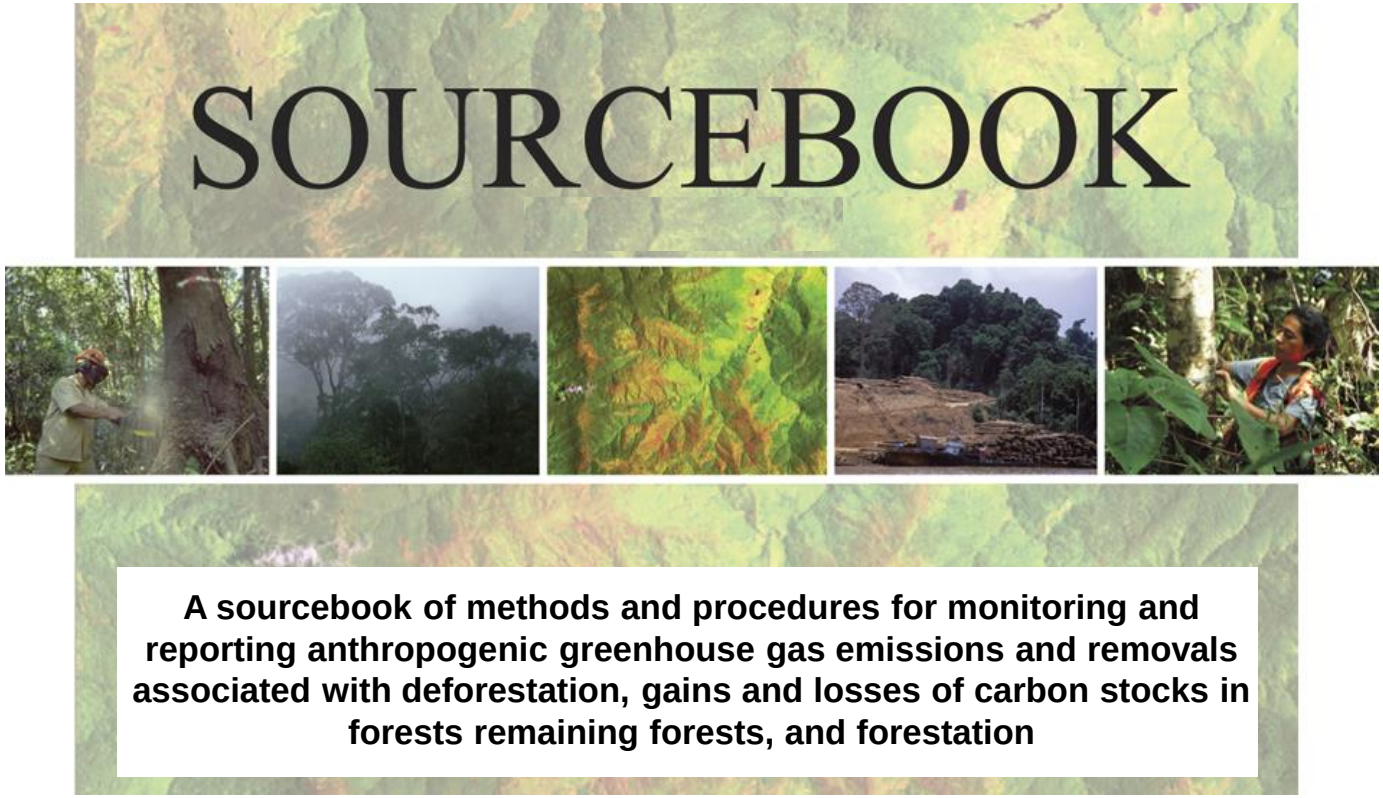
GOFC-GOLD Sourcebook training materials for REDD+ monitoring and reporting



March 2014

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FOREST CARBON PARTNERSHIP FACILITY

GOFC-GOLD
Global Observation of Forest and Land Cover Dynamics

1. REDD+ background and design

Module 1.1 UNFCCC context and requirements and introduction to IPCC guidelines

Module 1.2 Framework for building national forest monitoring systems for REDD+

Module 1.3 Assessing and analyzing drivers of deforestation and forest degradation

Module 1.2 Framework for building national forest monitoring systems for REDD+

Module developers:

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Martin Herold

Brice Mora

After the course the participants should be able to:

- Understand the needs and priorities of a national REDD+ policy and implementation strategy
- Assess and characterize forest monitoring and reporting capacities of developing countries in different national circumstances
- Develop a roadmap for building sustained in-country capacities for REDD+ MRV

Background material

- GOFC-GOLD Sourcebook section 1 and section 4
  http://www.gofcgold.wur.nl/redd/index.php
- Herold, M., 2009. An assessment of national forest monitoring capabilities in tropical non-Annex I countries: Recommendations for capacity building. Report for The Prince's Rainforests Project and The Government of Norway. Friedrich-Schiller-Universität Jena and GOFC-GOLD.
  http://princes.3cdn.net/8453c17981d0ae3cc8_q0m6vsqxd.pdf
- UNFCCC, 2009. Cost of implementing methodologies and monitoring systems. Technical Paper FCCC/TP/2009/1
  http://unfccc.int/resource/docs/2009/tp/01.pdf
- UNFCCC, 2009. Decision 4/CP15 Methodological guidance for REDD+
  http://unfccc.int/resource/docs/2009/cop15/eng/11a01.pdf#page=11
- UNFCCC, 2011. Decision 1/CP16 The Cancun Agreements
  http://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf#page=2

Background material

- UNFCCC, 2014. Decision 11 / CP19 – Modalities for national forest monitoring systems http://unfccc.int/resource/docs/2013/cop19/eng/10a01.pdf#page=31

- UN-REDD, 2013. National Forest Monitoring Systems: Measurement, Reporting and Verification (M & MRV) in the context of REDD+ Activities. http://www.unredd.net/index.php?option=com_docman&task=doc_download&gid=10305&Itemid=53

- FFPRI, Nov. 2012. REDD+ Cookbook. REDD Research and Development Center, Japan. http://www.ffpri.affrc.go.jp/redd-rdc/en/reference/cookbook.html

Outline of presentation

1. UNFCCC requirements for national forest monitoring systems (NFMS) and measurement, reporting and verification (MRV) of REDD+ activities
2. Framework for NFMS
3. Use of remote sensing within NFMS
4. Improving countries' capacities for establishing NFMS and MRV systems for REDD+
5. Roadmap for building sustained in-country capacities for MRV
6. Cost implications and different factors contributing to the costs

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Guidance from UNFCCC

- REDD+ results-based actions should be fully **measured, reported and verified (MRV**)
- REDD+ payments are based on emission reductions

Emission Reductions = **Actual GHG emissions and removals from forests within a year** − **Forest reference (emission) level (RL), with the same coverage of emissions and removals**

- Countries need to set up a **robust and transparent national forest monitoring system** including, if appropriate, sub-national systems to estimate emissions, establish a RL and calculate emission reductions

Modalities for national forest monitoring systems

UNFCCC, 2014, Dec. 11 / CP19

National forest monitoring systems, with, if appropriate, subnational monitoring and reporting as an interim measure should:

- Build upon existing systems, as appropriate
- Enable the assessment of different types of forest in the country, including natural forest
- Be flexible and allow for improvement
- Reflect, as appropriate, the phased-approach

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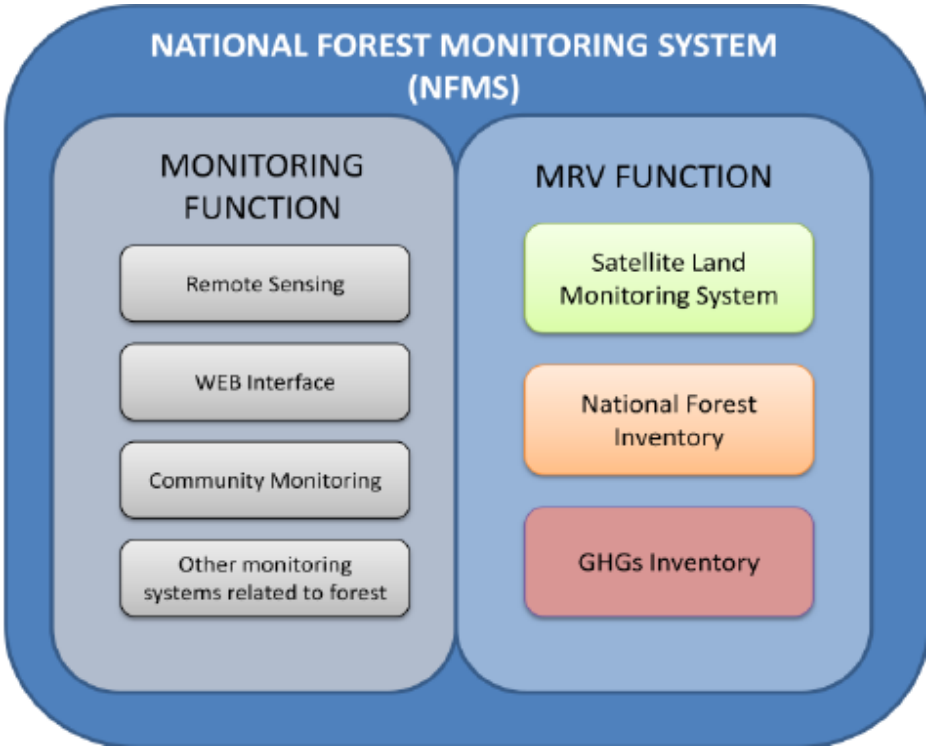
Modalities for national forest monitoring systems

UNFCCC, 2009. Decision 4/CP15; Methodological guidance for REDD+

National forest monitoring systems should:

- Use a combination of remote sensing and ground-based forest carbon inventory approaches
- Provide estimates that are transparent, consistent, as far as possible accurate, and that reduce uncertainties, taking into account national capabilities and capacities
- Be transparent, and the results should be available and suitable for review

Link between REDD+ MRV and national forest monitoring systems



Source: UN-REDD, 2013.

2 simultaneous functions of NFMS:

- Monitoring function
  - More than only assessment of carbon
  - Harmonization of existing and new forest monitoring tools important
  - Should be well-harmonized with development of MRV capacities
- Measurement, Reporting and Verification (MRV) function

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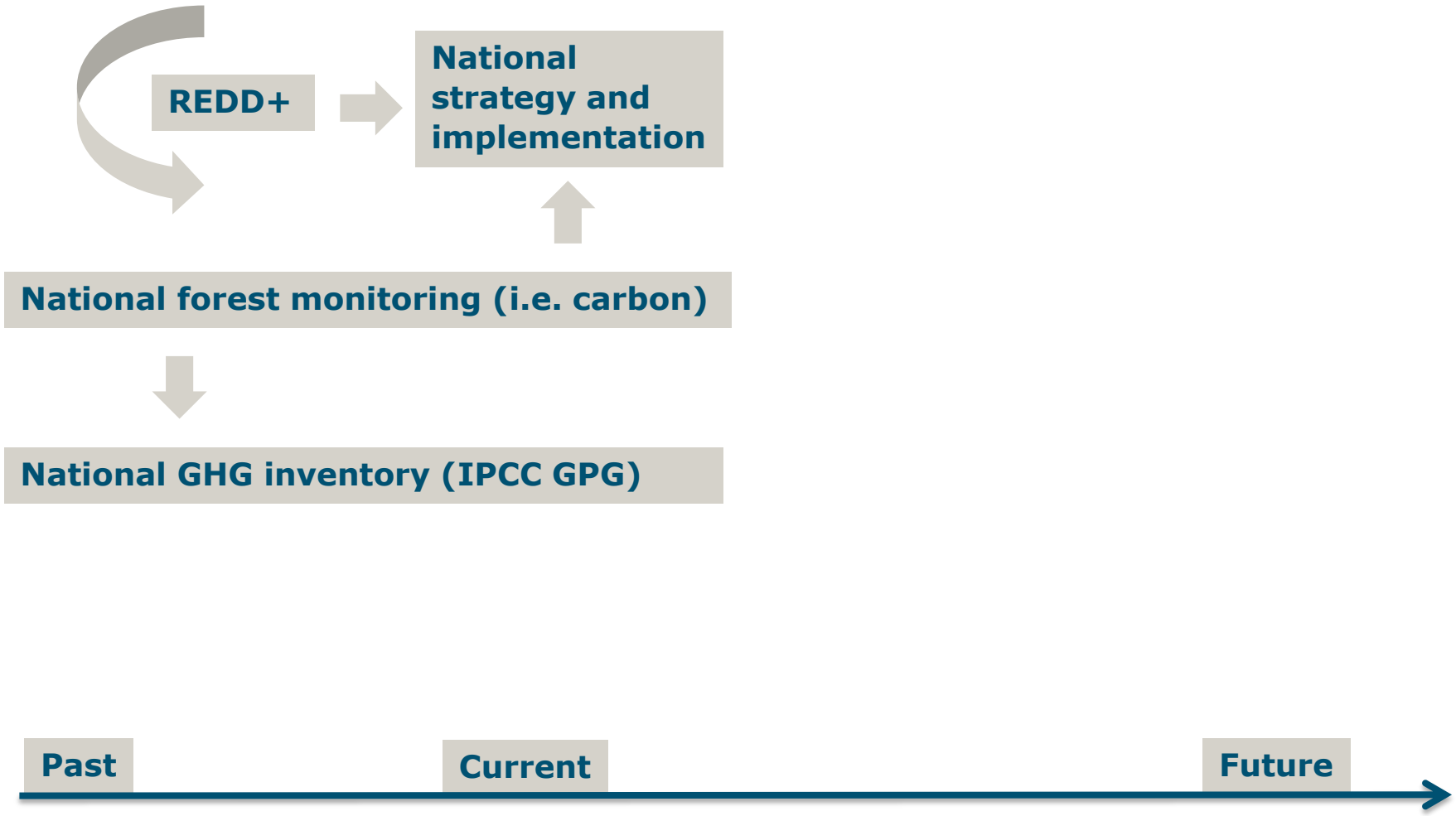
Framework for national REDD+ monitoring

National forest monitoring (i.e. carbon)

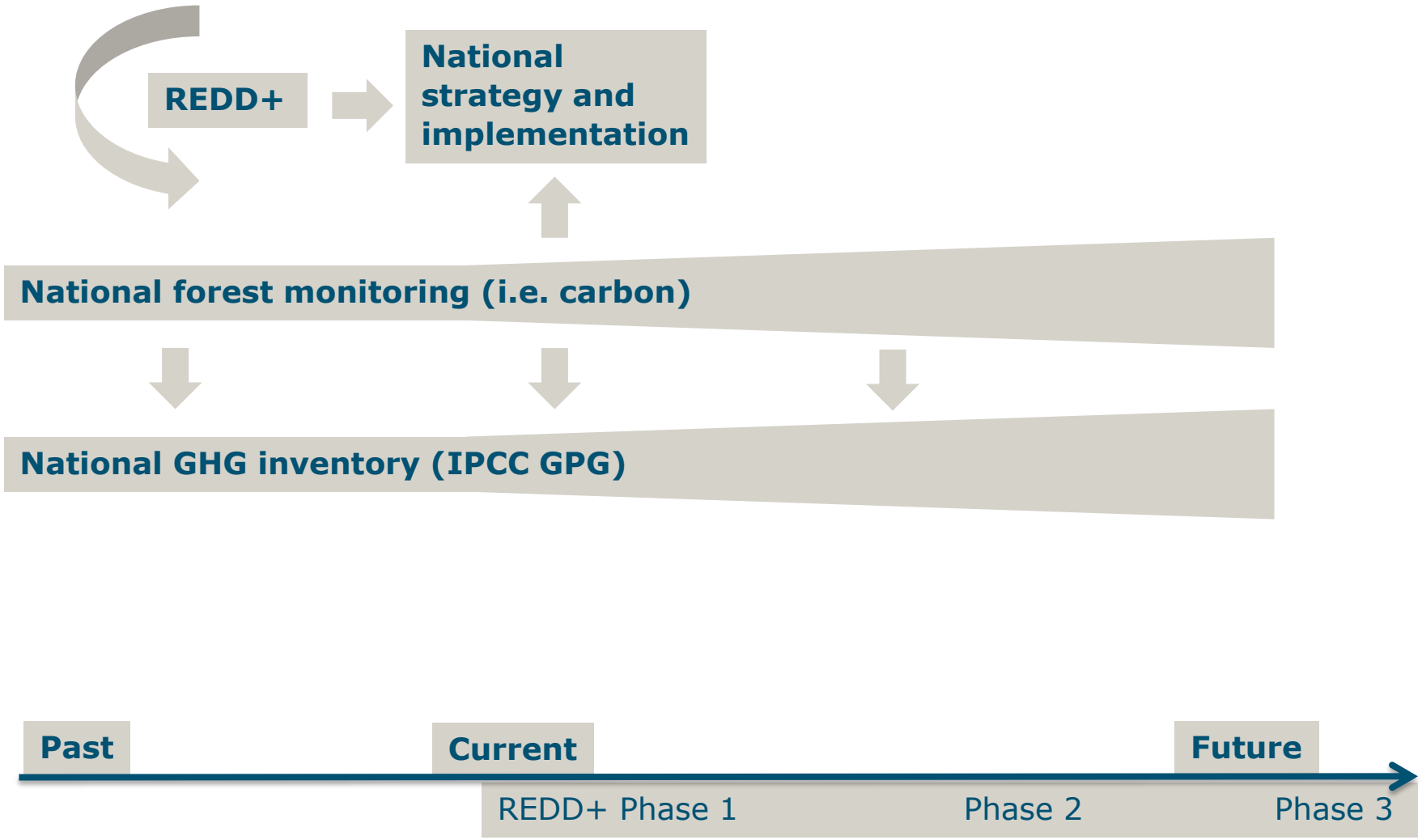
National GHG inventory (IPCC GPG)

Past **Current** **Future**

Framework for national REDD+ monitoring



Framework for national REDD+ monitoring



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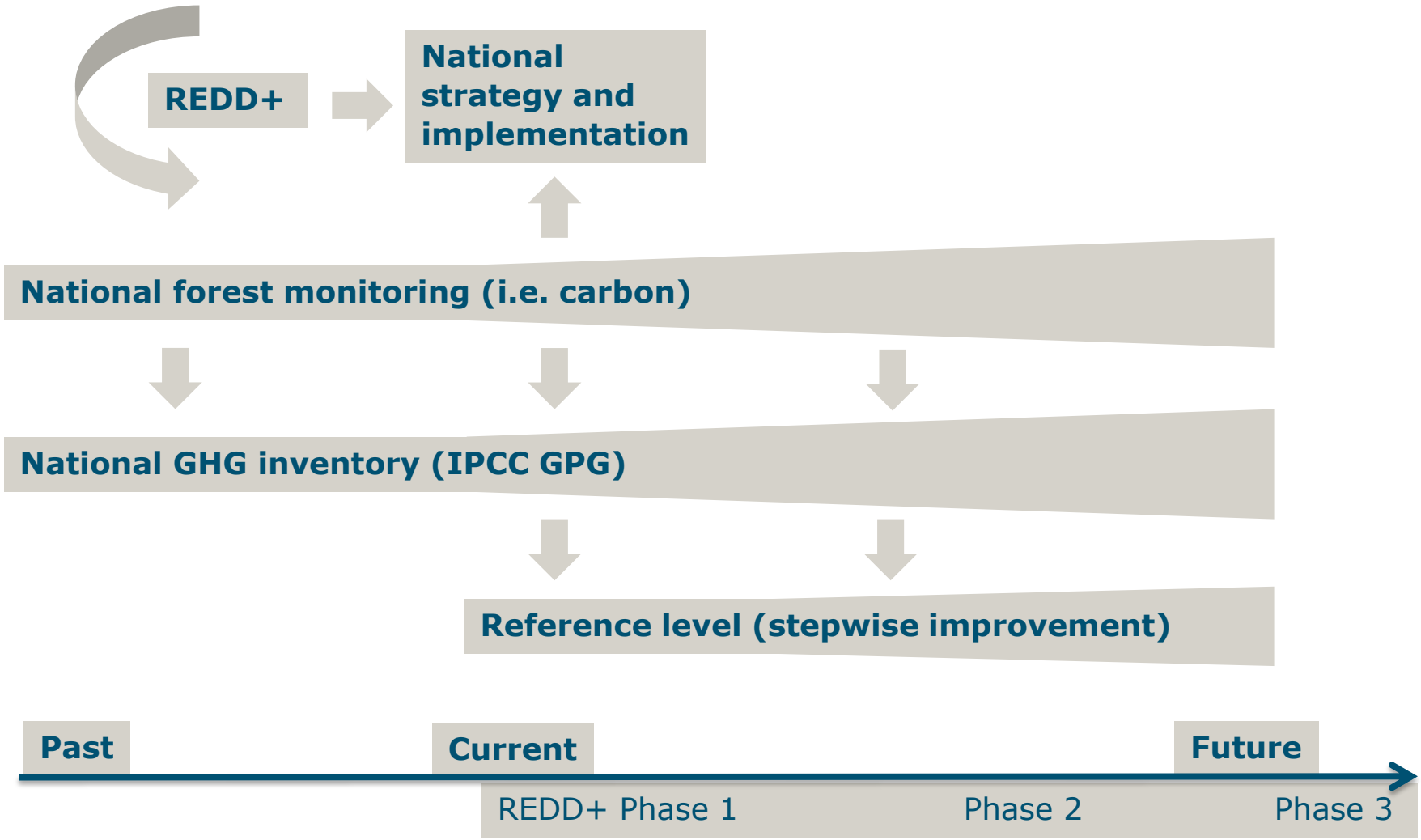

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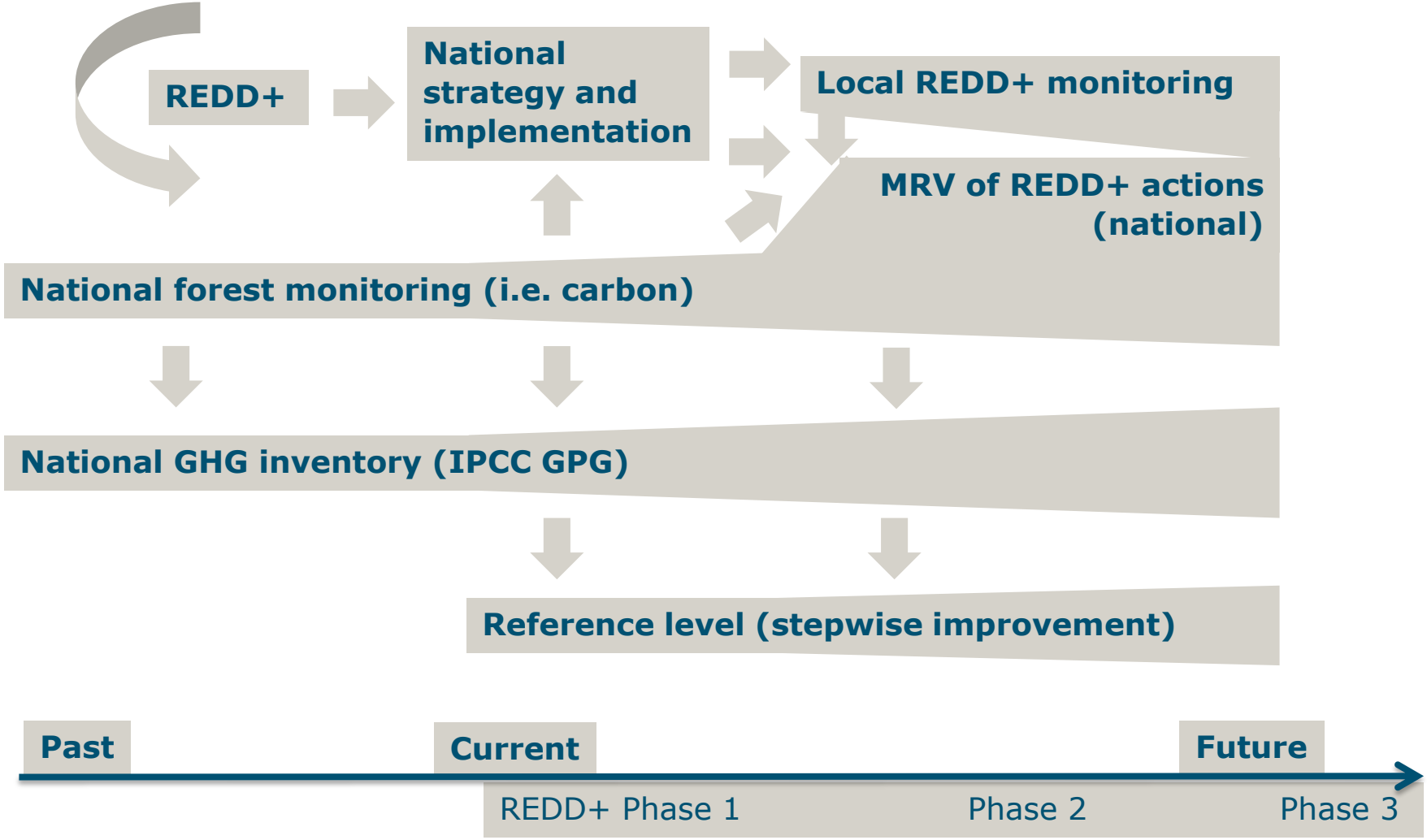

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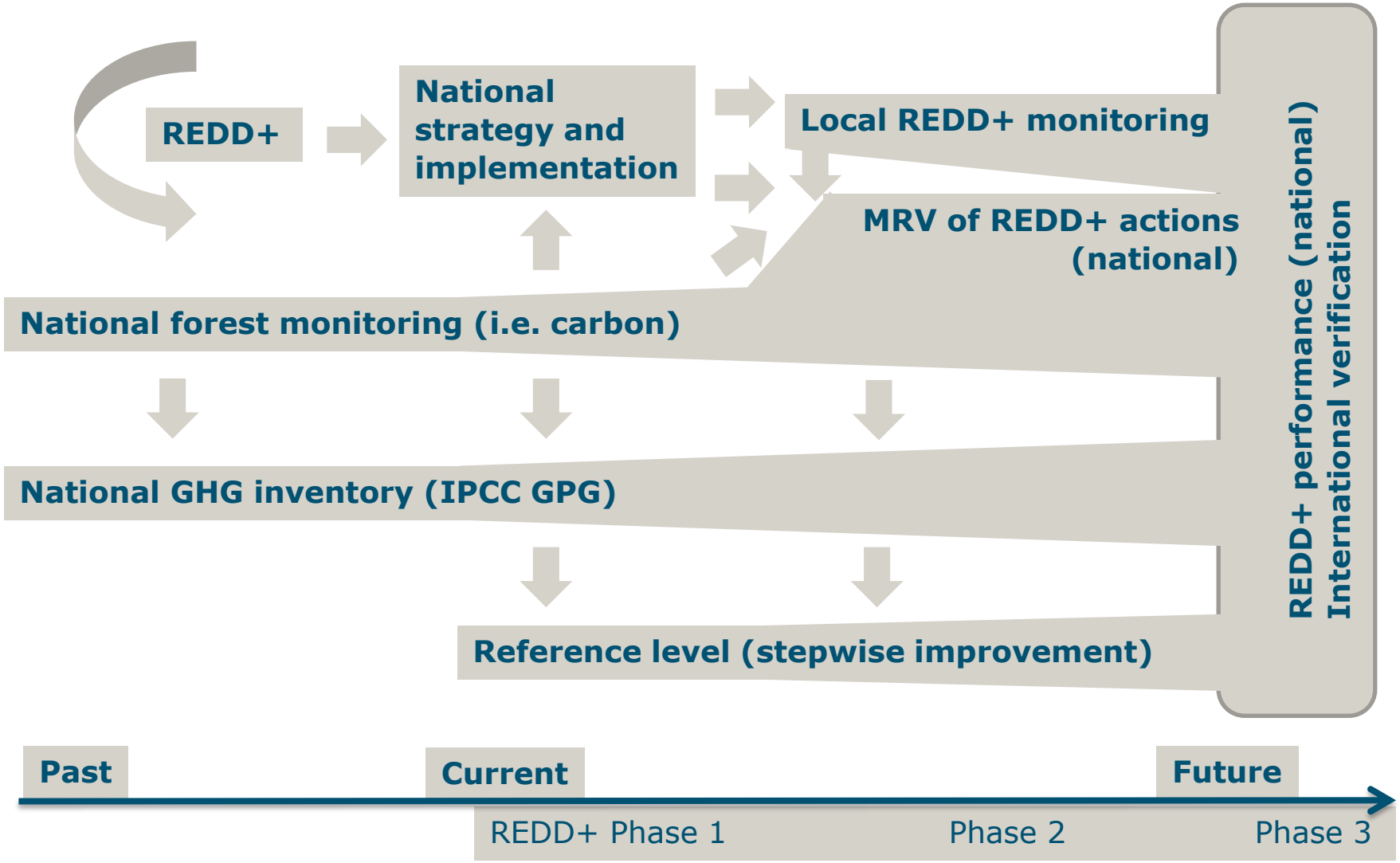

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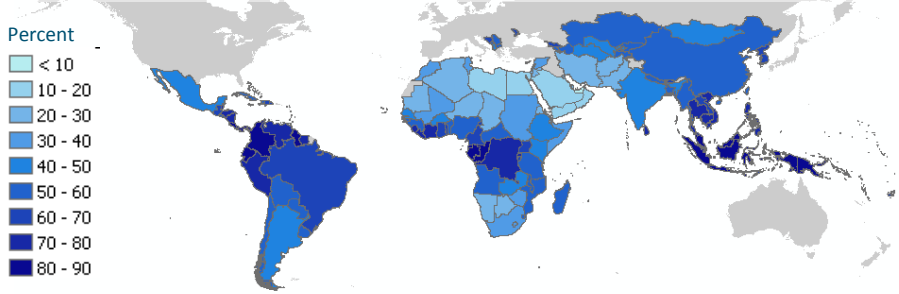
Use of remote sensing within the NFMS

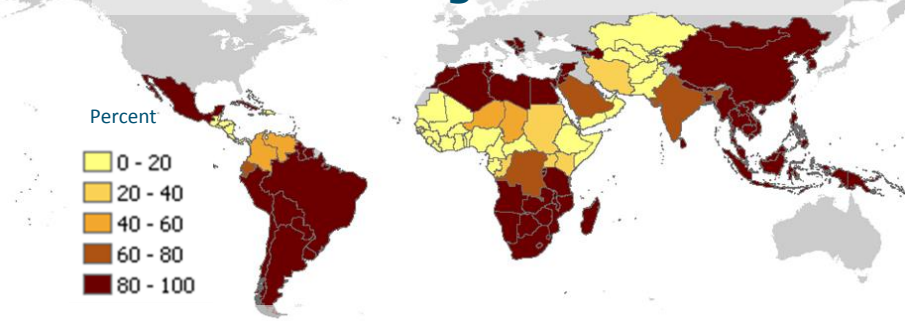
- Essential requirements for estimating forest emissions in the context of REDD+:
  - Historical data on forest area changes and forest carbon stocks changes → needed to establish forest reference emission levels and to estimate forest GHG emissions reductions
  - Understanding of deforestation processes & drivers
- Use of remote sensing for REDD+ measurements:
  - Primary source of data to measure forest area changes
  - Provides indicators for areas affected by forest degradation
  - Forest area change maps can be linked to specific activities of deforestation (follow-up land use) which are useful for assessing drivers

Technical challenges for the use of remote sensing

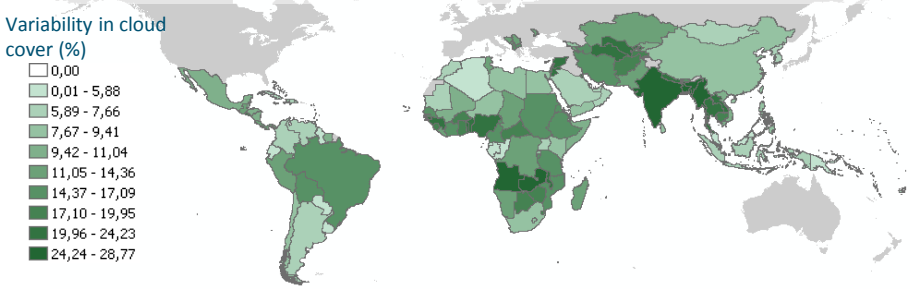
Mean annual cloud cover



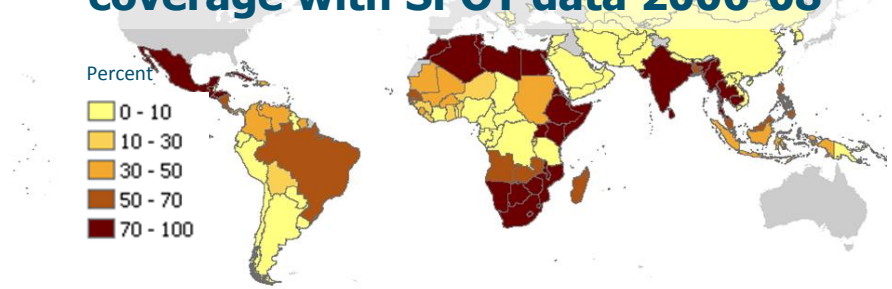
Country coverage of Landsat 5 receiving stations



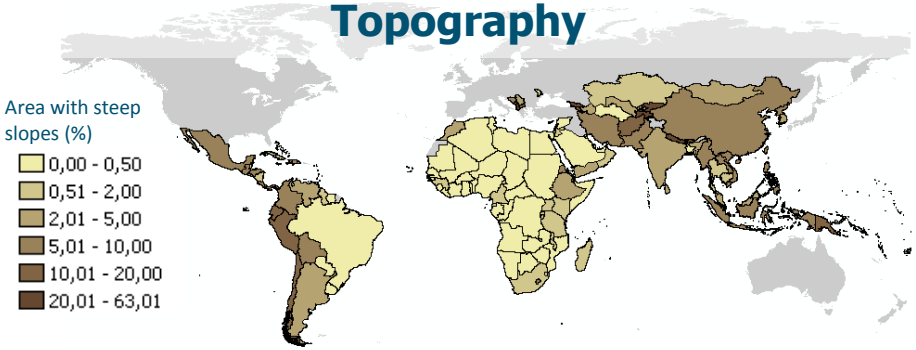
Seasonality



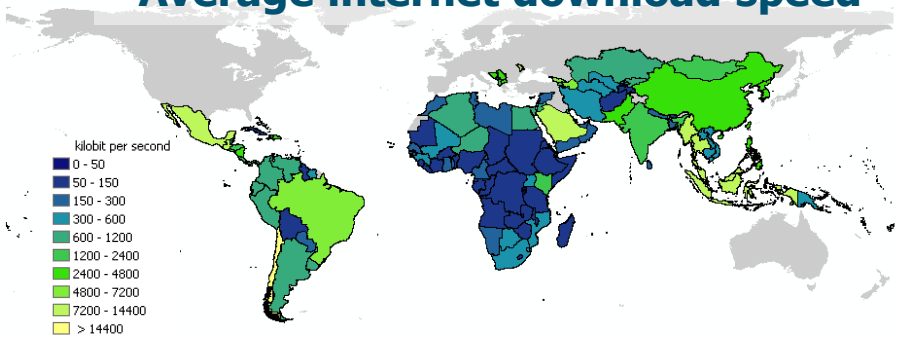
Mean annual cloud free country coverage with SPOT data 2006-08



Topography



Average internet download speed



Source: Herold, 2009.

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Implementation of National Forest Monitoring Systems

- Countries have full responsibility for implementation and effective operation of NFMS
- NFMS can be implemented starting at Phase 1 and moving towards Phase 3* of REDD+, with gradual improvements
- Technology transfers from developed countries are encouraged
- Building technical and institutional capacity for NFMS should take into account:
  - National circumstances (forest types, politics, economy, culture)
  - Drivers of deforestation
  - Existing capacities

**** REDD+ phased approach: see Module 1.1***

Building technical and institutional capacity for NFMS

- Requirements for MRV at national level:
  - International: principles and procedures specified by the IPCC Good Practice Guidance (GPG) & Guidelines*
  - National: needs and priorities of the national REDD policy and implementation strategy
- Bridging the capacity gap:
  - Assessment of existing national forest monitoring technical capabilities versus the requirements for the MRV system
  - Develop and implement a roadmap: to build sustained in-country capacities for MRV based on international requirements and national needs to implement REDD+ policy

**** For information on IPCC GPG and Guidelines: see Module 1.1***

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Assessment of existing national forest monitoring technical capabilities versus the requirements for the MRV system

Consideration of factors:

1. Requirements for monitoring forest carbon on national level (IPCC GPG)
2. Existing national capacities for national forest monitoring
3. Progress in national GHG inventory and engagement in REDD+
4. REDD+ particular characteristics: importance of forest fires, soil carbon, deforestation rate, etc.
5. Specific technical challenges (remote sensing): cloud cover, seasonality, topography, remote sensing data availability and access procedures

Planning and implementation of REDD+ MRV

1. Define initial priorities for capacity development:
   - Understanding the national REDD+ implementation strategies and policies
   - Identifying high priority areas to focus MRV activities (and demonstrations) using a stratified national approach
2. Early actions may need to deal with partial MRV but leakage needs to be assessed nationally
3. Synergy of national and local monitoring & ensuring REDD+ safeguards
   - Role of local communities and experts in REDD+ implementation
   - Link with monitoring of biodiversity (co-benefits)
4. Link with evolving benefit sharing mechanisms

MRV coordination on different levels

- **International support:**
  - South-South cooperation
  - Donors and supporting agencies/organizations
  - Technical community providing guidance
- **National strategy and MRV development:**
  - MRV roadmap and policy priorities
  - Institutional setup and multi-sector partnerships
  - Maximize country benefits from multi-donor support
- **Sub-national implementation:**
  - Stakeholder involvement in MRV
  - Linking national and local monitoring and verification

Institutional framework

- A strong institutional set up and the establishment and maintenance of **partnership and cooperation** on all levels as enabling framework
- **Coordination and integration** of national datasets through a high-level national technical committee accompanied and development of a national data management system and infrastructure
- Sustain internal and national **communication** mechanisms
- A framework for involving all relevant national **stakeholders** involved in MRV and REDD implementation and mechanisms to ensure transparent and open exchange and management of data streams
- Need for engagement with local and international community
- Clarity on **roles and responsibilities**

Institutional capacity development

- Suitable degree of **organizational capacity** within the country is required to establish and operate a national forest monitoring system for REDD+

- Consider establishing and maintaining the following **institutions** with clear definition of roles and responsibilities:
  - National coordination and steering body or advisory board
  - Central carbon monitoring, estimation and reporting authority
  - Forest carbon monitoring implementation units
  - Link to sub-national activities and benefit sharing

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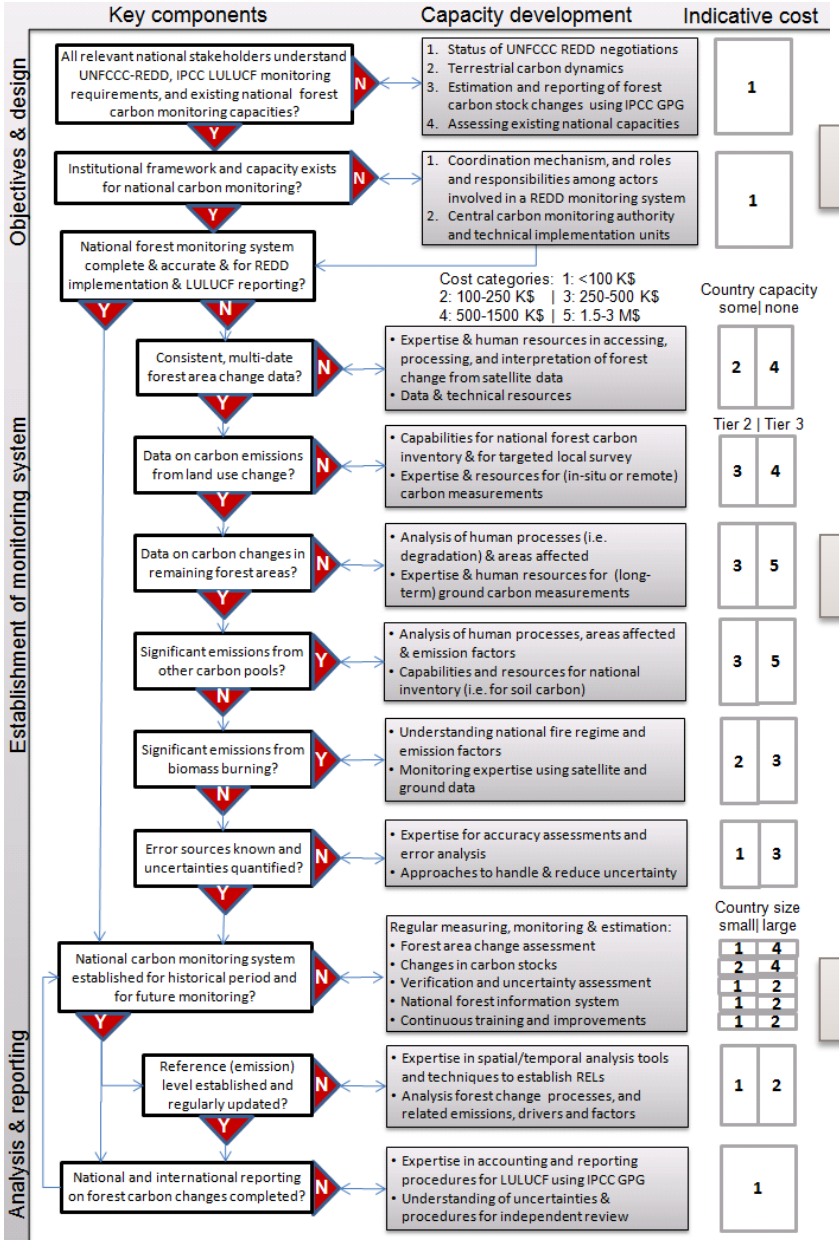
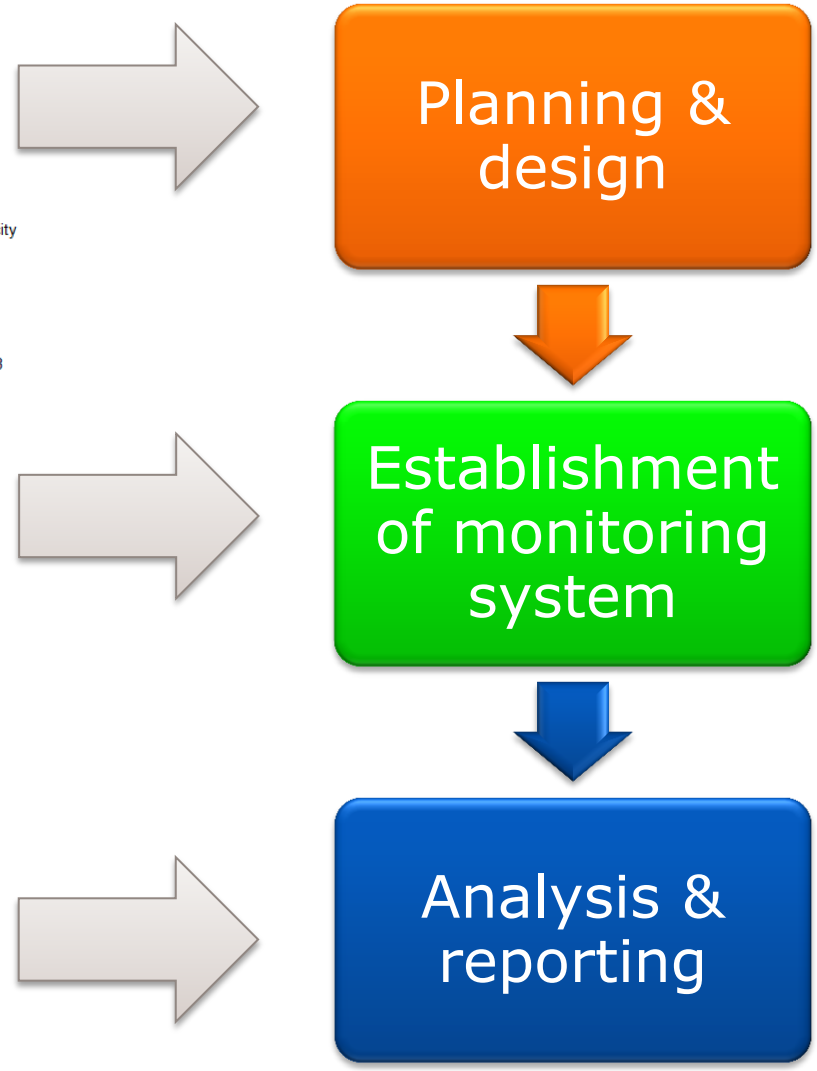
REDD+ MRV roadmap for Ethiopia

1. Establish institutional arrangements
2. Improve national forest monitoring: activity data
3. Improve national forest monitoring: carbon stocks and emission factors
4. Improve estimation and international LULUCF, GHG inventory and REDD+ reporting capacities
5. Prepare for MRV of REDD+ activities on the national level
6. Implement a program for continuous improvement and capacity development
7. Continued national and local communication mechanism on REDD+ monitoring

Process for establishing a national monitoring system





Source: UNFCCC, 2009

Planning & design phase of NFMS

Planning and design:

- Should result in a national **monitoring framework** which includes elements such as definitions, monitoring variables, and an institutional framework
- Should result in a plan for **capacity development** and long-term improvement of the system and estimation of the costs of establishing such a system
- Requires **resources** for training and capacity building, for participating in / organizing dedicated national or regional workshops, and for expert support

Monitoring in establishment phase

- Assessment and best use of **existing observations and information**
- Specify a methodology and operational implementation framework for **monitoring forest area change** on a national level
- Perform analysis of historical satellite data for establishing forest **reference emission levels** or forest reference levels
- Develop understanding of areas affected by **forest degradation** and provide assessment on how to monitor relevant forest degradation processes
- Complete **recruitment** and provide **training** to national team to perform monitoring activities
- Complete an **accuracy and error analysis** for estimates from the historical period
- Perform **a test run** of the operational forest area change monitoring system

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Cost implications of a NFMS

- Several categories of costs including **opportunity costs** and costs for **transactions** and **implementation**
- MRV of forest carbon primarily reflected in transaction costs
  - i.e. proof that a REDD activity has indeed achieved a certain amount of emission reductions and is suitable for compensation
- Resources needed for monitoring relatively small compared to all cost factors for REDD implementation in the long-term
  - may be rather significant in the country readiness phase since many countries require the development of basic capacities

Costs for remote sensing

Implementation of a satellite-based monitoring system includes a number of cost factors:

- Satellite data including data access and processing
- Software, hardware and office resources, including satellite data archive
- Human resources for data interpretation and analysis
- Monitoring in readiness phase
- Operational monitoring
- Accuracy assessment
- Regional cooperation for capacity building and technical assistance

In Summary

1. Establishing national forest monitoring system essential for measurement, reporting and verification (MRV) of REDD+ activities
2. Different elements of a national forest monitoring system: monitoring function and MRV function
3. National forest monitoring system needs to be built along the three 3 implementation phases of REDD+
4. Roadmap needed for building sustained in-country capacities for MRV
5. Different factors contributing to the costs of establishing and operating a national forest monitoring system

Country examples and exercises

Country examples

- UN-REDD monitoring framework for Democratic Republic of Congo
- Establishment of a system for monitoring, reporting and verification of REDD+ in Guyana

Exercise

- Assessing national forest monitoring and reporting capacities in tropical non-Annex I countries

Recommended modules as follow up

- Module 1.3 for considering national circumstances within a national forest monitoring system and assessing and analyzing drivers of deforestation and forest degradation

- Modules 2. to continue with REDD+ measuring and monitoring

- Modules 3. to learn more about REDD+ assessment and reporting