



Forest Carbon Partnership Facility

Design a Monitoring System

Global Dialogue on
Developing a Readiness Preparation Proposal
August 13-14, 2009



On REDD implementation

- Monitoring plus other information needs
 - e.g. forest monitoring, surveillance for law enforcement, etc.
- REDD implementation within broader development context
 - Additional benefits, etc.
- Governance
 - Institutional strengthening, capacity building
 - Stakeholder engagement



	MRV Requirements	Further national REDD implementation requirements
Carbon	Stock and changes of carbon pools in the relevant categories	Localized carbon information is required on carbon ecosystems, landscape, species and tree components for each category of land use
Multiple Benefits	?	Ecosystem and other services Cultural and spiritual values Forest products Socio economic indicators, Land tenure



Design Monitoring System

Key issues to address in the design of Monitoring system:

1. What is the current system a capacities and what are the gaps
2. Describe what monitoring system will be designed to accomplish:
 1. What specific data will it collect and report? (forest cover change, carbon?)
 2. Biodiversity conservation? rural livelihood variables? Etc.)
 3. Linkage to national GHG inventory
 4. Linkage to REDD national registry and tracking?
 5. What level of resolution is needed: for national & sub-national activities?
2. Who will be responsible for design and development?
3. What technical assistance and training will be required?
4. Implementation costs
5. Timeline

MRV Planning Process – Example: Road Map for PNG

Forest Land Monitoring	National Carbon Forest Inventory	National GHG Inventory
Operational wall-to-wall system based on RS. Historical data from AUS. Data distribution on web GIS system	Continuous national field sampling system to assess forest carbon stocks for all the carbon pools	National inventory for the AFOLU sector as per Annex-I Parties under UNFCCC
One year to be operative – two years to deliver outputs	Partially already operative – two years to be completed	Two years to prepare the first inventory (2011)
US\$ 1 M up to 2011	US\$ 2 M up to 2011	US\$ 500,000 up to 2011
Training: In country (AUS – FAO)	Training: FAO-ITTO-AUS	Training: At regional level (UN REDD)
Responsible; OCCES	Responsible: Forest Research Institute	Responsible: OCCES

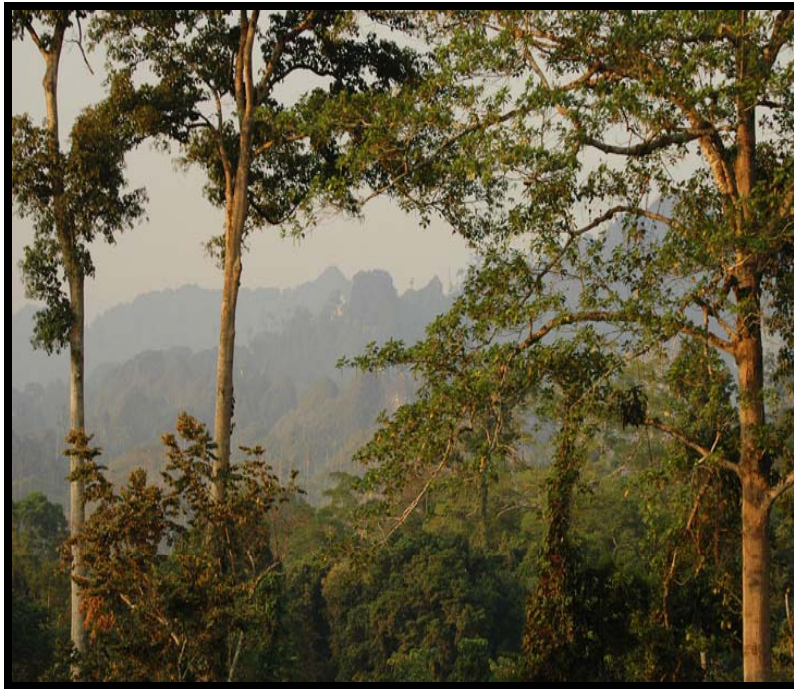
<i>Important components</i>	<i>Practical considerations</i>
FOREST AREA CHANGE	Primary source: Landsat-type satellite data
Deforestation	Starting point for historical assessment 1990-2005 (3 time steps minimum) Build basic satellite data proc. capabilities
Monitoring of forest degradation Forest fire and burned area	Relevance and characteristics for human-induced carbon emissions Definition of suitable monitoring system
Accuracy assessment	Using best/transparent methods and efforts for continuous improvement Prepare for statistically robust approach
CHANGE in CARBON STOCKS	Primary source: ground/inventory data
Existing stratifications and forest carbon estimates	Inventory of available data Decide on carbon pool/TIER level to report
Towards improved carbon stock change estimations	New inventory including other carbon pools Stratification in relevant areas/forest types
ACCOUNTING & REPORTING	Provide conservative estimates

Monitoring deforestation at national scale

- Satellite monitoring: National examples from Brazil, India and several national REDD case studies
- Starting point to develop more detailed monitoring system:
 - Motivation to use more detailed data than 1990-00-05
 - Identify hot spots of forest loss
 - Stratified approach to estimate area change in future or for monitoring degradation
 - Establish or enhance national capacities
 - Develop understanding of historical (spatial) processes
 - Remote sensing data output to guide further field work related to carbon accounting (i.e. stratification)

Remote Sensing Data Supply

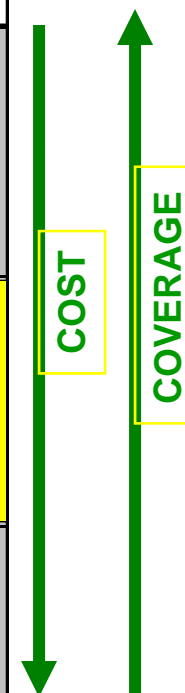
- Should be
 - Free (part of infrastructure)
 - Frequent (draw from available satellite systems)
 - Useful (standardized deliverables)



What analysis approach should be used to assess change at repeated intervals?: DATA SOURCES

Table 3.1. Utility of optical sensors* at multiple resolutions for deforestation monitoring

Sensor & resolution	Examples of current sensors	Minimum mapping unit (change)	Cost	Utility for monitoring
Coarse (250-1000m)	SPOT-VGT (1998-) Terra-MODIS (2000-) Envisat-MERIS (2004 -)	~ 100 ha ~ 10-20 ha	Low or free	Consistent pan-tropical annual monitoring to identify large clearings and locate "hotspots" for further analysis with mid resolution
Medium (10-60m)	Landsat TM or ETM+, SPOT HRV IRS AWiFs or LISS III CBERS HRCCD	0.5 - 5 ha	<\$0.001/km ² for historical data \$0.02/km ² to \$0.5/km ² for recent data	Primary tool to map deforestation and estimate area change
Fine (<5m)	IKONOS QuickBird Aerial photos	< 0.1 ha	High to very high \$2 -30 /km ²	Validation of results from coarser resolution analysis, and training of algorithms



*non-optical sensors appear promising for future but not yet operational



MRV – Measuring 5 Carbon pools

- Above Ground biomass
- Below Ground biomass
- Dead wood

Litter

Soil organic matter



Monitoring Issues in REDD implementation

- Monitoring of Carbon Stock Changes:
 - Not rocket science
 - Tendency: access to free and cheap data, analysis and images
 - ... But MRV will required methodological considerations and improvements and in-house capacity
- Transparency
- Multiple Benefits
 - REDD implementation required broader information on natural resources, their uses and users
- Governance
 - Long-term institutional Strengthening
 - Stakeholder engagement



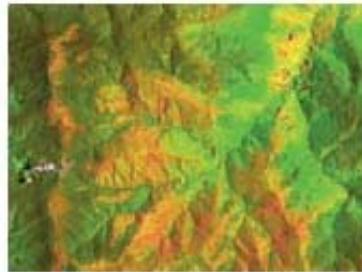
Synergies

- Integration of Carbon in existing monitoring systems

Sourcebook version COP13.2



SOURCEBOOK



Reducing Greenhouse Gas Emissions from Deforestation and
Degradation in Developing Countries: A Sourcebook of Methods
and Procedures for Monitoring, Measuring and Reporting

Web resources

- **GOFC-GOLD REDD sourcebook:**
 - <http://www.gofc-gold.uni-jena.de/redd>
- **Global Terrestrial Observing System (GTOS):**
 - <http://www.fao.org/gtos/>
- **GOFC-GOLD:**
 - <http://www.fao.org/gtos/gofc-gold/>
- **GOFC-GOLD land cover project office:**
 - <http://www.gofc-gold.uni-jena.de/>