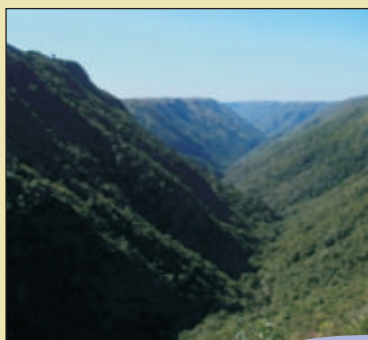
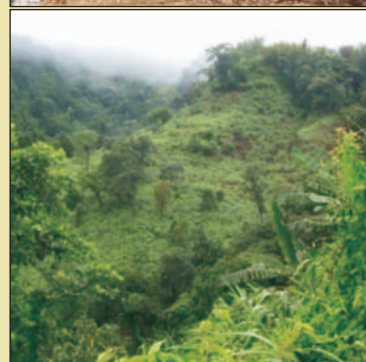


# REDD+ Manual for Practitioners



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*India's Forest Photo courtesy: Madhu Verma (2009) and IFCM Project (2012)*



## Preface

REDD+ is an incentive based, comprehensive conservation mechanism built on the fundamentals of sustainable forest management having two distinct and important additional elements of "assessment of carbon and leakages" through scientific methodology, and "trading of carbon". The international architecture on REDD+ is still evolving and has number of unresolved issues, which will be negotiated in future. Unlike A&R CDM projects the transaction cost for REDD+ project should be low so that financial benefit can be passed on to the community. Thus it becomes pertinent to discuss what kind of policy, institutional and legal frameworks are needed in Indian context to maximize the financial incentives from REDD+ while keeping the safeguards including rights of communities, livelihood dependence on forests and maintenance of ecosystem services, especially biodiversity.

This Manual, first of its type, intends to be a quick access guide for forestry practitioners and end users so as to bring considerable clarity on REDD+ concepts and issues, and to initiate actions for getting ready for REDD+. We would look forward to the comments for further enrichment of the Manual in its next edition.

Arun K. Bansal





## Abbreviations and Acronyms

A&R	Afforestation and Reforestation
CAMPA	Compensatory Afforestation Fund Management and Planning Authority
CDM	Clean Development Mechanism
CO <sub>2</sub>	Carbon dioxide
COP	Conference of Parties
EAP	Externally Aided Project
EU ETS	European Union Emissions Trading Scheme
ICFRE	Indian Council of Forestry Research and Education
IPCC	Intergovernmental Panel on Climate Change
I-SFR	India State of Forest Report
JFMC	Joint Forest Management Committee
FAO	Food and Agriculture Organization
FCPF	Forest Carbon Partnership Facility
FDA	Forest Development Agency
FPC	Forest Protection Committee
FSI	Forest Survey of India
FRL	Forest Reference (Emission) Level
GHG	Green House Gas
GIS	Geographic Information System
LULUCF	Land Use, Land-Use Change in Forestry
MDF	Moderately Dense Forest
MoEF	Ministry of Environment and Forests
MRV	Monitoring Reporting and Verification

NAP	National Afforestation Programme
NFI	National Forest Inventory
NRSC	National Remote Sensing Center
NTFP	Non-Timber Forest Produce
OF	Open Forest
PA	Protected Area
RED	Reducing Emissions from Deforestation
REDD	Reducing Emissions from Deforestation and (forest) Degradation
REDD+	Reducing Emissions from Deforestation and (forest) Degradation and includes incentives for positive elements of conservation, sustainable management of forests and enhancement of forest carbon stocks.
R-PIN	Readiness Plan Idea Note
RWG	Readiness Working Group
SBSTA	Subsidiary Body for Scientific and Technological Advice
SFD	State Forest Department
SMF	Sustainable Management of Forests
SFM	Sustainable Forests Management
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework on Climate Change Convention
UNREDD	United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in developing Developing Countries
VDF	Very Dense Forest
VCS	Verified Carbon Standard
WG	Working Group



## Key Terms Used in This Manual

**Additionality:** For a sink project would imply that the carbon sequestration that occurs in the project scenario would not occur otherwise.

**Afforestation:** Planting of new forests on lands that historically have not contained forests.

**Baseline:** Or the “without project” scenario represents the carbon stock projections for the project area in the absence of the project. The carbon stock changes during project implementation are useful in demonstrating additionality. In case there is no natural regeneration in the project scenario, the baseline can be assumed to be constant as before project implementation.

**A&R CDM Project Activity:** An afforestation or reforestation measure, operation or action that aims to achieve net anthropogenic GHG removals by sinks, whether as whole project or as a part of a project.

**Climate Change:** Framework Convention on Climate Change (UNFCCC), in its Article 1, defines climate change as: “a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.” The UNFCCC thus makes a distinction between climate change attributable to human activities altering the atmospheric composition, and climate variability attributable to natural causes.

**Climate Variability:** Climate variability refers to variations in the mean state and other statistics (such as standard deviations, the occurrence of extremes, etc.) of the climate on all spatial and temporal scales beyond that of individual weather events. Variability may be due to natural internal processes within the climate system (internal variability), or to variations in natural or anthropogenic external forcing (external variability).

**Ecosystem Services:** An ecosystem is a constantly changing complex of animate beings interacting with the non-living environment. The benefits people obtain from the ecosystem are called as

Ecosystem Services. According to Millennium Ecosystem Assessment classification, the services can be classified as provisioning services where goods are produced and provided by the ecosystem like food, water, fibre, etc.; regulating services, as benefits are obtained from regulation of the ecosystem processes. Climate regulation, flood control, water purification are some of the examples





of regulating services; the non-material benefits from the ecosystem such as aesthetics, spiritual, educational, recreational services, etc. are the cultural services provided by the ecosystem that enrich the quality of life; most important services of the ecosystem are the supporting services that are needed to produce all other services like nutrient cycling, soil formation and primary productivity in the ecosystem.

**Equivalent Carbon dioxide (CO<sub>2</sub>) Emission:** The amount of carbon dioxide emission that would cause the same integrated radiative forcing, over a given time horizon, as an emitted amount of a well-mixed greenhouse gas or a mixture of well-mixed greenhouse gases. The equivalent carbon dioxide emission is obtained by multiplying the emission of a well-mixed greenhouse gas by its Global Warming Potential for the given time horizon. For a mix of greenhouse gases it is obtained by summing the equivalent carbon dioxide emissions of each gas. Equivalent carbon dioxide emission is a standard and useful metric for comparing emissions of different greenhouse gases but does not imply the exact equivalence of the corresponding climate change responses.

**GHGs:** Greenhouse gases are those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of thermal infrared radiation emitted by the earth's surface, the atmosphere itself, and by clouds. This property causes the greenhouse effect.

**Global Warming Potential (GWP):** An index, based upon radiative properties of well-mixed greenhouse gases, measuring the radiative forcing of a unit mass of a given well-mixed greenhouse gas in the present-day atmosphere integrated over a chosen time horizon, relative to that of carbon dioxide. The GWP represents the combined effect of the differing times these gases remain in the atmosphere and their relative effectiveness in absorbing outgoing thermal infrared radiation.

**The Intergovernmental Panel on Climate Change (IPCC) :** It is the leading international body for the assessment of climate change. It was established by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) in 1988 to provide the world with a clear scientific view on the current state of knowledge in climate change and its potential environmental and socio-economic impacts.

**Leakages:** Leakages in a forestry mitigation project can result from unaccounted extraction from the project site, induced deforestation outside the project boundary, incomplete inclusion of carbon pools in baseline calculation, emission from which may occur during the project's lifetime.

**Carbon Stock:** The quantity of carbon contained in a “pool”, meaning a reservoir or a system which has the capacity to accumulate or release carbon.





**Mitigation:** A human intervention to reduce the sources or enhance the sinks of greenhouse gases.

**Non-Permanence:** It is resultant from the temporary nature of greenhouse gas removal by sinks. The benefits of GHG removals by the sink project might be reversed at the end of the project.

**Project Design Document (PDD):** PDD is the key document involved in the validation and registration of a CDM project activity. It is one of the three documents required for a CDM project to be registered, along with the validation report from the Designated Operational Entity (DOE) and the letter of approval from the Designated National Authority (DNA).

**Reforestation:** Planting of forests on lands that have previously contained forests but that have been converted to some other use.

**Sink:** Any process, activity or mechanism that removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas or aerosol from the atmosphere.

**Source:** Any process, activity or mechanism that releases a greenhouse gas, an aerosol or a precursor of a greenhouse gas or aerosol into the atmosphere.

**United Nations Framework Convention on Climate Change (UNFCCC):** The Convention was adopted on 9 May 1992 in New York and signed at the 1992 Earth Summit in Rio de Janeiro by more than 150 countries and the European Community. Its ultimate objective is the “stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.”

**Uptake:** The addition of a substance of concern to a reservoir. The uptake of carbon containing substances, in particular carbon dioxide, is often called (carbon) sequestration.

*Source: IPCC WG-III (2007) and UNFCCC documents.*



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## Abstract:

*REDD+ is an incentive-based mechanism for promoting and rewarding forest ecosystem conservation. However, there has been inadequate knowledge amongst practitioners to explore the REDD+ option to generate forest conservation finance and also as a tool for SFM. Thus the manual intends to be an easy reference guide for forest practitioners in India to understand REDD+. It discusses the REDD+ architecture and highlights the need for information on various physical data pertaining to forest cover, degradation and deforestation rate, socio-economic dependence on forest stock, etc. and capacity building of the State Forest Department for REDD+ readiness, and eventually to set up REDD+ projects.*

## SECTION 1: BACKGROUND

### Section 1.1: The science of climate change

Climate change, an issue of major global concern is drawing considerable attention at the international fora. Organizations like the Intergovernmental Panel on Climate Change (IPCC) and United Nations Framework Convention on Climate Change (UNFCCC) have been dedicated to scientifically predict and understand the climate phenomena and bring nations together to combat the adverse impacts of climate change through both, mitigation and adaptation measures.

Better REDD than dead :  
Tropical forest's best hope.  
Economist,  
(September 23rd 2010)

As defined by UNFCCC in its Article 1, climate change is: “a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.”

The phenomenon of climate change is directly linked to increase in Green House Gas (GHG) concentrations in the atmosphere. Increase in GHG leads to warming of the atmosphere (green house effect) leading to climate change. There is a consensus on the need to limit the global warming to  $\leq 2^{\circ}\text{C}$ , that may require limiting the atmospheric concentration of  $\text{CO}_2$ -equivalent GHGs at 450ppm or below.<sup>1</sup> This would require rapid implementation of mitigation strategies for achieving the emission targets (Ravindranath et al., 2012).

Mitigating climate change will require substantial investment. The costs in developing countries consistent with keeping average global temperature warming below  $2^{\circ}\text{C}$  compared to preindustrial levels could reach \$139–175 billion per year by 2030 (Nicholas et al., 2011). According to estimates of the World Energy Outlook 2010, within one year the global cost for maintaining temperature levels would be increased by \$1 trillion over 2010–30 (or \$50 billion/year). Various mechanisms are being explored for immediate implementation.

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<sup>1</sup> FCCC/CP/2009/L.7 18 December 2009.



## Section 1.2: Understanding forests and the carbon sequestration service

Carbon sequestration service is one of many ecosystem services rendered by forests

Forest ecosystems play an important role in the carbon cycle. Forests are a major carbon sink. Total carbon content of the forest ecosystem estimated about 638Gt carbon, in 2005, is more than the amount of carbon in the atmosphere<sup>2</sup>. Tropical forests store, on average, about 50% more carbon per unit area, than forests outside the tropics (FAO 2005). On the other hand, deforestation and forest degradation result in substantial reductions in forest carbon stocks and increase in emissions. Global deforestation was estimated at 13 million ha/year for 1990-2005 (FAO 2005). IPCC Working Group (WG) III (2007) estimated emissions from deforestation since the 1990s at 5.8 GtCO<sub>2</sub>/year. Hence, forests can also be a major carbon source. Thus, it becomes relevant to conserve and enhance them as this is one of the effective ways of storing carbon compared to the other option of CO<sub>2</sub> emissions mitigation. REDD+ is an international mechanism under negotiation within the UN climate talks and other international forums which will provide compensation to governments, communities, companies or individuals in developing countries for actions taken to Reduce Emissions from Deforestation and Forest Degradation below an established reference level (Global Witness, 2010).

## Section 1.3 : Co-benefits of carbon sequestration

Carbon sequestration is one of the many ecosystem services generated by the forests. Natural forest ecosystems provide a range of goods and services that are essential for human well-being. The Millennium Ecosystem Assessment demonstrates the linkages between categories of ecosystem services and components of human well-being that are commonly encountered. Forests play an important role in stabilization of carbon concentrations in the atmosphere while promoting sustainable development<sup>3</sup>. Tropical forests also harbour considerable biodiversity, being home to a range of plant and animal species<sup>4</sup> and render various watershed functions and add to the landscape beauty. Hence conservation of forests would not only contribute to climate change mitigation but also deliver considerable co-benefits in form of community well-being, watershed, landscape, biodiversity conservation and other ecosystem services. Though the REDD+ mechanism emerging from international negotiations is being designed with the primary goal of mitigating climate change but it can also provide biodiversity co-benefits if the mechanism results in the retention of forests in countries harbouring substantial biodiversity (Busch et al., 2010).

<sup>2</sup> [http://unfccc.int/methods\\_and\\_science/lulucf/items/4122.php](http://unfccc.int/methods_and_science/lulucf/items/4122.php)

<sup>3</sup> Article 2; Kyoto Protocol

<sup>4</sup> Collaborative Partnership on Forests (2008). Strategic Framework for Forests and Climate Change. A Proposal by the Collaborative Partnership on Forests for a Coordinated Forest-Sector Response to Climate Change. Collaborative Partnership on Forests; referred in <http://www.cpfweb.org/32827-08e7636a82889dec5cd50df093f056b73.pdf>



## Section 1.4 : Scope

This document is intended to be an easy reference guide for forest practitioners in India to understand the REDD+ mechanism and its process and suggests steps by the State/UTs for REDD+ readiness.

# SECTION 2: CLIMATE CHANGE AND CARBON MARKETS : POTENTIAL AND OPPORTUNITIES FOR THE FORESTRY SECTOR

## Section 2.1: Pre REDD+ : The CDM market scenario

Forestry activities are included in the Land Use, Land-Use Change and Forestry (LULUCF) sector in the UNFCCC. The forestry activities allowed as eligible in Article 12 of the Kyoto Protocol and the Marrakesh Accord<sup>5</sup> for the first commitment period (2008-12) are Afforestation and Reforestation (A&R).

Currently there are 33 Clean Development Mechanism (CDM) A&R projects registered worldwide, out of which 12 are in India. However this forms a very small percentage (0.004%) of the total 9064 registered CDM projects (UNEP Risoe, 2012). Moreover, none of these projects have issued any credits as of now. There are several reasons attributed to this situation including a complex methodological framework, high transaction costs, low emphasis on community and biodiversity safeguards and also a low market demand based on a complete exclusion of these credits from the European Union Emission Trading Scheme (EU ETS). However, it is expected that REDD+ will overcome these challenges based on large international support and also a comprehensive design that aims to overcome some of the above mentioned challenges and also emphasize co-benefits and safeguards.

REDD+ markets:

- Voluntary market
- Compliance market
- Carbon Funds

## Section 2.2: REDD+ : Carbon market potential

Even though the process for mobilization of funds to support REDD+ is still not decided and is being negotiated at the UNFCCC the voluntary carbon markets might provide an alternate funding mechanism to kickstart projects.

REDD+:  
Payment for  
performance

During 2009 -10 the REDD+ market share in the voluntary market space increased from 55.4 MtCO<sub>2</sub>e to 125 MtCO<sub>2</sub>e. The rise of REDD's market share in this market space (+500% from 2009)<sup>6</sup> can be attributed to formal recognition for REDD and REDD+ for climate change mitigation (Nicholas et al., 2011). The

There is an established  
carbon market where  
carbon trading is done.

<sup>5</sup>[http://unfccc.int/cop7/documents/accords\\_draft.pdf](http://unfccc.int/cop7/documents/accords_draft.pdf)

<sup>6</sup>Survey respondents transacted 16.7 MtCO<sub>2</sub>e REDD offset credits in 2010, up from 2.8 MtCO<sub>2</sub>e in 2009. Source: Ecosystem Marketplace and Bloomberg New Energy Finance Note: Preliminary Findings, dated April 2010.

investment in REDD+ is envisaged to grow further as the mechanisms, methodologies and technicalities are established. The potential can be leveraged through well-designed activities. The later sections of the manual highlight the REDD+ components and steps for developing these.

REDD+ intends to incentivize forest protection over forest destruction.

## SECTION 3 : REDD+ EVOLUTION AND CONSTRUCT

### Section 3.1: Historical development and current scenario

REDD+ evolved in response to a growing recognition of the need to preserve the standing forest stocks and promote growth of forests to sequester carbon. It is expected to focus on biodiversity conservation and community participation (Lal et al., 2011).

The concept of REDD+ has evolved over three Conference of Parties (COP) meetings of the UNFCCC. Reducing Emissions from Deforestation (RED) was first introduced in the 11th session of COP in 2005 at Montreal by Papua New Guinea and Costa Rica with a focus on developing countries and approaches to stimulate action. In 2007 COP13 “The Bali Action Plan” recognized the importance of forest degradation and its associated activities to RED evolving to REDD. In response to the COP 13 decision, the Food and Agriculture Organization (FAO), United Nations Development Programme (UNDP) and United Nations Environment Programme (UNEP) in 2008, launched the UNREDD programme to support developing countries in setting up pilot projects. The associated activities that lead to incentives for positive elements of conservation, sustainable management of forests and enhancement of forest carbon stocks while generating co-benefits like biodiversity conservation, livelihood generation and hence poverty alleviation became part of the “+” component and the whole concept evolved as REDD+ (or REDD- Plus)<sup>7</sup>.

What should we know as forest practitioners?  
What is REDD+?  
Why is REDD+ important to us?  
How can we be REDD+ ready?

In COP 14 Poznan, Subsidiary Body on Scientific and Technological Advice (SBSTA) in its 29th meeting referred REDD+ as “*reducing emissions from deforestation and forest degradation in developing countries, and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries.*”<sup>8</sup>

Key learnings :  
Phased approach of REDD+

- Readiness
- Implementation
- Reporting

In the successive COPs, there has been increasing consensus to rapidly formalize the structural REDD+. Subsequently the various working groups of UNFCCC are developing a methodological framework. The developing countries are at the moment developing their REDD+ architecture and the full scope of activities, in line with the phased process outlined in the Cancun Agreement in December 2010 at COP16. The phases are as follows:

<sup>7</sup> [FCCC/CP/2007/6/Add.1, 14 March 2008; Decision 1/CP.13 [BAP], paragraph 1(b)(iii)]

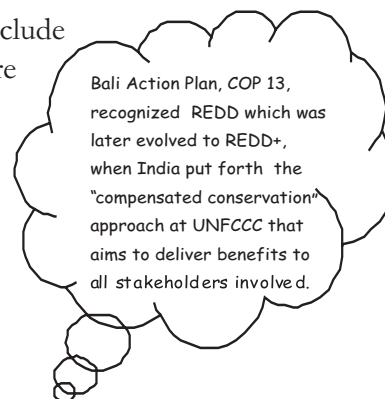
<sup>8</sup> [http://unfccc.int/files/methods\\_science/redd/application/pdf/the\\_history\\_of\\_redd\\_carbon\\_planet.pdf](http://unfccc.int/files/methods_science/redd/application/pdf/the_history_of_redd_carbon_planet.pdf)

- Phase 1: Readiness—Development of national plan, policies and measures, and capacity building.
- Phase 2: Implementation of the readiness plan and technology transfer from the developed nations with result-based demonstration activities.
- Phase 3: Reporting result-based actions with full measurement, reporting and verification.

In 2011 COP17, Durban, South Africa, decisions on defining and establishing systems under the mechanism were emphasized. Systems have to be developed for (i) financing by public, private, bilateral, multi-lateral and alternative sources through market or non-market mechanisms; (ii) modalities for reference level- the sub-national forest reference (emission) level (FRL) transitioning to national FRL; and (iii) providing information on safeguards, which includes environmental and social safeguards adhering to the national circumstances, legislations, sovereignty, international obligations/agreements and gender considerations.

Currently, there are ongoing international negotiations on how to include REDD+ in the regulatory framework of the UNFCCC. There are also proposals on mainstreaming co-benefits such as biodiversity conservation, community involvement concerns in the design of REDD+.

Key characteristics of a good REDD+ implementation system is that it should be efficiently monitorable, verifiable and reportable (MRV) with an equitable distribution mechanism of benefits to all stakeholders in the forest lands. The process should be transparent and constantly updated (Ravindraath et al., 2012).



### Section 3.2: India's stand on REDD+

The MoEF (2010b) defined REDD+ as a mechanism that "goes beyond merely checking deforestation and forest degradation, and includes incentives for positive elements of conservation, sustainable management of forests and enhancement of forest carbon stocks."

Further, the Indian Council of Forestry Research and Education (ICFRE), India's observer organisation to the UNFCCC has suggested a comprehensive approach on REDD+ as carbon saved is equivalent to carbon added in order to achieve stabilization and conservation of forest cover and the country's carbon stocks.

ICFRE has proposed that the country should be compensated for reducing deforestation, stabilizing and enhancing its forests cover under the REDD+ mechanism. The potential policy approach presented by India has been named "Compensated Conservation which is intended to compensate the countries for maintaining and increasing their forests as carbon pools as a result of conservation and increase/improvement in forest cover backed by a verifiable monitoring system."<sup>9</sup> (MoEF, 2010 a).

<sup>9</sup>(FCCC/SBSTA/2007/Misc.2)



### Section 3.3: Building blocks of REDD+

The major building blocks of REDD+ that will contribute to its effective, efficient implementation are as follows;

- a. **Forest reference (emission) level:** It defines the reference period and scale against which the activities within scope are measured (Parker et al., 2008). The baseline approach is critical to the success of a REDD + mechanism because it affects the quantity, credibility, and equity of credits generated from efforts to reduce forest carbon emissions (Griscom et al.). FRL should be developed in a transparent, comprehensive and accurate manner. Further according to COP17 sub-national approaches should constitute a step towards developing a national reference level adjusted for national circumstances. For constructing the FRL the components are:

REDD+ components are:  
FRL, financing mechanism,  
governance, equitable benefit  
sharing and co-benefits.

1. Forest definition to be used by the country.
2. Defining significant carbon pools to be included.
3. Establishing an historic time period for emission estimates.
4. Estimating area converted to other land uses as per the latest IPCC guidelines.
5. Establishing trends in forest conversion, deforestation and degradation.
6. Analysing the drivers of deforestation and degradation.

The data required for establishing RL includes:

1. Spatially explicit data for stratifying lands.
2. Spatially explicit activity data on gross deforestation and gross forestation.
3. Activity data for forest degradation and carbon stock enhancement.
4. Estimation of emission factors for each stratum and activity type (Meridian Institute, 2011).

**India status:** The baseline year may be taken as 1990/1994. “For REDD accounting, India favours a National Level Accounting Mechanism (as one single country project). COP/SBSTA may develop separate “Modalities and Procedure” for implementation of the REDD mechanism under UNFCCC.”<sup>10</sup>

- b. **Financing mechanism:** It can either be a fund or market based approach. REDD+ financing mechanism is proposed to be ‘result-based-actions by ‘result-based financing’ from private, public, bilateral, multilateral and alternative sources. Governments in REDD+ countries should ensure balanced investments within and outside the forest sector in order to address the drivers of deforestation and forest degradation (UNFCCC, 2012). The international community is still deciding on the framework mechanism to catalyse financing in all phases (as defined in Section 3) of REDD+. It is agreed that Phases I and II will be financed through bilateral or existing multilateral assistance, such as under Norway’s International Climate and Forest Initiative, the Forest Carbon Partnership Facility (FCPF), the REDD+ Partnership, or the UN-REDD Programme (Nicholas et al. Bank, 2011).

<sup>10</sup><http://unfccc.int/resource/docs/2007/smsn/ngo/031.pdf>



**India status:** Even though 12CDM A&R projects (UNEP Risoe, 2012) have been registered in India but none of them has issued any carbon credit. Hence an actual mechanism for distribution of carbon credit benefits to communities is to be developed. For REDD+ to become a reality it will be better to begin with a fund-based mechanism for demonstrating its effectiveness.

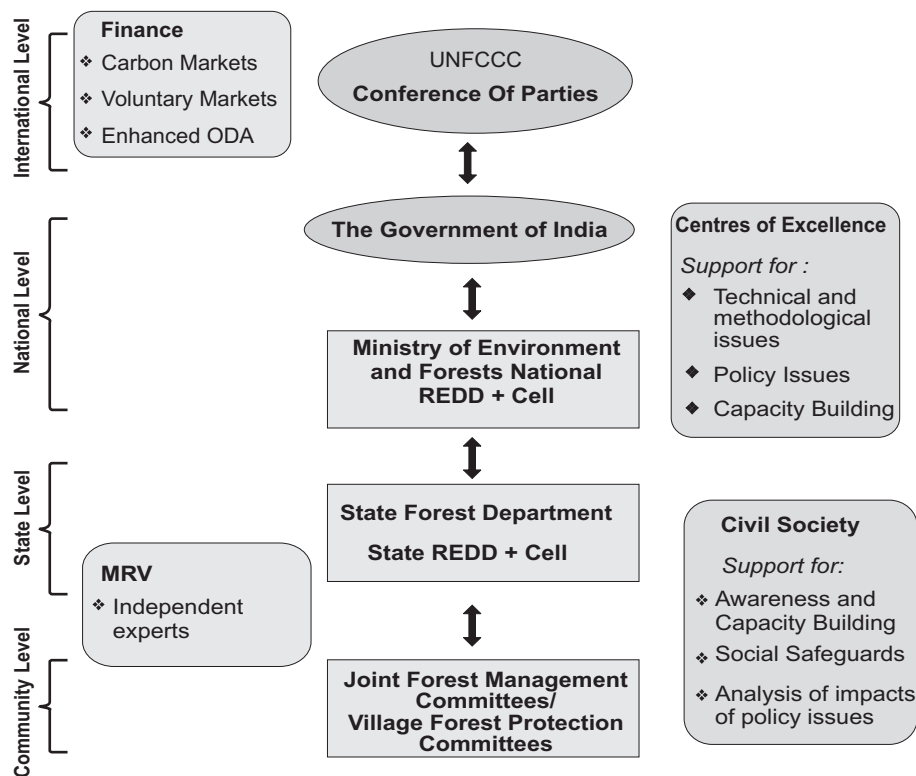
REDD+: A multi-level Payment for Ecosystem Service (PES) programme, to incentivize local interventions.

- c. **Governance:** has to be inclusive and it will provide the framework for the execution/implementation of REDD+.

**India status:** Under the MoEF, the REDD cell has been constituted to coordinate the REDD+ activities in a three-tier framework. REDD+ cell with the help of other ministries (Figure 1) would frame National REDD+ strategies and report at international fora with technical support from several national institutions including ICFRE, FSI, and the National Remote Sensing Center (NRSC). The various state forest departments would implement and coordinate the National Strategy on REDD+ by managing the forest area with direct involvement of the local communities, through Joint Forest Management Committees (JFMCs, known by different names in different states under their respective JFM resolutions).

REDD+: A positive incentive instrument.

**Figure1: Suggested Institutional Set-up for Implementation of REDD+ in India**



At the grass-root level there is a need to assess the capabilities of Joint Forest Management Committees (JFMCs) as well as the Forest Development Agency (FDA) and defining their roles and responsibilities in implementing the REDD+. The roles and responsibilities of State, Gram Sabhas, JFMCs and other local bodies that can contribute to successful implementation of REDD+ activities is yet to be decided.

- d. **Equitable benefit sharing:** It deals with the allocation of incentives and benefits across all stakeholders of the REDD+ projects. The approaches for distribution are both vertical (bottom up approach that benefits different stakeholders along the REDD+ structure) and horizontal (distribution among the communities) (Mayers et al., 2010).

**India status:** A mechanism has to be devised so that the benefits are shared with the communities associated in implementation of REDD+ initiatives. In the REDD+ readiness phase JFMCs need to be capacitated and strengthened through appropriate capacity building.

REDD+ will provide compensation to governments, communities, individuals, and companies participating.

- e. **MRV (Monitoring, Reporting and Verification) methodology:** The historical data for FRL and also the new data collected have to adhere to internationally accepted standards. The forest monitoring system would be based on remote sensing combined with extensive ground-truthing.

**India status:** A comprehensive methodological framework for assessing baselines and project level emissions is still to be decided for the country. The framework suggested by ICFRE is that of choosing a national level accounting mechanism and a national baseline, using remote sensing combined with minimum ground verification for MRV. However, for community-based initiatives an appropriate mechanism for community participation in MRV needs to be evolved.

- f. **Co-benefits:** Notable co-benefits that are generated from the REDD+ mechanism are livelihood generation and biodiversity conservation.

**India status:**

Can REDD+ mechanism ensure multiple benefits like biodiversity conservation, preservation of water sheds, soil conservation etc?

**Livelihoods:** In India there is a very high community dependence on forests for fuel wood, fodder and timber. Thus, there is a need to address/include community needs and cater to this dependence while we plan our REDD+ architecture.

**Biodiversity:** India is one of the 17 mega diverse countries in the world. Implementation of REDD+ in the country would also provide an opportunity to conserve the biodiversity and evaluate ecosystem services.

## SECTION 4: ECONOMICS OF REDD+

The economics of REDD+ is estimating the costs and valuing the benefits in the REDD+ activity. There are four main costs involved in REDD+ (i) opportunity costs: It represents the highest alternative land-use of the area under deforestation through, including net revenue from the conversion itself. It varies according to the drivers of deforestation. (ii) Implementation and transaction costs that include the monitoring and capacity building costs apart from establishing project activities and on-ground estimates. Table 1 presents estimates for the costs from various literature which are indicative values.

### Costs of REDD+

1. Opportunity costs
2. Implementation and transaction costs
  - Monitoring costs
  - Capacity building costs

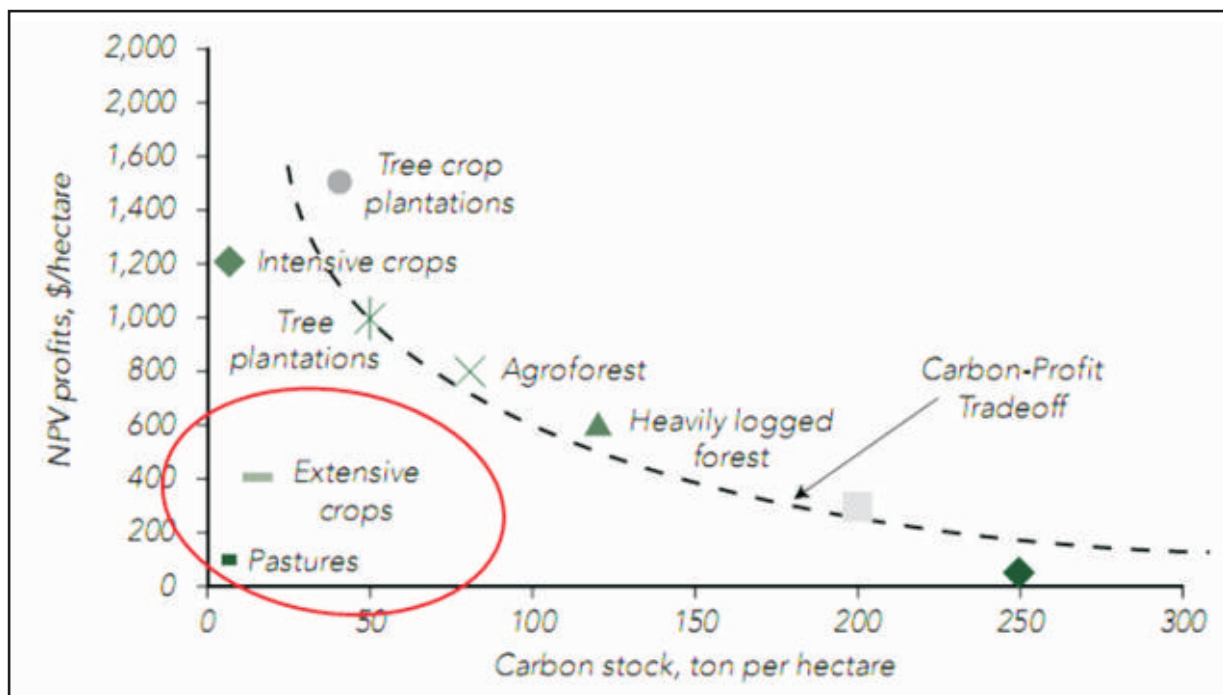
**Table 1: Costs of REDD+**

Component	Estimated Costs as per Literature
Opportunity Costs	Across Africa, Central America, South East Asia, and South America they amount to USD 30,000–250,000 per 100 ha (Grieg-Gran 2008).
Implementation and Transaction Costs	Such costs typically range from USD 400 to 1500 per 100 ha (Nepstad et al. 2007, Grieg-Gran 2008).
Monitoring Costs	Vary from USD 0.5 to 550 per 100 ha depending on the required precision of carbon stock and area change detection, which directly depends on the scale of economy. (Hannes et al. 2009)
Capacity Building Costs	The Eliasch Review (2008) estimates that reforms and capacity building within 40 REDD+ nations would cost up to USD 4 billion over 5 years.

**Source: Adapted from Hannes et al. (2009)**

Figure 2 demonstrates opportunity costs involved by comparing different land uses and their profits generated. Forests typically have a high stock of carbon but low returns when compared to intensive crop cultivation with a high return. However pasture and extensive crops are low carbon, low profit land uses. REDD activities that prevent the conversion of forest into low productive pastures can produce large carbon gains for a small opportunity cost and can be considered as a “low hanging fruit”, and a priority for policy action. Numerous factors such as soil type and distance from markets can affect carbon and profits. Land-use mapping can help to identify these issues (World Bank – FCPF, 2010).

Figure 2: Profits vs. Carbon Stocks in Typical Land Use Systems



Source: World Bank – FCPF (2010)



## SECTION 5: CURRENT STATE OF INDIA'S FORESTS

The FSI has monitored forest cover of the country biennially since 1987 and has published its findings in the India State of Forest Report (I-SFR). It reports forest cover as per tree canopy density. FSI defines forests as “all the lands, more than one hectare in area, with a tree canopy density of more than 10%.” The present Indian forest cover according to the I-SFR 2011 data 2.54 % of forest is very dense forest, 9.76 % of moderately dense, 8.75 % of open forests, while 1.28 % comprise of scrub land. Further, 21.02 % of the nation’s geographical area is under forest cover <sup>11</sup> (69.20 m ha) (I-SFR, 2011).

Need for prioritization of REDD+ readiness based on its building blocks

**Degradation:** The canopy density, though not a complete indicator for measurement of degradation, is an indicator of the quality of forest. The change from VDF to MDF/Scrub/OF represents degradation for which drivers need to be identified.

**Deforestation:** Identifying deforestation at the national level can be very tricky. Deforestation as defined in the Marrakesh Accord is the human induced conversion of forested land to non-forested land for a long period of time. Ravindranath et al. (2012) in their paper have assessed that when the forest cover analysis is broken down at the district level, the real picture of area being deforested in the state emerges, which otherwise is masked net forest cover change statistics at state/national level. For REDD+ to work, it is important to integrate the components and connect data bottom-up, i.e. from the site country level.

**Forest carbon accounting:** The increase in forest area is included under the enhancement component of REDD+. Further, the India –State of Forest Report (2011) has estimated the forest carbon account of five major pools, viz. above ground biomass, below ground biomass, soil carbon, deadwood and litter since 1994, for which India has established its own species-specific key-data factors. The historical change in the forest carbon has now been established at country level as shown in Table 2. It represents that over a decade India has successfully enhanced its forest carbon stock. However for a complete and comprehensive carbon account leakages need also to be accounted. In addition, there is a need to develop simple methodologies for accurate measurement of carbon at JFMC level along with capacity building of JFMCs so that they can measure carbon stocks in the forests.

<sup>11</sup> The forest cover is measured through canopy density. The canopy density classifications used are (i) very dense forest (VDF) – All lands having tree cover with canopy density more than 70%; (ii) moderately dense forests (MDF) – All lands having a tree cover with canopy density between 40% and 70%; (iii) open forests (OF) – All lands having a tree cover with canopy density between 10% and 40% and; (iv) scrub – All forest lands with poor tree growth, mainly small or stunted trees with canopy density less than 10%.

**Table 2: Change in Carbon Stock of Forest Land Between 1994 and 2004.**

Component	Carbon stock in forest Land in 1994 (MtC)	Carbon stock in forest Land in 204 (MtC)	Net change in carbon stock
Above ground biomass	1784	2101	317
Below ground biomass	563	663	100
Deadwood	19	25	6
Litter	104	121	17
Soil	3601	3753	152
<b>Total</b>	<b>6071</b>	<b>6663</b>	<b>592</b>

Source: I-SFR , 2011

### Section 5.1: JFM and REDD+

Verma et al. (2010) assessed JFM as an institutional setup for incentivizing communities through REDD+. Based on the pilot at three different site-villages in Madhya Pradesh, this study conservatively estimated the carbon stock enhanced over a decade through improved protection and conservation attributable to JFM. The study demonstrates a case for compensating JFMCs on an annual/ quarterly basis to ensure their participation in forest conservation, efforts through mechanism of compensation and rewards and provide them with additional income and asset development opportunities in ensuring that the pressure on forests is constricted to a sustainable level thereby contributing to their poverty alleviation efforts and sustainable management of forests.

The forests in India are under Protected Areas (PAs) Management emphasizing the people's participation and their support for wildlife conservation. At present, PAs cover about 4.90% of the geographical area of India comprising more than 102 National Parks, 515 wildlife sanctuaries, 47 conservation reserves and 4 community reserves (National Wildlife Database, 2011). PAs face both ecological and social issues namely habitat loss/fragmentation, overuse of biomass resources in the context of biotic pressures, increasing human-wildlife conflicts, livelihood dependence on biodiversity/forest resources, etc. PAs can thus meet their conservation goals only when their priorities are aligned with the large scale land use activities in and beyond their boundary with community involvement. PAs can potentially benefit from REDD+ to achieve these goals. Most states of North East India are community managed and are exemplary cases for biodiversity and forest stock conservation.

The following two cases in box 1 and 2 respectively describe the implementation of REDD+ in pilot stages in similar scenario countries of Vietnam and Nepal.

## Box 1: REDD+ in Vietnam

The forests in Vietnam are tropical rain forests in most regions, sub-tropical in the north and high altitudes, mangrove forests along coastline and peatlands forests in deltas. They are home to around 20 million people belonging to the lower economic strata of society. The Government of Vietnam has proactively participated in the UNREDD programme for preparing its country for REDD and REDD+ in establishing a national REDD+ Network, where various stakeholders come together to coordinate issues and develop capacities. In the next phase it would pilot in six provinces, through expanded engagement with the private sector. The key components of their strategy are:

### Identification of drivers of deforestation

- Conversion of forest land to other uses like agriculture and aqua-culture
- Development of infrastructural facilities and hydroelectric plants
- High population growth, resettlement, migration and poverty
- Increasing market demand for timber products and fuel-wood
- Inappropriate forest management and harvesting methods
- Incomplete legal systems and lack of capacity to enforce the law

### National REDD + strategy and targets

- Strengthen forest management and reforestation: 14.3 m ha in 2010 (43%) – 16.24 m ha by 2020 (47%)
- Afforestation: 1 million (2006-10); 1.5 m ha in 2011-2020
- Wood production: 20-24 m m<sup>3</sup>/yr. (Cuong, 2008)

**Consultative approach to national programme development:** A broad consultative approach for the development of Vietnam's REDD+ programme at the national level centred on the REDD+ Network and various sub-technical working groups each focussing on separate components of REDD+.

**Free, Prior, and Informed Consent (FPIC):** Through stakeholders' consultations and other techniques.

**Benefit distribution:** Exploring the use of R-coefficients and self-selection procedures for the distribution of REDD+ benefits. The R-coefficients would consider social and environmental criteria. The self-selection procedure would allow local communities to make choices about desirable benefits.

**Participatory Governance Assessment :** This will be guided by three principles: democratic governance, stakeholder rights, and stakeholder livelihoods.

**Participatory Carbon Monitoring (PCM):** with the aim of improving the understanding and engagement of local communities in carbon monitoring.

Source: Sikor and NuangTan, 2012



## Box 2: REDD+ in Nepal

**Nepal:** With a total population of 23.1 m, and annual growth rate of 4.5 (2007-11) (World Bank), Nepal has 70% of its population below the poverty line (less than 2 US\$ per day). It is an agrarian society with 76% population dependent on agriculture while having 39.6% of forest area (more than 10% crown cover), making people heavily dependent on the forests.

**Forest management regime:** 47% forests are public owned, 31% are PA, while 22% are under Community Based Forest Management.

**REDD+ Nepal** was one of the early participating countries in the World Bank-FCPF programme. In March 2008 it submitted its R-PIN, i.e. REDD Readiness Plan Idea Note. It formed its Readiness Working Group (RWG) in January 2009 which submitted its preparedness proposal in April 2009.

After the approval by the World Bank in June 2010, approximately US \$ 6. 75 M were released for piloting, project development and dissemination for REDD+.

Presently Nepal is piloting the projects as shown in Table 3.

**Table 3: Pilot REDD+ Projects in Nepal**

REDD Initiatives	Purpose	Physiographic Region
REDD + piloting	Setup and pilot REDD Payment and benefit sharing and capacity building	Mid Hills (3 watersheds)
Grassroots Capacity Building in REDD+	Awareness/Training	Terai and Mid-hills (16 districts)
Reducing poverty through REDD: early action	REDD+piloting	Terai and inner Terai (14 districts)
Climate change and REDD	Awareness and climate change literacy	Mid-Hill (12 districts) Teria (3 districts)

### Identified drivers of deforestation

- Grazing and encroachment.
- Land-use change: an annual decrease in forest cover of 1.7% (forest only).
- Physiographic factors: degradation due to hill aspect.
- Unsustainable extraction of resources to meet the daily needs of local communities for fuelwood and food items.

### Experiences

- REDD-plus and Biodiversity Conservation should complement each other to contribute in improvements.
- Biodiversity Conservation needs to be integrated with the economic incentives to make local people self reliant and resilient to the climate change and other adverse conditions.
- Institutional reform to address new public demands for biodiversity and environmental goods and services (including REDD+).
- Protocol for MRVs on REDD+ is quite understandable but it is not so for biodiversity because of different value system.
- Limited knowledge available on trade off among biodiversity conservation, soil conservation, and carbon density in climate change context.
- Strengthen capacity and improve policy-science interface to translate scientific findings in to actions.;
- Communities have the capacity to perform forest inventory and carbon inventory (locate points on GPS, record dbh data).
- Education level plays a critical role.
- Incentives from REDD need to be high for voluntary participation.

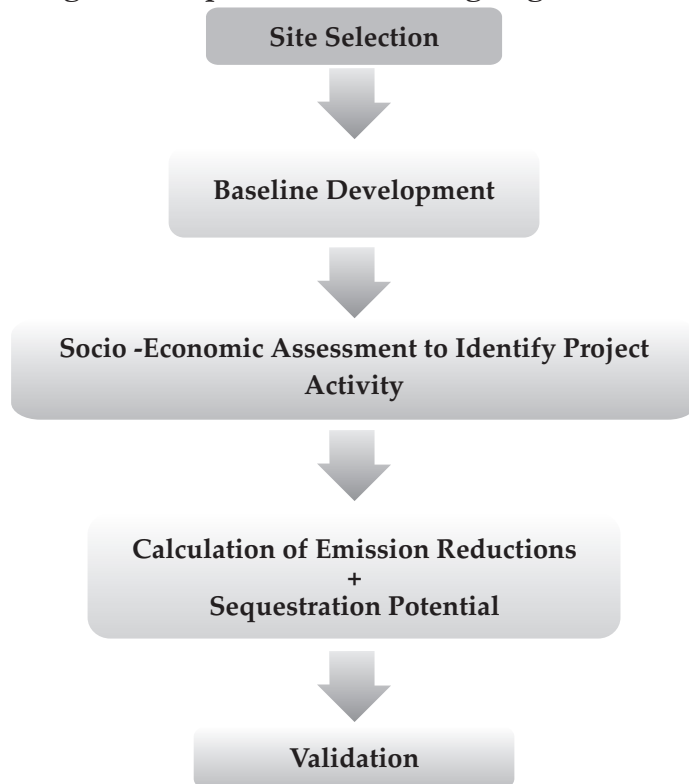
Source: <http://www.cbd.int/doc/meetings/for/nscredd-apac-01/other/nscredd-apac-01-nepal-en.pdf>



## SECTION 6: DEVELOPING REDD+ IN INDIA: BRIEF STEPS

The development of a REDD+ activity starts with identifying a pilot/target site. After identifying a suitable site for the project, the project proponents have to design the project baseline, which includes the pre-project scenario and what would have occurred on the project site in the absence of the project interventions. This can be done by using Remote Sensing Data and Geographic Information Systems (GIS). In addition the project proponent needs to carry out socio economic studies to identify major drivers of forest loss or those drivers that prohibit forest increase and suitable interventions to address these. A high degree of involvement of the local communities in this process is pivotal to the success of the project activity. Thereafter the emission reductions that may arise from the project owing to the interventions need to be recorded. These projections are based on the enhancement of forest carbon stocks in the region or the avoidance of loss of stocks. Once all the above information has been collated it needs to be presented in a definitive format, as prescribed by the standard being used, in the Project Design Document (PDD) for validation by a certified auditor. The project once validated is liable to earn carbon credits, however subject to recurring stringent monitoring of the on-ground performance and verification by auditors. In the readiness phase and demonstrating the effectiveness of the REDD+, funds can be earmarked in the various ongoing programmes/projects, including externally aided forestry projects, which can be used for giving incentives to the communities.

**Figure 3: Steps Involved in Designing a REDD+ Project.**



## SECTION 7: WAY FORWARD FOR REDD+ READINESS

While international architecture and financial arrangements for REDD+ are being evolved, the State Forest Departments (SFDs) can start Capacity Building activities towards REDD+ compliance, identify the gap in documentation, etc. and take action treating this as a tool for Sustainable Forest Management (SFM)<sup>12</sup> with documents in compliance and consider the REDD+ incentive as bonus as and when the same is available. In addition, specific funds can be earmarked under various programmes/projects (EAPs) to provide incentives in pilot REDD+ areas. Specifically the SFDs can take the following action for REDD+ readiness:

1. **Develop understanding of the REDD+ mechanism** within the department and at community level through consultations with experts, training workshops, multi-stakeholders meetings, focussed group discussions, etc. highlighting the role that the communities and SFD can play.
2. **Conduct stakeholder workshops** with the forest dependent communities with agenda on integrating and defining the role of each stakeholder in
  - i. developing mechanisms to assess forest condition and biodiversity
  - ii. ensuring safeguards for the communities
  - iii. developing benefit distribution mechanism. The funds for carbon are to be ultimately passed on to the community. The distribution mechanism may vary from region to region. The aim of such a consultation should be to draw a blue-print of such a distribution mechanism so that the community is ensured that their resource (forest) when conserved and enhanced would bring an additional source of income to them.
3. **Biodiversity conservation** is an important co-benefit of REDD+ which can be achieved only through the combined efforts of the community and SFD. Activities taken up for restoration of degraded forests under the National Afforestation Programme (NAP), Compensatory Afforestation Fund Management and Planning Authority (CAMPA), and Externally Aided Projects ANR and plantation activities should be refined/reoriented to maintain/increase biodiversity, which will also enhance their livelihood support potential and sustainability (Bansal et al. 2011).

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<sup>12</sup>Sustainable forest management integrates two main interdependent goals - "well-being of the forest" and "well being of the people."

4. **Carbon assessment** is integral to REDD+. In India, FSI, Dehradun conducts the national forest inventory (NFI) which includes carbon assessment. The SFDs should train teams for carbon assessment at forest division, range, forest block/compartment level based on NFI- carbon methodology.
5. **Training on GIS-related softwares** and working on remote sensing imagery should be provided to SFD. SFDs can plan conservation activities and periodic measurements under the GIM/NAP so as to qualify for REDD+ benefits.

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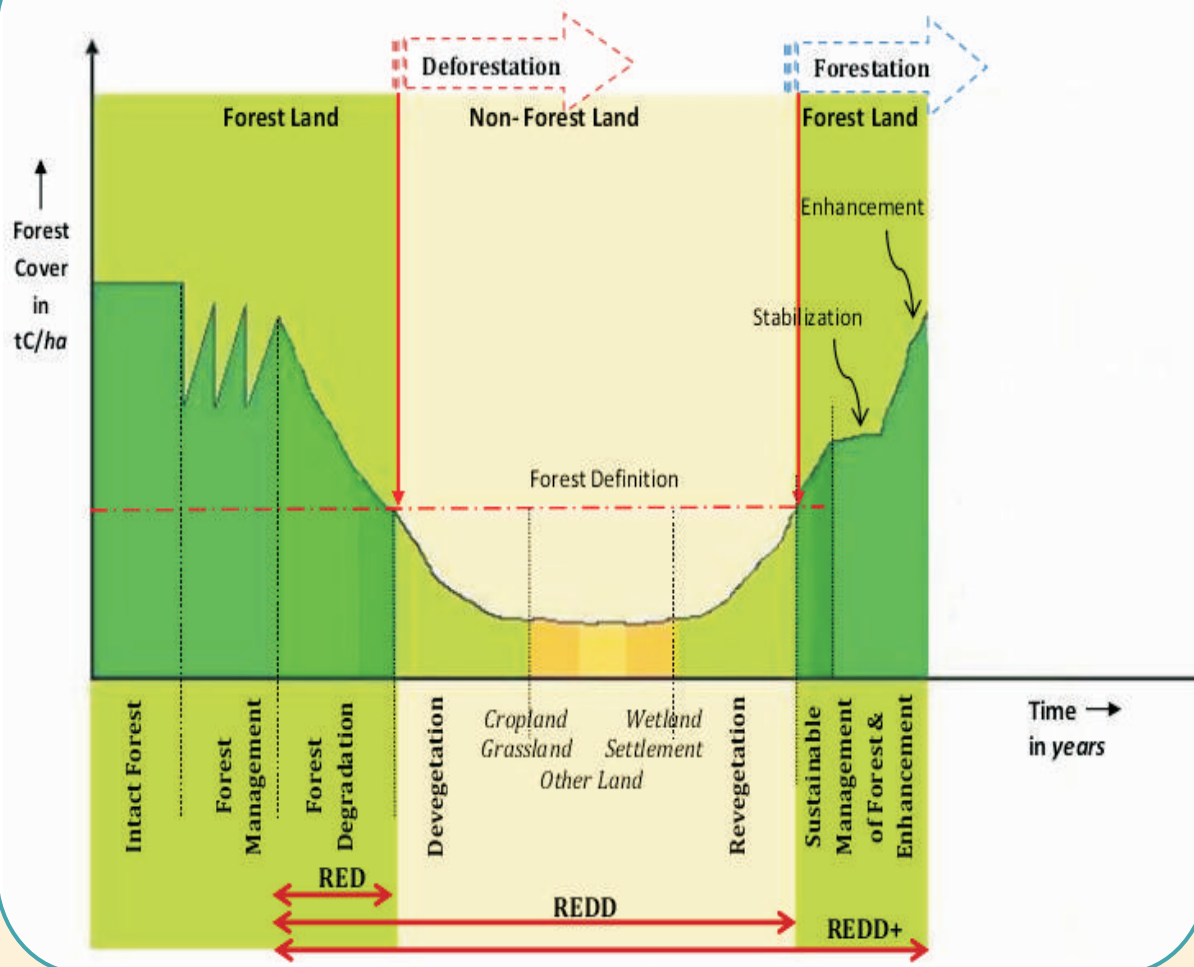
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## The Forest Transition Curve and REDD+



Source: Adapted from Lasco (2010)



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