

Forest Monitoring & MRV for REDD+

REDD+ Workshop

Thimphu

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Outline

- United Nations Framework Convention on Climate Change
- REDD+
- Monitoring
- MRV
 - Measurement
 - Reporting
 - Verification
- Monitoring and MRV actions for Bhutan

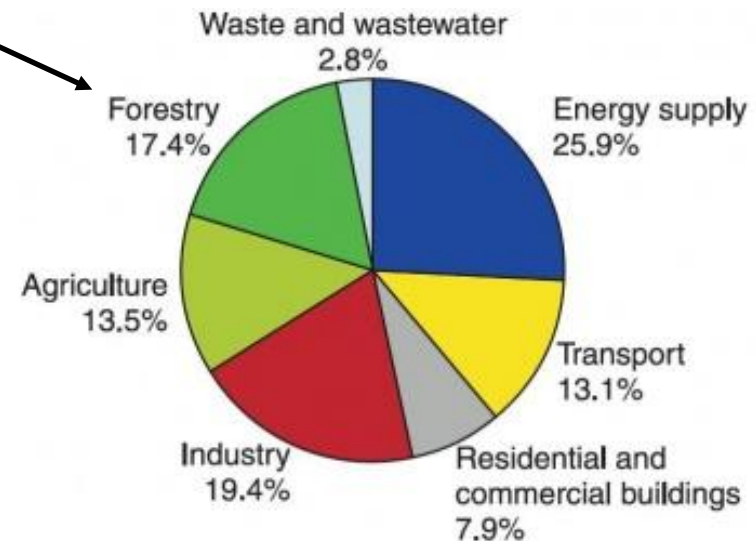


The UNFCCC

- The United Nations Framework Convention on Climate Change (UNFCCC) is an **international forum** for countries to discuss climate change
- The text of the UNFCCC sets out **commitments** which all countries must follow:
 1. **All Parties**, taking into account their common but differentiated responsibilities and their specific national and regional development priorities, objectives and circumstances, shall:
 - a) Develop, periodically update, publish and make available to the Conference of the Parties, in accordance with Article 12, **national inventories of anthropogenic emissions by sources and removals by sinks** of all greenhouse gases not controlled by the Montreal Protocol, using comparable methodologies to be agreed upon by the Conference of the Parties

The UNFCCC

- The UNFCCC recognised the contribution of **emissions from the forestry sector** in developing countries to climate change
- Research showed that reducing emissions from the forest sector was an opportunity to reduce emissions and increase removals **cost-effectively**
- This led to the creation of the forestry climate change mitigation mechanism, known as **REDD+**





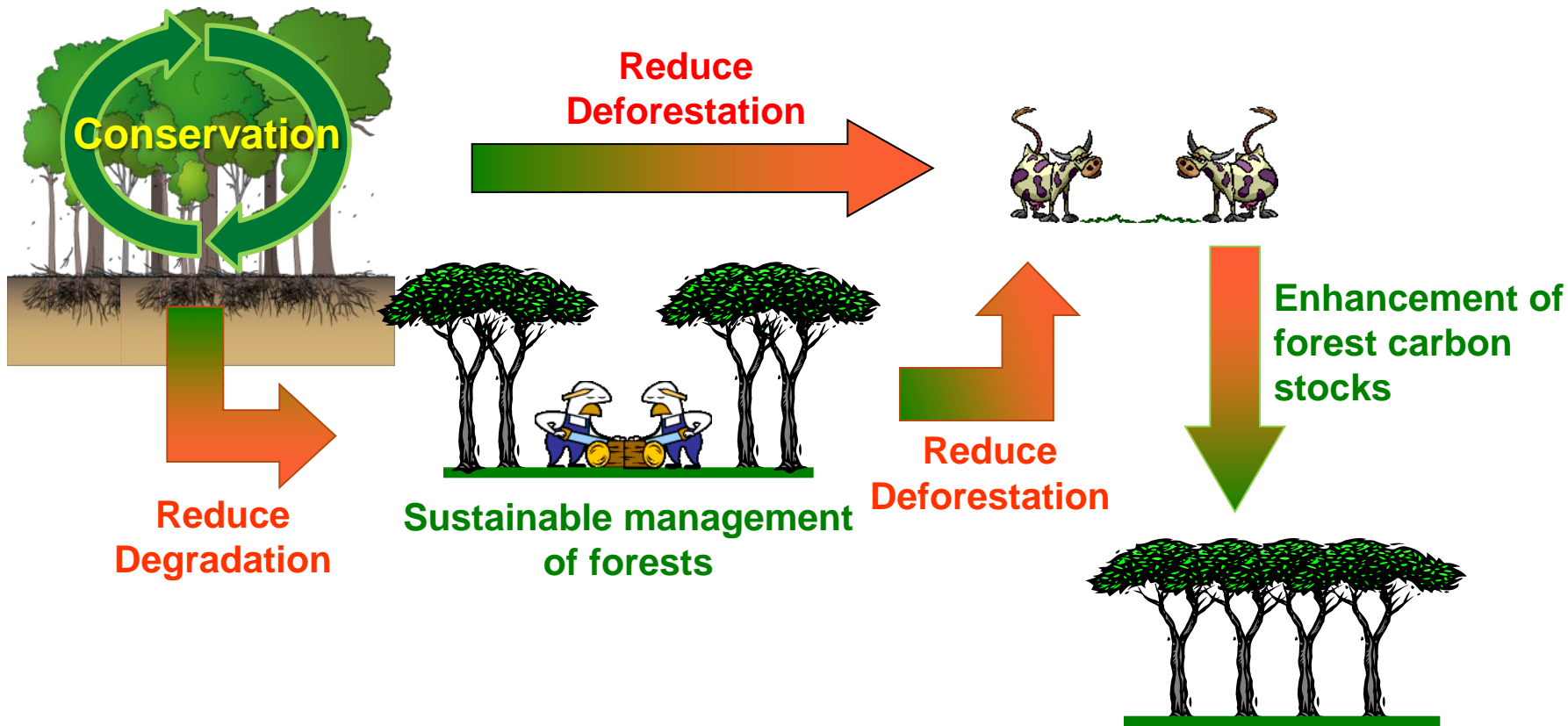


The REDD+ Activities

- Five activities are eligible under the REDD+ mechanism:

- 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
- } **REDD**
- } **+**


The REDD+ Activities



ACTIVITY	EXPLANATION	USEFUL INDICATORS
Reducing emissions from deforestation	Deforestation is the conversion from forest land use to another land use (e.g. forest land to crop land)	- Reduced rate of forest loss
Reducing emission from forest degradation	Degradation is the human-induced loss of carbon stocks within forest land that remain forest land	- Reduced rate and volume of timber extraction
Conservation of forest carbon stocks	Is an effort to decrease the threat that forests and to ensure permanence by establishing long-term commitments to preserve forest	- Expansion of protected area network
Sustainable management of forests	Generally refers to bringing the rate of extraction in line with the rate of natural growth or increment	- Increased land under sustainable management (e.g. CFM, SFM)
Enhancement of forest carbon stocks	Refers to 1) non-forest land becoming forest land, and 2) the enhancement of carbon stocks in forest land remaining forest land	<ul style="list-style-type: none"> - Increase in reforestation - Degraded forests allowed to regenerate - Enrichment planting

HOW TO MONITOR FORESTS & MEASURE FOREST CARBON?





REDD+ under the UNFCCC: Copenhagen Accords, 2009

- Decision 4/CP.15: **Methodological guidance for REDD+**
- Requests **developing country Parties**:
 - (c) To use the most recent **Intergovernmental Panel on Climate Change (IPCC)** guidance and guidelines ... as a basis for **estimating anthropogenic forest-related greenhouse gas emissions** by sources and removals by sinks, forest carbon stocks and forest area changes
 - (d) Develop a **national forest monitoring system** that:
 - (i) Use a **combination** of **remote sensing** and **ground-based forest carbon inventory** approaches for estimating forest-related greenhouse gas emissions, forest carbon stocks and forest area changes



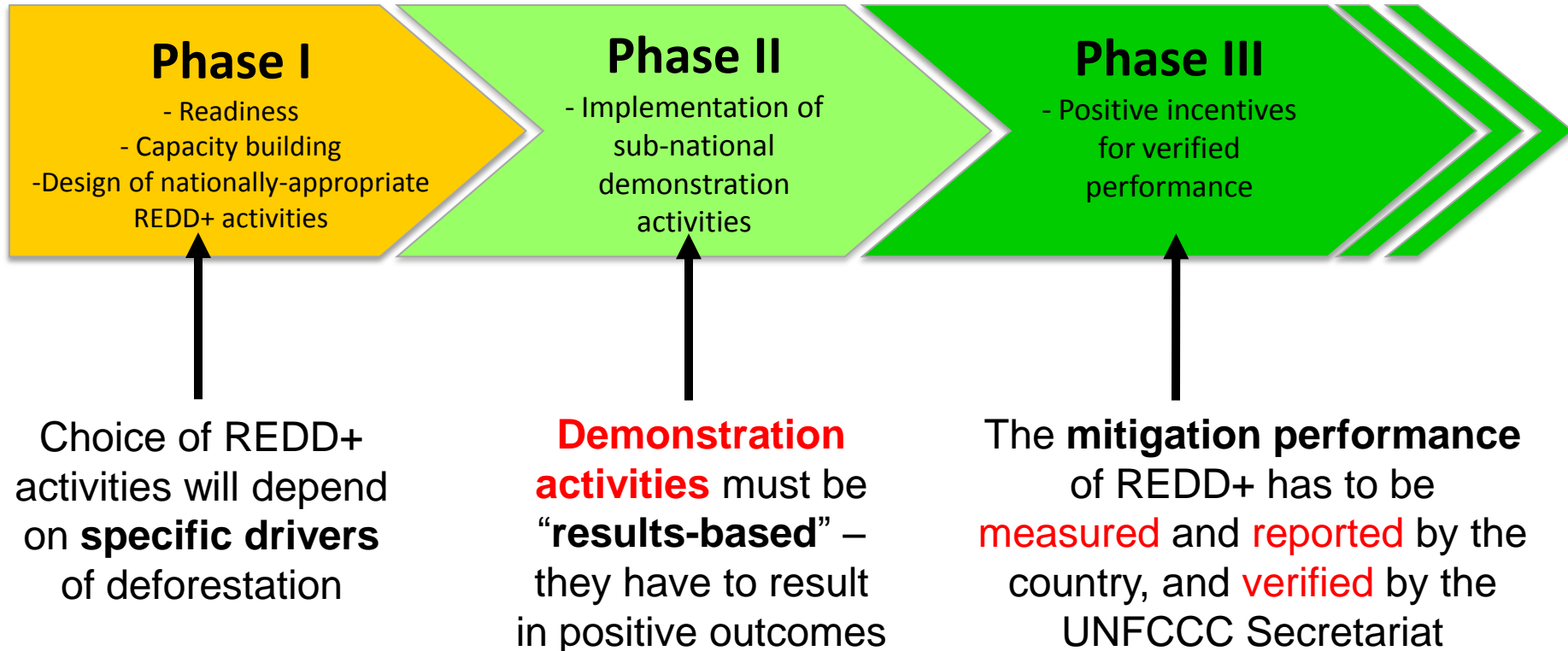
REDD+ under the UNFCCC: Cancun Agreements, 2010

- Paragraph 71: Requests developing country Parties aiming to undertake REDD+ activities to develop:
- (c) A **national forest monitoring system** for the *monitoring and reporting* of REDD+ activities:
 - The national forest monitoring system has **two functions**:
 - **A Monitoring Function** (to monitor outcomes of REDD+ activities)
 - **An MRV Function** (to **measure** and **report** on REDD+ mitigation performance (in CO₂-equivalents) to the UNFCCC; **verification** is coordinated by UNFCCC)
- Paragraph 73: **Decides** that REDD+ activities should be **implemented in phases**
 1. **READINESS**: Capacity building, development of national strategies / action plans
 2. **IMPLEMENTATION & MONITORING**: Sub-national demonstration activities
 3. **NATIONAL IMPLEMENTATION**: National implementation of REDD+ policies and measures



Phases of REDD+

REDD+ PHASES



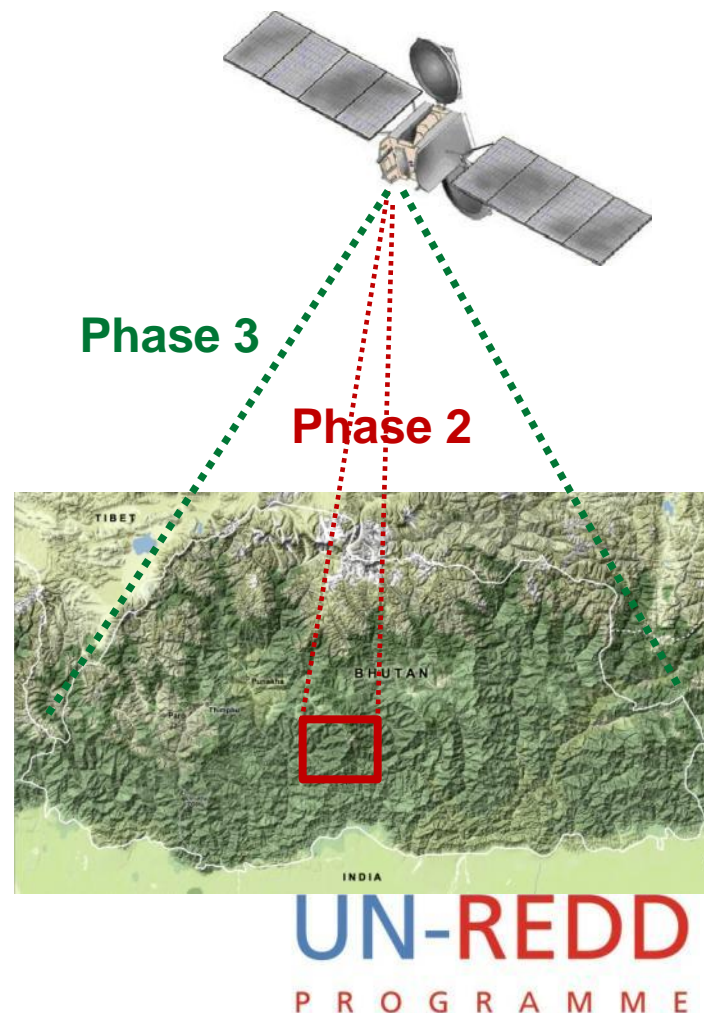
NATIONAL FOREST MONITORING SYSTEM:
MONITORING FUNCTION

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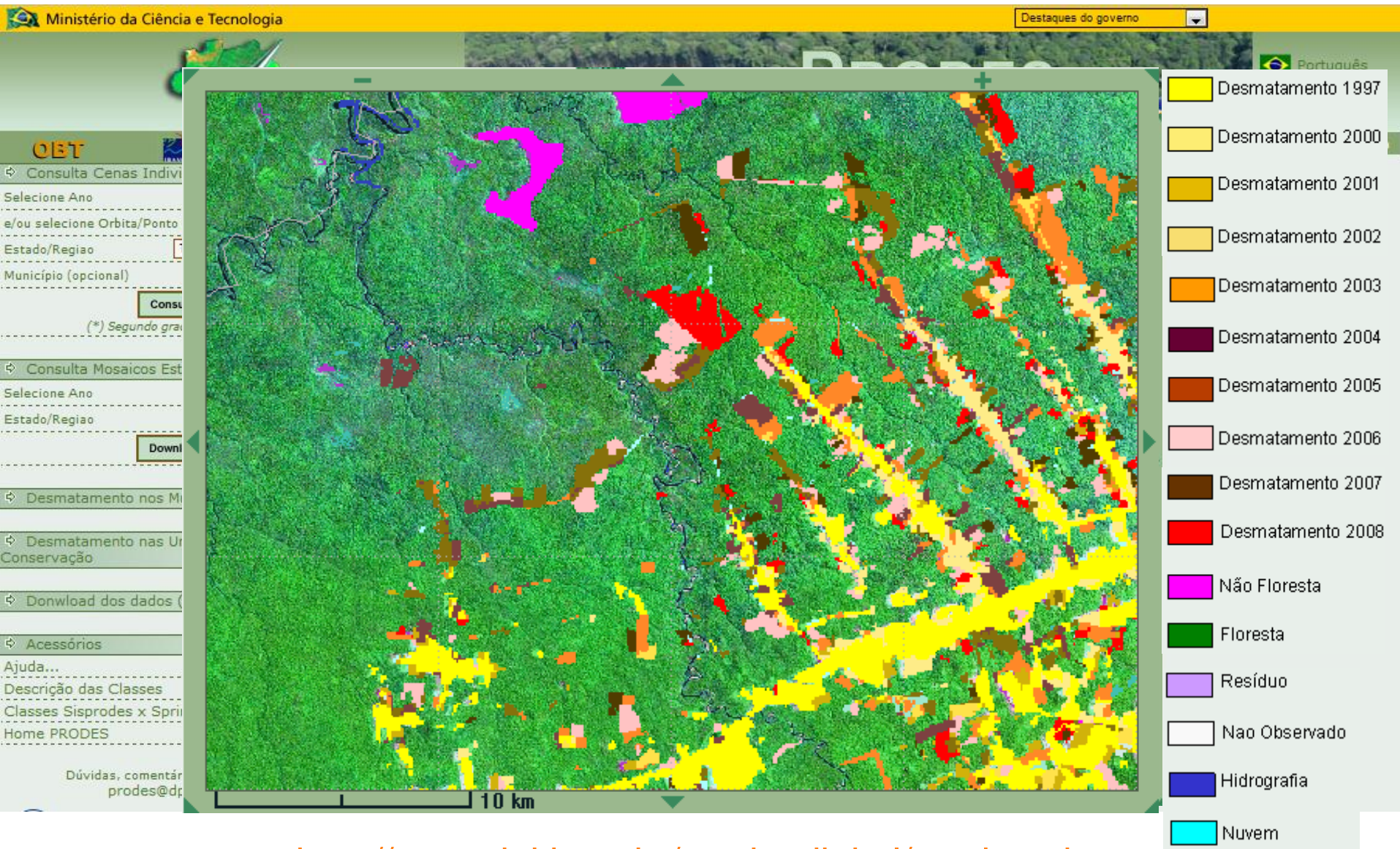


Monitoring Systems

- To assess whether REDD+ is resulting in net positive outcomes, i.e. results-based
- In **Phase 2** of REDD+
 - To monitor the outcomes of demonstration (**sub-national**) activities
- In **Phase 3** of REDD+
 - To monitor the outcomes of **national** policies and measures on all the national territory
- Technical requirements
 - Satellite Monitoring System (**remote sensing**)
 - **Web-GIS interface** (for transparency, open access)

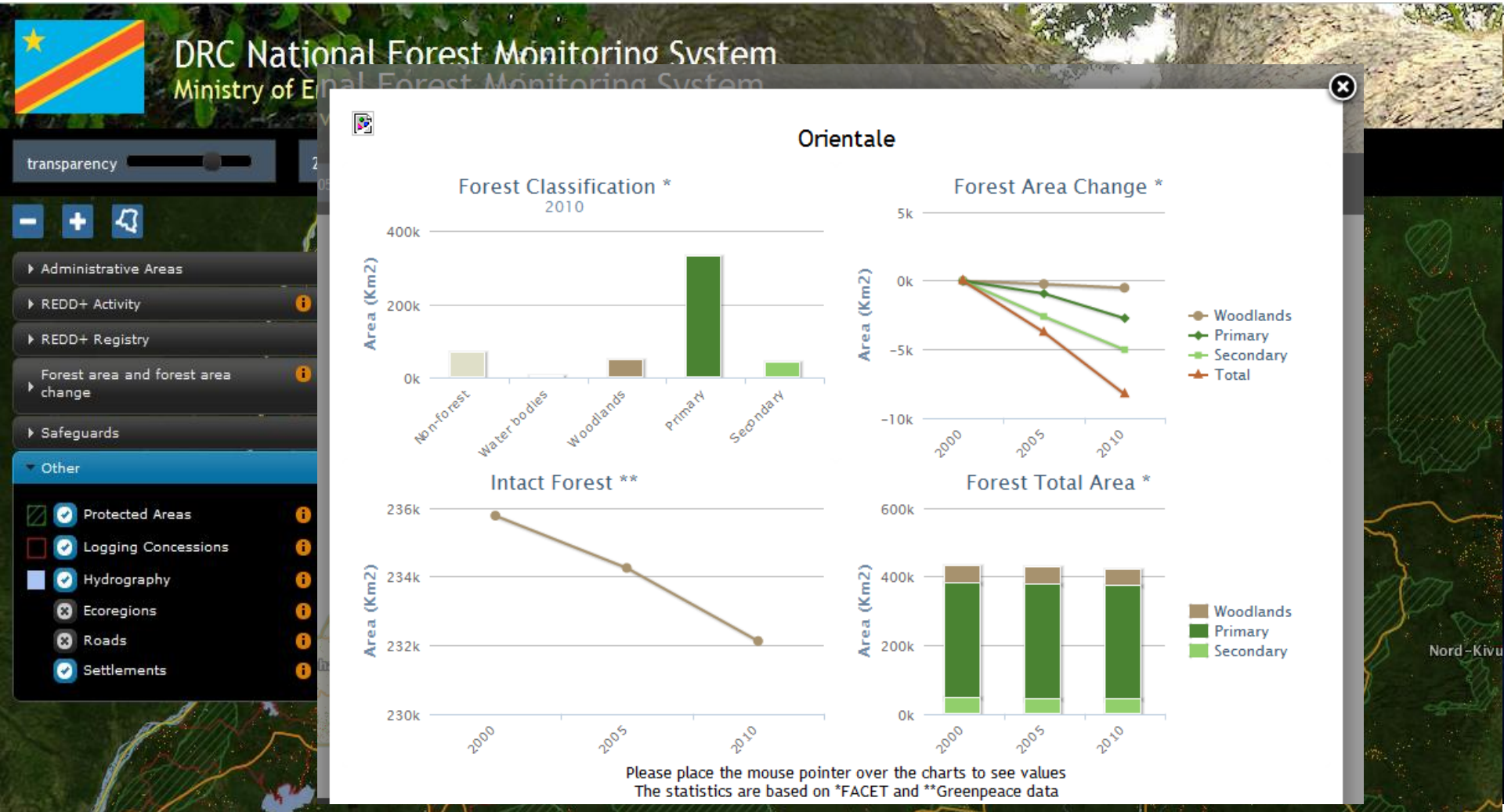


MONITORING: Brazil's System



<http://www.dpi.inpe.br/prodesdigital/prodes.php>

Democratic Republic of Congo's Forest Monitoring Web-GIS Portal



Paraguay's Forest Monitoring Web-GIS Portal

The screenshot displays the Paraguay's Forest Monitoring Web-GIS Portal. At the top, the title "Sistema Nacional de Monitoreo Forestal de Paraguay" is centered, flanked by the Paraguayan flag on the left and logos for Infona, SEAM (Secretaría del Ambiente Paraguay), and the National Institute for the Promotion of Sustainable Development on the right. Below the title bar, a navigation menu includes "2005", "Comentarios", "Estadística", "Español", and "English". The main map area shows a satellite view of a region with several green-shaded polygons representing forest areas. A network of yellow lines indicates roads, and blue lines represent hydrography. On the left side, a "Capas" (Layers) panel is visible, showing a list of layers: "Capas de Base", "Áreas Administrativas", "Superficie Forestal y Cambio en la Superficie Forestal", "Información Sobre Salvaguardias", and "Otros". Under the "Otros" section, three layers are checked: "Bosque Intacto" (Intact Forest), "Carreteras" (Roads), and "Hidrografía" (Hydrography). A "Leyenda" (Legend) button is located in the top right corner of the map area. At the bottom left, there are links for "Nota de Información" and "Encuesta de Satisfacción". At the bottom right, the scale is indicated as "Scale = 1 : 2M".

<http://www.paraguay-smf.org/>

NATIONAL FOREST MONITORING SYSTEM:

MRV FUNCTION





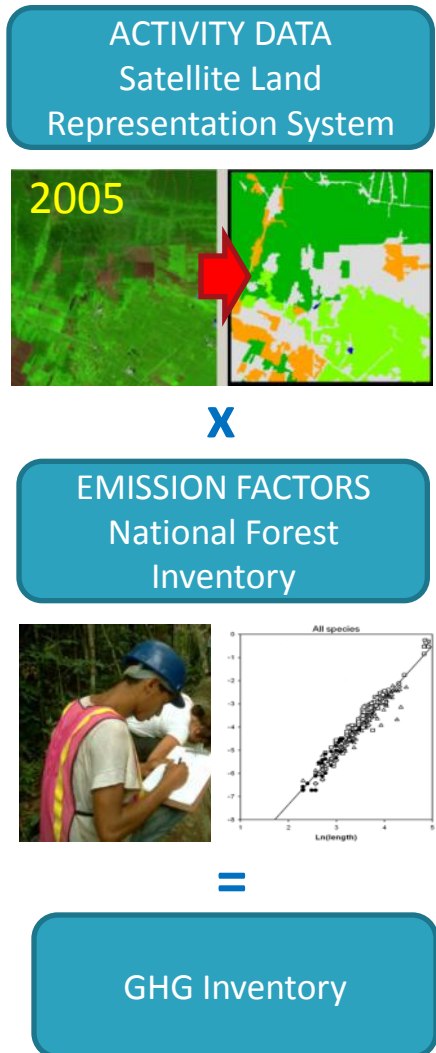
MRV for REDD+

Purpose:

- To **assess anthropogenic greenhouse gas emissions** by sources and removals by sinks related to forest land
- To enable measurement of the **carbon stock change outcomes** of REDD+ activities, following the most recent methodological approaches of the **Intergovernmental Panel on Climate Change (IPCC)**
- To **report GHG mitigation performance** (in CO₂-equivalents) of REDD+ activities to the UNFCCC
- Only has to be **fully operational in Phase 3** of REDD+

MRV: Measurement

- Measurements of **area change** (Activity Data) and **forest carbon stock changes** (Emission Factors)
- Activity data
 - Area / forest cover change data (hectares per year)
 - Achieved using **satellite remote sensing** imagery and GIS
- Emission factors
 - **Assessment of biomass, carbon stocks**
 - Data are obtained from a **national forest inventory** (NFI)
- This information provides the basis to compile a **GHG inventory**
- GHG Inventory
 - GHG assessment to determine national **mitigation performance**
 - Based on the data collected from the NFI and SLRS
 - **UNFCCC templates** available





MRV: Measurement

$$Emissions = AD \times EF$$



AD = Activity Data

x

EF = Emission Factors

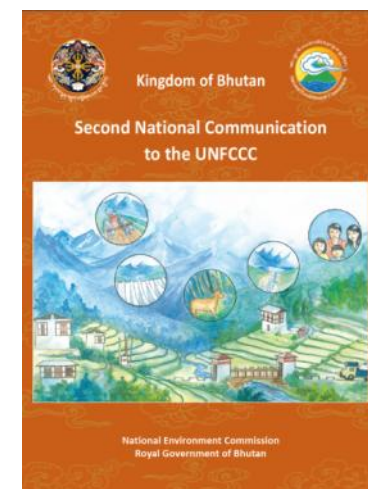
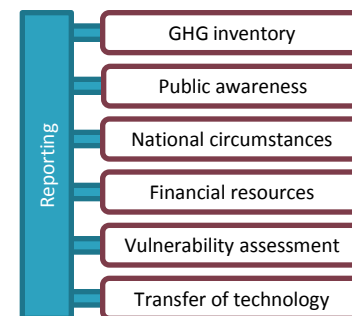
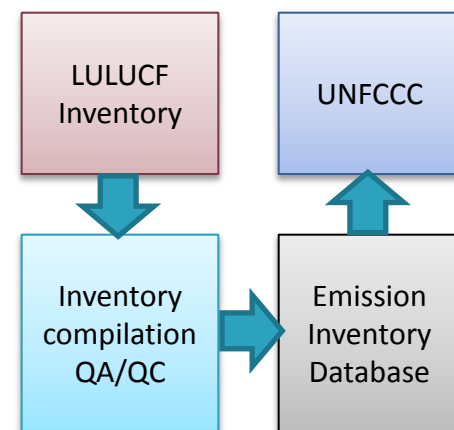


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GHG Inventory

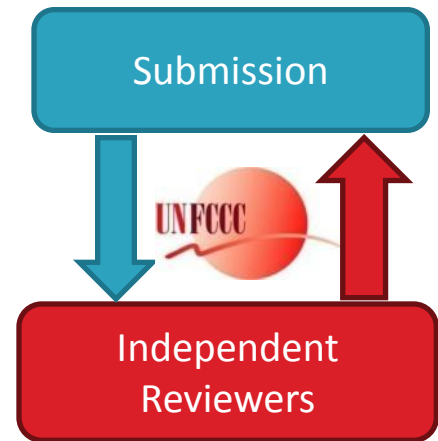
MRV: Reporting

- Purpose: For **reporting GHG mitigation performance** (in MtCO₂e) to the **UNFCCC Secretariat** as part of national communications
- Activity: Compilation of **national data and statistics** in the format of a GHG inventory
- Content: Core elements national communications are information on **emissions and removals of GHGs** and **details of mitigation activities**
- **Frequency:** Para. 60 Decision 1/CP.16 (on NAMAs):
 - **Decides** to enhance reporting in national communications from Parties not included in Annex I (i.e. developing country Parties):
 - (b) Should submit **national communications** to the COP every **four years**
 - (c) Should also submit **update reports every two years:**
 - Updates of national GHG inventories
 - National inventory report
 - Information on mitigation actions, needs and support received



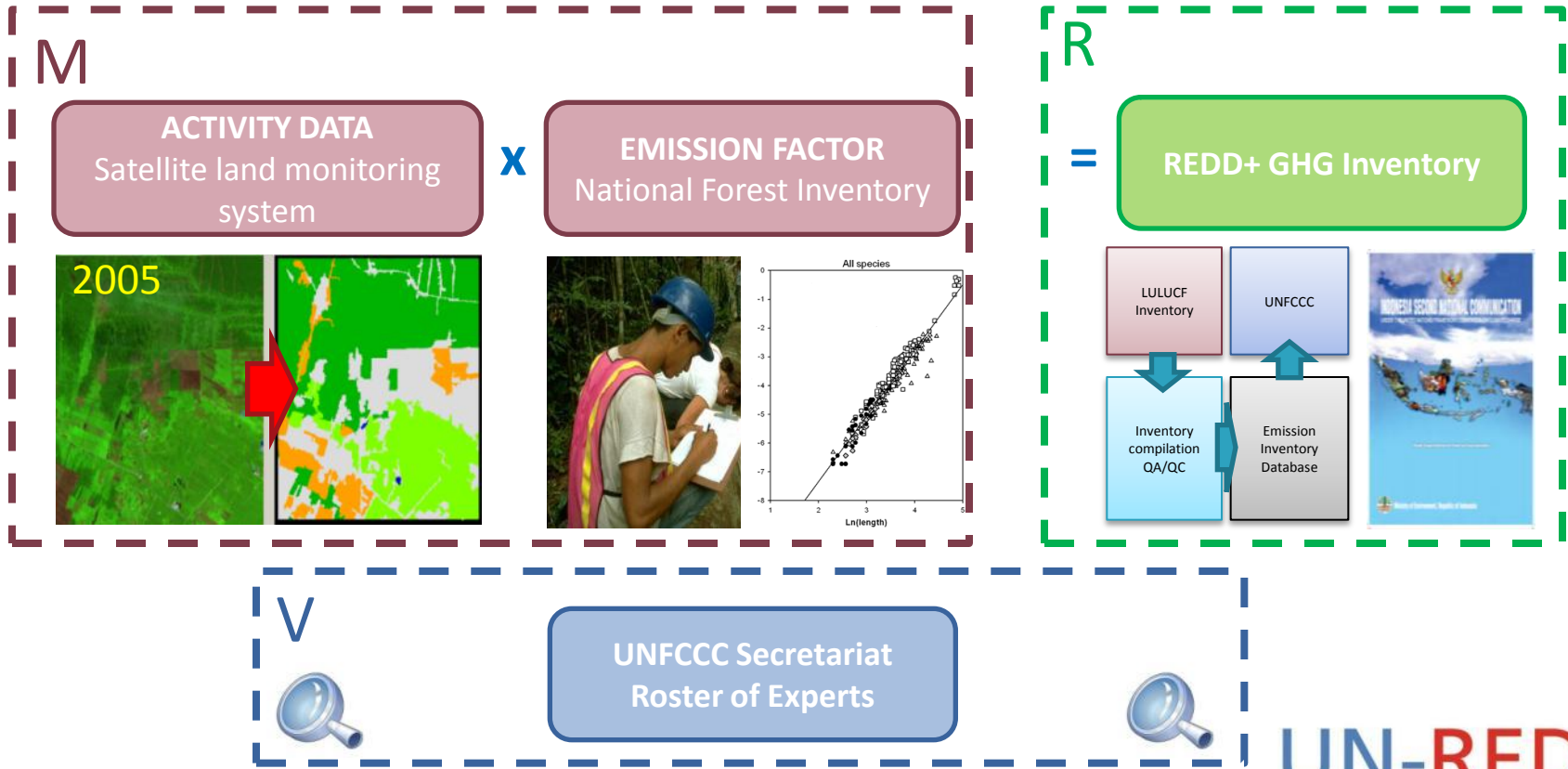
MRV: Verification

- Purpose: To independently **check the accuracy and reliability** of information reported in the GHG inventory or the procedures used to generate information
- Who: The UNFCCC Secretariat, through its **roster of experts**, will verify the methods used to generate the data
- How: A team of experts visit the country for **1-2 weeks**
- How: The **different means of verification** are: through interviews with key government officials and national NGOs; analysis of reports, media reports, training materials
- **Role of the country:** All data, including the satellite and forest inventory data are made available in order to allow verification





REDD+ MRV System: Overview



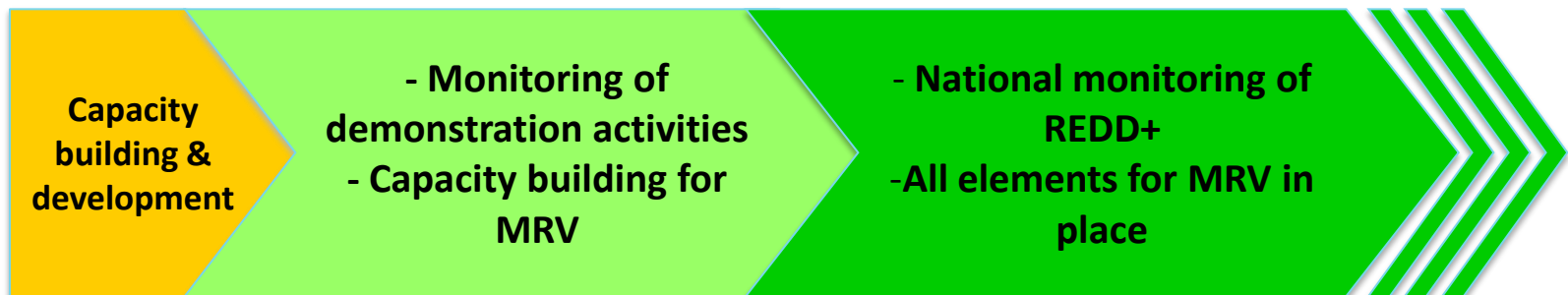


Phased development of the National Forest Monitoring System

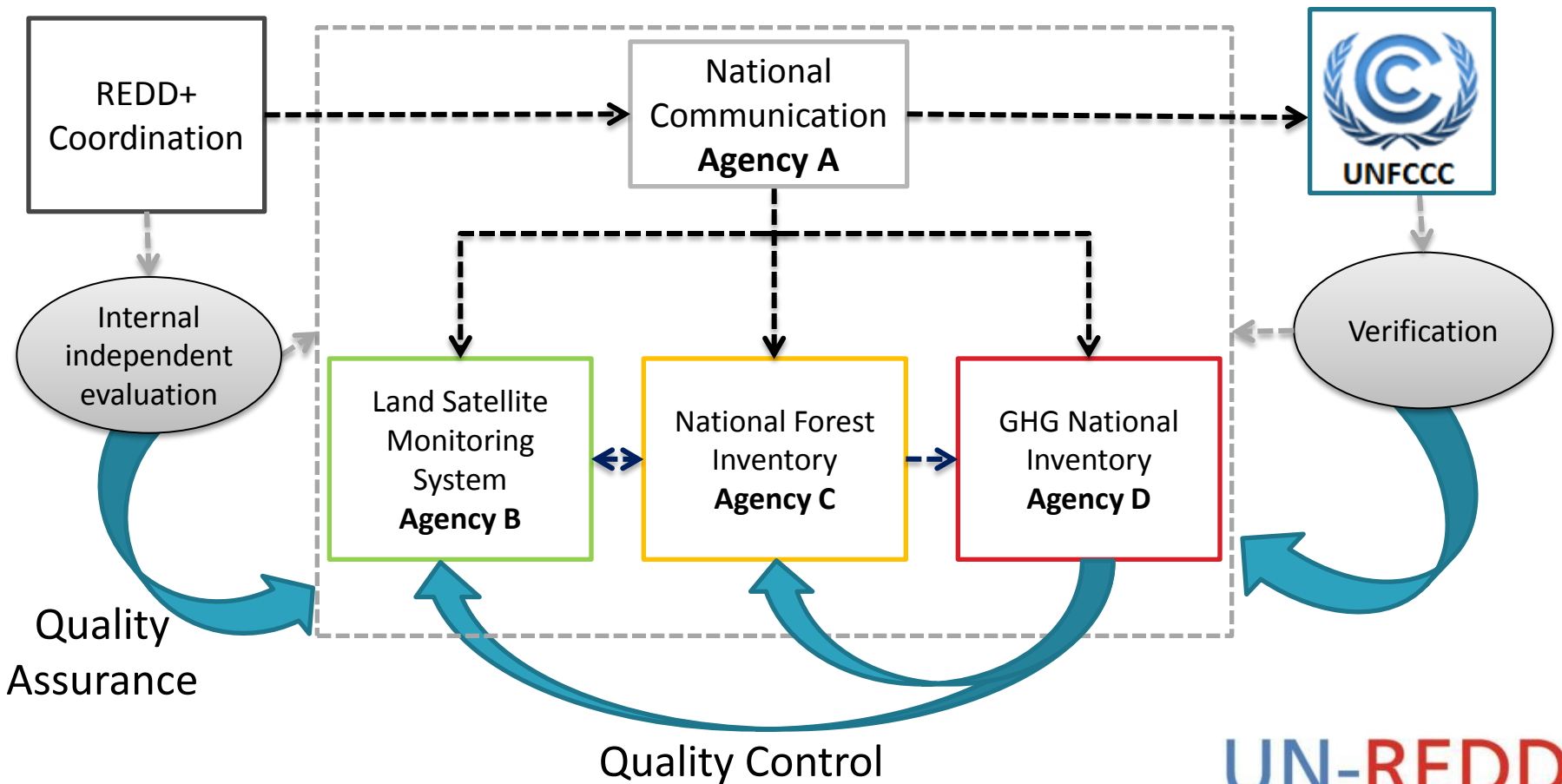
REDD+ PHASES



MONITORING & MRV PHASES



Institutional Arrangements





Monitoring and MRV Actions for Bhutan

1. Institutional arrangements for national forest monitoring system
2. Assessment of existing capacities
 - Satellite monitoring and remote sensing
 - Forest inventory
3. Assessment and compilation of existing data
 - Government agencies
 - Non-governmental organisations (NGOs)
 - Research institutions / universities
4. Identification of capacity gaps that can be addressed through UN-REDD support (e.g. support to the National Forest Inventory)

THANK YOU FOR YOUR ATTENTION!



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UN-REDD
PROGRAMME