

**Recommendations for forest carbon measuring, monitoring,
reporting, and verifying guidance for REDD+**

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Emerging national forest carbon measuring, monitoring, reporting, and verifying frameworks must provide transparency, consistency, and comparability of REDD+ results. Measuring and monitoring are especially important for ensuring that activities create real mitigation results, thus allowing REDD+ to fulfill its potential to contribute significantly to the objectives of the Convention. Reporting and verification are also critical to mobilizing financial resources and rewarding developing countries' REDD+ mitigation efforts while securing environmental integrity.

This paper addresses four important considerations for the upcoming work programs on forest carbon measuring, monitoring, reporting, and verifying for REDD+.

- **First, existing IPCC guidelines and good practice guidance are a starting point for REDD+ monitoring and MRV. Ongoing technical work may lead to additional, complementary methodologies and modalities that can both maximize the effectiveness and efficiency of forest carbon monitoring and MRV and facilitate country implementation.**
- **Second, elements for further consideration by SBSTA in the near term are identified in the section on REDD+-specific policy guidance.**
- **Third, a preliminary collection of considerations for REDD+ forest carbon measuring, monitoring, reporting, and verifying guidance is presented. Parties may wish to build on these initial recommendations and outline a range of approaches that can be used to develop measuring and monitoring methodologies in all REDD+ countries.**
- **Fourth, some issues for SBSTA to consider in coordination with ongoing policy discussions are identified.**

The purpose of this document is to contribute to discussions within SBSTA on forest carbon monitoring and MRV. A synthesis of ongoing technical work and experience is needed to provide context for the formulation of guidelines. This work, coupled with existing and future policy guidance, will inform the development of transparent, consistent, and comparable forest carbon frameworks across all REDD+ countries.

Decision 1/CP.16 requests SBSTA to develop modalities for both forest monitoring and reporting systems and for measuring, reporting, and verifying (MRV) anthropogenic forest-related fluxes, forest carbon stocks, and changes in forest carbon stocks and forest area.¹ To

¹ Decision 1/CP.16 contains requests for two related work programs: paragraph (b) of Annex II requests SBSTA to develop modalities for forest monitoring systems for the monitoring and reporting of REDD+ activities, while paragraph (c) requests SBSTA to develop modalities for measuring, reporting, and verifying anthropogenic forest-related emissions by sources and removals by sinks, forest carbon stocks, and forest area changes resulting from the implementation of REDD+ activities. This paper refers to

comply with this request, SBSTA will need to develop operational definitions of measuring, monitoring, reporting, and verifying in the context of REDD+. These operational definitions will need to be consistent with the broader discussion on MRV currently taking place under the LCA.

In this paper, the following general definitions are used.² They are supplied for the purpose of clarification only and do not prejudice further technical or policy guidance.

Inventory: Data on forest area and associated carbon stocks

Measuring: Determining values of parameters and variables of forest carbon, including forest area and carbon stocks, by field studies, inventories, and remote sensing

Monitoring: Using measuring systems to identify changes in forest cover, carbon stocks and fluxes through systematic measurements and observations

Reporting: Compiling and submitting the results of measuring and monitoring activities in accordance with UNFCCC guidelines

Verifying: Independently confirming reported data in accordance with UNFCCC guidelines

MRV: Measuring, reporting, and verifying³

This paper focuses primarily on the technical aspects of forest carbon measuring and monitoring, and the views contained herein are relevant regardless of the outcomes of discussions currently underway in the LCA and SBSTA.

Existing guidance for REDD+ monitoring and MRV – Decision 4/ CP.15 provides “Methodological guidance for activities relating to reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of forest and enhancement of forest carbon stocks in developing countries” and builds off of guidance contained in 1/CP.13 and 2/CP.13. Decision 4/CP.15 also requests developing countries “to use the most recent Intergovernmental Panel on Climate Change guidance and guidelines;” the IPCC-issued Guidelines (1996 and 2006) and LULUCF Good Practice Guidance (2003) (collectively referred to here as “guidance”) are the basis of forest carbon measuring, monitoring and reporting under the Convention and its Kyoto Protocol. These documents (1) provide guidance for establishing GHG inventories, which form the basis for measuring and monitoring frameworks; (2) lay the groundwork for basing a tiered approach to monitoring and reporting on the level appropriate given differing national circumstances and capacities; (3) include methodologies for measuring the carbon impacts of activities on forest land and lands converted to and from forest; and (4) promote transparency of reporting on methodologies, assumptions, and data.

IPCC guidance comprises the foundation and outlines the fundamental approaches for forest carbon measuring, monitoring, and reporting. Recent technological and methodological developments may provide innovative ways of working with existing guidance to make REDD+ frameworks as effective and efficient as possible. Emerging approaches based on a combination

forest carbon measuring, monitoring, reporting, and verifying while making no judgment on the respective agendas or contents of these work programs.

² From Baker et al., 2010. Achieving forest carbon information with higher certainty: A five-part plan. Environmental Science and Policy 13: 249-260.

³ 1/CP.16 Annex II paragraph c

of remotely-sensed and field data should complement the use of effective existing methodologies, and build upon accepted and proven forest carbon measurement and monitoring practices, thus creating space for robust complementary approaches while promoting the comparability of all REDD+ measuring and monitoring frameworks.

Additional REDD+-specific guidance is needed from SBSTA — While existing IPCC guidance provides the basis for some of the components of REDD+ measuring, monitoring and reporting, it is not sufficient to ensure that emerging frameworks fully conform to the policy guidance supplied by the COP. There are a number of elements specific to REDD+ that will require additional methodological and technical guidance. The SBSTA work program should address, inter alia, the following considerations in order to ensure that capacity building efforts and methodologies employed by Parties promote the objectives of REDD+ as decided by the COP in the Cancun Agreements and in any future REDD+ guidance. Because REDD+ countries are likely to adopt a range of measuring and monitoring methodologies, SBSTA must establish guidelines to ensure that those methodologies are both appropriate and harmonized with IPCC and policy guidance; these guidelines should respond to the wide array of national circumstances and capacities. In establishing such guidelines, SBSTA should also ensure that the costs of the implementation of proposed guidance not become so expensive as to limit the broad participation of developing countries in REDD+ mitigation efforts.

- SBSTA should determine the most effective methods for incorporating local knowledge and engaging indigenous peoples and local communities in both the formulation and implementation of forest carbon measuring and monitoring systems. SBSTA workshops should provide an opportunity to learn from efforts already being made on the ground and through funding frameworks such as the FCPF and UN-REDD.
- UNFCCC guidance does not currently exist on how countries that utilize subnational monitoring and reporting for an interim period should measure, monitor, and report on the displacement of emissions within their national boundaries; specific guidance on this issue will be required.
- SBSTA, in coordination with the IPCC and other technical experts, should provide guidance on how to incorporate, as appropriate, forest carbon monitoring and reporting at local to national scales with the assessment of both the drivers of deforestation and how social and/or environmental safeguards are addressed and respected.
- Also in coordination with ongoing technical efforts, SBSTA should provide guidance on measuring and monitoring forest degradation and other REDD+ activities (enhancement and conservation of forest carbon stocks and sustainable management of forests).
- SBSTA should provide clarity on the definitions of REDD+ activities, including, as necessary, how to differentiate between activities on the ground (e.g., if anthropogenic impacts are classified as sustainable forest management versus degradation), as well as on the implications of these definitions for measuring, monitoring, reporting and verifying the associated carbon emissions and removals. This guidance will also be informed by whether the impacts of REDD+ are assessed using a land-based or an activity-based approach (see below).

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- SBSTA guidance should specify that frameworks and methodologies for monitoring and MRV of forest carbon must be transparent and conducive to verification by external reviewers.
- SBSTA, in coordination with the IPCC and other technical experts, should provide more explicit guidance on assessing overall uncertainty in emissions estimates. Overall uncertainty is a function of uncertainty within individual datasets (e.g. area change, biomass) and model parameters used in deriving emissions estimates. Existing guidance focuses on quantifying uncertainty associated with individual datasets. There is insufficient guidance available on assessing overall uncertainty.
- Guidance on assessing uncertainty should also provide for consistent analysis of uncertainty across Tiers and Approaches.

REDD+ technical recommendations – There is currently a range of remote sensing-based methodologies in various stages of development for REDD+ measuring and monitoring at the national and subnational levels. A “one size fits all” solution is not likely to emerge. Rather, the technologies and methodologies employed will be determined by countries’ national forest circumstances, their technical and institutional capacities, cost-effectiveness, and the financial, technical, and institutional support received.

Ongoing work on methods that integrate remote sensing- and field-based approaches by a number of national governments, groups, and intergovernmental and non-governmental organizations has begun to converge on several technical standards and recommendations. These recommendations should be used in conjunction with existing IPCC guidance to form the foundations on which results-based forest carbon measuring and monitoring for REDD+ are built. Current recommendations include but are not limited to:

- Monitoring and MRV for REDD+ should integrate and coordinate field-based forest carbon inventories and remotely-sensed land cover change analyses and other datasets.
- Forest monitoring systems should augment field-based carbon inventories, and should ultimately be accomplished using wall-to-wall mapping at the national scale.
- Frameworks should be able to track changes to and from forest land in a spatially-explicit manner (IPCC Approach 3).⁴
- REDD+ monitoring and MRV should be compatible with potential future efforts to measure and monitor the impacts of anthropogenic activities on other land uses.
- All countries should aim to ultimately conduct measuring and monitoring at the scale/s consistent with the range of REDD+-relevant anthropogenic disturbance processes (e.g., different scales may be needed to accurately monitor and MRV emissions from conversion to industrial agriculture versus from selective logging).

Future considerations for SBSTA and the AWG-LCA – There are several additional considerations on which progress under the SBSTA and LCA must be made in a parallel and

⁴ Approach 3 requires spatially explicit observations of land use and land-use change. The data may be obtained either by a sampling of geographically located points, a complete tally (wall-to-wall mapping), or a combination of the two (IPCC Good Practice Guidance for LULUCF).

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complementary manner to move both technical and political guidance forward together. Work on the following issues should start in 2011 in order to ensure they are resolved in a timely manner:

- Determine the potential role of MRV systems in complementing policy mechanisms to promote additionality and permanence, and to avoid leakage of emissions reductions.
- Provide technical guidance needed to determine the appropriate scope and scale/s for measuring, reporting, and verifying the impacts of REDD+ activities on forest carbon. Specifically, the COP should consider the implications of land-based versus activity-based MRV of forest carbon for REDD+.⁵
- Determine the process and timeline through which interim sub-national monitoring and reporting is incorporated into a national framework, including:
 - Clear modalities for subnational REDD+ activities to ensure they are compatible with the national forest carbon measuring, monitoring, reporting, and verifying framework; and
 - How to develop a national registry to keep track of all subnational activities.

MRV in a broader context

A wide range of capacities exists to implement forest carbon measuring and monitoring. Many countries are working towards achieving the level of readiness necessary for REDD+ implementation. The international community should take advantage of opportunities to link these efforts with capacity building and technology transfer efforts under the UNFCCC and other forums. Building in-country capacity, including structures to integrate the knowledge and experience of indigenous peoples and local communities into forest carbon monitoring and MRV, is critical to the long-term effectiveness and sustainability of REDD+.

Although the focus here is on measuring and monitoring forest carbon stocks, benchmarks will also be necessary for governance, institutional and technical capacity, among other measures. Although each is a critical component of successful REDD+ mechanisms, only verifiable reductions in carbon emissions will contribute to climate change mitigation. It is critical that guidance for measuring, monitoring, reporting, and verifying forest carbon is based on robust and transparent methodologies that measure actual emissions and removals of carbon for REDD+ mechanisms to fulfill their mitigation potential and combat climate change.

⁵ In a land-based accounting system, all anthropogenic emissions and removals from the relevant forest area would be accounted for. In an activity-based system, Parties would only account for emissions and removals attributable to a defined set of anthropogenic activities, e.g. deforestation, harvest, fertilization.