Forest Monitoring & MRV

John Fonweban
UN REDD Programme
FAO (RAF), GHANA
John.fonweban@fao.org

Presentation at the M & MRV Workshop, 13-17 January 2014, Calabar, Nigeria

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REDD+ & MRV Genesis (2)

COP 16, Cancun, 2010: Requests developing countries to develop:

- a national strategy or action plan;
- a national forest reference emission level and/or forest reference level (or as an interim measure subnational ones);
- a robust and transparent national forest monitoring; and
- identified and requested that information on 7 safeguards be addressed, respected and promoted
- requested developing countries to address drivers of deforestation and degradation ….. ensuring the full and effective participation of relevant stakeholders, inter alia indigenous peoples and local communities.
- confirms that REDD-plus is to be implemented in phases, starting with readiness activities and evolving into results-based REDD-plus actions that are to be fully measured, reported and verified.

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Monitoring and MRV: Definitions

- **Measurement** includes both the actual/physical measurement of emissions or removals from forest areas, as well as their calculation, …… of different parameters that affect the release or sequestration of carbon and other GHGs. Its refers to estimation of AD and EFs

- **Reporting** refers to the process of documenting estimates of green house gases (GHGs) and the methodologies used to derive them, as well as other related issues, such quality assurance and quality control (QA/QC) activities, uncertainty estimation, etc.

- **Verification** provides inputs to improve GHG inventories, build confidence in estimates and trends, and help to improve scientific understanding of GHGs. Specific activities include both internal and external checks of the inventory parameters.

- **Monitoring** encompasses MRV, governance aspects, as well as the efforts to generate information on the effectiveness of policies and forest management practices as part of REDD+ implementation.

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National Forest Monitoring System

- The objective of the MRV System is to enable the assessment of national GHG emissions and removals in the forestry sector and to report this to the UNFCCC, in a transparent, accountable and verifiable manner.
- Countries are requested to establish, according to national circumstances and capabilities, robust and transparent national forest monitoring systems that:

1. Use a combination of remote sensing and ground-based forest carbon inventory approaches for estimating, anthropogenic forest-related greenhouse gas emissions by sources and removals by sinks, forest carbon stocks and forest area changes;

2. Provide estimates that are transparent, consistent, as far as possible accurate, and that reduce uncertainties, taking into account national capabilities;

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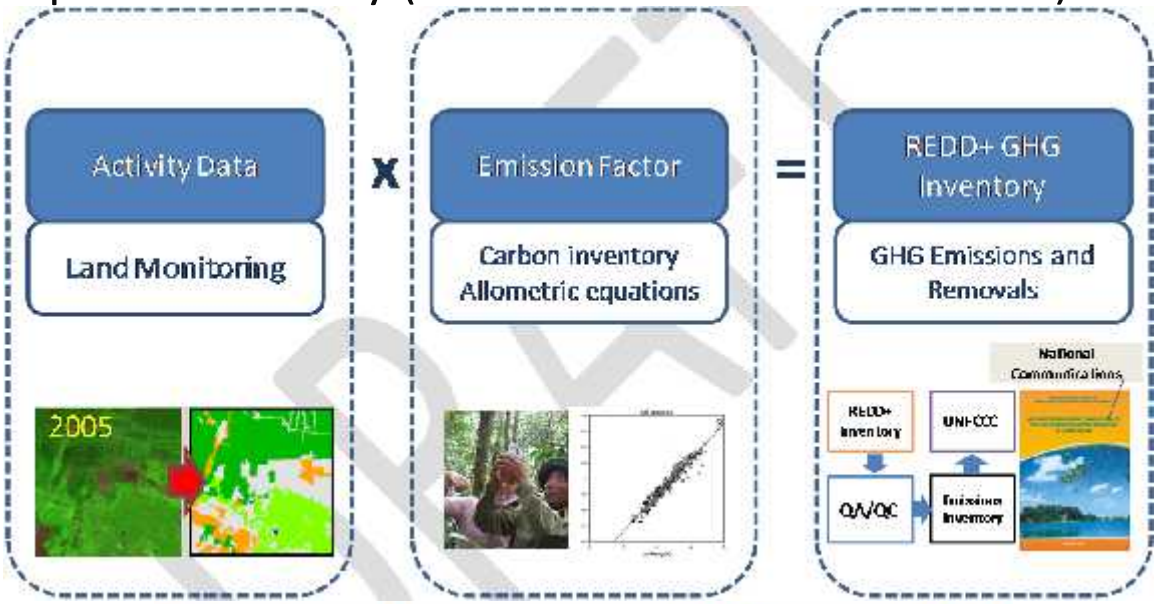
Methodological Guidance for MRV Systems

- Following the IPCC's Good Practice Guidelines (IPCC, 2003) and the Guidelines for National GHG Inventories (IPCC, 2006), the simplest methodological approach for MRV consists of combining information on the extent of human activities (called 'activity data' or AD) with coefficients that quantify emissions or removals per unit activity (called 'emission factors' or EF)



$$Emissions = AD \times EF$$

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Activity Data (AD) and "Approaches"

Approach 1:

Identifies the total area for each land-use category individually, with no detailed information about area change between categories; and is not spatially explicit.

Land-Use	Land Area Mha		
	Initial	Final	Net Change
Forest land total	18	19	1
Forest land (Unmanaged)	3	3	0
Forest land zone A	7	4	-3
Forest land zone B	8	8	0
Afforestation	0	4	4
Grassland total	84	83	-3
Unimproved grassland	49	49	-2
Improved grassland	35	35	-1
Cropland total	31	29	-2
Wetlands total	0	0	0
Settlements total	5	8	3
Existing Settlements	5	5	0
New Settlements	0	3	3
Other land total	2	2	0
Balancing term	0	0	0
TOTAL	140	140	0

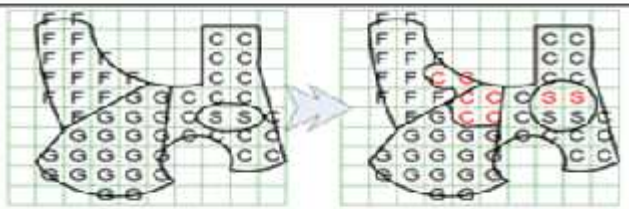
Approach 2:

Generates a land-use transition matrix between time t1 (initial) and t2 (final). For REDD+ activities, only the first column (forest land converted to other land uses) and/or row (land converted to forest land) may be necessary, depending on the REDD+ activity being considered.

Final \ Initial	Forest land (Unmanaged)	Forest land (Managed)	Grassland (Rough grazing)	Grassland (Improved)	Cropland	Wetlands	Settlements	Other land	Final area
Forest land (Unmanaged)	5								5
Forest land (Managed)		10	1	3	1				15
Grassland (Rough grazing)		2	50						50
Grassland (Improved)			2	22					24
Cropland					29				29
Wetlands						0			0
Settlements		1	1		1		6		8
Other land								2	2
Initial area	5	13	50	24	31	0	5	2	140
NET change	0	+1	-2	0	-2	0	+3	0	0

Approach 3:

Generates a transition matrix similar to that from Approach 2 but the land-use changes are identified in a spatially explicit way (geo-referenced).

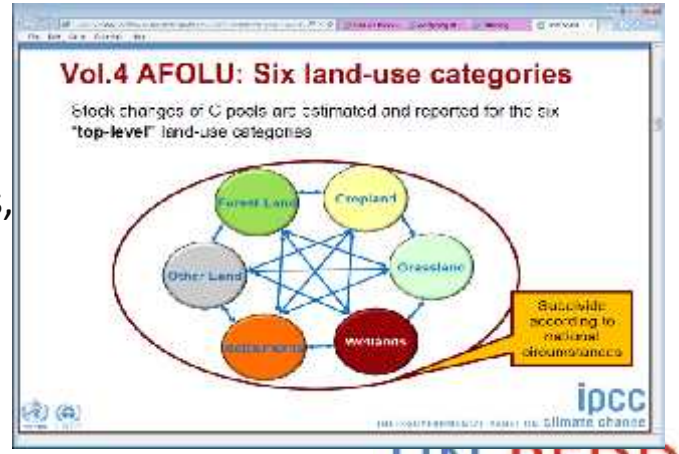


Adapted from Slides by Thelma Krug (2010)

REDD+ MRV System: Activity Data (AD)

- Activity Data for the REDD+ MRV System can be generated primarily from remote sensing data, and needs to comply to the IPCC (2006) guidance.
- An operational “wall-to-wall” system based on Approach 3 of the IPCC (2006) is preferable.
- Ideally a consistent land representation of 20 years is expected in order to capture lands that have been Forest Land for more than the transition period required.
- Remote sensing image analysis usually results in a stratification of the country into different land use categories, and the production of transition-matrices.
- Countries have been using different classification systems, but its good to align this with that prescribed by UNFCCC & IPCC.

Table 1. Example of land use change matrix



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Emission Factors & “Tiers” System

- The “Tiers” system represent different levels of methodological complexities, and vary from Tiers 1 to Tiers 3.

1. Tier 1 is basic and is used as s default EF data, provided by IPCC Guidelines & Guidance, and can also be obtained from the Emissions factor Database (EMFDB). It is appropriate for countries where national data is scarce or absent and hence default values have to be used.

2. Tier 2 is intermediate but uses EFs that are country- or region-specific for the most important or “Key Carbon Pools”.

3. Tier 3 uses higher order methods , including models and inventory measurement systems tailored to address national circumstances.

4. Tier 2 & 3 are sometimes refered to as higher order tier methods and provide more accurate estimates of greater certainty than Tier 1.

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Estimation of Emission Factors (EFs)

- National Forest (Carbon) Inventories are needed, including development of allometric equations and Conversion/expansion factors.

- The generation of EFs require extensive field-based data collection, and can be undertaken for specific ecological regions and land uses .

- Estimates have to be made for different carbon pools.

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Forest Carbon Inventory for Emission factors Determination

•Requires the estimation of biomass and Carbon stocks from several "pools":

1. Standing Live Trees
2. Standing Dead trees
3. Fallen Dead Trees
4. Understory vegetation
5. Forest Floor (Litter)
6. Soil Organic Matter

•Because of high cots, only "key Categories" or pools should be estimated due to high cost.

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REDD+ MRV: GHG-Inventory

- With the full development and operation of the two elements (AD and EF) of the MRV system a country can generate its REDD+ related National GHG-I, for reporting to the UNFCCC (*in Phase III of REDD*+).
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- The National GHG-I for REDD+ is incorporated into the National GHG-I, which will be submitted every four years as its National Communication (NC) to UNFCCC.
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- Under Articles 4 and 12 of the UNFCCC, all Parties are required to prepare NCs.

- Information reported in GHG-I represents an essential link between science and policy, and provides the means by which the Conference of Parties (COP) can monitor progress made by Parties in meeting their commitments and in achieving the Convention's ultimate objectives.

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REDD+: Ensuring Multiple Benefits

- REDD+, has the potential to deliver [**ecosystem-based & social**] benefits beyond carbon if properly planned & implemented

Ecosystem-based benefits:

- Conservation of biodiversity
- Water regulation
- Soil conservation
- Timber production
- Forest food and other NTFPs

Social Benefits:

- Forest-based employment opportunities
- Livelihoods & incomes
- Carbon credit payments
- Enhancement in decision-making
- Better governance

UNFCCC encourages countries to promote & support the **Cancun Safeguards**, which require that REDD+ activities be undertaken while respecting the knowledge & rights of indigenous peoples, including the effective participation of stakeholders.

UN-REDD Programme has agreed on a set of Social and Environmental Principles & Criteria (**SEPC**) that can assist countries in developing a national safeguards system.

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Monitoring Environmental Services (Safeguards)

- **"Forests are more than carbon (WWF 2010)"**
- Because of fears that the implementation of REDD+ activities could lead to some adverse effects on co-benefits (e.g. biodiversity conservation & improved livelihoods and governance), Parties reached broad consensus (prior to Copenhagen) on the need to promote 7 safeguards when undertaking REDD+ activities, including environmental, social and governance safeguards.

- For delivery of these co-benefits to be demonstrated, safeguards must be subjected to monitoring, reporting and verification (MRV) and should be built into REDD+ programmes from the beginning, to ensure that:

    1. REDD+ provides real and sustainable benefits to people, biodiversity and ecosystems, and supports improved governance;

    2. REDD+ programmes are effective and to reduce the risk of non-permanence; and

    3. there is transparency, full participation, and accountability, all of which are crucial to understanding the effectiveness and impacts of REDD+ activities.

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Community-Based Forest monitoring

- The Cancun Agreements of CoP16 requested Parties to ensure full and effective participation of Indigenous Peoples and local communities in REDD+ (probably not in monitoring per se)

- However, decision 4/CP15 (Copenhagen, December 2009) refers directly to the role of communities in monitoring, in article 3, in which the,

"….. *encourages as appropriate, the development of guidance for effective engagement of indigenous peoples and local communities in monitoring and reporting*".

- At Bonn (SBSTA30 Bonn, June 2009) the need for full and effective

engagement of indigenous peoples and local communities in, and potential contribution of their knowledge to, monitoring and reporting of activities relating to (REDD+) was emphasized and, furthermore, encouraged the development of guidance for effective engagement of indigenous peoples and local communities in monitoring and reporting.

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Community-Based Forest monitoring

- Research by the Kyoto: *Think Global, Act Local* program has already shown that communities may be trained to use standard forest inventory protocols for carbon stocks following IPCC recommended procedures, and that this is as reliable, but very much cheaper than, expert inventories, meaning that the transaction costs of REDD+ may be reduced if communities do the monitoring themselves

- Thus it is clear that the Parties to the UNFCCC consider that community monitoring can play an integral part in MRV for REDD+ and should be explored as appropriate.

- Community-based monitoring can be reliable and economic (cost effective), can enhance ownership and motivation, and can greatly enrich the national forest accounting database.

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Thank You

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