Status of REDD+ Measurement, Reporting and Verification (MRV) System for Tanzania

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Abstract

Through the current discussions under the United Nations Framework Convention on Climate Change (UNFCCC) there is a possibility for developing countries to receive financial benefits for Reducing Emissions from Deforestation and Forest Degradation; forest conservation, sustainable management of forests and enhancement of forest carbon stocks (REDD+). As REDD+ is a result-based mechanism, countries will be required to quantify their achievements in REDD+ by establishing a robust and transparent forest carbon Measurement, Reporting and Verification (MRV) system. MRV provides a system on how to account for the amount of forest carbon, including changes over time. The main focus is on the national level reporting to the UNFCCC, and the subsequent, anticipated accounting of valuable carbon credits at different levels that contributes to the country as a whole. Tanzania envisages participating in the implementation of REDD+ and has started setting up her MRV system for the determination of carbon benefits. Online with the methodological guidance for activities related to REDD+ under discussion by UNFCCC, Tanzania is undertaking her national forest resources inventory, estimating historical deforestation and forest degradation and or growth rates. It is anticipated that most of the data for the establishment of national carbon baseline for Tanzania will be available towards the end of 2012.

Keywords: *Status, MRV system, Tanzania*

1.0   Introduction

Tanzania has a total of 33.4 million hectares of forests and woodlands (FAO, 2011), rich in biodiversity and in carbon. Carbon stored in trees plays an important role in climate change mitigation. When emitted during deforestation or forest degradation, the carbon contributes to anthropogenic climate change. Through the current discussions under the United Nations Framework Convention on Climate Change (UNFCCC) there is a possibility for developing countries including Tanzania to receive financial benefits for Reducing Emissions from Deforestation and Forest Degradation; forest conservation, sustainable management of forests and enhancement of forest carbon stocks (REDD+). As REDD+ is a result-based mechanism, countries will be required to quantify their achievements in REDD+. Therefore, it is a key priority for countries to establish a robust and transparent forest carbon monitoring systems.

The most commonly debated subject under forest carbon monitoring is **Measurement, Reporting and Verification (MRV)** of forest carbon. MRV provides a system on how to account for the amount of forest carbon, including changes over time. The main focus is on the national level reporting to the UNFCCC, and the subsequent, anticipated accounting of valuable carbon credits at different levels that contributes to the country as a whole.

There is a discussion underway by the Subsidiary Body for Scientific and Technical Advice (SUBSTA) of the UNFCCC on methodological guidance for activities related to REDD+ (UNFCCC, 2011). This article draws heavily on this discussion with regard to issues related to MRV.

2.0   The Components of MRV
2.1   Measurements

Measurement for REDD+ refers to collection of data and information for the estimation of emissions and removals of GHGs from deforestation and forest degradation, forest conservation, sustainable management of forests and enhancement of forest carbon stocks. It involves determination of changes in carbon stocks and GHG emissions from changes in forest cover, and the enhancement of forest carbon stocks.

In the IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry (GPG-LULUCF) (IPCC, 2003), REDD+ activities are covered in three categories:
(i)   "forest land converted to other land" deforestation
(ii)   "forest remaining as forests": degradation, forest conservation, sustainable forest management, and enhancement of carbon stocks
(iii)   "other land converted to forest": afforestation/reforestation of non-forest land.

IPCC GPG is at present a widely acceptable official document that provides methodologies for the estimation of emissions and removals of GHGs. It refers to two basic data inputs: Activity data and Emission factors.

(i)   Activity data i.e extent of emission/removal category: in case of REDD+ refers to area of deforestation, forest degradation, forest conservation, sustainable management of forests and enhancement of forest carbon stocks presented in hectares over known time period. This can be determined using the following approaches:
• Approach 1.   Identifies the total area for each land category and provide net area changes i.e deforestation minus afforestation
• Approach 2.   Involves tracking of land conversions between categories, resulting in a non-spatially explicit land-use conversion matrix
• Approach 3.   Extends Approach 2 by using spatially explicit land conversion information, derived from sampling or wall to wall mapping techniques

Under a REDD+ mechanism, land cover/land use changes will need to be identifiable and traceable. Thus Approach 3 is the only option that will meet this goal.

(ii)   Emission factors i.e emissions/removals of GHGs per unit area eg. CO_2 emitted or sequestered per hectare. The carbon changes are determined in the five IPCC pools: aboveground biomass, belowground biomass, litter, dead wood and soil organic carbon. There are three Tiers of data for emission factors in the IPCC GPG that are derived from ground measurements:
• Tier 1: The use of IPCC default values such as aboveground biomass in six ecological zones per Africa, Asia and Latin America (IPCC Emission Factors Data Base − EFDB). This provides crude estimates of $\pm 70\%$ of the mean.

• Tier 2: This is the improvement of Tier 1 where country specific data collected within the national boundary are used. More detailed strata may also be delineated to improve the precision of estimations.

• Tier 3: Uses actual inventory with repeated measurements from permanent sample plots for the directly determination of forest biomass changes. This is the most rigorous approach associated with highest level of efforts.

Moving from Tier 1 to Tier 3 increases the accuracy and precision of the estimates, but also increases the complexity and the cost of monitoring.

Before moving to Tier 3, Approach 2 for activity data and a combination of Tier 1 and 2 for emission factors could be used. This information can be provided through a National Forest Inventory (NFI). As more data will be generated during the REDD+ readiness process, higher tier levels will be used in the monitoring system. Internationally acceptable methods, guidelines, and standards such as those of IPCC are used for the collection of high quality data.

2.2 Reporting

Reporting implies the compilation and availability of national data and statistics for information in the format of a GHG inventory. Reporting requirements to the UNFCCC (National Communications) may cover issues other than just those subject to measurement. The core elements of the national communications are information on emissions and removals of GHGs and details of the activities a country has undertaken to fulfill its commitments under UNFCCC.

2.3 Verification

Verification refers to the process of independently checking the accuracy and reliability of reported information or the procedures used to generate information. This verification is done by a totally independent and external review. The UNFCCC Secretariat through its experts will verify the data reported. The verification process concerns all the variables that were reported under REDD+. All the data, including the satellite and national forest inventory data will have to be made available in order to allow the verification of the GHG inventory.

3.0 Baseline/Reference level for REDD+ payments

The baseline/reference level is a benchmark against which the achievements on implementation of REDD+ activities will be credited. It

entails historical trends and projected business as usual scenario against which additional carbon benefits as a result of carbon project can be determined. In the construction of baseline/reference level for REDD+ the following terminologies are used: Reference Emission Level (REL) and Reference Level (RL)

3.1 Forest Reference Emission Level (REL)

REL is the amount of gross emissions from a geographical are estimated within a reference time period. It covers only emissions from deforestation and forest degradation (REDD) (Angelsen *et al*, 2011).

3.2 Forest Reference Level (RL)

RL is the amount of emissions/removal from a geographical area estimated within a reference time period (Angelsen *et al*, 2011). In addition to REDD, RL also cover removals through sustainable management of forests and enhancement of forest carbon stocks.

Data for setting up REL/RE usually come from National Forest Inventory that utilise remote sensing technologies combined with ground measurements to provide activity data and emission factors. Remote sensing is used for the estimation of historical emissions while degradation is assessed using ground measurements.

4.0 Setting up national baseline for REDD+ in Tanzania

Tanzania envisages participating in the implementation of REDD+ and has started setting up her MRV system for the determination of REL/RL. Online with the methodological guidance for activities related to REDD+ under discussion by UNFCCC, Tanzania is undertaking her national forest resources inventory, estimating historical deforestation and forest degradation and or growth rates. However as also suggested by the guidance, there is flexibility in

determining REL/RL to enable countries to progressively include more REDD+ as data becomes available.

4.1 National Forest Resources Monitoring and Assessment (NAFORMA)

Tanzania did not have carried out national forest inventory in the past. Therefore the starting point was to initiate a National Forest Resources Monitoring and Assessment (NAFORMA).

NAFORMA is:
– building the capacity on national forest inventories and remote sensing,
– determining the current land use cover/forest extent,
– determining the current forest growing stock,
– identifying drivers of deforestation and forest degradation, and
– designing a forest monitoring system using permanent sample plots (PSPs).

NAFORMA will therefore produce most of the essential inputs to the REL/RL establishment. The first phase of NAFORMA will be completed in December 2012, the construction of the REL/RE will therefore start as the data becomes available.

4.2 Estimation of the historical national deforestation

FAO Forest Resources Assessment Remote Sensing Survey (FRA-RSS) approach will be adopted. FRA-RSS is a continuous process of assessing the global forest condition over a 5 to 10 years interval. This assessment is done by means ofRemote Sensing Survey (RSS) sampling tiles all over the globe and produces data at continental level – not national level. There are 79 RSS tiles that fall in the territory of Tanzania this is however too little to measure national forest cover change with any degree of accuracy. With assistance from the Joint Research Centre (JRC) of the European Union the FAO

FRA-RSS tiles will be relocated over the 850 NAFORMA PSPs clusters. The forest cover change will be assessed at two periods of 1990-2000 and 2000-2010.

The continuous assessment in the PSPs linked up with the continuous FRA-RSS process will also ensure continuity of the MRV process in Tanzania. The NAFORMA PSPs will be re-measured in year 2 or 3 after NAFORMA field work. The ground data will then be used with the national RSS system to detect forest changes and provide a robust and efficient monitoring process for the REDD implementation. This work is currently done under the support of the UNREDD Tanzania programme in collaboration with NAFORMA.

4.3 Estimation of forest degradation

The remote sensing community has proposed several ways to measure deforestation accurately and reasonably cheap. Measuring forest degradation (loss of biomass within a forest) remotely is much more problematic. An alternative way to measure changes on standing carbon is carrying out a ground inventory basing on PSPs.

Tanzania like other developing countries has very little reliable data on forest stock changes. The absence of forest data is the outcome of the fact that continuous forest stock monitoring in PSPs is not adequately carried out. While NAFORMA provides future solution to this problem, existing PSPs from previous research with re-measurements within the present time can be utilised for the current uses. UNREDD Tanzania programme is commissioning institutions with PSPs to assess degradation/carbon sequestration in different vegetation types across the country.

5.0 Expectations

It is anticipated that most of the data for the establishment of national REL/RL for

Tanzania will be available towards the end of 2012. With this information the national REL/RL will be constructed based on activity data following IPCC approach 2 or 3 and tier 2 for emission factors.

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