate change agreements reached in Cancun, Mexico, in 2010 set out a framework for a REDD+ mechanism and marked a critical turning point in the development of the mechanism. The framework involves a three-phase process: (1) development of national strategies or action plans and capacity building; (2) implementation of national strategies or action plans that could involve REDD+ pilot projects; and (3) mobilization of funds from developed countries, with financing mechanisms yet to be decided (United Nations Framework Convention on Climate Change [UNFCCC], 2011, pp. 12–14, 26–28).

The primary goal of REDD+ is the reduction of greenhouse gas (GHG) emissions, consistent with the UNFCCC’s goal of achieving “stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.” REDD+ is a mechanism to transfer funds from developed to developing countries that are willing and able to undertake REDD+ actions.

1.2 Institutional Definition of Measurement, Reporting and Verification

Measurement, reporting and verification (MRV) for REDD+ is included in the Cancun Agreements as one of the most critical elements needed for the successful implementation of the REDD+ mechanism. For REDD+ to be a credible mitigation strategy, considerable investment is needed to strengthen national MRV systems for GHG emission removals and sinks (REDD-Net, 2010a).

The UN-REDD Programme, which supports the development of cost-effective, robust and compatible national monitoring and MRV systems in developing countries, gives the following definition (UN-REDD Programme, 2009, pp. 3–4):

- **Measurement:** The process of data collection over time, providing basic datasets, including associated accuracy and precision, for the range of relevant variables. Possible data sources are field measurements, field observations, detection through remote sensing and interviews.
- **Reporting:** The process of formal reporting of assessment results to the UNFCCC, according to predetermined formats and according to established standards, especially the

IPCC [Intergovernmental Panel on Climate Change] Guidelines and GPG [Good Practice Guidance].

- **Verification:** The process of formal verification of reports, for example, the established approach to verify national communications and national inventory reports to the UNFCCC.

1.3 The Five Reporting Principles of the IPCC Good Practice Guidance

Frameworks for MRV are being developed at the national level and will require some form of international oversight. A great deal of technical expertise has been developed around the various elements of MRV, but much more is needed. Existing MRV regimes provide learning opportunities, but also present challenges in streamlining and coordination. Not all countries require, or have the capacity, to produce the same quality and quantity of data. An MRV framework will need to take such factors into consideration.

The process should be guided by the five reporting principles of the IPCC Good Practice Guidelines (GPG), which are consistency, transparency, comparability, completeness and accuracy of information (UNFCCC, 2009). This will ensure the integrity of the MRV system and respect for the principle of Common but Differentiated Responsibilities and Respective Capabilities (Climate Action Network, 2011).

In practice, there are major shortcomings in current monitoring capacities according to the five principles of the IPCC GPG (Global Observation of Forest and Land Cover Dynamics, 2009, pp. 14–15):

- **Consistency:** estimations provided by many countries are based either on single-date measurement or on integrated heterogeneous data sources, instead of a systematic and consistent measurement and monitoring approach.”
- **Transparency:** expert opinion, independent assessment or model estimations are commonly used as information sources to produce forest carbon data. This can potentially lead to a lack of transparency.
- **Comparability:** standard methodologies and guidance are needed to produce comparable results.
- **Completeness:** there is a lack of relevant data for measuring and monitoring forest area change and carbon stocks changes in most non-Annex I countries. For instance, above ground and below ground carbon stock data are often based on estimations or conversions using IPCC default data and very few countries are able to provide information on all five carbon pools.

- Accuracy: there is limited information on sources of error and the uncertainty levels of estimates provided by countries, and the methods to reduce, analyze and deal with it.

1.4 REDD+ MRV in the Cancun Agreements

The Cancun Agreements encourage developing country parties to contribute to mitigation actions in the forest sector by undertaking REDD+ as deemed appropriate by each party and in accordance with their respective capabilities and national circumstances (UNFCCC, 2011, para. 70).

Box 1: REDD+ activities as a contribution to mitigation actions in the forest sector

To undertake these activities, the Cancun Agreements call for:

- A national strategy or action plan.
- A national forest reference emission level (REL) and/or forest reference level (RL) or, if appropriate, as an interim measure, subnational forest RELs and/or forest RLs, in accordance with national circumstances.
- A robust and transparent national forest monitoring system for the monitoring and reporting of the above activities, with, if appropriate, subnational monitoring and reporting as an interim measure, in accordance with national circumstances.
- A system for providing information on how the safeguards referred to in Appendix 1 to this decision are being addressed and respected throughout the implementation of the above activities, while respecting sovereignty.

Source: UNFCCC (2011), para. 71.

Appendix 2 of the Cancun Agreements requests that the Subsidiary Body for Scientific and Technological Advice (SBSTA) provide methodological guidance on MRV.

Box 2: Work program of the SBSTA regarding policy approaches and positive incentives for issues relating to REDD+

- Identify land use, land-use change and forestry (LULUCF) activities in developing countries, in particular those that are linked to the drivers of deforestation and forest degradation. Identify the associated methodological issues to estimate emissions and removals resulting from these activities and assess the potential contribution of these activities to the mitigation of climate change. Report on the findings and outcomes of this work to the Conference of the Parties (COP) at its 18th session.
- Develop modalities for developing national forest RELs and/or forest RLs and national forest monitoring systems, as well as guidance on safeguards for consideration by the COP at its 17th session.
- Develop, as necessary, modalities for measuring, reporting and verifying anthropogenic forest-related emissions by sources and removals by sinks, forest carbon stocks, and forest carbon stock and forest-area changes resulting from the implementation of the above activities, consistent with any guidance on measuring, reporting and verifying nationally appropriate mitigation actions (NAMAs) by developing country parties agreed by the COP, taking into account methodological guidance in accordance with Decision 4/CP.15, for consideration by the COP at its 17th session.

Source: UNFCCC (2011), p. 28.

These provisions in the Cancun Agreements represent progress toward greater accountability. However, the effectiveness of these provisions will depend on the design and operationalization of the components of an MRV system that will be determined by UNFCCC negotiators.

1.5 Outstanding Issues Discussed in This Paper

RELS/RLs are estimates of historic emissions and removals of GHGs. Establishment of RELs/RLs requires gathering several data: definition of forest, carbon stocks of forests and non-forests, carbon gains and losses representing the historic time period, key category analysis of carbon pools, time period of estimating historic emissions, interpreted remotely sensed data products for forest cover/forest use for the historic time period, and spatial data on biogeographical factors (Meridian Institute, 2011). Designing and implementing an MRV system for REDD+ requires the capacity to monitor forest sector carbon (emissions/removals), drivers of deforestation/degradation and other benefits over time, in relation to the reference scenario. Reporting should encompass development of REDD+ project databases, and their maintenance and verification should be undertaken by an independent and accredited third party. Multiple challenges remain in designing an efficient MRV system.

The modalities and processes of MRV and REL/RL for the REDD+ mechanism will continue to be negotiated under the UNFCCC in the lead-up to COP 17 to be held in Durban, South Africa, in December 2011. This paper focuses on some outstanding challenges in the negotiations identified during the IISD and ASB-ICRAF REDD+ capacity-building workshops held in Douala, Cameroon, and Hanoi, Vietnam, in May 2011. These include:

1. What are the various scopes of REDD+ activities and, by extension, what is the definition of forest definition, and with what implications?
2. What are the current key challenges in establishing RELs/RLs?
3. How should accuracy thresholds for the MRV system be determined?
4. What are the capacity-building areas required in terms of institutional frameworks, technical capacities, financial arrangements and participation of various stakeholders for designing and implementing an MRV system?
5. How should MRV for REDD+ be consistent with MRV for NAMAs?

The paper is not prescriptive, but aims to explore issues and options, with the intent of generating discussion. The paper first explores technical issues related to the scope of REDD+ and the definition of forest. Section 3 focuses on the main principles for establishing RELs/RLs and especially on the issues of scale and timeframe. It also explores the nested approach or how to link the development of subnational RELs/RLs with national RELs/RLs, with challenges and critical

questions to guide negotiators. Section 4 provides guidance on thresholds in terms of which tier to choose based on IPCC guidelines, as well as which of the five IPCC carbon pools to include. Section 5 examines the capacity-building areas for a successful MRV system in terms of governance and institutional frameworks, participation of local stakeholders, enhancement of technical capacities and associated costs and required funding. Section 6 illustrates the issue of consistency between MRV for REDD+ and MRV for NAMAs using Indonesia as an example. The final section includes recommendations from the IISD and ASB-ICRAF REDD+ capacity-building workshops held in Douala, Cameroon, and Hanoi, Vietnam, in May 2011.

2.0 Scope of REDD+ and Definition of Forest

2.1 Scope of REDD+

The scope of REDD+—that is, what range of activities it should cover—was set out in the Cancun Agreements. Developing countries are encouraged to contribute to mitigation actions in the forest sector by undertaking five main activities (UNFCCC, 2011, para. 70, p. 12):

1. Reducing emissions from deforestation
2. Reducing emissions from forest degradation
3. Conservation of forest carbon stocks
4. Sustainable management of forests
5. Enhancement of forest carbon stocks

The latter three activities constitute the “plus” in REDD+.

REDD+ is a complex concept and these activities are not yet clearly defined. Defining deforestation and degradation should be undertaken with support from the relevant technical institutions by determining the carbon stock and canopy cover thresholds in relation to forest definition. Another ambiguity in scope concerns enhancement of forest carbon stocks, which could include any afforestation or reforestation activity, or be limited to enhancement of carbon stocks within defined forest areas (Meridian Institute, 2011). In addition, it is important to consider the implications of the different nature of REDD+ activities, including how they relate to each other (for example, conservation can be seen as a means of reducing deforestation and forest degradation) and how this might be reflected in future decisions (Foundation for International Environmental Law and Development [FIELD], 2011).

2.2 Definition of Forest

By extension, better clarification of the definition of forest is needed. The scope of REDD+ will depend on how a forest is interpreted and which lands to include in REDD+ activities, and the definition of forest is a key component for the reference scenario and MRV system. A critical issue for REDD+ is the creation of a standard forest definition applicable at multiple scales. Historical emissions from deforestation and forest degradation are essential in determining areas eligible for REDD+ activities (for example, areas under agroforestry with a comparatively low crown cover might be excluded or included), as well as technical requirements for assessing deforestation (the lower the crown cover threshold, the more limited is the use of remote sensing data) (Readiness Preparation Proposal [R-PP], Uganda, 2011).

The definition of forest and what is included or not included in REDD+ is still subject to much debate. Definitions of forest exist but are diverse, with no globally agreed definition of forest under the REDD mechanism (van Noordwijk, et al., 2009). In order to develop a consistent MRV system, there is need for a common and clear understanding of what constitutes a forest and its boundaries at multiple scales (Climate Focus and Forest Trends, 2011).

Many countries refer to the Clean Development Mechanism (CDM) definition of forest, but this has not been agreed upon within the context of REDD+. Under the CDM, “forest is land area measuring a minimum of 0.05 to 1.0 hectare, containing tree crown cover (or equivalent stocking level) of more than 10–30 percent and trees with the potential to reach a minimum height of 2–5 m at maturity *in situ*. A forest may consist either of open forest or closed forest formations where trees of various storeys and undergrowth cover a high proportion of the ground. Young natural stands and all plantations which have yet to reach a crown density of 10–30 percent or tree height of 2–5 m are included under forest, as are areas normally forming part of the forest area but [that] are temporarily unstocked as a result of human intervention (such as harvesting) or natural causes and are expected to revert to forest” (UNFCCC, 2002, p. 58).

There are concerns that the CDM definition of forest does not separate plantations from natural forests. In addition, the current definition of forest under CDM does not account for degradation of forests and there is risk that substantial emissions from forest degradation could be ignored if the CDM definition of forests is adopted (Sasaki & Putz, 2009).

The example of Indonesia illustrates the complexity of a forest definition. The term “forest” can have multiple meanings (see Figure 1). In Indonesia, forest refers to woody vegetation with a minimum tree height and cover, but it is also linked to specific institutions empowered to manage forests (*kawasan hutan* in Indonesia), and these two definitions or classifications do not match, adding to the complexity. The case of Indonesia actually depicts forest with trees, forest without trees, non-forest with trees and non-forest without trees (van Noordwijk et al., 2009).

Ekadinata et al. (2010) reveal some serious concerns for current REDD+ approaches in Indonesia, particularly if trees outside the institutional forest are not considered:

- One third of Indonesia’s forest emissions (a total of 0.6 gigatons of carbon per year) occur outside institutionally defined forests and are not accounted for under the current national policy for REDD+.
- Carbon stocks outside of institutional forests are more at risk than those inside and may be depleted by 2032. This is partly due to emission leakages from protected forests.

- If carbon emissions from outside the institutional forest are accounted for, it becomes clear that there are no net emission reductions in Indonesia.

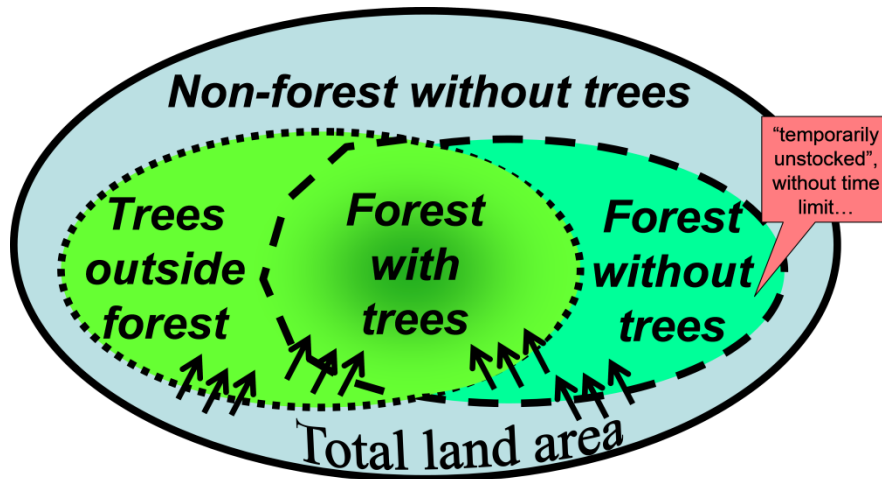


Figure 1: What is a forest? When do trees become a forest?

Source: van Noordwijk, et al. (2009), p. 2.

To be consistent, a national forest definition should be based on structural characteristics and correlated with carbon stocks so that it is possible to determine when and where deforestation is considered to occur and to differentiate between deforestation and forest degradation (Climate Focus and Forest Trends, 2011). A better forest definition should account for forest degradation. Technical discussions need to continue in order to determine what is being measured, reported and verified.

In accordance with the *2006 IPCC Guidelines for National Greenhouse Gas Inventories*, the ASB Partnership suggests considering whole-landscape approaches to reducing emissions, using the full accounting scheme for Agriculture, Forestry and Other Land Use (AFOLU). This could be challenging but might be more effective, efficient and equitable. Whole-landscape approaches and accounting (e.g., AFOLU) could minimize leakage and definition or eligibility questions that may hamper the implementation of REDD+, CDM and other mitigation options. This approach is also called Reducing Emissions from All Land Uses (REALU) and includes REDD+ and all transitions in land cover that affect carbon storage, whether peat land or mineral soil, trees-outside-forest scenarios, agroforests, plantations or natural forest. REALU does not depend on the operational definition of “forest.” A key entry point is to develop a relevant land cover/land-use mapping and change analysis to enable accounting for variations of carbon storage across the landscape.

3.0 Key Challenges for Establishment of Reference Emission Levels

RELs and RLs are REDD+ modalities upon which negotiators are trying to reach agreement by the end of 2011. SBSTA is creating modalities for development of national forest RELs and/or RLs and national forest monitoring systems for consideration at COP 17. A number of technical and procedural issues will need to be addressed in order to prepare modalities for REDD+ REL/RL at COP 17. This chapter focuses on some main issues, for example, the main principles for establishing an REL/RL, the RL time, the RL scale, and the nested approach or how to link the development of subnational RELs/RLs with national RELs/RLs, with challenges and critical questions to guide negotiators.

3.1 Definition and Purpose of REDD+ REL/RL

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 (Meridian Institute, 2011). Nevertheless, these terms are generally defined as:

- The reference level (RL) is 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, estimated within a reference time period. They are generally used in the context of REDD+.
- The reference emissions level (REL) is the amount of emissions from deforestation and forest degradation in a geographical area, estimated within a reference time period. They are generally used in the context of REDD only.

Emission reductions then equal the REL/RL baseline minus actual emissions. RELs/RLs are the benchmarks to measure the impact of REDD+ interventions. The terms “reference level” and “baseline” are frequently used interchangeably in the REDD+ debate. The term baseline is used to refer to the “business as usual” baseline, which is the prediction of what would occur within the boundary of the project area in the absence of REDD project activity (the business as usual, or BAU, scenario). “Baseline” is generally used at the project level, whereas REL is used at the national or subnational level.

The RELs and RLs are key elements to define and quantify the mitigation objectives that countries would like to reach through the implementation of REDD+ and to measure the performance of REDD+ policies and actions. They determine the historical deforestation and forest degradation trends and provide benchmark scenarios or baselines against which emission reductions will be measured, and depict what the emission scenario would be without REDD+ implementation. This

will, of course, be critical for determining the amount of emission reductions obtained and for rewarding the carbon rights holder if emissions are below that level. In addition, RELs/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 for measuring its success (Meridian Institute, 2011).

As per Section 2 of this paper, the scope of REDD+ includes five main activities, but each activity should not have a separate REL or RL. A more appropriate approach would have an REL/RL that corresponds to the outcomes of all of these activities, expressed in terms of emissions and/or removals (Meridian Institute, 2011).

3.2 Key Principles Applicable for the Development of REDD+ RL Modalities

The main criteria with which the RL will seek to comply are shown in the following box.

Box 3: Key principles for REDD+ RL modalities as submitted by UNFCCC parties

- **Environmental integrity:** The REDD+ mechanism will work in favour of climate protection and have to ensure that its corresponding activities will result in real climate change mitigation actions.
- **Transparency:** The data used to establish RLs should be available for open and independent reviews. Transparency also means that the assumptions and methodologies used to assess the RLs are clearly explained to facilitate replication and assessment by users of the reported information and by other relevant stakeholders.
- **Accuracy:** Estimates should be accurate in the sense that they are systematically neither over nor under true emissions or removals, as far as can be judged, and that uncertainties are reduced as far as practicable. The RL should be adjusted to national circumstances to improve accuracy.
- **Comprehensiveness:** RLs should cover all relevant REDD+ activities.
- **Comparability:** Estimates of emissions and removals reported in an RL should be comparable among all the other reported estimates by non-Annex I Parties.
- **Consistency:** An RL should be internally consistent in all its elements regarding estimates done in different years. Moreover, an RL should also be consistent with the methodologies that countries are going to use for the estimation of carbon stock and carbon stock changes in subsequent REDD+ application periods.
- **Feasibility and simplicity:** The modalities should establish a clear and straightforward process. The RL should be defined with a reasonable level of effort and expense. Feasibility factors include data availability, analytical capabilities, cost of data collection and analysis, and institutional support for these efforts.

Source: Adapted from R-PP, Democratic Republic of Congo (2010) and Meridian Institute (2011).

3.3 Choice of the Reference Level: Approach

A number of different approaches for establishing RLs have been proposed, but there is still no general agreement or criteria or indicators for setting them and particularly for how to factor in national circumstances. An RL setting will have direct consequences on the generation of carbon credits and, as such, is partly a political process (REDD-Net, 2010b).

The three main approaches to RLs are:

- **Historical baseline (retrospective):** based solely on historic deforestation trends and historical extrapolation of forest cover data. Questions include: Over which time interval? How far back? Examples include Brazil and Indonesia.
- **Projected/modelled baseline (prospective):** based on past deforestation and using economic models of planned deforestation. Questions include: Which models? How far into the future? Examples include the State of Amazonia in Brazil and the Noel Kempff Mercado Climate Action Project in Bolivia.
- **Historical adjusted baseline:** combination of historical and projected baselines adjusted for factors representing national socioeconomic and developmental circumstances such as demographic trends, agriculture, food self-sufficiency, infrastructure development and renewable energies. Questions include: Over which time interval? How far back? Examples include the Central African Forest Commission (COMIFAC) and the Coalition for Rainforest Nations (REDD-Net, 2010b; Martinet, Megevand & Streck, 2009).

The choice of the RL approach is very strategic, as it will affect countries differently depending on their forest cover and deforestation rate. Countries with high deforestation, such as (areas of) Brazil, Indonesia and Ghana, have strong incentives to engage in deforestation accounting. They will stand to gain more from proposals that use a historical baseline than a projected baseline. For instance, in Brazil, in the framework of the Amazon Fund initiative, the RL was developed using the historical baseline approach over a ten-year period (1996–2005) and averaging deforestation rates over that period. RLs are revised every five years. In this case, the proxy for emission reductions is created by only focusing on the area change in deforestation to estimate deforestation rates, averaging deforestation rates over the ten-year period to establish an RL and using a conservative and standardized value of carbon stocks of 100 tons per hectare. Brazil opted for a results-based system and adopted a very conservative approach to guarantee what it is delivering. They will progress toward accurate GHG estimate-based approaches with a track record of successfully reviewed inventory reports as the country increases its knowledge and experience (Amazon Fund, 2011).

Fewer countries, such as Bolivia with the Noel Kempff Mercado Climate Action project, have chosen the projected baseline. Bolivia used historical satellite imagery from 1986, 1992 and 1996 in order to observe deforestation and calculate deforestation rates in the project area, and they simulated the location of future deforestation with the spatial GEOMOD land-use change model using this historical deforestation information. This model enabled the identification of lands in the project area that were statistically the most likely to be cleared over the next 30 years, based on several deforestation drivers (distance to roads, towns, rivers, forest edges and prior disturbance [Nature Conservancy, 2009, p. 8]).

Countries with low deforestation and high forest cover, such as those in the Congo Basin and Guyana, have relatively undisturbed forests; however, deforestation and degradation may increase in the future because of economic development. Countries of the Congo Basin have pointed out that relying on historical deforestation rates when setting RLs would place them at a disadvantage. Therefore, they are developing historical adjusted baselines in relation to their national circumstances and their stage in the forest transition. For instance, the Democratic Republic of Congo (DRC) plans to establish the historic emissions level and define the national circumstances that could be used to adjust the historic data. Such national circumstances include (i) the analysis of existing socioeconomic data; (ii) the analysis of the needs for future development of the DRC; and (iii) potential forest cover changes (reference scenarios). To the DRC, the assessment of the different national circumstances is a key element for the application of the UNFCCC principle of common but differentiated responsibilities.

Some other approaches have been proposed for countries with low historical deforestation rates to allow them to benefit from financial incentives. One example is the stock/average approach that is based on current forest carbon stock or the forest area of each country and possibly a global average deforestation/emissions rate. This is the method used by Costa Rica. The Costa Rican option relies on historical trends for forests and deforestation from 1940 to 2005 and on the calculation of carbon stocks (in tons of carbon dioxide) for a baseline year, which may be 2000, 2005 or 2010. Costa Rica's approach does not require determination of additionality, i.e., the approach is based on rewards for existing forest, as opposed to avoiding forest loss. There is no risk of leakage, because payments are made for stock maintenance as opposed to preventing deforestation agents from operating inside the project area; the latter carries the risk that they could simply move outside the project boundaries (R-PP, Costa Rica, 2010).

3.4 Reference Level Scale and the Nested Approach

In regard to the RL scale, deforestation rates can be determined on a national or subnational level (Huettner, 2009). Proposals recently gathered by the Global Canopy Programme (GCP, 2008)

regarding country positions on the time and scale of RLs indicate strong consensus that RL scale should ideally be at the national scale. Most countries agree that accounting of overall REDD+ performance will have to be measured at the national level to reduce the risk of leakage. Leakage could be significantly higher in a framework that measures emission changes in individual projects, rather than changes across an entire country. Nevertheless, given the complexity and time required to implement and manage relevant systems at the national level, envisaging a nested approach to deal with the many challenges of establishing RL becomes increasingly relevant. The nested approach is “a mechanism which allows countries to start REDD efforts through subnational activities and gradually move to a national approach, or for the coexistence of the two approaches in a system where REDD credits are generated by projects and governments, thus maximising the potential of both approaches” (Angelsen et al., 2008).

The Cancun Agreements indicate that countries may start implementing subnational forest RELs and/or RLs as well as subnational monitoring and reporting systems for REDD+ as interim measures while preparing for full-scale national REDD+ implementation. Subnational RLs allow developing countries that do not have the capacity to create national carbon accounting mechanisms to participate in REDD+ to some extent; they provide an incentive for both project-level and national-level activities and they represent a transitional mechanism, allowing a country to move to a national RL in the long term (GCP, 2008).

Pedroni (2007) promotes the coexistence of the two approaches, where accounting and crediting would occur at two levels. He suggests that at the national level, governments are recipients of credits for emission reductions below a negotiated target and may redistribute the revenues from the sale of credits to local actors. At the subnational level, subnational entities, duly authorized by the host country to implement REDD project activities, are direct recipients of credits, regardless of national performance. This enables a direct opportunity for the private sector to invest. This also enables credit to subnational projects, independently from overall national performance.

Developing a nested approach for baseline deforestation rates will require consistency and coherence in the multiple baselines needed at different levels. Within a nested framework, there are two broad pathways to developing and integrating baselines from projects, states or provinces as suggested by Climate Focus and Forest Trends (2011, p. vii):

- Disaggregate or bottom-up approaches, in which multiple project-specific baselines are developed largely independently and should be gradually building up a patchwork or mosaic of baselines within the jurisdiction.
- Consolidated or top-down approaches, where spatially explicit regional baselines are developed and used to zone and stratify the forest landscape to predict the rate, location and

timing of future deforestation, or to establish benchmarks, allowing projects to extract relevant project-baselines out of a broader baseline map. For instance, Indonesia has given a national target but there are still uncertainties on modalities to distribute this target through subnational levels.

There are also discussions on boundaries to choose when establishing the subnational RL, either ecozones (collective blocks of forests in the same region affected by the same human-induced pressures and drivers of deforestation) or administrative/jurisdictional boundaries. The very different types of forests may lead to variability and lack of accuracy. For example, the development of an RL could include different ecosystems, but the reporting could be based on jurisdictional levels. A good example is Vietnam. Its R-PP states that subnational RLs will be developed based on stratification of the national territory. Stratification will be based on certain properties, of which ecoregions will be the principal property—and only property—for the initial stage. Other secondary and tertiary properties, such as forest type and management type, may be taken into account for stratification at a later stage. The national territory is estimated to have approximately 15 ecoregions and a study to define these ecoregions is currently underway by the UN-REDD Viet Nam Programme. The next challenges will be to allocate RLs for appropriate administrative unit levels (initially at the provincial level and applying in time to the district level) and to aggregate subnational RLs into a single RL at the national level (R-PP, Socialist Republic of Vietnam, 2011).

Several questions remain outstanding and will need to be addressed by UNFCCC negotiators, for instance:

- How do subnational RLs link up to the national level in terms of implementation?
- What is the appropriate subnational level (for example, council, district, provincial)?
- Which boundaries should be chosen when establishing RLs, for example, administrative/jurisdictional boundaries or ecozones?
- How can countries ensure that national reference scenarios be adapted in the event of modification of REDD+ rules at the international level?

4.0 Guidance on Thresholds

The determination of accuracy thresholds for countries will result in different measuring and monitoring costs. Determination of these accuracy thresholds needs more guidance and should also be relevant to a country's capabilities and circumstances.

4.1 Identification of Key Carbon Pools to Include in the Historic Estimate of Emissions/Removals

Emissions or removals resulting from land conversions appear as changes in ecosystem carbon stocks in the five IPCC eligible pools: aboveground biomass, belowground biomass, litter, deadwood and soil organic carbon. Carbon stock estimates for each pool can be obtained at different tier levels, requiring increasing levels of data, cost and analytical complexity (UNFCCC, 2009).

Not all eligible carbon pools are considered; this depends on a country's circumstances and capabilities. In Costa Rica, for instance, the current MRV system focuses on aboveground and belowground biomass. Peat lands are one of the major carbon emission sources in Indonesia, presenting a challenge. The next steps involve understanding how countries can make decisions about what to include or leave out, and how this affects the accuracy and acceptability of MRV results.

4.2 Selection of IPCC Reporting Tier

One major outstanding issue is the level of accuracy required. The IPCC (see Table 1) provides three tiers for estimating emissions, with increasing levels of data requirements and analytical complexity, and therefore greater accuracy.

The IPCC indicates that Tier 2 accuracy is the minimum required for reliable estimates and can monitor deforestation at a low cost. Nevertheless, methods of measurement vary depending on a country's capabilities and most developing countries may start with Tier 1 and progress over time toward more accuracy.

Table 1: IPCC tiers for estimating emissions

Tier	Description	Commentaries
Tier 1	<ul style="list-style-type: none"> - Use of default emission factors (indirect estimation of emissions based on canopy cover reduction) collected nationally or globally for forest activities - Use of very coarse activity data (e.g., global data sets) - Use of simple tools and methods 	<ul style="list-style-type: none"> - Lower costs, requires minimal capacity and provides the least accurate estimates of emissions and removals
Tier 2	<ul style="list-style-type: none"> - Use of emission factors and activity data from country-specific data - Use of national data, such as forest carbon inventories - Use of specialized land-use data (often representative data sets) - Use of higher resolution spatial data - Use of advanced methods and tools (e.g., remote sensing and field inventories) 	<ul style="list-style-type: none"> - Involves moderate costs, moderate capacity and provides improved estimates of emissions and removals and baselines
Tier 3	<ul style="list-style-type: none"> - Use of methods, models and inventory - Use of measurement systems driven by high-resolution activity data and disaggregated subnationally at a finer scale - Use of specific and detailed factors, such as fine resolution land-use/spatial data and complex modelling approaches and methods - Use of actual inventories with repeated direct measurements of changes in forest biomass on permanent plots 	<ul style="list-style-type: none"> - Involves higher costs and high analytical capacity and skills, while providing good results for baselines, emissions and removals - Also optimizes the ability to monetize carbon

Source: IPCC (2003).

Assessing the capacity of a country to implement these tiers is extremely important and should be a key activity in REDD+ strategy development. Analyzing trade-offs between the increase of certainty by using a higher approach and tier, and the increase of costs including the need to enhance human and institutional capacity, as well as infrastructure, is needed. Figure 2 shows progressive development of MRV systems within the REDD+ readiness phases. Clarification is required on the markers to denote transition from Phase 1 to Phase 2 to Phase 3.

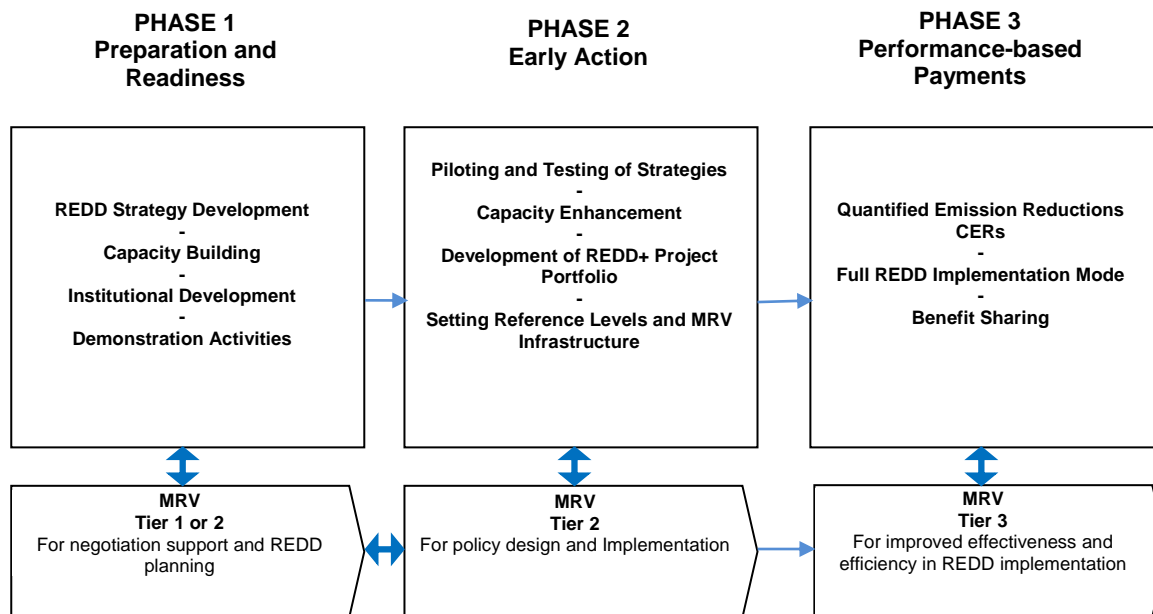


Figure 2: Progressive development of MRV systems within the REDD readiness phases.

Source: White & Minang (2011), pp. 2–11.

5.0 Inventory of Capacities Needed for MRV Design and Implementation

The capacity to implement MRV systems is low in many countries. Less than 20 per cent of developing countries have submitted a complete GHG inventory. Only three out of 99 developing countries (China, India and Mexico) have capacities considered adequate for both monitoring forest area change and for forest inventories (Herold, 2009).

To bridge the capacity gap, an assessment of existing capacities is needed, looking at institutional, data, and methodological capacities. The overall goal is to develop a capacity development process to establish sustained MRV for implementing REDD+ policies and results-based compensation. In Guyana, for instance, the roadmap for the development of a national REDD+ MRV system uses a phased approach that specifies near-term priorities and long-term targets, builds upon existing capacities and data, supports annual estimation, and moves toward reporting and verification of forest-related carbon emissions and removals at the national level (Guyana Forestry Commission, 2009).

This section focuses on the capacities needed in terms of institutional framework and participation of stakeholders at various levels, technical capacities and financial resources.

5.1 Institutional Frameworks for MRV at Multiple Levels

Identifying and designating the regulatory entities responsible for overseeing and approving MRV at multiple scales is a first step in establishing an MRV system. These regulatory entities may be in the form of a new dedicated public agency, an autonomous entity or an existing entity. For reasons of sustainability, it is important that the entity be established at an appropriate level in the government hierarchy and with high-level support (Climate Focus and Forest Trends, 2011). Existing capacities have to be assessed so as to determine where additional capacities may be required in the future. A strong institutional base and the establishment and maintenance of cooperation at all levels as an enabling framework is needed (Guyana Forestry Commission, 2009).

At the national level, a strategy is needed to develop modalities for multi-sector partnerships. Improved MRV capacity at subnational and local levels will facilitate linkages between national and local monitoring and verification. Subnational activities can help account for national leakage, and the involvement of local stakeholders can help to assure permanence. The scope and role of various government agencies or institutes, non-governmental organizations (NGOs), local communities and

the private sector in the MRV systems has to be clarified. In addition, local communities and indigenous peoples can play important roles in measurement and monitoring (See Box 4).

Box 4: Role of local communities and indigenous peoples in MRV

Local community and indigenous peoples involvement, including through participatory processes, must be an important element of MRV programs to ground-truth “top-down” measurements and improve accuracy.

Vietnam and Madagascar recently tested Participatory Carbon Monitoring methodologies that enable local communities and people to participate in carbon measurement and monitoring practices. Participatory Carbon Monitoring faces some challenges with regard to the technical capacity of local people and robustness of the collected data. Local communities should get involved progressively in MRV while improving their capacities; simple methodologies should focus on better involving local communities.

Existing MRV regimes provide opportunities for learning, and lessons learned from early implementation can inform other countries and should be communicated at the international level. (See Box 5 for examples from Indonesia and Brazil.) Many countries are still in “institutional mapping” stage, determining where capacity lies, where it must be strengthened, and where it is missing altogether.

Box 5: Lessons from existing MRV regimes in Indonesia and Brazil.

- Indonesia is establishing a national MRV agency responsible for all data collection and analysis. This approach helps to streamline information and leads to better coordination between the local, subnational and national levels. Indonesia adopted this approach because various government departments (and at different levels) produced contradictory results based on different methodologies and expertise. Indonesia stresses the need to define roles and responsibilities of existing agencies undertaking MRV-related work. Indonesia has adopted the principles of transparency of data and its collection, interagency cooperation, collaboration, and the sharing of data. Indonesia promotes the development of an MRV agency because it can help catalyze and coordinate the MRV process (Sukadri, 2010).
- Brazil’s experience offers lessons on a “patchwork” approach to MRV. For example, government reports and data in Brazil are supplemented by and compared against those from various research institutes and NGOs in the MRV process.

There appears to be potential scope for regional cooperation in REDD+ monitoring since some of the pertinent drivers (such as illegal logging) are of a transboundary nature (See Box 6). In addition, a regional monitoring system could probably be more cost-effective. Nevertheless, the success of such regional monitoring depends on harmonization of a certain number of parameters used by countries such as definitions, classification systems and technologies. It also depends on whether individual governments are willing to cede their authority on MRV. More studies are needed to assess the potential of multi-country monitoring, the harmonization requirements and possible implementation arrangements (R-PP, Socialist Republic of Vietnam, 2011).

Box 6: Regional cooperation in REDD+ MRV

- COMIFAC countries have developed their RLs at the regional level with World Bank support. Given similar ecological and economic components, this regional approach minimizes MRV system costs. At the same time, it enables a system that provides reliable and solid data at the national level of the ten countries. The COMIFAC countries are working to improve coordination, further a regional vision and improve negotiating power by speaking as a consolidated voice.
- Regional strategies are being considered in South Asia to ensure more cost-effective MRV development and exchange capacity building. India has good MRV capacity and Bhutan, which is experiencing a major capacity gap and is still at the inception stage, could benefit from India's support.
- Discussions are also taking place in the Mekong area where regional strategies could be used to develop RLs because the countries have similar ecosystems.

5.2 Technical Capacities

Improving technical capacities requires technology transfer and capacity building in specific technical areas related to MRV. The use of spatial images is a key element of establishing RLs and MRV systems, and capacity building is required on GIS and remote sensing. In addition, countries need support to improve management of information through numerical processing of remote sensing images, interpretation and analysis of the results, VHR imagery processing, and use of radar imagery to map often cloudy regions or to clear uncertainties of some optical images. Training is needed on field measurement and the management of this information, and in the acquisition and setting up of offices and computer laboratories in the target regions and in the field. Training should involve various stakeholders, including technicians and executives from ministries, NGOs, research institutions and university laboratories.

A review of the 22 draft or final R-PPs submitted to the Forest Carbon Partnership Facility (FCPF), as well as results of the workshops held by IISD and ASB-ICRAF, indicate that the main areas for capacity building are:

- Methods and modules for carbon measurement, including data collection, more precise data acquisition and integration at appropriate scales at national and subnational levels
- Choice of carbon pools
- Allometric equations¹
- Reference scenario setting
- Opportunity costs
- Information management systems and database management
- Quality control for information systems (how to bring up to international standards)

¹ Many countries currently use generic equations and little is known about specific equations. This requires more investment, given the implications it can have in terms of accuracy.

- Assessment of drivers
- Expertise with regard to UNFCCC and the IPCC guidelines
- Preparation of national GHG reports that will be requested by the UNFCCC

5.3 MRV Costs and Financial Resources

The cost of measuring and monitoring REDD+ depends on a country’s circumstances, which include factors such as the extent of forest cover; the level of forest stratification and the tier of carbon accounting applied (Terrestrial Carbon Group, 2009). For example, the DRC has only one major forest type, whereas Indonesia and Mexico have four or more forest eco-types. Figure 3 shows that the greater the information quality in an MRV system, the greater the increase in required costs and capacity. In addition, countries with no or weak MRV systems will incur readiness costs, depending on the tier of carbon accounting applied, country characteristics, and quality of pre-existing data and infrastructure.

Initial costs will be linked to developing reference scenarios and monitoring systems for emissions and removals. Ongoing costs will be dependent on several factors, such as the size of the REDD+ program, domestic and international reporting requirements, and local capacity to undertake monitoring.

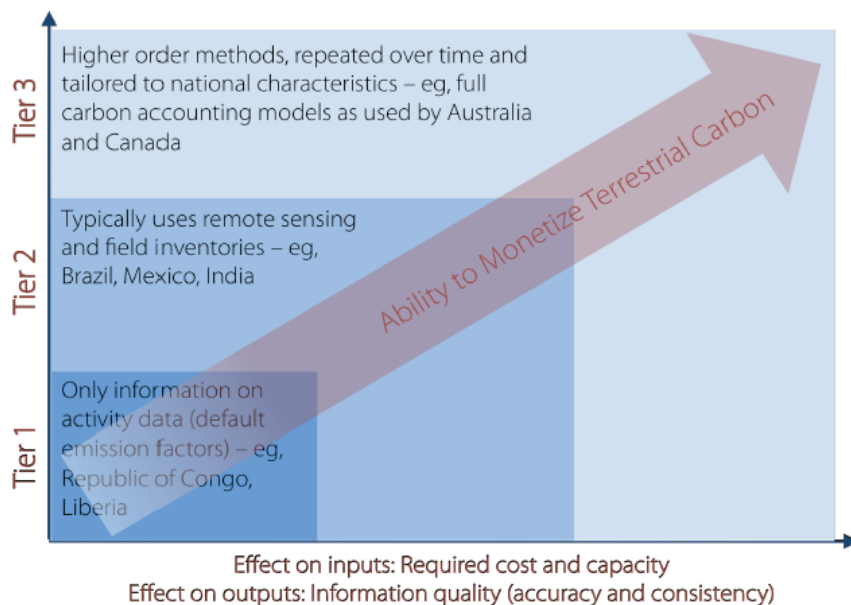


Figure 3: Cost and capacity versus information quality.

Source: Terrestrial Carbon Group (2009), p. 11.

Table 2 provides budget information from the 22 draft or final R-PPs submitted to the FCPF. These figures indicate the total budget figures for developing reference scenarios as well as MRV of emissions and removals, compared to the total cost of the REDD+ readiness plans. The budgets of R-PPs can provide a sense of these costs, but these are estimates and will likely change as early actors provide lessons and frameworks. Estimates of costs to set up reference scenarios and MRV for carbon emissions and removals during the REDD-readiness phase vary widely. The cost range for a reference scenario, for a three-year period, varies from US\$322,000 in Republic of Congo to US\$4,177,000 in Columbia, with an average cost of approximately US\$1,490,600. The cost range for MRV of emissions and removals, for a three-year period, vary from US\$350,000 in Liberia to US\$30,234,000 in Mexico, with an average cost of approximately US\$3,930,000. In both cases, the very wide range could reflect different starting points in terms of institutional frameworks and technical capacities. Other reasons for the wide range of costs could include the financing capacity of the country, the size of the country, and the accuracy of the approaches followed to develop the reference scenario and MRV emissions and removals.

Financing of MRV REDD+ activities is a key issue in the UNFCCC negotiations. With the phased approach, public funding would be needed initially to build capacity to implement REDD+ MRV activities in developing countries, moving on to a mix of public funds and carbon markets in the final phase. MRV is very critical at the results-based stage; there can be no REDD credits without credible and accurate MRV.

Building robust, rigorous and transparent national inventories and associated MRV systems in REDD+ countries will require the mobilization of funds from various initiatives and programs, such as the UN-REDD Programme and the World Bank's FCPF and Forest Investment Programme. Bilateral programs, especially those funded by Norway, have also allocated funds to strengthen MRV systems.

Direct participation of the private sector, for example through REDD+ initiatives, should be strongly encouraged in order to attract the required level of financial and human resources to REDD+ efforts.

Table 2: Reference scenario and MRV in R-PPs (in US\$).

Country and Date of R-PP	Reference scenario		MRV of emissions and removals		Total Readiness Plan
	US\$	%	US\$	%	US\$
Argentina, FCPF, 2010	765,000	8.31%	1,875,000	20%	9,201,000
Cambodia, FCPF, 2011	550,000	5.04%	4,040,000	37%	10,905,000
Central African Republic, 2011	795,000	14.27%	1,067,000	19%	5,570,000
Columbia, 2011	4,177,000	28.15%	4,600,000	31%	14,837,000
Costa Rica, 2010	642,000	14.76%			4,349,350
Democratic Republic of	980,000	4.33%	7,810,000	34%	22,652,000
Democratic Republic of	322,000	2.45%	643,000	5%	13,165,000
Ethiopia, 2011	2,670,000	18.92%	1,170,000	8%	14,115,000
Ghana, 2010	2,490,000	36.07%	590,000	9%	6,904,000
Guyana, 2010	480,000	8.23%	480,000	8%	5,835,000
Kenya, 2010	1,366,000	14.08%	740,000	8%	9,702,500
Laos, 2010	3,053,000	13.09%	12,665,000	54%	23,327,000
Liberia, 2010	575,000	15.30%	350,000	9%	3,758,000
Madagascar, 2010	1,614,870	29.08%	1,445,890	26%	5,553,720
Mexico, 2010	1,175,000	2.97%	30,234,000	76%	39,589,000
Nepal, 2010	1,355,000	17.70%	2,090,000	27%	7,654,500
Nicaragua, 2011	380,000	5.67%	1,872,000	28%	6,707,000
Peru, 2011	2,511,785	19.88%	1,223,286	10%	12,635,536
Suriname, 2009	3,673,000	17.28%	1,192,000	6%	21,250,000
Tanzania, 2010	1,555,000	13.53%	1,049,000	9%	11,489,500
Uganda, 2011	665,000	12.84%	530,000	10%	5,181,000
Vietnam, 2011	1,000,000	11.48%	2,710,000	31%	8,709,000

Source: R-PPs on the website of the Forest Carbon Partnership Facility (FCPF, 2011).

6.0 REDD+ MRV and MRV for NAMAs

NAMAs refer to a set of policies and actions that countries undertake as part of a commitment to reduce GHG emissions. NAMAs were introduced in the Bali Action Plan agreed upon at COP 13 and also formed part of the Copenhagen Accord at COP 15, which stated that NAMAs should be subject to international MRV in accordance with guidelines adopted by the COP (UNFCCC, 2010, p. 6).

Appendix 2 of the Cancun Agreements requests that SBSTA provide methodological guidance on how to make MRV of REDD+ activities consistent with MRV of NAMAs of developing countries. SBSTA is to make recommendations to the COP in Durban in 2011 (UNFCCC, 2011, p. 28).

The main challenges to linking REDD+ and NAMAs are (i) there are many ambiguities around the Cancun decision relating to NAMAs, and (ii) a great deal of progress has been made on REDD+ and there is concern that progress could stall or backtrack if REDD were more closely linked to NAMAs.

However, the question is not whether REDD+ should be considered a NAMA, but rather how to best harness the connections between the two. Indonesia has begun to look at how best to ensure coherence between policy, actions and MRV of REDD+ and NAMAs (see Box 7). Including REDD+ as a NAMA would theoretically promote efficiency, consistent and comparable MRV, streamlined funding, institutional efficiency and cross-linkages between sectors. But there is potential for inconsistencies between the two items, particularly if the NAMA MRV framework rejects the concept of reductions against a reference scenario (Global Witness, 2009).

Box 7: REDD+ MRV and MRV for NAMAs in Indonesia

Indonesia views MRV for REDD as part of MRV for national mitigation actions. Work is ongoing related to policy planning, awareness rising and capacity building around both REDD and NAMAs. The critical issue for Indonesia is how to ensure coherence between policy, actions and MRV of REDD+ and NAMAs. Coordination and integration at all levels of government is extremely important in setting standards, developing methodologies and building consensus among key stakeholders. Both top-down and bottom-up approaches are recognized as necessary for developing a comprehensive MRV system in Indonesia.

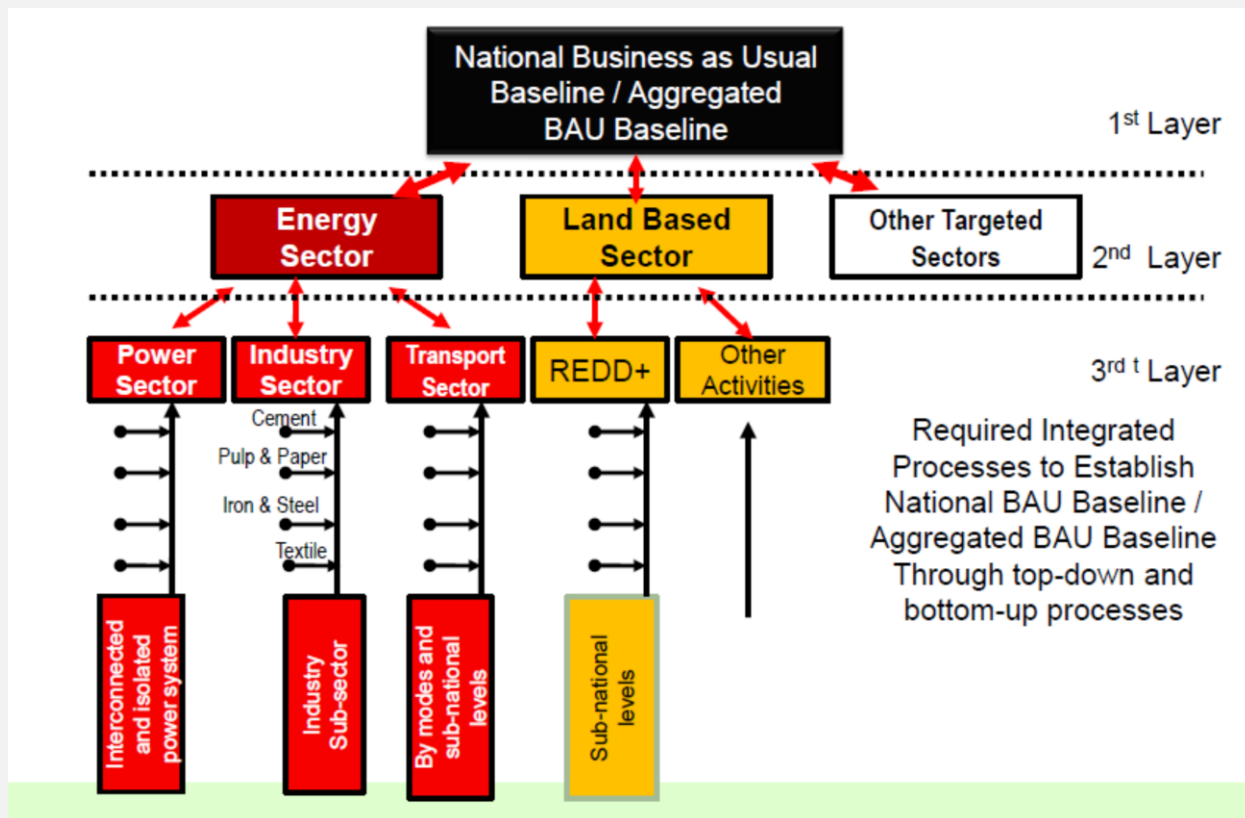


Figure 4: Required integrated processes to establish a national BAU baseline in Indonesia.

Source: Sukadri (2011).

7.0 Lessons from On-the-Ground Experiences

Participants at the IISD and ASB-ICRAF REDD+ capacity-building workshops held in Douala, Cameroon, and Hanoi, Vietnam, in May 2011 discussed MRV in REDD+ programs and activities. The following summary of the MRV discussions at the workshop highlights the main messages from the workshops and the challenges faced by developing countries as they develop MRV for REDD+.

7.1 MRV

Countries need support and assistance to determine available domestic skills, capacities, information and data, which will be the building blocks for developing effective MRV systems.

Countries should assess their existing and needed capacities, expertise and data as a starting point. The identification of skills and gaps will help countries tap into expertise at universities and research institutions, identify and coordinate data from different institutions, and enhance coordination between experts in different institutions. The use of in-country expertise can help to reduce the need for international consultants. The dissemination of information to local communities should be packaged in a manner that can be understood by different REDD+ stakeholders. Regional initiatives could promote strategies for cost-effective MRV and exchange of information.

Countries need to develop MRV REDD+ modalities, which include technical definitions and procedures, such as definitions of forest, reference level (RL), reference emissions level (REL) and nested approach.

Clarity—including classification issues and consistent terminology—is needed around the definitions of forests, REL/RL, and a “nested approach” to MRV.

The development of RELs, RLs and baselines should be flexible and based on the circumstances of countries. Many countries will require assistance to scale up project and subnational RLs to the national level.

In many cases, methodologies exist but are limited to the project and local levels. In order to ensure robust and comparable MRV, such methodologies must be scaled up, which will help to address permanence and leakage at a larger scale. Harmonizing project-scale and national-level methodologies is a challenge. The compilation of good practices and establishment of criteria for jurisdictional programs, baselines and crediting can support the linking of top-down and bottom-up processes.

Local community and indigenous peoples involvement, including through participatory processes, must be an important element of MRV programs to ground-truth top-down measurements and improve accuracy.

Participatory forest carbon monitoring is an important element of local community engagement. Improved involvement of communities in MRV can be facilitated through the use of simplified methodologies. Countries will need to balance simplicity with the need for scientific credibility of the data, but local communities should play a role in ground-truthing the information gathered through top-down processes (such as GIS).

Capacity building (e.g., forest assessments, monitoring forest cover change, information management systems) and technology transfer (e.g., GIS, remote sensing) is critical and needed.

Capacity building is critical at every level in order to ensure robust development and comparability of REDD+ activities. Developing country experience reveals priority capacity-building areas: GIS and remote sensing, field measurement and management of information, acquisition and setting up of offices and computer laboratories in the target regions, methods for carbon measurement, choice of carbon pools, allometric equations, opportunity costs, information/database management systems, quality control for information systems, assessment of drivers, expertise with regard to UNFCCC and the IPCC guidelines, and preparation of national GHG reports for the UNFCCC.

Developing countries should consider appointing MRV experts to UNFCCC technical and expert groups.

Appointing developing country MRV experts to UNFCCC technical and expert groups will improve a country's knowledge of leading edge MRV methodologies, as well as educate the technical and expert groups on the MRV needs and level of expertise found in developing countries.

Guidance is needed on how MRV for REDD+ is to be consistent with MRV for NAMAs.

Further exploration is needed as to what "consistent" means and the implications this will have for developing countries.

7.2 Moving Ahead

Critical challenges in moving forward on MRV identified by workshop participants included:

- Continued information exchange across countries, with an emphasis on engaging negotiators, technical experts (foresters, land managers and social scientists), civil society and the private sector.

- Capacity building to improve the understanding of IPCC guidelines for REDD MRV, including estimating implementation costs.
- Development of RELs, RLs and baselines, bridging gaps between local and national level approaches and data, and linking subnational and national approaches.
- Processes and examples for developing an inventory of a developing country's capacities and technologies for REDD+ MRV.
- Simplification: supporting information sharing and awareness raising for stakeholders in MRV to effectively communicate the “why” and “how.”
- Verification, including identifying cost-effective developing country processes for verification (such as using regional bodies).
- Capacity building is needed at every level and for all subjects related to MRV, e.g., at the national, subnational, community and institutional levels, and for the private sector (the agents of deforestation).
- Research also has a central role to play in linking new technologies, traditional knowledge and the needs of developing countries.

8.0 Concluding Comments

The main findings of this paper are:

1. Establishment of the REL/RL against which to measure reductions and emissions is a prerequisite of REDD+ activities; clarification on modalities is needed.
2. The choice of definitions will affect REL/RLs, monitoring methods and potential credits.
3. Supporting the development of nested approaches through assistance to scale up project and subnational REL/RLs to the national level is a major component of MRV for REDD+.
4. Capacity building, identification of domestic skills and capacities, transfer of technology and involvement of all stakeholders—including governments, local communities, civil society and the private sector—are key factors for successful MRV development and implementation.
5. Pilot projects, regional information sharing and demonstration activities are valuable in building knowledge and lessons about MRV.

Most of the discussions surrounding REDD+ MRV have focused on measurement of carbon. Little attention has been paid yet to reporting, and almost none to verification or the requirements for monitoring aspects of REDD implementation other than carbon. Further exploration is needed on the design and implementation of a broader monitoring system that addresses a wide range of information needs, and links MRV and safeguards information systems. Some countries are considering the development of broad MRV systems that would include information on safeguards and drivers, while others see MRV of carbon and an information system on safeguards as separate, but related, processes.²

The MRV system will be shaped by dialogue and debate in the UNFCCC, as well as between national and subnational governments, technical and financial institutions, and other stakeholders in REDD+. It will also be shaped by learning-by-doing in the implementation of national REDD+ programs. Sharing of lessons on the establishment of RLs and MRV systems could help to facilitate progress.

The outstanding questions to be addressed in the UNFCCC in the lead-up to Durban are as following:

² The IISD and ASB-ICRAF REDD+ project developed a second paper, “Safeguards and Multiple Benefits in a REDD+ Mechanism,” that discusses some of these issues.

1. What are the various scopes of REDD+ activities and, by extension, what is the definition of a forest? What are the implications of the various definitions?
2. What are the current challenges in establishing REL/RLs?
3. What is the best way to determine accuracy thresholds for MRV systems?
4. What are capacity-building needs in terms of institutional frameworks, technical capacities, financial arrangements and participation of various stakeholders?
5. How can MRV for REDD+ be consistent with MRV for NAMAs?

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