ENVIRONMENT INSTITUTE

UCL

Application of IPCC Guidance to REDD+ Advice from GFOI

IPCC Expert Meeting – Application of 2006 Guidelines to Other Areas

Sofia

1-3 July 2014

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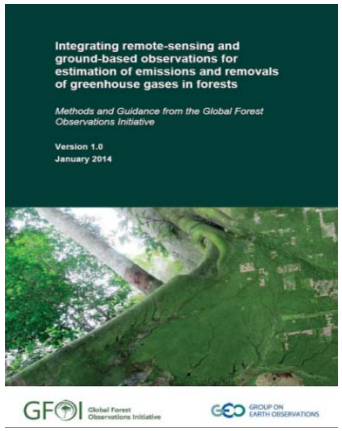
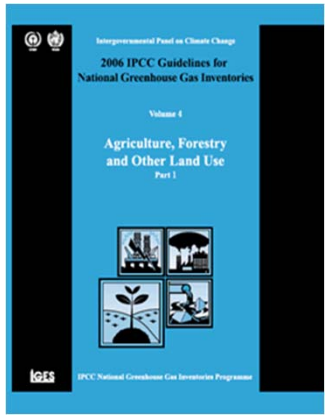
Environment Institute

University College London

Subject

- How the GFOI Methods and Guidance Document…
- …facilitates the application of IPCC methodologies to REDD+
- MGD was published by GEO in Jan 2014 and is available at http://www.gfoi.org/methods-guidance-documentation





REDD+ Activities listed by UNFCCC

From paragraph 70 of the Cancun Agreements:

(a) Reducing emissions from deforestation;

(b) Reducing emissions from forest degradation;

(c) Conservation of forest carbon stocks;

(d) Sustainable management of forests;

(e) Enhancement of forest carbon stocks.

Rationale for MGD

- MGD = Methods and Guidance Document of the Global Forest Observations Initiative
- COP decisions request (amongst other things):
  - use of IPCC guidance and guidelines in estimating emissions and removals associated with REDD+ activities
  - that remote sensing and ground-based observations be used in combination

MGD addresses how to do this, taking into account that IPCC guidance and guidelines do not systematically identify REDD+ activities listed by COP

Selected issues addressed by MGD

Issue	*MGD provides*
Estimate emissions and removals associated with REDD+ activities	First systematic description of REDD+ activities and how to use RS and ground-based data to estimate them in the context of IPCC guidance as required by UNFCCC. Focus on gain-loss method using change detection between forest strata with different disturbance levels, and non-forest strata
Combination of Remotely sensed and ground based data	Different tracks according to existence of NFI and need for spatially explicit data
Quantification of uncertainties	Sampling and statistical inference to correct possible bias and quantify uncertainties overall
Making best use of remotely sensed data	Core data sets and products identified

Estimation of emissions and removals associated with REDD+ activities

- Deforestation – sum of transitions away from forest (defined by IPCC in KP context)
- Degradation – *There is wide agreement that forest degradation represents long-term loss of forest values, and that temporary loss due to harvest or natural disturbance in sustainably managed forest is not degradation.* MGD treats C as the forest value in question, noting that if other values are considered to outweigh C, C loss would be counted under sustainable management of forests
- Plus activities – gains and losses within and between forest strata
- Equations provided for degradation and plus activities
- Conversions from natural forest separately identified

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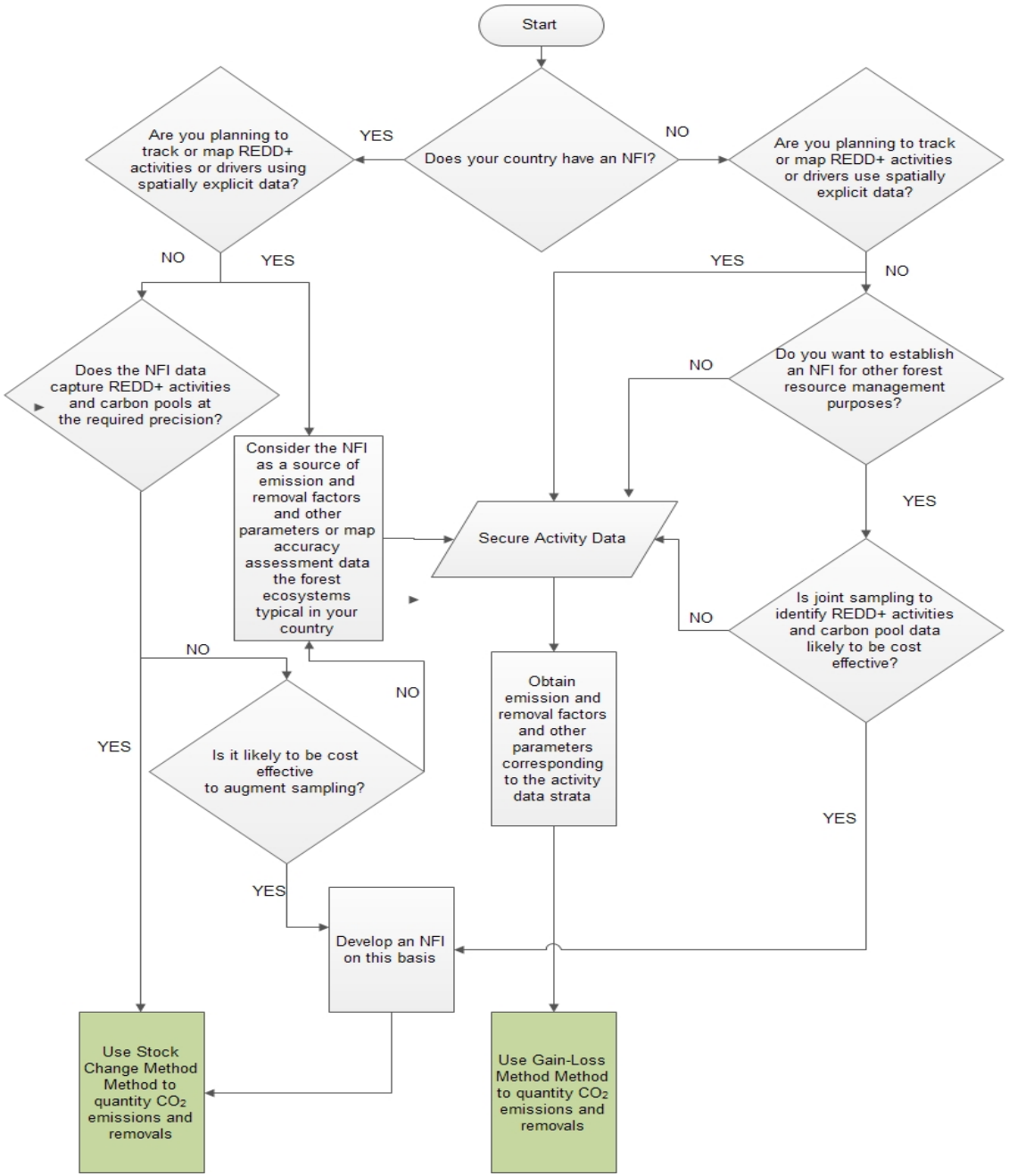
Start
Does your country have an NFI?
YES
Are you planning to track or map REDD+ activities or drivers using spatially explicit data?
NO
Are you planning to track or map REDD+ activities or drivers use spatially explicit data?
NO
YES
YES
NO
Does the NFI data capture REDD+ activities and carbon pools at the required precision?
Consider the NFI as a source of emission and removal factors and other parameters or map accuracy assessment data the forest ecosystems typical in your country
Secure Activity Data
NO
Do you want to establish an NFI for other forest resource management purposes?
YES
Is joint sampling to identify REDD+ activities and carbon pool data likely to be cost effective?
NO
YES
NO
Is it likely to be cost effective to augment sampling?
NO
YES
Obtain emission and removal factors and other parameters corresponding to the activity data strata
YES
YES
Develop an NFI on this basis
Use Stock Change Method Method to quantity CO_2 emissions and removals
Use Gain-Loss Method Method to quantity CO_2 emissions and removals

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Quantification of uncertainties

- Stratify according to ecosystem and management criteria; detect change
- Obtain carbon densities and associated uncertainties from NFI (if available) or by sampling the strata
- Use statistical inference to assess activity data uncertainty and correct for possible bias due to map classification errors
- Overall quantification of uncertainties – combine the above using error propagation (IPCC approach)

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CEOS/SDCG Core Missions

Optical:

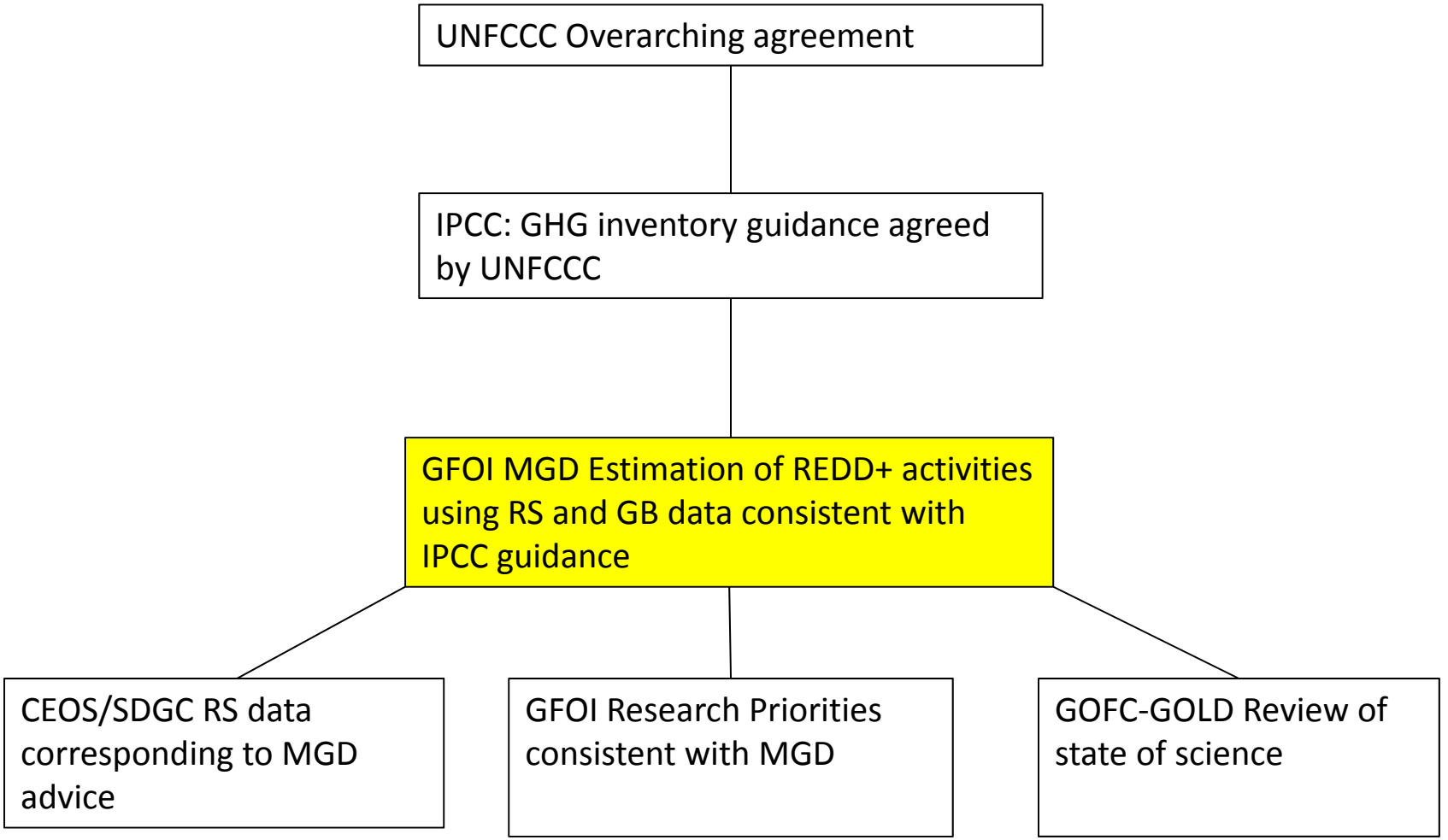
Agency	Mission	Launch	Resolution	Swath	Revisit	Planned Duration
USGS/NASA	Landsat-7	1999	15m, 30m	185 km	16 days	5 years
USGS/NASA	Landsat-8	2013	15m, 30m	185 km	16 days	5 years
INPE/ CRESDA	CBERS-4	2015	5m 10m, 20m, 40m, 64m	60-866 km	26 days	3 years
ESA	Sentinel 2A	2014	10m, 20m, 60m	290 km	10 days	7 years
ESA	Sentinel 2B	2015	10m, 20m, 60m	290 km	10 days	7 years

Agency	Mission	Launch	Band (wave length)	Polarization	Resolution	Revisit	Duration
ESA	Sentinel-1A and 1B	2014 and 2015	C (5.6 cm)	Single-, Dual-polarisation	9 m, 20 m, 50 m	12 days	7 years
CSA	RADARSAT Constellation Mission (3 satellites)	2018	C (5.6 cm)	Single-, Dual-, Full-polarisation	1 m, 3 m, 5 m, 16 m, 50 m, 100 m	12 days	7 years
CONAE/ ASI	SAOCOM-1A and 1B	2015 and 2016	L (23.5 cm)	Single-, Dual-, Full-polarisation	10 m, 30 m, 50 m, 100 m	16 days	5 years

Map products consistent with MGD methods

Map Name	Purpose	Description/Comment	Minimum Mapping Unit	Temporal Production Frequency
Forest/Non-Forest	Visual appreciation of trends for policy purposes; basis for other products[a]	Maps of forest cover through time	< 0.5 ha	Annual
Forest/Non-Forest Change	Activity data for deforestation and increase in forest area expressed on an hectare or percentage basis	Maps of change in the area of forest land[b]	< 0.5 ha	Annual
Forest Stratification	Visual appreciation of forest resources; basis for other products[a]	As Forest/Non-forest map, but with forest stratified according to PF, MNF, PlantF (or equivalent national stratification), and any sub-stratifications	< 0.5 ha	Annual
All Land Use Categories	Visual appreciation of national land use; basis for other products[a]	Default is UN-FAO Land Cover Classification (LCCS) or an equivalent national classification, and allowing aggregation into the six IPCC Land Categories. Forest included using forest/non-forest maps, stratified as in the Forest Stratification map	< 0.5 ha	Annual
Land-Use Change between Forests and other Land Uses	Activity data for deforestation and for enhancement of forest carbon stocks by afforestation or reforestation; activity data if needed for non-forest LULUCF activities	Maps of conversions between the six IPCC Land Categories, with forest stratified as described in the Forest Stratification map and the All Land Use Categories map	< 0.5 ha	Annual
Change within Forest Land	Activity data for degradation, sustainable management of forests, enhancement of forest carbon stocks within forest remaining forest, and conservation	Maps of conversions between forest strata in the Forest Stratification map, and of ongoing activities such as harvesting within categories	< 0.5 ha	Annual
Near-Real Time Forest Change Indicators	Early warning of deforestation and degradation	Not needed for measurement of emissions, but useful for early warning and detection of forest clearing and degradation, and so may be needed as part of the implementation of REDD+.	> 0.5 ha	Bi-monthly or better

MGD Process relationships



MGD Contents

Executive Summary	Outline, intended audience, relationship to negotiations
1 – Design Decisions	Introductory concepts, NFMS, use of existing data, Tier choices, cost effectiveness
2 – Estimating Emissions and removals	Stock change and gain-loss methods, focus on latter, REDD+ activities described with linked estimation methods
3 – Data Provision for Estimating Emissions and Removals	Activity data requirements; types RS data, pre-processing, map products, mapping, guiding principles, statistical inference , changes in pools
4 Overall uncertainties	Combined AD and EF uncertainties using IPCC method
5 Reporting	What can be said from UNFCCC
Technical Annexes	IPCC Guidance; RS data from CEOS/SDCG; Tier 3 methods; Sampling; Emission and removals factors; Direct biomass estimation by RS; Allometrics; Finance.

Case Study: Practical Application of MGD - Ghana

- Working with the Forestry Commission of Ghana
- Ghana commenced designing and documenting its MRV system in December 2013
  - Funded by the World Bank FCPF
  - MGD input from Carly Green; Environmental Accounting Services Limited
  - Complete by Nov 2015
- Builds on extensive existing REDD-Readiness work supported by the World Bank FCPF
- MGD being used to guide the combination of a large body of completed research work and achieve and an operational national system

Ghana's MRV System Elements

United Nations Framework Convention on Climate Change

COP 19, Warsaw, 2013

UN requirements to be included in the MRV

ipcc INTERGOVERNMENTAL PANEL ON climate change WMO UNEP

Good Practice Guidance, 2003

2006 AFOLU Guidelines

Methodological guidance on Tiers and Approaches

GFOI Global Forest Observations Initiative

Methods and Guidance Document, 2014

Guidance on applying IPCC methodological guidance to REDD+ activities

ISO International Organization for Standardization

ISO 9000 and 14000 series

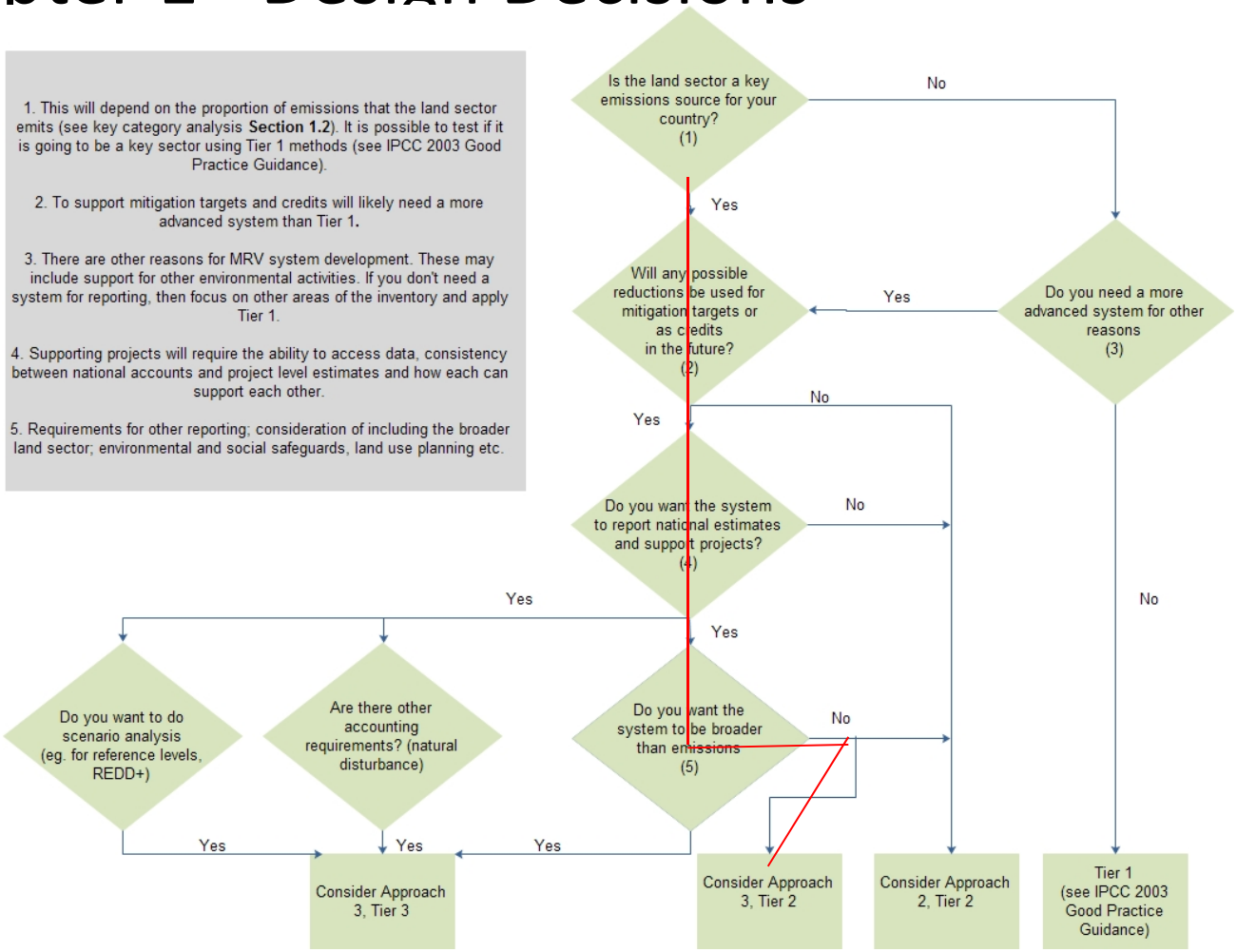
Standard documentation and reporting framework to document Ghana's National Methodological approach

Practical Application of MGD - Ghana

- MGD Chapter 1 – Design Decisions
  - Identification and documentation of existing data sources
    - Confirmed that an historical permanent sample plot program may provide useful data, but is no longer supported => a need to rely on other data sources and institute a cost effective ongoing monitoring program with targeted sampling
  - Cost effectiveness considerations and long term sustainability
    - Identified as a major concern to the Program and is at the forefront of design decision making in defining activity data sources through to ground based data collection programs. Availability of low-cost RS data important
  - Forest Definition and Stratification
    - Cocoa is a major driver. Cocoa landscapes identified as an Emission Reduction activity making stratification of these areas a priority
  - Documenting and testing approach to define the Reference Emission Level
    - Hstoric approach applied covering deforestation and degradation activities

Practical Application of MGD - Ghana

- Chapter 1 - Design Decisions



Practical Application of MGD - Ghana

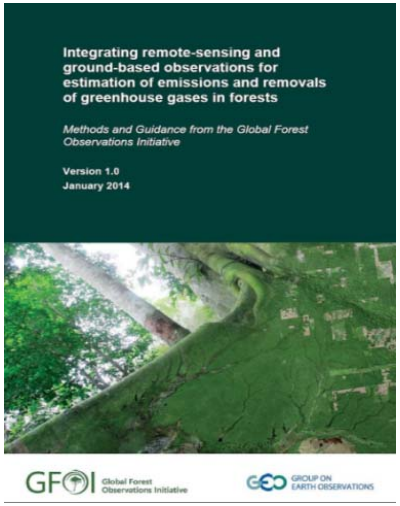
- MGD Chapter 2 – Estimating Emissions and Removals
  - Documenting and testing calculation approaches for deforestation, degradation. Identification of data sources for future reporting of REDD+ activities (i.e. removal activities)
- MGD Chapter 3 – Activity Data
  - Documenting and testing all activity data processes and procedures
  - Establishing cost effective long term access to satellite data that meets the design decisions
  - Data sources being considered – Landsat; potential to use Sentinel to address cloud cover issues
- MGD Chapter 3/4 – Uncertainty
  - Documenting and testing approaches to estimating and reporting uncertainty
- MGD Chapter 5 – Reporting
  - Completion of the reporting documentation and data archiving arrangements

Summary of feed-back

- A useful, systematic approach
- Provides guidance on the use of existing and disaggregated forest related information including national statistics, research and satellite data to ultimately develop an operational MRV system
- Has assisted in identifying gaps in the activity data and emissions factors and to prioritise actions to fill those gaps
- Inclusion of more decision tree material would assist users understanding
- Modules being developed to address issues identified as experience accumulates, to be communicated via GFOI website and incorporated in version 2 planned for end of 2015

Acknowledgements to:

- Advisory Group
- Lead Authors
- Authors and Contributors
- Reviewer



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