Ministry of Environment and Forests
GOVERNMENT OF INDIA

NATIONAL MISSION FOR A GREEN INDIA

(Under The National Action Plan On Climate Change)

Draft submitted to
Prime Minister's Council on Climate Change

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Government of India
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जयराम रमेश
JAIRAM RAMESH

सत्यमेव जयते

राज्य मंत्री (स्वतंत्र प्रभार)
पर्यावरण एवं वन
भारत सरकार
नई दिल्ली–110003
MINISTER OF STATE (INDEPENDENT CHARGE)
ENVIRONMENT & FORESTS
GOVERNMENT OF INDIA
NEW DELHI - 110 003

Foreword

I am pleased to introduce the Mission Document for the **National Mission for a Green India (GIM)**. As you are aware, this Mission is one of the eight Missions under India's National Action Plan on Climate Change, announced by the Hon'ble Prime Minister in June 2008.

This document lays out the approach we wish to pursue to redouble our efforts in the forestry sector. *The overarching objective is to increase forest/tree cover in 5 m ha of land and improve quality of forest cover in another 5 million ha of lands. Thus, the Mission will help in improving ecosystem services from 10 million ha of these lands, and increase forest based livelihood income of about 3 million forest dependent households.*

I believe this Mission document envisages **an approach that is innovative in several ways**:

First, **it proposes a fundamental shift in mindset from our traditional focus of merely increasing the *quantity* of our forest cover, towards increasing the *quality* of our forest cover and improving provision of ecosystem services.**

Second, **the Mission proposes to take a *holistic view* of greening, not merely focus on plantations to meet carbon sequestration targets.** There is a clear focus on enhancing biodiversity, restoring ecosystems and habitat diversity.

Third, **there is a deliberate and major focus on *autonomy* and *decentralization*.** The Mission will be implemented through an **autonomous organisational structure** reducing red-tape and rigidity, **while ensuring accountability. Local communities will be at the heart of implementation**, with the Gram Sabha as the overarching institution overseeing Mission implementation at the village-level. We cannot forget that forests are a source of livelihood for about 275 million people in our country, and hence their central participation is critical. A key innovation is the idea of **engaging a cadre of young "Community Foresters"**, most of whom will be from scheduled tribes and our other forest dwelling communities, to facilitate planning, implementation and monitoring of activities at local level.

The preparation of this Mission document has involved an intensive process of public debate and participation. We held a series of 7 public consultations across India that I have personally attended. More than 1450 people took part in these consultations. We also received several hundred other inputs on the draft mission document. I would like to thank experts and citizens at large for so actively participating in the process.

I want to also briefly mention that the **important issue of "de-greening"** was repeatedly raised in the public consultations. This is a broad, but very important issue; and while it is not directly addressed in the GIM document, it is a **high priority for us, and one that we will tackle with all the resources and policy and legislative tools at our disposal.** There is no point in launching a "Green India Mission" if we do not act forcefully and decisively to reverse the trend of deforestation and degreening. And replacing forests with plantations is not the panacea.

Lastly, I would like to thank our team who has been working on the Mission document and look forward to taking this to implementation.

Jairam Ramesh
(Jairam Ramesh)
16.9.2010

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Executive Summary

A. Background

The National Mission for a Green India, as one of the eight Missions under the National Action Plan on Climate Change (NAPCC), recognizes that climate change phenomena will seriously affect and alter the distribution, type and quality of natural biological resources of the country and the associated livelihoods of the people. Mission for a Green India (henceforth referred to as Mission) acknowledges the influences that the forestry sector has on environmental amelioration though climate mitigation, food security, water security, biodiversity conservation and livelihood security of forest dependant communities.

GIM puts "greening" in the context of climate change adaptation and mitigation. Greening is meant to enhance ecosystem services such as carbon sequestration and storage (in forests and other ecosystems), hydrological services and biodiversity; as well as other provisioning services such as fuel, fodder, small timber and non-timber forest products (NTFPs).

The Mission aims at responding to climate change by a combination of adaptation and mitigation measures, which would help:

- enhancing carbon sinks in sustainably managed forests and other ecosystems;
- adaptation of vulnerable species/ecosystems to the changing climate; and
- adaptation of forest-dependant communities.

B. Mission Objectives

The objectives of the Mission are:

a) *Increased forest/tree cover on 5 m ha of forest/non-forest lands and improved quality of forest cover on another 5 m ha (a total of 10 m ha).*

b) *Improved ecosystem services including biodiversity, hydrological services and carbon sequestration as a result of treatment of 10 m ha.*

c) *Increased forest-based livelihood income of about 3 million households living in and around the forests.*

d) *Enhanced annual CO2 sequestration by 50 to 60 million tonnes in the year 2020*

C. Mission Targets (Outputs)

The Mission will have clear targets for different forest types and ecosystems which will enable achievement of the overall objectives of the Mission. The Mission targets 10 m ha of forest/non-forest lands and includes: a) qualitative improvement of forest cover/ecosystem in moderately dense forests (1.5 m ha), open degraded forests (3 m ha) , degraded grassland (0.4 m ha) and wetlands 0.1 m ha; b) eco-restoration/afforestation of scrub, shifting cultivation areas, cold deserts, mangroves, ravines and abandoned mining areas (2 m ha); c) bringing urban/ peri-urban lands under forest and tree cover (0.20 m ha); and d) agro-forestry /social forestry (3 m ha). The Mission also targets improvement of forest- based livelihoods for about three million households living in and around forests.

D. Key Elements of Mission Strategy

The key highlights of the Mission strategy are listed below:

- **Holistic view to "greening" (broader than plantations):** The scope of greening will go beyond trees and plantations to encompass both protection and restoration. Emphasis will be placed on restoration of degraded ecosystems and habitat diversity, for example, grassland and pastures (more so in arid/semi-arid regions), mangroves, wetlands and other critical ecosystems. The greening will not only strive to restore degraded forests, but will also contribute in the protection and enhancement of forests with relatively dense forest cover.

- **Vulnerability' and 'Potential' as criteria for intervention: Criteria for selection of project areas/sub-landscapes/sub-watersheds under the Mission will include projected vulnerability to climatic change, potential of areas for enhancing carbon sinks and the significance of the area from ecosystem services angle, such as biodiversity and hydrological services.**

- **Integrated cross-sectoral approach to implementation:** The Mission will foster an integrated approach that treats forests and non-forest public lands as well as private lands simultaneously, in project units/sub-landscapes/sub- watersheds. Livelihood dependencies, for example firewood needs and livestock grazing, will be addressed using inter-sectoral convergence (e.g., livestock, forest, agriculture, rural development, and energy)

Key role for local communities and decentralized governance: Local communities will be required to play a key role in project governance and implementation. The Mission will bring primacy to Gram Sabha as an overarching institution to oversee Mission implementation at the village level. The committees set up by the Gram Sabha, including revamped JFMCs, CFM groups, Van Panchayats, Committees set up under Forest Rights Act; Biodiversity Management Committees etc., will be strengthened as the primary institutions on the ground for nested decentralized forest governance in rural areas. Similarly in the schedule VI areas, the traditional village level institution/village councils will be supported. Likewise, the Mission will support revamping/strengthening of the Forest Development Agencies to support the field institutions.

- **Cadre of Community Foresters: The Mission will invest in the development of a cadre of community-based change agents from amongst educated community youth. These community foresters will facilitate planning, implementation and monitoring of the Mission activities at the local level. This will provide skilled employment opportunity to about one lakh educated community youths.**

- **Robust and effective monitoring framework:** A comprehensive monitoring framework at four different levels is proposed. In addition to on-the-ground self-monitoring by multiple agencies, including communities, the Mission will support the use of modern technology like Remote Sensing with GPS mapping of plot boundaries for monitoring at the input /output/ outcome level. The Gram Sabha will carry out the social audit of the Mission activities at the village level.

- The Mission will identify research priorities in support of the Mission aim and objectives. The Mission will set up a cell under the overall guidance of MoEF to link to REDD Plus activities in the country.

The Mission will implement its strategy through a set of five Sub Missions and cross-cutting interventions.

E. Mission Organisation

At the national level, the Mission will be set up as an autonomous Society under the aegis of the MoEF to facilitate smooth implementation of the Mission .

The Governing Council of the Society, Chaired by the Minister for Environment and Forests, Government of India, and drawing upon cross-sectoral representation, will provide overall guidance. The Mission will be subjected to the highest degree of financial accountability and transparency.

A revamped State Forest Development Agency will act as the State Mission Directorate and will be chaired by the Chief Minister/ Forest Minister. It will solicit cross-sectoral representation and will guide the Mission activities at the State level.

At District level, the Mission implementation will be facilitated by revamped Forest Development Agencies (FDAs) and will link with District Planning Committee. The Gram Sabha, and the various Committees set up by it, will be the key institution for planning and implementation at the village level. A federation of these Committees along with a federation of self-help groups (SHGs)/ User Groups (UGs) at the cluster level will be represented in the revamped FDA at the district level. In urban areas, the ward level committees /RWAs linked to Municipality/Municipal Corporations will facilitate planning and implementation under the Mission.

F. Timeframe

The actual implementation period of the Mission will spread over 10 years, coinciding with the 12th and 13th five year plan periods. Year 2010-11 will be utilised to get the State Action Plans in place. The preparatory phase of the Mission (2011-12) will be devoted to carrying out institutional reforms, setting up of the Mission organisation, identification of sub-landscapes/areas for the Mission interventions, identification of partners, and awareness and capacity building etc. The Mission will thus have a preparatory phase , a first phase (five years) and a second phase (five years).

G. Resources

The total mission cost is estimated to be Rs 46,000 crores.

1.0 The Context

The National Mission for a Green India was announced by the Prime Minister as one of the eight Missions under the National Action Plan on Climate Change (NAPCC). It recognizes that climate change phenomenon will seriously affect and alter the distribution, type and quality of natural biological resources of the country. The NAPCC addresses the urgent and critical concerns of sustainable development and identifies the close linkage of the economy with its natural resource base, and cautions that climate-sensitive sectors such as forestry may face a major threat because of the projected changes in climate. This will have repercussions for livelihoods of people in general, and forest-dependant communities in particular.

The Green India Mission therefore puts the “greening” in the context of climate adaptation and mitigation, aiming 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, timber and NTFPs.

2.0 Significance of the Mission

2.1 Significance of forests in relation to climate change

The Green India Mission recognizes the influences and potential that the forests and other natural ecosystems have on climate adaptation/mitigation, and food, water, environmental and livelihood security of tribal and forest dwellers specifically, and the nation at large, in the context of climate change. The Mission is therefore in a unique position to significantly contribute to sustainability of other missions for the following reasons:

2.1.1 Ameliorating climate: Over the past decades, national policies of conservation and sustainable management have transformed the country's forests into a net sink of CO_2. From 1995 to 2005, carbon stocks stored in our forests are estimated to have increased from 6245 million tonnes to 6622 m tonnes thereby registering an annual increment of 37.68 million tons of carbon or 138.15 million tonnes of CO_2 equivalent[1] .

[1] Jagdish Kishwan, Rajiv Pandey and VK Dadwal. 2009. *India's Forests and Tree Cover : Contribution as a Carbon Sink* , Technical paper. Indian Council of Forestry Research and Education, Dehradun,

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2.1.2 Food security: Forests are essential for maintaining favourable and stable conditions needed for sustained agricultural productivity. In Nayagarh, Orissa, maintaining agricultural productivity is one of the key reasons for forest protection by the community[i]. According to a study by Nadkarni[2], as much as 50% of the productivity of paddy fields in the Western Ghats is actually attributed to leaf litter collected from the forests. Organic matter is essential to maintain the fertility, structure and water-holding capacity of soils in the high rainfall region. Forests provide food directly in the following categories: fruits, flowers, leaves, stems, seeds, roots, tubers, mushrooms, etc.

2.1.3 Water security: Forests are vital for maintaining the hydrological cycle and regulating water flows and sub-soil water regimes, recharging the aquifers and maintaining the flow of water in rivers

and rivulets. However, the relationship between forests and water flows, especially the low base flows, is not always as straight forward as often *believed.* [ii] Forest ecosystems are the source of a large number of rivers and rivulets in the country. The forested watersheds have better availability as well as quality of water than watersheds under alternative land uses. For example, the Shimla catchment forest was established in the early 20th century exclusively for securing the catchment and to protect 19 springs and streams that provided drinking water supply for Shimla town, subsequently the summer capital of British India. It comprises more than 1000 ha of very dense forest.

[2] MV Nadkarni with SA Pasha and LV Prabhakar. 1989. *The Political Economy of Forest Use and Management.* Sage Publications, New Delh.

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2.1.4 Livelihood security of local communities: Forests provide a range of provisioning services, particularly fuelwood, fodder, small timber, NTFP and medicinal plants, and artisanal raw material like canes and bamboo, that are crucial to livelihood security of forest-dependant communities. Nearly 27% of the total population of India, comprising 275 million rural people, depends on forests for its livelihoods. This number includes 89 million tribal people, who constitute the poorest and most marginalized section of the country. NTFP sector with an annual growth rate between 5-15% also contributes to 75% of the forest sector export income.

2.2 Forests and Climate Change: Key challenges

The Mission acknowledges challenges on account of the demand and supply gap of various provisioning services from forests, particularly fuelwood, fodder/grass/grazing; timber, cane/bamboo, NTFP etc., creating unsustainable pressure and contributing to degradation of forests and ecosystems. The productivity of Indian forests is low as compared to the world standards, worsening the gap between demand and supply of various forest products.

Through the scientific modeling done using RCM (Regional Climate Model) and BIOME model (BIOME 4), it is projected that nearly 77% and 68% of the forest grids are likely to be impacted by climate change leading to shifts in forest types in A2 and B2 scenario[3]. Use of the dynamic global response model IBIS (Integrated Biosphere Simulator) predicts the percentage of forested grids expected to undergo vegetation change range from 3.5% in the North-Eastern states to 73% in Chhattisgarh[4]. Already challenged forest eco-systems[iii] will become much more vulnerable to the adverse climatic conditions. The forests would be vulnerable on account of the altitudinal and latitudinal shift of the species of the forest ecosystems and also on account of increased occurrences of fire, pests/diseases, invasive species, change in species assemblage/forest type, forest die-back and loss of biodiversity.

[3] NH Ravindranath, NV Joshi, R Sukumar,R.and A Saxena.2006. Impact of Climate Change on forests in India, *Current Science*, Vol. 90: 354-361.

[4] RK Chaturvedi, ,Ranjit Gopal Krishnan, Mathangi Jayaraman, G Bala,, NV Joshi, R Sukumarand NH Ravindranath. (in print) , Impacts of climate change on India's forests : a dynamic vegetation modeling approach, *Mitigation and Adaptation Straties of Global Change*

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As a result, forest-dependant livelihoods may get severely affected, especially of women who depend on fuel, fodder and food from forests, thus enhancing vulnerability of forest-dependant communities.

3.0 Mission Goal, Objectives and Outputs

3.1 Overall Goal:

The Mission aims at responding to climate change by a combination of adaptation and mitigation measures, which would help enhancing carbon sinks in sustainably managed forests and other ecosystems, adaptation of vulnerable species/ecosystems, and adaptation of forest-dependant communities.

3.2 Mission Objectives

3.2.1 Increased forest/tree cover[iv] on 5 m ha of forest/non- forest[v] lands and improved quality of forest cover on another 5 m ha of non-forest/forest lands (a total of 10 m ha)

3.2.2 Improved ecosystem services including biodiversity, hydrological services, carbon sequestration from the 10 m ha of forest/non-forest lands mentioned above at 3.2.1

3.2.3 Increased forest-based livelihood income of about 3 million households , living in and around the forests

3.2.4 Enhanced annual CO_2 sequestration by 50 to 60 million tonnes in the year 2020 .

3.3 Mission Targets (Outputs)

3.3.1 The following targets will contribute towards achievement of the overall goal/outcomes of the Mission:

- Improvement in quality of forest cover ecosystem services of forest /non-forests, (including moderately dense, open forests, degraded grassland and wetlands: 5 m ha)
- Eco-restoration/afforestation of scrub, shifting cultivation areas, cold deserts, mangroves , ravines and abandoned mining areas (2 m ha)
- Improvement in forest and tree cover in urban/peri-urban lands (0.20 m ha)
- Improvement in forest and tree cover on marginal agricultural lands/fallows and other non-forest land under agroforestry /social forestry (3 m ha)

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- Management of public forest/ non-forests areas (taken up under the Mission) by the community institutions.[5]
- Adoption of improved fuelwood-use efficiency and alternative energy devices by project-area households.
- Diversification of forest-based livelihoods of about 3 miilion households living in and around forests.

4.0 The Core Principles

4.1 The first charge on the forest/ecosystem goods and services would be that of the local communities, as mandated in the National Forest Policy (NFP) of 1988. Public forest lands which serve as the life-sustaining resource base for the rural communities shall remain in the public domain so that the benefits accrue to all sections of society.

4.2 The Mission would contribute to empowerment of communities and to strengthening the decentralized local governance of forests. The Mission would support revamping of the existing institutions and working with plurality of institutions at the local level to strengthen decentralized forest governance.

4.3 Traditional Ecological Knowledge of communities, along with forestry science and state-of-the-art technology would inform the Mission interventions.

4.4 The scope of greening will not be limited to just trees and plantations; emphasis will be on restoration of ecosystems and habitat diversity, for examples grassland and pastures, degraded forest ecosystems, mangroves, wetlands and other critical ecosystems.

[5] Community institutions refer to institutions mandated by Gram Sabha at the the village level (see section/para 5.4.1 for details)

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4.5 The Mission will provide for adaptation/ mitigation measures that enhance ecosystem goods and services, particularly carbon stocks, water, and meet biodiversity conservation and livelihood security needs. While attempts will be made to synergize adaptation and mitigation needs, local communities will be required to play a key role in prioritizing the range of ecosystem goods and services, that they value most, through a process of informed decision-making.

4.6 Monocultures and habitat fragmentation are known to increase vulnerability. The Mission will therefore focus on restoration of native biodiverse species mix at the landscape level.

4.7 The Mission acknowledges the forces of de-greening operating across the country. It will be critically important that the Mission relates with processes that halt "de-greening".

5.0 Mission Strategy

5.1 Overall Strategy

5.1.1 Livelihood dependencies of local communities such as livestock grazing, firewood and NTFP collection from forests are best addressed in an integrated manner that treats forests and non-forest public lands as well as private lands simultaneously in a given bio-physical unit, for example, landscape[vi]/sub-landscapes/sub- watershed/micro-watershed/clusters etc . For instance, livestock grazing in forests could be effectively addressed by securing enhanced fodder availability, using integrated approach across forests /grasslands/agro-ecosystem, along with provision of rotational and deferred grazing in forests as per their carrying capacity. This would require engagement of the Forest Department, Animal Husbandry, Agriculture and Rural Development Departments, and marketing federations, working in tandem with the community and farmers.

5.1.2 The Mission will promote integrated actions at *a) the village level, b) at a cluster of villages in and around contiguous forest/ sub-landscape/sub-watershed, and c) the landscape level*. Securing overlap of watershed units like micro-watershed/ sub-watershed over forest cover would help maximize opportunities for convergence with the watershed program. However, village- or hamlet-based integrated planning and implementation will be the basic unit of operation, supported by planning at higher spatial level, that is, the cluster/sub-watershed/sub-landscape level.

Development of the micro-plans will be central to the Mission activities at the village level. Preparation of the Micro Plan will be facilitated by a planning support team .Such support will be available at the level of a cluster of villages/ sub-watershed/ sub- range level.

5.1.3 Criteria for selection of project areas/ sub-landscapes/ sub-watersheds under the Mission would include projected vulnerability to climatic change. Indian Institute of Science has defined seven vulnerability classes by spatially combining information on forest diversity (monoculture versus natural forest), forest density (an an indicator of degradation) and IBIS vegetation-type change estimates for the forest grids under A2 scenario [vii]. The vulnerability maps thus prepared will provide useful criteria for selection of areas under the Mission. The other equally important criteria for area selection would include corridors, critical biodiversity habitats and ecosystems, important groundwater/ spring recharge catchments, and potential of areas for enhancing carbon sinks etc. The *State of Forest Report 2005*[6] provides state-wise details of forest area that is devoid of forest cover and could be brought under green cover. This could be an added criterion for area selection. Rural poverty and scheduled areas could be taken as additional criteria while prioritizing the areas under the Mission.

5.1.4 Measures to support adaptation of species and ecosystem to climate change variability would be factored in across the various Sub-Missions.

Box 1 Adaptation Measures across Sub-Missions

Some of the key adaptation measures that will be factored in across various Sub Mission would include:

Effective fire prevention and fire management, weed management, sustainable harvesting of timber and non-timber products, securing corridors for species migration across Protected Areas (PAs), reduced forest fragmentation by conserving contiguous forest patches (use of landscape/sub-landscape approach), anticipatory planting of species across latitudinal and longitudinal gradient, adoption of short-rotation species, promotion of natural regeneration and mixed species planting, development of drought and pest resistance in tree species and improving overall hydrological regime.

[6] Forest Survey of India, *State of Forest Report 2005*, Ministry of Environment and Forests, Dehra Dun.

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5.1.5 The Mission will add "value" to ongoing programs/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, and *c)* advisory services for benefits under REDD Plus/ CDM and would include support in outcome-level monitoring.

5.1.6 The Mission will provide incentives to communities and other agencies to protect and manage forests sustainably, through enhanced tenure security and benefit-sharing arrangements. Creating community stake in regeneration of forests/restoration of ecosystems under the Mission will require that communities have sufficient stake in terms of enhanced biomass, NTFPs and environmental services like water recharge and surface flows, biodiversity and carbon benefits from such areas. Community-driven innovative/adaptive silviculture[viii] is of critical importance to successfully implement mitigation/adaptation strategies in restoration of forest/ecosystem.

The Mission would strengthen local level planning and management for forest/ecosystem restoration across Sub Missions.

5.1.7 The Mission acknowledges the crucial role of women in forest conservation, its sustainable use and equitable benefit sharing. The Mission will not only seek greater role for women in planning and execution of various Mission interventions, more importantly, it will engage women in decision making at various level.

5.2 Sub Missions

The following five Sub Missions, integrating adaptation/mitigation measures and corresponding to the Mission targets outlined in section 3, are detailed below. Sub Mission 1 and Sub Mission 5, with an estimated area of 5 m ha, would lead to a qualitative improvement of forest/other ecosystems (including quality of forest cover in case of forest ecosystem); Sub Missions 2, 3 & 4, adding another 5 m ha, would contribute to increasing the forest cover. However, the Mission interventions will enhance ecosystem services, particularly biodiversity, CO_2 sequestration and hydrological services across all five Sub Missions. The physical targets under various Sub Missions are indicative which may change based on the State Action Plans and State-level specificity.

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Eco-restoration/afforestation of public lands will have a maintenance component of seven years.

Ravindranath and Murthy (personal communication, 2010) have estimated the incremental annual mitigation potential of the Mission interventions to about 55 $MtCO_2$ in the year 2020, using moderate to conservative carbon accumulation rates. Sub Mission-wise details have been shown in Annex-2. These estimates exclude emissions resulting from harvest and disturbance. Thus the forest sector can significantly contribute to reducing GHG emissions in India in the coming years.

Sub Mission 1: Enhancing quality of forest cover and improving ecosystem services (4.9 m ha)

Ecosystems/landscapes prioritized under this Sub Mission will include a mosaic of forest/non-forest areas representing diversity in forest density, tenure and ownership. Assuming that within prioritized landscapes the total area under open forests would be twice that of moderately dense forests, an estimated area of 4.5 m ha (1.5 m ha of moderately dense forest and 3 m ha of open forests) will be treated under the Sub Mission. Another 0.4 m ha of grasslands will also be covered under the Sub Mission. Canopy density class/ecosystem- wise details are provided below:

a) Moderately dense forest cover, but showing degradation: 1.5 m ha

Though recorded as moderately dense cover[ix], many of these forests/ecosystems are subjected to degradation on account of recurrent fire, unregulated grazing, invasive species, shifting cultivation and illicit felling etc. Conservation and sustainable management of these forests has the potential to provide both mitigation (by reducing emissions from degradation) as well as adaptation benefits.

Better protection, fire management (both prevention and detection and control), regulated grazing, invasive species eradication, management of insects and other pathogens, improving hydrological regime through infiltration zone identification and protection, soil/ moisture conservation (on ridge to valley basis) would form some of the key interventions. Sustainable management of these forests would lead to increase in stocking density, enhanced biomass and carbon stocks, along with flow of forest goods like NTFPs, fuelwood, small

timber/timber for direct livelihood benefits to dependant local communities.

b) Eco-restoration of degraded open forests: 3 m ha

Presently open forests, mostly on the fringes of villages, with crown density between 10-40%, constitute 28.84 million ha (State of Forest Report 2009)[7]. Most of these forests are subjected to intense biotic pressure and unsustainable removals. These lands have immense potential for meeting the fodder, fuelwood, small timber,

NTFP requirements of the dependent village communities while enhancing water recharge and the carbon sinks substantially.

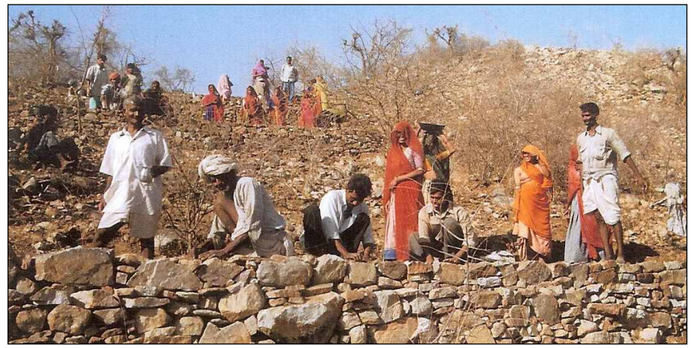
Broadly, three types of open degraded forests are envisaged: i) Type A with plenty of root stock, with little or no scope for planting, ii) Type B with open blanks having limited root stock, and iii) Type C largely open areas with sparse undergrowth

Type A area (1.80 m ha): Closure to grazing on rotational basis, soil and moisture conservation (SMC) works on ridge to valley basis, Cut Back Operations and very limited planting in gaps during second / third year may be possible. Management of these areas, as per approved Micro Plan, would be vested with community institutions. Multiple Shoot Cutting, singling, thinning in successive years has the potential to benefit local communities on a regular basis. These areas are meant to meet local needs of firewood, small timber, grass /fodder, bamboo, NTFPs, etc. Species like bamboo are known to provide huge benefits from both the mitigation and adaptation

[7] Forest Survey of India. *State of Forest Report 2009*, Ministry of Environment and Forests, Dehra Dun.

angles[8]. Regeneration and sustainable management of these forests would allow the creation of carbon sinks, would lead to an improvement in the water regime and to the restoration of biodiversity.

Type B areas (0.60 m ha): Closure to grazing, soil and moisture conservation works; focus on in-situ moisture conservation, rainwater harvesting, and run-off reduction activities on ridge to valley principle; regeneration of root stock and planting of indigenous grasses and shrubs will be priority agenda. Plantation of species of: fuelwood (short rotation), fodder, NTFPs, artisinal raw material and small-timber-yielding species will be promoted on *multi layered basis.* Planting of bamboo in suitable areas will



be encouraged. The ecological status and carrying capacity of the site, and the need to maintain a balance between evapo-transpiration and run off, and recharge of downstream aquifers by percolation, will be factored in.

Type C (0.60 m ha): These are largely open areas with sparse undergrowth.

In addition to SMC work as per Type B areas, these areas are suitable for afforestation of native fast-growing species. Investment in site preparation would be higher compared to type A and B areas. Initially it may be useful to plant leguminous species to improve the site quality which can subsequently pave the way for multipurpose species. Current examples of a such model use up to 1100 plants /ha.

[8] Bamboo: Roles in climate change, carbon sequestration and poverty alleviation under the Clean Development Mechanism of the Kyoto Protocol; International Network for Bamboo and Rattan, available at http://www.inbar.int/Board.asp?BoardID=331

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In all, 3 m ha under open degraded forests will be taken up under the Sub Mission within prioritized landscapes/sub-landscapes, across bio-geographic zones with varying degrees of productivity This would include 1.4 m ha proposed under fringe forest/ non-forest land development project [9].

c) Restoration of Grasslands: 0.4 m ha

Grasslands are often highly degraded ecosystems, and are recognized primarily as a resource for promoting animal husbandry. Native palatable species of grasses grown either by themselves or in combination with shrubs/trees of fodder value could restore these ecosystems. These lands, though predominantly located in arid or semi-arid zones, are also found in wet areas. Eco-restoration of these grasslands would render them as a good resource for animal husbandry. Effective protection, soil and moisture conservation work, seeding/slip-planting of native grass and legumes, and good management practices such as deferred/ rotational grazing (within the carrying capacity) would be of great value in restoration of such ecosystems. This could be supported by improved animal health services and, where feasible, improvement of livestock quality based on indigenous improved breeds, and reduction in the number of nondescript animals, improvement in marketing of animal products etc.

Sub Mission 2: Ecosystem restoration and increase in forest cover (1.8 m ha)

a) Rehabilitation of Shifting Cultivation areas: 0.6 m ha

The total area under shifting cultivation, or j*hum,* is 1.2 m ha, of which current *jhum* constitutes 0.56 m ha and abandoned *jhum* constitute 0.46 m ha (Wasteland Atlas of India 2010)[10]. The area under *jhum* cultivation had come down from 1.87 m ha in 2003 to 1.2 m ha in 2005-06. This is further corroborated by an increase in forest cover in three states in the North East (SFR 2009) on account of management of shifting cultivation areas under different agro-horti-forest systems. A combination of socio-cultural, legal and bio-

[9] A Project of National Rainfed Authority of India (2009), prepared in consultation with MoEF, titled "Simultaneous Treatment of Fringe Forest and Adjoining Non Forestlands for Conservation of Water, Bio-diversity, and Poverty Alleviation" .

[10] Government of India. *Wasteland Atlas of India 2010.,* , Ministry of Rural Development, Department of Land Resources, New Delhi, & National Remote Sensing Centre, ISRO, Hyderabad

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physical characteristics of shifting cultivations in a given location lends uniqueness to shifting cultivation. Although Alder-based agro-forestry in the shifting cultivation areas in Nagaland has been successful, monocultures need to be guarded against pest attack and vulnerability to market risk. Optimum utilization of indigenous knowledge based on multiple species must be factored in any *jhum* management.[11]

The Mission will support fallow management within the overall framework of socio-culturally valued, fast-growing species managed by the community. Services of agronomy and silvicuture experts along with community indigenous knowledge will be put to maximum use for fallow- management under the Mission. Learnings from existing *jhum* management models, both community-driven and those supported by the project/agencies, will be used.

b) Restoring Scrublands: 0.8 m ha

These are highly degraded forest/non-forest areas with scrub vegetation recording less than 10% forest density. Currently these area are virtually devoid of vegetation. Most such areas serve as grazing grounds after the monsoon and are prone to soil erosion.

Soil and moisture conservation measures including ridge to valley check dams, continuous contour trenches, closure to grazing and seeding of native grass/legume species helps in eco-restoration of such areas. . Afforestation of such areas through multipurpose native species should be considered after two to three years of closure and improvement in soil/moisture regime. Once rejuvenated, these areas can become an important source of grass/fodder, fuelwood, bamboo, small timber, medicinal plants, recharge of streams and groundwater, and carbon sinks. The Sub Mission will ensure community management of such areas.

c) Restoring/Planting Seabuckthorn: 0.1m ha

Seabuckthorn (*Hippophae rhamnoides L.*), popularly known as Leh berry, indigenous to the high altitudes it grows widely in the Himalayan region. The plant is hardy, can withstand extreme temperatures from -43ºC to +40ºC, and is considered to be drought resistant. The potential of Seabuckthorn in combating global warming, environmental conservation of high altitude areas of the Indian Himalayas, in health care and poverty

[11] MoEF (2008) Report of National Task Force for Rehabilitation of Jhum (Shifting Cultivation) Area; Ministry of Environment and Forests, Government of India, New Delih.

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alleviation has led to its declaration as a priority species for afforestation on marginal forest lands[x]. Being a nitrogen-fixing deciduous plant, it can be used for commercial purposes as well as for environmental protection, especially through afforestation.

Afforestation of Seabuckthorn in suitable areas in the States of Himachal , J & K , Uttarakhand and Sikkim will be taken up under the Mission. A pilot project on development of the value chain of Seabuckthorn would be taken up for further research, extension, technology intervention and establishment of a National Initiative on Seabuckthorn. The Defence Institute of High Altitude Research (DIHAR), Leh, will be the nodal laboratory for R&D activities on Seabuckthorn.

d) Restoration of Mangroves: 0.10m ha

Mangrove vegetation is spread over 4,639 sq km or approximately 0.4 m ha, of which 30% is categorized as very dense; 35% as dense and 34% as open mangrove forest.

Mangrove and coastal ecosystems deserve special conservation efforts as these ecosystems save lives and property from natural calamities such as cyclones, storm surges and erosion, and are the breeding, feeding and nursery grounds for many estuarine and marine organisms. Unfortunately, these areas are used for captive and culture fisheries often to the detriment of the mangrove ecosystem.

Andaman and Nicobar Islands present a unique situation where following the tsunami of 2004, upliftment of land in the northern islands and sinking of land in the southern islands has taken place. As a result some luxuriant mangroves in north Andamans are drying up on exposed lands which lack inundation by sea water. These areas therefore will need to be treated in a different manner. Planting of littoral species and mangrove associates to restore vegetation cover of indigenous species will be taken up. Development of artificial channels in uplifted areas to facilitate inundation by sea water and restore mangrove through planting of mangrove species along the channels will be taken up. These measures will not only restore mangrove ecosystem but will help immensely in boosting the local economy which is based primarily on fishing and collection of marine resources in the mangrove areas.

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The target of 0.10 m ha of mangrove restoration will primarily involve lands which were mangroves historically but are not under mangrove vegetation now. Along with protection/restoration of mangrove ecosystems, patches of biodiversity-rich habitats in the coastal, riverine and deltaic belt would also get protection.

e) Ravine Reclamation: 0.10 m ha

The total area under ravines is 2.75 m ha (Wasteland Atlas, 2010) in four states, namely, Uttar Pradesh, Madhya Pradesh, Gujarat and Rajasthan**.** Ravines eat into farms and villages affecting the poorest the most as they have no wherewithal to move out of these areas. These hapless people continue to suffer and become victims of ecological privations in the region.

Priority should be to stop further ingress of ravines into the non-ravine farmland by using the time-tested method of *dor bandi* [xi] (closing the ravine head). This should be matched with tackling the shallow gullies (2 to 5 meters in depth) by resorting to earthen bunds. Farmers' collective quest to reclaim the land lost to shallow gullies needs to be supported by the Mission.. Ravines on revenue and forest land abutting the farmlands could best be tackled by a building a relatively big Bund at the tail end to serve as a percolation dam as well as, to a limited extent, for water storage. The bunds could be stabilized by using a range of indigenous and useful grasses of high economic value. A higher moisture regime around earthen dams would allow good growth of Vetiver species as well as enhanced density of medicinal climbers like Asparagus, Giloy and conservation of the wild population of Guggal (*Comiphora whittii*). Planting of indigenous species of Accacia, Dalbergia etc., are known to give encouraging results.

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f) Restoration of abandoned mining areas: . 0.1 mha

It is estimated that the total land under mining in India is 7,548,61 ha, of which 6,20,372 ha is being mined for major minerals, involving 9131 mining leases; and 0.13 m ha is being mined for coal by the public sector million;. While minor minerals sector is dominated by small and medium mine leases, mining of fuel mineral is dominated by large-scale public sector mines, and of metallic minerals by large-scale private sector mines. Mines are often abandoned before proper closure. There are 296 abandoned mines (orphan mines) of major minerals and 214 abandoned coal mines number taking the total number of abandoned mines to 510. Mine closure plan was made a statutory requirement only in 2003, but a review of 36 closure plans has brought out its gross inadequacy.

The Mission will therefore work in tandem with Ministry of Mines to ensure eco-restoration of abandoned mines based on the polluter pays principle, and will use lessons from some of the best practice cases.

Sub Mission 3: Enhancing tree cover in Urban and Peri-Urban areas (including institutional lands): 0.20m ha

India has been experiencing an unprecedented pace of urbanization since the 1990s. Today, with 310 million people living in India's cities, every fourth Indian is a city dweller. It has been estimated that by 2030, more than 40% of India's population will be living in urban areas, and by 2045, India's urban population would be 800 million. Urban forests have been providing ecological services as well as supplying fuelwood to the urban poor. The National Sample Survey, in 2006, estimated that 21% of urban households use fuelwood as their primary source of cooking.

Increase in urbanization, however has also meant deterioration of air quality, increase in air temperature, noise level, and water and land pollution. Urban forests emerge as an exciting opportunity to help a) mitigate climate change, b) ameliorate air pollution c) improve the overall water regime, d) nurture urban biodiversity and e) provide shade and reduce ambient temperatures and the heat-island effect.

It is estimated that the total carbon stored by trees in urban areas is 23.89 million tonnes from an estimated 7.79 million ha urban

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area.[12] Thus, there is ample scope to increase the contribution of urban forests to overall carbon stocks.

The Mission will support urban greening by various interventions, categorising urban forests in the following broad categories:

i **Recorded or notified forest patches** which are threatened by expanding urban/industrial development. Such notified forest patches in urban and especially in peri-urban zones will be secured by appropriate fencing (wall or a combination of wall and wire mesh); restoration of representative ecosystems and plantation of biodiverse species mix to supplement natural regeneration. Special care will be taken to retain the natural local mix of grasses, herbs and shrubs along with tree species.

ii **Open spaces/green spaces like parks/wood lots** set up on municipal land will be supported to enhance their biodiversity status.

iii **Diffused planting such as on avenues and in households**: The Mission will support plantation of multiple species.

iv **Institutional lands,** especially lands belonging to or allotted to business/industrial houses and educational institutions will be supported for taking up planting of native species having multiple values for users.

Overall Strategy: It is recognized that due to high real-estate values, existing open patches of vegetation face extraordinary threats in urban and peri-urban areas. Thus, identifying and marking boundaries coupled with zoning of such areas is of

[12] Saibal Das Gupta , Rajesh Kumar & Prakash Lakhchaura. 2008. Urban Trees for Combating Climate Change, *Geography and You*, Vol 8, Sep- Oct; Special Issue on Climate Change in India

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utmost importance. Secure such high threat and vulnerable areas. Other measures will include encouraging the setting up of local users' or citizens' groups to oversee maintenance, regulation of access etc.; linking green spaces, including urban wetlands, and environment education programs by development of outreach initiatives, nature trails and interpretation activities wherever possible; making development of additional green spaces an essential and integral component of programs and schemes aimed at urban renewal and redevelopment; increasing manpower for watch and ward, setting up of mobile forces and legal services to combat encroachments, waste dumping, land grab and other threats.

The Mission will solicit the engagement of an array of institutions to support greening in urban/peri-urban areas for which detailed guidelines will be developed. Corporate sector/business houses will be encouraged to support such endeavors.

Improved amenities for urban dwellers, soil and water conservation, biodiversity conservation and improved habitats for resident and migratory wildlife would be some of the significant benefits.

Sub Mission 4: Agro-Forestry and Social Forestry (increasing biomass and creating carbon sink): 3 m ha

India is estimated to have between 14,224 million to 24,602 million trees outside forests, spread over an area equivalent of 17 m ha, supplying 49% of the 201 million tonnes of fuel wood and 48% of the 64 million m3 of timber consumed annually by the country (Pandey D.N., 2007). Total non-forest land in the country is 255 m ha, which includes fallow land (both current and permanent fallow). Non-forest land provides ample opportunity to increase forest cover, meet the needs for forest produce and create carbon sink. Non-forest lands to be supported under the Mission will include marginal farming lands/ fallow lands, trees on non-agricultural rural lands like homesteads, school yards, compounds of various offices, and private/public establishments, public spaces, roadsides, along canals, etc. The Mission will 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. The Mission will not support any diversion of productive agricultural land under this component. Moreover, the species

selection for agro-forestry/social forestry would be centered around farmers preference for multipurpose species

Reliable and sufficient data is available to indicate that a) there are sharp variations in productivity of plantations of agro-forestry species across the length and breadth of the country and b) productivity of tree crops on agricultural lands in India is much lower than the same achieved in many other countries (e.g., Brazil and Indonesia). This seriously undermines the real potential of agro-forestry/tree farming in India to the detriment of the farmers as well as to efforts to divert pressures away from areas under natural forest cover.

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 seeding production and transportation could be taken up by the private sector/farmers/women's SHGs on a competitive basis, with back-up support from the Forest Department, research institutions and private sector agencies currently engaged in this field. The quality seeding so produced would be provided to farmers at a subsidized price for which the Mission will provide the subsidy. The Mission may also consider dovetailing institutional financial support to farmers to go in for farm-forestry on their fallow lands/unproductive lands.

Backed by the Forest Department or the private sector, farmers have proved to be the best extension agents. The Mission will provide support for setting up of Farmers Field Schools or models on farmers' fields for a cluster of village as learning and demonstration units.

Agro-forestry systems can continue to act as sinks even after harvesting, if harvesting is accompanied by regeneration. The sink is further improved if the the life of wood is further increased by proper treatment, leading to substantial increment in the locking period. The Mission would examine the possibility of providing support to such post-harvest practices. The Mission will also support putting in place a system for certification of seed and genetically improved clonal planting stock and/or registration of clones and nurseries in India. Accreditation of the nurseries will be accorded high priority. The Mission will help in revamping /supporting the Social Forestry directorates/wing of the Forest Department.

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In all, 2.30 m ha of private land, 0.10 m ha of shelter belt and 0.60 m ha on the side of roads, canals and on other institutional lands including areas available in schools and colleges will be targeted under the Sub Mission .

Sub Mission 5: Restoration of Wetlands: 0.10m ha

India has a total of 67,429 wetlands, covering an area of about 4.1 million hectares[13]. Of these, 2,175 are natural and 65,254 are manmade. Of the 1,712 wetlands declared globally as protected Ramsar sites, 25 are in India and cover 677,131 hectares in 14 states.

Wetlands provide livelihoods to local communities; more importantly, the ecosystem services which they provide, such as recharge of groundwater, are of great significance to local communities. Wetlands host hundreds of species of migratory and local birds, fish, amphibians, insects, plants and trees. With the capacity of wetlands to store large quantities of water after heavy rainfall and release this gradually in a stable flow, wetlands, like marshes and lakes, have proved to be key areas to help the world to adapt to climate change impacts. Moreover, they help control floods, stabilize shorelines and mitigate climate change.

Wetlands today are a threatened ecosystem owing chiefly to encroachments; change of land use, infrastructure development, pollution, growth of invasive species and over-fishing.

Wetland ecosystems are high on soil carbon (peat). Loss of wetlands means losing carbon-rich organic peat soil, loss of biodiversity and of livelihood opportunities for local communities.

[13] Ministry of Environment and Forests (MoEF), 1990.

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The Mission will provide support in developing systematic wetland inventories at desired spatial and temporal scales. In addition, wetland catchment conservation including treatment of catchment areas, support to compatible land-use practices, fencing of strategic areas to protect wildlife and control encroachments, control of invasive weeds, pollution control measures, water quality monitoring, and community-based ecotourism enterprises would be some of the key interventions.

Restoration measures will be so carried out that they will cause least disturbance to wetland habitats, more so at the margins that provide transition zones or ecotones. Efforts will be made to restore the drainage system and links across neighboring wetlands, in order to recreate natural flow for recharge of the wetlands. Carefully selected aquatic species will be planted on the banks and islands. Local communities would be encouraged to continue with compatible use of wetlands and seek new opportunities for livelihood enhancement (e.g., ecotourism). Coastal wetlands will also be identified for protection.

Priority will be given to those wetlands that have a high value as habitats for animal, bird and plant life, in order to achieve biodiversity conservation along with livelihood improvement and carbon benefits.

5.3 Cross-cutting Interventions:

5.3.1 Improving fuel-use efficiency and promoting alternative energy sources: The energy security and carbon emission reduction objectives will be through energy efficient devices and alternative energy sources. Primary targets will be areas burdened with unsustainable harvesting and use of fuelwood. Promotion of

alternative energy devices such as biogas, solar devices, biomass-based energy and expansion of services for cleaner cooking fuels like LPG in rural areas; improved fuel-efficient stoves etc. would help in reducing pressure on forests, gaining carbon benefits, along with health and other associated benefits.

The sub-component would be technically and financially strengthened in convergence with MNRES and other partner agencies. The program will be implemented in all areas where forest/ecosystem conservation/restoration work is undertaken under the Mission.

5.3.2 Community Livelihood Enhancement: The Mission interventions outlined above will create both wage employment and skilled employment opportunity for households. It is estimated that the interventions under various Sub Missions will generate 2400 million person days of wage employment costing about Rs 24,000 crores. Additionally, over one lakh community youths will get skilled employment opportunities, costing approximately Rs 4800 crores.

The Mission is expected to substantially enhance forest-based biomass in the form of food, fuelwood, grass/fodder, timber, bamboo, cane and NTFPs[xii] to help community augment their livelihoods. The augmented ecosystem services like water flows, biodiversity and carbon pools would further provide opportunity for augmenting incomes. Rich biodiverse and cultural landscapes could provide the potential to build up community-based eco tourism enterprises.

Lack of sustainable harvesting practices and problems of NTFP productivity are some of the main barriers in NTFP management in most parts of the country. The Mission will support technology for value-added products, certification and marketing of NTFP, which would support bridging the knowledge gap. Institutional architecture engaging national research institutions, state level/ district level agencies, and the federations of NTFP collectors at the cluster level, will be crucial to support a two-way flow of knowledge and information for sustainable NTFP management and improved marketing[14].

The Mission will support village /cluster/sub-landscape-based planning for livelihood enhancement. The villages falling in the identified area under the Mission will be given adequate financial

[14] Singh KD, NTFP Management in India, Workshop Proceedings , JFM in India, IIFM, 2006

support to plan for the livelihood support activities, based on sustainable resource-use principles. Lessons from projects like Tamilnadu Afforestation Project (TAP) and other such interventions elsewhere have demonstrated that the financial resources to the tune of Rs. 15-25 lakhs made available to the village institutions could significantly contribute to livelihood support activities on one hand while securing larger community engagement in forest conservation.

5.3.3 Corridors for connectivity: Habitat fragmentation would be a constraint to climate-change-induced migration, especially in species with limited dispersal abilities. "Corridors" are needed for effective dispersal and establishment of species. Both plant and animal species need to adapt through migration along latitudinal and altitudinal gradients. Assisted migration of species would be possible through connecting corridors. While prioritizing the areas to be taken up under various SubMissions, corridor consideration would be taken on board along with other key criteria.

The Mission will support the setting up of a Task Force to identify/prioritize critical corridors; and will support working with an array of stakeholders including district business houses, farmers, schoolchildren, resort owners etc. to maintain corridors; working with farmers and local communities to regulate change of land-use, maintaining cover through agro-forestry, preventing crop raiding in corridors through fencing. Other key interventions would be rapid agency response in case of crop raiding and livestock loss, crop and livestock insurance, and simplified, hassle-free compensation.

5.3.4 Community conserved areas and sacred groves: Community conserved areas (CCAs) are defined as "Natural ecosystems (forest/ marine/ wetlands/ grasslands/ others), including those under minimum to substantial human influence, containing significant wildlife and biodiversity value, being conserved by communities for culture, religious, livelihood, or political purposes, using customary laws or other effective means"[15]. Examples of CCAs from across the country include many sacred groves.

Sacred groves are scattered all over the country, from scrub forests in the Thar Desert of Rajasthan maintained by the Bishnois, to rain forests in the Kerala Western Ghats, and are referred to by different

[15] N Pathak, (2009). *Comunity Conserved Areas in India: A Directory.* Kalpavriksh, Pune

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names in different parts of India Around 14,000 sacred groves have been reported from all over India, however their total number could be much higher. Sacred groves act as reservoirs of rare fauna, and more often of rare flora, amid rural and even urban settings.

The Mission will support CCAs, including sacred groves, through institutional, policy and legal measures. The CCAs, as part of various landscapes/sub-landscapes prioritized under the Mission, would be given support for protection and conservation using institutional diversity represented by the CCAs.

5.3.5 Understanding, identifying and protecting areas/catchments of hydrological importance: Forests play a key role in groundwater recharge and maintaining water quality. By moderating the hydrological cycle, native species forests and grasslands can often moderate monsoon peaks and enhance lean season flows in streams and rivers. On the other hand, certain exotic and invasive species can have adverse effects on both local biodiversity as well as the hydrological regime. Increased variability in rainfall patterns and more extreme events will enhance the importance of the hydrological function of forests and other landscapes in adapting to climate change. What is clear is that a combination of vegetation and the underlying hydrogeology promotes infiltration and groundwater recharge.

Thus the Mission will promote research to understand the linkage between vegetation and groundwater and surface flows, and encourage the identifying and protecting areas of hydrological importance within the various sub-missions. In such identified areas, priority will be given to protection and activities that enhance recharge. These could range from small spring recharge zones in mountain areas, to larger landscape elements. The key here will be to identify and prioritize the high recharge zones at multiple scales and then provide protection and appropriate interventions using the zoning approach. The Mission will support activities at the village level to identify vulnerable hill slopes and to take up protection and soil/water conservation measures backed up with plantation of suitable indigenous species. Protecting and enhancing the watershed services of forests and other ecosystems will be a key element of enhancing the adaptation potential for local communities. Incentivizing communities to protect such areas over time in their own local interest and broader societal interest would also be considered.

5.4 Strengthening Institutions for Decentralized Forest Governance

5.4.1 Strengthening local community institutions

a) *Strengthening decentralized governance through Gram Sabha and its committees/ groups:* Local institutions have a significant bearing on forest conservation and its sustainable use, more so at a time when market forces are putting tremendous pressure on natural resources. The institutions at the local level to deal with forests include: Joint Forest Management Committees[xiii] (JFMC), Community Forest Management groups (a large number in Orissa), Van Panchayats (Uttarakhand), traditional village level institutions/ Village Councils (schedule VI area); Biodiversity Management Committees, Forest Committees set up under rule 4 e of FRA etc. Self Help Groups /Common Interest Groups have also been set up at the village level to promote forest-based livelihood activities.

The spread of Joint Forest Management, despite several limitations and uncertainties in terms of tenurial insecurity, inadequate silvicultural development, and restricted harvesting and market access, has helped in regenerating forests and meeting local needs (Milne, 2006)[16].

Panchayati Raj Institutions (PRIs) are constitutionally mandated bodies for decentralized development planning and execution at the 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 the right to protect, regenerate and manage Community Forest Resource[17]. It is obvious that this right also places a great deal of responsibility on the community which it has to fulfil. The Gram Sabhas have been authorized to set up institutions to ensure this (4 e of Rules).

Strengthened Gram Sabhas[xiv] hold the key to decentralized governance of forests and natural resources. Informed Gram Sabhas would mean better coordination and linkages across different institutions at the local level, and improved accountability of such institutions.

[16] "Unlocking Opportunities for Forest Dependant People in India Report No. 34481 – In Volume 1 2006, World Bank"

[17] The Scheduled Tribes and Other Forest Dwellers (Recognition of Forest Rights) Act, 2006 Section 3 (i)

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The Mission would therefore help strengthen Gram Sabhas as the overarching institutions. A village-level institution dealing with protection and management of forests will need to be set up by the Gram Sabha. This would not only help in strengthening the GS, but would also help in necessary convergence of resources and integrated planning at the village level. Leadership provided by the committees of the GS and the UGs/SHGs would contribute to strengthening of Gram Sabha.

Livelihood activities and enterprises as well as protection of forests have often been effectively addressed at the cluster level/sub-landscape level, led by federations of SHGs/Common Interest Groups (CIGs) and federations of forest committees.. The Mission would therefore encourage federations of thematic committees/groups such as JFMCs/CFM/VPs/FRA committees etc, as well as livelihood promotion groups like SHGs/CIGs to plan for forest protection, conservation and livelihood activities. However, making of such federations needs to be the decision of communities and their respective Gram Sabha.

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 the landscape/sub- landscape level. These learnings need to come from an array of initiatives initiated by government and non-government organizations.

b) *Revamping JFMCs:* The Mission will provide an opportunity to reform the JFM. As an institution the JFMC must conform and contribute to decentralized forest governance , empowering the community on the one hand while securing sustainable forest management on the other. To allow greater decentralization of decision making , devolution of power, and adequate support, the following steps would be helpful:

1. The JFMC will set up by Gram Sabha, its constitution and processes need to be in tune with the provisions as laid out in the State Panchayat and PESA legislation.The JFMC, as a committee of the Gram Sabha, must be given power to protect and manage as well as derive benefits from forests. The Mission will examine provisions of the Indian Forest Act to provide power of a forest officer to such a committee. Provisions in the Panchayat Raj legislations in the States would need to acknowledge the role of JFMC as a committee of the Gram Sabha.
2. The JFMC must be provided resources (on a regular basis) and necessary skills to carry out its mandate.
3. Silvicultural management of the area assigned to JFMC must be as per the plan approved by the Gram Sabha, following the technical approval by the Forest Department.
4. Forest Department's role would be to provide demand-based support to the Gram Sabha and its mandated committees to strengthen decentralized forest governance leading to sustainable management of the forests.

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Similar provisions with necessary modifications could be made applicable to other committees of the Gram Sabha as well as to Village Councils (in North Eastern states) entrusted with the responsibility of managing forests and natural resources.

c) <u>*Revamping FDA:*</u> The current FDA structure and its role would be revisited so as to make the FDA a leading institution in contributing to decentralized forest governance and providing valuable services for forest conservation and improved livelihoods of people living in and around the forests.

1. The FDA at the district /division level will be chaired by the elected representative., such as the Zila Parishad president which would help in program convergence with the Panchayati Raj institutions...
2. The executive body of the FDA would have elected representatives from clusters/wards, comprised of revamped JFMCs. Such clusters could be formed at sub-block , sub-range , range or sub-landscape/landscape level.
3. Committees of Gram Sabha dealing with forest protection and development (other then revamped JFMCs) and their federations would also be represented at the district /division level.
4. SHGs/UGs and their federations engaged in forest-produce-based enterprise would be represented at the division level/district level FDA.
5. Representation of civil society organizations would be ensured.
6. Representation of line agencies particularly Rural Development, Age, riculturLivestock, Fisheries, Horticulture, Revenue, Drinking water, Health, Tribal Welfare and Education will be secured. All the Government. officials will be ex-officio members and would not have voting rights.
7. The CEO of the FDA will be the DFO.

The key role of the FDA will be to facilitate demand-based planning and implementation of forest conservation and community development by the local bodies mandated by Gram Sabha[xv]. It will need to forge partnerships with local NGOs/CBOs; academia, PRIs, research and training organization, people's representatives, media and Government line agencies to carry out the role.

In order to carry out the functions as outlined above, the FDA as an institution would need to be strengthened with skill/

knowledge support, sourced on contractual basis. Adequate infrastructural support will be provided for this.

d) *Building capacity of local institutions*: The Mission will support capacity building of the local community institutions as a long-term measure to help them effectively protect, regenerate and manage forests and undertake forest-based livelihood enterprises**.** Sustainable forest management and utilization will require sound knowledge in inventorization (including growing-stock enumeration, regeneration surveys, biodiversity and carbon assessment etc), adaptive silvicultural practices, sustainable NTFP harvesting, value addition and marketing; and monitoring of impacts. Traditional Knowledge, forestry science and Information and Communication Technology will provide the building blocks of the capacity-building endeavour.

e) *Building a cadre of Community Foresters:* The Mission is meant to nearly double the ongoing efforts of greening the country. This will necessitate developing extra hands from within the community, namely youths from the community who on one hand would provide service to the community, and on the other hand would link to a large number of other service providers, including the Forest Department and other agencies.

Given the fast changing rural scenario with an increasing number of educated unemployed/underemployed youth, the Mission will support development of youth cadres as Community Foresters to lead the charge at the local level. Support of the Forest Department, research institutions, universities/colleges from local area and NGOs would help develop this cadre of Community Foresters as self-employed change agents. *The Mission has the potential to develop about one lakh skilled local community youths who would provide support in community-based forest conservation, community livelihood enhancement and change monitoring etc. These youth will also act as a bridge between the community and the service providers like the Forest Department.*

The example of the Carbon assessment under " Project Kyoto: Think Global Act Local in Uttarakhand", 2009 in Lamgarha block in Uttarakhand proves the point that rural educated youth are quick to pick up skills, and have a huge potential to provide support to the community in planning, implementation and monitoring of the greening program at the local level. The Mission will learn from such examples and develop innovative and cost-effective

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models that would be replicable with ordinary resources and by building the capacity of community youths.

5.4.2 *Role of NGOs*: The Mission envisages the role of NGOs as partners in furthering the Mission mandate specially in community mobilization, strengthening of the Gram Sabha and its myriad bodies, in facilitating community ownership and management of natural resources, developing the cadre of skilled community youths etc. NGOs and as Process Support Groups would help in strengthening of institutions at various levels, from village level institutions to the State bodies. The Mission will ensure representation of NGOs in decision making bodies at different levels. The Mission will set the process guidelines for engagement of NGOs with proven track record. The State Mission organization, by using the guidelines, will be able to identify such NGOs and provide them with necessary support to help achieve the Mission objectives.

5.4.3 Strengthening the Forest Department: The Mission envisages a new role for the Forest Department. The engagement of community institutions in facilitating field actions will require sensitization of the Forest Department officials and front-line staff. The new role in no way will diminish the relevance of the department; on the contrary getting community institutions to play a leading role under the Mission would put the department in the role of an "enabler "in addition to its statutory role in protection and management of forests . The Forest Department will also need to ensure compliance with technical prescriptions spelt out in the Mirco Plan. It would be required to respond to the call of community institutions in providing greater support in "protection" in case of sensitive areas. The technical knowledge of the department will come to the fore to help develop quality planting material, designing eco-restoration programs, pilot testing of climate change adaptation measures, creating an enabling regime that helps farmers and communities to plant, protect and harvest trees/forests without having to incur huge transaction costs.

The frontline formation of the department currently suffers from serious limitations. A large number of vacancies currently exist at the level of frontline staff. Of the total sanctioned frontline positions of 1,37,000, there are 22,880 vacancies (MoEF, 2008) and more then 40% of the staff are in their late 40s and early 50s.

A time-bound program of the State Forest Departments to fill the vacant posts and prepare a perspective plan for a continuous inflow of personnel will be of utmost importance. The Mission will support the recruitment process by focused advocacy and even provide financial support for salaries of frontline staff for a limited period.

Capacity building of frontline staff, on a regular basis, to carry out the emerging role will be given high priority. Teams of Subject Matter Specialists at the level of revamped FDAs (on contractual basis) could bring in new knowledge and skills. The arenas include Information and Communication Technology (including RS/GIS capabilities), community mobilization, watershed/soil moisture/ water harvesting; hydrogeology, finance, ecological restoration/ REDD issues etc. The Mission will support strengthening of the Range Offices inter alia developing them as forest and wildlife resource centres (with library, documentation, map room, GIS and MIS cell facilities). This support could also be availed of by the partner agencies working in the sub-watershed /sub-landscape.

Infrastructure support in terms of enhanced mobility and communication at forest Range and Section level will enhance the rapid response needed for forest protection, fire protection, control of crop-raiding wildlife, etc.

5.4.4 Engaging Schools and Colleges

Schoolchildren and college students are a valuable and enthusiastic group to help further the Mission objectives, while in turn receiving real-life learning by their involvement. India has about 1 million recognized schools[18] and some 10,000 colleges.

[18] MHRD.2001. *Annual Report 2000-01*, Ministry of Human Resource Development, Government of India. New Delhi.

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Programs such as the National Green Corps (NGC) coordinated by MoEF, NCC and NSS, and many other initiatives taken by NGOs have shown a great deal of potential to engage school and college students and teachers in monitoring natural and restored forests and other landscapes as well as in actual "greening" activity. Working in tandem with these programs/initiatives and organisations, the Mission would help put more meaning into such programs/ initiatives while also scaling them up. One of the key handicaps in rural schools is inadequate fencing of the school plantation and its maintenance during the summer holidays. The Mission will provide support to enhance protective fencing and after-care of the plantations taken up under such initiatives.

5.5 Convergence with Cross-sectoral Programs; Adding value through support activities and relations with other Missions

a) Convergence with programs and schemes

The Mission would link with other ongoing land-based greening/restoration programs and schemes of different agencies. While working with existing programs/schemes, it would add "value" to them through a) technical inputs on species from climate mitigation/adaptation angle, b) improving policy regime/investment climate to help different agencies plant, protect and manage forests for multiple benefits, and c) providing services for improved monitoring at the outcome level to avail benefits under REDD Plus, CDM and other carbon market mechanisms.

Key ongoing programs/schemes (and those in the pipeline) include Integrated Wasteland Management Program; Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) under MoRD; schemes of Animal Husbandry Department, The Ministry of New and Renewable Energy (MNRE) programs on renewable energy. Similarly, ongoing programs/schemes of MoEF include National Afforestation Program, Intensification of Forest Management Systems, Compensatory Afforestation Management and Planning Authority (CAMPA), schemes under the13th Finance Commission, Capacity Development for Forest Management and the Personnel Training Project of MoEF under Japan International Cooperation Agency (JICA) collaboration, etc.

Comments

Various Mission interventions would seek convergence and learn from already ongoing Missions such as JNURM, National Watershed Mission, and Horticultural and Bamboo Mission.

The convergence with ongoing program/ schemes will be secured by getting representation of the concerned department/ministry in the organizational structure of the Mission at different levels. At district level, it will be further reinforced through linkages with the District Planning Process. Finally at the village/cluster/sub watershed/ sub landscape level, the planning process will be taken up using the convergence route.

From a cursory assessment, it is estimated that treatment under different schemes/programs would target about 10 m ha over the next 10 years, at a cost of approximately Rs 37,000 crores. It is presumed that the current level of investment in real terms in the 12th Five Year Plan will continue, whether under the existing schemes or under the Mission umbrella.

b) Convergence with other Missions

Other Missions of the climate change plan process are crucially relevant to the Greening India Mission and vice versa. The Mission will seek synergy with strategy and actions of related missions. For example, the ones related to energy, if moulded towards achieving local energy security through renewable/alternative sources, can considerably reduce fuelwood collection pressure on forest ecosystems. The Mission will actively engage with other related Missions under NAPCC during the preparatory phase so as to ensure convergence and synergy across the Missions.

5.6 Improving the Investment Climate to help Engagement of Multiple Stakeholders/ Agencies to plant, protect and manage forest and tree cover

a) **Improving investment climate for farmers**

Trees on private holdings can play an important insurance role in rural economies, provided they can be harvested at short notice. When regulations are complex, however, farmers in need suffer substantial losses by distress selling of their trees to agents. In effect this problem may be considered a regulatory barrier to conducting the business of growing trees, thus reducing the likely returns on investment and acting as a constraint to farmers investing in growing trees. For example, trees on private lands, especially the

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so-called 'forest species' in most states are governed by several regulations. Permissions are required for harvest, commercial use, own use, transit of forest produce as well as conversion of land use. In combination, these regulations pose diverse types of controls, multiple points of regulation, and considerable regulatory burden on farmers as well as on the implementing agencies[xvi]. Implementing regulation for trees outside forests rigorously places an enormous regulatory burden on the implementing agencies, with limited benefits. A review of regulations pertaining to trees on private lands in MP led to the passing of the Lok Vaniki Act, although its implementation has not been hassle-free.[xvii]

In the private sector, tall claims and lack of regulation of plantation companies led to the teak plantation investment scams of the 1990s. 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 Mission will 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.

b) **Certification**

Certification promotes and assures Sustainable Management of Forests , taking explicit account of environmental, economic, social and cultural dimensions of forest management, conservation and development in a holistic manner. It is also required for eco-labeling and related chain-of-custody (CoC) and legality verification, thereby promoting ethical trade and market for timber and non-timber forest products as well as socially responsible procurement policies and green consumerism. In addition, certification can help in securing local biodiversity and watershed services as well as social benefits of fair trade that benefit communities. Community-oriented carbon sequestration projects typically require forest certification of some sort.

India's forest sector faces the dilemma of an increasing demand for timber owing to burgeoning urbanization and economic growth on the one hand, and the need to conserve, preserve and restore forest resources for their ecosystems services, on the

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other, As such, there is an ever-growing gap between demand and supply of wood and products. India has a huge untapped potential for export of its processed wood and non-wood products with valorization and benefit sharing among the various stakeholders, including local communities, forest custodians and owners, producers and processors, traders and retailers. That is possible only if forest certification system is in place for requisite CoC eco-labelling and for assuring the legality and sustainability of the source of the products and thereby enable unbridled access to ethical trading and market arenas with price premiums.

The MoEF has constituted the National Forest Certification Committee (NFCC), a multi-stakeholder committee for the purpose. NFCC has prepared a report for developing and designing a national forest certification system and installing an Indian Forest Certification Council.[xviii]

The Mission will provide a sufficiently large corpus fund for setting up an independent certification organization with the support of different stakeholders.

5.7 Research & Development

5.7.1 Research to support Mission aim and objectives:

The Mission will identify research priorities in support of the Mission aim and objectives. Some of the key research areas would include long-term research to study vegetation response to climate change; silvicultural and management response to achieve the Mission objectives; pilot adaptation projects to develop adaptation options, strategies and practices; benchmarking carbon capture potential of ecosystems and economic evaluation of ecosystem goods and services; measuring degradation within density class ranges; social and economic research and studies, etc. The scientific and technical capability of forestry research institutions including Indian Council of Forestry Research and Education (ICFRE) would be significantly enhanced for ecological research and modeling of climate change impacts, mitigation and adaptation aspects. The Mission would support the strengthening of the research institutes under ICFRE and the State Forest Departments, including financial support for increased strength of scientists and their support staff, better infrastructure, equipment, etc.

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Since many of the proposed interventions are innovative, it would require an unprecedented level of collaboration of research institutions and the implementation agencies. ICFRE collaboration with academic scientific institutions of repute, both in country and overseas, joint research programs; exchange visits, capability building etc would be strongly supported under the Mission.

5.7.2 REDD Plus[xix] Cell

The Mission will set up a REDD Plus Cell under the overall guidance and supervision of the Ministry of Environment and Forests . The Cell will have the task of creating awareness/capacity building on the REDD Plus process for all stakeholders, including the community institutions. A comprehensive REDD Plus strategy would be worked out through an inclusive process. The Cell will design and formulate appropriate REDD Plus projects/strategy as consistent with the objectives of this Mission and propose, as necessary, for implementation/funding support to the designated bodies in accordance with the policies and decisions of the relevant authorities/bodies at the national and international level. Consistent with the architecture and rules agreed under UNFCCC for setting up REDD Plus mechanism, the Cell may also be required to provide technical advice to the appropriate national authorities on development and implementation of Monitoring Reporting & Verification (MRV) protocols and fair benefit-sharing mechanisms in the forestry sector. This will be done through improved capacity and comprehensive methodology design for forest carbon inventory as per internationally and domestically agreed rules for Measurement, Reporting and Verification System (MRV).

The Mission will improve capacity of multiple stakeholders, particularly forest-dependant communities, to implement REDD Plus at decentralized levels.

A majority of interventions under the Mission have potential to qualify under REDD / REDD Plus.

5.8 Monitoring and Auditing the Greening Mission

5.8.1 Monitoring at outcome/output level

The Mission will focus beyond input level/activity to outcome level over time by a combination of impact assessment at the field-unit level and application of modern technology like Remote Sensing and GIS.

Comments

Monitoring under the Mission will help in timely information for planning and feedback to multiple agencies/ stakeholders. In addition to on-ground self- monitoring by multiple agencies and communities, the Mission would support use of Geomatics (remote sensing with GPS mapping of boundaries) for monitoring at the output/ outcome level.. This service will be available for both Mission-financed activities as well as those undertaken and financed by other agencies/ stakeholders.

Monitoring is proposed at four levels-

Level 1: On-ground self-monitoring of the region by the local community, implementing organization and the Forest Department. Building community capacity to monitor Carbon and other services is envisaged using lessons from pilot projects.[19]

Level 2: Field review by an external agency of randomly selected sites This will be primarily for Mission-financed activities**.**

Level 3: This will use remote-sensing-based forest cover monitoring by the Forest Survey of India, supplemented by boundaries of areas covered under the Mission. The Mission will work in close collaboration with Forest Survey of India, National Remote Sensing Agency and Indian Institute of Remote Sensing for developing a countrywide mosaic of high resolution satellite images (LISS IV, Cartosat) and overlaying polygons of areas taken up for interventions under the Mission to help develop a centralized spatial data base in the GIS domain. Density slicing could be used to gauge migration within density class.

This service will be available for both Mission-financed activities as well as those undertaken and financed by other stakeholders. The real-time, web-based monitoring system being developed for CAMPA by National Informatics Centre (NIC) , will be taken as the starting point for the system.

Level 4: In addition, a few pilot areas will be intensively monitored to assess the impact and efficacy of different old and new practices, in tandem by the implementing agency, the Forest Department, and a support organization. In addition to growing stock and forest cover, other parameters will include

[19] Verplanke, J.J. and E. Zahabu, Eds. 2009: A Field Guide for Assessing and Monitoring Reduced Forest Degradation and Carbon Sequestration by Local Communities..

monitoring environmental services and associated factors: ground cover, soil condition, erosion and infiltration, run-off, groundwater levels to develop water budgets, as well as the provision of locally relevant fuelwood, fodder, and other NTFPs, and basic biodiversity analysis. This would facilitate review of different regulatory conditions in the future This analysis would require extensive support for communities and could form the basis for REDD-based monitoring methodologies.

All the interventions under the Mission will be assessed for the climate change adaptation/mitigation angle, as well as for the provisioning services critical to community livelihoods.

5.8.2 **Social Audit by Gram Sabha**

The Mission will learn from best practices on social audit, particularly the one designed for MNREGA. Section 17 of the NREGA Act empowers the Gram Sabha to carry out a social audit of all the works carried out by the Gram Panchayat. It requires that the Gram Panchayat make available all relevant documents, including the muster rolls, bill, vouchers, measurement book, copies of sanction orders and other connected books of account and papers to the Gram Sabha for the purpose. Taking a cue from the MNREGA, the Mission will similarly require that the Gram Sabha carries out a social audit of all expenses incurred by the Committees constituted by the Gram Sabha and these reports would be shared in the public domain.

5.8.3 Audit by Govt. bodies

The Mission accounts will be subjected to audit by Comptroller and Accountant General (CAG) at Centre and by Accountant General (AG) in the States. Achievement of annual targets will be governed by the local conditions/site- specific planning in each State covered under the Mission, and may at times be at variance with the overall Mission targets. The CAG and the AG will need to be taken on board from the very outset to understand such variations

5.9 Making Green India Mission a People's Program

5.9.1 Mission Outreach

The Mission seeks to unlock people's energy and solicit their engagement with the greening program. It will strive to secure participation of multiple agencies/ organizations/ individuals (community, farmers, Panchayat bodies, Government./non-government, Private institutions/agencies, academia, business

houses, children especially in rural communities, media, etc.) in greening activities. The Mission will develop a communication strategy to engage an array of stakeholders. It will provide support to various agencies/organizations to undertake Mission interventions through provision of knowledge and knowhow, monitoring support, planting material and financial models for participation, as well as engage in decentralized monitoring.

5.9.2 **Innovation Fund**

The Mission will provide a demand-driven window for innovative initiatives and small scale projects to a range of stakeholders. The innovation funds would be available at national, state and district-level Mission organization. At State level the innovation fund could be used for cross-cutting research/action research studies. At district level, the innovation fund can be used for initiatives by the local-level organization to try out things in consonance with the overall Mission goals and objectives.

6.0 Mission Organization

The Ministry of Environment and Forests will be responsible for operationalizing the Mission activities at the national level through an autonomous institutional architecture.

National level:

At the national level the Mission will be set up as a Society to facilitate smooth implementation of the Mission.

The Governing Council of the Mission, chaired by the Minister Environment and Forests, will provide overall guidance and synergy of actions. The Council will have representation from Ministries/Department namely Environment & Forests, Planning Commission, Tribal Welfare, Rural Development, Panchayat Raj, Agriculture, Finance, Ayush etc. Eminent experts, research institutions, State Forest Department (by rotation), community representatives, civil society organisations, corporate sector etc. will be represented in the Council.

The Mission Director will be the Member-Secretary of the Governing Council.

The Mission will be adequately staffed with experts and office support/infrastructure for carrying out the Mission mandate. The Mission will exercise the highest degree of financial accountability and transparency. All the rules, financial codes and

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procedures, including procurement of goods and services, will generally follow procedures as laid out in the Government. The accounts of the Mission will be subjected to CAG audit. To maintain the highest standards in financial transactions, the Mission will have services of a Financial Advisor on deputation from the Finance Ministry. A clear devolution of administrative and financial powers will be made for the Mission to facilitate smooth and timely implementation of the Mission activities.

State level

To avoid multiplicity of agencies, a revamped State Forest Development Agency (SFDA) will act as the State Mission Directorate. States will be advised to revisit the constitution of the SFDA to ensure representation of all key interests as spelt out in the Mission organisation at the national level. The revamped SFDA would be chaired by the Chief Minister/ Forest Minister.

District and village level

The Mission activities at the district level will be facilitaed though a revamped Forest Development Agency. The planning process will be suitably linked with the District Planning Committee. .

At the village level, planning and implementation will be vested with the local-level institutions of the Gram Sabha, i.e., revamped JFMCs, CFM groups, Van Panchayats, Village Council, Biodiversity Management Committees, or any new institution set up by the Gram Sabha for CFR provisions under Forest Rights Act, 2006. The institutions at village level would link to the cluster level, sub-watershed/sub-landscape level.

In urban areas, the ward-level committees/ Resident Welfare Associations linked to Municipality/ Municipal Corporations will facilitate planning and implementation under the Mission.

7.0 Timeframe

7.1 The actual implementation period of the Mission would spread over 10 years, coinciding with the 12th and 13th Five Year Plan period. 2011-12 will be taken as the preparatory phase of the Mission. Thus, the Mission will have a preparatory phase, a first phase (five years) and a second phase (five years).

The preparatory phase of the Mission will be utilized for carrying out the reforms, setting up the Mission organisation, leveraging resources for the Mission, identification of sub-landscapes/areas

for Mission interventions, identification of partners, creating awareness across multiple stakeholders, setting up/ revamping and strengthening of institutions to improve decentralised forest governance, sensitization of Forest Department/ multiple agencies, and forest-dependent communities, capacity building of staff and the communities, commissioning of research/ assessment, etc. The Mission would consider getting many of these actions in the preparatory phase as "conditionality" (refer to Box-2), before funding could flow for implementation. Actual field operations will take place from 2012-13.

Box-2 : The Reform Agenda

The following reforms would contribute to improved forest governance in line with democratic decentralization, community-driven forest management and strengthening of forestry sector as a whole .

Centrality of Gram Sabha for improved forest governance

- The Gram Sabha and the bodies set up by it to be the key institutions to plan and implement the Mission activities at the village level.
- Revamping of JFMCs as bodies of the Gram Sabha.
- Legal empowerment of the bodies of the Gram Sabha, including the revamped JFMCs to protect, regenerate and sustainably manage forests. This could be done under Indian Forest Act. Provisions to acknowledge such bodies of the Gram Sabha would need to be made in Panchayat Act by respective States.

Revamped FDAs to strengthen decentralized forest governance

- The FDAs would be revamped as institutions contributing to decentralized forest governance.
- The FDAs, at the district /division level, would be positioned as democratic and inclusive institutions, chaired by an elected representative instead of a Government official. Representatives of federations of local bodies including revamped JFMCs/ forest committees of Gram Sabha and SHG federations to be represented in decision-making body in the FDA at division level

Strengthening FRA implementation

- The areas where the Mission activities are proposed need to ensure that the FRA compliance has been made.

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Easing out the regulatory framework on felling and transit of forest produce

- Promotion of Agro-forestry /Social Forestry, based on multiple species including those nationalized, would require that regulatrory framework currently in place is eased out, so that farmers and others can harvest and transit the trees in a hassle-free manner.

Strengthening front line formation in Forest Department

- The existing vacancies of the front line staff (FG to RFOs) need to be filled on a priority basis during the preparatory phase of the project. A 10-year perspective plan of recruitment and capacity building must be put in place to ensure continuous inflow of new recruits.

  Different States have different local-level governance institutions to manage forest and natural resources. Subject to overarching reforms indicated above, the States may exercise flexibility in carrying out the institutional revamping.

7.2 State Action Plans

The Mission document is meant to provide strategic intent for getting the States to put up the State Action Plans over the next six months. The State Action Plans could dwell on State-specific details for Mission interventions. These Action Plans will also be required to propose a clear roadmap for forest governance reforms. The State action plan will need to be developed using an inclusive process, engaging the Forest Department, line agencies, civil society organisations, community groups, academia, etc. The State Action Plans will draw convergence with overall State Climate Action Plans.

7.3 Operational Guidelines

To facilitate development of State Action Plans, operational guidelines will be issued by the MoEF on selection of areas/sub-landscapes, interventions under Sub Missions, planning at the level of local bodies, cluster and sub-landscape level, on the process of carrying out institutional reform, identification of partner organisations, etc. Operational guidelines will stress site-specific bottom-up planning at the level of Gram Sabha and its Forest Committees. It will specify linkages of such village-based plans with Forest working plans, which will be based on sound

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silvicultural prescriptions, blending both traditional knowledge and scientific forest management to ensure sustainable management of forests and natural resources.

8.0 Mission Costs

The total mission cost is Rs 46,000 crores (details at Annex-1) for treatment of 10 million ha over the next 10 years. This is an indicative cost for the country as a whole. The costs would vary according to the State-specific situation, including wage rates, specificity of intervention, etc. The Mission expects the State Action Plans to bring such specificity in the costs and interventions when these plans are drawn up. Cost escalations on account of wage rate revisions and other exigencies have not been factored in.

These resources will be mobilized as additionality from the Planning Commission. The gap, if any, will be met by external support.

Finally, the Mission recognizes that by engaging in forest protection, individuals and communities provide a valuable economic in-kind contribution to national and Mission objectives that complement the financial inputs and are thus a critical factor in the success of the Mission.

Abstract of Mission Costs and Resources

	Activities	Costs (Rs. crores)
A.	Resources needed for the Mission to meet specific objectives and the activities thereof	34,000
B	Resources for Support Activities	12,000
	Total Mission costs (A+B)	**46,000**

Comments

ANNEX 1

TENTATIVE MISSION COSTS

A. For Sub Missions/Interventions to achieve Mission outputs/targets

Sub Missions	Categories	Type	Area (million ha)	Unit cost per hectare (Rs)	Total cost (Rs Crores)
Sub Mission 1: Enhancing quality of forest cover and improving ecosystem services (4.9 m ha)	a) Moderately dense forest cover, but showing degradation		1.5	15,000	2250
	b) Eco- restoration of degraded open forests	Type A	1.8	16,000	2880
		Type B	0.6	30,000	1800
		Type C & D	0.6	50,000	3000
	c) Restoration of grasslands		0.4	35,000	1400
	Total Sub Mission 1		**4.9**		**11330**
Sub Mission 2: Ecosystem restoration and increase in forest cover (1.8 m ha)	Rehabilitation of Shifting Cultivation areas		0.6	30,000	1800
	Restoring Scrublands (0.4)		0.8	50,000	4000
	Restoring /planting Seabuckthorn		0.1	100000	1000
	Restoration of Mangroves		0.1	70,000	700
	Ravine Reclamation		0.1	70,000	700
	Restoration of abandoned mining areas		0.1	100000	1000
	Total Sub Mission 2		**1.8**		**9200**
Sub Mission 3: Enhancing tree cover in Urban & Peri-Urban areas (including institutional lands): 0.20 m ha			0.2	100000	2000
	Total Sub Mission 3		**0.2**		**2000**

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Sub Mission 4 : Agro-forestry and Social Forestry (increasing biomass & creating carbon sink): 3 m ha	Farmers' land including current fallows		2.3	20000	4600
	Shelterbelt plantations		0.1	80000	800
	Highways/ Rural roads/Canals/Tank Bunds		0.6	70,000	4200
	Total Sub Mission 4		**3**		**9600**
Sub Mission 5: Restoration of Wetlands: 0.10m ha			0.1	60000	600
	Total Mission 5		**0.1**		**600**
Total Sub Missions			**10**		**32730**
Promoting alternative fuel energy	Biogas, solar devices, LPG, Biomass-based systems, improved stoves		3 million house-holds	3300 per house-hold	1000
Grand Total					**33730**
					or say 34,000 crores

B. For Support Activities

Activities Cost	
Research (2% of A)	680
Publicity/Media/outreach activities (1% of A)	340
Monitoring and Evaluation (1% of A)	340
Livelihood improvement activities, (17% of A)	5780
Strengthening local-level institutions (5 %)	1700
Strengthening FDs (5%)	1700
Mission Organisation, operation and maintenance, contingencies and overheads (4%)	1360
Total	**11,900**
	or say 12,000 crores
	Grand Total A+B = 46,000 crores

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ANNEX-2

Mitigation potential of various interventions under GIM is estimated by the Indian Institute of Science. The mitigation potential estimate depends on various factors such as area to be brought under the Sub Missions under GIM and the phasing, species mix and density, different carbon pools (aboveground and belowground biomass, soil organic carbon and litter) considered, rates of change in the carbon pools or mean annual increment, transfer and dynamics of different carbon pools, harvest and extraction of timber, fuelwood etc., and initial stock of different carbon pools. Various models are available for estimating the mitigation potential namely, COMAP, GCOMAP, CO_2Fix, Roth C and CENTURY (Ravindranath and Ostwald, 2008). The mitigation potential is estimated using the widely used COMAP model for the area proposed under different Sub Missions in the GIM. Table 1 provides the estimates of incremental and cumulative mitigation potential for the different sub-missions.

Incremental annual mitigation potential ($MtCO_2$) of different Sub Missions estimated using COMAP model

Sub MissionsArea	(Mha)	Incremental annual mitigation potential 2020 ($MtCO_2$)
Moderately dense forest cover, but showing degradation (MDF)	1.5	6.7
Eco- Restoration of degraded open forests (D/O)	3	27.0
Restoration of Scrublands + Grasslands (S/G)	1.2	5.4
Restoration of Mangroves +Wetland catchment (M/W)	0.2	1.6
Avenue, City forests, Municipal parks/ gardens, Households,Institutional lands+ Agro-forestry on fallows, Shelter belts, Roads, canals , tank bunds, schools etc (AF_SF_UF)	3.2	8.3
Others (Rehabilitation of Shifting Cultivation areas, Restoring /planting Seabuckthorn, Ravine Reclamation and Restoration of abandonedminingareas)	0.9	6.0
	10	**55.0**

Notes:

Carbon pools considered*: Aboveground (AGB) and belowground biomass (BGB), soil and litter pools*

***Area to be treated** : 10 Mha phased over 10 years, starting 2011-12*

***Biomass carbon pools (Ravindranath and Murthy, 2010) AGB growth rates**: MDF: 1.5 t/ha/yr; D/O: 3.56 t/ha/yr, S/G: 1.51 t/ha/yr; M/W: 3.2 t/ha/yr; AF_SF_UF: 0.84 t/ha/yr; Others: 2.5 t/ha/yr; **BGB growth rate:** Computed using the IPCC default value of 0.26 of AGB; **Litter (micro and macro litter) growth rate:** 0.5 t/ha/yr*

***SOC growth rate:** 0.22 tC/ha/yr.*

END NOTES

I Some of the model areas in the Nayagarg district in Orissa are Chadheyapalli, Kendudhipi and Koska, and in Deogarh district is Siarimalia where forest protection and conservation has helped agricultural development.

ii The relationship between forests and waterflows, particularly low-base flows, depend not only on forest cover but also on species , soil health, etc. This has been demonstrated through research in different parts of the world. Therefore to ensure water security, the relationship between forests and water flows needs to be better understood.

iii Forest ecosystems in India are hugely challenged on account of fragmentation, over-extraction, insect outbreaks, livestock grazing, forest fires and "development"- project pressures. Climate change will bring additional stress.

iv The quality of forest cover will include indicators like regeneration status, stand density, canopy density, species and ecosystem diversity, etc.

v Non-forest lands include public lands under revenue department and classified as revenue wastelands/land with forest growth under various names like *Chhote Bade Jhad Ke Jangal*, public lands with other government agencies, grazing lands under Panchayats. It also includes private lands, particularly the private wastelands as fallows.

vi The landscapes can be defined, based on a range of attributes, from bio-physical to cultural attributes. The landscape from species conservation point of view may mean contiguity of the habitat to meet need of species/populations. For instance, Tadoba —Andheri landscape of 2000 sq km, including PA, buffers, corridors, non-forests that may meet the requirement of a viable tiger population. From Livelihood-Conservation point of view, Buchnania dominated NTFP landscape of 70 sq km (including forest and non-forest lands) in Seoni district in MP that provides livelihood incomes from NTFPs to over a dozen villages. Landforms like Satpura ranges in Central India are a very large landscape that forms the catchment of many rivers and houses rich biodiversity and cultural diversity.

Comments

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vii The study by IISc on vulnerability mapping shows that nearly 39% of forested grids in India are vulnerable to climate change. The forests in the central part of India, and especially the north-western part of India, are highly vulnerable. A significant part of the Himalayan bio-diversity hotspot is projected to be highly vulnerable due to higher warming. Northern and central parts of the Western Ghats are also vulnerable to climate change. Thus, vulnerability analysis helps to identify forest types and regions which require adaptation strategies to enable forests to cope with climate change.

viii Some key elements of Adaptive Silviculture:

- The management unit is JFMC /CFM/ /Community Forest Resource or a cluster of such units.
- Participatory assessment of the condition of forests including growing stock/carbon stock enumeration and regeneration survey of both timber and non-timber species is done at the local level by the community, supported by front-line forest staff, using both traditional ecological knowledge as well as scientific measurements. Similarly, community needs assessment with regard to a range of forest goods and services is done using participatory methodology.
- Micro-plan is governed by participatory objective-setting to meet the need of all sections of the society. Prioritization across a range of goods and services addresses intra-community, inter-community and inter-generational needs vis-à-vis forest goods and services. For instance, balancing needs of the village poor for fuelwood and poles versus the need of the relatively well-to-do farmers for timber. Microplans should dwell both on supply as well as demand management of forest produce and services.
- Silvicultural tools like cut-back operations, singling, thinning, gap planting and regulated harvesting of NTFPs are applied innovatively, taking JFMC/CFR forests as unit, but the option of federating at higher levels for inventory, planning and monitoring.
- Provides for impact monitoring on periodic basis to modify practices as and when required to ensure regular and sustained provisioning of forest goods and services (including carbon, water, biodiverisity) along with continuous improvement of forests.

ix As per the latest Forest Survey of India report (2009), the total area of very dense/dense forests including PAs is 40.25 million ha. Of these, about 15 million ha is under protected area network (National Parks and Wildlife Sanctuaries), thus leaving 25 m ha of the remaining very dense/dense forests.

x Leh declaration ; "National initiative on Seabuckthorn" launched recently by the MoEF & Defence Research and Development Organisation at Leh; 14 July 2010

xi *Dor Bandi* is the time-tested method being used traditionally by farmers to check ingress of ravines in their farm lands. It uses bunding of various cross sections (depending on the slope) across contours to arrest rapid flow of water from upstream to downstream rivers, thus preventing gully formation in farmlands. Some of these *Dor uand*s provide elaborate spillways to allow flow of excess

Comments

water. The *dor bund*s are generally stablised by planting a range of vegetation, including grasses like *Daab Ghass* and *Moonj*.

xii Of the total forest export income, about 75% comes from NTFPs (MoEF, 2008).There is a continuing boom in the trade of NTFPs. According to one estimate, the NTFP enterprises can notch up a growth rate of about 6% and contribute to livelihood enhancement in forested areas, more so for communities vulnerable to climatic variability. Enhanced incomes from NTFP/medicinal plants have the potential to broaden the livelihood basket for the poor. The worldwide market in NTFP and medicinal plants has shown average growth rate of nearly 10%.

xiii There were about 106,482 JFM committees protecting about 22.01 million hectare of forestsa third of the land with the forest departments in the country. (MoEF,2006)

xiv The Gram Sabha has same meaning as specified in 73rd Constitutional amendment and Panchayat Raj Extension in Scheduled Area,1996. "A village shall ordinarily consist of a habitation or a group of habitations or a hamlet or a group of hamlets comprising a community and managing its affairs in accordance with traditions and customs. Every village shall have a Gram Sabha consisting of persons whose names are included in the electoral rolls of the Pachayat at the village level."

xv Such facilitiation role would include awarness and capacity building of the local bodies, of partner NGO/CBOs and of frontline staff for community-led forest protection and management; support in institution building, building and reinforcing opportunity for convergence; providing technical approval of village plan for forest protection and management; support to SHGs/UGs and their federations to carry out forest/NTFP-based livelihood enterprise; support to federation of local bodies for planning at sub-landscape level; develop/facilitate monitoring mechanism as spelt out in the Mission document; application of traditional knowledge and state-of-the-art science and technology in carrying out the Mission intervention.

xvi Simplification of rules governing the harvest, sale and transit of short-rotation trees on private lands such as eucalyptus and poplar and on NTFPs occurring on all lands has helped, though long-rotation tree species such as teak are still highly regulated, as are high value NTFPs such as Tendu (Saigal, 2002, Agarwal 2003). There is considerable scope for regulatory changes and institutional and market development that can empower and incentivise low income producers and collectors. Changes in the legislation and regulations that govern this public-private interaction would reduce the regulatory burden on producers, the implementation burden on the regulating agency and thereby likely increase the incentives for small-scale private participation in generating forest-based incomes, as well as free up scarce (and expensive and valuable) forest department resources for more productive use

xvii Lok Vaniki in MP: Recognizing the constraints to private forestry, an attempt was made in Madhya pradesh to deregulate for long rotation species as well, for farmers willing to get management plans in place for their forests prepared by a chartered forester. Lok Vaniki or People's Forestry is governed by the Madhya

Comments

Pradesh Lok Vaniki Rules 2002, issued under Section 11 of the Madhya Pradesh Lok Vaniki Adhiniyam, 2001. The rules provide requirements for managing "tree clad" areas on private lands and revenue lands. A key provision of the rules is that farmers who develop management plans to manage their forests under Lok Vaniki are provided a regulatory waiver from the web of pre-existing rules governing harvesting of trees on private lands . Lok Vaniki is designed to motivate farmers to think of long-term forest management and not one time harvest and conversion of land use. In Dewas, on private forests, mean annual increments (MAI) can reportedly be increased from 0.46 to 1.5 m3/ha with scientific management. In the few districts in MP where several hundred forests have been brought under management, farmers have benefited from harvesting their long standing trees, predominantly of teak. The real policy attractiveness of the Lok Vaniki program is that it has the potential to double state timber output without any investment by the state government and also increase returns to farmers, besides contributing to carbon sequestration and other local environmental benefits. Large-scale implementation would also free up scarce government resources as less regulatory oversight would be required. With little streamlining, the Lok Vaniki program can dramatically enhance the investment climate for small-scale private forestry, lead to an increase in planting, sustainable management, and increased supply of timber from extensive forests outside FD forest land.

xviii The National Forest Certicfication Committee report details out a proposal to complete the process of designing and delivering the *ab-initio* steps of a credible certification system with focus on assessing, monitoring and deploying SFM principles, criteria and indicators and the regulatory framework for ensuring the legality of logging and trade, both regarding imports and exports, also for promoting private-public-people partnership for contributing to SFM, forest restoration, greening initiatives, REDD plus and payment of ecosystems services.

xix REDD Plus: India advocates a comprehensive approach to REDD (Reduced Emissions from Deforestation and Degradation) which has been termed as REDD Plus approach. The approach argues for compensating countries not only for reducing deforestation but also for conservation and sustainable management of forests and increase in forest cover (ICFRE, 2007). In its submission to UNFCCC in August 2009, India has elaborated REDD as Reducing Emissions from Deforestation in Developing countries, Sustainable Management of Forests (SFM) and Afforestation and Reforestation (A/R) which further substantiates its comprehensive approach. (MoEF,2009)