Implementation of IPCC and other carbon certification guidelines in climate change mitigation projects: Experiences from 20 subnational initiatives in six countries

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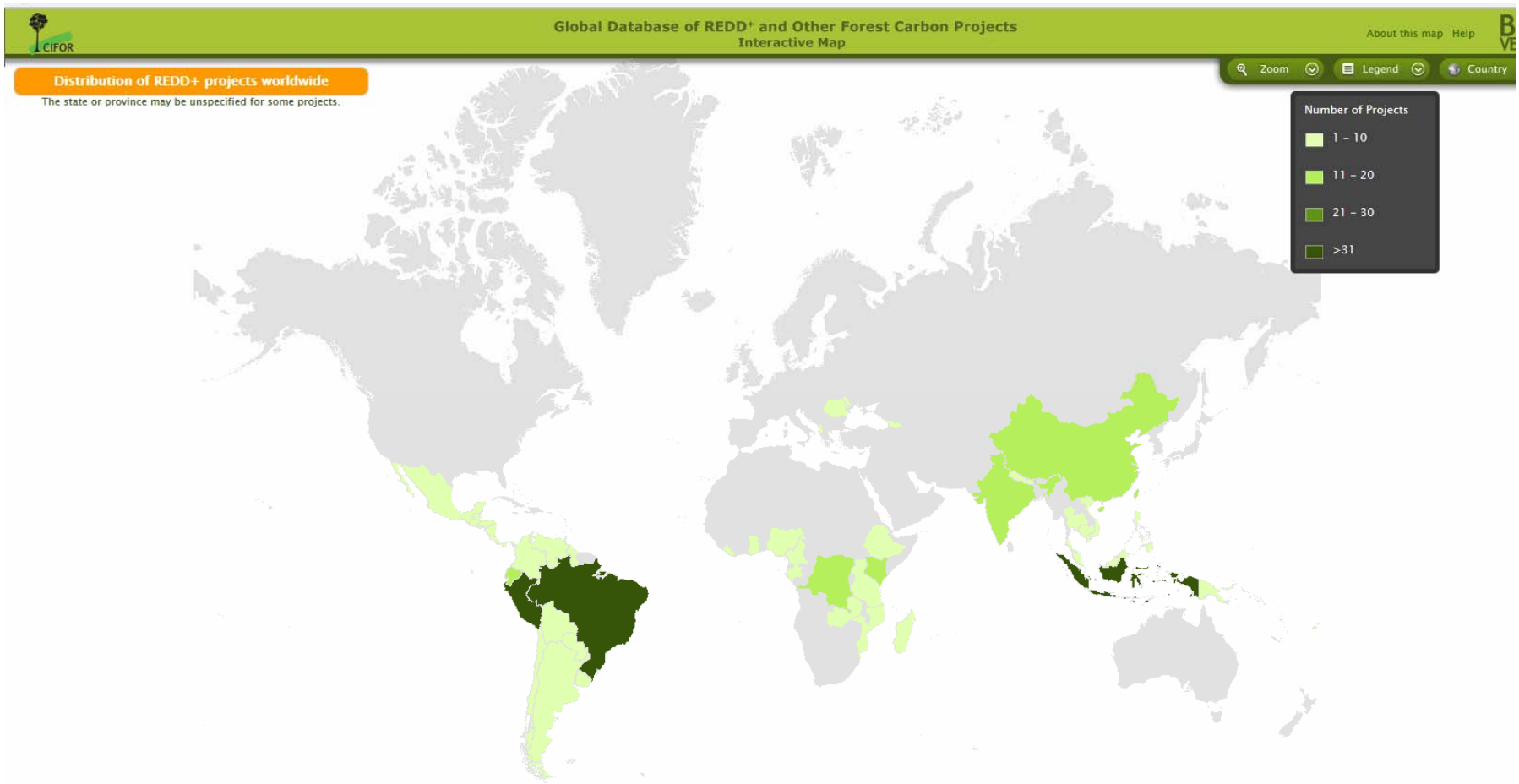
Center for International Forestry Research

IPCC Expert Meeting: Application of 2006 IPCC Guidelines to Other Areas

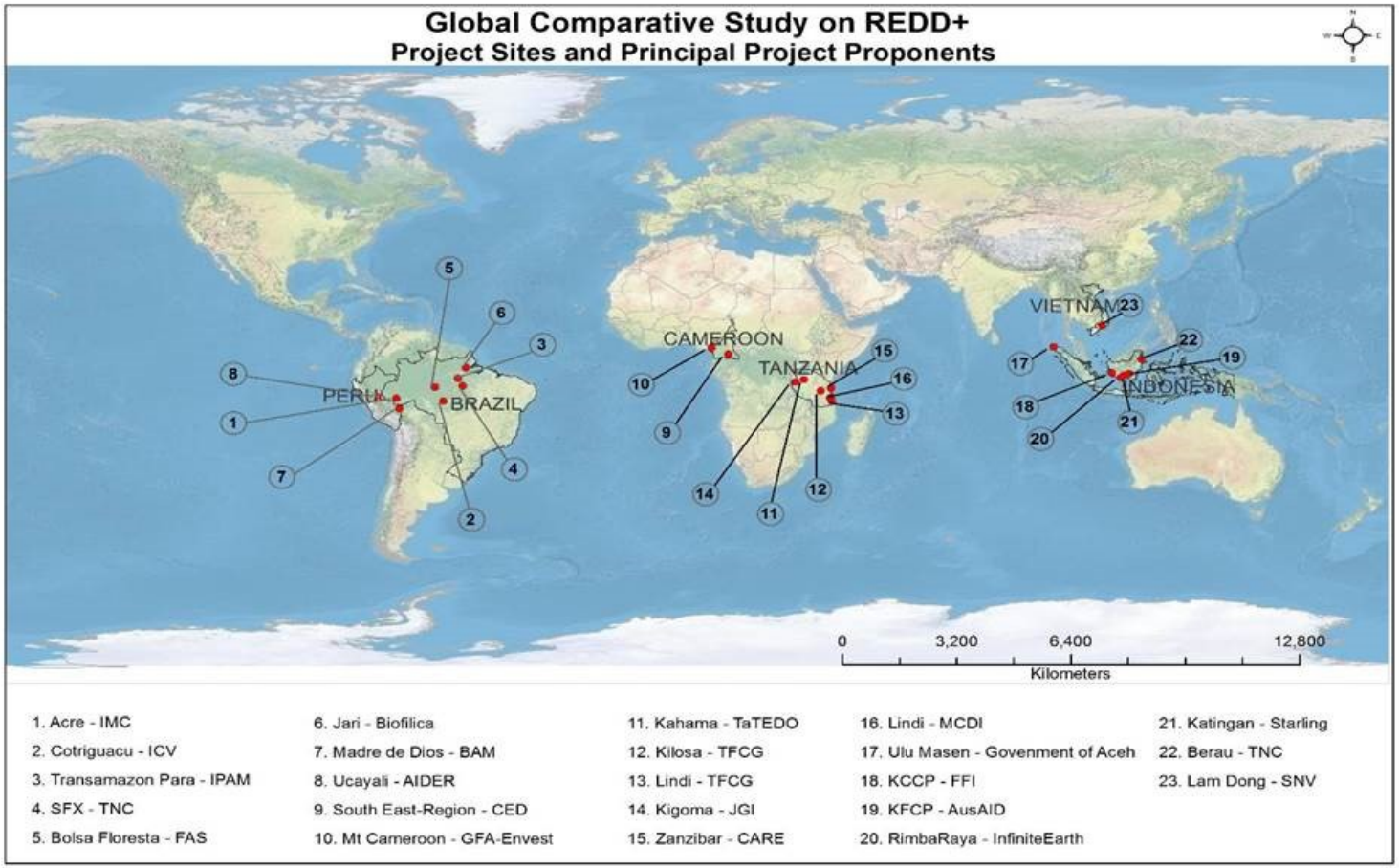
1-3 July 2014
Sofia, Bulgaria

REDD+ demonstration projects



- REDD+ and non-REDD+ forest carbon projects - 340 sites in 52 countries
- Key goal : to implement performance-based rewards for increments in carbon against the baseline, while also achieving social and environmental co-benefits.

Global Comparative Study on REDD+



MRV assessment

Questionnaire survey, Interview with MRV experts, Field visits, and Regional MRV workshops

Insights on implementing IPCC and other carbon certification guidelines

2006 IPCC Guidelines for National Greenhouse Gas Inventories : Volume 4 – Agriculture, Forestry and Other Land Use (AFOLU)
http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.html

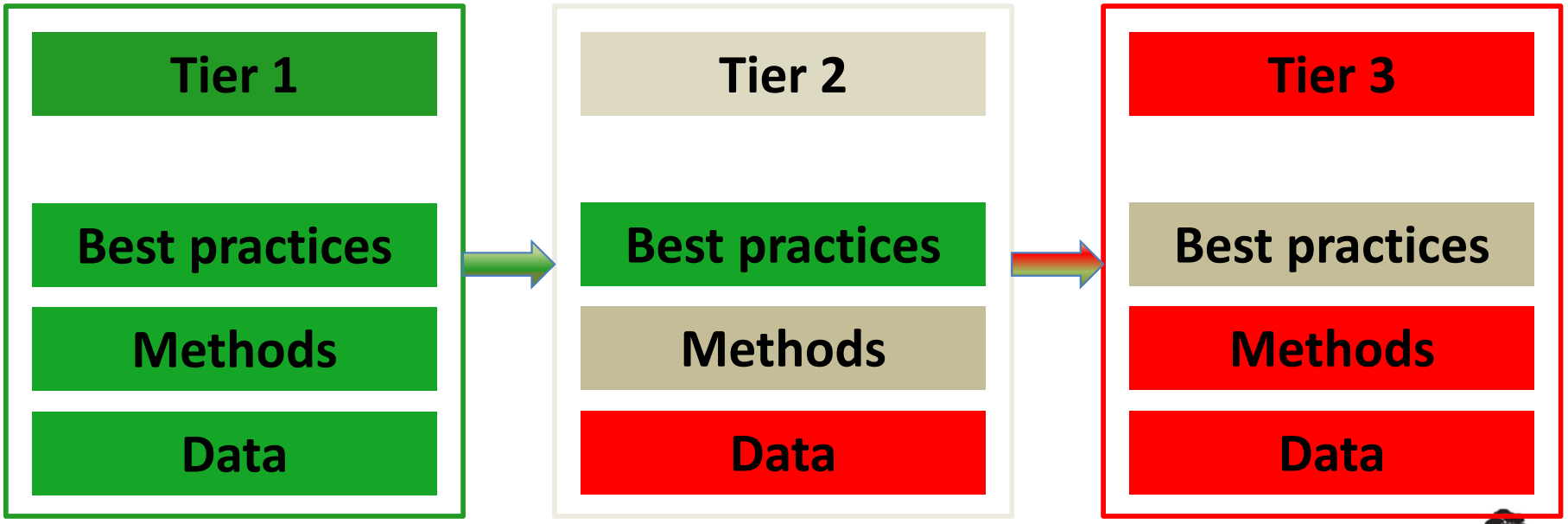
2003 IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry (LULUCF)
http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.html

are the **world's most authoritative source of methods to estimate GHG inventories,** and provide the **methodological basis for the voluntary carbon markets** and the **UNFCCC discussions on methods for REDD+**

Insights on implementing IPCC and other C GL

However, it is important to understand !!!

- Scale - is primarily targeted to country level GHG inventorying.
- Tiers - Strength of Guidelines (i.e, explaining best practices, suggesting methods and supplying data) weakens as it move from Tier 1 to Tier 3.



- REDD projects require Tier 3 level analysis

Insights on implementing IPCC and other C GL

- Whereas VCS provides additional directives on data and methods

- However:

- Projects are structured to target on carbon credits and market. Less importance in addressing deforestation beyond project boundaries.
- Focus is on carbon, not GHGs as such.
- Perceived as difficult to attain without considerable investment.

VCS guidance on generating activity data

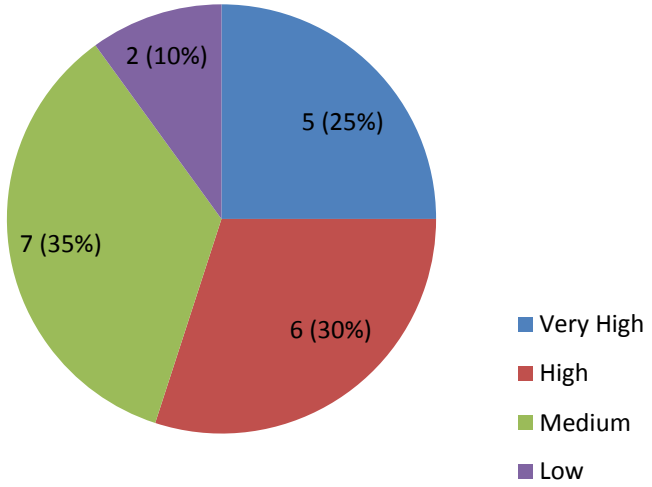
Data / Task	VM0006 "Mosaic AUDD"	VM0007 "Modular Meth"	VM0009 "Cumulative Mosaic AUD"	VM0015 "AUD"
Remote sensing/imagery resolution	≤ 30m	≤ 30m	≤ 30m	≤ 100m
Remote sensing/imagery time series needs for reference area	limagery from 4 time points between 0 and 15 years prior to project start.	For unplanned deforestation, imagery from 3 time points between 2 and 12 years prior to project start.	Imagery from at least 2 time points prior to project start. At least 90% of the reference area must have coverage by at least 2 time points.	Imagery from at least 3 time points from the period 10-15 years prior to project start, with one within 2 years of project start.
Remote sensing/imagery minimum classification accuracy (forest: non-forest)	70% of sampled pixels (with uncertainty discounts)	90% of sampled pixels	Not pixel-based. Quality control guidelines to minimize point interpretation error.	90%
Remote sensing/imagery minimum classification method	Review high resolution imagery or database of known classes at locations	Review high resolution imagery or ground truthing	N/A	Review high resolution imagery or ground truthing
Remote sensing/imagery minimum cloud free	80%	90%	Unspecified - shifting sample point approach flexible in regions with significant and variable cloud cover.	Unspecified

Shoch *et al*. (2011)

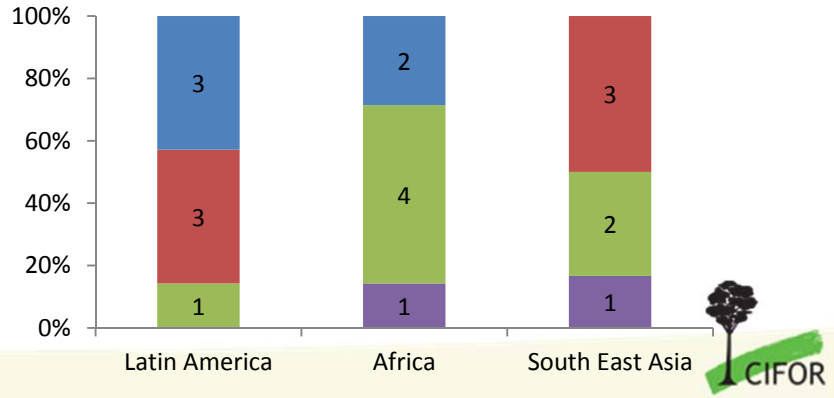
REDD proponents capacity and readiness to generate activity data

Criteria
Availability of med. resolution RS data
Availability of high resolution RS data
Access to other higher end Aerial, SAR and LiDAR data
Availability of ancillary GIS layers
Availability of RS & GIS softwares
Use of higher end classification and change detection techniques
In-house expertise for implementation

Overall capacity and readiness



Region-wise capacity and readiness



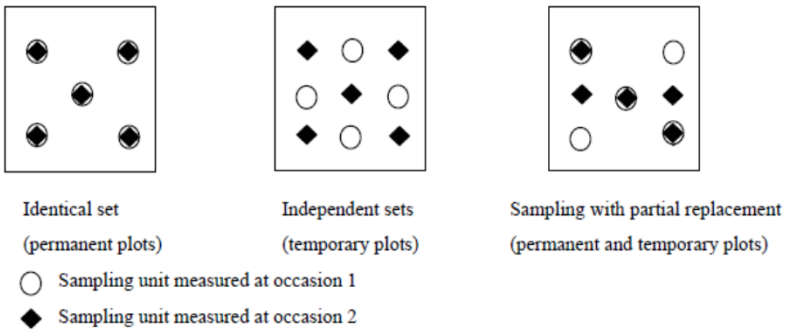
Observations - activity data

- Landsat is the primary carrier for developing activity data in projects.
- The availability of Landsat time series data varied with respect to regions; High in Latin America, Medium in Southeast Asia, and Low in Africa.
- About half of the proponents had high-resolution (>10 m) satellite data.
- Majority of organizations (70%) showed good in-house expertise and used advanced techniques for generating activity data.

Emission Factors

IPCC GL

- Five carbon pools and non-CO2 greenhouse gases
- Key category analysis is key
- Default factors for Tiers 1 & 2.
- Recommends mix of permanent and temporary sampling units for monitoring



VCS GL

- Relevant carbon pools
- Methodologies mostly focused on AGB; scarce data and methods on other C-pools and non-CO2 GHGs.
- Site specific EF.
- Permanent or temporary sampling units

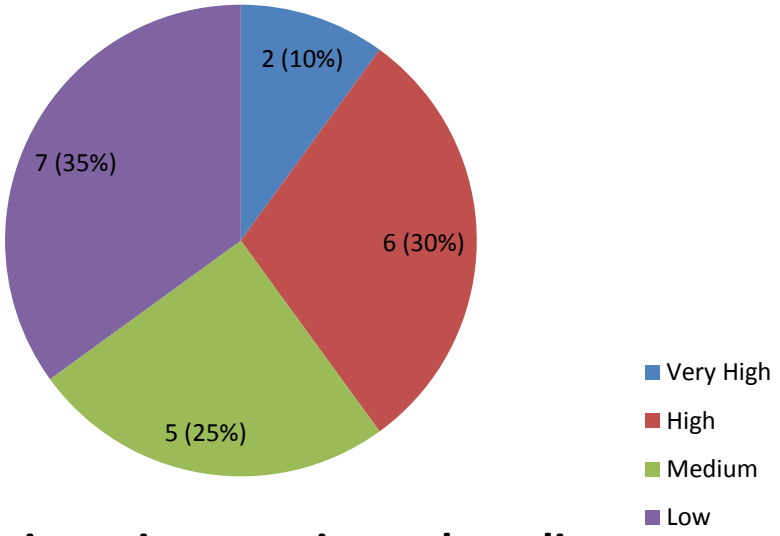
Stock estimate	VM0004 "SE Asia Peat APD"	VM0006 "Mosaic AUDD"	VM0007 "Modular Meth"	VM0009 "Cumulative Mosaic AUD"	VM0015 "AUD"
Baseline (ex ante)					
Project area forest carbon pools	Forest biomass inventory once at beginning of project with permanent or temporary fixed area plots	Forest biomass inventory of each identified forest stratum with permanent sample plots.	Forest biomass inventory with fixed area or variable radius sample plots (must take place within +/-5 years of the project start date)	Forest biomass inventory with fixed area plots (must take place in the first monitoring period, i.e. prior to first verification).	Forest biomass inventory with temporary or permanent plots, or conservative default
Post conversion	Growth of vegetation in future land use based on default factors from literature or field measurements from representative areas.	Default factors from literature or measurements from temporary plots on representative areas.	Default factors from local studies or literature or measurements from temporary plots on representative areas.	Not needed if project area is semi-arid tropical forest. Otherwise requires soil carbon sampling from proxy farms in the reference area to parameterize the soil carbon loss model.	Default factors from literature or measurements from temporary plots on representative areas.

Shoch *et al*. (2011)

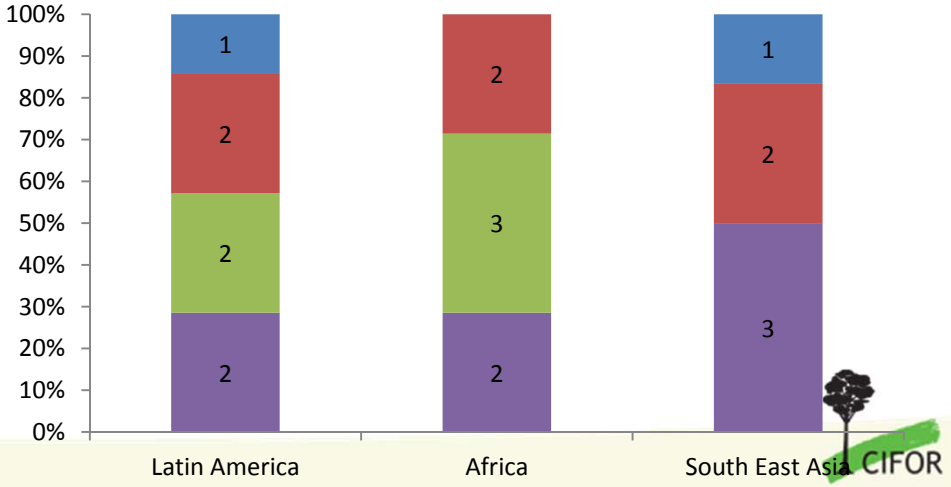
REDD proponents capacity and readiness to generate emission factors

Criteria
Availability of allometric equations
Availability of carbon fraction coefficients
Availability of other emission factor datasets
Monitoring with respect to five carbon pools
Sampling scheme and methods
In-house expertise for implementation

Overall capacity and readiness



Region-wise capacity and readiness



Observations – emission factors

- A few projects only monitor all five carbon pools
- None of the projects inventoried N_2O or CH_4
- About half of the projects had site-specific allometric equations
- Carbon fraction coefficients, biomass expansion factor and root-shoot ratio were limitedly available for most sites.
- None of the projects used the mix of permanent and temporary sampling units for monitoring additionality.

Reference emission level and Monitoring

IPCC GL

- Not mentioned about REL
- Best practices for monitoring (time series consistency, reporting, quality assurance, quality control and verification)

Item Monitored	VM0004 "SE Asia Peat APD"	VM0006 "Mosaic AUDD"	VM0007 "Modular Meth"	VM0009 "Cumulative Mosaic AUD"	VM0015 "AUD"
Frequency of monitoring forest cover change.	Annual for the project area and lands controlled by the deforestation agent (for land use change and forest fires)	Annual for the project area and leakage belt and prior to each verification (or every ≤5 years) for the reference region.	Prior to each verification for the project area and leakage belt, and prior to each baseline re-assessment for the reference region.	At baseline re-evaluation, i.e. every 10 years.	Prior to each verification for the project area and leakage belt, and in the reference region at the beginning, middle and end of each baseline period.

VCS GL

- Methods are available for REL. Uncertainty in the estimates remains as an issue.

Data / Task	VM0006 "Mosaic AUDD"	VM0007 "Modular meth"	VM0009 "Cumulative Mosaic AUD"	VM0015 "AUD"
GIS analysis to apply criteria demonstrating similarity of the reference to the project area	Required	Required Not required when using population driver approach	Required	Required.
Rate modeling of deforestation (from historic forest cover change analysis)	Simple historic (average or trend)	Simple historic (average or trend) or population driver	Logistic model based on historic and covariates (drivers)	Simple historic (average or trend) or based on covariates
Data on covariates (e.g. population)	N/A (simple historic only)	Optional Required when using population driver approach	Optional	Optional
Spatial modeling of deforestation and GIS coverages (i.e. shape files) of spatial drivers (e.g. digital elevation models, road networks, etc.)	Required.	Required if unplanned frontier deforestation, or if < 25% of project boundary within 120m of recent deforestation (i.e. isolated from areas of active deforestation).	None (not spatially explicit)	Required.
Spatial modeling minimum goodness of fit	Unspecified	40% Figure of Merit (FOM) for frontier, 80% FOM for mosaic	N/A	50% Figure of Merit (FOM) for frontier, 80% FOM for mosaic

- Monitoring guidance are also provided.

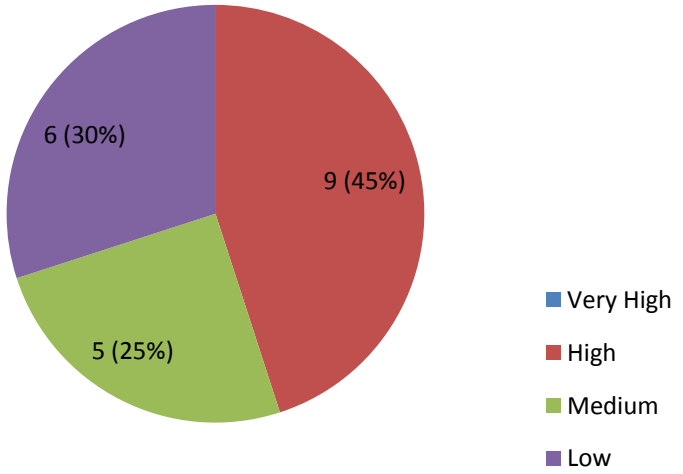
Shoch *et al*. (2011)

REDD proponents capacity and readiness for REL and Monitoring

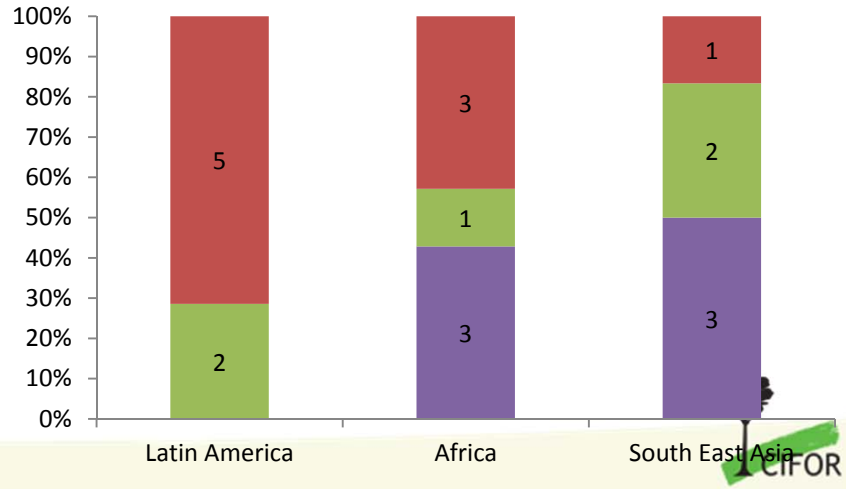
Criteria

- Methods used for baseline estimate
- Understanding on the proximate drivers of deforestation
- REDD+ intervention plans on proximate drivers
- Understanding on the underlying drivers of deforestation
- REDD+ intervention plans on underlying drivers
- Long term monitoring plans to evaluate the REDD+ interventions

Overall capacity and readiness



Region-wise capacity and readiness

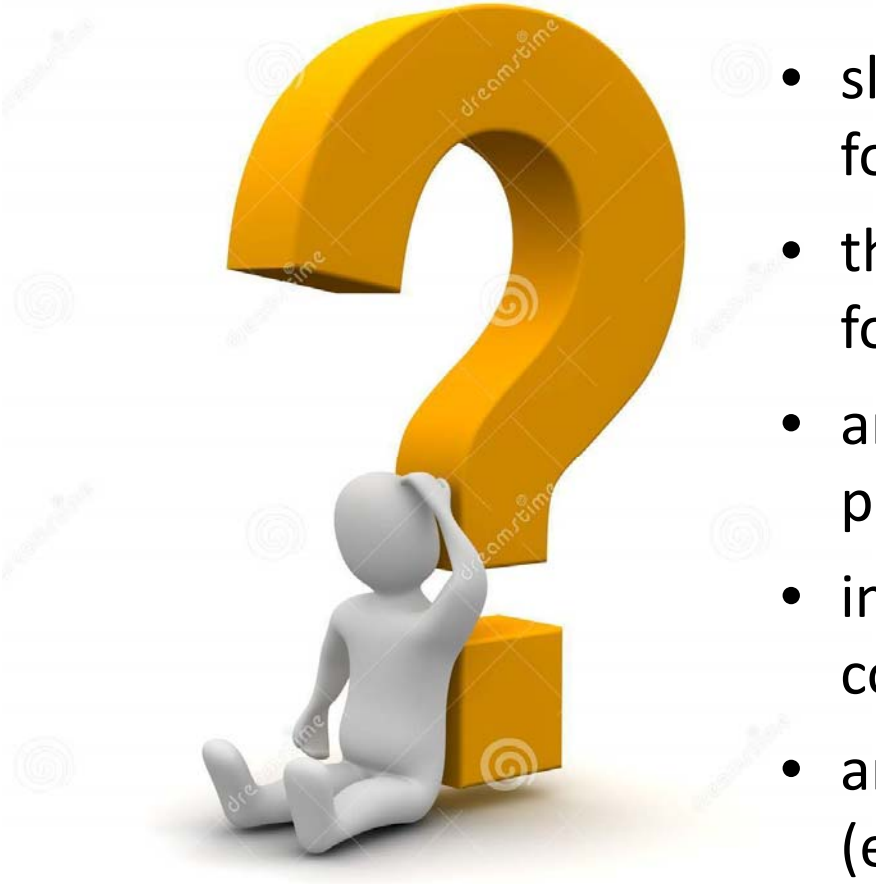


Observations – REL and Monitoring

- None of the projects showed ‘very high’ readiness for REL and monitoring.
- A few organizations had well-defined strategy to slow and halt proximate causes of deforestation.
- In most cases, the underlying causes of deforestation originate outside the project boundary; intervention plans are beyond the proponent’s capacity.
- A few projects only showed reasonable monitoring plans, while the rest had loosely defined monitoring plans or no plan at all.

Overall Synthesis

The future of REDD still unknown!



- slowness in international REDD+ policy formulation
- the unclear path of development of the forest carbon market
- architectural issue of nesting of projects to larger jurisdictions
- institutionalization of REDD within the country context
- ambiguity in methodological guidelines (eg: REL, monitoring degradation etc.)
- tenure and land right issues

Key questions

- Do we need to have additional methodological guidelines pertaining to REDD? If yes, how it should be the structured?

- Even if we recommend IPCC guidelines, capacity remains a key issue. How to overcome?

- Is it the time for developing new guidelines? (1996 -2006 - 2016??) by incorporating advances with the method development on activity data, emission factor, monitoring and so on?

- Get ready for the 2020 implementation of climate agreement!. How to develop an Integrated Monitoring and Reporting framework applicable across scales (projects, subnational jurisdictions, national and international)?

Methodological Guidelines - Challenges and opportunities

With respect to best practices, data and methods, REDD still need to addresses many unresolved questions:

- Key category analysis is key – Forest degradation, timber logging, fuel wood collection are some key categories of emission (key drivers) at the projects. Similarly regrowth and forest enhancements drives emission removal or sinking. Best practices are yet to be developed on addressing these sources and sinks.
- Uncertainty and error management - As we move up in higher Tiers the complexity and uncertainty keep rising. Additional guidelines on error management and uncertainty reduction with demonstrated examples could be addressed by revising the existing guidelines.

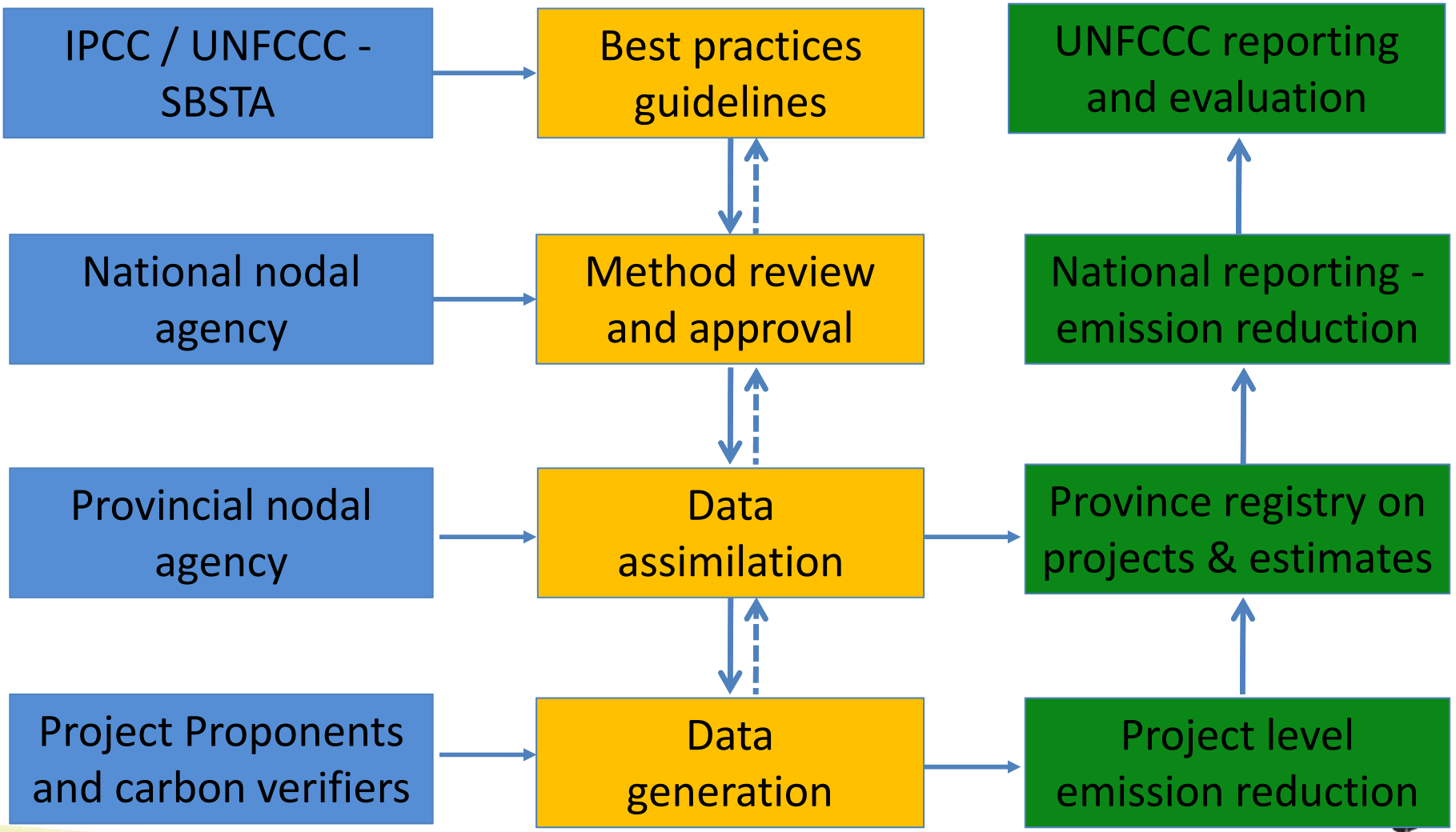
Challenges and opportunities

- Reference Emission Levels - REDD differ from national GHG inventories as they need to assess a reference emission level, which has all of the problems associated with trying to quantify a counterfactual case (BAU deforestation or forest degradation). REDD+ programs also need to assess net avoided emissions and enhanced sinks against a net reference level that includes sinks and sources.

- Permanence and leakage - REDD activities also need to address issues of permanence and leakage.

- Jurisdictional counting - Reporting of emission reduction assessments need to be consistent with national GHG inventories. Omission, double counting, and overlapping claims of carbon rights need to be addressed.

Towards an integrated monitoring and reporting framework in support of 2020 climate agreement implementation



Advancing the science and technology: multi-scale monitoring – CIFOR experience

RapidEye satellite tasking

Airborne LIDAR

Unmanned aerial vehicles (UAV)/Drones

Terrestrial LIDAR (TLS)

In-situ monitoring LIDAR

Biomass field measurement

Conclusion and recommendation

As the global community targets to have consensus on climate agreement by 2015 and the corresponding implementation by 2020, the lessons from CIFOR's phase 1 and Phase 2 REDD+ activities show that additional guidance on applying the IPCC 2006 guidelines to areas other than national scale inventories would greatly facilitate implementation of emission abatement programs aimed at slowing, halting and reversing land use related emissions.

Further readings

Joseph, S., M. Herold, W. D. Sunderlin and L. V. Verchot (2013). "REDD+ readiness: early insights on monitoring, reporting and verification systems of project developers." Environmental Research Letters **8**(3): 034038.

Joseph, S., M. Herold, W. Sunderlin and L. Verchot (2013). "Challenges in operationalizing remote sensing in climate change mitigation projects in developing countries." Geoscience and Remote Sensing Symposium (IGARSS), 2013 IEEE International: 2752 – 2755.

Estrada, M. and S. Joseph (2012). Baselines and monitoring in local REDD+ projects. Analysing REDD+: Challenges and choices. Bogor, Indonesia, Center for International Forestry Research (CIFOR)**:** 247-260.

Acknowledgement

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