Ministry of Environment and Forests
GOVERNMENT OF INDIA

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NATIONAL MISSION FOR A GREEN INDIA

DRAFT MISSION DOCUMENT
VERSION 1.0

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Ministry of Environment and Forests
GOVERNMENT OF INDIA

This Draft Mission Document has been prepared as a basis for discussion and feedback from all stakeholders.

The Mission document will be finalized after a series of public consultations across the country.

We welcome feedback on this document by email. Kindly send your comments to:

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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 resources of the country and the associated livelihoods of the people. The Mission (henceforth referred to as GIM) 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 the "greening" in the context of climate change adaptation and mitigation, meant to enhance ecosystem services like carbon sequestration and storage (in forests and other ecosystems), hydrological services and biodiversity; along with provisioning services like fuel, fodder, small timber and NTFPs.

The Mission aims at addressing climate change by:

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

B. Mission Objectives

The objectives of the mission are three-fold:

- **Double the area to be taken up for afforestation /eco-restoration in India in the next 10 years, taking the total area to be afforested or eco-restored to 20 million ha.** (i.e., 10 million ha of additional forest/non forest area to be treated by the Mission, in addition to the 10 million ha which is likely to be treated by Forest Department and other agencies through other interventions).
- **Increase the GHG removals by India's forests to 6.35% of India's annual total GHG emissions by the year 2020** (an increase of 1.5% over what it would be in the absence of the Mission)**.** This would require an increase in above and below ground biomass in 10 million ha of forests/eco-systems, resulting in increased carbon sequestration of 43 million tons CO_2e annually.[1]

[1]Source: India's Forests and Tree Cover : Contribution as a carbon sink , Technical paper , ICFRE,2009; page 10

- **Enhance the resilience of forests/ecosystems being treated under the Mission** – enhance infiltration, groundwater recharge, stream and spring flows, biodiversity value, provisioning of services (fuel wood, fodder, timber, NTFPs, etc) to help local communities adapt to climatic variability.

C. Mission Targets (Outputs)

The Mission will have clear targets for different forest types and ecosystems which will enable achieving the overall objectives of the Mission. The Mission targets can be classified into the following:

- 2.0 m ha of moderately dense forests show increased cover and density
- 4.0 m ha of degraded forests are regenerated/afforested and sustainably managed
- 2.0 m ha of degraded scrub/grasslands are restored and put under sustainable multiple uses
- 0.10 m ha of mangroves restored/established
- 0.10 m ha of wetlands show enhanced conservation status
- 0.20 m ha of urban/peri urban forest lands and institutional lands are under tree cover
- 1.50 m ha of degraded agricultural lands and fallows are brought under agro forestry
- 0.10 m ha of corridor areas, critical to wildlife migration are secured
- Improved fuel wood use efficiency devices adopted in about 10 million households (along with alternative energy devices)
- Biomass/NTFP based community livelihoods are enhanced that lead to reduced vulnerability

D. Key Elements of Mission Strategy

Some key highlights of the Mission strategy are listed below:

- **Holistic view to "greening" (broader than plantations):** The scope of greening will not be limited to just trees and plantations. Emphasis will be placed on restoration of eco-systems and habitat diversity e.g. grassland and pastures (more so in arid/semi arid regions), mangroves, wetlands and other critical ecosystems. It will not only strive to restore degraded forests, but would also contribute in protection/enhancement of forests with relatively dense forest cover.

- **Integrated cross-sectoral approach to implementation:** The Mission would 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. Drivers of degradation e.g. fire wood needs and livestock grazing will be addressed using inter sectoral convergence (e.g. livestock, forest, agriculture, rural development; energy etc.)

- **Key role for local communities and decentralized governance:** Local communities will be required to play a key role in project governance and implementation. Gram Sabha and its various committees/groups including JFMCs, CFM groups, Van Panchayats, etc. would be strengthened as institutions of decentralized forest governance. Likewise, the Mission would support revamping/strengthening of the Forest Development Agencies. The Mission would support secured community tenure, capacity building for adaptive forest management and livelihood support activities e.g. community based NTFP enterprises.

- **'Vulnerability' and 'Potential' as criteria for intervention:** An overarching criterion for selection of project areas/sub-landscapes/sub watersheds under the Mission would include vulnerability to climatic change projections and potential of areas for enhancing carbon sinks.

- **Robust and effective monitoring framework:** A comprehensive monitoring framework at four different levels is proposed. In addition to on-ground self- monitoring by multiple agencies, the Mission would support use of modern technology like Remote Sensing with GPS mapping of plot boundaries for monitoring at output/ outcome level. A few identified sites within the project area will be selected for intensive monitoring using additional parameters like ground cover, soil condition, erosion and infiltration, run-off, ground water levels to develop water budgets as well as biomass monitoring indicators. The Mission would also commission a comprehensive research needs assessment in support of Mission aim and objectives. The Mission would set up a cell with in Mission directorate to coordinate REDD Plus activities in the country.

The Mission will implement its strategy through a set of 9 sub-missions and cross-cutting initiatives.

E. Mission Organisation

An Advisory Council chaired by the Minister for Environment and Forests, Govt. of India will provide overall guidance to the Mission. A National Steering Committee will provide necessary direction and support to the Mission activities. The Mission will be serviced by a Mission Directorate at MoEF to be housed in the National Afforestation and Eco-development Board (NAEB). At State level, the Mission will be housed within the State Forest Development Agency in the Forest Department and will have a State Steering Committee and an Executive Committee to help the Mission achieve its aims and objectives. At District level, the Mission activities will be coordinated through the existing mechanism of District Planning Committees and FDAs. The Gram Sabhas and the various Committees set up by them, including JFMCs, CFM groups, Van Panchayats, Village Council etc, will be the key vehicle for planning and implementation at the village level.

F. Time frame

The implementation period of the Mission would be 10 years, i.e., from FY 2010-2011 to FY 2019-2020. The first year of the Mission would be utilized in institution building, sensitization, capacity building and baseline research etc. Actual field operations will commence from the second year of the Mission.

G. Resources

Total mission cost is estimated to be Rs 44,000 crores.

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1.0 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 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 repercussion 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, small timber and NTFPs.

2.0 Significance of forests in relation to climate change

2.1 The Green India Mission

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 m tons to 6622 m tons, thereby registering an annual increment of 37.68 million tons of carbon or 138.15 million tons of CO_2 equivalent. This annual removal by forests is enough to neutralize 9.31% of total GHG emission in year 2000[2].

2.1.2 Food security: Forests are essential for maintaining favorable and stable conditions needed for sustained agricultural productivity. According to one estimate, 2 ha of forest area is required to sustain one ha of crop land in west Himalayas (Singh & Singh ,1992); forest

[2] Source: India's Forests and Tree Cover : Contribution as a carbon sink , Technical paper , ICFRE,2009

eco-systems contribute 6-10 units of energy towards 1 unit of grain energy in agro ecosystem in Himalayas (Pandey and Singh 1984). In Nayagarh, Orissa, maintaining agriculture productivity is one of the key reasons for forest protection by community. According to a study by Nadkarni, 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.

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. Forest eco-systems 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 early 20th century exclusively for securing the catchment and to protect over 19 springs and streams that provided drinking water supply for Shimla town, subsequently the summer capital of British India. It comprises of over 1000 ha of very dense forest.

2.1.4 Livelihood security of local communities: Forests provide a range of provisioning services, particularly fuel wood , 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 of 275 million rural people, depend on forests for their livelihoods. It also includes 89 million tribal people, who constitute the poorest and marginalized section of the country[3]. NTFP sector with annual growth rate between 5-15% also contributes to 75% of forest sector export income.

2.2 Forests and climate change: Key challenges

The Mission acknowledges challenges on account of demand supply gap of various provisioning services from forests, particularly fuel wood , fodder/grass/grazing; timber, cane/bamboo, NTFPs etc. creating unsustainable pressure, and contributing to degradation of forests and ecosystems. The productivity of Indian forests is low as compared to 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 was observed that more than 50% of the vegetation in India would find it less than optimally adapted to its existing

[3] World Bank ,2006

location by 2085, making it more vulnerable to the adverse climatic conditions as well as to the increased biotic stresses of already challenged forest ecosystems. 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, pest /diseases, invasive species, change in species assemblage/forest type, forest die -back and loss of biodiversity[4].

Forest dependant livelihoods may get severely affected, enhancing vulnerability of local communities.[5]

3.0 Mission Goal, Objectives and Outputs

3.1 Overall Goal:

The Mission aims at addressing climate change by enhancing carbon sinks in sustainably managed forests and other ecosystems, adaptation of vulnerable species/ecosystems to the changing climate, and adaptation of forest dependant local communities in the face of climatic variability.

3.2 Mission Objectives:

3.2.1 The Mission would double the area taken up under afforestation /eco-restoration. 10 million ha of forest/non forest area would be treated during the Mission, which would equal the area to be treated by Forest Department and other agencies over next 10 years through existing schemes/programmes.

3.2.2 The Mission would contribute to enhanced resilience of the forests and other ecosystems, being treated under the Mission. The Mission interventions would enhance infiltration and groundwater recharge as well as stream and spring flows. Significant benefits would accrue in terms of biodiversity values, as well as enhanced provisioning services (fuel wood, fodder, timber, NTFPs, medicinal plants etc) to help local communities adapt to climatic variability. Suitable indictors would be identified to monitor the changes.

3.2.3 The Mission would increase above and below ground biomass in 10 million ha of forests and other eco-systems, resulting in increased carbon sequestration of 43 million tons CO2-e annually, in year 2020. This will neutralize an additional 1.5 % of annual GHG emissions in 2020, taking GHG removal by India's forests to 6.35 %. (The GHG

[4] Ravindranath et al 2006,
[5] Stern 2007

removal by India's forests in 2020 is projected at 4.87 % of total GHG emissions in year 2020).[6]

3.3 Mission Targets (Outputs)

3.3.1 The following targets will contribute towards the over all goal/outcomes of the Mission:

- 2.0 m ha of moderately dense forests show increased cover and density
- 4.0 m ha of degraded forests are regenerated/afforested and sustainably managed.
- 2.0 m ha of degraded scrub/grasslands are restored and put under sustainable multiple use
- 0.10 m ha of mangroves restored/established.
- 0.10 m ha of wetlands show enhanced conservation status.
- 0.20 m ha of urban/peri urban forest lands and institutional lands are under tree cover.
- 1.50 m ha of degraded agricultural lands and fallows are brought under agro forestry.
- 0.10 m ha of corridor areas, critical to wildlife migration are secured.
- Improved fuel wood use efficiency devices adopted in about 10 million households (along with alternative energy devices)
- Biomass/NTFP based community livelihoods are enhanced that lead to reduced vulnerability

The Mission interventions would double the current rate of afforestation and regeneration being undertaken in forest/non forest areas. (Ref: Annex-3)

3.3.2 **Means to achieve the Mission targets/outcomes:**

- Strengthening local community institutions of decentralized forest governance through secure tenure and capacity enhancement
- Strengthening capacity of forest department and other line agencies
- Improving investment climate for planting and forest conservation
- Improved monitoring at planning, input, outcome, and impact level
- Commissioning Research in support of the Mission aim
- Making the Mission a people's program

[6]Source: India's Forests and Tree Cover : Contribution as a carbon sink , Technical paper , ICFRE,2009; page 10

4.0 Green India Mission: The core principles

4.1 The scope of greening will not be limited to just trees and plantations, but emphasis will be on restoration of eco-systems and habitat diversity e.g. grassland and pastures (more so in arid/semi arid regions), mangroves, wetlands and other critical ecosystems. It will not only strive to restore degraded forests, but would also contribute in protection/enhancement of forests with relatively dense forest cover (in line with country strategy on REDD Plus).

4.2 The mission would foster an integrated approach that treats forests and non forest public lands as well as private lands simultaneously, in given project unit / sub-landscape/sub- watershed.

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

4.4 The first charge on the forest/ecosystem goods and services would be that of 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 public domain so that the benefits accrue to all sections of society.

4.5 Monocultures are known to increase vulnerability, and the Mission would, therefore, ensure restoration of native bio-diverse species mix while at the same time enhancing carbon sink in forests and other ecosystems. The entire program would be informed by a sensitivity to the ecological nature and value of the resource, for instance avoiding dense plantations in grasslands which have other values like fodder, watershed etc. Habitats of animals and plants would be preserved, especially the mosaic of different vegetation types that maximize niches for diverse life forms.

4.6 The Mission would contribute to empowerment of communities and strengthen decentralized local governance of forests in the overall context of climatic variability. The Mission would invest in development of a cadre of community- based change agents from amongst educated community youth, to facilitate planning, implementation and monitoring of Mission activities at local level.

5.0 Mission Strategy

5.1 Overall Strategy

5.1.1 Drivers of degradation are best addressed in an integrated manner that treats forests and non forest public lands as well as private lands simultaneously. For instance livestock grazing in forests could be effectively addressed by securing enhanced fodder availability across forest /grasslands/agro ecosystem, using inter- sectoral approach (Forest Deptt, Animal Husbandry, Agriculture and Rural Development) in a given project unit . The Mission would strive to extend and upscale integrated approach in *contiguous areas/landforms, sharing specific set of ecological and socio-economic characteristics (landscapes[i]/sub-landscapes)*

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

5.1.3 It is surmised that integrated planning at Forest Division and at Circle level would provide for integration at the landscape level , for addressing externalities and interactions, for instance between wildlife PA's and non PA's etc.

5.1.4 The Mission would add "value" to ongoing program/schemes on "greening", being taken up by multiple agencies. Such value addition will come through, *a)* technical inputs on species mix from climate adaptation/mitigation angle, *b)* improved policy regime to help multiple agencies plant, protect and manage forests and tree growth, *c)* advisory services for benefits under REDD Plus / CDM, and *d)* support in outcome level monitoring.

5.1.5 The Mission would provide incentives to communities and other agencies to protect and manage forests sustainably through enhanced tenure security and benefit-sharing arrangements.

5.1.6 *An overarching criterion for selection of project areas/sub-landscapes/sub watersheds under the Mission would include vulnerability to climatic change projections*[ii] and potential of areas for enhancing carbon sinks. Disturbed and fragmented forests and monoculture are likely to be more vulnerable to the climate change.

The Mission would prioritize the areas (taking forest density as indicator of degradation), that are high on moderately dense cover, those that have dominance of open degraded forests and those that have high percentage of scrubs/grasslands. In addition to these, the Mission would also target mangroves, wetlands, urban/peri urban lands, agro ecosystems etc, as they provide low entry cost opportunities for increasing carbon stocks in the short term.

5.1.7 Measures to support adaptation of species and ecosystem to climate change variability would be factored-in across various Mission strategies/ interventions. Some of these measures include: effective fire prevention and fire management, sustainable harvesting of timber and non timber products, securing corridors for species migration, anticipatory planting of species across latitudinal and longitudinal gradient, adoption of short rotation species (refer: Sum Mission 2), promotion of natural regeneration and mixed species planting, and improving overall hydrological regime.

5.2 Sub Missions:

The following Sub Missions, integrating mitigation /adaptation measures and corresponding to the Mission targets, outlined in section 3, are detailed below as the key Mission interventions:

5.2.1 Sub Mission 1 : Enhancing climatic resilience in moderately dense forests: 2 m ha

Though recorded as moderately dense cover[iii], many of the areas are subjected to degradation on account of recurrent fire, unregulated grazing, invasive species, shifting cultivation etc. The FSI forest cover estimation does not capture movement within the density class (e.g. within 40 -70%), hence other methods will need to be devised to measure such changes. Conservation and sustainable management of these forests has potential to provide both mitigation (by reducing emissions from degradation) as well as adaptation benefits.

Better protection, fire management (both prevention , 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, fuel wood, small timber/timber for direct livelihood benefits to dependant local communities.

2 Mha of moderately dense forests will be targeted under the mission. Projects will be sited in a) areas where carbon sinks are subjected to loss due

to deforestation and degradation, and b) areas that are likely to be most vulnerable to climate change impacts.

The Sub Mission has the possibility of enhancement of carbon stocks by 0.80 million tons per year or 2.93 million tons of CO2-e per year. (Ref: Table. 2)

5.2.2 Sub Mission 2 : Eco - Restoration of open forests : 4m ha

28.84 million ha forestland is available as open forests, mostly on the fringes of villages, with crown density between 10-40% (FSI 2009). Most of these forestlands are subjected to intense biotic pressure and unsustainable removals. These lands have immense potential for meeting the fodder, fuel-wood, water, and small timber, NTFP requirements of the dependent village communities on one hand, while enhancing the carbon sinks substantially.

Plantation of indigenous species and/or regeneration of root stock and indigenous grasses and shrubs will be priority agenda with focus on in-situ moisture conservation/rain water harvesting/run off reduction activities on ridge to valley principle. Once moisture retention and percolation status is improved and natural regeneration is initiated, such areas will be subjected to gap plantation of multi-purpose tree species. Technology based plantations of fuel-wood (short rotation), fodder, NTFPs, artisanal raw material and small timber yielding species will be promoted on a three tier basis. Utility of grasses and shrubs in providing soil cover as well as useful products like fodder and artisanal raw material, etc will be taken into account. 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 also be factored in.

4 million ha would be taken across bio-geographic zones with varying degree of productivity. This would include 1.4 moa proposed under fringe forest/ non forest land development project[7] .

The Sub Mission has the potential to enhance carbon stocks by 6 million tons of carbon or 22 million tons of CO2-e per year (Ref: Table. 2).

5.2.3 Sub Mission 3: Restoration of scrub/grasslands : 2 m ha

The lands with less then 10% cover amount to some 4.15 million ha, and are under scrub/grassland category (FSI 2009). These are often highly degraded and refractory lands, and would be recognized primarily as a resource for promoting animal husbandry, in which the native palatable species of grasses either by themselves or in combination with shrubs/trees of fodder value could restore these ecosystems. It has to be noted that most of these lands are in arid or semi arid zones, and the lands would be expected to become a good resource for animal husbandry but may be not suitable for high density tree

[7] Project of National Rainfed Authority of India, prepared in consultation with MoEF, titled "Simultaneous treatment of Fringe Forest and adjoining Non Forestlands for Conservation of Water, Bio-diversity, and Poverty Alleviation".

plantations. Soil and moisture conservation work and good management practices such as deferred/ rotational grazing (within carrying capacity) would be of great value in restoration of such eco-systems, supported by improved animal health services and, where feasible, improvement of quality and reduction in number of animals, improvement in marketing of animal products etc.

The Sub Mission has the potential to enhance carbon stocks by 1.4 million tons of carbon or 5.10 mt of CO2-e per year. (Ref: Table. 2).

5.2.4 Sub Mission 4: Restoration of new mangroves 0.10m ha

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

Mangrove and coastal eco-systems deserve special conservation efforts as these ecosystems save lives and properties 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.

Target of 0.10 mha of mangrove planting would involve lands which were mangroves historically but are not under mangrove vegetation now. Along with protection of mangroves, patches of biodiversity rich habitats in the coastal, riverine & deltaic belt would also get protection.

The Sub Mission has the potential of enhancement of carbon stocks by 0.25 million tons of carbon or 0.91 million tons of CO2-e per year. (Ref: Table. 2).

5.2.5 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[8]. Out of these, 2,175 are natural and 65,254, man made. Of the total 1,712 wetlands declared the world over as protected Ramsar sites, 25 are in India covering around 677,131 hectares and involving 14 states.

Wetlands provide livelihoods to local communities; more importantly, the ecosystem services like recharge of ground water provided by wetlands 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.

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

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

Wetland ecosystems are high on (peat) soil carbon. Loss of wetlands mean losing carbon rich organic peat soil, loss of biodiversity and livelihood opportunity to local communities.

The Mission would provide support in developing systematic wetland inventories at desired spatial and temporal scales; 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, community based eco-tourisms enterprise etc would be some of the key interventions.

Restoration measures would be so carried out that it will cause least disturbance to wetland habitat, more so at the margins that provide transition zones or ecotones. It would try and restore drainage system and links across neighboring wetlands, in order to recreate natural flow for recharge of wetlands. Local communities would be encouraged to continue with compatible use of wetlands and seek new opportunities for livelihood enhancement (e.g. eco-tourism). Coastal wetlands would also be identified for protection.

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

The Sub Mission has the potential of enhancement of carbon stocks by 0.04 million tons of carbon per year or 0.14 tons of CO_2-e per year (Ref: Table. 2).

5.2.6 Sub Mission 6: Enhancing tree cover in Urban & Peri-Urban areas (including institutional lands): 0.20m ha

India has been experiencing an unprecedented pace of urbanization since the 1990's.Today, 310 million people live in India's cities making every fourth Indian a city dweller. It has been estimated that by 2030 more than 40% of India's population is likely to be residing in urbanized areas. Urban population of India is expected to be 800 million by 2045. Urban forests have been providing environmental services along with supply of fuel wood to urban poor. NSSO in 2006 estimated that around 21% of urban households use fuel wood as primary source of cooking.

Increasing trend in urbanisation, however has also meant deterioration of air quality, increase in air temperature, increased noise level, along with water and land pollution. Urban forests emerge as an exciting opportunity to a)

mitigate climate change, b) ameliorate air pollution c) help in improving overall water regime and d) nurture biodiversity in urban environment.

It is estimated that total carbon stored by the urban trees is 23.89 million tons from an estimated 7.79 million ha urban area, i.e. 3.01 tons of carbon/ha. Urban forests contribute only 2.21% of the carbon stock against 17.11 tons carbon/ha from overall forest and tree cover[9]. Thus, there is an ample scope to increase contribution of urban forests to overall carbon stocks.

The Mission would support urban greening by various interventions, categorising urban forests in 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 half wall and wire mesh) ; restoration of representative ecosystems and plantation of bio-diverse species mix to supplement natural regeneration. Special care would 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 lands would be established to enhance biodiversity status.

iii. **Diffused planting like avenues / households**: The Mission would support plantation of multiple species for multiple values.

iv. **Institutional lands**, especially lands belonging to or allotted to business/industrial houses and educational institutions.

An overall strategy cutting across the above classifications would include: securing patches under high threat and vulnerability; encouraging setting up of local users or citizen's groups to oversee maintenance, regulation of access for walking ,etc.; linking green spaces with conservation education programs and environment education initiatives 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 & 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.

Mission would solicit engagement of an array of institutions to support greening in urban/peri urban areas. Corporate sector/Business houses would be encouraged to support such endeavor. Detailed guidelines will be

[9] Urban Trees for Combating Climate Change ; Das Gupta , Kumar, & Lakhchaura ,2008

developed to this effect. The activities that change the natural ecosystem will be prohibited such as construction of hard surface facilities like paved yard, food courts, rest houses etc.

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

It is assumed that this entire land would fall under the category of improved tree management rather than land use change. The Sub Mission has the potential of enhancement of carbon stocks by 0.06 million tons of carbon per year amounting to 0.22 CO_2-e per year (Ref: Table. 2).

5.2.7 Sub Mission 7: Agro forestry and social forestry (increasing biomass & creating carbon sink): 1.5 m ha

Overall, India is estimated to have between 14,224 million to 24,602 million trees outside forests, spread over an area equivalent of 17 million ha, supplying 49% of the 201 million tons of fuel wood and 48% of the 64 million m3 of timber consumed annually by the country (Pandey, 2007).

Reliable and sufficient data is available to indicate that a) there are sharp variations in productivity of plantations of these 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 (like Brazil and Indonesia). This seriously undermines the real potential of agro-forestry/tree farming in India to the detriment of its 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 the villages to provide easy reach and supply in an energy efficient manner. Support would also be made available for post plantation care through a program of training and visits by Forest Department staff, agriculture/forestry scientists from local university and research institutes It would also support putting in place a system for certification of seed and genetically improved clonal planting stock or registration of clones and nurseries in India .Other supporting elements, including improving investment climate have been discussed separately. This component will also extend support for special forestry species planting e.g. trees on non agricultural rural lands like homesteads, school yards, compounds of various offices, and private/public establishments, public spaces, road side, canal side, etc. The support would include planting and after-care for government lands, but would provide only supply of seedlings at the site at nominal cost and training and visits in the case of private lands.

Under agro-forestry, 0.80 m ha would involve improved agro-forestry practices on the existing lands under agro-forestry, and that 0.70 would involve additional lands under agro-forestry.

The Sub Mission has the potential of enhancement of carbon stocks by 2.41 million tons Carbon and 8.14 m tons of CO2-e . **(**Ref: Table. 2).

5.2.8 Sub Mission 8 : Securing Corridors to help species adapt to climate impacts: 0.10 m ha

Habitat fragmentation would be a constraint to migration, especially in species with limited dispersal abilities. "Corridors" across large landscapes 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. Networking of existing forest patches through corridors is essential to mitigate the negative biological effects of habitat fragmentation and insularization. The corridors would have huge value from adaptation angle.

The Mission would support the setting up of a Task Force to identify/prioritize critical corridors; and would support working with an array of stakeholders including district agencies/ institutional agencies, business houses , farmers, school children, resort owners in order 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 , rapid agency response in case of crop raiding, crop insurance and , hassle free compensation would be some of the key interventions.

No separate carbon sequestration value has been assigned; however depending on the land-use, land-use change in corridors, the value can be assigned.

5.2.9 Sub Mission 9: Improving fuel use efficiency and promoting alternative energy sources

The energy security and carbon emission reduction objectives would be promoted through energy efficient devices and alternative energy sources like bio gas, solar energy devices etc. Areas burdened with unsustainable harvesting and use of fuel wood will primarily targeted.
The Ministry of New and Renewable Energy (MNRE), Government of India has been promoting improved cook stoves (IC) which could significantly save fuel wood and thus could reduce pressure on the forests. The Mission would target 10 million house holds (in 0.1 million villages) for improved stoves (over 30% wood saving). But this programme needs to be technically and financially strengthened in convergence with MNRES. The program would be

taken in all the areas where forest/ecosystem conservation/restoration work is being taken up under the Mission.

This would lead to saving of 2 million tons of fuel wood every year[iv] amounting to saving of 3.6 mt of CO2 e per year.

Also, promotion of alternative energy devices like biogas, solar devices (solar lanterns and solar street lighting) and expansion of services of cleaner cooking fuels like LPG in rural areas would help in reducing pressure on forests , gaining carbon benefits , along with health and other associated benefits.

5.3 Cross cutting interventions:

5.3.1 Livelihood enhancement through biomass/ NTFP based enterprise

About 75% of forest export income is from NTFPs (MoEF, 2008). There is continuing boom in the trade of NTFPs. According to one of the estimates, the NTFP enterprises can notch up a growth rate of about 6% and contribute significantly to livelihood enhancement in forested areas, more so for communities vulnerable to climatic variability. Enhanced incomes from NTFP/Medicinal plants have 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%.

But in order to harness the rich potential of NTFP for inclusive growth, the Mission would support in bringing larger policy focus and higher financial allocation for NTFP sector in particular.

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 would support technology for value added products, certification and marketing of NTFP. It would support bridging of knowledge gap. Institutional architecture engaging national research institutions , state level / district level agencies , and the federations of collectors at cluster level, will be crucial to support two way flow of knowledge and information for sustainable NTFP management and improved marketing[10].

[10] Singh KD, NTFP Management in India, Workshop proceeding , JFM in India, IIFM, 2006

5.4 Means to achieve Mission targets:

5.4.1 Strengthening local community institutions

a) Strengthening decentralized governance through Gram Sabhas and other thematic committees/ groups

Local institutions have significant bearing on forest conservation and its sustainable use, more so, at a time when market forces are putting tremendous pressure on the natural resources. The institutions available at local level to deal with the forests include: Joint Forest Management Committees[v], Community Forest Management groups (a large number in Orissa), Van Panchayats (Uttarakhand), Village Councils (north east); etc. Self Help Groups /Common Interest Groups have also been set up at village level to promote forest based livelihood activities. The spread of 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). Community Conserved Areas (CCAs)[11], containing significant wildlife and biodiversity value, have been conserved by communities for culture, religious, livelihood purpose using customary laws or other effective means.

Panchayati Raj Institutions (PRIs) are constitutionally mandated bodies for decentralized development planning and execution at local level. The Scheduled Tribes and Other Forest Dwellers (Recognition of Forest Rights) Act, 2006, in addition to individual rights, provides for Community Forest Rights, including right to protect , regenerate and manage Community Forest Resource [12] . It is obvious that this right also places a great deal of responsibility that the community has to full fill. The Gram Sabhas have been authorized to set up institutions to ensure this (4 e of Rules).

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

The Mission would therefore strengthen Gram Sabhas as overarching institutions, supported by thematic committees and user groups (JFMCs, CFM groups, BMCs,). In PESA areas, the Gram Sabhas would need to be convened for setting up/vetting up of the thematic committees, following due process, so that the planning and implementation by these committees under

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[11] Pathak, N. Community Conserved Areas in India: A Directory. : Kalpavriksh; 2009.

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

the Mission links to overall village level planning. This would help in necessary convergence of resources and integrated planning. Leadership provided by the thematic committees and the UGs/SHGs would contribute to strengthening of Gram Sabhas and the Gram Panchayats.

At another level, it would encourage federation of thematic committees/groups such JFMCs/CFM/VPs etc, as well as livelihood promotion groups like SHGs/CIGs to plan for forest protection, conservation and livelihood activities. Livelihood activities/enterprises are best addressed at cluster level/sub landscape level/ federation of SHGs/CIGs.

Current institutional structure of FDA would be strengthened / revamped to link with such federations on one hand while allowing greater representation of such federations at apex level decision making.

Larger landscape level governance/management needs to emerge over time, engaging a diversity of institutions depending on the local context and learning from the successes and failures of initiatives at landscape/sub landscape level. These learnings need to come from an array of initiatives initiated by government and non govt organizations.

b) Providing legal back up to JFMCs

JFMCs in the majority of States are not set up under any specific statute. To allow greater decentralization of decision making and devolution of power, and secured community tenure, providing legal back up to JFMCs would be helpful. The Mission would examine provisions of Indian Forest Act (e.g. Section 28) and other legislations including FRA (e.g. Section 3 i) to provide such support.

c) Building capacity of local institutions to help them effectively protect, regenerate and manage forests

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 (including carbon benefits) from such areas. Community driven innovative/adaptive silviculture[vii] is of critical importance to successfully implement mitigation/adaptation strategies in restoration of forest/ecosystem.

The Mission would bring in greater space for local level planning and management for forest/ecosystem restoration; this would require that linkages with Forests Department's working plan are revisited in order to ensure that this is mutually reinforcing. It would also be useful in the context of CFR provision of Forest Rights Act, 2006.

d) Building a cadre of community youth for ecosystem restoration

Given the fast changing rural scenario with increase in the number of educated unemployed/underemployed youth, the Mission would support development of youth cadres to lead the charge at the local level. Support of research institutions, universities/colleges from local area, Forest Department and NGOs would help develop this cadre as Self Employed Change Agents (SECA). The example of the Carbon assessment project in Lamgarha block in Uttarakhand proves the point that rural educated youth are quick to pick up skills, and have huge potential to provide support to the community in planning, implementation and monitoring of the greening program at the local level[13]. The cadre of community youths will help Mission activities at the local level with active support of FD and other agencies. This will also augment capacity of Forest Department to facilitate Mission activities with existing regular staff.

5.4.2 Strengthening Forest Department and other partner agencies

In order to ensure an integrated approach at village/cluster/sub-landscape/sub- watershed level, the forest department will need new capacities. Teams of Subject Matter Specialists at Range and Division level (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; finance, ecological restoration / REDD issues etc. The Mission would support upgradation of the Range Office into a forest and wildlife resource centre (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 rapid response needed for forest protection, control of crop raiding wildlife etc.

5.4.3 Convergence with cross sectoral programs; adding value through support activities and relations with other Missions

a) Convergence with program 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 on greening, it would add "value" to such ongoing program/schemes 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 c) providing services for improved monitoring at outcome level to avail benefits under REDD Plus, CDM and other carbon market mechanisms.

[13] Project "Kyoto: Think Global Act Local in Uttarakhand", 2009

Key ongoing programs/schemes (and those in the pipe line) include: Integrated Wasteland Management Program; NREGA under MoRD; Bamboo Mission, Horticultural Mission , Schemes of Animal Husbandry Deptt, Program on renewable energy of MNRES . Similarly, ongoing programs/schemes of MoEF include National Afforestation Program, Panchayat Van, Intensification of Forest Management Systems, CAMPA, schemes under 13th Finance Commission, etc.

From a cursory assessment, it is estimated that treatment under different existing schemes/programs would target about 10 m ha over next 10 years, at a cost of approximately Rs 37000 crores. It is presumed that the current level of investment in real terms in 12th five year plan will continue, and the proposed schemes in the pipe line would come through.

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 GI Mission will seek synergy with strategy and actions of related missions. For example, the ones related to energy, if molded towards achieving local energy security through renewable/alternative sources, can considerably reduce fuel-wood collection pressure on forest ecosystems.

5.5 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 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 the implementing agencies[viii]. 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[ix].

The Mission would provide support in assessing the investment climate to help identify good practices, constraints, and regulatory lacunas/ vacuums, and to address the same. This would increase investment by a variety of stakeholders and improve outcomes.

b) **Certification**

International demand for products of forest based industries and growers, particularly of small and medium scale enterprises like handicrafts, is likely to get affected unless they secure forest certification. Recently, there has been a decrease in the export of wood based handicrafts (mainly bamboo and cane products) from Rs.700 crores per year to Rs.680 crores per year, whereas it was anticipated that the export value will increase. The main reason for this was lack of certification of these products. Likewise, the value added products from timber as well as the NTFPs including medicinal, aromatic and ornamental plants, would face issues in the international market due to lack of certification.

After developing a national set of criteria and indicators for Sustainable Forest Management at Forest Management Unit level, there is need to develop national level standards and procedures for certification that primarily meet country requirements, though in line with international developments. The Mission would support an early lead in this direction.

5.6 Research & Development:

5.6.1 Research to support Mission aim and objectives:

Mission would commission a comprehensive research needs assessment in support of Mission goals and objectives. Some of the key areas would include: long term research to study vegetation response to climate change; 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, etc.

5.6.2 REDD Plus[x] Cell

The Mission would set up a cell within the Mission directorate under the overall guidance and supervision of the Ministry of Environment and Forests to coordinate REDD Plus activities. 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 UNFCC 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 would 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 would 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 the REDD / REDD Plus.

5.7 Monitoring the Greening Mission

The Mission would 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.

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 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 FD. Building community capacity to monitor Carbon and other services is envisaged using lessons from pilot projects.[xi]

Level 2: Field review by an external agency of both random and 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 would work in close collaboration with Forest Survey of India and Indian Institute of Remote Sensing for developing country wide mosaic of high resolution satellite image (LISS IV, Cartosat) and overlaying polygons of areas taken up for interventions under the Mission, to help develop a centralized spatial data base in GIS domain. Density slicing could be used to gauze migration with in density class.

This service will be available for both Mission financed activities as well as that undertaken and financed by other stakeholders.

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, additional parameters will include – ground cover, soil condition, erosion and infiltration monitoring, run-off, ground water levels to develop water budgets, as well as the provision of locally relevant fuel-wood, fodder, and other NTFPs, and basic biodiversity analysis. This analysis would require extensive support for communities and could form the basis for REDD based monitoring methodologies.

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

5.8 Making Green India Mission a people's program

The Mission would unlock people's energy and solicit their engagement with the greening program. It would strive to secure participation of multiple agencies / organizations / individuals (community, farmers, Panchayat bodies, Govt./Non Govt/ Private institutions/agencies, academia, business houses, children- especially in rural community, media etc) in greening activities. The Mission would develop a communication strategy to engage an array of stakeholders. It would provide support to various agencies/organizations to undertake Mission interventions.

6.0 Mission Organization

The Ministry of Environment and Forests will be responsible for operationlising the mission activities at the national level.

A National Advisory Council, chaired by the Minister Environment and Forests would be set up to provide overall guidance to the Mission. The Council will have representation from relevant sectoral line agencies at Secretary level. It will have representation of research institutions, civil society organisations and corporate sector. The Mission Director, will be Member-Secretary of the Council.

A National Steering Committee will be constituted to provide direction and management to the Mission. The Secretary/DGF, of the Department of Forest and Wildlife, Government of India will be the Chair. Members would include certain of the State Principal Chief Conservators of Forests (PCCFs) by rotation, representatives from related divisions in MoEF and related Ministries, eminent experts and representation of civil society organisations. The Mission Director will be the Member-Secretary of this body as well.

The National Mission Directorate will be serviced by the National Afforestation and Eco-Development Board. NAEB will house the secretariat for the Mission. IGF NAEB would be the Mission Director and will function as Member Secretary of both the National Advisory Council and the National Steering Committee. The Mission Director will be provided with required staff/experts and infrastructure for carrying out the Mission activities. A clear devolution of financial powers would be made for the Mission Directorate to facilitate smooth and timely implementation of action plans.

A similar set up will be created at each State. A State Steering Committee chaired by Chief Secretary/Additional Chief Secretary, would be set up in every State/UT to provide overall guidance to the Mission. The Steering committee would have sectoral representation at Principal Secretary/Secretary level. It will have representation of research/academic institutions, civil society organisations, communities and corporate sector. The State PCCF will be Member-Secretary

State Forest Department level will be responsible for operationlising the Mission activities at the state level. An Executive Committee chaired by PCCF will be set up for directing the Mission and overseeing implementation. To avoid multiplicity of agencies, State Forest Development Agency would act the State Mission Directorate.

The Mission activities at the district level will be coordinated by District Planning Committee and Forest Development Agency.

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

In urban areas, it will be the ward level committees /RWAs linked to Municipality / Municipal Corporations that will facilitate planning and implementation under the Mission.

7.0 Time frame

The implementation period of the Mission would be 10 years starting from FY 2010-2011 and the completion would be in the FY 2019-2020. The first year of the Mission would be utilized in setting up of the mission and sub-missions, institution strengthening, sensitization of forest department/ multiple agencies, and forest dependent community, capacity building of staff and the community, commissioning of research / assessment etc. Actual field operations will take place from the second year of the Mission.

8.0 Resources

Total mission cost is Rs 44,000 crores (details at Annex-1) for treatment of 10 million ha over next 10 years. These resources will be mobilized as additionality from Planning Commission. The deficit if any will be taken care of by developing projects for seeking assistance from international funding agencies, UN organization, etc.

Abstract of Mission Costs and Resources

Activities	Costs (Rs. crores)
A. Resources needed for the Mission to meet specific objectives and the activities thereof	32,000
B Resources for Support Activities	12,000
Total Mission costs (A+B)	**44,000**

Annex-1

TENTATIVE MISSION COSTS

For Sub Missions/ Interventions to achieve Mission outputs/targets:

Model/ components	Unit Cost (Rs/ha)	Area (Million ha)	Total Cost (Rs.cr)
Treatment Costs(TC)			
Sub Mission 1- Moderately dense forests	15,000	2.0	3000
Sub Mission 2- Degraded/Open forests	30,000	4.0	12,000
Sub Mission 3 – Scrub/grasslands eco-system	25,000	2.0	5,000
Sub Mission 4- Mangrove Ecosystem	50000	0.10	500
Sub Mission 5- Wetland Ecosystem	60,000	0.10	600
Sub Mission 6- Urban/Peri-urban / Institutional lands	100,000	0.20	2000
Sub Mission 7- Agro-forestry & social forestry (10)	50,000	1.50	7,500
Sub Mission 8- Corridors (1.0)	LS 50,000	0.10	500
Sub Total **(**Sub Mission 1 – Sub Mission 8**)**		**10.0**	**31,100**
Sub Mission 9- Improved cook stoves (10 million)	@ 600 Rs / IC	100.00 pc	600
Total		**10.0**	**31,700 or say 32,000**

B. For Support Activities

Activities	**Cost**
Research (5% of A)	1600
Publicity/Media/outreach activities(1% of A)	320
GIS/Monitoring and Evaluation (2%of A)	640
Livelihood improvement activities , (5 %f A)	1600
Strengthening local level institutions (5%)	1600
Strengthening FDs (10%)	3200
Overheads, Mission Directorate (10%)	3200
Total	**12,160 or say 12,000**

Total 32000 + 12000= 44,000

Annex-2

CARBON SEQUESTRATION POTENTIAL OF THE MISSION INTERVENTIONS

Mission components	Area (million ha)	Carbon Sequestration value(tC/ha/ year)	Carbon (million tons)	CO2 –e (million tons)	Remark
Sub Mission 1: Areas/sub-landscapes with moderately dense forests	2.0	0.4	0.80	2.93	IPCC value[14]
Sub Mission 2- Areas/ sub-landscapes with degraded forests	4.0	1.5	6.0	22.02	An average C seq. value of 1.5 tC/ha/year has been arrived from 0.4 t/C/ha/year and 2.75 t/C/ha/year [xii] (refer end note)
Sub Mission 3 – Areas/ sub-landscapes with scrub/grasslands vegetation	2.0	0.7	1.40	5.10	IPCC value
Sub Mission 4- Mangrove Ecosystem	0.10	2.56	0.25	0.91	As per productivity estimates
Sub Mission 5- Wetland conservation	0.10	0.4	0.04	0.14	IPCC value
Sub Mission - Urban/Peri-urban / Institutional lands	0.20	0.3	0.06	0.22	IPCC value
Sub Mission 7- Agro-forestry & social forestry (0.80 m ha area under improved agro-forestry; 70 m ha as increased area)	1.50 (0.8+ 0.7)	0.3 (improved agro-forestry) 3.1 for new areas	2.41	8.14	IPCC value & as per productivity estimates
Sub Mission 8- Corridors (1.0)	0.10	-	-	-	-
Total (Sub Mission 1-8)	**10.00**		**10.96**	**39.46**	
Sub Mission 9- Improved cook stoves (10 million	100.00 pc	-	0.98	3.62	
Grand Total	**10.00**		**11.94**	**43.08**	

[14] IPCC-LULUCF, 2000; page 14

Annex-3

Forest/Non Forest areas to be treated over next 10 years +

Type of area and the density class	Extent of area (in Million ha)	Area likely to be treated under existing program schemes till 2020 (Million ha)	Areas to be treated under the Green India Mission (Million ha)
Moderately dense forest (40- 70%)	31.90	2.0	2.0
Open Forests* (10-40 %)	28.84	6.0	4.00
Scrub/Grasslands	4.15		2.0
Non Forests land	255.49	2.0	2.0
		10.0	**10.0**

END NOTES:

[i]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 requirement of viable tiger population. From Livelihood-Conservation point of view, Buchnania –Terminalia dominated NTFP landscape of 70 sq km (including forest and non forest lands) in Seoni district in MP that provides livelihood incomes from NTFP to over a dozen villages. The landforms like Satpura make a very large landscape that provide catchments of many rivers and are house to rich biodiversity and cultural diversity.

[ii]Vulnerability assessment done at IISc Bangalore using HadRM3 using A2/B2 scenario and global vegetation response model IBIS. The assessment has looked at forest grids projected to undergo change in different states.

[iii]As per the latest Forest Survey of India report (2009), 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 mha of the remaining very dense/dense forests.

[iv] According to one of the estimates put up by TERI (2009) there is huge potential of 85 million ICs in the country, which could save 17 MT of fuel wood every year.

[v]There were about 106,482 JFM committees protecting about 22.01 million hectare of forests—approximately a third of the land with the forest departments in the country. (MoEF,2006)

[vi]The Gram Sabha has same meaning as specified in 73rd Constitutional amendment and Panchayat Raj Extension in Scheduled Area,1996

[vii]Adaptive Silviculture: A few key Elements

- The management unit is JFMC /CFM/ /Community Forest Resource or a cluster of such units.
- Participatory assessment of forests condition including growing stock/carbon stock enumeration and regeneration survey of both timber and non timber species is done at local level by community, supported by front line forest staff, using both traditional ecological knowledge as well as scientific measurements. Similarly, community need assessment with regards to 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. Prioritisation across range of goods and services addresses intra community, inter community as well as inter-generational needs vis-à-vis forest goods and services. For instance, balancing needs of village poor for fuel wood and poles verses need of relatively well to do farmers for timber. Microplans to dwell both at 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 option of federating at higher level 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.

[viii]Simplification of rules governing the harvest, sale and transit of short rotation trees on private lands such as eucalyptus and popular 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

[ix]Lok Vaniki in MP
Recognizing the constraints to private forestry, an attempt was made in state of 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 Peoples Forestry is governed by the Madhya 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. 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.

[x] 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 UNFCC 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)

[xi] Project , Think Global Act Local; Singh 2009; and other such project using community youths to measure ecosystem services

[xii] The average value of carbon sequestration for open forests has been considered: a) based on the estimates shown in Technical paper of ICFRE India's Forest and Tree Cover : Contribution as Carbon Sink , page 10 and b) personal communication Kant, Pramode.
