

Stocktaking of REDD+ in India





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**Indian Council of Forestry Research and Education
P.O. New Forest, Dehradun – 248 006, India**

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भारतीय वानिकी अनुसंधान एवं शिक्षा परिषद्
(पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, भारत सरकार की एक स्वायत्त संस्था)
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Message

Reducing emissions from deforestation and forest degradation and role of conservation, sustainable management of forests, and enhancement of forest carbon stocks, collectively known as REDD+ has been discussed under United Nation Framework Convention on Climate Change (UNFCCC) for over a decade. ICFRE as an observer organization to UNFCCC has proactively contributed to the agenda of REDD+ in the form of various submissions and policy inputs. Now the concept of REDD+ is quite mature and various countries have started claiming benefits, accruing from the mechanism by fulfilling the conditions required to be eligible for REDD+ finance. India has always remained in the forefront of REDD+ negotiations. However, it lagged behind its speedy implementation at domestic level. For example, India is yet to develop the national strategy and action plan, the reference level and also the safeguard information system for implementing REDD+ in the country.

I am happy to present this study on 'Stocktaking of REDD+ in India' undertaken by Biodiversity and Climate Change Division, Directorate of Research, ICFRE under the programme 'REDD+ Himalayas: Developing and using experience in implementing REDD+ in the Himalayas' which is being implemented by ICFRE in collaboration with ICIMOD, Kathmandu. I hope the policy makers will try to address the outstanding issues related to REDD+ implementation at the national and state level.

(Dr. Shashi Kumar)



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Foreword

Emissions from deforestation and forest degradation in developing countries constitute around 9-11% of global greenhouse gas emissions. 'Reducing emissions from deforestation and forest degradation, conservation of forest carbon stocks, sustainable management of forests, and enhancement of forest carbon stocks' in developing countries collectively known as REDD+, has an immense mitigation potential. It is an important agenda in United Nation Framework Convention on Climate Change (UNFCCC) and has also been agreed under Paris Agreement. India being a Party to the UNFCCC, attaches great importance to climate change issues, and played a very important role in shaping the agenda of REDD+ at UNFCCC. Landmark progress under REDD+ was achieved at COP 16 when the Cancun Agreements were adopted, and scope of REDD+ was also defined. Further at COP 19 in Warsaw with adoption of Warsaw Framework on REDD+ a set of methodological guidance were agreed. India can rightfully claim the financial benefits by giving the comprehensive shape to the mitigation actions in the forest sector by way of REDD+.

Government of India has put in place a National Mission for a Green India as part of the country's comprehensive National Action Plan for Climate Change over a period of 10 years. Overarching objective of the Green India Mission is to increase forest and tree cover in 5 mha, and improve the quality of forest cover in another 5 Mha. GIM also offers a good opportunity for forest dependent communities to participate in REDD+ activities.

However, India still needs to do a lot of work to implement REDD+ at domestic level. The present document on 'Stocktaking of REDD+ in India' elaborates the work needed to be done at the domestic front in India in order to harness the benefits of internationally agreed REDD+ programmes. The document will help the policy makers in India speed up the process at the highest level to accomplish the basic requirements of implementing REDD+ in accordance with the agreed REDD+ decisions at UNFCCC.

I congratulate the officers and staff of the Biodiversity and Climate Change Division, Directorate of Research, ICFRE to bring this lucid document of REDD+ stocktaking in the country.


(Dr. G.S. Goraya)



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Preface


The importance and relevance of forests has been increasingly recognized in climate change mitigation and adaptation process. India has a strong policy framework focusing on conservation of forests. India's efforts at conservation have helped in sequestering substantial amount of carbon. India is one of the few developing countries where forest sector is net sink of GHG and the trend is likely to move upwards with more and more carbon getting locked in forests, and also in tree cover outside forests.

ICFRE has initiated a programme titled 'REDD+ Himalayas: Developing and using experience in implementing REDD+ in the Himalayas' with active collaboration of the International Center for Integrated Mountain Development, Kathmandu. It is a trans-boundary programme with overall goal to build the REDD+ capacity to develop and implement National REDD+ Strategy through conservation & sustainable use of natural sinks. Under the programme ICFRE has conducted a REDD+ stock taking study for India. In the current study, a detailed literature review and analysis of relevant documents on the subject has been carried out to provide an overview of the current status of knowledge on REDD+ in India.

We are extremely thankful to Dr. Shashi Kumar, Director General, ICFRE for providing his valuable guidance and support for coming out with this publication. Overall direction and support provided by Dr. G.S. Goraya, Deputy Director General (Research), ICFRE for bringing out this publication is also gratefully acknowledged. We are also grateful to Dr. Bhaskar Karky of ICIMOD and Mr. Kai Windhorst, Chief Technical Advisor, GIZ, Kathmandu, Nepal for their valuable inputs for the report. Financial support from ICIMOD, GIZ, and Norwegian Aid for carrying out this study under the 'REDD+ Himalaya project' is also gratefully acknowledged.

We take this opportunity to offer our sincere thanks to all the officers, scientists and staff of Biodiversity and Climate Change Division, Directorate of Research, ICFRE who were directly or indirectly involved in this activity. Without their support it was not possible to accomplish the task and bringing out this publication

This publication will update the state of knowledge on REDD+ in India. A brief on REDD+ pilot projects initiated in different parts of the country are given in the report and actions that are required to be taken at national level by the government. Findings of the study will be submitted to the Ministry of Environment, Forest and Climate Change, Government of India, for its kind consideration so that REDD+ preparedness as required by under UNFCCC decisions are accomplished at the national level.


(Dr. T.P. Singh)

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Abbreviations Used

A/R	Afforestation and Reforestation
AFOLU	Agriculture, Forestry and Other Land Use
ANR	Assisted Natural Regeneration
AR5	5 th Assessment Report
ARR	Afforestation, Reforestation and Revegetation.
CDM	Clean Development Mechanism
CFI	Community Forestry International
cm	Centimeters
CO₂	Carbon Dioxide
CO₂eq	Carbon Dioxide Equivalent
COP	Conference of Parties
CSR	Corporate Social Responsibility
FAO	Food and Agriculture Organization
FCA	Forest Conservation Act
FCS	Forest Carbon Stock
FIP	Forest Investment Program
FSI	Forest Survey of India
FTC	Forest and Tree Cover
GCF	Green Climate Fund
GHG	Greenhouse Gas
GIM	Green India Mission
GIZ	Deutsche Gessellschaft fur Internationale Zusammenarbeit
GPG	Good Practice Guidelines
Gt	Giga Tonne
ha	Hectare
ICFRE	Indian Council of Forestry Research and Education
ICIMOD	International Center for Integrated Mountain Development
IFM	Improved Forest Management.
IGNFA	Indira Gandhi National Forest Academy
IPCC	Intergovernmental Panel on Climate Change
ISFR	India State of Forest Report
JFM	Joint Forest Management
JFMCs	Joint Forest Management Committees
km²	Square Kilometer
LULC	Land Use Land Cover
LULUCF	Land Use, Land Use Change and Forestry

M	Million
m²	Square Meter
Mg	Mega Gram
MoEF&CC	Ministry of Environment, Forest and Climate Change
MRV	Measuring, Reporting and Verification
MSP	Multi-Stake Partnership.
NAPCC	National Action Plan on Climate Change
NCB	Non Carbon Benefit
NDC	Nationally Determined Contributions
NFCAMS	National Forest Carbon Accounting and Monitoring System
NGO	Non Governmental Organization
NGT	National Green Tribunal
NTFPs	Non Timber Forest Products
PRI	Panchayati Raj Institution
REDD	Reducing Emissions from Deforestation and Forest Degradation
REDD+	Reducing emissions from deforestation and forest degradation, and role of conservation, sustainable management of forests and enhancement of forest carbon stocks
REL	Reference Emission Level
RIL	Reduced Impact Logging
RL	Reference Level
SAPCC	State Action Plan on Climate Change
SFDs	State Forest Departments
SIS	Safeguard Information System
SMF	Sustainable Management of Forest.
t	Tonne
TERI	The Energy Resource Institute
UKFD	Uttarakhand State Forest Department.
UNFCCC	United Nation Framework Convention on Climate Change
USAID	United State Agency for International Development
VER	Verified Emission Reduction

Executive Summary

Reducing emissions from deforestation and forest degradation in developing countries (REDD) was introduced in UNFCCC as a climate change mitigation option. Later on REDD was upgraded to REDD+ with introduction of conservation and sustainable management of forests. Cancun (COP 16) was a major milestone in REDD+ negotiations where REDD+ activities were finalized and finally in Warsaw at COP 19 'Warsaw Framework for REDD+' was agreed. The Warsaw Framework for REDD+ consisted of seven decisions on REDD+ methodological guidance and coordination of support for REDD+. The Paris Agreement also recognizes role of forests as carbon sink for mitigation of climate change that include all components of REDD+.

India is one of the few countries with a documented forest policy right since 1894. The first forest policy of independent India came in 1952. It recognized the need of forest conservation and also emphasized on the role of forests for meeting needs of industry and society. National Forest Policy of 1988 emphasizes that derivation of direct economic benefits from natural forests is to be subordinated to the principal aim of maintaining ecological balance. It also retained the provisions of 1952 policy of bringing one-third of the land mass under forest/tree cover.

Forest Conservation Act, 1980 was enacted to reduce indiscriminate diversion of forest land for non-forestry purposes, to help regulate and control the land use changes in existing forest area. This act allows the diversion of forest for non-forestry use with the prior approval of the central government. Over the past decades, national policies for conservation and sustainable management have transformed the country's forests into a net sink of CO₂. The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 enjoins upon the local communities, to recognize their role in forest and biodiversity protection through sustainable management practices, which will yield long term benefits to them. The concept of Joint forest management in India is a step towards the conversion of low-productivity forests to productive forests. Improving the stocking of poorly stocked forests will also increase carbon stocks in turn. Currently, JFM covers approximately 30% of the total forest area of the country.

Government of India is in the process of developing its 'National REDD+ Policy and Strategy'. Ministry of Environment, Forest and Climate Change has prepared a draft national REDD+ Policy and Strategy with the broad objectives to create REDD+ architecture at National and Sub-National levels to support REDD+ actions. The draft National REDD+ strategy lays emphasis on developing a robust REDD+ framework at national level through establishing a National REDD+ Authority. Strategy also underscores provisions of REDD+ safeguards, strengthening stakeholders' participation for addressing forest degradation and role of private sector. Government of India's Reference Document for REDD+ describes in detail the issues, concepts and approach related to construct the national forest reference level. It also assigns the roles and responsibilities to different government and other organizations. It prescribes a set of governance and structures to ensure the safeguard for REDD+ implementation, rights of the local communities and indigenous peoples (tribals) as also conservation of biodiversity in natural forests. This 'Reference Document' comprehensively addresses the need of capacity building across all levels of the government, civil society, other organizations and local communities. The Government of India has established a REDD+ Cell in the Ministry of Environment, Forest and Climate Change having the task of coordinating and guiding REDD+ related actions at the national level, and to discharge the role of guiding, and collaborating with the

State Forest Departments to collect, process and manage all relevant information and data relating to forest carbon accounting.

In order to get REDD+ kick start at national and subnational level, the strengthening of local community institutions like '*Gram Sabhas*' (Village level Institutions) and other local institutions having significant bearing on sustainable forest management needs to be done. Building capacity of local institutions is needed under climate change mechanisms to help them effectively protect, regenerate and manage forests. There are numerous gaps and constraints, which hamper undertaking of research activities in climate change with respect to forests, and these need to be addressed while developing a comprehensive REDD+ mechanism for the country.

India, although has been in the forefront of REDD+ negotiations and contributed a lot in REDD+ negotiations under UNFCCC. However, few REDD+ project activities have been started in India viz. Umiyam Sub-Watershed, through USAID supported programme 'Forest PLUS' is being implemented in four landscapes across the country, Uttarakhand Government supported REDD+ is being developed by ICFRE for the community forests (*Van Panchayats*) of Uttarakhand. ICFRE with active collaboration from ICIMOD is implementing a programme on REDD+ capacity building focusing on North East region. The project will assist in developing & implementing REDD+ projects that will focus on trainings, technology sharing and knowledge dissemination. Pilot REDD+ projects will be established under the project.

Government of India in its Nationally Determined Contributions to UNFCCC committed to create an additional carbon sink of 2.5 to 3 billion tonnes of CO₂ equivalent through additional forest and tree cover by 2030. Forestry is one of the major sectors in various State Action Plans of Climate Change. SAPCCs are envisioned to encompass the vision of the NAPCC and aligned with the 8 National Missions. To augment the availability of assured targeted resources, Government of India has set up two dedicated funds (i) Cess on Coal and (ii) National Adaptation Fund at the national level for mobilizing financing for mitigation and adaptation respectively. National Adaptation Fund with an initial allocation of ₹ 3,500 million (USD 55.6 million) has been established to combat the adaptation needs in sectors like agriculture, water, forestry etc. in addition to sectoral spending by the respective ministries. Green Highways (Plantation & Maintenance) Policy has been formulated to develop 140,000 km long "tree-line" with plantation along both sides of national highways. Besides funding by the Government, there is a need to develop innovative Multi-Stakeholder Partnership Frameworks to encourage private (both for-profit and not-for-profit) investment and community participation in afforestation and tree planting on degraded forest lands, wastelands, and other public lands.

REDD+ needs to be institutionalized at national/ subnational level. Creating community stake in REDD+ actions like regeneration of forests/restoration of ecosystems requires that communities have sufficient stake in terms of enhanced biomass, NTFPs and environmental services from such areas. Strengthening local community institutions is required to pass on REDD+ benefits at the community level. Uniform guidelines across the states are needed to develop forestry and REDD+ actions at national/subnational level. The REDD+ Cell established at the MOEF&CC needs to be strengthened to undertake these tasks on priority basis in accordance with the various COP decisions and methodological guidance agreed under the UNFCCC.

1.1 Concept of REDD and REDD+

Forests are both sources and sinks of carbon. Deforestation results in immediate release of the carbon originally stored in the trees as carbon dioxide emissions. According to Fifth Assessment Report of Intergovernmental Panel on Climate Change, Working Group III annual greenhouse gas emission flux from land use and land-use change activities accounted for approximately 4.3—5.5 GtCO₂eq/yr, or about 9—11% of total anthropogenic greenhouse gas emissions (IPCC, 2014). The total contribution of the Agriculture Forestry and Other land Use (AFOLU) sector to anthropogenic emissions is around one quarter of the global anthropogenic total. “**Reducing emissions from deforestation and forest degradation in developing countries (REDD)**” was first introduced in COP 11 of United Nation Framework Convention on Climate Change as a climate change mitigation option. India proposed a new potential policy approach named **Compensated Conservation** to compensate the countries for maintaining and increasing their forests as carbon pools as a result of conservation and increase/ improvement in forest cover. India's concern for inclusion of conservation and increment of forest cover as a policy approach to reduce emission from deforestation was recognized in Bali in 2007 (COP 13) and given effect to in the Bali Action Plan (Para 1b (iii) of Bali Action Plan) as “.....*Policy approaches and positive incentives on issues relating to 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*”. The above paragraph of Bali Action Plan {paragraph 1b (iii)} is collectively referred to as 'REDD+'

In Indian context, Rawat and Kishwan (2008) presented a forest conservation based climate change mitigation approach for India and advocated for compensating countries for the carbon conserved through sustainable management of forests and enhancement of forest carbon stocks. This Indian approach later on became the '+' part of REDD agenda in UNFCCC. Agarwal *et al.* (2009), Pant *et al.* (2010), TERI (2012), Sud *et al.* (2012), Sharma and Chaudhry (2013), Vijge and Gupta (2014), and Singh *et al.* (2015) have also analysed India's readiness for REDD+.

1.2 Evolution of REDD+ under UNFCCC

In Cancun, in 2010, Governments agree to boost action to curb emissions from deforestation and forest degradation in developing countries with technological and financial support. The decision text on REDD paragraph 70 of the decision 1/CP.16 of Cancun Agreements) “Encourages developing country Parties to contribute to mitigation actions in the forest sector by undertaking the following activities, as deemed appropriate by each Party and in accordance with their respective capabilities and national circumstances:

- (a) Reducing emissions from deforestation;
- (b) Reducing emissions from forest degradation;
- (c) Conservation of forest carbon stocks;
- (d) Sustainable management of forest;
- (e) Enhancement of forest carbon stocks;

COP decision further requests developing country Parties aiming to undertake REDD+ activities are

mandated to develop the following elements, in accordance with national circumstances and respective capabilities:

- (i) A national strategy or action plan
- (ii) A national forest reference emission level and/or forest reference level or, if appropriate, as an interim measure, subnational forest reference emission levels and/or forest reference levels
- (iii) A robust and transparent national forest monitoring system for the monitoring and reporting of the REDD+ activities, if appropriate, subnational monitoring and reporting as an interim measure
- (iv) A system for providing information on how the safeguards are being addressed and respected throughout the implementation of the REDD+ activities while respecting sovereignty

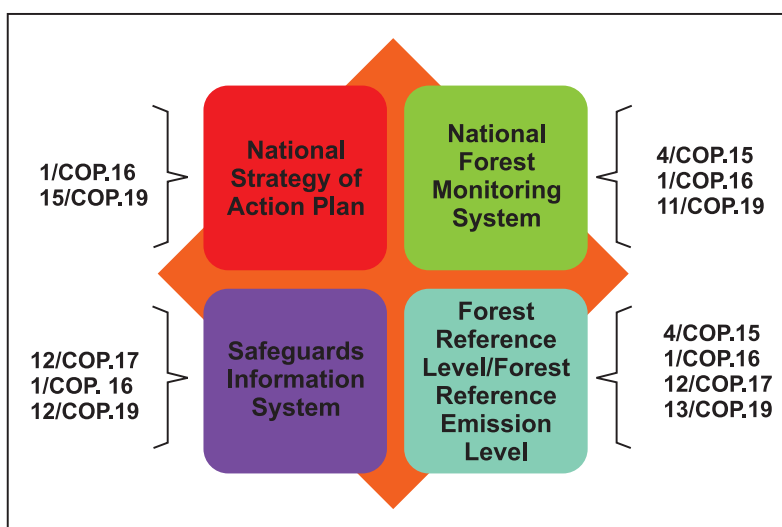


Fig. 1.1: Essential elements of REDD+ and relevant COP decisions

At COP 19 in Warsaw, Parties approved a package of decisions (named as Warsaw Framework for REDD+) on financing REDD+ action and decisions on methodological guidance. On financing REDD+ action, the COP decision says 'Results-based finance provided to developing country Parties for the full implementation of REDD+ activities', may come from a variety of sources, public and private, bilateral and multilateral, including alternative sources. Developing country Parties seeking results-based payments should provide the most recent summary of information on how all REDD+ safeguards have been addressed and respected before they can receive results-based payments'. The decision encourages entities financing the REDD+ activities through the wide variety of sources, including the Green Climate Fund in a key role, to collectively channel adequate and predictable results-based finance in a fair and balanced manner, taking into account different policy approaches (decision 9/CP.19).

On methodological aspects Warsaw Framework agreed on methodological guidance for Measuring Reporting and Verification of REDD+ activities; guidance and procedure for technical assessment of Reference Emission Levels/ Reference Levels submitted by Parties; timing and frequency of submission of summary of information on how safeguards are addressed and respected; addressing drivers of deforestation and forest degradation and on national forest monitoring systems.

After eight years of intense negotiations, parties finally completed a package agreement without establishing a market based mechanism for REDD+ under UNFCCC, however, presently it is leaning toward a fund-based approach.

1.3 REDD+ under Paris Agreement: Paris Agreement recognized role of forests as carbon sink for mitigation of climate change, and devoted a whole section (Article 5) to REDD+. Article 5 of Paris Agreement encourages all Parties, developed and developing countries, to take action to conserve and enhance emissions sinks and reservoirs, including forests. It also encourages countries to “take action to implement and support, including through results-based payments” REDD+ activities. The overarching COP “decision” also recognised “the importance of adequate and predictable” finance for REDD+ activities.

Although the broad rules and methodological guidance for REDD+ were already agreed under 'Warsaw Framework for REDD+' and other relevant COP decisions, legitimising and 'regulating' REDD+ activities under the Article 5 of the Paris Agreement is a strong political signal. This will give the added confidence to developing forested countries to continue with REDD+ strategy and readiness activities. In its INDC India had communicated REDD+ among other efforts to achieve the additional carbon sink of 2.5 to 3 billion tonnes of CO₂eq through additional forest and tree cover by 2030. The targets fixed under Green India Mission (GIM) i.e., enhancing annual CO₂ sequestration by 50-60 million tonnes (0.5 to 0.6 billion tonnes), if implemented effectively are likely to capture 0.75 to 0.9 billion tonnes of CO₂ in next 15 years. A significant amount of this sink can be achieved through REDD+ programmes. Recognition of REDD+ under Article 5 of the Agreement and para 55 of the decision text will further boost REDD+ actions in meeting India's INDC (Rawat and Singh, 2016). Parties to the UNFCCC under the Agreement are obligated to review their emissions reduction every five years. Paris Agreement has given more confidence to the forested nations and political will to the initiate REDD+ programmes and contribute towards their INDCs.





2.1 Introduction

India is one of the few countries which has a documented forest policy right since 1894. In India, political, social and economic developments were the key factors in shaping the National Forest Policies of 1894, 1952 and 1988. The 1952 Forest Policy while recognizing forest conservation requirements, emphasized on the role of forests for meeting needs of industry and society. The policy gave thrust to extending forests outside the traditional forest areas through practice of social forestry so that biotic pressure on forests could be reduced. However, most provisions of the policy could not be implemented due to inadequate investments and ever increasing biotic pressure due to burgeoning population. The latest National Forest Policy promulgation in 1988 emphasizes that derivation of direct economic benefits from natural forests is to be subordinated to the principal aim of maintaining ecological balance. This policy underlines the need to meet domestic demands of the tribal and rural people for forest produce, besides highlighting the imperative of participatory approach in protection and management of forests. The policy advocates for people's movement for forest conservation and protection. It also retained the provisions of 1952 policy of bringing 1/3rd of the land mass under forest/tree cover. The National Forest Policy, 1988 outlined a renewed policy statement on conservation strategies.

Forest Conservation Act, 1980 is one of the most effective legislations contributing to reduction in deforestation. This was enacted to reduce indiscriminate diversion of forest land for non-forestry purposes, and to help regulate and control the land use changes in existing forest area. Forest Conservation Act, 1980 empowers only Union Government to allow the diversion of forest for non-forestry use. The pace of diversion of forest land for non-forest purposes was around 1.6 lakh hectares per annum from 1951 to 1976. However, after the implementation of Forest (Conservation) Act, 1980, the rate of diversion of forests has come down drastically to 35000 ha annually during 1980-2011 (ICFRE, 2010). Now forests are diverted for urgent national developmental need only after rigorous environmental impact assessment of the developmental project. Over the past decades, national policies for conservation and sustainable management have transformed the country's forests into a net sink of CO₂. From 1995 to 2005, carbon stocks stored in our forests are estimated to have increased from 6245 m tons to 6622 m tons, thereby registering an annual increment of 37.68 million tons of carbon or 138.15 million tons of CO₂eq. This annual removal by forests is enough to neutralize 9.31 percent of total GHG emissions in year 2000 (Kishwan *et al.*, 2009).

2.2 Laws related to Forest Conservation

A few important acts, instruments and rules governing the protection and conservation of forests are listed below:

- (i) **The Indian Forest Act, 1927** seeks to consolidate the law relating to forests, the transit of forest produce and the duty that can be levied on timber and other forest produce. This Act provides definitions for forest-produce and includes: trees and leaves, flowers and fruits, and all other parts or produce not hereinbefore mentioned, of trees plants not being trees (including grass, creepers, reeds and moss), and all parts or produce of such plants, wild animals and skins, tusks, horns, bones, silk, cocoons, honey and wax, and all other parts or produce of animals, and peat, surface soil, rock

and minerals (including limestone, laterite, mineral oils, and all products of mines or quarries).

- (ii) **The Wild Life (Protection) Act, 1972, amended in 1993** was enacted for protection of plants and animal species. Before 1972, India only had five designated national parks and after enactment of this act about 105 national parks exist in the country. Among other reforms, the Act established schedules of protected plant and animal species; hunting or harvesting these species was largely outlawed. The Act provides for the protection of wild animals, birds and plants; and for matters connected therewith or ancillary or incidental thereto. It has six schedules which give varying degrees of protection. Schedule I and part II of Schedule II provide absolute protection - offences under these are prescribed the highest penalties. Species listed in Schedule III and Schedule IV are also protected, but the penalties are much lower. Schedule V includes the animals which may be hunted. The plants in Schedule VI are prohibited from cultivation and planting.
- (iii) **The Forest Conservation Act, 1980 amended in 1988** has five sections which deal with conservation of forests. It was enacted with the twin objectives of restricting the use of forest land for non-forest purposes, and preventing the de-reservation of forests that have been reserved under the Indian Forest Act, 1927. However, in 1988 the Act was further amended to include two new provisions where it sought to restrict leasing of forest land to private individuals, authorities, corporations not owned by the Government, and to prevent clear felling of naturally grown trees. The Act provides for punishment, including imprisonment, for the contravention of the provisions of the Act.
- (iv) **The Environment (Protection) Act, 1986 amended in 1991** came into force on November 19, 1986. It is an act to provide the protection and improvement of environment and matters related to it. Environment Protection Act, 1986 came into force soon after the Bhopal gas tragedy. The main objective of the act was to provide the protection and improvement of environment. It specifies that the State shall protect and improve the environment and also to safeguard the forests and wildlife of the country.
- (v) **The National Forest Policy, 1988** ensures environmental stability and maintenance of ecological balance including atmospheric equilibrium which is vital for sustenance of all life forms, human, animal and plant. The basic objectives of the policy was maintenance of environmental stability through preservation, conserving the natural heritage of the country by preserving the remaining natural forests with the vast variety of flora and fauna, checking soil erosion and denudation in the catchments areas of rivers, lakes, reservoirs in the interest of soil and water conservation, for mitigating floods and droughts and for the retardation of siltation of reservoirs, checking the extension of sand-dunes in the desert areas of Rajasthan and along the coastal tracts, increasing substantially the forest/tree cover in the country through massive afforestation and social forestry programmes, especially on all denuded, degraded and unproductive lands, meeting the requirements of fuel wood, fodder, minor forest produce and small timber of the rural and tribal populations, increasing the productivity of forests to meet essential national needs, encouraging efficient utilization of forest produce and maximizing substitution of wood and creating a massive people's movement with the involvement of women, for achieving these objectives and to minimize pressure on existing forests.
- (vi) **The National Environment Tribunal Act, 1995** provides for strict liability for damages arising out of any accident occurring while handling any hazardous substance and for the establishment of a National Environment Tribunal for effective and expeditious disposal of cases arising from such accidents, with a view to giving relief and compensation for damages to persons, property and the environment and for matters connected therewith or incidental thereto. This act is based on decisions taken at the United Nations Conference on Environment and Development held at Rio de

Janeiro in June, 1992, in which India participated, calling upon the States to develop national laws regarding liability and compensation for the victims of pollution and other environmental damages.

- (vii) **The National Green Tribunal (NGT)** The National Green Tribunal has been established under the National Green Tribunal Act 2010 for effective and expeditious disposal of cases relating to environmental protection and conservation of forests and other natural resources including enforcement of any legal right relating to environment and giving relief and compensation for damages to persons and property and for matters connected therewith or incidental thereto. It is a specialized body equipped with the necessary expertise to handle environmental disputes involving multi-disciplinary issues. The Tribunal is mandated to make and endeavour for disposal of applications or appeals finally within 6 months of filing of the same.

National Green Tribunal is the most important grievance redressal mechanism (GRM) for cases relating to environmental protection and conservation of forests and other natural resources. Any person who has been affected adversely by activities causing harm to the environment, forests and biodiversity, can approach to National Green Tribunal with a simple application without any fee and lawyer. The NGT further supplements the provisions of Safeguard Information system (SIS) for implementation of REDD+.

- (viii) **Biological Diversity Act, 2002** is an Act of Parliament for conservation of biological diversity in India. The Act was enacted to meet the obligations under Convention on Biological Diversity, to which India is a Party. It provides conservation of biological diversity, sustainable use of its components and fair and equitable sharing of the benefits arising out of the use of biological resources, knowledge and for matters connected therewith or incidental thereto.
- (ix) **Biological Diversity Rules, 2004** outline the procedures to be followed for access to biological resources (wild plants and animals, crops, medicinal plants, livestock, etc), their commercial utilization, transfer of rights of research, and intellectual property rights related to biodiversity. It also explains that every local body shall constitute a Biodiversity Management Committee with in its area for the purpose of promoting conservation, sustainable use and documentation of biological diversity including preservation of habitats, conservation of land races, folk varieties and cultivars, domesticated stocks and breeds of animals and microorganisms and chronicling of knowledge relating to biological diversity”.
- (x) **The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006** is a result of the protracted struggle by the marginal and tribal communities of India to assert their rights over the forestland on which they were traditionally dependent. The notification of Rules for the implementation of the Forest Rights Act, 2006 on 1st January, 2008 has finally paved the way to secure community rights or rights over common property resources of the communities in addition to their individual rights. The Act enjoins upon the local communities, to recognize their role in forest and biodiversity protection through sustainable management practices, which will yield long term benefits to them (Dash, 2010). The Act is significant as it provides scope and historic opportunity of integrating conservation and livelihood rights of the people. The rules under the Act encourage transition from regulatory mode of forest governance to decentralized forest governance in India.
- (xi) **National Environment Policy, 2006** is one of the main drafts concerning environmental policy of India. It encourages imposing of more stringent local level water and air quality standards for receptors. The objectives of the National Environment Policy include conservation of critical environmental resources, intra-generational equity, and livelihood security for the poor, inter-

generational equity, integration of environmental concerns in economic and social development, efficiency in environmental resource use and enhancement of resources for environmental conservation.

- (xii) **The National Green Tribunal Act, 2010** is an act of Parliament which enables creation of a special tribunal to handle the expeditious disposal of the cases pertaining to environmental issues. It was enacted under India's constitutional provision of Article 21, which assures the citizens of India the right to a healthy environment. The National Green Tribunal (NGT) was established on October 18, 2010. The objective of the Tribunal is to provide a specialized forum for effective and speedy disposal of cases pertaining to environment protection, conservation of forests and for seeking compensation for damages caused to people or property due to violation of environmental laws or conditions specified while granting permissions.
- (xiii) **The Compensatory Afforestation Fund Act, 2016:** This act has been recently enacted and deals the “establishment of funds under the public accounts of India and the public accounts of each State and crediting thereto the monies received from the user agencies towards compensatory afforestation, additional compensatory afforestation, penal compensatory afforestation, net present value and all other amounts recovered from such agencies under the Forest (Conservation) Act, 1980; constitution of an authority at national level and at each of the State and Union Territory Administration for administration of the funds and to utilise the monies so collected for undertaking artificial regeneration (plantations), assisted natural regeneration, protection of forests, forest related infrastructure development, Green India Programme, wildlife protection and other related activities and for matters connected therewith or incidental thereto”. Through unlocking of significant funds, this legislation will help meet the target to create an additional carbon sink of 2.5 to 3 billion tonnes of CO₂ equivalent through additional forest and tree cover by 2030 what has been committed by India in its INDCs submitted to UNFCCC.

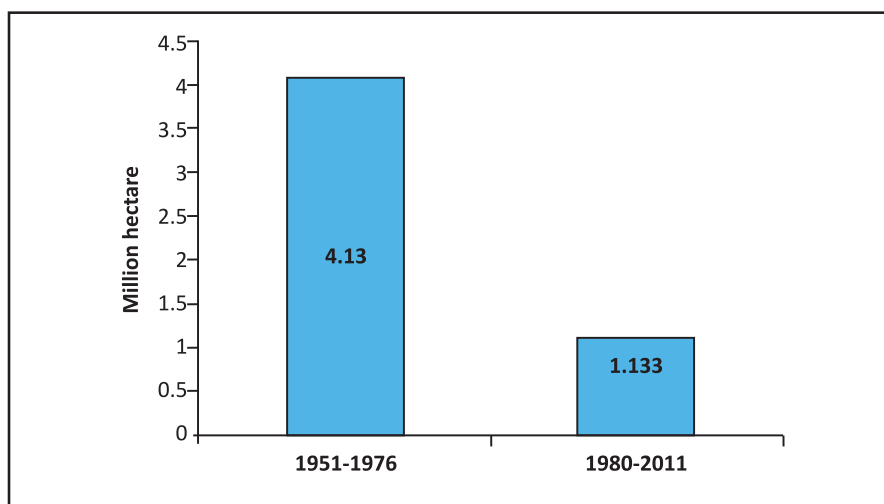


Fig. 2.1 Diversion of forest land before and after Forest Conservation Act (1980)

2.3 Joint Forest Management

In 1990, India initiated a very successful programme involving local communities for forest protection and management. The concept of JFM recognizes the share of the protecting communities over forest produce. The local communities and the State Forest Department jointly plan and implement forest regeneration and

development programmes, and the communities are rewarded with useful share in forest produce in return for their efforts in protection and management of forests. JFM functions through its three systems- the forest supporting system, life supporting system and JFM supporting system (Paulraj, 2012). So far, more than 1, 12,816 JFM committees have been formed covering about 25 million ha of forest area (ICFRE, 2010). JFM has enabled protection and regeneration of existing forests, and raising of forest plantations, which is contributing in conservation of existing forests as also the carbon stocks. The total area under JFM is now comparable to the areas managed under national parks and sanctuaries. This approach matches well with the objectives of National Environment Policy, 2006 which, inter-alia, emphasizes the identification of climate change impacts on forests, and the need to internalize the mitigation and adaptation measures with respect to forest management.

The concept of JFM in India is a step towards the conversion of low-productivity forests to high productivity forests. Improving the stocking of poorly stocked forests will also in turn increase carbon stocks. Currently, JFM covers approximately 30% of the total forest area of the country (ICFRE, 2010). Over the years, the involvement of the local communities in the management of forests has increased manifold due to setting up of JFMCs in many parts of India. In India, 59.31% forestland is administered by the government and 28.5% is designated for use by communities and indigenous groups like *Van Panchayat* in Uttarakhand (RRI, 2011). The implementation of JFM programme aims to improve quality of forests besides improving the economic status of local people involved in the protection and management of forests.

2.4 Working Plan Code - 2014

At the country level Working Plan has been the main instrument of forest planning (more exactly forest working) for scientific management of forests. At the Forest Divisional level, it is a very useful document for evaluating the status of forests, biodiversity resources, assessing the impact of past management practices and deciding about suitable management interventions for future. The first planned working of forests in the country was written in 1837 and after India became independent in 1947, the forest department undertook a big exercise to bring substantial areas under the working plans. State/ provincial governments adopted their own provincial working plan codes. However, with the intervention of Hon. Supreme Court of India in 1996, all working plans were to be approved by the Central Government on account of forests being brought in the concurrent list. MoEF&CC adopted a uniform code, the National Working Plan Code - 2014 for preparation of working plans for the management of forests.

According to new Working Plan Code-2014 the forest management planning must provide for sustainable management of forests and its biodiversity as enshrined in the National Forest Policy, encompassing the ecological (environmental), economic (production) and social (including cultural) dimensions. The objectives for attaining this goal include conservation of forests and reducing forest degradation, maintenance and enhancement of ecosystem services including ecotourism, enhancement of forest productivity together with establishment of regeneration to improve forest health and vitality as per ecological and silvicultural requirements of the species, progressively increasing the growing stock and carbon sequestration potential, maintenance of biological diversity, sustainable yield of forest produce, prevention of soil erosion and stabilization of the terrain; improvement and regulation of hydrological regime; people's involvement in planning and management of forests fulfilling socio-economic and livelihood needs of the people. Along with the various objectives and other management practices under national working plan code-2014, the REDD+ is now as an important component at the forest division level. The linkage of REDD+ with national forest inventory with the help of robust and dynamic national carbon MRV (measuring, reporting and verification of carbon stocks) based on forest resource assessment of working plan has been incorporated under national working plan code 2014 so that the REDD+ implementation can be facilitated at the forest division level of every state.

2.5 Existing Forest Governance supporting REDD+

The first forest policy of independent India came was formulated in 1952. The Forest Policy of 1952 declared that village communities should not be permitted to use forests at the expense of national interest. The enactment of the Forest Conservation Act, 1980 was the first transition in forest governance from commercialized use of forest to conservation. The pace of diversion of forest land for non-forest purposes was around 1,60,000 hectares per annum from 1951 to 1976. However, after the implementation of Forest (Conservation) Act, 1980, the rate of diversion of forests has come down drastically to 35,000 ha annually during 1980-201 (ICFRE, 2010). Diversion of forest land before and after Forest Conservation Act (1980) is given in Fig. 2.1.

The National Forest Policy 1988 was a paradigm shift in the forestry sector. It differed from the previous policies of independent India. In the past, forests were being looked upon merely as a source of revenue. The objective of the 1988 policy was to ensure that the rights of the forest dependent people are protected. The ecological security was the primary goal of this policy. (Kohli and Sharma, 2014). The policy also emphasized upon the close relationship between the tribal population and the forest (Saxena, 1996; MoEF, 2006). In tune with the nation's forest policy, the programmes on forest conservation aim at enhancing and improving the forest and tree cover of the country thereby enhancing the quantum of forest ecosystem services that flow to the local communities. The services include fuelwood, timber, fodder, NTFP and also carbon sequestration. It is underlined that in the Indian context, carbon service from forest and plantations is one of the co-benefits and not the main or the sole benefit. Present initiatives like National Afforestation Programme (NAP) of the Ministry of Environment, Forest and Climate Change (MoEF&CC), together with programmes in sectors like agriculture and rural development are on an average add or improve 1mha of forest and tree cover annually. This amounts to the addition of about 1 million tonne of carbon annually. Combined with the accretion of biomass in our managed forests, protected areas, and in tree cover outside the government forests, the total carbon service of our forests at present is estimated at 138 mt CO₂ eq. every year (Kishwan *et al.*, 2009). The cost of the projected reforestation and afforestation activities contributing in mitigation and adaptation is estimated at Rs. 50,000.00 million annually for the 12th Five Year Plan, or Rs. 2,50,000 million for the entire five year plan (Planning Commission, 2011).

The existing policy and legislative framework as discussed above which includes National Forest Policy 1988, Indian Forest Act 1927, Wild life (Protection) Act, 1972, Forest (Conservation) Act, 1980, Environment (Protection) Act, 1986, Biological Diversity Act, 2002 etc. and rules there under for guiding forest conservation and management are supportive of REDD+ elements. The goals of REDD+ are in conformity with India's National Forest Policy, 1988, which aims to ensure environmental stability and maintenance of ecological balance through protecting, conserving and enhancing the existing forests of the country. As early as in the year 1988, the National Forest Policy first time brought out participation of people in protection, improvement and management of forests and also meeting their bonafide needs as the first charge on the forest produce. The Forest (Conservation) Act, 1980 regulates diversion of forest land for non forestry purpose and provides for compensatory afforestation. Safeguarding Rights of Local communities is also addressed in the National Forest Policy as well as in the recently enacted the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006. Prior consent of local communities/Gram Sabha is mandatory before the proposals for diversion of forests are approved by the Central Government. Thus the existing policy framework is supportive of implementation of REDD+. The National Forest Policy, 1988, the Forest Conservation Act, 1980, The Biological Diversity Act, 2002 and the Forest Rights Act, 2006 taken together adequately address the various safeguards mentioned under the REDD+ activities.

Reducing emissions from deforestation and forest degradation in developing countries is based on the idea of rewarding projects, programmes for actions that reduce greenhouse gas emissions. In many developing countries, REDD+ has the potential to deliver large cuts in emissions at a low cost within a short time frame and, at the same time, contribute to reducing poverty and sustainable development.

To complement actions to reduce emissions from deforestation and degradation, there is a need to further reinforce measures aimed at forest conservation, increasing terrestrial carbon pools by promoting afforestation and reforestation or other mechanisms, improved forest management, cropland management and agroforestry etc. There are also possible synergies between carbon sequestration and adaptation measures, e.g., through afforestation of vulnerable areas, watersheds, and rehabilitation of degraded lands. Sud *et al.* (2012) also gave a brief overview of India's preparedness for REDD+ and proposed a design and implementation of REDD+ activities in India covering finance, MRV, institutional mechanism etc. Singh *et al.* (2015) discussed in detail as to how various REDD+ Actions viz. (a) Reducing emissions from deforestation; (b) Reducing emissions from forest degradation; (c) Conservation of forest carbon stocks; (d) Sustainable management of forest; and (e) Enhancement of forest carbon stocks; can be implemented in India and also highlighted some key interventions that are required to be taken for forest management in the country.

3.1 National REDD+ Policy and Strategy

Government of India is in the process of developing its National REDD+ Policy and Strategy. Ministry of Environment, Forest and Climate Change has prepared a Draft National REDD+ Policy and Strategy. The document was web hosted for public comments in 2014, however, it is yet to get final nod from the government. Objectives of the draft policy on REDD+ are as follows:

- (i) to create REDD+ architecture at National and Sub-National levels to support REDD+ actions.
- (ii) to develop an appropriate REDD+ strategy and implementation frameworks at sub-national level to represent the diversity of forests in the country,
- (iii) to develop a national forest reference emission level and /or forest reference level,
- (iv) to develop institutional capacity for a robust and transparent National Forest Carbon Accounting and Monitoring System,
- (v) to manage forests for improving and enhancing supply of forest products and ecological and environmental services, that are flowing from the forests including biodiversity and not limited to carbon services alone, benefitting the society leading to increased growing stock and the stored carbon in the forests,
- (vi) to encourage and incentivize local communities for their role in conservation and safeguard their rights and interests including improvement of their livelihood, and develop a system for providing information on how the safeguards are respected,
- (vii) to develop appropriate mechanism for channelizing REDD+ funding from public as well as private

- sources and transfer the accrued financial benefits to the communities in a fair, equitable and transparent manner based on their performance, as is reflected in monitoring,
- (viii) to strengthen coordination among sectors and stakeholders having direct and indirect impacts on land use and forestry.
 - (ix) to lay emphasis on achieving various thematic elements of SMF and help in developing action plans to address the drivers of deforestation and forest degradation, afforestation of degraded areas, adequate protection measures, forest governance and gender considerations etc. while implementing the REDD+ programmes,
 - (x) to provide adequate technical and financial resources to implement various phases and action plan of REDD+, especially providing support to small scale projects at JFMC/ EDC level,
 - (xi) to build resilience and adaptation to projected climate change impacts to sustain the carbon sinks under REDD+ and to ensure conservation of biodiversity and ecosystem services.

Draft National REDD+ Policy and Strategy lays emphasis on developing a robust REDD+ framework through establishing a National REDD+ Authority at national level. Strategy also underscores provisions of REDD+ safeguards, strengthening stakeholders' participation for addressing forest degradation and role of private sector.

The important programmes areas identified for REDD+ implementation are as under:

- (i) Developing national forest monitoring system
- (ii) Setting up of national REDD+ architecture and governance
- (iii) Creation of a platform for stakeholder engagement,
- (iv) National REDD+ information system including NFCAMS,
- (v) System for managing data on valuation and equitable sharing of multiple benefits of forests,
- (vi) Transparent, equitable and accountable management and
- (vii) Capacity building.

India's draft national REDD+ strategy aims at enhancing and improving the forest and tree cover of the country thereby enhancing the quantum of forest ecosystem services that flow to the local communities. The services include fuel wood, timber, fodder, NTFP and also carbon sequestration. It is underlined that in the Indian context, carbon service from forest and plantations is one of the co-benefits and not the main or the sole benefit.

To facilitate REDD+ at National level among all stakeholders, government has also prepared a REDD+ Reference Document¹. After REDD+ actions started taking shape at global level, the need was being felt in India for a guidance document that could channelize the actions of all relevant stakeholders for an effective implementation of REDD+ in the country. It was in this background that the Ministry of Environment, Forest and Climate Change constituted the Expert Committee in 2013 with leading experts on REDD+ of the country. The Committee was charged with the responsibility of formulating this Reference Document for REDD+ in India.

The Reference Document is divided into 9 chapters starting with an introduction and overview of the subject, moving on gradually and logically to required policy framework to support REDD+ implementation as part of the forest management in the country. The document describes in detail the issues and concepts related to definitions as also approach to construct national forest reference level. It also assigns the roles and responsibilities to different government and other organizations, including MoEF&CC, FSI, ICFRE, SFDs, JFMCs, *Van Panchayats* and *Gram Sabhas*, etc. Governance and safeguards to ensure that REDD+

¹ <http://envfor.nic.in/sites/default/files/pressreleases/Reference%20Document%20For%20REDD+%20in%20India.pdf>

implementation supports the rights of the local communities and indigenous peoples (tribals) as also conservation of biodiversity in natural forests. Reference document comprehensively addresses the need of capacity building across all levels of the government, expert organizations, civil society, other organizations and local communities. Important aspects of National Forest Monitoring System comprising MRV and Safeguards Information Systems have been dealt with lucidly in the document.

3.2 Institutional Mechanism for REDD+ at National Level

The Government of India has established a REDD+ Cell in the Ministry of Environment, Forest and Climate Change having the task of coordinating and guiding REDD+ related actions at the national level, and to discharge the role of guiding, and collaborating with the SFDs to collect, process and manage all relevant information and data relating to forest carbon accounting. National REDD+ Cell would also guide formulation, development, funding, implementation, monitoring and evaluation of REDD+ activities in the States. The Cell will also assist the Ministry of Environment, Forest and Climate Change and its appropriate agencies in developing and implementing appropriate policies relating to REDD+ implementation in the country.

National Mission for a Green India (GIM) and REDD+

The National Mission for a Green India (also referred to as Green India Mission or GIM) recognizes that climate change phenomena will seriously affect and alter the distribution, type and quality of natural resources of the country and the associated livelihoods of the people. GIM acknowledges the influences that the forestry sector has on environmental amelioration through climate mitigation, food security, water security, biodiversity conservation and livelihood security of forest dependent communities (NAEB, nd). The Mission has been approved by the Prime Minister's Council on Climate Change in February 2011.

GIM puts the "greening" in the context of climate change adaptation and mitigation, meant to enhance ecosystem services like carbon sequestration and storage (in forests and other ecosystems), hydrological services and biodiversity; along with provisioning services like fuel, fodder, small timber and NTFP.

Key innovations under GIM are:

- (i) *Focus on quality of forests:* Primary focus on improving density of forest cover.
- (ii) *Focus on ecosystem services:* Emphasis on biodiversity, water and improved biomass, carbon sequestration as co-benefit, addressing ecosystems like grasslands, wetlands, urban and peri-urban.
- (iii) *Focus on democratic decentralization:* Gram Sabha (Village level institution) as overarching institution to facilitate implementation of the Mission activities at village level, nested as Polycentric Approach (not one size fits all).
- (iv) *Creating a new cadre of Community Youth as Foresters:* Build a skilled cadre of young "community foresters" from scheduled tribes and other forest dwelling communities.
- (v) *Adoption of Landscape-based Approach:* Interventions at scale (5000-6000 hectares) at a time, simultaneous treatment of forest and non forest areas and addressing key drivers of degradation.
- (vi) Reform Agenda as conditionality

The Green India Mission GIM aims at responding to climate change by a combination of adaptation and mitigation measures, which would help in (i) enhancing carbon sinks in sustainably managed forests and

other ecosystems; (ii) adaptation of vulnerable species/ecosystems to the changing climate; and (iii) adaptation of forest dependent local communities in the face of climatic variability.

Promoting REDD+ is *inter alia* part of overall strategy of the Green India Mission. Article 5.1.1 of the Mission Document says 'The Mission would add "value" to ongoing program/schemes on "greening", being taken up by multiple agencies. Such value addition will come through, a) technical inputs on species mix from climate adaptation/mitigation angle, b) improved policy regime to help multiple agencies plant, protect and manage forests and tree growth, c) advisory services for benefits under REDD+ / CDM, and d) support in outcome level monitoring.

The National Mission for a Green India (GIM) is currently being implemented in nine States namely Uttarakhand, Punjab, Karnataka, Andhra Pradesh, Chhattisgarh, Odisha, Mizoram, Manipur and Kerala. Proposals have been received from 14 other States namely Jharkhand, Uttar Pradesh, Bihar, Haryana, Himachal Pradesh, Nagaland, Tamil Nadu, Meghalaya, Maharashtra, Andaman & Nicobar Islands, Sikkim, Madhya Pradesh, Jammu & Kashmir and Tripura, which are under examination/consideration².

S. No.	States	Funds allocated (in ₹ Lakhs)	Funds Utilised	Remarks
1.	Andhra Pradesh	105.53		Funds were released in 2016-17
2.	Chhattisgarh	4077.93	2338.55	
3.	Karnataka	192.383	104.4	
4.	Kerala	914.82		Funds were revalidated in 2016-17
5.	Manipur	834.84	834.84	
6.	Mizoram	988.35		Funds were released in 2016-17
7.	Odisha	321.884	182.92	
8.	Punjab	611.53		Funds were revalidated in 2016-17
9.	Uttarakhand	2020.9		Funds were revalidated in 2016-17
	Total	10068.17	3460.71	

Forestry Sector Contribution to India's INDC: Government of India in its INDC submitted to UNFCCC prior to Paris COP (2015) committed to create an additional carbon sink of 2.5 to 3 billion tonnes of CO₂ equivalent through additional forest and tree cover by 2030. India is determined to continue with its on-going interventions, enhance the existing policies and launch new initiatives in the priority areas *inter alia* full implementation of Green India Mission and other programmes of afforestation. In India forestry sector is net sink of CO₂, forestry sector pays a major role in mitigation and adaptation to climate change in India. The highlights of forestry contribution to India's INDC are as follows:

Planned Afforestation has been seen as a major mitigation strategy in forestry sector. India is one of the few countries where forest and tree cover has increased in recent years transforming country's forests into a net sink owing to national policies aimed at conservation and sustainable management of forests. As per the latest assessment, forests and tree cover has increased from 23.4% in 2005 to 24% of the

² <http://164.100.47.192/Loksabha/Members/QResult16.aspx?qref=39582>

geographical area in 2013. Government of India's long term goal is to bring 33% of its geographical area under forest cover and tree cover as envisaged in The National Forest Policy.

India has been witnessing continuing improvement in existing policies and formulation of new policies and thus trying to keep pace with the activities and programmes to strive towards achievement of the country's national goal of 33% forest/ tree cover as enunciated in National Forest Policy. To realize this goal India has to bring about 109 Mha (33% of its total geographic area of 328 Mha) of land under forest/tree cover. The latest statistics of the India State of Forest Report (ISFR, 2015) shows that the existing forest cover in India is 70.17 million ha (21.34%) besides an additional 9.26 million ha (2.82 %) of tree cover outside forests in the country. An extent of 4.14 million ha (1.26%) of scrub forests is also available in addition to the forest cover of 70.17 million ha. Out of its existing forest cover different classes of forest cover are as follows:

(i)	Very dense (Crown cover >70%)	8.59 million ha (2.61%)
(ii)	Moderately dense (Crown cover 40-70%),	31.53 million ha (9.59%)
(iii)	Open forests (Crown cover 10-40%),	30.04 million ha (9.14%)

Box 3.1: Estimated land require for meeting India's INDC

INDC forestry target: 2.5 to 3 billion tonnes of CO₂ by 2035 (Say in next 15 years)

For 3 billion tonnes average CO₂ capture per year will be 200 million tonnes for 15 years

Assuming plantation productivity of 5 m³/ha/yr and using the IPCC (2003) for

$$C = [V \times D \times BEF] \times (1+R) \times CF$$

Where:

C=Carbon stock in Biomass (tonnes C)

V=Stand volume (m³ ha⁻¹)

D= basic wood density (tonnes d.m m⁻³) a conservative value of 0.6 has been considered assuming plantation wood are of low density

BEF= Biomass expansion factor (Default) an average value of 1.5 has been considered

R=Root shoot ratio (Default) an average value of 0.26 has been considered

CF=Carbon Fraction (Default value of 0.5 has been considered)

Calculations:

$$C = [5 \times 0.6 \times 1.5] \times [1+0.26] \times [0.5]$$

$$C = 2.84 \text{ tonnes /ha/yr}$$

$$= 10.4 \text{ tonnes of CO}_2/\text{ha/yr (multiplying by CO}_2 \text{ conversion factor of 44/12)}$$

10.4 tonnes of CO₂/ha/yr is captured assuming modest plantation productivity of 5 m³/ha/yr

200 million tonnes per year will require 19.23 million ha of land for afforestation/ reforestation in a phased manner in order to capture 2.5 to 3 billion tonnes of CO₂ in 15 years

Thus the total land under forest and tree cover in India currently is 79.42 million ha or 24.16% of its geographic area (ISFR, 2015). The difference in existing forest cover and the target area suggests that an additional 29.58 million ha need to be brought under the tree cover to achieve 33% tree cover as envisaged in National Forest Policy. Most of the forest in the "Open Forest" (30.04 million ha) category of 10-40 % canopy density is either patchy or degraded and needs restoration efforts. The additional land area of 29.58 million ha needs to be targeted under various programmes like GIM, National Agroforestry Policy etc.

A perusal of India's registered Afforestation/ Reforestation CDM portfolio indicates that average reduction through these project activities is 16.58 tonnes of CO₂/ha/yr. These are mostly high density plantations raised for the purpose of climate change mitigation. Most of these projects are developed by private sector or NGOs or by state forest department with the help of bilateral or multilateral financial support. Assuming a modest productivity of plantations at 5 m³/ha/ year, 20.0 million ha of afforestation/reforestation activities will be required to capture 3 billion tonnes of CO₂ in next 15 years (See Box 1).

The actual implementation to target the additional land area under forest tree cover may involve convergence and dovetailing with a number of other government programmes. They may include, the Mahatma Gandhi National Rural Employment Guarantee Programme (MGNREGA), Integrated Watershed Management Programme (IWMP), National Rural Livelihood Mission (NRLM), National Bamboo Mission, National Medicinal Plants Board (NMPB), Mission for Integrated Development of Horticulture (MIDH), National Green India Mission, CAMPA fund etc.

Namami Gange: Giving a major fillip to Namami Gange programme the Empowered Steering Committee (ESC) of the National Ganga River Basin Authority (NGRBA) appraised the Detailed Project Report on 'Forestry Intervention in River Ganga'. The project will focus on augmenting water flow together with abating the pollutants loads of river Ganga through appropriate forestry intervention along the banks of river Ganga. The major project components are implementation of Forestry Interventions in Five States at the banks of River Ganga; strengthening Knowledge Management and National Capacity for Forestry Interventions and conservation of Rivers and scaling up and replication of successful models of Forestry interventions and Riverscape. The estimated cost of the project is Rs. 2294 crore for the duration of five years³.

Seeking to rejuvenate the river Ganga through massive plantation exercise, the Centre had in March released the DPR on forestry intervention for the river which will see the five Ganga Basin states -- Uttarakhand, Uttar Pradesh, Bihar, Jharkhand and West Bengal states to plant trees on 83,946 sq km (or 83,94,600 ha) of identified diverse forest areas over the next five year⁴. Assuming a modest productivity of plantations at 5 m³/ha/ year, the carbon captured by the plantations raised under Namami Gange will be capable of capturing 12.5 tonnes of CO₂/ha/year which will be equal to 87.26 million tonnes of CO₂/ha/year.

Green Highway Policy (2015) India has launched the Green Highways Policy- 2015. Under the new Green Highways Plantation, Transplantation, Beautification and Maintenance Policy, there will be four columns of trees alongside highways. According to new policy, road developers will need to earmark 1 per cent of a project's total cost for planting of trees and shrubs along national highways. Under this policy, around 1,40,000 kilometers of national highways will be lined with trees⁵. Assuming a modest productivity of plantations at 5 m³/ha/ year, the carbon captured by the plantations raised under National Green Highway Policy 2015 will be capable of capturing 12.5 tonnes of CO₂/ha/year which will be equal to 1.45 million tonnes of CO₂/ha/year.

3.3 Methodological Issues for Estimation of Forest Carbon Stocks

In India, there is need to give more responsibility to the State Forest Departments to carry out the assessment and estimation of forest carbon stocks in conjunction with the biennial exercise of assessment of forest and tree cover.

³ <http://pib.nic.in/newsite/PrintRelease.aspx?relid=144783>

⁴ http://www.itrcenviis.nic.in/Database/NEWS_3714.aspx

⁵ <http://pib.nic.in/newsite/efeatures.aspx?relid=126427>

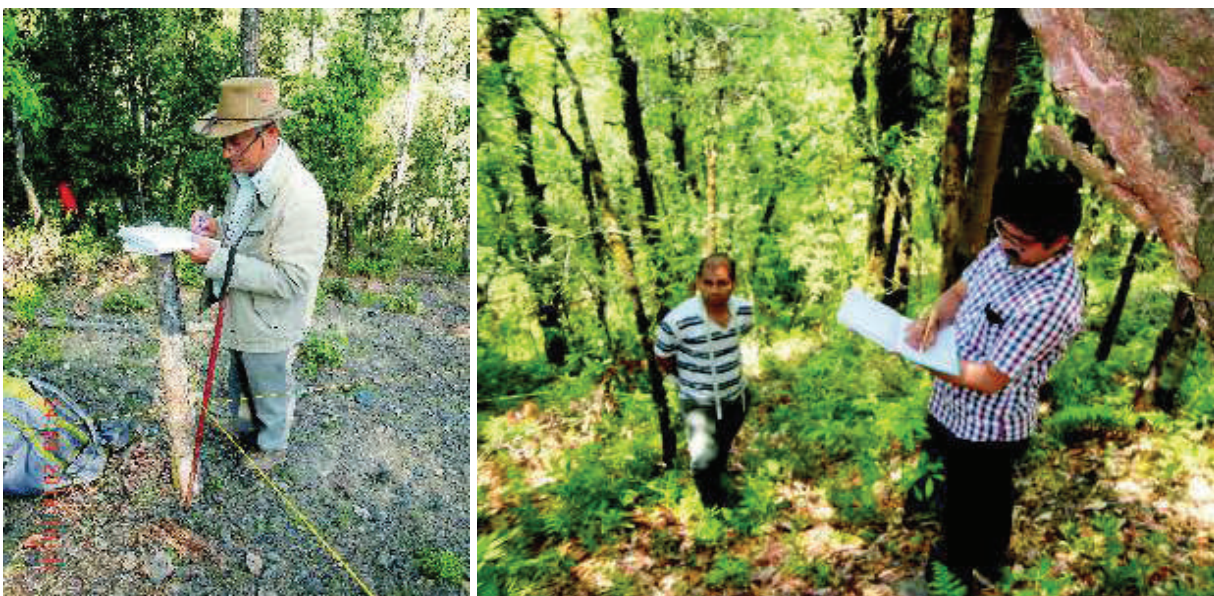
This is considered essential to improve the precision level for estimation of FCS as the State Governments are in position to cover more number of sample points. In future, the SFDs can take the responsibility of carrying out the inventories for FTC and FCS by more effectively utilizing the services of their Remote Sensing Centres/ Space Application Centre. FSI can act as the source for providing satellite imageries required by the States for the purpose.

3.3.1 Estimation of Forest Carbon Stocks

India is among the few countries to regularly use satellite-based remote sensing technology in detecting forest cover changes. The FSI has been assessing the forest cover of the country on a two-year cycle since 1987. Over the years, there have been improvements both in the quality of remote sensing data and the accuracy of interpretation techniques. The 14th biennial cycle has been completed from digital interpretation of data from year 2013-14 and published in 2015 with a minimum mapping unit of 1 ha. FSI is following the tier 2 and tier 3 of IPCC Good Practice Guidance (methodology) for carbon estimation in forests of India through a combination of remote sensing and ground-based forest carbon inventory. Methodology followed by India for estimation of biomass carbon and soil organic carbon has the potential of being developed and adopted as a general REDD+ methodology for assessing changes in forest carbon stocks at national level in a country over a stipulated period.

3.3.2 National Forest Reference Level

India gives highest priority to fix the reference level for carbon stocks in its forest and tree cover with a view to make assessment and MRV of baseline forest carbon stocks and incremental forest carbon stocks. Reference level in essence will be a baseline forest carbon stocks position corresponding to a specific year, which may be called as the 'zero year. The 'reference year' would need to be fixed with consensus amongst intra-country stakeholders which would include the Central Government, State Governments, forest experts and scientists, local community and civil society. It is presumed that the starting point for fixing a forest reference level will be backed by sound logic, time series of scientific historical data, and milestones of relevant legislation and/or policy prescriptions. The reference level would need to be agreed at the technical level, *i.e.*, amongst scientific organizations and subsequently at the government level involving the Central and the State Governments. Currently Forest Survey of India has been entrusted with working out the reference level for India taking into account national circumstances and rationale.





Forest Reference Level/ Reference Emission Level for India is yet to be developed. Forest Survey of India has been assigned the task to develop national forest reference level for India.

3.3.3 Local Communities and Co-benefits of Forest Ecosystem Services

While moving forward towards implementation of REDD+, participation of local communities with compulsory representation of women would be the central theme. Government of India has committed to ensure that full and adequate incentives from REDD+ go to the local communities as and when these become available. In India's context, the forest will not be managed for 'carbon services' alone, but for all the ecosystem services that are flowing to the local community from the forest. Incentives for carbon services will be an add-on to the benefits that the local communities are already receiving from the forest ecosystems.



3.4 Framework for Implementing REDD+ Activities in India

To implement specific REDD+ actions in the country, key interventions are required to be taken for forest management in the country (Singh *et al.*, 2015). These are explained in the subsequent paragraphs.

- (i) **Addressing Drivers of Deforestation and Degradation:** Large scale deforestation is not evident in India. However, the dependence of local communities on forests for their livelihoods causes degradation. As per the India State of Forest Reports (FSI, 2009, 2011, 2013 and 2015), high density forest is converting in to low density forest.

Addressing drivers of degradation could be best addressed in an integrated manner that treats forests and non-forest public lands as well as private lands simultaneously. REDD+ mechanism may extend and upscale integrated approach in contiguous areas and landforms, sharing specific set of ecological and socio-economic characteristics.

Box 3.2. REDD+ Policy and Definitional Issues

India needs to work upon the definitions of REDD+ activities listed in paragraph 70 of the decision 1/CP.16 to be able to implement the same in its national context and circumstances. Specifically, more insight into understanding the definition of sustainable management of forest (SMF) is required to steer its proper application in forestry mitigation actions in different parts of the country. In ensuring the safeguards for the rights of local communities and indigenous people, involvement of various stakeholders and state forest departments is needed in working out provisions and modalities under the extant Forest Rights Act, and approaches of Joint Forest Management (JFM) and Community Forest Management (CFM).



The energy security and carbon emission reduction objectives need to be promoted through promoting energy efficient devices and alternative energy sources like biogas, solar energy devices etc. Penetration of improved cook stoves, which could save fuel wood and thus could reduce pressure on the forests, needs to be promoted among masses. Active participation with local NGOs having track record of working with communities on rural energy related issues can be roped into actions. This would lead to saving of 2 million tons of fuel wood every year amounting to saving of 3.6 mt of CO₂eq. per year (MoEF&CC, 2010).

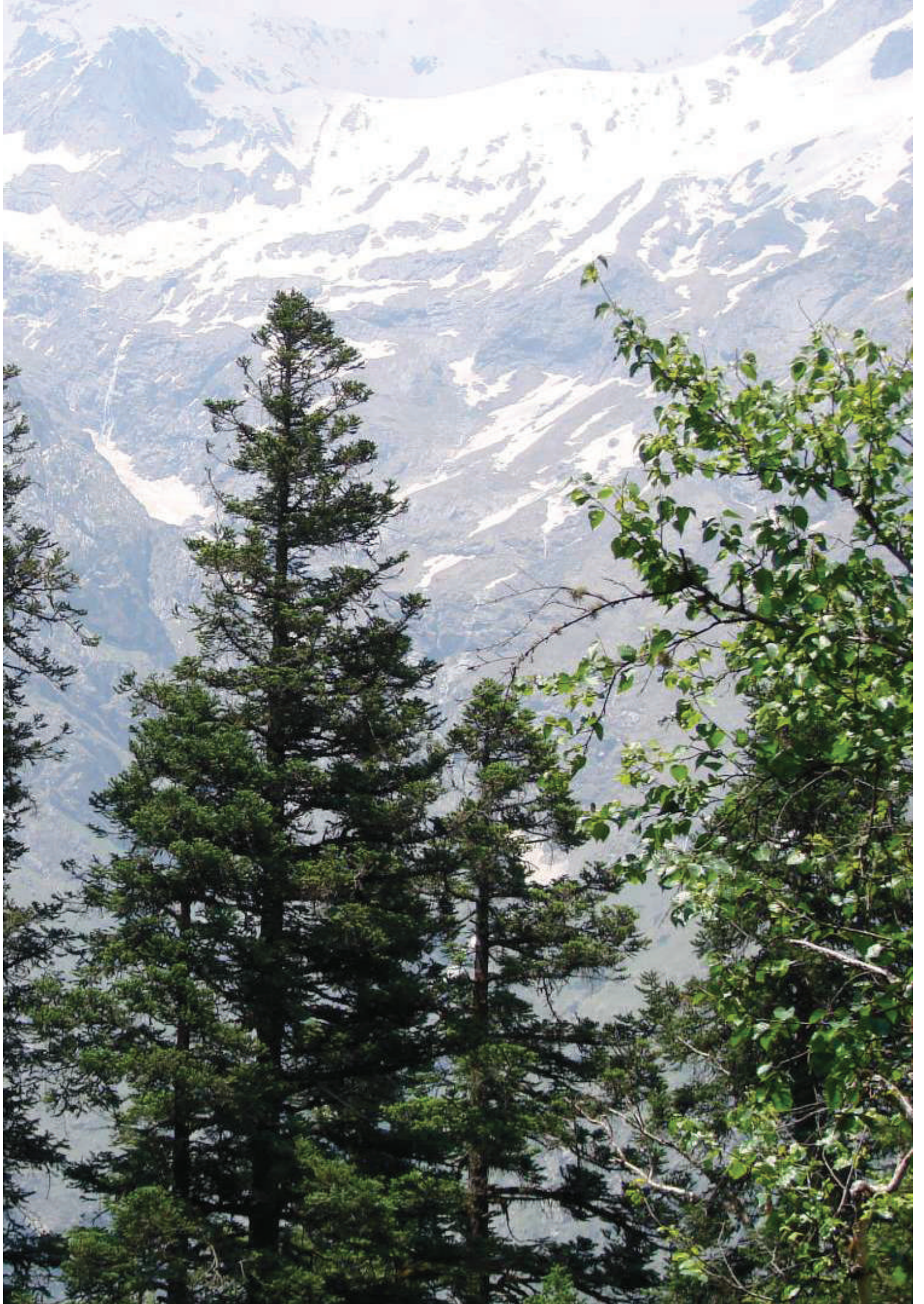
- (ii) **Conservation and Enhancement of Forest Carbon Stocks:** Indian submission to UNFCCC on implementation of REDD+ in India outlines that REDD+ pilot projects on conservation, sustainable management of forests (SMF), and enhancement of forest carbon stocks (EFCS) subject to availability of funding, India intends to launch one each, based on the concept of conservation, SMF and EFCS respectively to understand the intricacies of maintaining baseline forest carbon stocks, forest carbon stocks changes, and forest carbon accounting. (UNFCCC, 2011). As there is not much of the problem of deforestation in the country, the focus has to be more on tackling forest degradation and implementing other '+' components of REDD+, viz. conservation, sustainable management of forests and enhancement of forest carbon stocks.
- (iii) **Sustainable Management of Forests:** Sustainable management of forests (SMF) is one of the important components of REDD+. SMF may be defined as the management which is economically feasible, socially acceptable and environmentally sound. The activities proposed to be undertaken under REDD+ for addressing the drivers of deforestation and degradation, conservation and enhancement of carbon stocks as described in the preceding discussion and biodiversity safeguards under the mechanism are expected to bring a positive change in environment and climate change (WWF, 2011). Incorporating social safeguards shall make REDD+ a mechanism acceptable to the society, the local communities and indigenous people. Finally, the mechanism of incentivizing the REDD+ initiatives is expected to make this programme economically viable. Thus REDD+ in India would contribute to sustainable management of forest resources in the country.
- (iv) **Safeguards and Safeguards Information System:** In accordance with UNFCCC decisions and methodological guidance, a system for providing information on how safeguards for ensuring participation of local communities, and conservation of natural forests and their ecosystem services are yet to be developed while implementing result based REDD+ actions. In India tribals, forest dwellers and other local communities have always enjoyed legal safeguards to exercise their customary rights and traditions. In addition, the country has a very successful programme involving local communities for forest protection and management. JFM provides for the protecting communities a share in the forest produce. So far, more than 100,000 JFM committees covering about 22 million ha of forest area have been formed with about 22 million participating members. JFM has enabled protection and regeneration of existing forests, and also raising of new forest plantations, which contribute in conservation of existing forests and thereby the associated carbon stocks. Indian experience of implementing concept of Joint Forest Management can successfully be replicated in protecting the rights of indigenous people and at the same time involving them in REDD+ mechanism and simultaneously ensuring fair share of forest carbon incentives for them. In addition, the *Panchayati Raj* Institutions (PRIs) are constitutionally mandated bodies for decentralized development planning and execution at local level. The Scheduled Tribes and Other Forest Dwellers (Recognition of Forest Rights) Act, 2006, in addition to individual rights, provides for community forest rights, including right to protect, regenerate and manage community forest resource. It is obvious that this right also places a great deal of responsibility that the community

has to fulfill. REDD+ is expected to contribute to empowerment of communities and strengthen decentralized local governance of forests in the overall context of climatic variability.

Developing countries are expected to follow safeguards, as mandated various COP decisions with a view to ensure full participation of indigenous peoples, local communities and other stakeholders, and conservation of natural forests and biodiversity in implementing the REDD+ activities. India intends to ensure that all REDD+ incentives available from international sources will flow fully and adequately to the local communities which participate in management of forest resources or are dependent on the forest resources for sustenance of their livelihood. Part of the incentives are expected to be invested in conservation and improvement of the ecosystem services like biodiversity and non-timber forest produce.

India has not yet formally developed the Safeguard Information System (SIS) for REDD+ implementation. However, the process has been started by way of pilot studies, which provide an ideal opportunity to develop the same. Various acts and legislations mentioned earlier are strong testimony to Government of India's commitment to implement REDD+ safeguards. India is in a commanding position to have a strong policy, legal and regulatory framework for environmental safeguards, and also an elaborate institutional arrangement of JFMCs at the grassroots level for ensuring social safeguards. However, the process needs to be formalized by way of an SIS. Among the various options available, the 'Cancun Principles' are the most elaborate option to follow, but are not very objective and focused. India has recently joined UN-REDD programme and needs to relook at the safeguards followed by FCPF and UN-REDD Programme. The biggest challenge; however, is to build capacity for development and implementation of such a system.





Capacity building, Gaps and Constrains for implementing REDD+ in India

4

India is in a reasonably comfortable position vis-a-vis many of the other developing countries, as far as the capacity to implement climate change forestry programmes is concerned. Still a lot needs to be done on the capacity building front. Various initiatives taken by the Ministry of Environment, Forest and Climate Change, Government of India have helped in capacity building of SFDs. Vijge and Gupta (2014) analyzed the interaction of climate governance goals with long-standing forest policies and practices in India. They focused on India's REDD+ strategy, with a particular focus on the Green India Mission (GIM). They argue that the GIM frames the climate-forest interaction as an opportunity to synergistically enhance both carbon and non-carbon benefits to be derived from forests; while simultaneously promoting further decentralization of Indian forest governance. However, based on past experiences and developments to date, they concluded that without significant investments in community-based carbon and biodiversity monitoring, as well as institutionalized benefit sharing mechanisms that reach down to the local level, the posited REDD+ induced move toward more holistic and decentralized Indian forest governance is unlikely to take place.

4.1 Evaluation of Current Capacity Building Needs

Forestry sector in India is at the threshold of unprecedented opportunities. Forests are increasingly recognized as a key ingredient in resolving global issues such as poverty, climate change, biodiversity loss and natural resource supply. These opportunities, if effectively realized, could both enhance the livelihoods of forest-dependent people and improve the state of the forests by providing steady funds and ultimately allowing forest-dependent people to sustainably manage the forests around them and rise out of poverty. Full and effective participation of indigenous people and local communities in developing, implementing and monitoring of REDD+ related initiatives in forests requires investments in capacity building and inclusive decision-making process. Financial resources for such investments needed for successful implementation of the same, as currently no such mechanisms are specifically available.

On the technical front, in order to facilitate REDD+ requirements, considerable capabilities have been developed in India in forest resource assessment; however, a lot still needs to be done to dovetail them with Warsaw Framework for REDD+. The resolution of data used in satellite images is not very high. More capacities are needed to be built in this direction. Also, the resource assessment at the State level is needed. Capacity building exercise needs to be carried out upto community level. Capacity building in climate change of following stakeholders is required:

- (i) **Local Capabilities:** The institutions available at local level to deal with the forests include 'Gram Sabhas', JFMCs, CFM groups (a large number in Orissa), 'Van Panchayats' (Uttarakhand), village councils (North-East), etc. Self help groups/common interest groups have also been set up at village level to promote forest based livelihood activities. The spread of JFM has helped in regenerating forests and meeting local needs (MOEF&CC, 2014; Kohli and Sharma, 2014). Strengthening decentralized governance through 'Gram Sabhas' (Village level Institutions) and other thematic committees/ local institutions have significant bearing on forest conservation and its sustainable use. Comprehensive approach and programmes should therefore strengthen *Gram Sabhas* as overarching institutions. Larger landscape level governance/management needs to emerge over time, engaging a diversity of institutions depending on the local context and learning from the

successes and failures of initiatives at landscape/sub landscape level. Uniform guidelines across the states are needed to develop climate and forestry actions at national level.

- (ii) **Capacity Building of Local Institutions:** Building capacity of local institutions is needed under climate mechanisms to help them effectively protect, regenerate and manage forests. Creating community stake in regeneration of forests/ restoration of ecosystems requires that communities have sufficient stake in terms of enhanced biomass, NTFPs and environmental services from such areas. Community driven innovative/ adaptive silviculture is of critical importance to successfully implement mitigation/ adaptation strategies in conservation of ecosystems and enhancement of carbon stocks. There should be greater space for local level planning and management for forest/ ecosystem restoration with special reference to carbon sequestration.
- (iii) **Strengthening Forest Department and Other Partner Agencies:** In order to ensure an integrated approach under climate change at village/cluster/sub-landscape/ sub- watershed level, the forest department will need new capacities with inclusion of REDD+ in new working plan code, capacity building activities should support upgradation of the Forest Range Officers and other cadres to sensitise on REDD+.

It would also be appropriate to say that at national level; a reference guide needs be prepared that provides information material on climate change programmes and its implications for the key stakeholders. It should help in developing understanding of climate change programmes like GIM, CDM and REDD+ and how they relate to the recognition and exercise of the collective rights and responsibilities of the stakeholders. Apart from this, there should be a 'Manual for the Trainers' as a companion resource to the stakeholders' guide. It should be written for trainers who intend to conduct training workshops for key stakeholders like forest department personnel, indigenous leaders, community members and others (Singh and Rawat, 2013).

4.2 Gaps and Constraints

There are numerous gaps and constraints, which hamper undertaking of research activities in climate change with respect to forests (Singh *et al.*, 2014). Some of these are summarized below:

- (i) **Knowledge Gaps:** Though climate change is global issue, still there are some gaps and constraints visible in knowledge of adaptation and mitigation from point of view of forestry. Key knowledge gaps include linkages between impacts of climate change and adaptation and mitigation options and new issues developing under UNFCCC like REDD+, joint mitigation & adaptation programmes, non-carbon benefits of REDD+, Paris Agreement, forest sector contribution to NDCs etc. More research is required to better understand these issues and cost-effective solutions at the local levels and to fill knowledge gaps. Despite the emergence of more and more regional and country-specific studies on climate change in India in recent years, knowledge gaps remain. Hence, there is an urgent need for undertaking more research on new REDD+ related issues at regional level to better understand intricacies of REDD+ at local level.
- (ii) **Financial Gaps:** Government of India has initiated its National Action Plan on Climate Change (NAPCC) with equal thrust on climate change adaptation and mitigation strategies (MoEF&CC, 2014). Green India Mission under NAPCC promotes REDD+ by creating a REDD+ Cell at MoEF&CC. There is need to translate policy statements into strategies and strategies into budgetary allocations. It is important to make simple and easy approachable rules and regulation for funding the project work related to adaptation and mitigation activity.
- (iii) **Research Gaps:** There is a considerable gap in our knowledge of the natural resources of India. A

study undertaken by International Centre for Integrated Mountain Development (ICIMOD) in the Eastern Himalayas and their vulnerability to climate change indicated that there is no systematic monitoring, documentation, or research to check the status of biodiversity in the region (ICIMOD, 2009). Despite various projections and observed changes, the region also lacks adequate scientific evidence to understand the impact of climate change on different aspects of human wellbeing. Across the entire region, most of the limited research that is available focuses on the adverse impacts of climate change and overlooks the adaptation mechanisms that local people have developed themselves, and the potential new opportunities. There also appears to be a lack of human and institutional set ups and policy imperatives to tackle climate change issues. A focussed REDD+ programmes in North-East region of India could supplement these gaps.

A strategic approach is needed for detailed research on different ecosystem services and functions to estimate the potential impacts of climate change. Such research could develop adaptation mechanisms and/or highlight mechanisms that have already been implemented by local people in response to the changing environment. Detailed indicative research is also essential to define mitigation strategies at the policy level that need prioritizing at the government/ international level.

- (iv) **Technological and Capacity Building Gaps:** A well equipped and trained human resource concerned to research activity is lacking at many places. The status of forestry statistics has become a cause of concern because there is a vast gap in the current technology applications and their adaptation to the day-to-day working of forest research. The existing capacity to collect data at regional level is weak. Before implementing technological advances in statistical data reporting work, it is necessary to build adequate capacity for collection of data from primary sources. India has submitted a very ambitious NDC to create an additional carbon sink of 2.5 to 3 billion tonnes of CO₂ equivalent through additional forest and tree cover by 2030, considerable inputs in the form of predicted finance and capacity building is required to attain this objective.
- (vi) **Gaps and Constraints at Policy Level:** India was among the first few countries in the world to provide for the protection and improvement of the environment in the national constitution, and it has taken several steps in designing policies and legislation to overcome environmental problems. The GIM under NAPCC is still to capture full momentum, so a lot of works are needed to be done to spell out the contours of GIM and NDC. Cumulatively, over a period of years, the mission could help in gradual removal of bottlenecks at the policy level.
- (vii) **Gaps and Constraints in Data Collection and Impact Assessment Capacity:** Climate change has wide implications in the Indian forestry sector. Therefore there is a need to develop mitigation strategies and projects, maintain a periodic inventory of the greenhouse gases emissions and removal, promote sustainable management of forests, and sustainable production of timber, fuelwood and biomass for reducing the vulnerability of forest ecosystems. Data limitations related to various pertinent issues such as forest vegetation characteristics, plant functional types, plant physiology aspects, soil and water and socio-economic implications etc. need to be overcome by initiating studies to develop databases (Chaturvedi *et al.*, 2008). Absence of forestry functional related data limits the future projection of changes in India's forests. This limits the strategies for adaptation and mitigation too. Therefore, core research on this aspect is a major constraint for forestry under climate change regime.

Improving data collection and sharing results at national, regional and international levels will improve the quality of work regarding adaptation and mitigation. It can also increase the detail of climate impact

assessments to a scale that is meaningful for optimizing adaptation and mitigation measures, and operating nearly real-time, early warning systems for forestry in India. Better data will improve access to international funding mechanisms. National extension and forestry research services have an increased role to play in data collection, analysis and use for decision-making and decentralized service to nation well being. There is also a need to include social science research to boost understanding on how people adopt and implement adaptation and mitigation options. Easy availability of such information will facilitate in developing effective REDD+ programmes and strategies in different agro-ecological region of the country.

(viii) Training Programmes: MoEF&CC through its research and training organizations has initiated capacity building programmes on various aspects of REDD+ to the officers of Indian Forest Service, trainees of Central Academy for State Forest Service and scientists and technologists working in Government sector. These programmes are on limited scale REDD+ needs enormous capacity building programme at national level. India can help in the capacity building programmes of other non Annex countries under the climate change collaborations especially on National Forest Monitoring system. A suitable multilateral financial mechanism needs to be developed to operationalize such capacity building programmes for countries intending to participate in such activities.



Initiation of REDD+ Pilot Projects in India

5

India, although has been in the forefront of REDD+ negotiations since COP 13 in Bali and contributed in shaping the REDD+ architecture. However, at national level first REDD+ in India was initiated in 2011 in Meghalaya under Plan Vivo Standard. Few REDD+ pilot project activities have already been started in India. A brief description of these REDD+ pilots are as follows:

5.1 Khasi Hills Community REDD+ Project, Meghalaya

The Khasi Hills Community REDD+ Project is India's first community-based REDD+ programme, and will protect and restore 27,000 ha of forest. A pilot project in the East Khasi Hills in Meghalaya being run jointly by a California-based non-profit organization, Community Forestry International (CFI) and the Mawphlang community of Meghalaya. They have been working together in the Umiam basin watershed region to develop a REDD+ Project in East Khasi Hills District of Meghalaya.

The project is registered with Plan Vivo as the first REDD+ project from India. It engages ten indigenous Khasi communities (hima) with 62 villages. The area was chosen on the grounds of established Khasi traditions of forest conservation and legal right for natural resource management. This REDD+ project aims to slow, halt and reverse the loss of community forests by providing support, new technologies and financial incentives to conserve existing forests and regenerate degraded forests. The project intervention area is a global biodiversity hotspot, providing habitat to many endangered species. Another primary objective of the project is to deliver long-term strategies to address extreme poverty facing rural families and is involved in the establishment of women-run microfinance institutions. The Khasi Hills Community Carbon project aims to reduce deforestation and restore forests at the same time. It does so by attacking the area's root causes of deforestation. 48,545 tCO₂eq carbon credits have been issued to the project proponents⁶.

Therefore, the project focuses on reducing the number and severity of forest fires by establishing firelines which are maintained and monitored during the fire season by local communities. To reduce fuelwood collection, fast-growing woodlots are being established near villages to cover the demand for firewood. The project is manufacturing and installing fuel-efficient cook stoves and plans to subsidise the majority of the 5,000 households in the project area. As a result of this activity, fuelwood consumption and indoor smoke pollution will be reduced improving forest and family health⁷.

5.2 Forest-PLUS by USAID

USAID Forest-PLUS is a bilateral program between India and the U.S. to develop solutions for sustainable forest land use in India. The program, in partnership with the Ministry of Environment, Forest and Climate Change, prepares India to implement successfully Reducing Emissions from Deforestation and Forest Degradation (REDD+), an international mechanism for climate change mitigation, livelihoods improvement, and biodiversity protection. Forest-PLUS brings together Indian and American expertise to develop technologies, tools, and methods of forest management to meet the technical challenges of managing forests for ecosystem health, carbon stocks, biodiversity, and livelihoods. Forest-PLUS collaborates with Indian forestry institutions and local communities to pilot these solutions in landscapes of Karnataka,

⁶ <http://www.planvivo.org/project-network/>

⁷ <http://www.planvivo.org/?s=khasi+hill>

Madhya Pradesh, Himachal Pradesh and Sikkim. These landscapes represent tropical moist deciduous, tropical dry deciduous, moist temperate and subtropical broadleaf forest types.

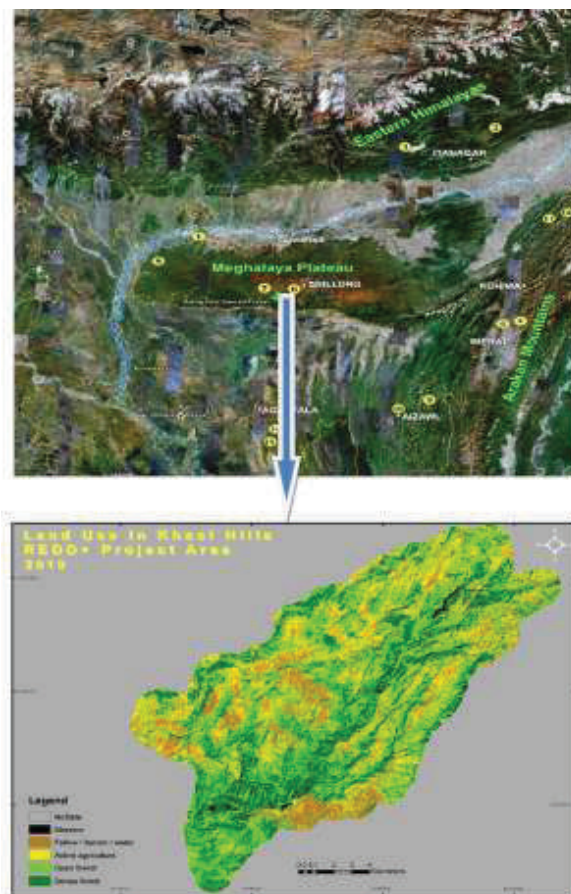


Fig 5.1: Location Khasi Hills Community REDD+ Project, Meghalaya

Forest-PLUS Pilot Landscapes: Pilot landscapes are key to Forest-PLUS success. They provide the locations where Forest-PLUS can field-test, modify, and demonstrate the scalability of the REDD+ tools, techniques, and methodologies. The pilot landscapes have been developed through mediating technical cooperation between the U.S. and Indian institutions. Four Forest-PLUS pilot landscapes have been chosen in the states of Himachal Pradesh, Madhya Pradesh, Karnataka and Sikkim.⁸

Shimoga Landscape: Shimoga district in the south Indian state of Karnataka lies across the ecological gradient from the dry plains of the western Deccan Plateau to the lower reaches of the monsoon-trapping Western Ghats escarpment. Reflecting both natural variation in site quality and degradation from human activity, forest density in all forest types can vary from very dense closed canopy to open woodland. The wet evergreen forests of the wetter Western Ghats are some of the most diverse tropical forests in the world and have an unusually high percentage of endemic species, some descended from floras of the pre-Jurassic Gondwana megacontinent.

Hoshangabad Landscape: Hoshangabad landscape is in the central Indian state of Madhya Pradesh south of the Narmada River. The climatic gradient in Madhya Pradesh is from hot and dry in the northwest to moderate temperatures and seasonally wet in the southeast. The Hoshangabad landscape lies across the

⁸ <https://www.usaid.gov/india/energy-environment-and-global-climate-change>

Satpura range south of the Narmada River, dominated by strongly seasonal monsoon rains. The forest vegetation is dry tropical deciduous, dominated by teak, a forest type widely distributed in central India. As with all forests in India, human activity has changed the ecology of Hoshangabad forests; many that originally were a dense, closed canopy, and species-diverse are now almost teak mono-cultures, often planted and burned regularly. Reflecting topographic variation, soil mosaics, exposure, and degradation from human activity, forest density in Hoshangabad varies from a few very dense patches to open. In general the forest is fragmented, with intact ecotones and large forest blocks rare.

Rampur Landscape: Rampur landscape is in Himachal Pradesh. It extends from the Sutlej River at 1000 m elevation to well over 3500 m. Elevation, exposure, temperature, and disturbance gradients largely determine the types and distributions of forest vegetation. Although in the Sutlej River valley there can be some mixed deciduous forest species, most forests are species combinations of pine, oak, deodar, spruce, fir, juniper, willow, and birch varying on environmental gradients. As always, the effects of humans are overlaid on these natural patterns of vegetation. In Rampur apple cultivation is a booming, expanding activity and many mountain slopes are entirely covered in terraced orchards that were recently natural forests. In addition, there is still considerable terraced agriculture of grains and vegetables, and livestock herding is an ancient practice. Free-range livestock browse and trample the forest regeneration and shrub layer. On recent landslides and flood disturbances, hill bamboo and alder are often early colonizers.

Sikkim Landscape: Sikkim landscape is in the lower Teesta River valley in south Sikkim, the lower range of an elevation gradient from 300 to 850 m. The forests are cool temperate deciduous, with ample monsoon rains. The dominant tree species are broad-leaved including extensive forests dominated by sal (*Shorea robusta*) partly as a result of past forestry treatments to eliminate species thought less useful. At higher elevations and on northern exposures various species of oak become common with rhododendron in the understory. High rainfall, very steep slopes, and high energy streams cause frequent landslides colonized by bamboo breaks. Very little of the landscape is at elevations high enough to develop coniferous forests. As in other Forest-PLUS landscapes, humans have modified natural patterns of forest distribution and species composition. Terraced agriculture is a traditional activity, conspicuous along major roads. Cattle and goats are herded in forests for browse. But many forests are used less than they used to be and the area officially in forest cover has increased in Sikkim over the last few decades (Fig 5.2).

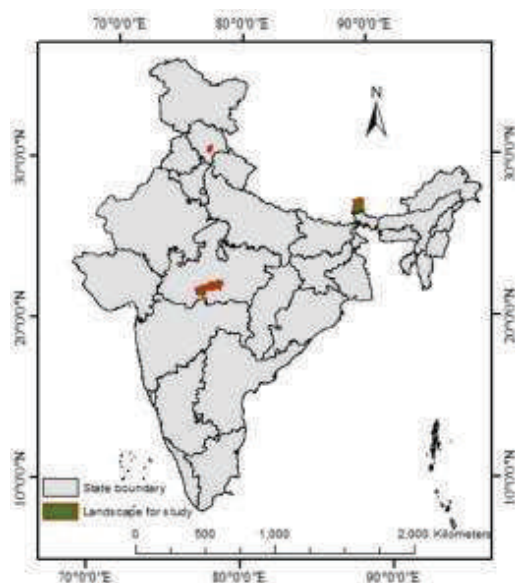


Fig 5.2: Location of Forest-PLUS project sites
(Source: Personal Communication of Mr. Manoj Kumar, FRI, Dehradun)

5.3 Uttarakhand REDD+ Pilot Project

Indian Council of Forestry Research and Education has initiated a REDD+ pilot project in the *Van Panchayat* (Village Community Forests) of Uttarakhand (India). Community managed forest like *Van Panchayats* (Community Forests) in Uttarakhand are example of community control over forests. REDD+ actions are being initiated as demonstration activities in these forests. The overall objective of the project will be to develop ideal pilot projects for demonstration of REDD+ actions in the selected cluster of *Van Panchayats* and JFM areas of Uttarakhand covering an area of about 43,000 ha with active involvement of local communities. Under the project ICFRE intends to develop modalities for passing financial incentives to local communities that can make the REDD+ a success at local, sub-national and National level. For this purpose methodologies and modalities for a procedural framework will be worked out. The project will ensure people's participation and sharing of the benefits accruing from REDD+ incentives at local project level (Singh *et al.* 2014). The location of project site is shown in Fig 5.3.

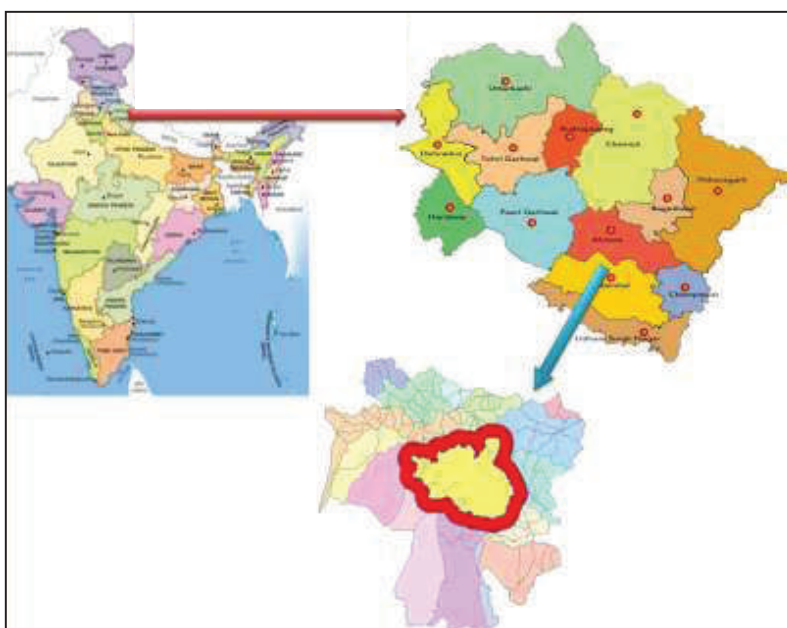


Fig 5.3: Location of Uttarakhand REDD+ Pilot Project

Project Objectives:

- a. Estimation of carbon status in different carbon pools in the selected *Van Panchayat* forest of Uttarakhand.
- b. Estimation of enhancement in forest carbon stocks as a result of conservation efforts in *Van Panchayat* forests.
- c. Empowering forest dependent communities for forest carbon conservation and developing an MRV system for REDD+ actions.
- d. Capacity building of participating communities for developing a transparent MRV system at small project level.
- e. Developing a system of respecting and reporting of safeguards in accordance with the international agreements at UNFCCC.
- f. Feasibility study for getting the project registered for carbon credits and developing a system of payment for environmental services to the participating communities.

5.4 ICIMOD-ICFRE-GIZ Transboundary REDD+ Programme

All the Himalayan countries are taking serious steps to engage in REDD+ programmes where a large population is dependent on forest resources, but their capacity to meet various standards for participation is constrained. Many Himalayan nations do not have capacity to address international standards required for REDD+. The overall goal of this programme is to build the capacity of the REDD+ focal points in the four countries namely India, Nepal, Bhutan and Myanmar to develop and implement National REDD+ Strategy through conservation and sustainable use of natural sinks. This project on REDD+ with active collaboration from ICIMOD with a regional mandate, is implemented in Bhutan, India, Myanmar and Nepal. In India this partnership is for REDD+ capacity building focusing on North East region. The programme will assist in developing and implementing REDD+ projects that will focus on trainings, technology sharing and knowledge dissemination. Pilot REDD+ projects will be established in each country for all stakeholders. The broad objectives of the programme are:

- a. Development of methods for calculating, modelling and forecasting carbon storage.
- b. Developing instruments in preparation for regional REDD+ readiness.
- c. In working towards harmonisation in the region, an exchange of experience and mutual learning on good REDD+ implementation practices are established as South–South cooperation.

It especially deals with standards for calculating reference levels (RLs) and reference emission levels (REL) and the design of systems for measuring, reporting and verification (MRV), including social and environmental aspects (regional).

This regional scale REDD+ programme meets the goal, *i.e.*, “Transboundary landscapes are better conserved and managed for sustaining ecosystem goods and services to improve livelihoods and enhance ecological integrity, economic development, and socio-cultural resilience to environmental changes”.

The expected output will be enhanced capacity for development and implementation of REDD+ strategy and action plan at each level (community, national and sub national/ state levels) and improved understanding of scientific knowledge for precise estimation of carbon stocks.

5.5 The Energy Resource Institute REDD+ Pilot Projects

TERI, New Delhi is implementing small REDD+ pilot projects financed by Norwegian Government in close association with Ministry of Environment, Forest and Climate Change and State Forest Departments as per following details: (i) Temperate forests (Mussoorie, in Uttarakhand), (ii) Dry-Deciduous Mixed Forests (Renukoot, Uttar Pradesh), (iii) Moist–Deciduous Forests (Chhindwara, Madhya Pradesh), (iv) Moist deciduous-Mixed forests (Angul, Odisha), (v) Mangrove Forests of Sundarbans (West Bengal WB) and (vi) Tropical Moist Deciduous forests (Nagaland).

5.6 REDD+ Cell of Indira Gandhi National Forest Academy

REDD+ cell has been established in IGNFA and a “Pilot Project on REDD+” has been initiated as a step towards 'hands on learning' of different components of REDD-plus, including mitigation potential, cost effectiveness, and on relevant issues and challenges involved in operationalization of REDD+. The Timli Forest Range (Fig 5.5) has been selected for the pilot study which is located in the eastern part of Doon valley (30°18'48.4" - 30°26'19.3"N & 77°34'32" - 77°47'59"E). The area of Timli Forest Range is 9907 ha and it falls in Kalsi Soil Conservation Forest Division of Shiwalik Circle. The majority of the forest area is bound by the

Yamuna River in northwest and Shiwalik ridge in south (Personal Communication of Dr. Mohit Gera, IGNFA, Dehradun).

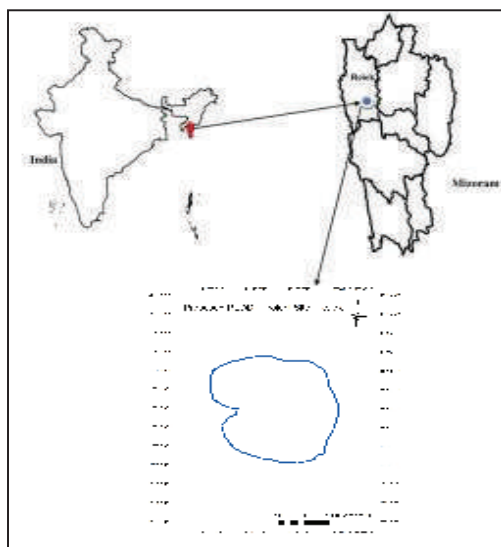


Fig 5.4: Location of proposed REDD+ project

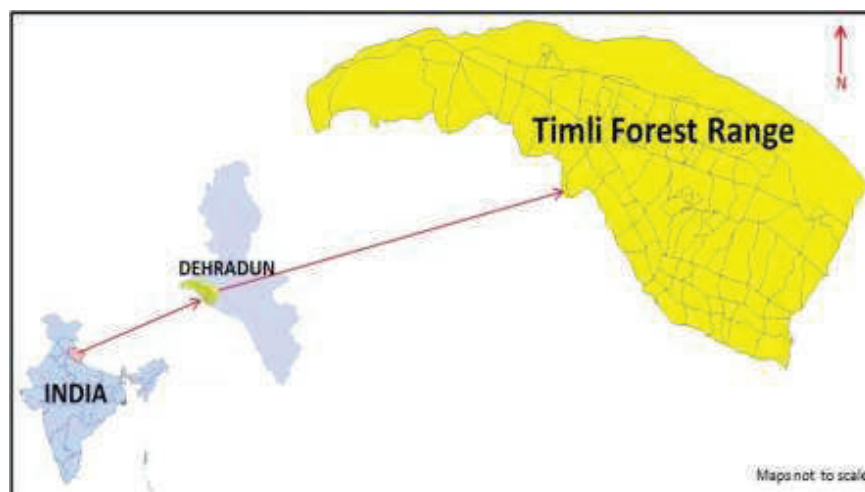


Fig 5.5 Location of project site (Timli Forest Range)

Project Objectives: The specific objectives of the pilot project on REDD+ are as follows:

1. Estimate the potential of emissions reduction due to avoidance of forest degradation.
2. Study the drivers of forest degradation and ways to address them for emission reductions.
3. Estimate the mitigation potential of enhancement of carbon stocks by reforestation and restoration of forests including ANR (Assisted Natural Regeneration).
4. Estimate costs effectiveness of REDD+ mitigation interventions.
5. Develop a field based practical module on REDD+ to be utilized in capacity building of entry level and in-service IFS officers.

Way Forward: Operationalization of REDD+ in India

6

6.1 India INDC and REDD+

Keeping in view the progress made under the agenda of REDD+ in the international negotiations, Government of India has initiated preparation of a REDD+ policy and strategy for the country. India's draft national strategy or action plan aims at enhancing and improving the forest and tree cover of the country thereby enhancing the quantum of forest ecosystem services that flow to the local communities. The services include fuelwood, timber, fodder, NTFP and also carbon sequestration. It is underlined that in the Indian context, carbon service from forests is one of the co-benefits and not the main or the sole benefit. Initiatives like GIM and National Afforestation Programme (NAP), Namani Gnage, together with programmes in sectors like agriculture and rural development would add or improve 1-1.5 million ha of forest and tree cover annually in our country. Some forestry sector initiatives that helps in meeting India's climate change mitigation target will further substantiate in carving REDD+ programmes at sub-national level

- (i) With its focus on sustainable forest management, afforestation and regulating diversion of forest land for non-forest purpose, India has been successful in improving carbon stock in its forest by about 5%, from 6,621.5 million tons in 2005 to 6,941 million tonnes in 2013.
- (ii) Initiatives like Green India Mission aim to further increase the forest/tree cover to the extent of 5 million hectares and improve quality of forest/tree cover on another 5 mha of forest/non-forest lands along with providing livelihood support. It is expected to enhance carbon sequestration by about 100 million tonnes CO₂ equivalent annually.
- (iii) These efforts have been further augmented by policies like National Agro-forestry Policy, REDD+ policy, Joint Forest Management; National Afforestation Programme, *Namami Gange* programme afforestation along the river sides and proposed devolution of about USD 6 billion under Compensatory Afforestation to states.
- (iv) Finance Commission (FC) Incentive for creation of carbon sink: Another important initiative has been the 14th FC recommendation on incentives for forestry sector. The devolution of funds to states from the federal pool would be based on a formula that attaches 7.5 % weight to the area under forest. According to the estimations based on 14th FC data, this initiative has effectively given afforestation a massive boost by conditioning about USD 6.9 billion of transfers to the states based on their forest cover, which is projected to increase up to USD 12 billion by 2019-20. Implicitly, India is going to transfer to states roughly about USD 174 per hectare of forest per year which compares very favorably with other afforested countries⁹.

Forestry is one of the major sector in various State Action Plans on Climate Change (SAPCC). All the 29 states and 7 Union Territories in India are preparing a State level action plan to deal with the challenges of climate change incorporating local needs and priorities. SAPCCs are envisioned to encompass the vision of the NAPCC and aligned with the 8 National Missions. SAPCCs describe in detail the impact of climate and vulnerability assessment, adaptation, mitigation options and financing and capacity building needs to implement the identified interventions.

⁹ <http://finmin.nic.in/14fincomm/14fceng.pdf>

To augment the availability of assured targeted resources, Government of India has set up two dedicated funds (i) Cess on Coal and (ii) National Adaptation Fund at the national level for mobilizing financing for mitigation and adaptation respectively. National Adaptation Fund with an initial allocation of INR 3,500 million (USD 55.6 million) to combat the adaptation needs in sectors like agriculture, water, forestry etc. in addition to sectoral spending by the respective ministries.

In order to create safe, smart and sustainable green transportation network among other policy options, India has recently formulated Green Highways (Plantation & Maintenance) Policy to develop 140,000 km long “tree-line” with plantation along both sides of national highways. 1% of total civil cost of projects is to be set aside to implement the policy.

Besides funding by the Government, there is a need to develop innovative Multi-Stakeholder Partnership (MSP) frameworks to encourage private (both for-profit and not-for-profit) investment and community participation in afforestation and tree planting on Degraded Forest Lands, Wastelands, and other Public Lands.

6.2 Potential Role of Private Sector in REDD+ Mechanism

The role of private sector as a key stakeholder that contributes towards mitigation and removals of GHGs is quite evident in India. The draft National REDD+ strategy and action plan envisages active role of Private sector in REDD+ implementation. The private sector can be a major source of finance and an agent to lead the implementation of REDD+ provided there are safeguards for their investments in REDD+. However, clear guidelines on implementation and carbon rights in the legislation are required to attract their engagement.

The private sector is potentially interested in afforestation/ reforestation programmes provided there is a facilitating policy regime. A perusal of India's current Afforestation/ Reforestation CDM portfolio indicates that seven out of 15 registered projects from India are developed by private sector or NGOs. This happened because of lead role on capacity building programmes conducted by ICFRE and an active national CDM Authority at national level. India is leading Afforestation/ Reforestation CDM country in the world and second in overall CDM.

India's Green India Mission recognizes active role of private sector in effective implementation of the Mission. The Mission will support a program of nurseries for raising of “quality seedlings” to meet the demands of farmers, including transportation to villages to provide easy reach and supply in an energy efficient manner. Quality planting stock production and transportation could be taken up by the private sector/farmers/women's SHGs on a competitive basis, with backup support from the Forest Department, research institutions and private sector agencies currently engaged in this field. Non-forest land provides ample opportunity to increase forest cover (i.e., enhancement of forest carbon stocks) meet the needs for forest produce and create carbon sink. The Mission also intends to support a massive program of forestry on non-forest lands with participation of the community, farmers, NGOs, private sector, institutions, government agencies and the Forest Department. Besides, meeting its afforestation target for INDC, the private sector can also be involved (Kishwan, 2015):

- Expand tree cropping agroforestry, horticulture, sericulture, etc.) on private land
- Create city forests and urban parks
- Reduce own carbon footprint
- Trade ESCs under PAT
- CSR- distribute i) fuel-efficient cook stoves, ii) solar lamps to replace Kerosene oil use for lighting
- Bioenergy or use of renewable energy

Creating appropriate regulatory safeguards could help in creating a partnership of retail investors with farmers and communities that could lead to large-scale financing and planting. The key here would be in

developing working financing models and providing regulatory oversight for longer-term investments. The national REDD+ strategy could provide support in assessing the investment climate to help identify good practices, constraints, and regulatory lacunas/ vacuums, and to address the same through appropriate policy and legal frame work. This would increase investment by a variety of stakeholders and improve outcomes.

The current policy frameworks address the issue of land diversion for industrial purpose solely in a quantitative manner. As per the current framework the project developers seeking diversion of forest land needs to offer alternate revenue land to concerned forest departments in lieu of forest land being diverted. This has resulted in only quantitative conversion of forest land. A high level committee on environment laws set up by the Ministry of Environment, Forest and Climate Change observed that quality of forest cover has declined between 1951 and 2014, with poor quality of compensatory afforestation plantations being one of the reasons behind the decline¹⁰. Comptroller and Auditor General in its report (21 of 2013) pointed out that large sums of monies released based on approved plans could not be utilised. This indicated poor planning and execution by the MoEF&CC/ State Forest Departments. (21 of 2013 Comptroller and Auditor General).¹¹

The recently passed Compensatory Afforestation Fund (CAF) bill is also aimed at setting up the National Compensatory Afforestation Fund at centre and the State Compensatory Afforestation Fund in respective states. Majority of the collected fund (90%) will be spent by the states for afforestation and other related works including forest regeneration and wildlife protection. It also provides for setting up a national authority at centre and state-level authority in respective states to monitor the utilization of the funds. The purpose of this new legislation is, therefore, also to provide safety, security and transparency in utilization of these amounts, which are currently kept in different nationalized banks at the behest of the ad-hoc CAMPA.



¹⁰ http://envfor.nic.in/sites/default/files/press-releases/Final_Report_of_HLC.pdf

¹¹ http://www.cag.gov.in/sites/default/files/audit_report_files/Union_Compliance_Civil_Compensatory_Afforestation_21_2013.pdf



In order to tap REDD+ finance available through variety of sources including GCF, India, in accordance to Cancun Agreements, needs to develop following elements (Decision 1/CP.16 Para 71) (UNFCCC, 2010):

- (i) A national REDD+ strategy or action plan
- (ii) A national forest reference emission level and/or forest reference level or, if appropriate, as an interim measure, subnational (i.e., state level/or at physiographic level for country like India) forest reference emission levels and/or forest reference levels
- (iii) A robust and transparent national forest monitoring system for the monitoring and reporting of the REDD+ activities
- (iv) A system for providing information on how the safeguards are being addressed and respected throughout the implementation of the activities

REDD + needs to be institutionalized at national/ subnational level (i.e., state level). Although, now REDD+ is a component of new National Working Plan Code 2014, however, Working Plan Officers and other front line forest staff needs to be sensitized on various aspects of REDD+. In order to achieve its INDC targets India a massive afforestation/ reforestation programme to the tune of 1-1.5 million ha per annum is required. Initiatives like Green India Mission (GIM), Namami Gange, National Agroforestry Policy, Green Highways policy etc. if implemented in strategic manner are capable of achieving these targets. These action also offer an opportunity for developing REDD+ programmes at sub-national level if not national. Few REDD+ pilot activities has already been initiated in India. India needs a massive Capacity building of local institutions and stakeholders to get ready for REDD+. Creating community stake in REDD+ actions like regeneration of forests/restoration of ecosystems requires that communities have sufficient stake in terms of enhanced biomass, NTFPs and environmental services from such areas. There should be greater space for local level planning and management for forest/ecosystem restoration with special reference to carbon sequestration. Strengthening local community institutions is required to pass on REDD+ at the community level. Uniform guidelines across the states are needed to develop forestry and REDD+ actions at national level.

Government of India needs to come up with a National REDD+ strategy and Action Plan defining how REDD+ can be dovetailed with various forest and climate change programmes at National and state level. A robust REDD+ policy, strategy and action plan will help in realising the REDD+ potential of the country and will also create an enabling environment for generating financial opportunities for REDD+ The REDD+ Cell established at the MOEF&CC needs to be strengthened to undertake these tasks on priority basis in accordance with the various COP decisions and methodological guidance agreed under the UNFCCC.



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