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Report of the Steering Committee

ENVIRONMENT, FORESTS, WILDLIFE &
CLIMATE CHANGE

for the Twelfth Five Year Plan
(2012-2017)

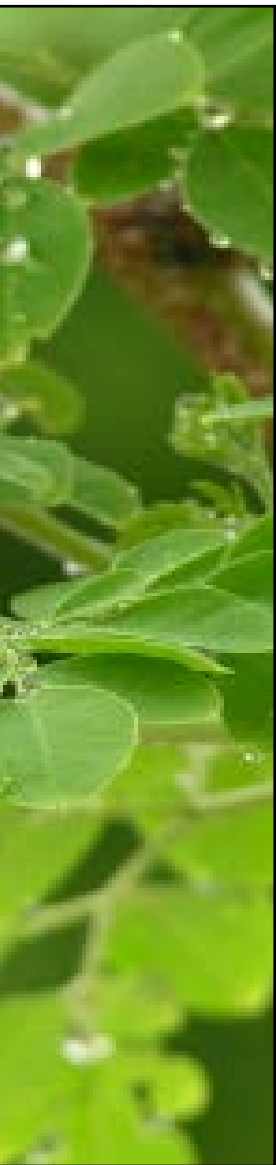


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Preface

The planning process in India lays emphasis on mainstreaming environmental considerations in the economic and development Planning Processes. In the current scenario, the protection of environment is a central aspect of India's sustainable inclusive growth strategy. The Planning Commission Approach Paper for the Twelfth Five Year Plan "Faster, Sustainable, and more Inclusive explicitly acknowledges that economic development will be sustainable only if it is pursued in a manner which protects the environment. On an economy wide level, the Approach paper ", lays out major focus areas and targets for the economy, examines the key challenges confronting progress in these areas along with their underlying causes and defines the broad strategies that may be followed to achieve the objectives stated therein. The Section on Managing the Environment specifically emphasizes on the need to focus attention on securing ecology of watershed and catchments, Environmental Impact Assessments of vulnerable regions, management and restoration of wetlands and water resources, increase in forest cover and forest management, waste treatment, mining area restoration, protection and preservation of biodiversity, wildlife and community rights, pricing of minor forest produce and mitigation and adaption issues relating to climate change.

With this approach paper serving as the basis for discussions, the steering committee framed its recommendations and formulated this report. The findings and recommendations presented in this report are based on an in-depth participatory, consultative process, supported by literature review and research through four working groups, namely WG on Environment and Climate Change; WG on Forestry and Sustainable Natural Resources Management; WG on Wildlife Management, Ecotourism and Livelihood, and Animal Welfare; and WG on Eco-resilience, Biodiversity and Sustainable Livelihood. Through active engagement and a wide range of interactions, the views of the experts constituting the working groups are canvassed on this document. A comprehensive analysis of the policies and programmes in the Environment, Forestry, Wildlife, Animal Welfare sectors and Climate Change was carried out by the working groups leading to the formulation of 23 monitorable targets and 24 goals for the 12th plan which are highlighted in the document in the subsequent sections. .

Some of the major national challenges that were identified during the formulation of the steering committee report include:

- The need to include "environment" as a concurrent subject in the constitution- Environment is a residual central subject with both the Central and the State Government responsible for regulation and enforcement. Thus, there is a need to include "environment" as a concurrent subject in the constitution. This will help the State Governments and the local authorities enact and notify their own enforcement laws and rules to ensure compliance of relevant environmental norms.
- Inadequacy of resources- An important factor constraining effective environmental and forests management in the country is that of inadequate resources, manpower, institutions and intersectoral harmonization . Thus, there is need for significant increase in investment allocation for sustainable management and protection of natural resources as well as conservation of the Environment, including investment on adequate human resource support. Additionally, the work of several ministries, namely, the Ministry of Urban Development, Rural Development, Agriculture, Tribal Affairs, Panchayat Raj, New and Renewable Energy, etc. have a direct bearing on the achievement of objectives of Ministry of Environment and Forests (MoEF). Considering that the domain of environment cuts across sectoral lines and interests, there is considerable potential for dovetailing of MoEF's resources with the schemes of several ministries and an attempt could also be made for earmarking of resources under these ministries for investment in environment and forestry.

For the preparation of this report, I would specially like to acknowledge the support received from. Prof Madhav Gadgil. Dr Balakrishna Pisupati, Dr U. Sankar, Dr T. Chatterjee, Shri JM Mauskar, Dr Dilip Kumar, Ms Mira Mehrishi, Shri Paritosh Tyagi, Shri Mukerjee, Dr C.R. Babu, and Shri Jagdish Kishwan.



Vision

Managing Environment, Forests, Wildlife and challenges due to Climate Change for FASTER and EQUITABLE growth, where Ecological Security for SUSTAINABILITY AND INCLUSIVENESS is restored, EQUITY IN ACCESS to all environmental goods and Ecosystem services is assured, through

INSTITUTIONALIZATION

of

PEOPLE'S PARTICIPATION

And

A FUTURE in which the Nation takes pride in the quality of its environment, forests, richness of its biodiversity and efforts by the STATE AND

ITS PEOPLE

to protect, expand and enrich it for

INTRA AND INTERGENERATIONAL EQUITY

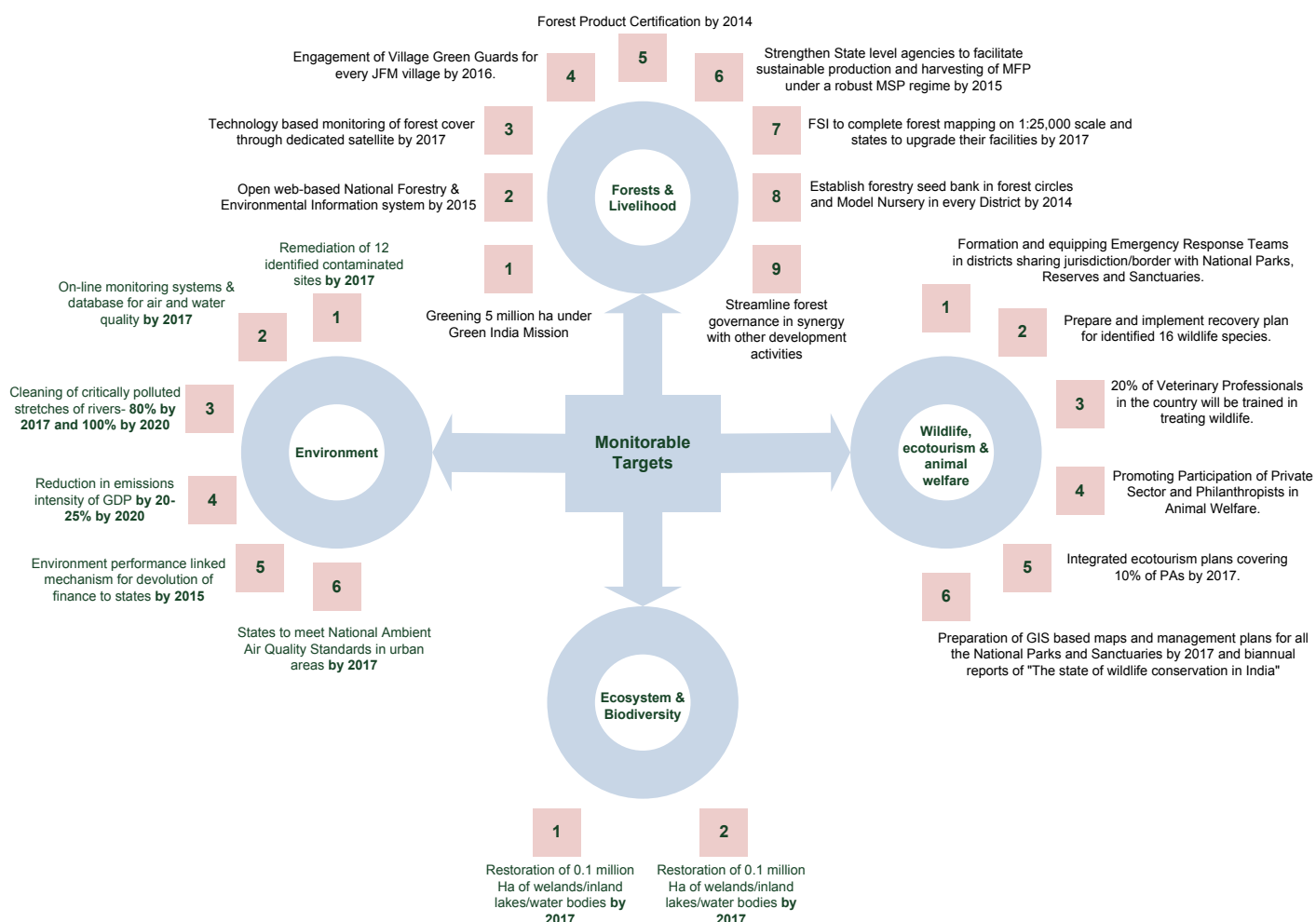
and welfare of the

LOCAL and GLOBAL COMMUNITY.

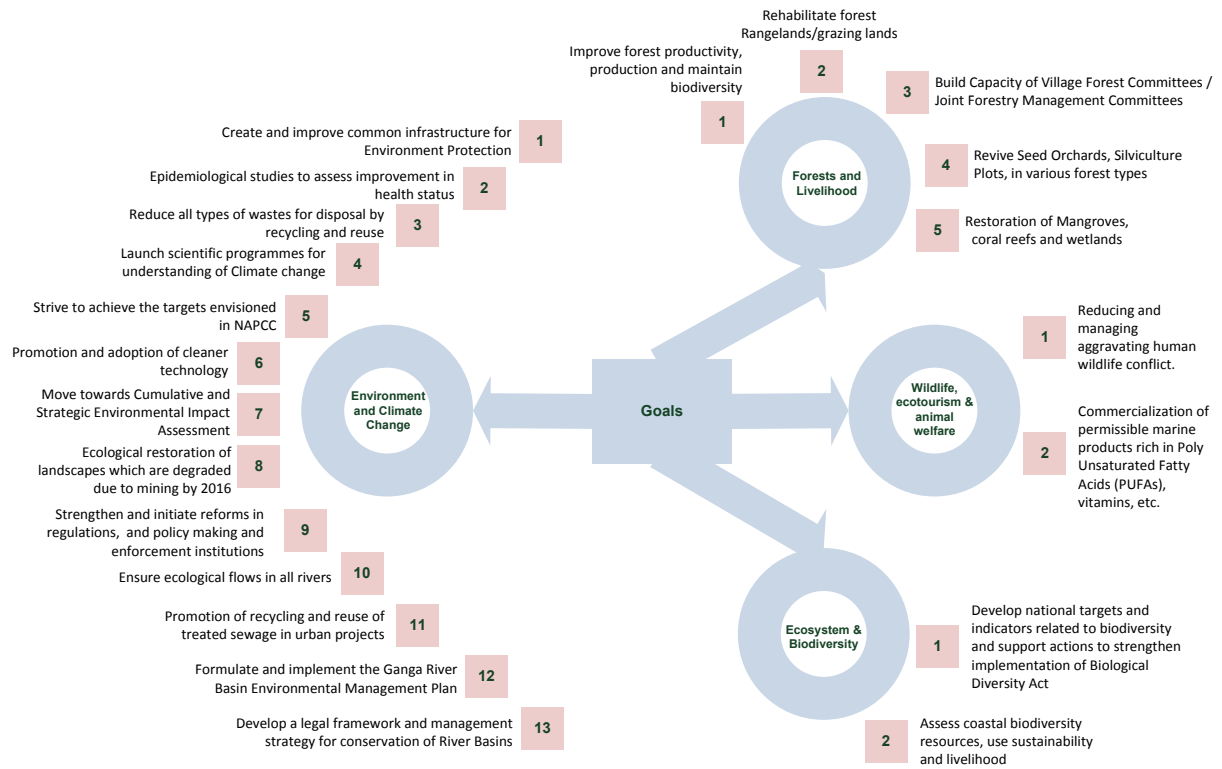
Targets for the Twelfth Plan

On the threshold of the XII Five Year Plan, it was felt necessary to undertake an assessment of all the sectors of environment from a holistic and scientific perspective and set ourselves targets for the 12th plan. Based this review, the Committee has set 23 specific monitorable targets in addition to 22 general goals in the field of environment, forestry, bio-diversity, wildlife and climate change for the Twelfth plan. **Its holistic implementation shall be contingent on the availability of adequate financial and human resources.**

Monitorable Targets



Goals



Executive Summary

The scale of environmental challenge is set to increase in magnitude as well as complexity. The foremost challenge is arresting the pace of environmental degradation due to the imperatives of maintaining high economic growth coupled with increasing urbanisation, population growth, industrialization, unmet basic needs, lifestyle changes and biotic pressure. While the challenges are formidable for India, there are a number of positives such as strong scientific and technology base supported by institutions which provide us the opportunity to take forward the environmental agenda.



Global environmental governance is gaining increasing importance. Environment being an indivisible entity transcending national and international boundaries, international cooperation and national efforts to achieve the objectives of equitable access to clean air and water, adaptation and mitigation of climate change, conservation of bio-diversity, sustainable forest management, safety in the management of chemicals, wastes and other hazardous substances is an absolute necessity and a priority the nation. An important factor constraining the effectiveness of environment and forest management in the country is that of inadequate resources. Currently, the percentage of Gross Domestic Product (GDP) spent on environment is 0.012%, and the Annual budget of MoEF is around ₹ 2000 crore, i.e., less than 0.25% of the National Plan. The situation in the States and at the city level is a real cause for concern. There is need for significant increase in investment on protection, sustainable management of natural resources and conservation of environment.

Several ministries, notably the Ministry of Urban Development (MoUD), run major programmes such as Jawaharlal Nehru National Urban Renewal Mission (JNNURM) and Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT), which have a direct impact on the progress of MoEF's objectives. Programmes such as the JNNURM and National River Conservation Programme need to be brought together effectively to achieve the target of river cleaning. The MoUD should also ensure creation of required waste management systems in all urban local bodies. Similarly, afforestation work including rehabilitation and livelihood improvement activities can be taken up under the schemes of the ministries of Rural Development, Agriculture, Tribal Affairs, Panchayat Raj, Renewable Energy etc. Thus, there is thus considerable potential for dovetailing of MoEF's resources with the schemes of several ministries and an attempt could also be made for earmarking of resources under these ministries for investment in environment and greening of the country.

Besides programmes, legislative initiatives of a number of other ministries have a bearing on the enforcement of certain environment related laws. International commitments in various sectors and their compliance through new laws, institutions of enforcement and programmes of action impact environmental governance. To promote harmony, the National Environmental Policy was devised with the objective of ensuring that all developmental decisions are

informed and influenced by environmental imperatives of conservation and sustainable development. In the XII Plan, the National Environmental and Forestry Council (NEFC) is proposed to be set up, with the Prime Minister as the Chairperson and the Minister of Environment and Forests as the Vice-Chair. Aided and advised by a group of experts, this high-powered body would have representation from the ministries of External Affairs, science & Technology, Agriculture, Commerce, Urban and Rural Development, Tribal Welfare, etc. Its primary function would be to bring in harmony in the functioning of different ministries and to ensure that the evolution of all policies, laws and their implementation concerning development, are in conformity with the objectives under the environmental policy document. NEFC would also be engaged in extending incentives for the environmental performance of states, based on periodic reports submitted to it by a newly constituted body for this purpose.

Following an in-depth analysis of policies and programmes in the Environment, Forestry, Biodiversity, Wildlife and Animal Welfare sectors, 23 monitorable targets have been set for the 12th plan, along with 22 goals.

Monitorable Targets for 12th plan

ENVIRONMENT AND CLIMATE CHANGE

1. Assess and remediate 12 identified contaminated sites (hazardous chemicals & wastes), with potential for ground water contamination by 2017.
2. Establish on-line continuous monitoring systems and develop geospatially enabled comprehensive database for Air and water quality (Ambient and source), by 2017.
3. Clean 80% of critically polluted stretches in rivers by 2017 and 100% by 2020.
4. Emissions intensity reduction of GDP by 20-25% by 2020 in comparison with 2005 level.
5. Introduce Performance monitoring and develop Environment performance linked mechanism for devolution of finance to states by 2015.
6. States to meet National Ambient Air Quality standards in urban areas by 2017.

FORESTS AND LIVELIHOOD

7. Greening 5 million ha under Green India Mission including 0.75 million ha of degraded lands and afforestation and eco-restoration of 2.0 million ha of ecologically sensitive areas.
8. Technology based monitoring of forest cover, biodiversity, growing stock and change monitoring on periodical basis through dedicated satellite by 2017.
9. Establish open web-based National Forestry & Environmental Information system for public accessibility of information and research by 2015.
10. Engagement of Village Green Guards/Community Foresters for every Joint Forest Management (JFM) village by 2016.
11. Develop Forest Product Certification/Forest Certification system by 2014.
12. Forest Survey of India (FSI) to complete forest mapping on 1:25,000 scale and states to upgrade facilities to be able to prepare maps on 1:10,000 and 1:4,000 [cadastral map scale] wherever necessary; JFM micro plans, core areas of Protected areas, allotment of forest under Scheduled Tribe & Other Traditional Forest Dwellers (Recognition of Forest Rights) Act (FRA-2006) etc. for planning and monitoring on scientific basis by 2017.
13. Streamline forest governance in synergy with other development activities like health, agriculture, education, tourism, etc at the cutting edge level particularly in 188 Tribal Districts which includes 60 Left Wing Extremism (LWE) Districts to facilitate the formation of Bio-diversity Management Committees.
14. Strengthen State level agencies including State Forest Corporations to facilitate sustainable production and harvesting of Minor Forest Produce (MFP) under a robust MSP regime by 2015.
15. Establish forestry seed bank in forest circles and Model Nursery in every District with information on public portal by 2014.

WILDLIFE, ECOTOURISM AND ANIMAL WELFARE

16. Prepare and implement recovery plan for identified 16 wildlife species.
17. Formation and equipping Emergency Response Teams of Non-government Organizations (NGOs), Veterinarian, Wildlife Experts/Enthusiasts in all Districts sharing jurisdiction/border with National Parks, Elephant & Tiger Reserves and Wildlife Sanctuaries.
18. 20% of Veterinary Professionals in the country will be trained in treating wildlife.
19. Ensure preparation of Geographical Information System (GIS) based maps of appropriate scale and management plans for all the National Parks and Sanctuaries by 2017 and Wildlife Institute of India to bring out biannual reports of "The state of wildlife conservation in India".
20. Integrated ecotourism plans covering 10% of Protected Areas (PAs) by 2017.
21. Promoting Participation of Private Sector and Philanthropists in Animal Welfare.

ECOSYSTEM AND BIODIVERSITY

22. Restore 0.1 million ha. of wetlands/inland lakes /water bodies by 2017.
23. Mapping of deserts, both cold and arid, coastal areas, important coral zones, wetlands, mangroves and preparation of management plans be completed by 2017.

Goals**ENVIRONMENT AND CLIMATE CHANGE**

1. Create and improve Common Infrastructure for Environment Protection viz; Common Effluent Treatment Plants (CETP), Treatment, Storage and Disposal Facility (TSDF) etc.
2. Epidemiological studies to assess improvement in health status due to better management of Environment and ecology.
3. Reduce all types of wastes for disposal by recycling and reuse.
4. Strengthen / Launch scientific programmes for deepening the understanding of Climate change and its likely impacts.
5. Strive to achieve the targets envisioned in the Missions of the National Action Plan for Climate Change (NAPCC) and mapping of various adaptation practices/schemes in vogue.
6. Promotion and adoption of cleaner technology and implementation of environmental regulations.
7. Move towards Cumulative and Strategic Environmental Impact Assessment.
8. Ecological restoration of landscapes which are degraded due to mining -by 2016. Strengthen institutional mechanism to achieve the targets
9. Strengthen and initiate reforms in regulations, and policy making and enforcement institutions, for environmental governance.
10. Ensure ecological flows in all rivers by regulating abstractions so as to allow conservation of riverine ecosystems.
11. Promotion of recycling and reuse of treated sewage in urban projects such as sanitation, landscaping, central air-conditioning etc. will be promoted.
12. Ganga has been declared as the national river and the National Ganga River Basin Authority has been established in 2009 to conserve the river and its basin, steps are being taken to formulate and implement the Ganga River Basin Environmental Management Plan.
13. Develop a legal framework and management strategy for conservation of River Basins.

FORESTS AND LIVELIHOOD

14. Improve forest productivity, production and maintain biodiversity (linked to benefit sharing with people)
15. Rehabilitate forest Rangelands/grazing lands and establish community grazing land around forest fringe villages
16. Build Capacity of Village Forest Committees / Joint Forestry Management Committees for Management of Forest Resources including ecotourism potentials.
17. Revive Seed Orchards, Silviculture Plots, in various forest types including Minor Forest Produces (MFPs/NTFPs), genetic improvement of species and establishment of Clonal orchards.
18. Restoration of Mangroves, coral reefs and wetlands.

WILDLIFE, ECOTOURISM AND ANIMAL WELFARE

19. Reducing and managing aggravating human wildlife conflict.
20. Commercialization of permissible marine products rich in Poly Unsaturated Fatty Acids (PUFAs), vitamins, etc.

ECOSYSTEM AND BIODIVERSITY

21. Develop national targets and indicators related to biodiversity and support actions to strengthen implementation of Biological Diversity Act to ensure biosafety and economic and social development of local communities.
22. Assess coastal biodiversity resources, use sustainability and livelihood.

The steering committee report proposes measures to strengthen the country's capacity to respond to present and future challenges by aiming to mainstream environment, forests, wildlife and climate change concerns into future development planning and policy making in the country. A snapshot of the views of the steering committee members and other experts consulted for this purpose are canvassed below.

Institutional arrangements

In the 12th Plan, institutional mechanisms like establishment of a Department of Environment in the states for environmental management to address intersectorality issues, should be addressed on priority. Inter-Ministerial Standing Committees and Working groups in specific domains within broad areas like air quality management and waste management need to be established both at the Central and State government levels. On the lines of NEFC, a high-powered body should be constituted - State Environmental Council (SEC)- to align the working of all the other ministries with that of the Ministry of Environment and Forests, in each State. Environment cells have to be constituted in line with ministries at the central and state levels so as to mainstream environmental concerns.

Ecological processes that generate ecosystem services and goods and biodiversity are central for ecological sustainability. It is proposed to establish an Ecosystem Research Institute (ERI) under MoEF for undertaking research in ecosystems, biodiversity and sustainable development.

It is important that we take concrete steps to implement Biological Diversity Act, 2002 and Forest Right Act, 2006 throughout the country. XII Five Year Plan (FYP) should provide for taking immediate steps to ensure establishment of Biodiversity Management Committees at all levels, namely, Gram Panchayats, Taluka Panchayats, Zilla Panchayats, as also Nagarpalikas and Mahanagarpalikas throughout the country. Furthermore, the Ministry of Environment & Forests needs to ensure that Bio-diversity Management Committees (BMCs) are motivated and empowered to collect 'charges' as provided in the Biological Diversity Act.

In order to evolve a national consensus on forestry matters and to meet new challenges, it is proposed that the 'Cen-

tral Board of Forestry (CBF)' be revived with Prime Minister as Chairperson and Minister of Environment & Forest as Vice Chairperson, on the lines of National Board for Wildlife. This should be the apex body for policy development and consultation in the country.

Reorientation of ICFRE on the lines of ICAR and augmentation of funding needs to be taken up during the Twelfth Five Year Plan. The Working Plan Code, based on which forest working plans are prepared and adhered to, needs to be amended to incorporate new dimensions along with assigning specific responsibility to cutting edge level workers and for transferring the rights in the field with proper documentation.

There is a need for creation of "Green fund" by pooling forest development tax which can be levied on sale of forest products, forest conservation tax on the sale of petroleum products/ coal and similar taxes like Eco-tax in Himachal Pradesh, which may be utilized for forestry activities.

Regulatory and policy reforms

A comprehensive review and reform in laws concerning Environment, Forests and Wildlife and Biodiversity will be undertaken in the 12th Plan, to make them more effective, harmonized and capable of addressing new challenges. This would be undertaken in the following areas, in particular:

- (i) **Pollution Control and Waste Management Regime:-** This would be against the backdrop of exponential expansion of the powers and functions of the existing authorities, to deal with non-point source pollution issues (like agricultural runoffs etc.), alarming increase in chemicalization of soil and other natural resources and to consider and contextualize the proposal for the setting up of NEPA in restructuring the environmental management regime.
- (ii) **Environment (Protection) Act, 1986 (EPA) and notifications under it like Environment Impact Assessment (EIA) and Coastal Regulation Zone (CRZ):-** This is to make the system more effective and to evolve better proactive legislative and administrative measures for switching over from carbon-based economy to a carbon neutral one; to promote alternative energy options; to deal with situations arising out of creation of SEZs; to strengthen the Impact Assessment Law and laws relevant to the coastal regions by making the local authorities more responsible and accountable and by plugging the loopholes that weaken and dilute their effectiveness; to give effect to the new Liability Regime to which India has committed itself (2010 UNEP Guidelines on Liability, Response Action and Compensation for Environmentally Harmful Activities- a new legal regime that will have far reaching implications on all perceivable development activities and the actors engaged in them, without exception) and to foreground the idea of "Commons" at the domestic level and secure them.
- (iii) **Forest, Wildlife and Biodiversity Regime:-** This would be undertaken, in the light of legislative developments, in related areas, initiated by other ministries (like Protection of Plant Varieties and Farmers' Rights Act (PPVFRA), Forest Rights Act, Seeds Amendment Bill, Biotechnology Regulatory Authority Bill, etc.) to evolve effective and robust legal safeguards for addressing the issue of "biosafety"; to internalize the international commitment concerning the Access and Benefit sharing regime (-Nagoya Protocol); to provide sufficient and effective safeguards for the protection of Traditional Knowledge (TK) & Folk Art concerning Biodiversity and to ensure that India gives a good account of itself in the international arena, as the President of CoPs of CBD, starting from 2012, on compliance with its international commitments over Biodiversity issues (-primarily over biosafety, conservation of TK, equity and benefit-sharing etc.). It is also to bring out the harmony in the working of these laws with the Panchayat Extension to Scheduled Areas Act, 1996.

It is also necessary to consider integrating environmental values into cost-benefit analysis, to encourage more efficient allocation of resources while making public investment decisions. Amendments to the environmental laws to introduce pollution charges and other economic instruments, incentivizing good environmental performance by larger allocation

for environment sector (Finance Commission) and grants by Planning Commission, and considering creation of a National Environment Restoration Fund (NERF) from the net proceeds of economic instruments, user fees for access to specified natural resources, and voluntary contributions need to be considered. The Fund may be used for restoration of environmental resources, including clean-up of toxic and hazardous waste legacies.

Monitoring and Assessment

The establishment of National Environment Assessment and Monitoring Authority (NEAMA), a professional multi-disciplinary and autonomous body, could pave the way for greater efficiency and objectivity in grant of environmental clearances and improvement in the monitoring of clearances. In the 12th FYP, the Central and State governments need to invest in strengthening the mechanisms for implementing rules notified under the E(P) Act, 1986 including the CRZ notification and the marine fisheries regulation.

Promotion of continuous 24x7 online air quality monitoring which includes Continuous Ambient Air Quality Monitoring Stations (CAAQMS) and Continuous Emission Monitoring System (CEMS), introduction of cost-effective technologies such as bioremediation to address the pollution of water bodies, use of high calorific value hazardous wastes in cement kilns as a safe alternative to conventional incineration, and use in power and steel plants, needs to be further explored.

A unified National Environmental Monitoring Programme (NEMP) on forests, wetlands, biodiversity, air quality, river and ocean pollution needs to be established. The NEMP should focus on tracking status and change in biophysical parameters, and their social impacts, be a real-time data sharing platform on environmental parameters and consist of a mix of national, regional and local programmes.

Strengthening of Botanical Survey of India (BSI) and Zoological Survey of India (ZSI) in terms of manpower and infrastructure is the key to the inventorization of living resources of the country and should be achieved during the Plan. A consortium of research organizations in environment, forestry, wildlife and climate change should validate and update the Biodiversity Information System (BIS), the Indian Bioresource Information System (IBIN) and India Biodiversity Portal (IBP) and the Indian Ocean Census of Marine Life (IOCoML). An effort to digitize gene-map and make available existing taxonomic collections should be piloted. The mandate of different institutes engaged in forestry, biodiversity and wildlife research is required to be broadened to accommodate emerging needs for collaborative multidisciplinary research.

During the 12th Plan, a provision of ₹23000 crore needs to be made for aggressive implementation of the Green India Mission to achieve the target of increased forest and tree cover on 2.5 m. ha area (non forest through agro / social / farm forestry), improved quality of degraded forest on another 2.5 m ha area, improved ecosystems services, increased forest based livelihood income and enhanced annual carbon dioxide (CO₂) sequestration. A new scheme "Satellite-based Forest Resource Assessment and Technology based M & E" to put in place a system of technology-based collection of baseline data, monitoring and evaluation of forestry schemes, including GIS-based mapping and monitoring of areas allotted under Scheduled Tribe & Other Traditional Forest Dwellers (Recognition of Forest Rights) Act (FRA) 2006 to prevent their encroachments and programmes at State and Central level need to be initiated.

National Action Plan on Climate Change

During the 12th Plan, it is necessary to adopt a well defined strategy to achieve the objectives laid down in the National Action Plan on Climate Change (NAPCC). The strategy has to be built around appropriate adaptation and mitigation actions in line with the NAPCC and should permeate all sectors of the 12th Plan. While the strategy for achieving the mitigation goal including the goal of a lower carbon inclusive growth will need to be drawn up at the national level, adaptation actions must reflect the needs and priorities of the States. The key elements of the strategy will be establish-

ment of institutional arrangements to coordinate and monitor implementation of the NAPCC and its national missions, provision of financial resources for the missions and initiatives under the NAPCC, preparation and implementation of a mitigation strategy for a lower carbon inclusive growth, building and strengthening the institutional capacity for scientific research into climate change including observation of ecological changes and assessment of climate change, and involving States in these efforts. This will include a scheme for supporting states in preparing and implementing State Action Plans on Climate Change.

International cooperation

In the area of International Cooperation in the XII Plan, the Ministry would take the lead in setting up an institutional mechanism for a Regional Alliance of South Asian Association for Regional Cooperation (SAARC) countries in developing policies, laws, action plans concerning environment, for implementation and strengthening capacity, by linking up scientific and research institutions, institutions of excellence concerning forestry, wildlife and biodiversity that would include disciplines like law, natural resource management, economics and administration in the region. This involves a variety of measures that include strengthening South Asia Co-operative Environment Programme (SACEP) in the formulation of policy and law and their implementation, technical cooperation, management practices as to conservation and sustainable use of bioresources; strengthening legal capacity in administration, information sharing and its dissemination and building capacity in justicing and justice-delivery concerning natural resource management, for which India is a global leader, etc.

Livelihoods

To develop the Non Timber Forest Produce (NTFP) sector in a holistic way and coordinate/guide the various government sponsored activities/programmes for sustainable management and livelihood, an apex and autonomous agency in the Ministry of Environment and Forests called the NTFP Development Board, with state offices/branches is required. For the overall management of NTFP resource including conservation and development of an estimated 6 lakh ha value addition and marketing support, a new scheme "Sustainable Livelihoods through NTFP Management including Bamboo" needs to be formulated.

There is an urgent need to focus on pasture management and formulation of grazing policy at the national level which will enhance the livelihood, nutrition and quality of life of all fringe forest dwellers. There is need for a new scheme "Rangeland and Silvi-pasture Management" for rehabilitation and productivity enhancement of rangelands, traditional grasslands on common / revenue lands around forest areas. Infrastructural and institutional mechanism for fodder storage, value addition facilities, maintenance of germplasm banks and nurseries requires to be developed during the Plan.

Wildlife specific schemes

Tiger conservation, as led by the National Tiger Conservation Authority, needs to be continued as a flagship programme of the MoEF. Based on past experiences, it has identified several new thrust areas for action during the Plan. This would include strengthening protection and furthering the coexistence agenda in the buffer areas of tiger reserves and voluntary relocation, along with regular monitoring of tiger population and their habitat.

Project Elephant needs a new focus under the Plan, with the proposed creation of the National Elephant Conservation Authority (NECA) and notifying critical areas of Elephant Reserves as ecologically sensitive areas under the Environment (Protection) Act, 1986. Special focus is required to be given for mitigation of human-elephant conflict through strengthening of the existing Project Elephant scheme.

Scientific and socio-economic issues related to wildlife conservation including strengthening of veterinary care for

wild animals, scientific management of PAs and wildlife rich areas outside PAs, mitigation of human-wildlife conflict, operationalization of ecotourism linked to livelihood enhancement of local communities, and a coordinated approach for rejuvenating the animal welfare structure in the country are areas of focus in the 12th Five Year Plan, and have been dealt with in detail in the next chapter on Recommendations.

Animal Welfare Boards need to be set up in all the States, including Societies for the Prevention of Cruelty to Animals (SPCAs) under the Prevention of Cruelty (Establishment of Societies for the Prevention of Cruelty to Animals) Rules, in all districts within all States.

It is proposed in the 12th Plan to strengthen two existing schemes: 1) Integrated Development of Wildlife Habitats, and 2) Project elephant, and introduce two new schemes, namely, 1) Operationalization and Strengthening of Eco-tourism for Local Livelihoods and 2) Promoting Participation of Private Sector and Philanthropists in Animal Welfare.

The 12 Central sector (CS) and 5 Centrally-sponsored schemes (CSS) being implemented will be continued during the 12th Plan. A new CS scheme on Climate Change is being added as also three sub-schemes, namely Sustainable Livelihoods through NTFP Management, Green India Mission and Rangeland and Silviculture Development. The proposed outlay for the 12th Plan is ₹47586.19 crores.





Recommendations

Four Working Groups (WG), namely, i) WG on Environment and Climate Change; ii) WG on Forestry and Sustainable Natural Resources Management; iii) WG on Wildlife Management, Ecotourism and Livelihood, and Animal Welfare; and iv) WG on Eco-resilience, Biodiversity and Sustainable Livelihood were constituted by the Steering Committee to deliberate and draw up a plan for the sectors. Recommendations were prepared based on the review of existing programmes, regulatory mechanism, infrastructure, institutional mechanism, research & development and global dynamics.





It is necessary to emphasise here that all sectoral ministries need to dovetail their inter-sectoral Action Plans /programs/ in these sectors and implement them in coordination with the Ministry of Environment and Forests (MoEF). Adequate budgetary support for the sectors is needed to ensure implementation of the Action Plans. It is also important to highlight that these sectors are cross-cutting in nature and need to be regarded as crucial guiding dimensions while framing policies and programmes in every sector. Integration of the considerations of these sectors into planning and developmental activities across all sectors is crucial for enhancing effectiveness and attaining success from these efforts.

A. Environment

The key recommendations on Environment for the 12th Five Year Plan are as follows:-

A.1. Regulatory and Institutional Mechanism

- A.1.1. A multi-pronged approach to environmental regulation in terms of capacity building of existing institutions, improved database management, professionalization of environmental clearance system and introduction of alternative systems of regulation, other than the traditional command and control ones, has to be adopted. This may be achieved through a combination of amendment to the E(P) Act, 1986, and the subordinate rules, issue of notifications under various legislations and through policy and programmatic interventions.
- A.1.2. Strengthening of the technical manpower of Central Pollution Control Board (CPCB) along with improved infrastructure, including additional zonal offices needs to be undertaken. CPCB labs to be upgraded to the level of ISO 9001 or ISO 17025 (National Accreditation Board for Testing and Calibration Laboratories (NABL)) and OHSAS 18001 accreditation.
- A.1.3. State Pollution Control Boards (SPCBs) have to be strengthened in terms of technical manpower, infrastructure and labs. Financial support to SPCBs may be improved through budgetary support by the State Governments, upward revision of cess rates under the Water Cess Act, 1977 and strengthening the weaker SPCBs/PCCs,

particularly of the North-Eastern (NE) States, through Central Government schemes.

- A.1.4. Establishment of separate department of Environment in the States and ensuring funding of the department of Environment.
- A.1.5. Robust environmental database management system has to be developed. CPCB has to take responsibility of collection, compilation and dissemination of databases on air and water quality. These databases need to be placed on a geospatial platform in order to enable efficient decisionmaking for the implementation of conditions laid in environmental clearances and regulation.
- A.1.6. The establishment of a National Environment Assessment and Monitoring Authority (NEAMA), a professional multi-disciplinary and autonomous body could pave the way for greater efficiency and objectivity in grant of environmental clearances and improvement in the monitoring of clearances. Such an authority would be a recommendatory body for project appraisal and the final decision-making would continue to be vested in the Ministry of Environment & Forests. In the second phase, NEAMA may also be vested with functions related to chemical safety in industrial storage, transport and use.
- A.1.7. Authorities like NEAMA may be enabled to charge fees for specific services rendered, so as to make them financially self-reliant. Towards this end, suitable amendment to Environment (Protection) Act, 1986 will be required.
- A.1.8. Institutional mechanism to address intersectorality in environmental management have to be developed. Firstly, Inter-ministerial working groups in specific domains within broad areas like air quality management and waste management need to be established at the central and State government levels. Secondly, Environment Cells have to be constituted in line ministries at the Central and State levels so as to mainstream environmental concerns.
- A.1.9. A framework of specialized and general training in environmental management, at both induction and mid-career levels, has to be developed for the officers of the pollution control boards. Capacity-building of PCBs may be supplemented with constitution of committees also comprising outside domain experts.
- A.1.10. Greater role of economic instruments in regulation needs to be explored. A provision of bank guarantee for specific performance, including restoration of damaged environment, may be specifically incorporated in the E(P) Act.
- A.1.11. Effective regulation envisages not only a salutary level of penalty but also a process of expeditious action against the defaulters. The E(P) Act, 1986 may be amended for an upward revision in the quantum of penalties and also to include an enabling provision for civil administrative adjudication to fast track levy of penalty, thereby ensuring effective deterrence.
- A.1.12. Common consent and authorization mechanism which is deployed in some SPCBs needs to be replicated in other SPCBs for integrated and faster clearances. Moreover, adoption of an Information Technology (IT)-based consent management system will not only promote transparency and permit online tracking of consent applications but it can also facilitate regulation including its linkages with inspections and water cess receipts. Consent management at SPCB level can be further improved through associating subject matter specialists with the Consent Management Committee and through delegation of powers suitably to the regional offices of SPCBs.
- A.1.13. Review of the functioning of regional offices of MoEF should be undertaken to assess the need of increasing their number as well as capacities.
- A.1.14. Physical inspection of industrial units by SPCBs/Pollution Control Committees (PCCs) has its limitations. This needs to be supplemented by third party audit by accredited consultants. For this purpose, industry may be

charged using the 'polluters pay' principle. Panel of accredited consultants may be deployed by SPCBs/PCCs and allocation of auditors can be done at SPCB/PCC level.

- A.1.15. Alternative systems of regulation need to be developed. The existing provision of 'annual environmental statement' to be submitted by industrial units under the Environment (Protection) Rules needs to be revamped. A rational template for annual environmental statement needs to be developed – simpler one for (Micro, small and Medium Enterprises) MSMEs and a more comprehensive one for larger units. These statements should require to be submitted regularly by the industry for analysis at the SPCB level, including through outsourcing of the scrutiny work. In parallel, these statements should be put in public domain for ensuring oversight by civil society. A mechanism to link the disclosure-cum-social audit with regulatory intervention requires to be developed through appropriate amendments to the relevant acts, rules and notifications.
- A.1.16. Social audit can be made more effective through creation of awareness about environmental regulations amongst all stakeholders. In addition, compliance assistance programmes have to be initiated or stepped up as the case may be, by the SPCBs/PCCs, targeting the MSME sector in particular.
- A.1.17. Greater and more intensive dialogue is required between the Central Environmental Agencies and SPCBs for coordinated action.
- A.1.18. Urban Local Bodies (ULBs) should be encouraged to develop PPP models for creating infrastructure to ensure O&M of STPs and other assets created.

A.2. Air Quality Management

- A.2.1. In order to address the intersectorality of air quality management, respective ministries dealing with urban air quality issues need to mainstream environmental concerns in their respective plans. These include Ministry of Petroleum and Natural Gas (auto-fuel quality), Department of Road Transport and Highways (motor vehicle regulation), Ministry of Heavy Industries (engine technologies), Ministry of Urban Development (mass transport systems & urban planning), Ministry of New and Renewable Energy (bio-diesel/ethanol blending), Ministry of Health and Family Welfare (epidemiological studies on health impacts) and Ministry of Earth Sciences (atmospheric chemistry and Forecasting of air quality).
- A.2.2. The National Ambient Air Quality Monitoring Network has to be strengthened both in terms of number of stations as well as the parameters monitored in order to undertake more advanced monitoring as per the revised National Ambient Air Quality Standards (NAAQS). The monitoring network should be linked with existing monitoring stations of (India Meteorological Department) IMD.
- A.2.3. Continuous 24x7 online air quality monitoring needs to be promoted judiciously. This includes Continuous Ambient Air Quality Monitoring Stations (CAAQMS) and Continuous Emission Monitoring System (CEMS). The latter takes care of stack emission monitoring and has the potential of laying the foundation for a market-driven emission trading scheme. Innovative financing for this initiative may be mobilized through application of the Polluter Pays, principle.
- A.2.4. Intensive monitoring of action plans in 43 critically polluted areas of the country, including independent assessment of pollution levels has to be pursued.
- A.2.5. Emphasis on R&D, through the CPCB for development of more stringent standards and on innovation in Council of Scientific and Industrial Research (CSIR institutions and development and adoption of cost-effective cleaner technologies in polluting industrial sectors is necessary.
- A.2.6. City-specific air quality management plans need to be prepared and implemented for non-attainment capital cities, apart from the existing 16 cities. This work may be coordinated by the respective SPCBs at the State

level and the concerned municipal authority at the local level. This exercise has to be led by the concerned State Governments in view of the intersectorality of plans while CPCB may act as a facilitator.

- A.2.7. Efforts need to be made for universalising BS-IV fuel across the country and promotion of gaseous fuels.
- A.2.8. Fiscal incentives should be introduced to promote alternate fuels (biofuel), electric vehicles and advanced vehicular technologies like hybrid vehicles.
- A.2.9. Noise standards for off-road vehicles, earthmoving equipment and other appliances.
- A.2.10. Health impact of air pollutants should be assessed with the involvement of MoH&FW and Indian Council for Medical Research (ICMR)

A.3. Water Quality Management

- A.3.1. Considering the challenges of water quality management, including coastal water quality, a concerted inter-ministerial effort involving line ministries like Ministry of Water Resources, Ministry of Urban Development, Department of Industrial Policy and Promotion, Ministry of Earth Sciences, and Ministry Of Agriculture has to be endeavored.
- A.3.2. Programmes such as the JNNURM (MoUD) and National River Conservation Plan (NRCP) (MoEF) need to be effectively combined to achieve the target of River Cleaning.
- A.3.3. Management of Water Quality in rivers should cover the basin and the tributaries of major rivers. Accordingly, the Ganga River Basin Environment Management Plan is being formulated for implementation.
- A.3.4. The National Water Quality Monitoring Network has to be strengthened in terms of increasing the number of stations and also introducing continuous river water monitoring stations.
- A.3.5. Basic data on coastal water quality, oxygen zone in the sea, transport of nitrogen and phosphorus in the rivers from agriculture use needs to be generated.
- A.3.6. Efficiency in utilization of created sewage treatment capacity needs to be enhanced. Introduction of the Public Private Partnership (PPP) model not only provides additional resources for creation of Sewage Treatment Plants (STPs), but also improves the efficiency and maintenance of assets during the operational stage. There is also a need for enhancing budgetary financial allocation in view of the large gap between sewage generation and available treatment capacity. The State governments and ULBs need to focus on implementing governance reforms to improve revenue of ULBs. Policy is to be framed for using the sludge generated from STPs either as manure or as source of energy in line with 3R principle. Addition of capacity to meet the unmet effluent treatment need through establishment of new CETPs and upgradation of existing ones should be taken up on priority. Establishment, operation and maintenance of CETPs needs to be strengthened in terms of managerial, financial and technical aspects. Operation of CETPs through a SPV (special purpose vehicle) should be promoted. Progressive cost-effective technologies should be promoted to achieve low/zero discharge or recycling of wastewater from industries/ CETPs.
- A.3.7. Revision of existing standards and introduction of new effluent standards may be undertaken by CPCB as part of a ten-year framework. Continuous effluent monitoring systems and online flow meters at industry/ Common Effluent Treatment Plant (CETP) level should be introduced selectively to ensure better compliance.
- A.3.8. Identification of sources of pollution along the coastline should be undertaken to address the pollution caused.
- A.3.9. Indian Council of Agricultural Research (ICAR)/ Ministry of Agriculture (MoA) has to work in collaboration with MoEF for promoting bio-pesticides/bio-fertilizers to minimize the pesticide pollution and nutrient loading due to use of chemical fertilizers and pesticides in agriculture.

- A.3.10. Efforts to maintain minimum ecological flows in rivers is needed to address the issue of water quality and the health of riverine ecosystem. The sustainability of riverine ecosystems depends on maintaining environmental flows in rivers and towards this, regulate abstraction of water and enable aquatic life and society.
- A.3.11. The possibility of introduction of cost-effective technologies such as bioremediation to address the pollution of water bodies has to be explored.
- A.3.12. Depletion of mangroves has to be addressed to comprehensively manage the health of coastal areas.
- A.3.13. A paradigm shift is needed from centralized to decentralized sewage treatment system which can ensure that the treated sewage is conveniently used in surrounding habitation for landscaping, cooling, etc.

A.4. Solid Waste Management

- A.4.1. To address the problem of indifference in sectoral ministries of environmental issues (e.g. MoH&FW for biomedical waste and MoUD for MSW), environmental cells at the Central and State levels should be constituted in line ministries. MoEF should sensitize these cells and also monitor their functioning.
- A.4.2. Dedicated budget head should be earmarked in line ministries to address the problems of sanitation and waste management

A.5. Municipal Solid Waste Management

- A.5.1. Ministry of Urban Development (MoUD) should ensure creation of required waste management system in all urban local bodies. Municipal authorities should set up proper collection, storage, segregation, transportation, processing and disposal of municipal solid waste including plastic waste.
- A.5.2. Municipalities have to be given responsibility and powers for meeting the challenge of managing non-point pollution in their jurisdiction. Towards this end, municipalities may engage professional persons including technical manpower from SPCBs.
- A.5.3. PPP models need to be incentivized for creating the required treatment/disposal infrastructure.
- A.5.4. Complete recycling of Municipal Solid Waste (MSW) should be ensured and energy generation from waste technology should be promoted to reduce the burden on landfills.
- A.5.5. Closure and rehabilitation of abandoned MSW disposal sites with recovery of landfill gas wherever feasible should be carried out.
- A.5.6. There is also need to address problem of sanitation and solid waste management in the hilly areas and religious places on priority basis.

A.6. Hazardous and Biomedical Wastes Management

- A.6.1. Setting up of Common Treatment Facilities for hazardous, electronic and bio-medical waste is funded by the MoEF under a Centrally sponsored Scheme (CSS) on a PPP basis. Project proposals for setting up of Treatment, Storage and Disposal Facilities (TSDFs)/ Common Bio-Medical Waste Treatment and Disposal Facilities (CBMWTFs)/ Integrated E-Waste Recycling, Treatment and Disposal Facilities are required to be thoroughly examined by the SPCBs before forwarding them to the Ministry, including the angle of financial viability.
- A.6.2. Utilization of hazardous waste as supplementary resource of energy or raw material should be promoted by encouraging co-processing for recovery of energy, especially from wastes which have high calorific value and reprocessing/ recycling scrap or other wastes. Use of high calorific value hazardous wastes in cement kilns as a safe alternative to conventional incineration has been initiated. Use of such waste in power and steel plants

also needs to be explored.

- A.6.3. MoEF has initiated a proposal for “Remediation of Hazardous Waste Dump Site” to undertake environmentally sound remediation of contaminated sites and to support the development and implementation of methodologies along with institutional and legal framework under the National Clean Energy Fund (NCEF). Twelve contaminated areas were identified as priority sites in the country. The Ministry of Finance has approved financial support of 40% of the total project cost under NCEF. Further, an amount of ₹60 crore has been recommended for the preparation of Detailed Project Reports (DPRs) in 2011-12. This project is required to be scaled up on mission mode basis in the 12th Five Year Plan to cover all contaminated sites in the country, besides the twelve contaminated sites identified earlier.

A.7. Management of Other Wastes

- A.7.1. E-waste recycling facilities should be expanded and infrastructure for safe collection, transportation and recycling facility for spent Compact Fluorescent Lamps (CFLs) and tube-lights should be developed.
- A.7.2. E-waste from the informal sector to the formal sector should be channelized to ensure recycling in an environmentally sound manner.

A.8. Environmental Impact Assessment

- A.8.1. Load-based standards need to be implemented to facilitate carrying-capacity based and cumulative EIAs especially for areas having concentration of developmental activities such as mining, thermal power plants etc.
- A.8.2. Environmental databases need to be created followed by real-time and time-series measurements by authenticated survey agencies such as CPCB, Forest Survey of India (FSI) and National Centre for Sustainable Coastal Management (NCSCM) for respective areas to fast track EIA process. The data on the EIS should be placed on GIS platform. The fund for undertaking this exercise should be earmarked.
- A.8.3. Mapping and monitoring of areas covered under the CRZ Notification need to be carried out in order to identify the vulnerable areas (e.g. mangroves).

A.9. Pollution Abatement Strategies

- A.9.1. Adoption of appropriate cleaner technologies, as opposed to end of pipe treatment, is a potent instrument of long term and cost effective pollution abatement.
- A.9.2. Encourage adoption of 4Rs (Reduce, Recycle , Reuse and Remanufacture)
- A.9.3. Emphasis has to be given on development and deployment of cleaner technologies in the MSME sector, particularly for the 17 categories of highly polluting industries. Demonstration projects through a tri-partite partnership between MoEF, technical institutions, and industry may be undertaken to establish techno-economically feasible industrial prototypes for MSME sector, followed by scaling up of such practices. In addition, a technology network of scientific institutions including the CSIR ones may be developed by CPCB and a shelf of available technologies may be put in public domain for usage by the MSME sector. In addition, a subsidy based scheme for switch over to cleaner technologies by the MSME sector maybe initiated by the Department of Micro, Small and Medium Enterprises. CPCB/SPCBs could provide technical support to such a scheme.
- A.9.4. The sub-schemes, ‘Waste Minimization and Pollution Prevention Strategies’ and ‘Clean Technology’ could be merged.
- A.9.5. Increase the existing number of Waste Minimisation Circles (WMCs) in the identified clusters is important to

upscale dissemination of best practices.

- A.9.6. It is important to work out the total pollution load over an area and its effective monitoring, including for the critically polluted areas. Scientific pollution management in existing industrial areas has to be given preference over shifting new industries to green areas. In this direction, development of load-based standards and application of 'polluter pays' principle have to be promoted.
- A.9.7. Implementation of action plans in Care Programme Approaches (CPAs) has to be made rigorous. Improved environment surveillance, including through alternative methods of regulation has to be put in place. Three-tier monitoring system of implementation of plans at the district, state and CPCB levels is to be established. This should be supplemented by social audit through putting industry-specific and ambient data in the public domain. Augmentation of air and water quality network, including continuous monitoring, promotion of common pollution control facilities and independent assessment of Comprehensive Environmental Pollution Index (CEPI) scores at periodic intervals needs to be undertaken. Health impact assessment and related epidemiological studies in CPAs are also vital.
- A.9.8. Ecological Restoration, after preparation of a Restoration plan, of landscapes which are degraded due to mining, would lead to an increase in availability of land and also arrest further contamination of both land and ground water.

A.10. Environment Awareness and Education

- A.10.1. Focussed attention on public awareness.
- A.10.2. Periodic assessment of Centres of Excellence (CoE), wherever environmental Information System (ENVIS) and Environment Education, Awareness & Training (EEAT) schemes for mid-term corrections have to be carried out.
- A.10.3. Redesigning of ENVIS websites has to be done by using content management system.
- A.10.4. Putting all ENVIS Centre websites on National Informatics Centre (NIC) platform and linking them to ENVIS Portal at head-quarter is necessary to facilitate access to a variety of information.
- A.10.5. Convergence of programmes of Ministry of Human Resources and Development (MHRD) on environmental education should be done.

A.11. Environmental Economics

- A.11.1. Load-based standards would be required to design various EIs and their implementation would be necessary.
- A.11.2. Reversing the tendency to treat environmental resources as free goods :-
 - A.11.2.1. Develop/strengthen Natural/Green Resource Accounting, with a view to its adoption in the system of National Income Accounts.
 - A.11.2.2. Also, strengthen in all respects, the system of collection, collation and analysis of all significant and relevant environmental monitoring data.
 - A.11.2.3. Gradual phasing out of subsidies on non-merit goods and targeting more efficient subsidies on merit goods and adoption of appropriate pricing of environmental goods and services.
- A.11.3. Incorporating costs of degradation/depletion of resources at various levels by:
 - A.11.3.1. Facilitating the integration of environmental values into cost-benefit analysis, to encourage more efficient allocation of resources while making public investment decisions.
 - A.11.3.2. encouraging financial institutions to adopt appropriate appraisal practices, so that environmental risks

are adequately considered in the financing of projects.

A.11.3.3. Developing and promoting the use of standardized environmental accounting practices and norms in preparation of statutory financial statements for large industrial enterprises, to encourage greater environmental responsibility in investment-decision making, management practices and public scrutiny.

A.11.4. Greater use of Economic Instruments/principles such as:

A.11.4.1. Preparation and implementation of an action plan on the use of economic instruments for environmental regulation in specified contexts, including those relating to unsustainable production and consumption.

A.11.4.2. Consider creating a National Environment Restoration Fund from the net proceeds of economic instruments, user fees for access to specified natural resources, and voluntary contributions. The Fund may be used for restoration of environmental resources, including clean-up of toxic and hazardous waste legacies.

A.11.4.3. Amending the environmental laws to introduce pollution charges and other economic instruments .

A.11.5. The design of the new Goods and Services Tax (GST) system needs to take on board the environmental considerations with a view to imparting a green shift to India's tax system.

A.11.6. Incentivizing good environmental performance by larger environment promoting subsidies (like from Finance Commission) and grants from Planning Commission.

A.12. International Cooperation

A.12.1. Pursuing the International Convention Authorities to set up regional secretariat in India.

A.12.2. Continuing close engagement with bilateral agencies and Global Environment Facility (GEF).

A.12.3. Ensuring submission of National reports mandated under all conventions including hazardous substances and put in place a mechanism for regular updating.

B. Climate Change

Following are the suggested policy initiatives and programmes in the core areas of mitigation and adaptation to strengthen the existing policies and actions towards accelerating the move towards sustainable development.

B.1. Integration of NAPCC into Central Sector Plans

NAPCC is being implemented by various ministries to enhance the capacity to cope effectively with the consequences of climate change. The objectives of the NAPCC should permeate the planning process at all levels. Specific sectors that are included in the NAPCC should be built into the respective sectoral plans. These sectors are agriculture, water, health, coastal management, forests and other ecosystems, energy including renewable energy, and infrastructure and climate change assessment. This however, would require a large amount of resource mobilization. The assessment made by various Ministries for implementing their Missions is tabulated in the statement at Annexure to this Section. The 12th Plan should take these requirements into account while finalizing sectoral outlays.

B.2. Specific Sector Recommendations

B.2.1. Agriculture

- B.2.1.1. A science-based programme Agricultural Intelligence System should be launched under the sectoral plan to facilitate the understanding of impact of real-time weather on production. This should include setting up of Weather Watch groups for climate sensitive commodities and to enable appropriate policy responses.
- B.2.1.2. Community partnerships should be supported in developing food and forage banks to manage scarcity during the projected periods of drought and floods.
- B.2.1.3. A 'Green Research Fund' should be set up for strengthening research and deployment of adaptation technologies to conduct/manage impact assessments.

B.2.2. Water

The existing framework of collection and analysis /use of data from river basins etc. should be strengthened with more advanced modeling tools, e.g., MIKE Basin/RIBASIM (River Basin Simulation Model) for basin simulation and management, Soil and Water Assessment Tool (SWAT) for generating hydrological scenarios, MODFLOW for ground water, Water Evaluation and Planning System (WEAP) for water management etc. An amount of ₹300 crore may need to be provided in the respective sectoral plan for this purpose.

B.2.3. Forestry

- B.2.3.1. The Green India Mission should be aggressively implemented to achieve the target of 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 mined 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 implementation should aim at additional carbon sequestration of 55 MtCO₂ approx. by the year 2020. Availability of more options in forestry beyond Green India Mission for enhanced mitigation and adaptation services needs to be explored.
- B.2.3.2. The Green India Mission should promote convergence of National Afforestation Programme (NAP) with activities and objectives of National Rural Employment Guarantee Act (NREGA) in order to maximize efficiency and resource use. The central assistance for afforestation (mostly under NAP) per year is around ₹350 crore. With convergence between NREGA and NAP, the financial resources for the Green India Mission can be augmented.
- B.2.3.3. Although there has been continuous increase in forest cover (653,898 sq. km. in 2001 to 690,899 sq.km. in 2009), the country could not take a positive stride in improving the quality of forests or meeting the target of 11th Five Year Plan due to financial constraints. During the 12th Plan, the endeavor would be to focus on improving the quality of forests through multi-tier vegetation / plantations through judicious combination of grasses, creepers, herbs, shrubs and trees in various tiers for density improvement.
- B.2.3.4. The monitoring mechanism and spatial and temporal performance of Green India activities should take place through high resolution Indian Remote Sensing (IRS) satellite based image. This could include initiatives aimed at maintenance of "Long Term Ecological Sites", use of modern methods of "Terrestrial Laser Scanners" (TLS), and attention to Ecological hotspots.

B.2.4. Coastal Zone Management

Integrated Coastal Zone Management (ICZM) must be accorded enhanced priority in the context of climate change. Climate Change Impact Assessment should be integrated into the already existing practice of cumulative impact assessment of the environment.

B.2.5. Infrastructure

Infrastructure related development projects should be climate resilient. Assistance to developmental activities or even environmental impact assessments may be made conditional on the basis of the assessment of risks posed by climatic factors. These risks include direct threats to a project's investment (such as the effects of extreme events on infrastructure), the underperformance of investments (failure of irrigation schemes), or investments that heighten vulnerability based on exposure to extreme climatic conditions (storm surges, landslides, floods, etc).

B.2.6. Health

Besides enhancing risk protection in four areas of risks arising from climate change, such as (a) Climate Change and Vector Borne diseases, (b) Aerosols and Respiratory Diseases, (c) UV-A and UV-B and Corneal Damage and Cataract, and (d) Environment and Heart Diseases, additional focus may be given on 'diarrheal and viral diseases', 'heat stress and certain types of cancer such as skin cancer'. Multi-disciplinary long term studies should be initiated in partnership with Indian Meteorological Department, Central Pollution Control Board and Indian Space Research Organization.

B.3. Climate Change Assessment

- B.3.1. A Greenhouse Gas (GHG) Inventory Management System (GHG-IMS) programme needs to be institutionalised, as India is required to publish its greenhouse gases (GHG) inventory after every two years. The programme is initially to be planned in the same manner as the Climate Change Assessment Centre, to be housed under Indian Network for Climate Change Assessment (INCCA) and operationalized at the MoEF. The programme would coordinate with network agencies for estimation and regular publication of GHG inventory. The nodal centre at MoEF would also act as a data repository and analysis centre for GHG inventory to support policymakers in feeding information pertaining to development of response strategies to the climate change challenge. The total budgetary support for initiating this activity as well as ensuring its regular functioning would be ₹ 20 crore for the initial period of 5 years and thereafter, regular budgetary support would be required to ensure its continuity.
- B.3.2. A Black Carbon Research Initiative (National Carbonaceous Aerosols Programme) BCRI-NCAP should be launched to enhance understanding of the impact of aerosols and greenhouse gases (such as carbon dioxide) on climate. This program is envisaged to comprise of 65 observatories and 101 institutions and the budgeted expenditure for this initiative would be ₹ 200 crore over a 5-year period.
- B.3.3. A network of 10-12 Long-Term Ecological Research Observatories representing different biomes and geographical regions should be launched. The Long-Term Ecological Research Observatories (LTEOs) will be used as locations for experimental research in ecology. This program is planned to comprise of 25 institutions and 10 observatories and would cost ₹ 100 crore over the 5-year period. Centre for Ecological Sciences is proposed to act as the coordinating agency for the scientific programme and the overall management at the national level.
- B.3.4. For the North Eastern Region, a programme of Co-ordinated Studies (CS) on Climate Change (NECC) (CS-NECC) should be launched to understand the impacts of climate change on sectoral and regional basis.
- B.3.5. A specific programme aimed at Climate Change Assessment Studies (CCAS) and institutionalizing the obligatory and scientific work of the Ministry is urgently called for. The programme requires capacity building in carrying out modelling studies of climate change. This can be done with the help of technological, economic and scientific observations/data and assessment of climate change impacts, vulnerability and adaptation. A dedicated centre for Studies & Research in Climate Change should be set up within MoEF to provide scientific and analytical support for carrying out these functions. This programme may initially be conceptualised within the MoEF with a Director and at least 10 scientists and experts from different fields and associated support staff. The Centre

should also plan, collate and coordinate the assessment work for National Communication which is a regular and mandatory international obligation performed by the Ministry. The 12th Plan should support provision of at least ₹25 crore over a period of 5 years to the Centre with an appropriate institutional arrangement.

B.4. Lower Carbon Growth Strategy

The 12th Plan should launch a process for development of a well coordinated policy of low carbon inclusive growth. Strategy for mitigation should be implemented through comprehensive programmes of Nationally Appropriate Mitigation Actions (NAMAs) so as to ensure the ultimate goal of sustainable development. The strategy should be formulated by an Empowered Inter-Ministerial Group. The Group should identify sectors and possible mitigation actions. The process under the 12th Plan should take into account the Report of the Group and hold widest possible consultation with the concerned ministries and stakeholders before recommending a set of actions.

B.5. National Agency for Implementing Mitigation Actions

A national authority for preparing and implementing NAMAs should be set up with clear responsibility of implementing them and identifying the required resources from the national and international sources. The Agency should also have the responsibility of monitoring the outcomes relative to the national goals under international agreements. The national authority for NAMAs can function on the lines of the designated authority for Clean Development Mechanism (CDM) project. The Authority should have the powers to administer nationally developed Monitoring Reporting Verification (MRV) protocols and an institutional and financial structure to fulfill the domestic and international obligation for implementation of the mitigation actions.

B.6. State Action Plan on climate change

States should be supported to prepare and implement state level action plans on climate change. The 12th Plan should launch a programme for supporting such actions at the state level and make specific provisions/earmarks for this purpose in the relevant sectoral budget. A budget provision for the SAPCC needs to be made and resource allocated/earmarked under different sector based on transparent criteria followed by the 13th Finance Commission, as suitably amplified. The dominant criteria of course should be the relevance of the various activities proposed by States for the achievement of goals under NAPCC and cross sectoral convergence and synergy.

B.7. National Strategic Fund for Climate

A national strategic fund for climate change R&D may be set up with the objective of supporting development and deployment of adaptation and mitigation through clean energy -related technologies. The fund would promote R&D in climate change science, development of new technologies, create networks of scientific and RD&D institutions including investment (equity and/or debt) and venture capital financing for deployment of technologies. The Fund should act as an independent entity in order to scale up its operations and fulfil both domestic and international mandate. The financial resources for the operation of the Strategic Fund could include funding by the Central and State Governments, private sectors, Public Sector Units (PSUs), multilateral and bilateral agencies, or endowment contributions. The National Clean Energy Fund (NCEF) created with revenues from coal cess could be merged with the Fund.

B.8. Capacity building for Market Partnerships/Mechanisms

Efforts need to be undertaken to increase participation of financial institutions in financing voluntary projects for emissions reduction, bundle small projects to reduce transaction costs and increase the average project size. Although project based CDM is operational, it should be enhanced in its scope through a programme-driven mode of operation

wherein projects could be implemented at a larger scale to generate credits. A capacity-building initiative in this field should be launched with adequate budgetary provisions in public-private partnership mode.

C. Forests and Sustainable Natural Resource Management

The recommendations of the Committee are based on a careful analysis of the ongoing schemes for protection and conservation of forest wealth and eco-restoration of the degraded ecosystems, the unutilized and underutilized potential of the forestry sector and the strategic measures to harvest this potential in a sustainable manner ensuring equity in access and intergeneration equity. The following are the major recommendations.

C.1. Non Timber Forest Produce(NTFP) and Socio-economic Inclusion

- C.1.1. The State level agencies including State Forest Corporations are required to be strengthened for facilitating sustainable harvesting and management of NTFP under an efficient MSP regime.
- C.1.2. Twelfth Plan is very crucial for institutionalization of market mechanism and sustainable management of economically viable MFPs. It requires in situ, as well as, ex-situ management of MFPs through participatory JFM mechanism for afforestation and NTFP regeneration.
- C.1.3. To enable the Panchayat and other local bodies to take informed decision while preparing their micro plans and annual action plans, capacity building and hand-holding is critical including training and sensitizing the staff at the cutting edge about the process change .
- C.1.4. To develop the NTFP sector in a holistic way and coordinate/guide the various government sponsored activities/ programmes, an apex and autonomous agency like the Rubber Board or Spice Board in the Ministry of Environment and Forests called the NTFP Development Board, with state offices/branches is required.
- C.1.5. To protect sustainability of livelihood of 27% of population dependent on NTFP Sector, overall management of NTFP resource including conservation and development over an estimated 6 lakh ha, Value addition and Marketing Support needs to be undertaken in the 12th Plan under a new scheme "Sustainable Livelihoods Through NTFP Management Including Bamboo ".

C.2. Grazing and Pasture Management in Forests

- C.2.1. Grazing lands are considered to be one of the most productive ecosystems in the Indian Subcontinent. The absence of a pasture management and grazing policy at national/ state level have rendered the pasture lands, including village commons and unculturable wastes, open to developmental, societal and grazing pressures. Absence of a policy has also encouraged unilateral implementation of animal husbandry policy that seeks to increase the number of livestock without corresponding focus on developing fodder resources. There is, therefore, an urgent need to enunciate pasture management and grazing policy at national level during the 12th Plan period.
- C.2.2. There is currently no department to educate the communities about the usefulness of maintaining tree component on agricultural lands. Absence of a policy on pasture management and grazing has led to severe restriction of availability of fodder. A central body is, therefore, needed to steer the fodder development and grazing land management program in the country.
- C.2.3. A special program under the 12th Plan to address the issue of dwindling fodder and grazing land resources needs to be launched. A new scheme "Rangeland and Silvi-pasture Management" for rehabilitation and productivity enhancement of rangelands and common / revenue lands around forest areas, fodder storage/ value addition facilities, on fodder and pasture management, germplasm banks and nurseries is proposed in the Twelfth Five

Year Plan.

C.3. Greening in the context of climate change- Green India Mission

Forestry sector has emerged as an important component in the strategy for mitigation and adaptation of climate change at national as well as global level. The specific recommendations for the green India mission have been deliberated in section B.2. It is recommended that during the 12th Plan, a provision of ₹23000 crore be kept for aggressive implementation of the Green India Mission to achieve the target of increased forest and tree cover on 2.5 m ha area (non forest through agro / social / farm forestry), improved quality of degraded forest on another 2.5 m ha area, improved ecosystems services, increased forest-based livelihood income and enhanced annual CO₂ sequestration.

C.4. Enhancing land/agricultural productivity through watershed interventions in catchment areas adjoining forests.

The key ecological services rendered by the forests are biodiversity and watershed by way of regulating hydrological cycle and preventing soil erosion etc. The watershed interventions in the forest areas have led to an increase in water availability in the adjoining agricultural fields leading to change in cropping pattern, intensifying and enabling multi-cropping with increased productivity and yield. Based on the success of such interventions in the forest fringe areas in drought prone areas of M.P. under Special Bundelkhand Package and other such success stories in Tamil Nadu, Karnataka etc., it is recommended that bioengineering measures may be scaled up in the 12th Plan in the forest areas which act as catchments to agricultural fields and the existing National Afforestation Programme be augmented to address this issue.

C.5. Monitoring and evaluation, Forest Resource Assessment, National Repository, Data Management and Change Monitoring

- C.5.1. There is an urgent requirement of real time monitoring of forest fires and forest cover in eco-sensitive zones. A robust mechanism for forest resource assessment needs to be established wherein data nodes can be created at state levels, coordinated by a central node at MoEF, to be managed by FSI.
- C.5.2. Establishment of a unified National Environmental and Forestry Information System for public accessibility for research, preparation of site specific micro-plan and national preparedness for taking informed decision is necessary. This open and transparent National Grid of Information on web-portal would include Forestry Information System, Environmental Clearance Status, Ambient Air Quality, Water Quality, Biodiversity (marine, terrestrial and fresh water) Information, Invasive Species Information, Climate Change Assessment, Desertification, Information of Wetland and Lakes etc. The Forest Survey of India/ICFRE can be adequately strengthened to play a nodal role in this regard.
- C.5.3. There is a need to revisit the existing monitoring and reporting systems for implementation and achievement of the physical targets. Concurrent physical monitoring of survival percentage should be taken into account while reporting the achievements in the initial four to five years of plantation. In addition to survival percentage, other important aspects which need to be introduced for monitoring are technical indicators like growth parameters (depending upon age and climatic conditions), ground flora, improvement in ground water table and socio-economic indicators like participation of local community in the programs including change in the crop pattern etc implemented through JFM committees and level of empowerment of the local people including women.
- C.5.4. The Mid Term Appraisal report of the Eleventh Plan has recommended that at least a preliminary version of State of Forest Report (SFR) should be printed within a year of collection of data in the scale of 1:10,000 to start with. It is felt that this is only possible when all Survey of India reference maps and geo-referenced revenue maps are available at these scales besides enhancing the infrastructure, manpower and budgetary

support to FSI . With this objective in view, a new scheme under the CS “Strengthening of Forestry Divisions” called “Satellite based Forest Resource Assessment and Technological based M & E” is recommended in the 12th Plan to put in place a system of technology-based collection of base-line data, monitoring & evaluation of forestry schemes, including GIS-based mapping and monitoring of areas allotted under FRA 2006 to prevent their encroachment and programmes at state and central levels.

C.6. Capacity development of Gram Sabha, JFMCs and other stakeholders for a JFM + approach for enhanced livelihood

- C.6.1. Participatory management approach to forest management is vital for livelihood security of communities and individuals specially women. A decentralized dedicated three-tier institutional structure (State Forest Development Agency (SFDA), Forest Development Agency (FDA) and JFMC) is already grounded in the states to facilitate focused planning and implementation involving community participation. In the 12th Plan, the three-tier institutional structure should be strengthened and made fully functional. Presently, at the local level, 1.5 lakh JFMCs are actively involved in management of about 30 million ha of forests in India. There is a need of broad-basing of JFM by making JFMs as Standing committees of the Gram Sabha. JFM also needs to be evolved into a higher platform “JFM Plus” where the livelihood promotion of the communities, specially women Self Help Groups (SHGs) formed for such activities, gets increased importance in the conservation and development of forests. To achieve this, JFMC are required to be adequately and strategically revitalized and empowered. Involvements of women, who are the major gatherers of forest produce, are to be prioritized in forest management and regeneration operations.
- C.6.2. The Twelfth Plan proposes a capacity-building and training programme of forest officers and all the stakeholders including local bodies. This will also include preparation of training modules for biodiversity conservation, non-destructive harvesting of NTFPs, preparing site-specific plan, annual action plan etc. An infrastructural net-work between Centre and States with existing Forestry Training Institutes is proposed with schematic support in the Twelfth Plan.
- C.6.3. For adequate capacity-building of JFMC members in forest resource management, livelihood issues, community mobilization and decentralized governance on a large scale, a new scheme for their capacity-building is recommended in the twelfth plan. The scheme will have adequate inbuilt outcome-based monitoring mechanism for ensuring meaningful implementation of the programme.

C.7. Capacity Building for International Cooperation

- C.7.1. The Forestry sector has emerged as an important component in the strategy for mitigation and adaptation of climate change at national as well as global level. Reducing Emissions from Deforestation and Forest Degradation (REDD+) is one such internationally accepted component for GHG reduction and improvement of livelihood of millions of poor people. India is a signatory to major international conventions including many legally and non-legally binding instruments. As a Non-Annex I country, India submits its ‘National Communication’ to United Nations Framework Convention on Climate Change (UNFCCC), showcasing its efforts towards assessment, monitoring and reduction of GHGs. Similarly, India is a signatory to many international commitments related to sustainable management of forests, biodiversity, wetlands, wildlife and trade in wood, non-wood forest produces. There is need for a more systematic, dynamic and futuristic approach to international negotiations and programmes. This would require capacity-building of personnel for ensuring better negotiating skills and strengthening of institutions dealing with natural resource management in a coordinated manner to promote effective compliance, enforcement and monitoring of international commitments. The existing ongoing scheme may be augmented to include short, medium and long term training modulesthrough institutions of excellence in the field.

- C.7.2. A Centre/Multi-stakeholder Forestry Forum (MFF) for consultation and evaluation to facilitate development of the country's position in respect of important international conventions and agreements is of interest to India. The Centre or MFF is intended to be a permanent institution serviced and funded by the MoEF to enable evaluation of the stand of the country on various international instruments in different forums, and suggest adjustment and modification in the existing country position in consonance with the national interest. The Centre/ Forum will also help in drafting and finalizing inputs for specific meetings of the sessions of international conventions and agreements in collaboration with other institutions and stakeholders, wherein India is participating. The Centre will enable participation of all concerned ministries, departments and research organizations of the Central and State Governments, reputed scientific and educational institutions in the private sector, and individual experts and subject matter specialists outside the government.
- C.7.3. A new scheme in the central sector is recommended to address the issues on international cooperation and law.

C.8. Forestry Institutional and Technology Management

- C.8.1. The mandate of different institutes engaged in forestry, biodiversity and wildlife research is required to be broadened to accommodate emerging needs for collaborative multidisciplinary research. Need-based applied forestry research should get adequate focus, especially in addressing livelihood needs of the forest dependent communities including ways to enhance production and productivity of NTFP's for their economic empowerment. To achieve these results and outcomes, the professionalism in the forestry sector also needs to be broad-based to bear multifunctional responsibilities through need based capacity-building programmes at various levels.
- C.8.2. The Twelfth Plan proposes a massive capacity-building and training programme of such local bodies and preparation of training modules for biodiversity conservation, non-destructive harvesting of NTFPs, preparing site-specific plan, annual action plan etc. An infrastructural net-work between the Centre and the States with existing Forestry Training Institutes is proposed with schematic support in the Twelfth Plan. ICFRE is proposed as the Nodal agency and focal point to coordinate and establish linkages with national and international institutes such as State Forestry Research institutes ,BSI, FSI, ZSI, Indian Plywood Industries Research and Technology Institute (IPRITI), Indian Institute of Forest Management (IIFM), Wildlife Institute of India (WII), ICFRE, National Environmental Engineering Research Institute (NEERI) etc. to achieve the desired outcomes from the forestry research.
- C.8.3. One of the strategies for the 12th Plan should be to support schematically the research efforts on a sharing basis with technical networking and collaboration between all institutions under a central Body/Forum.
- C.8.4. In order to evolve a national consensus on forestry matters to meet the new challenges, It is proposed that the 'Central Board of Forestry (CBF)' be revived with Prime Minister as Chairperson and Minister of Environment & Forest as Vice Chairperson, on the lines of National Board for Wildlife. It should have membership from key Ministries, State Ministers, PCCFs/senior professionals and Forest Secretaries, civil society representatives, JFM committee representatives, tribal representatives, and forest based industries, and R&D institutions. This should be the apex body for policy development and consultation in the country.
- C.8.5. Reorientation of Indian Council & Forestry Research & Education (ICFRE) on the lines of ICAR with its headquarters in Delhi and augmentation of funding are important steps that have to be taken during the Twelfth Five Year Plan. The National Forest Commission has recommended that the functional autonomy should be granted to ICFRE, under an act of parliament, as provided to other institutes of excellence. ICFRE has been accredited as Designated Operational Entity (DOE) for validation, verification and certification of CDM projects under the sectoral scope of 'Afforestation and Reforestation' of the United Nations Framework Convention on

Climate Change (UNFCCC). It is proposed that the core component of the headquarter of ICFRE be shifted to New Delhi. This is particularly important as forestry is at the centre-stage of international negotiations, conventions, action plans and green business to meet the Millennium Development Goals of reducing poverty to 50% by 2014.

- C.8.6. A scheme called “Forestry Institutional Development and Support” is recommended in the 12th Plan to address the vital issues of Grants-in-aid to Institutions, support for capacity building and motivation of forestry personnel including provisions for fellowships, technology up-gradation, Forestry database and knowledge management, infrastructure development of forestry institutions, forestry research, Forest Congress, and payment of contributions to international institutions.

C.9. Agro/ Farm-forestry and Energy Plantations to bridge the gap between domestic demand and supply

- C.9.1. Presently, felling of trees is banned, from areas lying 1000 M above Mean Sea Level (MSL), National Parks and Sanctuaries, all types of notified reserves and from any forest lands for which there is no Forestry Working Plans or Working Schemes. More than 80% of domestic timber products in the market are of private origin. India imports huge quantities of raw material for paper and plywood industry for its domestic consumption. Incentives for implementation of agro-forestry models to encourage utilization of wasteland are required to be introduced. This is a strategic intervention for efficient utilization of under-utilized and wasteland or permanent fallows.
- C.9.2. One of the recommendations for sustainable inclusive growth in the 12th Five Year Plan is large scale promotion of energy plantations, and agro/farm-forestry to enhance income of people and diversion of pressure from natural forests so that natural forests can perform their legitimate environmental functions to provide ecological security to the country. It is recommended that agro forestry and energy plantations may be vigorously promoted through NAP, Green India Mission (GIM) and externally aided projects in the 12th Plan.

C.10. Amending the Working Plan Code

No activities other than those prescribed in the Forestry Working Plan are allowed in the forest. Working Plans are prepared based on the National Working Plan Code. It is recommended to amend the Working Plan Code to incorporate new dimensions along with assigning specific responsibility to the cutting edge level workers for transferring the rights in the field with proper documentation. It is recommended that the working plan should reflect scientific temperament by engaging suitable manpower. A committee of experts in the states including Ecologists, Taxonomists, Bio-Engineers and Sociologist, etc. should evaluate the working plans and monitor its implementation on regular basis.

C.11. Motivation and Morale of Forest Personnel

- C.11.1. It is often stated that forestry personnel at the cutting edge level are under continuous threat from smugglers, encroachers and leftwing extremist (LWE) groups as they have to serve and guard precious resources in remote and inhospitable terrain. The area of the forest beat varies from 25 to 75 sq km among different states, to be manned by a single Forest Guard who is neither intellectually equipped with the skills for emerging technical issues nor is young enough to traverse the entire area of the forest beat, average age being over 55 years. The structure of forest organization should gear up to have a delivery mechanism for interface with the public which can inspire the confidence of the people.
- C.11.2. Creation of a trained village cadre of forest extension workers/ community foresters to act as a facilitator is also recommended in the 12th Plan. The steering committee therefore recommends that a study may be undertaken to assess the requirement of forestry personnel in the country and to recommend the optimum size of the beat. A Forest housing Corporation should be established on the lines of Police Housing Corporation to provide

family accommodation to the forestry personnel who work in interior areas. Similarly, other incentives which are available to the state police and paramilitary personnel may also be provided to the forestry personnel. The ongoing scheme of the forest and wild life should be augmented appropriately for this purpose.

C.12. Ecological Services of Forests in National Accounting

At present, contribution of the forestry sector to National GDP has been underestimated at 1.0 to 2.5% only. This may be ascribed to the fact that a range of non-priced as well as undervalued products such as fuel-wood, fodder and Non-timber Forest Products (NTFPs) including medicinal plants that are usually exchanged in an informal manner are not measured. Moreover, there is no mechanism to take into account the ecological services contributed by the forests for national accounting. Currently ongoing studies do not seek to determine economic values or NIA adjustments for the core ecological services of forests, namely, groundwater recharge and the prevention of soil erosion. Accounting for distinct ecological functions of forests would not only correct the mis-allocation of sectoral benefits but also induce efficiency while taking decisions with respect to budgetary resource allocation for their conservation vis-à-vis other demands on the same funds.

C.13. Resource and Commitment

C.13.1. The Thirteenth Finance Commission has recommended a grant of ₹5000 crore spread over 2010-15, over and above the regular allocation for maintenance of forests. While the National Forest Commission has recommended allocation of 2.5% of national budget to the forestry sector, the Planning Commission in the 11th Plan Mid Term Evaluation also recommended “increasing the allocation of at least 5% of annual state and central sector outlay to the forestry sector preferably by 12th Plan”. However, the allocation for the environment, forests and wildlife has remained below 1% and Forest and wildlife sector received only 0.4% to 0.5% of the overall 11th FYP allocation. Besides, the tendency in the states to reduce the state funding to forestry considering grants like Compensatory Afforestation Fund Management and Planning Authority (CAMPA) and from 13th Finance Commission as part of regular allocation have resulted in loss of focus on restoration of degraded forest lands. In many of the states, funding from central government and Externally Aided Projects remained the main plan resources for afforestation. However, the State Government must treat External Assistance, Campa Funds, Thirteenth Finance Commission funds, etc. as additionality.

C.13.2. There is a need for creation of “Green fund” by pooling forest development tax levied on sale of forest products, forest conservation tax levied on the sale of petroleum products/ coal and similar taxes like Eco-tax in Himachal Pradesh, which may be utilized for forestry activities. There has been a tendency to neglect maintenance and upkeep of assets once generated and sub-optimal utilization of resource created. Non-plan and Plan Divide in allocation is also primarily responsible for the dismal situation. To make the system self-sustaining, innovative funding and plough back of the earnings as cess-money holds the promise. Accordingly, proposals of the Twelfth Plan are streamlined.

D. Wildlife Management, Ecotourism and Livelihoods, and Animal Welfare

A comprehensive review of challenges facing the wildlife and allied sectors was performed based on which the recommendations below were framed to make policies and regulations more effective towards addressing current and future challenges.

D.1. Gap analysis

D.1.1. An Evaluation of the performance of various schemes during the 11th Plan notes with concern that the budgetary allocations provided for this sector have not at all kept pace with the lofty challenges and roles it is expected to

perform. Thus, only about half of India's 661 Protected Areas (PAs) have received some form of central funding support during the 11th Plan. Timely devolution of available funds is a matter of continuing concern, and needs to be stressed upon in the 12th plan.

- D.1.2. Proper awareness was identified as a critical gap in the planning process of the respective subjects/themes. While awareness on wildlife conservation issues has been on the rise, there is still a huge disconnect as to how this is relevant or important to the common masses and what and how they can contribute to development of this sector. Well targeted outreach programmes will be an integral part of planning and implementation for all projects for this plan. A distinct component of awareness generation is intended to be incorporated in the three sub-sectoral themes during the 12th Five Year Plan. This will not only generate awareness but may be useful in finding the resources, both physical and financial, for the sector.

D.2. Wildlife Management

- D.2.1. Continued fragmentation of important wildlife habitats due to developmental imperatives leading to ever-intensifying human-wildlife conflict plagued by inadequate planning priority and investment have been prominently flagged in the WVG report. The report has identified the following as some of the major thrust areas for support during the 12th Plan:
- D.2.1.1. Enhanced support for improving the conditions of field level staff in this sector as well as implementation of a well-planned modernisation plan is required. It is proposed that wildlife management should be identified as a priority for bio-prospecting and conservation of bio-resources. This prioritization will help ensure that vacancies in the sector are filled in time, a modernisation plan can be put in place and a well-equipped, well-trained and highly motivated force-effectively manage these resources.
 - D.2.1.2. As the sector needs to perform both management and enforcement roles, it deserves to be treated at par with other enforcement agencies.
 - D.2.1.3. Some important recommendations relating to human resource development include: additional health and life insurance cover for wildlife staff, residential accommodation for families of staff posted in non-family stations, and certain minimum standards for infrastructure support for field units such as Anti-Poaching camps etc. needs to be prescribed by States and course correction made o priority under the 12th Plan.
- D.2.2. The scope of the ongoing scheme, Integrated Development of Wildlife Habitats (IDWH) is proposed to be expanded further to incorporate new concepts and ideas. These new concepts may include corridor management, conservation of Community Reserves etc. along with eco-development under this scheme. It will also incorporate a sharper focus on a landscape based approach to conservation for greater ecological security.
- D.2.3. Tiger conservation, as led by the National Tiger Conservation Authority, needs to be continued as a flagship programme of the MoEF. Based on past experience, it has identified several new thrust areas for action during the 12th Plan. This would include strengthening protection and furthering the coexistence agenda in the buffer areas of tiger reserves and voluntary relocation, along with regular monitoring of tiger populations and their habitats.
- D.2.4. Project Elephant needs a new focus under the 12th Plan, with the proposed creation of the National Elephant Conservation Authority (NECA) and notifying critical areas of Elephant Reserves as Ecologically Sensitive Areas under the Environment Protection Act. Special focus is required to be given for mitigation of human-elephant conflict through the strengthening of existing Project Elephant scheme.
- D.2.5. Biosphere Reserves are areas of terrestrial and coastal ecosystems which are internationally recognized within the framework of Man and the Biosphere (MAB) programme of United Nations Educational, Scientific

and Cultural Organization (UNESCO). The programme was initiated in 1986 and till date, 17 sites have been designated as Biosphere Reserves (BRs) in different parts of the country. In the 12th FYP, a renewed strategy for grounding the participatory regime of sustainable management of bio-resources needs to be adopted. Bio-prospecting and equity in benefit access sharing is to be ensured.

- D.2.6. Funding support committed for the Project Snow Leopard, Project Lion and Project Gharial in the 11th Plan needs to be continued during the 12th Plan. In addition, a special provision is being proposed for the launch of “Project Bustards” to focus on these highly endangered flagship species of the grassland ecosystems.
- D.2.7. Resources for supporting conservation of critically endangered and important keystone species such as vulture, dolphin and gharial need to be made available through a project-based approach as a subcomponent of the ongoing but amplified Integrated Development of Wildlife Habitat (IDWH scheme).
- D.2.8. A strong case is made out for prioritising Protection of Wildlife outside PAs as this has long term implications for conservation.
- D.2.9. The Wildlife Crime Control Bureau is a newly created national level agency to address issues related to organised wildlife crime. Strengthening of the infrastructure and reach of this agency is to be taken up on priority. Bureau will establish wildlife crime and criminal data network by linking the Chief Wildlife Warden offices in the States with the Wildlife Crime Control Bureau (WCCB) Head Quarters (HQ). The Bureau will help in terms for hardware/software supply and training of the personnel. Given the emergence of wildlife crime as a form of organised transnational crime, there is need to extend the reach and effectiveness of the WCCB by building on its infrastructure and reach.
- D.2.10. Acknowledging the very important role of local communities in conservation, several activities are proposed to address and build upon this relationship.
 - D.2.10.1. It is proposed to launch a programme to provide alternate livelihood opportunities for communities known to be dependent on illegal exploitation of wildlife resources including hunting.
 - D.2.10.2. Acknowledging the complexity of the approaches towards relocation of villages from Protected Areas and Critical Wildlife Habitats, it is recommended that any such relocation has to be voluntary, after due consultation in a transparent manner, and in accordance with the Wild-life (Protection) Act, the Forest Rights Act and the National Rehabilitation and Relocation Policy.
 - D.2.10.3. The issue of human-wildlife conflict is flagged as a top priority and an urgent concern. Innovative approaches for conflict mitigation, beyond the trench and fence approach are to be explored and encouraged. This would include options like “Grain for Grain” as ex-gratia in cases of crop losses and attention on proactive rather than reactive approaches. The need to have Rapid Response Teams well-equipped and trained to handle all exigencies, including crowd management and control and providing immediate ex-gratia as may be needed, is strongly emphasized. A new mechanism needs to be developed to realize this objective. Additional resources for the above are required to be made available as a sub component of the ongoing IDWH scheme.
- D.2.11. India is party to several multilateral and bilateral agreements and International conventions related to wildlife conservation. The report recommends a specific allocation to enable India to fulfil its leadership roles and responsibilities at such forums. This may include strategic investments including support for research on regional issues, capacity-building for management of transborder wildlife landscapes and for wildlife law enforcement, transborder and multi country meetings and other related activities, in order to facilitate collective and well structured responses to wildlife related issues on a regional and global scale. The South Asian region will be given special attention for this.

- D.2.12. The Wildlife Institute of India (WII) has emerged as an eminent regional centre for training and research in the field of wildlife conservation in South Asia and South East Asia. In order to meet the 'emerging' challenges in the field of wildlife research, conservation and management, the Institute has proposed a series of new initiatives to be backed up by rigorous research and science and technology applications. These are as follows:
- D.2.12.1. Establishment of a National Wildlife Forensic Research Facility;
 - D.2.12.2. Development of Protected Areas Geodatabase at Enterprise Level;
 - D.2.12.3. Development of Wildlife Health and disease Research and Monitoring Facility; and
 - D.2.12.4. Remote Monitoring of Wildlife Populations.
- D.2.13. The Central Zoo Authority (CZA) is the agency responsible for management and regulation of zoos in the country. It presently regulates 198 zoos and manages seven rescue centres for rehabilitation of wild animals whose performance has been banned in circuses, in addition to coordinating planned Conservation Breeding Programme of 73 identified critically endangered wild animal species in Indian Zoos. The CZA has put forth a need for more financial and technical resources under various ongoing schemes to strengthen its management and functioning.
- D.2.14. The National Zoological Park, Delhi, India's only national zoo, needs urgent support to restore its position as a premier ex-situ conservation facility. Several new initiatives are proposed to improve the zoo and bring it up to the international standard. Nonetheless, the importance of regional efforts to showcase its biological heritage, educating its masses, conducting research etc. can not be underestimated. The role of States in mainstreaming conservation needs to be given priority in the 12th FYP. The Steering Committee recommends every State to have at least one State zoological park.
- D.2.15. Acknowledging the huge gap with respect to veterinary support available for wildlife in the country, several steps are suggested to address this lacuna. These include compulsory attachments of veterinary science students to Protected Areas and Zoos as part of their course curricula; deputation of vets to Forest Department with built-in incentives for willing personnel and better equipment and training opportunities to deal with field requirements.
- D.2.16. To integrate wildlife conservation concerns amongst various stakeholders operating in a wildlife landscape, it is proposed to support the formulation of a Perspective Plan, over a 10 year cycle aligned with two National Plan cycles. This would address the priorities set by such departments and suggest appropriate steps to integrate wildlife concerns in such planning.
- D.2.17. To encourage and facilitate field based innovations and use of scientific tools and technologies that strengthen wildlife conservation, it is proposed to establish a corpus fund. These could include improved equipment and tools for use during patrolling or for communication, design of water delivery systems for anti-poaching camps and waterholes in various terrain conditions, renewable energy sources for camps and while on the move, alternate cropping models as tools to mitigate crop losses due to wildlife and safety equipment to deal with wildlife rescue and rehabilitation.
- D.2.18. A series of issues related to research and training, especially the need to go beyond research on conservation biology issues have been identified. Themes like sociology, potential impacts on climate change on wildlife and their habitats, social and economic impacts of tourism, human wildlife conflict mitigation including innovative and alternate means to reduce losses, wildlife trade, control of invasive and alien species, etc. are suggested. These research projects would be carried out in a collaborative manner involving various specialist agencies on the model of All India Coordinated Research Projects and would also involve local level scientific and academic institutions to strengthen local level ownership and collaboration.
- D.2.19. Several issues related to law and policies are highlighted to add more strength to the sector. For example,

provisions for constitution of a 'National Elephant Conservation Authority', in order to provide for a stronger organizational framework to 'Project Elephant' and enable the Central Government to prescribe statutory directives and norms with respect to management of elephants and its habitats, inclusion of a new chapter in the Act in consonance with the provisions of the Convention on International Trade in Endangered Species of wild fauna and flora (CITES).

- D.2.20. Innovative mechanisms for attracting additional resources for this sector were also discussed. Corporates, NGOs, the Nature-Based travel Industry, individuals and public institutions, even existing Government schemes such as CAMPA can be a source of support for this sector.
- D.2.21. The sector has to leverage external support including from a large number of NGOs, corporate bodies and other institutions and entities which can provide support across a diverse sphere of activities including building awareness and harnessing public opinion in support of wildlife conservation, resource mobilisation, research, rescue and rehabilitation, monitoring and strengthening wildlife law enforcement. The concerned government agencies should be encouraged to reach out to such agencies to seek their collaboration and support as per clearly defined roles and responsibilities, and to bring greater strength and synergy to the sector.
- D.2.22. The need to build synergies at the state or national level with various sectors, agencies and ministries having an impact on wildlife conservation is acknowledged. These would include Rural Development, Tribal Welfare, Tourism, Roads, Irrigation, Water Resources, Mining and many others. This will be achieved by reaching out, sharing ideas, greater transparency and building mutual trust and understanding.

D.3. Ecotourism and Livelihoods

- D.3.1. For the first time, this subject has been dealt with at length in a Five Year Plan. The potential of ecotourism in leveraging the cooperation and support of local communities in wildlife conservation and providing them with livelihood opportunities is brought out in no uncertain terms. The underlying central concept is partnership of local communities in conservation and management of wildlife resources by enhancing and improving the quality of their livelihoods, and thus by increasing their stake in the well-being of wildlife. A new scheme to operationalize the emerging concept of ecotourism for livelihoods of local communities is being proposed in the 12th FYP.
- D.3.2. Ecotourism, being a non consumptive use of natural resources, is one of the most effective ways to ensure development hand in hand with conservation. And thus there is an urgent need to have a holistic national framework for developing ecotourism as a source for conservation and livelihood.
- D.3.3. The need of the hour is formulation of an all-inclusive strategy, keeping in view the scope of the industry and the challenges. An outline of the strategy encompassing all aspects is included in the WG report. Looking at the vast spread of ecotourism potential, ecotourism has been categorised in four major areas, i.e., Protected Area based Ecotourism, Ecotourism in Forests outside Protected Areas, Village based Ecotourism, and, Ex-situ Conservation Areas (Ecological Gardens, Zoological Parks, Botanical Gardens and Biodiversity Parks). This categorisation will help in having a focussed approach as per specifics of areas engaged and needs of stakeholders involved.
- D.3.4. A proper institutional framework will have dedicated departments for ecotourism, convergence with various schemes and other departments, incentives, rewards and proper monitoring systems and further, certain amendments / clarifications in existing laws / policies to facilitate ecotourism. This will help in creating an enabling environment for operationalising ecotourism.
- D.3.5. Schematic support is required for the 12th Plan for the tasks identified for the financial outlays, which include institutional development, creation of policy planning division in MoEF, market research, infrastructure

development at ecotourism destinations, promotion of indigenous ecological architecture, promotion of ecotourism in ex-situ conservation areas, community-based ecotourism projects, strengthening IT, and promotion of community entrepreneurship, for sustainable development of community-based ecotourism in the country.

D.4. Animal Welfare

- D.4.1. The subject of "Animal Welfare," though allocated to the Ministry of Environment and Forests (MoEF), is a complex issue requiring synergy between different ministries / departments, mainly the Dept. of Animal Husbandry, Dairying and Fisheries (DAHD&F), Ministry of Health, Ministry of Urban Development, Ministry of Rural Development, along with the MoEF.
- D.4.2. Considerable strides have been made during the 11th Plan period towards Animal Welfare, mainly in the area of Animal Birth Control and Anti Rabies (ABC/AR) programme. During the last couple of year, a beginning has also been made towards participatory approach in ABC/AR through active contribution of Animal Welfare Organisations (AWOs), and local civic bodies. During last five years, on an average, about 1.25 lakh dogs have been sterilised every year.
- D.4.3. Besides the constraint of funds, there is lack of awareness among masses, and lack of trained manpower. These are two major issues to be tackled during the 12th Plan.
- D.4.4. The World Health Organization (WHO) has quoted a figure of 20565 human deaths from India due to rabies per year. What is significant, and alarming, is that the dog - man ratio in India is rising from 1 : 40, to 1 : 20, as per the Bombay Veterinary College. The no. of dog bites is estimated at 17.4 Million every year. The cost of Post Exposure Treatment in humans is about 400 crore and in animals, it is about 10 crore.
- D.4.5. The continuous neglect of this subject due to lack of input of appropriate planning and matching resource has been identified in the report. The need for leveraging support from non-government sources like corporate sector, individual philanthropists and other interested entities has been flagged. Awareness is flagged as a missing link in this sector and therefore, has been given special attention. Human-dog and human-monkey conflicts plaguing cities and rural areas alike are dealt with extensively in the report along with the need for strengthening veterinary support and ambulance services. A structured scheme to garner the non-conventional support like resources and participation from corporates, NGOs, Civic Bodies and individual philanthropists is proposed during the 12th FYP.

D.5. Existing and New Schemes

- D.5.1. It is proposed to strengthen two existing schemes- i) Integrated Development of Wildlife Habitats, and ii) Project Elephant.
- D.5.2. It are also proposed to state two new schemes- one on "Operationalization and Strengthening of Ecotourism for local Livelihoods," and another on "Promoting Participation of Private Sector and Philanthropists in Animal Welfare"

E. Ecosystem and Biodiversity

India is a mega diversity country and is the host for CoP 11 for CBD to be held in October, 2012 at Hyderabad. The country will have the opportunity to lead the international forum and to gear up its domestic mechanism for bio-diversity conservation. A focused policy intervention for ecological security to achieve the goal of inclusive and sustainable development, a resilient ecosystem and equity in benefit and access sharing of environmental goods and services are the basic requirements for climate change adaptation and socio-economic empowerment of vulnerable population. Hinging on

these considerations, the recommendations for the twelfth plan for ecosystem and biodiversity are enumerated below.

E.1. Strengthening institutional mechanism for participatory governance

There is a need to empower people to participate in sound management of natural resources to strengthen democratic functioning and to ensure transparency and openness. The country has a progressive legislative frameworks, viz, 73rd and 74th Amendments to Constitution, Panchayats (Extension to Scheduled Areas) Act, Biological Diversity Act and Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act etc. that can potentially leverage sustainable bio-diversity management in the country. There is need for strengthening institutional mechanism for participatory governance at the cutting edge level.

E.2. Public Accessibility of Information and Research

- E.2.1. Conservation and sustainable use of biodiversity requires accurate data in space and time. This data needs to be constantly updated and the information generated needs to be quickly disseminated across stakeholders for adaptive management decisions at local, regional and national levels. The National Biodiversity Authority estimates that about 115 governmental and non-governmental institutions are involved in data generation and these are currently used for specific objectives such as species inventory, pollution monitoring and wildlife crime control. There is need that this data be made available to multiple stakeholders or for meta-analysis across space and time which can then feed the management and policy reform.
- E.2.2. In the 12th Plan, it is proposed that a national information grid for biodiversity, ecology and environmental data sets for scientific documentation, monitoring and management of biodiversity and natural resources be developed. This database should be an open, transparent and comprehensive web-based Environmental Information System and needs to cover various landscapes including forests, coastal stretches, and territorial waters of the country's Exclusive Economic Zones (EEZ), mountains and desert regions of the country.
- E.2.3. The Twelfth Five Year Plan needs to pursue vigorously further development of this database, and its extension to other parts of the country, by networking many available databases, such as the National Knowledge Commission endorsed knowledge portals such as the India Biodiversity Portal (IBP), and other portals. The Twelfth Five Year Plan may also sponsor further scientific inputs by linking the People's Biodiversity Register prepared by the Biodiversity Management Committees that are mandated under Biological Diversity Act to augment the database. Databases and systems developed by the Central Marine Fisheries Research Institute, Indian National Centre for Ocean Information Services, Indian Ocean Census of Marine Life, the National Institute of Oceanography, and the National Institute of Ocean Technology can be used for marine ecosystems.

E.3. Monitoring and Adaptive Management of Ecosystem Services and Biodiversity

E.3.1. National Environmental Monitoring Programme

The Twelfth Plan recommends a unified National Environmental Monitoring Programme (NEMP) on forest monitoring, air quality, river and ocean pollution. The NEMP needs to focus on tracking status and change in biophysical parameters, and their social impacts, and serve as a real-time data sharing platform on environmental parameters. The NEMP will consist of a mix of national, regional and local programmes. The NEMP will consist of a special portal for environmental data from school and college student projects and People's Biodiversity Registers, with a Technical Support System, including information in local languages.

E.3.2. National Forestry Information System

The National Forestry Information System needs to allow networking with States for tracking changes in forest develop-

ment, harvesting, trade and utilization scenario with particular focus on issues of ownership and rights over land and forest produce. Particularly, geomatic information will lead to greater transparency and trust amongst stakeholders.

E.3.3. Forest Monitoring System/Programme

There is an urgent need to set up a collaborative, bottom-up forest cover monitoring system or programme involving independent research organizations, State Remote Sensing Centers, civil society groups, as well as Biodiversity Management Committees, educational institutions and Forest Survey of India. In addition, this monitoring system should also include ecosystem service flows and values (hydrological regulation, soil conservation, carbon sequestration, pollination services of forests).

E.3.4. Forest Land Information System

In the 12th Plan, it is proposed to put together a non-spatial database with records for each parcel of public land (forest and revenue) that indicates its settlement history and status, to complement a spatial database. In particular, this database should address the issue of implementation of Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act. This would involve scanning, digitization, and eventual geo-spatial registration of forest survey and village cadastral maps. Frontline survey and working plan staff need to be trained, as well as community members, including members of Biodiversity Management Committees in the use of Global Positioning System (GPS) and other instruments in their survey work, and in registering their survey work onto the geo-referenced database. We should experiment with manual and participatory GIS approaches in the micro-planning setting, and work on integrating these microplans into higher level working plans (Forest Working Plan, Eco-development Plan).

E.3.5. Invasive Species Monitoring System

India needs to develop a national invasive species monitoring system to track the introduction and spread of invasive species. Such a system should be linked to the State forest departments and the field staff should be trained to collect information on invasive species and feed it into the NEMP. However, significant invasive species have also affected grazing lands (e.g. Parthenium), wetlands (e.g. Water Hyacinth) and other habitats and this system needs to be linked to People's Biodiversity Register exercises.

E.3.6. Building a Knowledge Base on Coastal and Marine Resources

Coastal and marine conservation in India requires not just substantial information for the management and policy, but there is a critical need to integrate science with traditional knowledge systems and facilitate greater involvement of communities/community based organisations in monitoring resource use, status, history and on-going changes. This will lead to better information flow within and between target groups and ensure that the communities/resource managers are empowered to play their role effectively in conservation.

E.4. Strengthening Systematic Biology and Science of Taxonomy

E.4.1. Strengthening of BSI and ZSI in terms of human resource (Taxonomists and Geologists) and state of art technology is recommended for inventorization of living resources of the country.

E.4.2. Systematic biology, with taxonomy, the science of discovering, naming and classifying living organisms, at its core, is crucial to biodiversity conservation and meeting development challenges of the 21st century, particularly in developing countries. Today, we are losing species faster than they can evolve or be discovered, which means that our scientific surmises on taxonomy, evolution, ecology, biodiversity and molecular biology are less robust than we assume. The implications are vast and serious for all enterprises ranging from forestry to medicine that require sound taxonomic foundations. For example, high quality taxonomic research is vital for poverty reduction

through sustainable agriculture, forestry, and fisheries, for combating insect pests and human diseases, and for sustainable national and international trade in biological products without endangering indigenous plant and animal species. Less than 100,000 species have been described out of an estimated million species in India, showing the pressing need for strengthening systematic biological efforts in India.

- E.4.3. Centers of excellence in systematic biology that incorporate conventional and modern molecular, digital and computational tools and approaches of taxonomy in universities and other knowledge-based institutions should be established. These centers need to (a) facilitate the completion of inventories on flora and fauna and compilation of People's Biodiversity Registers, (b) train systematic biologists in national and international institutions of repute and provide financial support, (c) facilitate organizing and disseminating taxonomic data, and support public biodiversity portals to engage civil society in collating biodiversity information, and (e) encourage publication of field guides to identify our flora and fauna to draw students and young people to the study of taxonomy, and to create awareness about the importance of biodiversity.
- E.4.4. A taxonomist with specialized training needs to be assigned to every wildlife sanctuary national park and protected areas in coastal and marine habitats. An educational institution, either a college or a University, should be identified in every district for special support for work in the area of systematic biology. All Universities, in biodiversity-rich areas especially, should also have competent taxonomists in the faculty.
- E.4.5. Free access for researchers to natural habitats for study and collection of specimens is necessary to enable comprehensive taxonomic revision of our flora and fauna following modern systems of classification.
- E.4.6. Establishment of state-of-the-art national and regional repositories for preserving type specimens and other valuable biological material for posterity at suitable locations is necessary.
- E.4.7. Promotion of national and international collaboration in taxonomic research and free exchange of specimens for basic, non-commercial research, and promotion of fundamental research in biology by suitably amending the Biological Diversity Act, 2002 is recommended.
- E.4.8. A consortium of research organizations should validate and update the Biodiversity Information System (IBIS), the Indian Bioresource Information Network (IBIN) and India Biodiversity Portal (IBP) and the Indian Ocean Census of Marine Life (IOCoML). An effort to digitize and make available existing collections of taxonomic collections should be piloted.

E.5. Invasive Species Management

- E.5.1. Invasive species have been known to cause vast ecological and economic damage. The impacts of marine invasive species are very poorly studied and documented, especially in India. A number of marine invasive species and pathogens are introduced through ballast water and hull fouling. A national programme, specific to invasive species, needs to be launched. One of the aims of this programme would be to compile a national inventory of invasive species. A standardized protocol needs to be developed for the identification of invasive species using GIS and remote sensing technology. Invasive species identification should not be limited to invasive species in forests – it should also include invasive species in aquatic and marine ecosystems, grasslands, wetlands, etc.
- E.5.2. Local-level Initiatives need to be undertaken. Concerned officials need to train frontline forest staff and community members, in particular through Biodiversity Management Committees to monitor and control the spread of invasive species spread. Locally relevant invasive species management could be funded under the MNREGA. Community members should also be trained to manufacture and market products made from invasive species.

E.6. Ecorestoration

The National Afforestation and Eco-development Board (NEAB) needs to strengthen 'Ecorestoration' activities, to en-

hance the health status of non-tree covered ecosystems best maintained under grass, lichen/moss and other relevant type of vegetation. The Board needs to focus on empowering all participatory institutions to promote forest development and Eco-restoration. The FDA chairperson needs to be democratically elected from the chairpersons of the JFMCs, community and village forest institutions.

E.7. Strengthening the National Biodiversity Act (NBA)

- E.7.1. It is important that serious steps are taken to implement Biological Diversity Act throughout the country. XII FYP will provide for taking immediate steps to ensure establishment of Biodiversity Management Committees at all levels, namely, Gram Panchayats, Taluka Panchayats, Zilla Panchayats, as also Nagarpalikas and Mahanagarपालikas throughout the country. Furthermore, the Ministry of Environment & Forests needs to ensure that BMCs are motivated through empowerment to levy 'collection charges' as provided for in the Biological Diversity Act. The BMCs are expected to take care of agro-biodiversity as well, and in this context, the provisions of Protection of Plant Varieties and Farmers' Rights Act (PPVFRA) 2001 are highly relevant. A National Gene Fund has been established under PPVFRA. These funds can be utilized to build capacity at Panchayat level for in situ conservation of genetic diversity of indigenous crop varieties, and XII FYP schemes should facilitate such activities.
- E.7.2. A program for accelerating creation of People Biodiversity Registers (PBRs) in the country with special focus on bio-geographic, socio-economic and regional priorities needs to be implemented. The PBRs are not to be an end in themselves but are to be used to encourage developmental programs for food, health and livelihood security of local communities. In order to demonstrate its impact, this program needs to be implemented on a minimum size and scale of ₹100 development projects in rural India. In fact, the Ministry of Environment and Forests, Govt. of India, needs to have long term program, strategy or dedicated funding for assessing monitoring and recovery of populations of threatened taxa or undertaking assessment of threatened habitats.
- E.7.3. It is proposed that in the 12th FYP NBA should be supported to coordinate an appropriately funded all India coordinated scheme for assessment, monitoring and restoration of prioritized threatened taxa and habitats. This scheme should be coordinated by NBA, although it may be implemented by a network of reputed Institutions who have the competence to study the different groups of plants, animals and habitats. Assuming that 10 national institutions will be involved in the program, it is recommended that in the 12th Plan, a budget to the extent of ₹100 crore may be allocated to support the network of 10 specialized institutes.

E.8. Strengthening Structures and Capacities for Local Environmental and Forest governance

E.8.1. Forest Rights Act

The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 is a landmark legislation. We have yet to succeed fully in achieving its objectives, because of certain difficulties in implementation. Community rights, especially of minor forest produce, need to be recognized. The Council for Social Development (CSD) in its report on the implementation of the FRA noted that 'all non-land rights in the Act – most of which are community right have largely not been implemented. It is therefore recommended that

- E.8.1.1. There is greater clarity on the institutional structures that the Gram Sabhas and collaborative institutions can use to evolve their own mechanism for forest management. These institutional structures must provide space for local and contextual flexibility.
- E.8.1.2. The roles of the Gram Sabhas versus the forest department be clarified.
- E.8.1.3. The Gram Sabhas are empowered and identified as the primary institutions. In addition, it should

not be mandated that they manage resources. This gives communities that desire to manage their resources an opportunity to do so. By identifying the Gram Sabha as the primary institution, the FRA builds on nascent decentralization attempts.

- E.8.1.4. An institutional structure be prescribed by which the Gram Sabhas can claim and receive their rights to conserve and manage their community forest area.
- E.8.1.5. Sustainable management of NTFP is strengthened by the involvement of Forest Department/ Forest Corporation which have trained manpower and scientific know-how for managing and non-destructive harvesting of NTFPs.

E.8.2. Consolidating Community Rights to Improve Biodiversity Conservation

The FRA clearly lays down that only security of tenure and formalized recorded rights in favour of forest users would lead to responsible forest management and sustainability. The Act and the Rules made under FRA therefore detail the institutional arrangements for the protection, management and regeneration of Community Forest Resources (CFR), defined in section 2(a) of FRA as customary common forest land where the communities had traditional access, or which could be construed to be customary boundaries of a village. In other words, these are areas where communities can demonstrate their traditional access.

- E.8.2.1. Despite the fact that the main intention of FRA was to promote community participation and management, field work shows that recognition of individual rights has taken precedence over community or group rights, and the focus seems to be confined only to land rights for agriculture - one amongst the thirteen sets of rights recognized under the Act.
- E.8.2.2. Gram Sabha, which has been conferred CFR should be given status of "Village Bio-Diversity Management Committee" (VBMC) under Sec.41 of the 'Bio-Diversity Act, 2002'. The capacity building of this VBMC shall be done to prepare People's Biodiversity Register (PBR) and used in the planning process.

E.8.3. Panchayats (Extension to Scheduled Areas) Act

The Panchayats (Extension to Scheduled Areas) Act (PESA) was passed in 1996 by the Indian Parliament as a means to recognize the dire need to protect the rights and resources of the communities in Schedule V areas and upholding their right to self-governance (Dandekar and Choudhury 2010). PESA recognized the Gram Sabha (a habitation was the natural unit of the community, and its adult members constitute the Gram Sabha, as against the elected Gram Panchayat) to be pre-eminent. The Gram Sabha was recognized as being competent to act on a range of powers. However, in the decade-and-a half since it was passed, the experience of PESA has been stilted.

The Twelfth Plan recommends that as a complement to FRA, PESA be implemented to its full extent as a means to genuinely empower tribal people and invest in institutions that are responsible for capacity-building, monitoring and regulatory activities involved in its implementation with respect to community rights for Bio-diversity and Minor forest produce (MFP) Management.

E.8.4. Marine Biodiversity Conservation and Fisher folk Rights

- E.8.4.1. The presence of a vibrant fishing community on the coast is what has protected the vast coastal stretches of the country from being unsustainably commercialized by development. However, fishing communities need developmental interventions to address their livelihood requirements. The sustainable and equitable development of the marine fisheries sector in the country will entail revising the existing plans for the development of coastal and marine resources.

E.8.4.2. In the 12th FYP, the Central and State governments need to invest in strengthening the mechanisms for implementing the CRZ Notification and the marine fisheries regulation laws. A task force needs to be set up for reviewing legislations related to marine areas comprising of leaders of the fish-worker associations and leading marine-conservation organizations in the country. The first step to conserve marine biodiversity would be to identify areas of significant marine biodiversity in India, classify them on the basis of research and conservation/management requirements, record the threats they face, and undertake long-term surveys to document species diversity and trends in populations.

E.8.5. Monitoring Fisheries Resource Use:

E.8.5.1. India is the third largest contributor to fisheries in the world and earns foreign exchange valued at over ₹ 700 crore annually (a figure of ₹ 7621 crore was estimated for 2007-08 which is the latest available estimate). Global demand for marine resources, expansion of mechanised fishing fleets and unsustainable fishing practices have led to a large-scale impact on marine resources. Although critical from the point of view of livelihood and sustainability, the role of the extraction process and its impact on biodiversity and ecosystem function has not been documented accurately. A review of monitoring protocols and their standardisation is urgently required. Fishing communities often have intimate knowledge of the marine resources that they exploit, and therefore have immense potential to be active participants in monitoring resources that are critical to their well-being.

E.8.5.2. The Centre for Marine Living Resources & Ecology (CMLRE)/ Earth System Science Organization (ESSO) co-ordinates the project on census of marine life, a global initiative for the Indian Ocean and manages the Ocean Bio-geographical Information System.

E.9. CBD and Commitments of India

India is hosting the 12th Conference of Parties of the Convention for Biological Biodiversity in 2012 and will play a leadership role of CBD for 4 years. This is an unprecedented opportunity for India to showcase its achievements in maintaining thriving biodiversity in the midst of dense human populations and sustainable forest use. In order to highlight our achievements, funds should be made available to implement the provision of the Biological Diversity Act as well as FRA. This can be showcased as a remarkable and unique achievement by India as a megadiverse country towards settling community rights over biodiversity. It is recommended that funds be made available to all Gram Sabhas to develop and implement plans for community-managed and monitored resource areas and launch a global award to at least two countries in each bioregion that have set global benchmarks in advancing local community rights over and local management of forests and biodiversity.

E.10. Ecosystem is central to the functioning of ecological systems

Institutional mechanisms, in the form of establishment of specialized Centres/ institutes, to undertake ecosystem research and sustainability of natural resource is necessary.

E.11. Valuation of Ecosystem Services and Biodiversity

E.11.1. The 12th Plan should promote nature-conservation oriented activities and use positive incentives to encourage both traditional practices such as sacred groves and modern ones. There is currently no accepted system of valuation, and no open information repository containing the values which have hindered efforts to value ecosystem services and biodiversity. Some States are demanding green bonus for providing eco-system services to the nation. It is therefore important that ecosystem services and biodiversity of ecosystems in the different States are valued using accepted and comparable protocols.

E.11.2. There is a need for Institutional mechanism for research on ecosystems, biodiversity and sustainable development. It is recommended that an Ecosystem Research Institute (ERI) be established under MoEF.

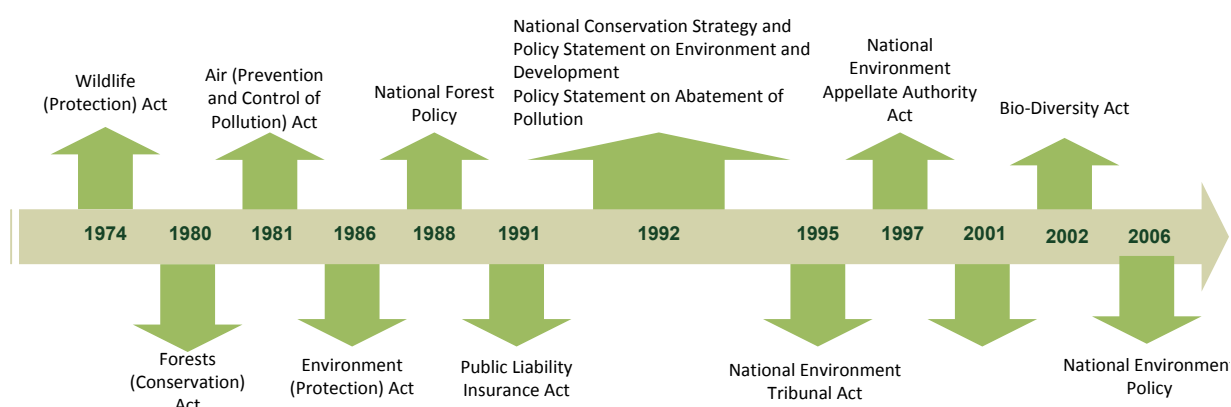
1. Review of the 11th Plan

A variety of schemes on pollution abatement, conservation of biodiversity and habitat management were implemented during the 11th plan period, a review of which is presented in this chapter.





Planning, coordination and overseeing the implementation of India's environmental and forestry policies and programmes are carried out by the Ministry of Environment & Forests (MoEF) which serves as the nodal agency for these sectors in the Central Government. The main objectives of the MoEF include: protection of the environment, conservation and assessment of flora and fauna, forests and wildlife, prevention and control of pollution, afforestation and regeneration of degraded landscapes, ensuring welfare of animals and international cooperation in forestry and environment. These objectives are being fulfilled through activities like environmental impact assessment of development efforts (EIA, CRZ, Eco sensitive areas, etc), afforestation, regeneration and eco-development (NAEB, ETFs, NAP etc.), ecological adaptation to climate change (including conservation of natural resources such as forests, wildlife, fragile eco systems), prevention and abatement of pollution, survey and inventorisatation of natural resources, and research, extension, training, education, awareness generation and information dissemination in environment and forestry. The objectives are supported by necessary policy framework and appropriate legislative and regulatory measures aimed at preservation, conservation and protection of environment, some of which are depicted below.



The planning for the sector also takes into account the agreement signed under United Nations Environment Programme (UNEP), South Asia Co-operative Environment Programme (SACEP), International Centre for Integrated Mountain Development (ICIMOD) and the United Nations

Conference on Environment and Development (UNCED). Coordination with multilateral bodies such as the Commission on Sustainable Development (CSD), Global Environment Facility (GEF) and regional bodies such as Economic and Social Council for Asia and Pacific (ESCAP) and South Asian Association for Regional Cooperation (SAARC) on matters pertaining to environment as another facet of planning to optimize national priorities and objectives with global aspirations.

The 11th Plan laid special emphasis on environmental sustainability while pursuing development by incorporating environmental concerns in development planning at all levels. A number of schemes on pollution abatement, conservation of biodiversity and habitat management were implemented during the plan period to achieve the monitorable targets set in the 11th plan. A review of these schemes is presented in this chapter.

Review of Schemes

Plan schemes of the MoEF were rationalized, by suitably merging/clubbing its 68 smaller schemes into 22 thematic schemes, for implementation in the 11th Five Year Plan. Of these 22 approved thematic schemes, the scheme of Muli Bamboo was successfully completed in 2008-09. The new scheme of afforestation through Panchayati Raj Institutions, which proposes large scale intervention in non forest areas, has been dropped following the formulation of National Mission for Green India with similar objectives on a much larger scale. The scheme of Taj Protection had been put on hold pending an evaluation of the scheme by NEERI, Nagpur. The Evaluation Report has since been accepted and it is proposed to revive the scheme in the 12th Five Year Plan. There are, thus 20 thematic schemes under implementation at the end of the 11th Plan.

Other developments during the Plan include: transfer of the “civil construction unit” component under International Cooperation Activities scheme to non plan budget; merger of the “state of environment” component with “ENVIS” component under the Environmental Information, Education and Awareness scheme; and addition of a new externally aided component on “Capacity Building for Forest Management and Training of Personnel” under the scheme of capacity building for forestry sector.

Further, externally aided projects on National Coastal Management Programme, Capacity Building for Industrial Pollution Management project (HSMD) under Pollution Abatement scheme, and Biodiversity Conservation and Rural Livelihood Improvement Project became operational in the 11th Plan. Another major initiative during the Plan was the setting up of “National Ganga River Basin Authority” for effective abatement of pollution and conservation of the river Ganga, the scheme being funded under both budgetary support and external aid from the World Bank.

Details of the 22 thematic schemes, including achievements during the 11th plan are as under:-

1.1. Environment & Ecology

1.1.1. Environmental Monitoring and Governance:

Schemes	Objectives
<ol style="list-style-type: none"> 1. Central Pollution Control Board [1974] 2. Establishment of Environment Protection Authorities & Commission & Tribunal 3. Activities under EIA 	<ul style="list-style-type: none"> • Monitor compliance and implementation, • Strengthen Institutional & Technical capabilities for environmental governance and • Mainstreaming environment in developmental activities by grant of Impact Assessment Clearances.

Three schemes have been grouped under this head. CPCB is the major scheme with an Eleventh Plan outlay of ₹194

Cr . 559 National Water Quality monitoring stations, 150 ambient air quality monitoring stations and 9 continuous air quality monitoring stations were setup under this scheme. The National Green Tribunal (NGT) was established in 2010 and became functional in 2011. 25 states constituted the State and UT level Environment Impact Assessment Authorities (SEIAAs).

1.1.2. Pollution Abatement:

Schemes	Objectives
<ol style="list-style-type: none"> 1. Industrial Pollution Abatement through Preventive Strategies, 2. Assistance for Abatement of Pollution 3. Clean Technology 4. CETP 5. Hazardous Substances Management. 	<ul style="list-style-type: none"> • Prevention of pollution through preventive activities such as waste minimization/Cleaner Technology in Small Scale Industries (SSI), • Support to State Pollution Control Boards (PCBs), • Financial assistance to Common Effluent Treatment Plants (CETP), and • Demonstration investment in Hazardous Waste Management.

Five Schemes have been grouped under Pollution Abatement. The Objectives of these schemes are; Achievements include development of eight technologies in the areas of natural dyes, bio-adhesives, eco-friendly welding machines, lignin precipitation, and Upflow anaerobic sludge blanket digestion (UASB) technology for CETP's under Clean Technology. 23 CETPs have been funded so far of which 19 have been setup.

Schemes 1 and 3 will be merged during the 12th Plan. Other achievements include the initiation of a World Bank assisted project on Capacity building for Industrial Pollution Management. Most of the State PCB's depend on reimbursement of Cess collected. Under these schemes, after pre-feasibility studies 2 states were identified for undertaking remediation of contaminated sites. A number of studies for web-enabled emergency response for chemical crisis management, and pilot trials for co-incineration were also undertaken.

1.1.3. Research & Development (R&D) for Conservation & Development (C&D):

Schemes	Objectives
<ol style="list-style-type: none"> 1. Botanical Survey of India (BSI) [1890 and reorganized in 1954], 2. Zoological Survey of India (ZSI) [1916] 3. GBPHIED [1988] 4. Assistance to Botanical Gardens [1992] 5. Taxonomy Capacity Building (AICOPTAX) – 1997, 6. Bio-diversity Conservation, 7. National Natural Resource Management Scheme (NNRMS) 8. Research & Development [1985]. 	<ul style="list-style-type: none"> • Survey, inventorisation and ex-situ conservation of Biological diversity, • Bio-prospecting of plant and animal wealth and • Dissemination of research findings. BSI undertook 56 field visits , collected 42 species at national and digitized 9071 .

Eight schemes have been grouped under this head. Significant achievements include formation of the Meghalaya Bio-diversity Board and 95 surveys undertaken by ZSI with identification of 1500 species.

1.1.4. Conservation of Natural Resources and Ecosystems:

Schemes	Objectives
1. Conservation of Corals, Mangroves, Wetlands and 2. Biosphere Reserves [1986]	<ul style="list-style-type: none"> • Preparation of Management Action Plans (M.A.P), • Intensive in-situ conservation of biodiversity, through management interventions, • Fund research to facilitate multi faceted research in Biosphere Reserves and potential sites.

Two schemes have been grouped under this head. Very few authorities have been constituted and no financial support was available for wetlands from the State Governments. The annual mangrove plantation target of 5,000 ha was not achieved.

1.1.5. Environment Information, Education & Awareness:

Schemes	Objectives
1. Environment education and Awareness [Eleventh Plan], 2. NMNH [1978], 3. Centres of Excellence [1983], 4. Environment Information System. (ENVIS), 5. Information Technology and 6. State of Environment Project [Eleventh Plan]	<ul style="list-style-type: none"> • Enhancing the understanding of people at all levels of the relationship between human beings and the environment • Development of capabilities/ skills to improve and protect the environment are the major thrust of all the Schemes.

Six schemes have been grouped under this head.. Supporting institutions for the Conservation of Biodiversity and strengthening awareness, research and training in priority areas of environmental science and management, providing information on environment and related subject areas to researchers, academicians, policy planners, environmentalists, scientists, engineers and the general public through a decentralized network of ENVIS Centres on diverse subject areas are other objectives of the Schemes. There has been delay in the execution of the project on Information Technology.

1.1.6. International Co-operation Activities:

Schemes	Objectives
1. International Cooperation (IC) Activities 2. GOI-UNDP-CCF [2008], 3. Climate Change [1994], 4. Grants in aid to States for Externally Aided Projects (EAP)/other EAPs including EPCO and 5. Civil Construction Unit (CCU).	<ul style="list-style-type: none"> • Foreign and domestic travel expenses • Grants in aid • Contribution to UN and other International bodies, and • Undertake climate change capacity building activities in the country

Five schemes have been grouped under this head The Schemes basically deal with facilitation of India's participation in various international negotiations. Under the Clean Development Mechanism (CDM) of Kyoto Protocol, Projects are considered for grant of Host Country Approval by the National CDM Authority. The expenditure under the scheme is primarily on travel. The CCU component has been transferred to Non plan.

1.1.7. National Coastal Management Programme:

Schemes	Objectives
1. National Coastal Management Programme (NCMP)	<ul style="list-style-type: none"> Protection and conservation of the coastal environment including minimizing risk to coastal communities.

National Coastal Management Programme (NCMP) is a new Central Scheme of the Eleventh Plan. The aim of the scheme is to support the coastal regulation activities of the MoEF by application of Science and Technology to protect the coastal environment and the livelihood of coastal communities. To achieve the aims of the project the following activities are being initiated;

1. Mapping and identification of coastal ecologically important areas,
2. Delineation of hazard line
3. Capacity development in coastal area management and
4. Pilot investment in coastal states for sustainable development.

The above activities are financially supported by the World Bank.

1.1.8. National River Conservation Plan (NRCP):

Schemes	Objectives
<ol style="list-style-type: none"> 1. NRCD [1985 and renamed in 1995], 2. NRCP [1995] 3. National Lake Conservation Plan (NLCP) [2001]. 	<ul style="list-style-type: none"> Sanctioning and monitoring of works under NRCP & NLCP for improving the water quality of rivers and lakes respectively Reducing pollution load in major rivers through pollution abatement works.

Three schemes have been grouped under NRCP. The need for revamping the river Ganga cleaning Programme has been widely recognized. Hitherto the implementation has been piecemeal and focusing more on municipal sewage. The problem is further compounded by inadequate flows. A comprehensive response is necessary covering water quality and flow, sustainable access, prevention and control of pollution. The National Ganga River Basin Authority (NGRBA) has been setup and a Notification issued for NGRBA. The powers for prosecution, entry and inspection are to be delegated to both NGRBA and State Authorities. 150 major polluted stretches on 37 rivers identified. NRCP only covers 40 polluted stretches.

1.2. Forests

1.2.1. Grants-In-Aid to Forests and Wildlife Institutions-(CS):

Schemes	Objectives
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<ol style="list-style-type: none"> 1. ICFRE [1989]; 2. The Indian Plywood Industries Research and Training Institute (IPIRTI); 3. The Indian Institute of Forest Management (IIFM); and 4. The Wildlife Institute of India (WII). 	<ul style="list-style-type: none"> • Promote research, education, and extension in forestry and wildlife sectors, • Undertake R&D of technologies for plywood and other panel products, including plantation of timber, bamboo, and fibres, • Training to include training of managers of protected areas and undertaking research to build capacity for effective management of natural resources in the country, including training of managers of protected areas • Advise the government on conservation and management of forestry and wildlife resources • Support research in the field/area of forestry and wildlife.
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Four schemes have been grouped under this head. Post Graduate Diploma in Forestry Management (PGDFM) (1988) has been awarded to 90 students every year. M.Phil in National Resource Management has been initiated in 2011 with proposed strength of 20 students. The program is recognized by Saurashtra University. Till date, 29 scholars have registered for Ph.D. program and 4 Ph.D. Degrees have been awarded along with 6 thesis submitted. Fellow Program in Management (FPM) was initiated by IIFM in the year 2008-09 and in the year 2011 seven scholars have registered themselves for the program. Besides the activities mentioned above, an ongoing study on The Economics of Ecosystems and Biodiversity in India (TEEB-I), 2011-15 under the overall coordination of the Indian Institute of Forest Management, Bhopal is being implemented.

1.2.2. Capacity Building in Forestry Sector :

Schemes	Objectives
<ol style="list-style-type: none"> 1. Training to Indian Forest Service (IFS) Officers 2. Directorate of Forest Education (DFE) 3. Indira Gandhi National Forest Academy (IGNFA) (1987) 4. Training of Personnel of Other Services 5. Foreign Training of Forestry Personnel 6. Training of Other Stakeholders. 	<ul style="list-style-type: none"> • Conduct short-term courses of one/two week(s) duration for the IFS officers in the country • Update their knowledge and skills with a training component abroad

Six schemes have been grouped under this head. The scheme has been revised to add an EAP component. Under the revised programme, so far more than 700 officers have been trained and the inputs provided have been well received by the participants. Workshops were conducted during the year 2010-11 to assess the effectiveness of these trainings. Based on the feedback from the participants, this pattern of the MCT Programmes for IFS may continue in the 12th Plan also. During the 11th plan, 183 one week training and 60 workshops were organized for the IFS officers. Besides this, 183 officers were provided induction training. However, in-service training of State Forest Service (SFS) officers, particularly Range Forest Officers, has been neglected. During the 12th plan, training of subordinate staff requires an added focus and adequate financial provision may be made for it. Training of members of JFM committees and other local level institutions in forestry and allied activities need to be stepped up. The existing training infrastructure for training could be augmented. Training curriculum of forest officials should incorporate conservation and sustainable utilization of forest resources.

1.2.3. Intensification of Forest Management (Former IFPS) Scheme-CSS (Eleventh Plan)

Schemes	Objectives
1. Forest Management (Former IFPS) Scheme	<ul style="list-style-type: none"> • Forest Fire Control Management • Strengthening of Infrastructure • Survey and Demarcation • Preparation of Working Plans which includes fire lines creation and maintenance, construction of forest boundary pillars and approach roads, etc. <p>The scope of the scheme has recently been expanded by adding four new components:</p> <ul style="list-style-type: none"> • Protection and Conservation of Sacred Groves • Conservation and Restoration of Unique Vegetation and Eco-systems • Control and Eradication of Forest Invasive Species • Preparedness for meeting challenges of Bamboo flowering and improving management of Bamboo Forests.

Under the scheme, 325 firewatchtowers, 597 water storage structures, 2,67,274 boundary pillars, 302 new buildings were constructed in the first four years of the plan. Besides this, an average 80,000 kms of firelines were maintained every year. The release of funds to the implementing agencies in most states have been delayed under the scheme and the fund flow mechanism under the scheme requires inbuilt checks for timely releases at all levels. The timely preparation of working plans needs to be monitored. The new components on Sacred Groves, Restoration Of Unique Vegetation & Ecosystems and Control of Invasive Weeds require an added focus and implementation through state specific strategic action plans during the 12th Plan.

1.2.4. Strengthening Forestry Divisions

Schemes	Objectives
<ol style="list-style-type: none"> 1. Forest Survey of India (1981) 2. Strengthening of Regional Offices 3. National Forestry Information System National Co-ordinated Programme for Assessment of Non-Timber Forest Product Resources (2009) 4. Certification Programme for Wood and Non-Wood Forest Resources. 	<ul style="list-style-type: none"> • Assess forest cover • Undertake forest inventory • Conduct research on applied forest survey techniques • Capacity building of forestry personnel • Establish zonal offices • Monitor forest plantations.

Five schemes have been grouped under this head. Starting in the year 1987, 10 cycles of forest cover mapping have been accomplished in the last two decades by FSI. The forest cover assessment of the country is currently being done at 1:50,000 scale using digital image processing (DIP) technique. Besides mandated activities, some of the studies conducted are, Assessment of Trees outside Forests in Punjab State, Assessment of Forest Cover in Tiger Reserves of India, Assessment of damage to ecology due to Tsunami, Preparation of baseline data for preparation of Working Plan – a Case Study of Kolasib Division of Mizoram, Assessment of growing stock and increment in India's Forest, Assessment of Mining area in Forests, Assessment of Forest Cover burnt by Forest Fire, Status of Forest Cover in Project Tiger Reserves, Forest Typing mapping of India etc. About 2900 forestry personnel from different State Forest Departments

have been trained.

At present, time lag between fire detection and reporting is about 24 hrs which needs to be brought down. Some of the other gaps are real time monitoring of Forest Cover in Eco-Sensitive zone, monitoring of incremental carbon stock, monitoring of plantation & other activities under centrally sponsored schemes through an Integrated information system. Work on the State of Forest Report (SFR) 2011 should be undertaken in a manner that allows for a timely release. The National Coordinated Programme for Assessment of Non-Timber Forest Product Resources and Certification Programme for Wood and Non-Wood Forest Resources need to become operational.

1.2.5. National Afforestation and Eco-Development Board (NAEB)

Schemes	Objectives
1. NAEB 2. Eco-Task Force (ETF)	<ul style="list-style-type: none"> • Afforestation and eco-development, including monitoring and evaluation; • Communication and awareness generation; • Supports projects approved under the grants-in-aid scheme for greening India; • Increases forest/tree cover in inaccessible areas like deserts and mountain slopes through regular/retired territorial army personnel; • Continuation of six of the existing ETF battalions in of Jammu and Kashmir, Uttarakhand, Rajasthan, and Assam.

Two schemes are grouped under NAEB. with the board supporting the implementation of schemes relating to the above mentioned objectives.

1.2.6. National Afforestation Programme (NAP)

Schemes	Objectives
1. NAP	<ul style="list-style-type: none"> • Increase forest and tree cover • Support Forest Development Agencies (FDAs) for natural and artificial regeneration and perennial herbs and shrubs in existing FDAs.

The target for the Eleventh Plan is to cover 10,00,000 (ha) and operationalize 3,000 new Joint Forest Management Councils (JFMCs) in existing FDAs. The achievement of planting were accordingly 4.93 lakh ha (including that of 2005-06 carried over to 2007-08, first year of eleventh plan), 1.73 lakh ha, 1.03 lakh ha, 0.59 lakh ha and 0.50 lakh ha during 11th Plan. National Afforestation Program (NAP) is implemented through decentralized structure of Forest development Agency (FDA) and JFM Committees. From the year 2010-11, State Forest Development Agency (SFDA) has been constituted at the State level in all states except Goa to smoothen the fund flow from the Ministry to the FDAs. 71 FDAs have been formed in the first 4 years of the plan and 18333 JFMCs have been operationalised.

1.2.7. Afforestation through PRIs (Panchayat/ Gram Van Yojna):

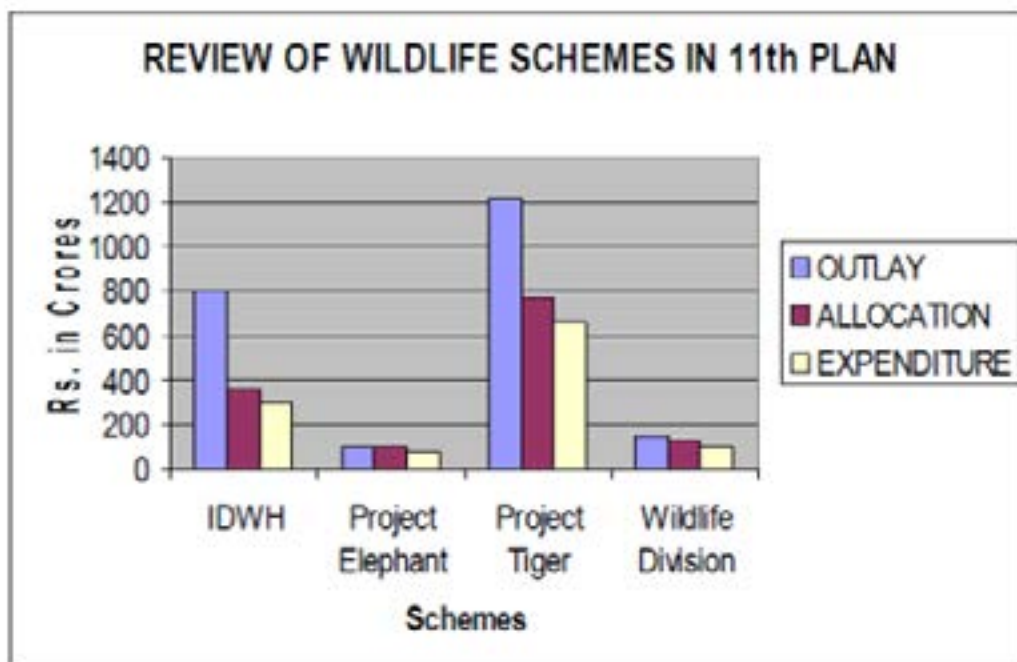
Schemes	Objectives
1. Afforestation through PRIs	<ul style="list-style-type: none"> Afforestation on various categories of vacant public land involving PRIs. Approval of new project areas for natural regeneration, artificial regeneration, and planting of perennial herbs and shrubs.

The Scheme was to be launched during 2009-2010. The scheme has now been subsumed under the new sub-scheme "Green India Mission"

1.3. Wildlife

Presently, central assistance to the State/Union Territory Governments for protection and management of wildlife is provided under the following three Centrally Sponsored Schemes (CSS). The states do not have the inclination to provide resources for conservation and the conservation activities are largely dependant on central assistance.

- Integrated Development of Wildlife Habitats (IDWH).
- Project Tiger (PT)
- Project Elephant (PE)



These are umbrella schemes of the sector which aim to extend support to the entire spectrum of actions needed to conserve wildlife in the country. Project Tiger is a scheme which is specifically targeted at areas declared as “Tiger Reserves” and at actions that benefit the cause of wild tiger conservation. In contrast, the other two schemes are more open ended in their approach since they include areas irrespective of their legal status for strengthening conservation initiatives. Review of the sector uncovers the following weaknesses and threats:

Weaknesses

- Contribution of wildlife conservation to quality of life poorly understood and not acknowledged.
- Poor inter and intrasectoral linkages with other stakeholders.
- Poor infrastructure support for field level management.
- Poorly equipped and lowly motivated field cadre, with limited opportunities to improve knowledge and skills
- Management focus limited to few charismatic species and PAs.
- Various ecosystem types not adequately represented in the PA network (e.g., marine, mountains, deserts etc.).
- Poor availability of research information on most species and ecosystems.
- Not enough incentives or acknowledgement and support for communities and people to value wildlife on their own.
- Lack of awareness, resulting in wildlife conservation to be generally seen by planners and Policy makers as an “Impediment” to “growth” rather than an essential component of “Sustainable Growth”.
- Growing national and international concern on wildlife conservation issues.
- Support from higher judiciary on environmental issues per se as an element of “Right to life”
- Wider canvas and organisation of research including on social issues being made available for decision making.
- India’s acknowledged leadership at various bilateral and multilateral forums such as CITES, CBD, South Asia Wildlife Enforcement Network (SAWEN), SAARC, GTF, IWC etc.

Threats:

- Increasing loss and fragmentation of wildlife habitats and everincreasing biotic pressures.
- Growing Human-Wildlife Conflict.
- Inability of present accounting systems to adequately reflect contribution of wildlife conservation to national growth and quality of life.
- Growing transnational organised wildlife crime.
- Impacts of climate change and Invasive Alien Species.

1.3.1. Strengthening of Wildlife Division

Schemes	Objectives
<ol style="list-style-type: none"> Control of Wildlife Crime [1986] and Central Zoo Authority (Including NZP) 	<ul style="list-style-type: none"> Strengthen Central Wildlife organization, existing Regional Offices for Wildlife Preservation & opening new Regional offices for better enforcement of Wildlife (Protection) Act, 1972 & CITES), To provide Rajiv Gandhi and Amrita Devi Bishoni Awards and Dr. Salim Ali and Dr. Kailash Sankhla National Fellowships, To improve the quality of zoo animals Coordinate research in captivity breeding Education programmes for the purpose of zoos (Improve zoos in the country and Maintain rescue centers).

Two schemes have been grouped under this head, as shown above. The scheme on Control of Wildlife crime has been revised and a bureau has been set up.

1.3.2. Integrated Development of Wild Life Habitats (IDWH):

Schemes	Objectives
<ol style="list-style-type: none"> Integrated Development of Wild Life Habitats 	<ul style="list-style-type: none"> Development of National Parks & Sanctuaries; Facilitates & encourages expansion of protected areas network; Creation of infrastructural protection and management of Protected Areas (PAs) Provides financial assistance for Eco- dev, training, capacity building & research studies. Relocation of villages and settlement of rights for better enforcement of Wildlife (Protection) Act, 1972.

Under this scheme, support is also provided to States/UTs for the recovery programme of critically endangered species. Project Elephant, a CSS initiated in 1991, has been incorporated as a sub-scheme under the IDWH. The Objective is to assist the States having free ranging populations of wild elephants to ensure long term survival of identified viable populations of elephants in their natural habitats i.e fund 26 notified and 6 proposed elephant reserves in 16 states., catering to only wild elephants.

1.3.3. Project Tiger:

Schemes	Objectives
<ol style="list-style-type: none"> 1. National Tiger Conservation Authority [1973] 2. Bio-diversity Conservation and Rural Livelihood Improvement Project. 	<ul style="list-style-type: none"> • To ensure maintenance of a viable population of Tigers in India for scientific, economic, aesthetic, cultural and ecological values and to preserve for all times, areas of biological importance as a national heritage for the benefit, education and enjoyment of the people. • Financial support to tiger States for wild tiger conservation in designated tiger reserves • Funding support to States for relocation of villages/ settlement in the core/critical tiger habitats of tiger reserves, based on reserve-specific proposals

Two schemes were grouped under Project Tiger. During the MTA, the scheme on Biodiversity was shifted to the Scheme " Conservation and Survey" i.e a scheme under the Environment sector.

1.3.4. Animal Welfare:

Schemes	Objectives
1. Animal welfare	<ul style="list-style-type: none"> • Promote welfare of animals by providing finances for Shelter houses, Ambulance vans and Animal Birth Control • Training Programmes

Financial Review

Ministry of Environment & Forests has an approved outlay of Rs 10,000 crore for its 11th five year plan, 2007-12. The figure below provides the sanctioned outlay along with the actual expenditure for each year of the 11th plan.

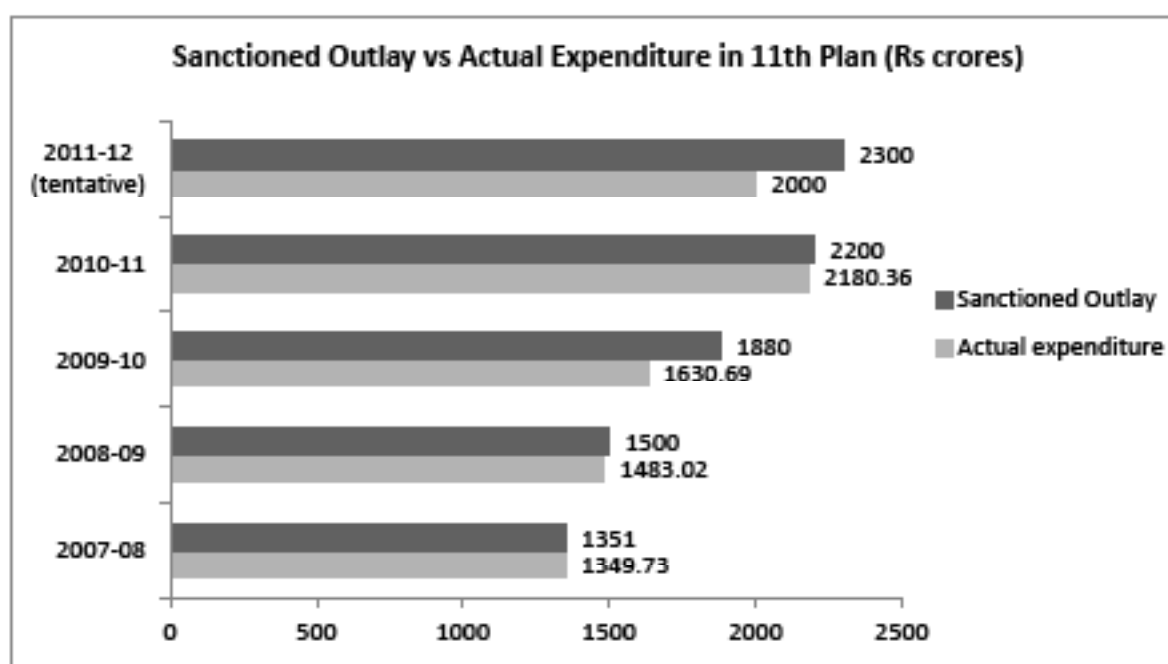


Figure 1: Sanctioned outlay vs Actual Expenditure in 11th Plan (Rs. crores)

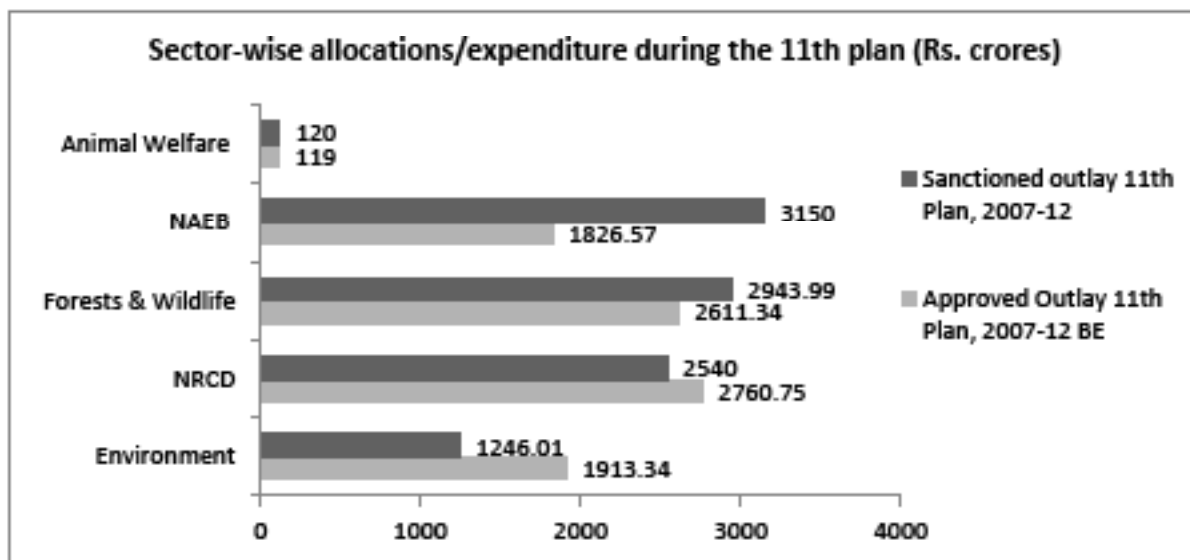
For the current financial year 2011-12, the Ministry has been allocated an outlay of Rs 2,300 crore, against which likely expenditure is tentatively placed at Rs 2,000 crore.

Thus, a total outlay of Rs 9231.00 crore has been allocated to the Ministry in the 11th Plan as Budgeted Expenditure (BE), against which its likely expenditure is Rs 8760.07 crore which implies a utilization ratio of around 95% during this period. Total allocations made in the 11th Plan amounted to around 92% of Ministry's sanctioned/approved outlay.

The sector-wise position of allocations/expenditure during the 11th plan is summarized in the table below.

Table:- Sector-wise position of allocations/expenditure during the 11th plan

Sector	Sanctioned outlay 11th Plan, 2007-12	Approved Outlay 11th Plan, 2007-12 BE
Environment	1246.01	1913.34
NRCD	2540.00	2760.75
Forests & Wildlife	2943.99	2611.34
NAEB	3150.00	1826.57
Animal Welfare	120.00	119.00
Total	10000.00	9231.00

Figure 2: Sector-wise allocations/expenditure during the 11th plan

During Eleventh Plan the country pursued its development agenda considering environmental protection at the core of all policy formulation. In the 12th Plan it has been felt that the country needs more focused efforts not only to preserve and maintain natural resources but also provide equitable access to those who are denied this currently.

The Eleventh Plan emphasized on four monitorable socio-economic targets, viz. increase forest and tree cover by 5

percentage points, treat all urban waste water by 2011-12 to clean river waters, attain WHO standards of air quality in all major cities by 2011-12 and increase energy efficiency by 20 percentage points by 2016-17 in the environment and forests sectors.

The progress achieved is given in the text box below:

Progress on the Monitorable Socio-economic Targets of 11th Plan

The Forest and Tree Cover (FTC) including mangroves, as reported in the State of Forest Report 2009, (based on the data of 2007) is 23.84%. To meet the 11th Plan target of 5% increase, an additional 160 lakh ha FTC had to be achieved by 2012. However, the State of Forest Report of 2011 (based on the data of 2009) has assessed the FTC at 23.81% indicating a net loss of 36700 ha. This decline has to be viewed against the backdrop of initiatives taken to increase the FTC. While the major afforestation programme of MoEF, could target only 8.78 lakh ha. during the 11th plan, the rate of planting during the period, as reported under 20 point programme by various Ministries/ State Govt/Organisations, has been around 15 lakh ha per year. Evidently, the massive plantation reported under 20 point programmes has failed to produce the expected outcomes in terms of a comparable increase in FTC. The decline in FTC clearly indicates the need to refurbish the planning process and to fine-tune and strengthen the implementation strategy to achieve the desired outcomes. An ambitious Green India Mission (GIM) targeting 10 million ha. is set to be launched during the 12th plan. A strong transparent and visible monitoring mechanism backed by regular reviews is required not only for GIM but also for all the existing afforestation programmes by all organisations.

Deterioration in river waters is largely due to discharge of raw/partially treated sewage into the rivers. Cleaning of rivers is a mammoth task requiring the involvement of all stakeholders. As per CPCB, the estimated wastewater generation in 498 class I cities & 410 class-II towns is estimated to be about 38000 mld, against which treatment capacity of only 12000 mld exists at present. Sewage treatment capacity of about 4418 mld (about 37%) has been created under NRCP and a total sewage treatment capacity of 1801 mld is likely to be created under NRCP during the 11th Plan. Given the large gap between sewage generation and treatment capacity available, substantial increase in allocations is required to be made in the XII Plan period.

The MoEF feels that notified NAAQS, and not the WHO guidelines, would provide a more realistic and appropriate goal for achieving better air quality in India. The NAAQS were revised in the 11th Plan, and limits for 12 pollutants, including new parameters such as ozone, arsenic, nickel, benzene and benzo(a)pyrene were notified. Air quality Management is also inter-sectoral in nature.

A National Mission on Enhanced Energy Efficiency (NMEEE), under the Ministry of Power has been launched under NAPCC, to achieve 19000 MWs of energy saving by 2015, 23 MTOE of fuel saving (against 24 MTOE consumed in 9 sectors) by 2015, and reduction of 98.55 MTs of CO₂ equivalent. India has also announced its domestic mitigation goal of reducing emissions intensity of GDP by 20-25% by 2020 compared to 2005. An Expert Group constituted by the Planning Commission is in the process of drafting a low carbon inclusive growth strategy for India for the 12th Five Year Plan.

With the increasing emphasis on the need for development, coupled with increasing urbanization, it is becoming apparent that the natural resources have to be used judiciously and sustainably. Translating the vision of environmental sustainability will require that environmental concerns are given a high priority in development planning at all levels.

The Twelfth Five Year Plan needs to adopt specific strategies to tackle emerging challenges concerning conservation

and survey of flora, fauna, forests and wildlife; prevention and control of pollution; afforestation and regeneration of degraded areas; protection of the environment, and issues related to the welfare of animals.

2. Strategies and Policies

A comprehensive response to the issues and challenges highlighted in this report can only come from agreed national strategies and supporting policies. An outline of the same in the area of Environment, Forests, Wildlife & Climate Change is presented in this chapter.





2.1. Environment

- 2.1.1. To achieve the objectives of prevention and control of pollution and conservation of environment, National Conservation Strategy and Policy Statement on Environment and Development, 1992, and Policy Statement on Abatement of Pollution, 1992 were adopted. These policies emphasized pollution prevention/abatement, and promotion of cleaner technologies to reduce industrial pollutants. Further to these policies, as a comprehensive policy to mainstream environmental concerns in all the developmental activities, the National Environmental Policy (NEP) was adopted in 2006. The NEP articulates the spirit of 'sustainable development'; it states that only such development is sustainable, which respects ecological constraints and imperative social justice is sustainable. The NEP reiterates the national commitment for environment protection and sustainable development and proposed strategies and actions for protection and conservation of environment. Review of NEP was carried out in 2009-10. Monitoring of the implementation plan is ongoing and will continue during the 12th Five Year Plan.
- 2.1.2. Outcome of the Ministry under the mandate of NEP has been the passage of the National Green Tribunal (NGT) Act in 2010. The Act paved the way for the establishment of the NGT. It is a green court established for the effective and expeditious disposal of conflicts related to environmental conservation and protection of other natural resources of the country. The relevant Rules have been notified and the Tribunal is operational in Delhi and expected to be fully functional in the 12th Plan period with establishment of benches at Bhopal, Chennai, Kolkata and Pune.
- 2.1.3. In addition, to address the delay in award of environmental clearances and improve the monitoring of clearance conditions in projects requiring EIA, creation of independent National Environmental Appraisal and Monitoring Agency (NEAMA) is proposed to be established in the 12th Plan. It will set up a new process for environmental appraisal of projects, and monitoring the observance of environmental management plans. It would be a recommendatory body, subject to final decision-making by the Environment Minister.

2.1.4. Other recent policy initiatives

A number of other policy and legislative initiatives were taken by MoEF in the 11th Five Year Plan. These include:

- Re-engineering of environmental clearance process in 2006.
- Notification of Hazardous Waste (Management, Handling and Transboundary Movement) rules in 2008 and its amendment in 2009.
- Amendment in National Ambient Air Quality Standards in 2009.
- Establishment of National Ganga River Basin Authority in 2009.
- E-waste (Management and Handling) Rules in 2011.
- Plastic Waste (Management and Handling) Rules 2011.
- Coastal Regulation Zone Notification in the year 2011.

2.1.5. Many sectoral ministries have programmes and schemes that compliment the efforts of the MoEF. These include:

- Restoration of Ponds - Ministry of Water Resources.
- Municipal Solid Waste Management - Ministry of Urban Development.
- Waste-to-energy programme - Ministry of New and Renewable Energy.
- Industrial Infrastructure Development Scheme supporting funding of CETPs and solid waste, management projects – Ministry of Commerce.
- Vehicular pollution – Ministry of Road Transport and Highways (MoRTH), Ministry of Petroleum and Natural Gas (MoPNG).

2.2. Forests

The first public policy statement on the subject of forests was enunciated in 1894. The Policy of 1894 gives the impression that forestry was not given the importance it deserved and with respect to land use, it was placed second to agriculture. The main thrust areas were to ensure maintenance of adequate forest cover for general well being of the country, meeting needs of local people and after meeting local needs, maximum revenue collection. However, over-harvesting of timber during the two world wars resulted in considerable degradation of forests. In 1952, the Government of India in the erstwhile ministry of food and agriculture enunciated a forest policy to be followed in the management of state forests in the country. An independent and democratic India saw a lot of new political initiatives. Large forest areas of princely states and “zamindaris” were taken on adoption of the Forest Policy of 1952 which recommended that 33% of the total land area of the country should be brought under Forest or tree cover. It provided detailed guidelines for management and protection of forests and wildlife.

In 1972, The National Commission on Agriculture recommended raising of large scale plantations in degraded forest areas and through social forestry in community and private lands, to meet the growing gap in timber and firewood requirement. It also suggested formation of Forest Corporations to use bank finance.

In 1976, by 42nd amendment in the constitution, ‘Forest’ was brought under central concurrent list followed by the enactment of the Forest (Conservation) Act in 1980 (amended in 1988). It made it mandatory for the States to take approval of the Government of India before diversion of any forestland for non-forestry purpose with a provision for

compensatory afforestation preferably on non-forest area.

In 1985, the subject of Forestry and Wildlife was shifted from Ministry of Agriculture to a new Ministry of Environment and Forests (MOEF) to ensure a more focused attention to emerging forestry issues.

However, over the years, forests in the country have suffered serious depletion. This is attributable to relentless pressures arising from ever-increasing demand for fuel-wood, fodder and timber; inadequacy of protection measures; diversion of forest lands to non-forest uses without ensuring compensatory afforestation and essential environmental safeguards; and the tendency to look upon forests as revenue-earning resource.

In 1988, the new Forest Policy was adopted, which covers all the sustainable management approaches subsequently provided in the 1992 Rio "Forest Principles". The main objectives are:

- Maintenance of Environmental stability and restoration of ecological balance, soil and water conservation.
- Conservation of natural heritage and genetic resources.
- Increasing substantially forest/tree cover (33% of land mass and 66% in hills).
- Increasing productivity of forest to sustainably meet first local and then national needs.
- Creating massive peoples movement to increase and protect forest and tree cover.
- Deriving economic benefit must be subordinated to these principal aims.

The policy recognizes that the principal aim should be to ensure environmental stability and maintenance of ecological balance including atmospheric equilibrium which is vital for sustenance of all life-forms, human, animal and plant. The derivation of direct economic benefit must be subordinated to this principal aim. This initiated a process of reform at policy and operational levels of forest management.

The National Forest Policy of 1988 is a comprehensive document with directives on afforestation, forestry and farm forestry, management of forests, rights and concessions, diversion of forestland, wildlife conservation, tribal communities, discouragement of shifting cultivation, management of forest fires and grazing, forest based industries, forest extension, forest education, forestry research, personnel management, forest survey and database, and legal and financial support.

The evolving policies supported by various Acts and Rules and the administrative set-up checked to some extent the downhill trend in forest resources. Among the various steps taken, creation of protected areas and joint forest management are significant. The Ministry of Environment and Forests, Government of India (MOEF) issued detailed guidelines in June 1990 for people's involvement in forest conservation and management through an appropriate village level organization. It also laid emphasis on the procedure of sharing of usufructs and a share of the net sale proceeds. Joint Forest Management (JFM), which has taken firm roots in the country since 1990, is now the central policy of forestry sector in various States/UTs.

2.2.1. Strategies

1. Quantitative and qualitative improvement in Forest Cover and carbon sequestration

Though there has been continuous increase in forest cover (653,898 sq km in 2001 to 690,899 sq km in 2009), the country could not take a positive stride in improving the quality of forest or meeting the target of 11th Five Year Plan due to financial constraints. During the 12th plan, the endeavor would be to focus on improving the quality of forests through

multi-tier vegetation/ plantations/forests through judicious combination of grasses, creepers, herbs, shrubs and trees and their density improvement. The Green India Mission should be aggressively implemented to achieve the target of qualitative improvement of forest cover/ecosystem in moderately dense forests, open degraded forests, degraded grassland and wetlands, eco-restoration/ afforestation of scrub, shifting cultivation areas, cold deserts, mangroves, ravines and abandoned mining areas. It should also lay emphasis on bringing urban/peri-urban lands under forest and tree cover through agro-forestry/social forestry. Implementation of these measures should aim at increasing carbon sequestration.

2. Protection of Forests, River Basins and Bio-diversity for Ecological Security and Ecosystem Services to the people

For the first time, a new scheme for rehabilitation of ecosystem, Biodiversity Conservation with a multipronged approach, has been proposed. The strategy would involve sustainable management of soil, water, NTFP and biodiversity through a participatory landscape approach. It would also augment employment generation and better livelihood in forest-fringe villages and for tribal people. The tribal youth may be involved in afforestation and forest protection by engaging them as community foresters/village green guards.

3. Shelter/Green-belt Development as a strategy for Disaster/ Risk Management and Climate Change Adaptation

The length of India's shoreline is 7517 km (mainland 6100 km). These coastal areas are densely populated and also disaster prone to tsunami, cyclone, storm-surges, tidal effects, etc. Coastal green belt/shelter belt and mangrove forests act as natural barrier or bio-shield against natural disaster as has been successfully demonstrated in coastal areas of Orissa, Tamil Nadu and Andhra Pradesh. Intertidal zone and the tidal influenced water are very sensitive to natural disaster which need demarcation and protection as emphasised in the Coastal Regulation Zone Notification.

During the 12th Plan, the strategy would be to raise huge grid of shelterbelt plantation as future bio-shield against natural disasters. Shelterbelt plantation also can be taken up along river basin to reduce the impact of flood, sand storm and strategic boundaries (example, sea buck thorn in Himalayas), linking corridor connecting important wildlife habitats. Such a programme will help to check erosion and sand casting as well as improve the microclimate.

4. Greening of under-utilized and Problematic land to combat desertification

The optimum productivity of farm and common lands is a pre-condition for future food security of the country. We have big chunk of under-utilized areas and permanent fallows. At the same time-factors such as land degradation due to tremendous biotic pressure on land coupled with water shortage, soil erosion etc. have accelerated the desertification process. Salinity and alkalinity, infestation of invasive weeds, water logging are also increasing at an alarming rate. All these affect the lives and livelihoods of the populations, eventually inducing forced migration and socio-economic conflicts. These areas need to be identified and treated through large scale R&D interventions by specialized institute of ICFRE, Central Arid Zone Research Institute and other institutes and universities. These also need to be brought under the Forestry Working Plan prescription during 12th Plan as degradation of these lands has severe implications on the livelihood and food security of millions. An integrated strategy to combat the threat with a cross-sectoral approach is proposed in the 12th Plan.

5. Participatory Management

Participatory management approach to forest resources is vital for livelihood security of communities and individuals, especially for women. It is also necessary to ensure involvement of local elected bodies for developing self-sustaining models. Since there is delay in fund transfer to the state forest departments, the State Forest Development Agency (SFDA), District Forest Development Agency (DFDA) in the districts and the Joint Forest Management Committees

(JFMCs)/Village level committee at Gram Sabha level may implement the forestry activities. These agencies may, however, require further strengthening to take care of changing paradigm in forest management and meeting the democratic aspirations of the people.

Local level institutions like JFM in various forms in different parts of the country should be promoted for forest management in the country and JFM Committees need to be formed as standing committees of the Gram Sabha. The strategy would be to evolve JFM into a higher platform "JFM Plus" where the livelihood promotion of the communities especially women SHGs formed for such activities, get increased importance in the conservation and development of forests. Broad-basing of JFM by convergence with different schemes of the other ministries is included in the proposed strategy.

6. Agro/ Farm-forestry to bridge the gap between domestic demand and supply

Till the eighties, India had raised plantation of fast growing and high yielding species of plants to produce raw materials for the industry. In the National Forest Policy 1988, a reversal to this trend was embraced stating "The principal aim of forest policy must be to ensure environmental stability and maintenance of ecological balance including atmospheric equilibrium, which are vital for sustenance of all life forms, human, animal and plant. The derivation of direct economic benefit must be subordinated to this principal aim".

At the same time, it has laid emphasis on increasing productivity of the forests. Currently, felling of trees is banned from areas lying 1000 metre above MSL, National Parks and Sanctuaries, all types of notified reserves and from any forest lands for which there is no Forestry Working Plans or Working Schemes. More than 80% of domestic timber products in the market are of private origin. India imports huge quantities of raw material for paper and plywood industry for its domestic consumption.

One of the strategies for sustainable inclusive growth in the 12th Plan would be large scale promotion of agro/farm-forestry and research inputs to increase productivity and to enhance income of people with simultaneous diversion of pressure from natural forests.

7. Rehabilitation of Grazing and pasture land including formulation of National Grazing Policy

India has 18% livestock population and 16% of human population over 2.4% geographical area of the world. Because of heavy pressure on land resources from competing demands of other sectors, traditional grazing and pasture lands have either vanished or shrunk drastically. This has resulted in heavy pressure on other productive forest lands dislodging ecological security of the locality. The country requires a National Grazing Policy and schematic support to extend, improve and scientifically manage grazing and pasture lands with ex-situ and in-situ efforts. Every village should have common grazing lands, and fodder bank for meeting the fodder needs in the lean season.

Village common lands, permanent fallow land of marginal productivity and fringe forest lands are the areas to be strategically covered in the Twelfth Plan. Appropriate provisions at comprehensive rehabilitation of these degraded grasslands are proposed under the 12th Plan.

8. Sustainable Non-Timber Forest Product (NTFP) Management and strengthening Livelihood of forest depended communities

Special efforts are required for reduction of pressure on forests for NTFPs by cultivating selected species in forest fringe areas and undertaking intensive conservation in existing forests through Aided Natural Regeneration (ANR) and other conservation activities. The increased production thereby would not only reduce the gaps between demand and supply but also shall become the ground for sustainable NTFP development. Detailed inventory of NTFPs and prioritization of

agro-climatic zone with specific management interventions needs to be taken up during 12th Plan. In such effort, PPP model may also be explored which may help achieve the objectives of private sector involvement for bringing technology and capacity in the remote areas. Procurement of collected products providing a uniform minimum assured price will immensely help the gatherers who are often exploited by the local level trader.

To develop the NTFP sector in a holistic way by coordinating/guiding various government sponsored activities/programmes on the same, along with managing knowledge, developing package and practice, ensuring capacity development of stakeholders and providing overall guidance over the NTFP sector, an apex and autonomous agency like the Rubber Board or Spice Board would be required. This agency may be called the NTFP Development Board, and can have its own state offices/branches.

9. Urban and Recreational Forestry

Urban areas need special attention as pollution levels and radiating heat from the concrete buildings requires dissipation through green cover. In urban areas, local level institutions such as RWAs, schools, colleges, NGOs etc. should be involved in the implementation of greening activities. This is very urgent as cities and towns are expanding fast and all efforts need to be made to preserve existing forests and open lands as public amenity spaces and to add new spaces within the urban plans, wherever possible.

10. Training and Capacity Building of Multiple Stakeholders

Most important management strategy for the 12th Plan is capacity-building of local bodies for sustainable management of forest resources. The main focus for capacity-building should be on the convergence of all the Acts/Regulations for all the stakeholders to provide better economic benefits and social empowerment through sustainable forest management of natural resources. Existing infrastructure and human resources of State Forest Department shall be strengthened and streamlined for capacity building and training of all the stakeholders up to grassroot level in natural resource management. This will enable them to take informed decision for preparation of site-specific micro plan to achieve the ultimate objectives of sustainable forest management. Convergence of all schemes of Ministry of Tribal Affairs and Ministry of Rural Development can bring expected outcomes where the Forestry Extension Officer of Department (to be created) can take the role of a facilitator.

11. Strengthening Science and Technology for Forestry and Climate Change Research, Extension and Networking

There is a need for greater coordination and collaboration between the Central and State Forestry Research Institutes. Even collaboration amongst international research centres and universities under different bi-lateral and multi-lateral arrangements are essential for high quality research, particularly on issues and challenges of international dimensions like climate change, biodiversity, combating desertification, etc. The Indian Council of Forestry Research and Education (ICFRE), is the nodal institute for undertaking the holistic development of forestry research through need based planning, promoting, conducting and coordinating research and extension, covering various aspects of forestry.

One of the strategies for the 12th Plan should be to support schematically the research efforts on a sharing basis with technical networking and collaboration between all institutions under a central Body/Forum. Reorientation of ICFRE on the line of ICAR and augmentation of funding are important steps to be taken up during the Twelfth Five Year Plan.

12. Strengthening National Information Repository and collaborative Institutional Net-Work for Forestry and Biodiversity

The Forest Survey of India (FSI) is a premier national organization, responsible for assessment and monitoring of the forest resources of the country regularly. FSI also functions as a nodal agency for collection, compilation, storage and dissemination of spatial database on forest resources. Most of the States have developed their scientific and techno-

logical capability for advanced survey, data management and monitoring related to Forests cover, forest carbon stock, status of coral reef, mangroves, wetlands, wildlife and drainage characteristics. There is a need for coordination and collaboration between State and Centre efforts for continuous comprehensive data management and technology transfer. Madhya Pradesh has developed advanced forest-fire monitoring system. Gujarat has excellent data management and survey report on the status of its coral reef and mangrove forests. In the context of sustainable and inclusive economic development, reliable dynamic information back up to meet the inevitable challenges from climate changes, disaster, biodiversity loss, reduction of ecosystem resilience, depletion of mangroves, negative socio-political fallouts like left wing extremism etc. is required.

The strategy would be to establish a comprehensive network taking all the institutions on board. There should be a provision of continuous strengthening of its scientific and technology base to develop an open and transparent National Repository of Information and Forestry Data management network to support decision making in the 12th Plan. FSI can serve as the nodal institute to collaborate and coordinate these efforts.

13. Cross-sectoral synergy and convergence of integrated execution of schemes

In the 11th Five Year Plan, there have been many instances of non-convergence and lack of synergy between different schemes. Intra-ministerial as well as inter-ministerial synergy and convergence of schemes would result in better outcomes and delivery to the people. In the 12th Plan, synergistic and comprehensive implementation of different schemes would be the strategy for maximum output. An informal forum for intra and inter-Ministry coordination to develop Integrated Investment Framework for convergence of schemes must be developed in the 12th Plan including tentative earmarking of funds under convergence of scheme to facilitate planning and implementation of plantations and their maintenance so that forest department / Forest Development Agencies can do the planning in advance.

14. Forest Certification

Forest Certification has emerged as a market-driven mechanism in support of Sustainable Forest Management (SFM). Certification initiatives rely on consumers exercising purchasing choice in favour of products labelled as originating from forests certified as being sustainably managed. Certification and Eco-labelling are the new mantras to enhance the product positioning for a premium price on the one hand and ensuring better forest management practices on the other. The subject of Certification is emerging very fast and promotion of certification of NTFPs including medicinal and aromatic plants has many direct and indirect benefits. Activities initiated by some of the national institutes such as IIFM in this regard can be taken as a benchmark and the Ministry of Environment and Forests can take forward the initiative to have a proper mechanism in place for forest product certification.

15. International Cooperation and Commitment for Sustainable Natural Resource Management to achieve Millennium Development Goal

There is a need for greater cooperation in forestry and wildlife between developed countries and developing countries to achieve common global goals. India being a signatory to the major International Conventions on forestry and wildlife, it is imperative to have proper understanding of their impacts on India's internal policies and programmes. This calls for institutionalizing the approach for taking a more systematic and proactive stand during future international negotiations. It is important to have an institutional arrangement and proper mechanism to develop negotiating capability, research and data back-up, think-tank for critical analysis etc., including follow up, monitoring and reporting on International Conventions, Treaties, bilateral agreements, MoUs, etc.

The steering committee recommends establishment of a Centre to work as 'Multi-stakeholder Forestry Forum' (MFF) for continuous analysis, consultation, evaluation, and to strategize development of country's position in respect of important international conventions and agreements. The Centre/ Forum will also help in drafting and finalizing inputs for

specific meetings of the sessions of international conventions and agreements in collaboration with other institutions and stakeholders, wherein India is participating. The Centre of Forest Policy and International Cooperation Studies (MFF) is proposed to be established in Delhi under MoEF, which will enable participation of all concerned ministries, departments and research organizations of the Central and State Governments, reputed scientific and educational institutions in the private sector, and individual experts and subject matter specialists outside government. The Group has identified few Constraints in International Cooperation, which can be strategically overcome in the 12th Five Year Plan. These challenges include inadequate capacity, lack of institutional network, inadequate collaboration/partnership with international institutions, lack of continuity of officials/ad-hoc approach, and lack of specified budget to meet expenses/annual contributions for international organizations such as International Tropical Timber Organization (ITTO), International Network for Bamboo and Rattan (INBAR).

The recommended strategies are intended to strengthen the institutional framework and build capacity to negotiate in respect of international instruments and ensure follow up of compliance, monitoring and reporting besides development of a platform for regular interaction of experts and stakeholders, improved follow up of international commitments and better implementation of our obligations and futuristic orientation of our approach.

16. Development of Integrated Investment Framework and innovative augmentation of finances to the Sector

The sector remained perpetually deprived of funds for major part of the 9th, 10th and 11th Five Year Plan period. During 11th Plan, there has been a major reduction in the allocation. At present, total allocation to the forestry sector varies from 0.6 - 0.7% of the total budgetary outlay of the Centre and State as compared to 2% allocation in China.

The midterm appraisal of 11th Five Year Plan by Planning Commission recommends that 5% of total annual outlay (Central and State) should be allocated for the environment and forestry sector. It has become necessary to find ways and means to generate funds for forestry and wildlife sector to make our economic growth more environmentally sustainable. The Following steps are suggested to augment the financial flow into the sector.

There is worldwide acceptance of the ecosystem services of forests like hydrological benefits, soil conservation, flood control, carbon sequestration, access to clean air and water, climate stabilization, biodiversity conservation, etc. The forestry sector needs to be looked at differently especially for ecological services, rather than focusing on tangible outputs. The sector must be compensated for the ecological services it provides. Initially, a fee of at least 5% on the values of the services generated from dams/ power generation, oil/gas/ coal may be stipulated in forest clearance of projects under Forest (Conservation) Act 1980. The fees collected need to be ploughed back in the forestry sector for its conservation and development.

There is need for creation of "Green fund" by pooling forest development tax (About 5% of value) levied on sale of forest products, 3% forest conservation tax levied on the sale of petroleum products/ coal and similar taxes like Eco-tax in Himachal Pradesh, which may be utilized specifically for forestry activities.

There is also need to attract funds from international institutions / bodies/ organisations for carbon sequestration, REDD+, biodiversity conservation etc. to enhance the domestic investment for afforestation and to pass it on to local communities for their role in conservation and development of the forests.

Multi-Stakeholder Partnership involving industries (requiring forest based raw material) for pooling of financial resource, Forest Corporations for implementation and local JFM Committees for participation in the afforestation of the degraded forest lands in a phased manner holds the key for optimum utilization of land capability and optimizing its productivity.

Big business houses/ corporate houses/ Public Sector Units should provide funds for conservation and development of

forest under their Corporate Social Responsibilities. This has been supported by the Permanent Parliamentary Committee on Environment & Forests and Science & Technology.

17. Streamline and leverage implementation of FRA, Provision of Panchayats (Extension to Schedule Areas) Act (PESA) and Biodiversity Acts through Amendments of Forestry Working Plan Code

Considering that the primary objective of the 12th Plan is inclusive and sustainable growth, the economic inclusion of fifth and sixth schedule areas corresponding to 188 tribal districts in the country is very critical. Empowerment of local bodies in far-flung areas of the country would definitely improve the governance framework needed to achieve inclusive growth. As one-third population of our country derives some portion of their livelihood in one form or another from forest, forest resource augmentation and sustainable management through a participatory management assumes greater significance. Joint Management and usufruct sharing are preconditioned by conferment of rights to the stakeholder (forest dwellers and tribal population). The country has taken a number of legislative measures to confer the rights of forest land, NTFP Management and Biodiversity to democratically-elected local bodies. However, as no activities other than those prescribed in the Forestry Working Plan are permitted in the forest, these measures are required to be imbibed in the Working Plans. Hence, the Working Plan code needs immediate revision in view of changing scenario incorporating the contemporary issues. The strategy of the 12th Plan would be to amend the Working Plan Code to incorporate new dimensions along with assigning specific responsibility to the cutting edge level workers for transferring the rights in the field with proper documentation. It is recommended that the working plan should reflect a scientific temperament by engaging scientific manpower, i.e., Ecologist, Taxonomist, Bio-Engineers and Sociologist, etc. A committee of experts should evaluate the working plans and monitor its implementation on regular basis.

18. Revamp and strengthen the institutional mechanism for effective delivery

There has been a paradigm shift in management of forests and the participatory approach to community involvement specially in biodiversity and NTFP management. Several Acts have conferred the rights of management, harvesting and marketing to the local communities/Gram Sabha and local elected bodies of Panchayats and Municipalities. On one side it requires their capacity building and on the other, building of the institution for effective delivery. Sensitization and awareness building of local bodies at the cutting edge level are as important as organizational motivation for the Forest Department. There is a strong need to have a strategy framework to institutionalize training, awareness and capacity building for local bodies in the 12th Plan. Funding can be assured through convergence of different schemes of the MoTA, MoRD, and Ministry of Panchayati Raj.

19. Scientific and transparent GPS-based evaluation and monitoring in GIS format and social auditing

Openness and transparency of implementation enhances the credibility of the institution. This can be improved manifold through technological upgradation of our evaluation and monitoring system. Geo-referencing of field works with the use of GPS and management and spatial data on GIS format removes bias and improves the authenticity of evaluation and monitoring. Continuous data management over a time line also enhances modelling as a better policy tool for decision making. In the 12th Plan, there is an increasing need for transparency in implementation, monitoring and evaluation of schemes and for optimum delivery. Social and third party auditing should be made mandatory for all schemes.

2.3. Wildlife

- 2.3.1. Identification and notification of critical Wildlife habitats (CWHs) in national parks and wildlife sanctuaries under the FRA and provision for voluntary relocation are important. FRA requires devolution of forest rights on eligible individuals and communities as provided under this landmark Act even inside the protected areas barring the CWHs. To enable the State Governments to meet this requirement of determination and notification of CWHs, draft guidelines have been formulated following an open and transparent process involving all important

stakeholders. The draft guidelines have been sent to the Ministry of Tribal Affairs for concurrence. The guidelines contain an important section on 'voluntary relocation' also.

2.3.2. Identification and notification of eco-sensitive zone (ESZ) in respect of national parks and wildlife sanctuaries, (WSs) is a requirement mandated by the Supreme Court orders. All project proposals requiring environmental clearance and falling within ESZ of NPs and WSs require recommendation of the Standing Committee of the National Board for Wildlife (NBWL). In the absence of a specifically determined notified ESZ around NPs and WSs, areas falling within a distance of 10 km from the boundary of such PAs constitutes the ESZ. Guidelines have been issued to the State Governments for identification and notification of ESZ around NPs and WSs.

2.3.3. Need to reduce human-wildlife conflict

- With continued need for development, the wildlife habitats are coming under increased anthropogenic pressures. This results in wildlife is spilling over non-traditional habitats giving rise to human-wildlife conflict. In this context, conflict with tiger, leopard, elephant, bear and blue bull has attained serious proportion in different parts of the country. Delayed response including paltry and late disbursement of ex-gratia coupled with inadequate state of capability and preparedness of the forest field staff has compounded the problem manifold. There is need to leverage financial and technical resources for ensuring quick and adequate response to the incidents of loss of life and property due to wildlife attacks and depredation, duly backed by appropriate policy framework.

- Enforcement of zoo regulations to improve zoo management across the country

Effective implementation of Zoo regulations by the State Governments will require good financial and technical support from the Central Government. Needless to say management of most zoos in the country is not up to the mark, and so is the case with most rescue centres sheltering sick, injured, infirm and old wild animals.

- Constitution of State Animal Welfare Boards (SAWBs)

Most States have not been able to put in place an effective SAWB with the result that abandoned domestic as well as stray animals create problems in congested market places and cities. Dog bites and monkey menace in urban and rural habitations continue to be areas requiring attention and support of the Central Government.

The policy gaps identified in the ecotourism policy sector are as follows:

- Ecotourism policies often conflict with policies of the tourism sector. For example, tourism policy promotes infrastructure development and minimal environmental regulations, whereas ecotourism policy mandates minimising new infrastructures and implementing environmental norms.
- Role of government and other institutions are not specified – there is no nodal agency for ecotourism, except in Kerala.
- There is a conservation bias which ignores the need to protect and promote local livelihoods.
- It lacks clear and measurable indicators to monitor the impact of ecotourism on ecological and socio-cultural parameters.
- There is an absence of links between monitoring and regulation, and a lack of incentives for the same.

2.4. Biodiversity and Ecosystems

In the 12th Five Year Plan, implementation of Biodiversity Act, 2002, FRA, 2006, and PESA 1996, etc. in letter and spirit is extremely important for inclusive and sustainable growth of our economy. Economic inclusion of these areas is possible through smooth transferring the management and marketing responsibility of NTFP to Gram Sabha and local elected bodies. Creation of a village cadre/appointment of Village Forest Extension Worker or Village Green Guard at the Forest Department-Villagers interface is very important. This cadre can bridge the gap between forest administration and local elected bodies and act as facilitator for the community.

Biodiversity assessment depends upon systematic biology that includes taxonomy. The numbers of taxonomists are rapidly declining and the country does not have experts in some groups of plants, animals and microbes. The strategies for overcoming the shortage of taxonomists are to:

- (i) strengthen BSI and ZSI in terms of infrastructure and manpower;
- (ii) to develop centres of excellence in systematic biology; and
- (iii) to promote national and international linkages in taxonomic research.

The second largest threat to biodiversity is biological invasions by alien species (invasive species). The strategy to meet the challenge of invasive species in terrestrial and aquatic ecosystems is to initiate a programme on management of invasive species.

Marine biodiversity, which is rapidly vanishing, needs to be assessed, monitored and conserved. The strategies to achieve this are long term monitoring, sustainable harvests of sea resources and restoration of mangrove and coral ecosystems.

The ecological services and goods are generated through ecosystem processes and the resilience of ecosystem depends upon its biodiversity, both of which are critical for sustainable development. Information is lacking on these aspects. The strategy is to generate knowledge on the ecosystem dynamics and function through research on ecosystems, biodiversity and sustainable development. To achieve this, an institute for research on ecosystem, biodiversity and sustainable development is proposed under MoEF.

2.5. Climate Change

2.5.1. The Planning Commission has outlined its approach to the challenge of climate change in chapter V- Sustainable Management of Natural Resources- of the Approach Paper for the 12th Plan. The Approach Paper calls for implementing the activities outlined under various missions of the National Action Plan on Climate Change and a low carbon mitigation strategy.

Goal of Sustainable Development and National Action Plan on Climate Change

2.5.2. The National Action Plan on Climate Change launched in 2008 embodies the government's vision of addressing the challenge of climate change through a process of sustainable development. The goal of NAPCC is to enhance ecological sustainability of our development path. This is sought to be achieved through eight National Missions and several other specific initiatives in the relevant sectors.

2.5.3. Domestic Mitigation Goal

In 2009, the goal of sustainable development was supplemented by a domestic mitigation goal of reducing emissions intensity of GDP that enjoins upon the government to endeavour to reduce emissions intensity of GDP by 20-25% by 2020 in comparison with 2005 level. This was an advance over the approach taken in the 11th Plan where concern on

climate change was expressed in the form of a limited reference to the objective of improving energy efficiency by 20% by 2016-17.

2.5.4. Strategy for 12th Five Year Plan

- Considering the vulnerability of a large number of sectors to climate change and their adaptation needs, a well-defined strategy should be adopted during the 12th Plan to achieve the objective of various Missions under the National Action Plan on Climate Change, and the goal of a low-carbon inclusive growth strategy.
- An effective strategy for addressing climate change should permeate the planning process at three levels. Firstly, in articulating the overall approach of the Five Year Plan, the considerations of sustainable development and lower carbon inclusive growth should be integrated in all sectors. Secondly, in specific sectors which are considered particularly vulnerable to climate change, a climate change adaptation strategy should be built into their respective plans. Lastly, in the Environment and Forests sector, specific schemes and programmes should be launched to strengthen the capacity for making scientific assessment, GHG measurement and monitoring, and achieve environmental protection through a coherent strategy of adaptation and mitigation actions.
- An optimal way of achieving this would be to integrate the objectives of the NAPCC and the domestic mitigation goal in the development strategy of the respective sectors. In the area of adaptation, this calls for specific policy initiatives across a wide variety of sectors, particularly in the areas of agriculture, water, health, coastal management, forests and other ecosystems, energy including renewable energy, and infrastructure and climate change assessment. The strategy, to be effective, must reflect the needs and priorities of the state governments who should be involved in the process. Further, an appropriate mitigation strategy will need to be drawn up at the national level. This should be implemented through an appropriate mechanism that should decide, finance and administer the process of achieving the domestic mitigation goal. The mechanism will need to involve the concerned Ministries and agencies which have the ability to influence the course of emissions emanating from consumption of fossil fuels and/or switch to alternative sources of energy or cleaner energy technologies. Considering the domestic needs and international obligations, other specific programmes and activities regarding scientific assessments and strategy will also be necessary to sustain the efforts scientifically and systematically over a longer term.
- The key actions needed to achieve this objective are (i) establishing a framework of policy and institutional arrangements and provision of financial resources for implementation of national Missions under the NAPCC, (ii) preparation of a mitigation strategy and institution of an implementation mechanism for a lower carbon inclusive growth, (iii) building and strengthening the institutional capacity for scientific research into climate change including observation of ecological changes and assessment of climate change, and (iv) involving States in implementing Action Plans on Climate Change at the state level.

2.5.5. Integrating the NAPCC in the Sectoral Plans

As the specific missions have already been approved by the Prime Minister's (PM's) Council on Climate Change, the nodal ministries will need to build the approved activities in the relevant sectoral plan of the Ministry. Specific areas included in the NAPCC are renewal energy/solar energy, enhanced energy efficiency, agriculture, urban habitat, water, Himalayan eco-system, forest cover, and strategic knowledge-base. Besides the eight specific Missions, there are several other initiatives in the area of research, energy, disaster management, coastal management etc. which, if implemented, will help achieve the objectives of the NAPCC. It is necessary to analyse the vulnerability of each of these sectors, and

devise appropriate interventions at the scientific, policy and institutional level. The required resources for implementing the objectives of each of the National Missions also have to be projected and agreed as a part of the 12th Plan.

2.5.6. Lower carbon mitigation strategy for inclusive growth

With a view to enable the industry to grow sustainably while protecting the environment, a clear strategy for achieving the domestic mitigation goal has to be formulated during the 12th FY Plan. This requires that the potential of relevant sectors is studied through a well-planned exercise to reduce emissions relative to output and the cost of implementing such policy measures and actions is assessed and provided for in the course of the 12th Plan. To fulfill this objective, a set of nationally appropriate mitigation actions in various sectors will have to be identified and implemented through a nationally coordinated policy. A national mechanism for identifying and financing such actions will be needed. Besides, a national system for GHG emissions monitoring and management will also have to be put in place. The existing system for preparing and reporting the national GHG inventory will need to be enhanced and suitably equipped in order to meet the international obligations to submit national Communications (NATCOMs) at periodical intervals. This will also include a process of periodical (biennial) update of inventories and evaluation and assessment of the impact of the mitigation actions on the national goal.

A major barrier in designing policies for low carbon growth is the absence of reliable information on the external costs of pursuing different activities. For example, in the energy sector, if the external /social costs (including carbon emissions) of using different fossil fuels are computed and internalized in the energy prices, then the extent of subsidies needed for promotion of renewable energy will be lower and an informed pricing policy can be evolved.

2.5.7. Strengthening scientific research capacity and strategic knowledge for climate change observation and assessment

Strengthening the capacity to assess vulnerability and impacts of climate change and conduct scientific studies of the ecological changes in different sectors such as agriculture, coastal areas, water etc. are critical to support the climate change related policy interventions. These require setting up of specific programmes and institutions by various Ministries. The 12th Plan will have to be geared to put in place scientific observation systems and launch specific programmes to build up and enhance such capacity.

2.5.8. Implementing climate change related actions at state level

The involvement of States in implementing the NAPCC through preparation of state level action plans is another important consideration in formulating a cross sectoral strategy. State Governments are currently preparing State level Action Plans for climate change (SAPCC) and adequate provisions will have to be made in the 12th Plan either through the developmental plans of the concerned State Governments or the nodal ministries to support the SAPCCs.

3. Regulatory Mechanism and Assessment

The existing regulatory framework for sustainable development in the sectors under consideration are elaborated in the policies, regulations and programmes of the Ministry of Environment and Forests. A brief on the same is presented in this chapter.





3.1. Environment

- 3.1.1. The introduction of legislative measures for pollution control in the country commenced with the enactment of the Water (Prevention and Control of Pollution) Act, 1974, Air (Prevention and Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and recently the National Green Tribunal Act, 2010. To implement these legislations, the Ministry formulated various regulatory instruments (e.g., environment standards, consent administration, authorization, environment clearances, etc.) and created institutional infrastructures at the national, regional and state levels in the form of Central Pollution Control Board (CPCB), regional offices of MoEF and CPCB, State Pollution Control Boards/Pollution Control Committees (SPCBs/PCCs), State Department of Environment, and Environmental Research Institutes/Organizations, etc. Other new regulatory tools to address industrial pollution include Industrial Self-Monitoring, and Representing Verification (MRV) and third party audit.
- 3.1.2. The Environment (Protection) Act has been in force since 1986. Even after 25 years, the penalties mandated for environmental violations remain unchanged. These penalties no longer act as a deterrent to defaulting industries. Given the inflation and increasing administrative costs, the rate of penalties are required to be hiked upwards and made as an effective deterrent. Further, the effectiveness of SPCBs enforcement efforts is limited.
- 3.1.3. Some States have employed a bank guarantee to ensure compliance with the SPCB directives on consent to operate. Under this, the non-complying firm needs to post a bank guarantee to ensure implementation of the corrective actions within the stipulated timeframe. In case of non-compliance, the guarantee is forfeited. This acts as a powerful monetary penalty for a violator and a deterrent against future non-compliance. The section 5 of the E (P) Act related to issue of directions needs to have provision for furnishing of suitable bank guarantee to ensure environmental compliance. Such bank guarantee also needs to be obtained upfront at the time of grant of environmental clearance for developmental projects.

- 3.1.4. Self-monitoring in industries and reporting and verification process need to be refined and appropriate provisions are needed to be included in the E (P) Act itself. Disclosure statements need to be put in the public domain to ensure oversight by the civil society and its appropriate linkage with the regulatory regime. Enabling provisions are required to be made in the E (P) Act for regulatory authorities to levy and collect fees for providing specific services. These measures would improve the financial health of these agencies and thus, make them more effective.
- 3.1.5. New draft Rules on Bio-Medical Waste Management have been prepared replacing the existing Bio-Medical Waste (Management and Handling) Rules 1998 and its Amendments. The new draft Rules are expected to be comprehensive and inter-alia cover:
- Listing of identified authorities and their corresponding duties for implementation of the Rules.
 - Changes to simplify and rationalize the colour coding system for disposal of bio-medical waste.
 - Modifications in the Categories of Bio-Medical Wastes and their treatment and disposal options.
 - Changes in the format for submissions of Annual Report by the State Pollution Control Board and It is also proposed to cover all the Health Care Establishments, irrespective of the number of patients serviced per month for obtaining authorization from the Prescribed Author.
- 3.1.6. The Hazardous Wastes (Management and Handling) Rules, 1989 and as amended thereafter were re-visited in 2007 and the Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2008 were published on 24th September, 2008. At present, these rules are the main instrument to ensure proper management of hazardous waste in the country.
- 3.1.7. In order to streamline the EIA process, the Ministry has undertaken re-engineering of Environmental Clearance (EC) Process and issued an Environmental Impact Assessment Notification in 2006 and amendment in 2009. This notification replaces the earlier EIA Notification, 1994. Under this Notification, developmental activities have been categorized into Category 'A' and Category 'B' based on potential impacts instead of investment criteria. Category 'A' projects/activities will be appraised at the Central level by Expert Appraisal Committees while Category 'B' projects/activities will be appraised at the state level by the State Level Environmental Impact Assessment Authority.
- 3.1.8. At present, e-waste management is regulated under the Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008. Since e-waste is one of the fastest growing waste streams in the country, a need for separate rules on e-waste management was felt. The Ministry has notified the E-waste (Management and Handling) Rules, 2011 on 12th May, 2011. These rules will be effective from 1st May 2012. The concept of Extended Producer Responsibility (EPR) has been enshrined. Accordingly, producers are required to set up collection system and meet the costs involved in the environmentally sound management of e-waste generated from the 'end of life' of their own products.
- 3.1.9. Draft rules on Hazardous Substances (Classification, Packaging and Labelling) Rules, 2011 have been notified inviting public comments and suggestions. These rules will give guidance to the manufacturers and transporters for assigning hazard classes, use proper shipping name, suitable packaging, requisite label, marking and use of updated Safety Data Sheet for transportation.
- 3.1.10. In 2010, the MoEF notified the Wetlands (Conservation and Management) Rules for conservation and management of wetlands and to stop their degradation. The Wetlands Rules, 2010 ban activities like industrialization, construction and dumping of untreated waste near wetlands.

3.2. Forests

- 3.2.1. The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, passed in 2006 is a landmark legislation that aims to undo the historical injustice done to tribals and other forest dwellers by recognition of their forest rights. The historic significance of the Act was because forest laws often deemed tribals and other forest dwellers “encroachers” or criminals for exercising their customary rights. The Forest Rights Act (FRA) was intended to address this situation by providing legal recognition to forest dwellers’ rights, while making forest management more open and participatory.
- 3.2.2. However, it has not yet succeeded fully in achieving its objectives, because of some difficulties in implementation which have in turn resulted in the majority of claims by forest dwellers in many States being rejected. In some States, rejection rates are higher than 60%. The failures to recognize community rights, especially to Minor Forest Produce, have been even more widespread. Due process in deciding on the claims has been compromised in many cases, and specific documentary evidence is being insisted upon, contrary to the letter and spirit of the law. The Gram Sabhas are not being held at the village or community level as required by the law, and where these are held, their recommendations are often not given sufficient weight. One of the key innovations of the Act was to provide recognition to communities’ rights to use, protect and conserve community forest resources. This was intended to be a first step to shift towards a democratic frame of forest governance. Yet, these rights have not been recognized in almost all the states.
- 3.2.3. The Panchayats (Extension to Scheduled Areas) Act (PESA) was passed in 1996 by the Indian Parliament as a means to recognize the dire need to protect the rights and resources of the communities in Schedule V areas and upholding their right to self-governance (Dandekar and Choudhury 2010). PESA recognized the Gram Sabha (a habitation was the natural unit of the community, and its adult members constitute the Gram Sabha, as against the elected gram panchayat) to be pre-eminent. The gram sabha was recognized as being competent to act on a range of powers.
- 3.2.4. Forests, wildlife and dependent communities have been given their due recognition in our Constitution. Special status to the Fifth and Sixth Schedule areas, conferring autonomy of natural resource management to the traditional forest dwellers and assigning the responsibility of safeguarding the forests and wildlife to States under Article 48A, bear testimony of such recognition. Fundamental duties with respect to protection of natural resources are also added to the Constitution through 42nd Amendment under Part V – A of Article 51, which reads as “It shall be the duty of every citizen of India - (g) To protect and improve the natural environment including forests, lakes, rivers and wild life, and to have compassion for living creatures”. Forest is included in the Concurrent list of our Constitution.
- 3.2.5. Concomitant with the domestic Forest Policy, the country also honours the international commitment for sustainable natural resource management and inclusive growth embracing the Millennium Development Goals. Apart from all legally binding and non-legally binding commitments, the country in the last decade experienced a paradigm shift in its domestic legal landscape too. The Indian Forest Act, 1927 and Wildlife Act 1972 have been amended with respect to their penal provisions and constitution of statutory bodies for the protection of forests and wildlife. There has also been changes in the provision of Forest Conservation Act 1980 to accelerate the infrastructural development in Left Wing Extremism affected Districts. Few legislations related to ownership right to forest produces, NTFP, forest land and biodiversity etc. were enacted to empower the local bodies like Gram Sabha and Municipal bodies. These Acts are Forest Right Act., 2006; Panchayatraj Extension to Scheduled Areas Act (PESA), 1996; Biodiversity Act, 2002, etc.

- 3.2.6. Presently, our forests are administered by the officers of Indian Forest Service (IFS). The authorized cadre strength of IFS is 3079 (2146 Direct Recruits and 933 Promotion posts). Cadre management in all the States is not uniform. As a result, many of the States the officers suffer from stagnation (without promotion to next higher posts). Officers in many States are not promoted for 10 -15 years after crossing the eligibility. Stagnation is seriously impeding the professionalism of the officers and is a major cause of low morale of the organization. When the entire dynamics of forestry management are changing, the process change in the organization has taken a beating because of low morale of staff and lack of individual and organizational motivation. Much of the success of JFM and Community Forestry depends on the motivation and organizational sensitization about the process change in the Department.
- 3.2.7. Implementation of programmes related to bio-diversity, ecosystem rehabilitation, restoration of wet-land etc. are currently delinked from the institution (Forest Department) in whose jurisdiction they exist. The responsibility to manage and execute programmes are delegated to other organizations. In the 12th Five Year Plan, a balanced and pragmatic view is to be taken to make the institution deliver in the system.
- 3.2.8. Administration of forest field staffs at the cutting edge level has become extremely difficult over years of neglect in addressing their genuine problems. They are now crippled by the following circumstances:
- Majority of forest staff have crossed the age of 50 yrs and are on the verge of retirement.
 - More than 20 to 40 percent posts of the field staff are vacant across the length and breadth of the country.
 - Old staff are not motivated and sensitized for participatory forestry management.
 - The field staff are stationed in far flung remote areas of the country and mostly lack basic amenities, for education of their children, accommodation, patrolling, medical facilities etc. Forest staff are not given ration allowance like other protection force working in similar dispositions. Their counterparts in Police and other Defence Departments are provided with most of these facilities.
- 3.2.9. In the 12th Plan, with the increase in plantation target and required escalated efforts for sustainable management of forests, wildlife, ecosystem and biodiversity with the participation of community, a critical review and strengthening of forestry administration at the cutting edge level would be the critical determinant.
- 3.2.10. In the 12th Five Year Plan, implementation of Biodiversity Act, 2002; FRA, 2006, and PESA 1996 etc. in letter and spirit is extremely important for inclusive and sustainable growth of our economy. Economic inclusion of these areas is possible through smooth transferring the management and marketing responsibility of NTFP to Gram Sabha and local elected bodies. Creation of a village cadre/appointment of Village Forest Extension Worker or Village Green Guard at the Forest Department– villagers, interface is very important. This cadre can bridge the gap between forest administration and local elected bodies and act as facilitator for community management of forest resources.

3.3. Wildlife

- 3.3.1. The Wildlife (Protection) Act, 1972 is the umbrella legislation for wildlife conservation in the country. The Act has been amended in the years 1982, 1986, 1991, 1993, 2002 and 2006 to keep pace with the changing dynamics of wildlife law enforcement and management. A new amendment is likely to be presented before Parliament during 2011 for its consideration. The salient features of this proposed amendment include the following:
- Inclusion of a new chapter in the Act in consistence with the provisions of the Convention on Interna-

tional Trade in Endangered Species of wild fauna and flora (CITES). The terms, phrases and definitions etc. in the Chapter would have the same meaning as these have in the Convention. As one of the earliest members of the Convention, it is a much-needed step for India to bring in relevant legislation to facilitate implementation of CITES.

- Enhanced penalties for wildlife offences.
- Statutory prohibition on the use of animal traps, commonly used for poaching.
- Facilitation of scientific research on wildlife in protected areas.

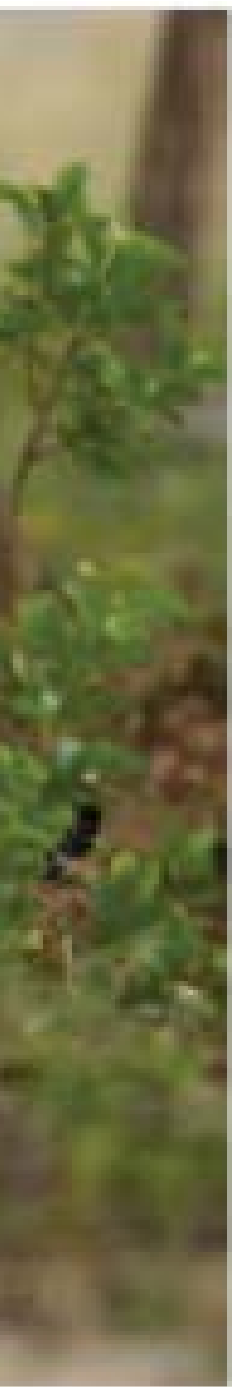
3.3.2. Separately, an EFC proposal is being moved for creation of a National Elephant Conservation Authority to secure effective protection and conservation of wild elephants in the country.

3.3.3. Animal Welfare: The main functions of Animal Welfare are performed by the MoEF through the Animal Welfare Board of India (AWBI), which is a corporate body constituted under section 4 of the Prevention of Cruelty to Animals Act (1960). Though some of the States have constituted Animal Welfare Boards at the State level, there is a need to have such Boards in all the States. Moreover, as per a Supreme Court direction, and as per the Prevention of Cruelty (Establishment of Societies for the Prevention of Cruelty to Animals) Rules, SPCAs have to be established in all districts within all States.

4. Existing Schemes

There are various centrally sponsored and central sector schemes undertaken for the sectors under consideration, a brief on the same is presented in this chapter.





- 4.1. Pursuant to directions from the Planning Commission and the Finance Ministry, large number of ongoing Plan schemes of the Ministry were clubbed/merged into 22 broad thematic schemes as a measure of rationalization exercise carried out by the Ministry for its 11th Five Year Plan.
- 4.2. Out of these, the following 9 schemes pertain to “Environment and Ecology,” six schemes being central sector and three being centrally sponsored-schemes. The 9 thematic schemes involve 36 individual schemes/programmes:
 1. Environment Monitoring and Governance (CS)
 2. Pollution abatement (CS)
 3. R&D for Conservation and Development (CS)
 4. Conservation of Natural Resources and Ecosystems (CSS)
 5. Environmental Info, Education and Awareness (CS)
 6. Environment Management in Heritage including Taj Protection (CSS)
 7. International Cooperation Activities (CS)
 8. National Coastal Management Programme (CS)
 9. National River Conservation Plan (CSS).
- 4.3. The following 7 thematic schemes pertaining to forestry, with each scheme having further components / programmes, were approved by the Planning Commission for the 11 th Plan of the Ministry:
 10. Intensification of Forest Management (CSS)

11. Grants-in-aid to forestry and Wildlife institutions (CS)
12. National Afforestation Programme (CSS)
13. National Afforestation and Eco Development Board , NAEB (CS)
14. Capacity building in forestry sector (CS)
15. Strengthening of Forestry Division (CS)
16. Gregarious Flowering of Muli Bamboos (CSS)
17. Afforestation through PRIs (Panchyath Van Yojna) (CSS)

4.4. The following 5 thematic schemes fall under “Wildlife”:

18. Strengthening of Wildlife Divisions (CS)
19. Integrated Development of Wildlife Habitats (CSS)
20. Project Tiger (CSS)
21. Project Elephant (CSS)
22. Animal Welfare (CS).

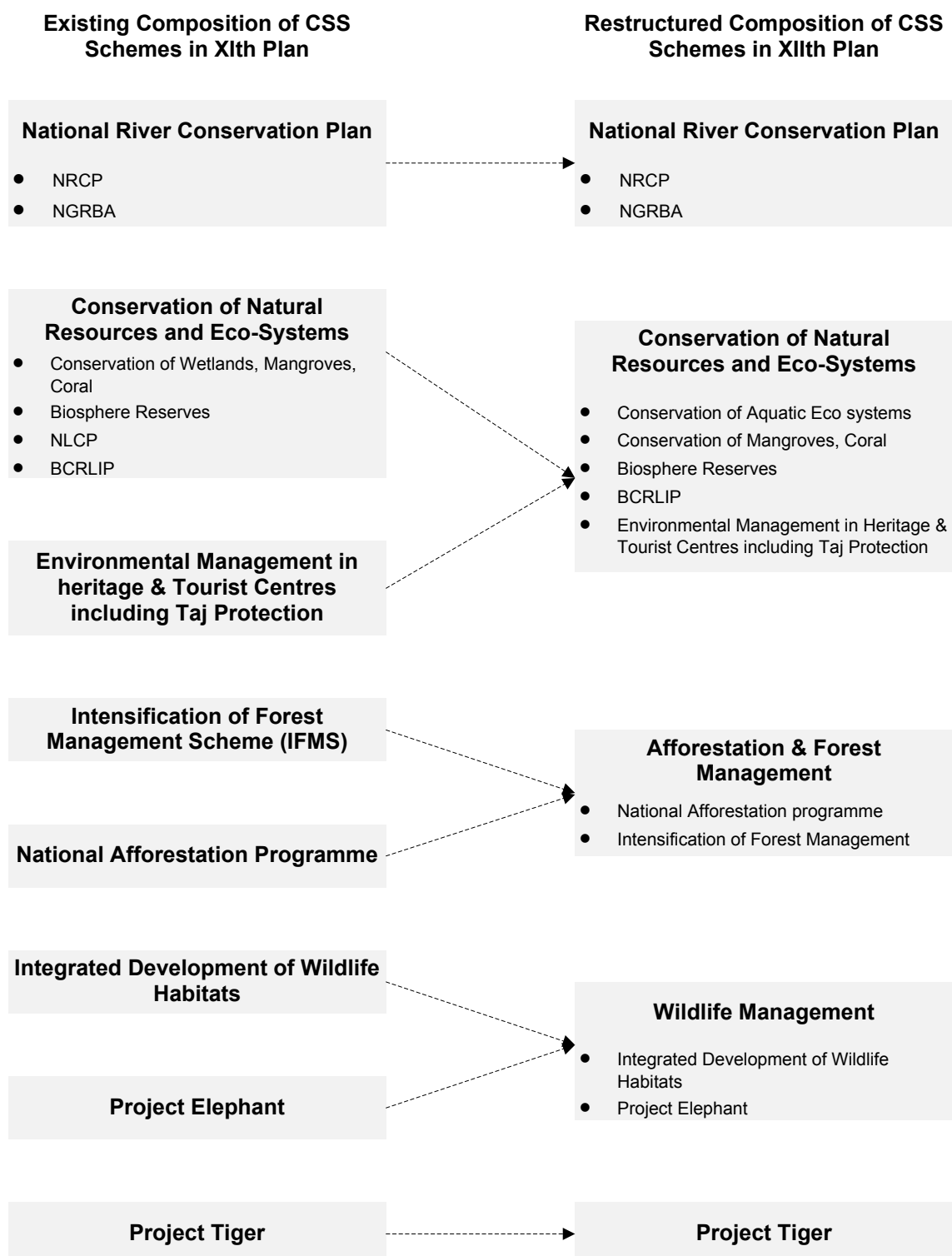
4.5. The following table gives the broad outlay and expenditure for the 11th and 12th Plan:

Plan Outlays/ Expenditure – (11th Plan and 12th Plan)

Sector	Sanctioned outlay 11th Plan 2007-12	Approved Outlay 11th Plan 2007-12 BE	Proposed Outlay 12th Plan 2012-17
1. Environment	1246.01	1913.34	11000.00
2. NRCD	2540.00	2760.75	6736.46
3. Forests & Wildlife	2943.99	2611.34	13949.73
4. NAEB	3150.00	1826.57	15600.00
5. Animal Welfare	120.00	119.00	300.00
Total (1-5)	10000.00	9231.00	47586.19

4.6. The rationalization of eight existing CSS schemes in the Eleventh Five year Plan to five in the Twelfth Five year Plan was carried out by suitable merger/clubbing as demonstrated in the next page:

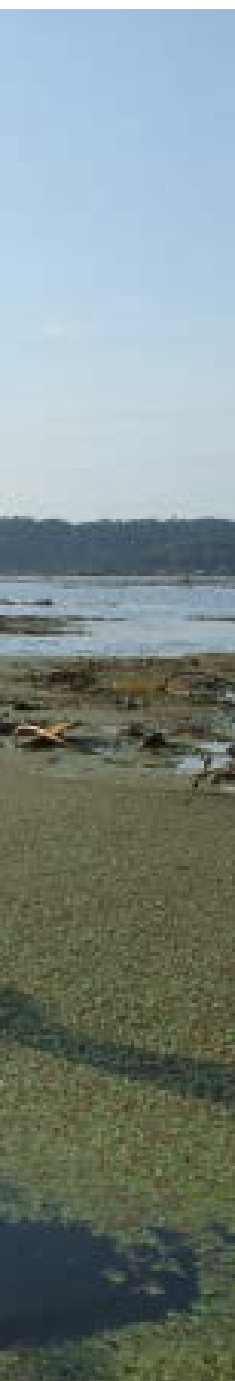
Figure 3: Rationalization of schemes from Eleventh to Twelfth Five year Plan



5. New Initiatives

It is suggested that some key schemes be strengthened and new schemes be introduced further during the 12th Plan to tackle current and emerging issues more effectively. This chapter presents key considerations in this regard.





5.1. Recasting the scheme of CETPs

In the light of operational deficiencies in the existing scheme of CETPs, the extant guidelines of CETPs are proposed to be revised for enforcement during the 12th Plan period. CPCB has initiated a study for "Inventorization of industrial clusters in the country and assessment of the unmet demand for CETPs". Based on the recommendations, a prioritised list of required CETPs will be prepared.

5.2. Enhancement of sewage treatment capacity

During the 12th Plan, concerted efforts would be made to complete the ongoing works of the 11th Plan under NRCP/NGRBA/NLCP. For effective enhancement of the capacity, requisite funds need to be made available either under the JNNURM/UIDSSMT and/ or under National River Conservation Plan. Technical and financial capacity of ULBs will also have to be suitably augmented for meeting both the capital and O&M requirements. States are also required to earmark allocations/mobilise necessary resources for funding sewerage infrastructure and their maintenance.

5.3. National Plan for Conservation of Aquatic Eco-Systems' (NPCA)

As per the latest recommendations of Expenditure Finance Committee, merger of NWCP and NLCP schemes into one integrated scheme entitled 'National Plan for Conservation of Aquatic Eco-Systems' (NPCA) is proposed with effect from 12th Plan Period, i.e., 1st April, 2012, with the objective of conserving aquatic ecosystems, namely, lakes and wetlands through implementation of sustainable conservation plans. The merged scheme is proposed to be implemented by National River Conservation Directorate in the MoEF in a mission mode with target-oriented implementation.

Rivers are under stress on account of pollution, diversion of flow and encroachment on flood plains. To ensure that the rivers remain in a healthy state, it is proposed that environmental flows be maintained at appropriate levels throughout the year. The various functions of the year including sustenance of aquatic life, livelihood and assimilation of unavoidable wastes will

thereby be enabled. It shall be endeavored that obstruction of water from the river shall be so regulated as to conserve the riverine ecosystems and enable the river to perform its functions.

Ganga river is revered in India as the holy river which supports the economic activity of the large part of the country. The Government of India has recognized the unique place of this river and has designated it as the National river as one of the National symbols. For the first time, the proposals for conservation of a river shall extend over its basin and include its tributaries. The National Ganga River Basin Authority constituted in 2009 has engaged a Consortium of seven Indian Institute of Technologies (IITs) to formulate the Environment Management Plan.

Recycle and reuse of sewage is not feasible when sewage treatment plans (STPs) are centralized systems to which sewage is conveyed over long distances involving intermediate pumping stations and outfall sewers. A decentralized sewage system offers opportunities to conveniently use the treated sewage and is hence recommended.

5.4. National Environmental Monitoring Programme

There should be a unified National Environmental Monitoring Programme as opposed to the separate, disparate programmes on forest monitoring, air quality and river and ocean pollution that currently exist. The NEMP should be focussed on tracking status and change in socially relevant biophysical parameters, and their social impacts, and on making this information available as widely as possible; it should be a real-time sharing of data on environmental parameters. The NEMP will consist of a mix of national, regional and local programmes and include the following:

5.5. National Forestry Information System

The National Forestry Information System should enable networking with States for tracking changes in forest development, harvesting, trade and utilization scenario with particular focus on issues of ownership and rights over land and forests.

5.6. Non-spatial database

A non-spatial database with records for each parcel of public land (forest and revenue) that indicate its settlement history and status, to complement a spatial database. In particular, this database should address the issue of implementation of Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act.

5.7. Invasive species

A national programme specific to invasive species needs to be launched. One of the aims of this programme should be to compile a national inventory of invasive species. A standardized protocol needs to be developed for the identification of invasive species using GIS and remote sensing technology. Invasive species identification should not be limited to invasives in forests – it should also include invasives in aquatic and marine ecosystems, grasslands, wetlands, etc. A national invasive species monitoring system to track the introduction and spread of invasives is needed. Such a system should be linked to the State Forest Departments and the field staff should be trained to collect information on invasives and feed it into the NEMP.

5.8. Coastal and marine conservation

Coastal and marine conservation in India requires not just substantial information to inform management and policy, but there is a critical need to integrate science with traditional knowledge systems and facilitate greater involvement of communities/community-based organisations in monitoring resource use, status, history and on-going changes. This

will lead to better information flow within and between target groups and ensure that the communities/resource managers are empowered to play their roles effectively in conservation. following require concerted efforts and attention during the 12th Plan:-

1. Creation of vital information on spatio-temporal trends of responses of ecosystem/species to human and climate induced variations by initiating long-term monitoring of ecosystems and development of valuable baseline information that will be critical in taking informed management decisions.
2. Understanding critical ecosystem processes, identifying and bolstering the inherent resilience of ecosystems to climate and manmade perturbations.
3. Evaluating impacts of resource exploitation (especially fisheries) on the functionality of coastal and marine ecosystems and evaluating the efficacy of different management practices.
4. Continuous monitoring of coastal biodiversity and digitization for sustainable utilization of marine bio-resources which calls for identification of institutions for implementing a national coordinated project through the concerned Ministry for assessing the coastal and marine biodiversity resources so as to plan sustainable use of the same.
5. Quantify XIth plan accomplishments on the success of mangrove plantations and the difficulties encountered including steps taken by States for both conservation and enhancement of corals and its biodiversity and fix targets for the same during the 12th Plan.
6. The potential of marine bio-resources towards commercialization of PUFA, vitamins, essential amino acids needs to be popularized and commercialized. Drug development from marine bio-resources needs to be intensified by studying potential marine organism like sea snakes. There are plenty of opportunities for offering additional and alternative livelihood options by promoting marine cage culture, marine ornamental fish culture such as clown and damsel, culture of algae and seaweeds towards organic fertilizers and growth promoters, microalgae towards bio-fuels, etc.

5.9. Valuation of Ecosystem Services and Biodiversity

In order to successfully and efficiently value ecosystem services and biodiversity, appropriate institutional mechanisms need to be developed, preferably by the Finance Commission, Planning Commission, Centre of Excellence in Environmental Economics and the Ministry of Environment and Forests. These institutional mechanisms should allow for effective implementation of compensation and green bonus schemes which aim to fix, monitor, negotiate and share payments. Any payments made should be based on negotiations between two parties.

Institutional mechanism for research on eco systems, bio diversity and sustainable development is vital for ensuring sustainability of eco system services and biodiversity maintenance and hence an institute for achieving this is a necessity.

5.10. Environmental Performance Index (EPI)

The Planning Commission is in the process of developing an Environmental Performance Index (EPI) to recognize environmental performance by states and devolve central funds accordingly. The index includes biodiversity conservation as a criterion of environmental performance and identifies indicators of biodiversity. The indicators chosen should be able to be measured, updated at regular intervals and compared against a baseline. The EPI represents a positive incentive

for the conservation and sustainable use of biodiversity.

5.11. Sustainable Livelihoods through NTFP Management

A new scheme called Sustainable Livelihoods through NTFP Management is proposed, which includes provisions for resource management, value addition, marketing, minimum support price, capacity building and Information, Education, and Communication (IEC), research and development, policy and institutionalization for development of the sector for enhancement of the livelihood options of the people especially in north-east, mountain areas and left wing extremist affected areas.

5.12. Climate Change Action Programme

A new thematic/umbrella Scheme namely 'Climate Change Action Programme' is proposed to be introduced in order to support initiatives in various fields relating to the objectives of the NAPCC. The new scheme aims at enhancing understanding of science of climate change, launching scientific projects for climate change assessment including study of vulnerabilities and impacts, building institutional and analytical capacity for climate change, and providing financial support to build capacity and implement actions to address climate change at the national and state level. This will also include a window for supporting states for preparing and implementing their SAPCCs.

5.13. National Strategic Fund for Climate Change, Research, Design & Development

A National Strategic Fund for Climate Change Research, Design and Development (RD&D), is envisaged to be set up with the objective of supporting development and deployment of adaptation and mitigation measures through clean energy - related technologies and Green India Mission (GIM). The financial resources for the operation of the Strategic Fund could include funding by the Central and State Governments, private sectors, PSUs, multilateral and bilateral agencies, or endowment contributions. The National Clean Energy Fund (NECF) created with revenues from coal cess could be merged with the Fund

5.14. Green India Mission Scheme

The National Mission for a Green India (GIM) is as one of the eight missions under the National Action Plan on Climate Change (NAPCC). The Mission has been approved by the Prime Minister's Council on Climate Change. Total Mission cost is ₹46,000 crore over ten years starting from the year 2012-13, and coinciding with the 12th and 13th Five Year Plan Period. The Green India Mission (GIM) has been conceived as a multi-stakeholder, multi-sectoral and multi-departmental mission. The GIM recognizes that climate change phenomena will seriously affect and alter the distribution, type and quality of natural resources of the country and the associated livelihoods of the people. The 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 through agro and farm forestry, and NTFPs. During the 12th Plan, a provision for ₹23000 crore has been made for the GIM for increased forest and tree cover on 2.5 m ha area (non forest through agro/social/farm forestry), improved quality of forest cover on another 2.5 m ha area, improved ecosystems services, increased forest based livelihood income and enhanced annual CO₂ sequestration.

5.15. Rangeland and Silvi-pasture Development Scheme

New scheme called "Rangeland and Silvi-pasture Development Scheme" with a proposed outlay of Rs. 900 crores has been formulated to take care of the aspirations of the local people living in and around forests. Rehabilitation and productivity enhancement rangelands and common/revenue lands around forest areas, fodder storage/value addition

facilities, linkages with existing institutes/Centre of Excellence on fodder and pasture management, research, developing models, germplasm banks and nurseries etc. are the major components of the scheme.

5.16. Satellite based Forest Resource Assessment and technological based M & E

Sensing-based forest cover monitoring 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 to help develop a centralized spatial data base in the GIS domain. An amount of ₹1000 crores has been proposed for this scheme during 12th Plan period. In order to achieve the adequate level in the monitoring and evaluation system, a dedicated forest satellite for monitoring forest cover, NTFP resource, bio-diversity on periodical basis etc. and change monitoring has been proposed. The improved real-time, web-based monitoring system under this scheme would be extended to other schemes by strengthening the Forest Survey of India (FSI) and Remote Sensing/Geomatics Units in the states.

5.17. Besides strengthening 2 existing schemes, i.e, i) Integrated Development of Wildlife Habitats, and ii) Project Elephant, it is also proposed to introduce two new schemes- one on "Operationalization and Strengthening of Ecotourism for Local Livelihoods" and another on "Promoting Participation of Private Sector and Philanthropists in Animal Welfare in the 12th Plan.

Sector
Biodiversity Conservation – New EAP component
International Cooperation Activities – EAP component on GEF FSPOP5 Small Grant Programme
Desertification cell
Setting Up of NEAMA – Est. of Env. Protection Authorities
Research & Development – Upgradation of EPTRI to NEPTRI Est. of Institute of Ecosystem Research & Management
NMNH – Acquisition of Land & new Building for HQ New Delhi
Climate Change Action Programme

6. Financial requirement for the 12th plan

The tentative sectoral outlays for the 12th Five Year Plan are presented in this chapter.



Sl. No	Name of the Scheme	Nature of the scheme	Sl. No.	Schemes in the 12th Plan	11th Plan Allocation (₹ in Crores)	Proposed Allocation for 12th Plan (₹ in Crores)
	A – Environment			A – Environment		
1	Environmental monitoring and Governance	CS	1	Environmental monitoring and Governance	216.00	1367.10
2	Pollution Abatement	CS	2	Pollution Abatement	235.00	682.83
3	Research & Development for Conservation & Development	CS	3	R & D for Conservation & Development	250.00	1747.75
4	Conservation of Natural Resources and Ecosystems	CSS	4	Conservation of Natural Resources and Ecosystems and Envl Mgt in Heritage, Pilgrimage and Tourist Centres Including Taj Protection	600.00	1130.45
5	Environment Information, Education & Awareness	CS	5	Environment Information, Education & Awareness	295.00	1167.81
6	Environmental Management in Heritage, Pilgrimage and Tourist Centres Including Taj Protection	CSS		Merged with item 4	0.01	–
7	International Co-operation Activities	CS	6	International Co-operation Activities	80.00	127.52
8	National Coastal Management Programme	CS	7	National Coastal Management Programme	10.00	903.00
9	National River Conservation Plan (NRCP)	CSS	8	National River Conservation Plan (NRCP)	2100.00	10100.00
			9	Climate change		510.00
	Total Env. & Ecology			Total Env. & Ecology	3786.01	17736.46
	B - Forestry and Wildlife			B - Forestry and Wildlife		
10	Grants- in-aid to Forests & Wildlife institutions	CS	10	Forestry Institutional Development and Support (the on-going scheme of Grants-in-aid is augmented and renamed)	450.00	2351.33
11	Capacity building in forestry sector	CS	11	Capacity building in forestry sector including Gram Sabhas and JFMCs (the on-going scheme is augmented and renamed .	110.00	464.80

12	Gregarious Flowering of Muli (Melacanna baccifera) Bamboos)	CSS		Terminated	37.00	-
13	Intensification of Forest Management (former IFPS) Scheme	CSS	12	<ul style="list-style-type: none"> • Intensification of Forest Management (former IFPS) Scheme • National Afforestation Programme • GIM • Rangeland and Silvi Pasture Management • Sustainable livelihood through NTFP • Ecotourism • NIMS 	600.00	600.00 4660.00 10500.00
14	Strengthening Forestry Divisions	CS	13	Strengthening Forestry Divisions: Satellite based Forest Resource Assessment and technological based M&E (New Sub-scheme)	100.00	269.00
15	Strengthening of Wildlife Division	CS	14	Strengthening of Wildlife Division	150.00	775.00
16	Integrated Dev. of Wild Life Habitats	CSS	15	<ul style="list-style-type: none"> • Integrated Dev. of Wild Life Habitats • Project Elephant 	800.00	3000.00 600.00
17	Project Tiger	CSS	16	Project Tiger	615.00	5889.00
18	Project Elephant	CSS		Merged with item no. 16	81.99	
19	National Afforestation & Eco-Development Board (NAEB)	CS	17	National Afforestation & Eco-Development Board (NAEB)	250.00	440.00
20	National Afforestation Programme	CSS		Merged with item no. 13		
21	Afforestation through PRIs (Panchyath Van Yojna)	CSS		Merged with item no.13	900.00	
22	Animal Welfare	CS	18	Animal Welfare	120.00	300.00
	Total Forestry & Wildlife			Total Forestry & Wildlife	6213.99	29849.73
	Total Ministry of E&F			Total Ministry of E& F	10000.00	47586.19

Tentative Sectoral outlays - 12th Five Year Plan

Sector	Sanctioned outlay 11th Plan 2007-12	Approved Outlay 11th Plan 2007-12 BE	Proposed Outlay 12th Plan 2012-17
1. Environment	1246.01	1913.34	11000.00
2. NRCD	2540.00	2760.75	6736.46
3. Forests & Wildlife	2943.99	2611.34	13949.73
4. NAEB	3150.00	1826.57	15600.00
5. Animal Welfare	120.00	119.00	300.00
Total (1-5)	10000.00	9231.00	47586.19

Abbreviations

ABC	Animal Birth Control
ACU	Adult Cattle Unit
AFDP	Accelerated Fodder Development Programme
AICOPTAX	All India Coordinated Project on Taxonomy
ANR	Assisted Natural Regeneration
AR	Anti Rabies
ASEAN	Association of Southeast Asian Nations
ASEM	Advisory Services in Environmental Management
ASHA	Accredited Social Health Activist
AWBI	Animal Welfare Board of India
AWO	Animal Welfare Organisation
BCRI	Black Carbon Research Initiative
BE	Budgeted Estimate
BIS	Bureau of Indian Standards
BMC	Bio-diversity Management Committee
BSI	Botanical Survey of India
C&I	Criteria & indicator
CAAQMS	Continuous Ambient Air Quality Monitoring Stations
CAG	Comptroller and Auditor General
CAMPA	Compensatory Afforestation Fund Management and Planning Authority
CBD	Convention on Biological Diversity
CBF	Central Board of Forestry
CBFO	Capacity Building of Forest Officials
CBMWTF	Common Bio-Medical Waste Treatment and Disposal Facilities
CBNRM	Community-based natural resource management
CCAS	Climate Change Assessment Studies
CCD	Convention to Combat Desertification
CCU	Civil Construction Unit
CDH	Conservation, Development and Harvesting
CDM	Clean Development Mechanism
CEMS	Continuous Emission Monitoring System
CEPI	Comprehensive Environmental Pollution Index
CETP	Common Effluent Treatment Plant
CFL	Compact Fluorescent Lamp
CFR	Community Forest Resources
CIDA	Canadian International Development Agency
CITES	Convention of International Trade in Endangered Species
CMLRE	Centre for Marine Living Resources & Ecology
CO	Carbon Monoxide
CO ₂	Carbon di oxide
CoE	Centre of Excellence
COFO	Corporate Social Responsibilities

CPA	Care Programme Approach
CPCB	Central Pollution Control Board
CPM	Computerised Project Monitoring
CPRs	Common Property Resources
CREP	Corporate Responsibility for Environment Protection
CRZ	Coastal Regulation Zone
CS	Central Sector Schemes
CSD	Commission on Sustainable Development
CSIR	Council of Scientific and Industrial Research
CS-NECC	Coordinated Studies on - National Environment Coordinating Committee
CSO	Civil Society Organizations
CSS	Centrally Sponsored Schemes
CTF	Conservation Trust Fund
CTSDF	Common Treatment, Storage and Disposal Facilities
CWH	Critical Wildlife Habitat
CZA	Central Zoo Authority
DAHD&F	Department of Animal Husbandry, Dairying and Fisheries
DARE	Department of Agricultural Research and Education
DDP	Desert Development Programme
DEA	Department of Economic Affairs
DFDA	District Forest Development Agency
DFE	Directorate of Forest Education
DFID	Department for International Development
DIC	District Industries Centre
DIP	Digital Image Processing
DOE	Department of Environment
DoPT	Department of Personnel and Training
DPAP	Drought Prone Area Programme
DSS	Decision Support System
EAP	Externally Aided Projects
EC	Environmental Clearance
EEAT	Environment Education, Awareness & Training
EEFP	Energy Efficiency Financing Platform
EEZ	Exclusive Economic Zones
EFC	Expenditure Finance Committee/ (Elephant conservation)
EIA	Environmental Impact Assessment
ENVIS	Environmental Information System
EPA	Environment (Protection) Act, 1986
EPCA	Environment Pollution (Prevention and Control) Authority
EPCO	Environmental Planning & Coordination Organisation
EPI	Environmental Performance Index
EPR	Extended Producer Responsibility
EPTRI	Environment Protection Training and Research Institute
ERI	Ecosystem Research Institute
ESCAP	Economic and Social Council for Asia and Pacific
ESSO	Earth System Sciences Organization

ESZ	Eco-sensitive Zone
EU	European Union
FAO	Food and Agriculture Organisation
FCA	Forest Conservation Act
FD	Forest Department
FDA	Forest Development Agency
FEEED	Framework for Energy Efficient Economic Development
FPC	Forest protection committee
FPM	Fellow Program in Management
FRA	Scheduled Tribe & Other Traditional Forest Dwellers (Recognition of Forest Rights) Act
FRLHT	Foundation for Revitalisation of Local Health Traditions
FSI	Forest Survey of India
FTC	Forest and Tree Cover
FYP	Five Year Plan
GAP	Ganga Action Plan
GBPHIED	G.B.Pant Institute of Himalayan Environment & Development
GCC	Girijan Cooperative Corporation
GDP	Gross domestic product
GEF	Global Environment Facility
GIM	Green India Mission
GIMD	Green India Mission Document
GIS	Geographical Information System
GoI	Government of India
GPS	Global Positioning System
GS	Gram Sabha
GST	Goods and Services Tax
GTF	Global Tiger Forum
GTZ/GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
HDI	Human Development Index
HRD	Human Resources Development
HSMD	Hazardous Substances Management Division
IBIN	Indian Bioresource Information System
IBP	India Biodiversity Portal
IC	International Cooperation
ICAR	Indian Council of Agricultural Research
ICFRE	Indian Council & Forestry Research & Education
ICIMOD	International Centre for Integrated Mountain Development
ICMR	Indian Council for Medical Research
ICT	Information and communications technology
ICZM	Integrated Coastal Zone Management
IDWH	Integrated Development of Wildlife Habitats
IEC	Information, Education, and Communication
IFA	Indian Forest Act
IFPS	Intensification of Forest Management
IFS	Indian Forest Service
IGNFA	Indira Gandhi National Forest Academy

IIFM	Indian Institute of Forest Management
IIT	Indian Institute of Technology
IMD	India Meteorological Department
INBAR	International Network for Bamboo and Rattan
INR	Indian Rupee
IPIRTI	Indian Plywood Industries Research and Technology Institute
IRS	Indian Remote Sensing
ISCST	Industrial Source Complex Short Term
ISO	International Standards Organization
IT	Information Technology
ITTO	International Tropical Timber Organization
IUFRO's	International Union of Forest Research Organizations
IWC	International Whaling Commission
JFM	Joint Forest Management
JFMC	Joint Forest Management Committee
JICA	Japan International Cooperation Agency
JNNURM	Jawaharlal Nehru National Urban Renewal Mission
LCA	Life Cycle Analysis
LISS IV	Linear Imaging Self-Scanning System
LRTAP	Long Range Transportation of Air Pollution
LTEO	Long-Term Ecological Research Observatories
LVA	Lok Vaniki Act
LWE	Left Wing Extremism
M&E	Monitoring & Evaluation
MAB	Man and the Biosphere
MCT	Mid Career Training
MDF	Moderately Dense Forests
MDG	Millennium Development Goals
MEA	Multilateral Environmental Agreements
MFF	Multi-stakeholder Forestry Forum
MFP	Minor forest produce
MGNREGS	Mahatma Gandhi National Rural Employment Guarantee Act
MHRD	Ministry of Human Resources and Development
MIS	Management Information System
MLD	Million Litres Per Day
MNES	Ministry of Non-Conventional Energy Sources
MoEF	Ministry of Environment and Forests
MoH&FW	Ministry of Health and Family Welfare
MoPNG	Ministry of Petroleum and Natural Gas
MoPR	Ministry of Panchayati Raj
MoRTH	Ministry of Road Transport and Highways
MoTA	Ministry of Tribal Affairs
MoUD	Ministry of Urban Development
MRV	Monitoring Reporting Verification
MSL	Mean Sea Level
MSME	Micro, small and Medium Enterprises

MSP	Minimum Support Price
MSW	Municipal Solid Waste
MTE	Mid Term Evaluation
MTEE	Market Transformation for Energy Efficiency
NAAQS	National Ambient Air Quality Standards
NABARD	National Bank for Agriculture and Rural Development
NABL	National Accreditation Board for Testing and Calibration Laboratories
NAEB	National Afforestation and Ecodevelopment Board
NAMA	Nationally Appropriate Mitigation Action
NAP	National Afforestation Program
NAPCC	National Action Plan on Climate Change
NATCOM	National Communication
NBA	National Biodiversity Agency
NBWL	National Board for Wildlife
NCEF	National Clean Energy Fund
NCSCM	National Centre for Sustainable Coastal Management
NE	North east
NEAA	National Environment Appellate Authority
NEAB	National Afforestation and Eco-development Board
NEAMA	National Environmental Appraisal and Monitoring Agency
NECA	National Elephant Conservation Authority
NECC	National Environment Coordinating Committee
NEERI	National Environmental Engineering Research Institute
NEFC	National Environmental and Forestry Council
NEMP	National Environmental Monitoring Programme
NEP	National Environmental Policy
NEPA	National Environmental Policy Authority
NEPTRI	National Environment Protection Training and Research Institute
NERF	National Environment Restoration Fund
NFC	National Forest Commission
NFP	National Forest Policy
NGO	Non-government organization
NGRBA	National Ganga River Basin Authority
NGT	National Green Tribunal
NIA	National Investigation Agency
NIC	National Informatics Centre
NIMS	National Incident Management System
NLCP	National Lake Conservation Plan
NMNH	National Museum of Natural History
NMPB	National Medicinal Plants Board
NNRMS	National Natural Resource Management Scheme
NOx	Nitrogen Oxides
NRAA	National Rainfed Area Authority
NRAP	National River Action Plan
NRCD	National River Conservation Directorate
NRCP	National River Conservation Plan

NTFPs	Non-timber Forest Products
NWFP	National Wood Forest Products
NZP	National Grazing Policy
ODS	Ozone Depleting Substances
OF	Open Forests
OHSAS	Occupational Health and Safety Advisory Services.
OSPAR	Convention for Protection of Marine Environment for the North East Atlantic
PAs	Protected Areas
PAH	Poly Aromatic Hydrocarbons
PAT	Perform, Achieve and Trade
PBR	People Biodiversity Registers
PCC	Pollution Control Committee
PCCF	Principal Chief Conservator of Forests
PDS	Public distribution system
PE	Project Elephant
PES	Payment for Ecosystem Services
PESA	Provision of Panchayats (Extention to Schedule Areas) Act
PGDFM	Post Graduate Diploma in Forestry Management
PIC	Prior Informed Consent
PM	Prime Minister
POP	Persistent Organic Pollutant
PPC	Permanent Parliamentary Committee
PPP	Public Private Partnership
PPVFRA	Protection of Plant Varieties and Farmers' Rights Act
PRI	Panchayati Raj Institutions
PSUs	Public Sector Units
PT	Project Tiger
PUFA	Poly Unsaturated Fatty Acids
QA	Quality Assurance
QC	Quality Control
R&D	Research and Development
RCDC	Regional Centre for Development Cooperation
RD&D	Research, Design and Development
REDD	Reducing Emissions from Deforestation and Forest Degradation
RIA	Regulatory Impact Assessment
RIBASIM	River Basin Simulation Model
RKVY	Rashtriya Krishi Vikas Yojana
RSPM	Respirable Suspended Particulate Matter
SAARC	South Asian Association for Regional Cooperation
SACEP	South Asia Co-operative Environment Programme
SAICM	Strategic Approach to Integrated Chemicals Management
SAPCC	State Action Plan on Climate Change
SAWB	State Animal Welfare Boards
SAWEN	South Asia Wildlife Enforcement Network
SEC	State Environmental Council
SEIAA	State and UT level Environment Impact Assessment Authorities

SEZs	Special Economic Zone
SFDA	State Forest Development Agency
SFDC	State/ Forest Development Corporation
SFD	State Forest Department
SFI	State Forest Institution
SFM	Sustainable forest management
SFR	State of Forest Report
SFS	State Forest Services
SFT	State Forest Training School
SHG	Self Help Group
SME	Small and Medium Scale Enterprise
SO ₂	Sulphur Dioxide
SPCA	Societies for the Prevention of Cruelty to Animals
SPCB	State Pollution Control Board
SPM	Suspended Particulate Matter
SPV	Special Purpose Vehicle
SSI	Small Scale Industries
STP	Sewage Treatment Plant
SWAT	Soil and Water Assessment Tool
TDCC	Tribal Development Cooperative Corporation
TEEB	The Economics of Ecosystems and Biodiversity
TERI	Tata Energy Research Institute
TK	Traditional Knowledge
TLS	Terrestrial Laser Scanners
ToR	Terms of Reference
ToT	Training of Trainers
TPP	Twenty Point Programme
TRIFED's	Tribal Cooperative Marketing Development Federation of India Limited
TSDF	Treatment, Storage and Disposal Facility
UBFDB	Uttarakhand Bamboo & Fibre Development Board
UIDSSMT	Urban Infrastructure Development Scheme for Small and Medium Towns
ULB	Urban Local Body
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNFCCC	United Nations Framework Convention on Climate Change
UNFF	United Nations Forum on Forests
USAID	United States Agency for International Development
UT	Union Territory
UV	Ultra Violet
VAT	Value Added Tax
VBMC	Village Bio-Diversity Management Committee
VDF	Very Dense Forest

VFPCs	Village Forest Protection Committees
VOC	Volatile Organic Compound
VP	Van Panchayat
VSS	Vana Samrakhshana Samiti
VVK	Van Vigyan Kendra
WCCB	Wildlife Crime Control Bureau
WEAP	Water Evaluation And Planning System
WG	Working Group
WHO	World Health Organization
WII	Wildlife Institute of India
WQAA	Water Quality Assessment Authority
WS	Wildlife Sanctuary
WTO	World Trade Organization
WWF	World Wildlife Fund
ZSI	Zoological Survey of India

Missions under NAPCC

Sl. No.	Name of the Mission/ Nodal Agency	Salient features and status of the National Missions
1	National Solar Mission Nodal Agency: Ministry of New & Renewable Energy	<p>The Mission aims at increasing the share of solar energy in the total energy mix through development of new solar technologies, while attempting to expand the scope of other renewable and non fossil options such as nuclear energy, wind energy and biomass. The Mission recommends implementation in 2 stages leading up to an installed capacity of 20,000 MW by the end of the 13th Five Year Plan in 2022.</p> <p>The total financial outlay during Phase 1 is estimated at ₹4337 crore of which ₹2527 crore is for the remaining period of the 11th Plan. Requirement for Phase 2 will be assessed after review of implementation of Phase 1.</p>
2.	National Mission for Enhanced Energy Efficiency Nodal Agency: Ministry of Power/Bureau of Energy Efficiency	<p>This Mission comprises of 4 initiatives, namely, Perform, Achieve and Trade (PAT), market transformation for energy efficiency (MTEE), energy efficiency financing platform (EEFP) and framework for energy efficient economic development (FEEED).</p> <p>The Mission seeks to upscale efforts to create a market for energy efficiency which is estimated to be around ₹74,000 crore. As a result of implementation of this Mission over the next five years, it is estimated that by about 2015, about 23 million tons of oil-equivalent of fuel savings – in coal, gas, and petroleum products, will be achieved every year along with an expected avoided capacity addition of over 19,000 MW. Prime Minister's Council on Climate Change has approved the Mission document on August 24, 2009.</p> <p>The total requirement projected under the Mission between 2010- 2012 is ₹ 425.35 crore. This is intended to attract private sector investment in energy efficiency market estimated at ₹ 74,000/- crore.</p>
3.	National Mission on Sustainable Habitat Nodal Agency: Ministry of Urban Development	<p>The Mission attempts to promote energy efficiency in buildings, management of solid waste and modal shift to public transport including transport options based on bio-diesel and hydrogen. Main components of the Mission are, (i) Development of National Sustainable Habitat Standards (Legal/ Regulatory) measures, (ii) Incorporation of Principles of Sustainable Habitat in city, and (iii) Complementary action such as support for building green demonstration projects and National outreach programmes for creating consumer awareness.</p> <p>Mission Document prepared by M/o Urban Development was approved by PM's Council on Climate Change on June 18, 2010. The total cost estimate projected in the Mission Document is ₹1000 crore. During 11th Plan, expenditure of ₹50 crore is to be incurred and remaining ₹950 crore is to be incurred during the 12th Five Year Plan.</p>

4.	<p>National Water Mission</p> <p>Nodal Agency: Ministry of Water Resources</p>	<p>This mission aims at the conservation of water, minimizing wastage and ensuring more equitable distribution both across and within states. The key focus of the Mission document are: (i) Intensive rain water harvesting and ground water charging to meet the demand of 1120 critical blocks during the 11th Plan and remaining blocks in the 12th Plan (March, 2017). Besides, 30% of the total urban areas would be covered by March, 2012. (ii) Increasing water use efficiency at least by 20% by 2012.</p> <p>As per the Mission document, the total estimated additional fund required for implementing the Mission is ₹89,101 crore during the 11th and the 12th Five Year Plan periods. This includes expenditure on schemes implemented through the State Plans and the Central Plan.</p>
5.	<p>National Mission for Sustaining the Himalayan Ecosystem</p> <p>Nodal Agency: Ministry of Science and Technology</p>	<p>This mission aims at evolving management measures for sustaining and safeguarding the Himalayan glacier and mountain eco-system. The mission attempts to address following key issues:</p> <p>Himalayan Glaciers and the associated hydrological consequences</p> <p>Biodiversity conservation and protection</p> <p>Wildlife conservation and protection</p> <p>Traditional knowledge societies and their livelihood</p> <p>Planning for sustaining for the Himalayan Ecosystem</p> <p>For implementing the activities, a total fund of ₹195 crore is required in the 11th Plan period. Total budget outlay to the tune of ₹900 would be required under 12th plan period for initiating some broad mission activities.</p>
6.	<p>National Mission for Green India</p> <p>Nodal Agency: Ministry of Environment & Forests</p>	<p>This mission focuses on enhancing eco-system services and carbon sinks through afforestation on degraded forest land in line with the national policy of expanding the forest and tree cover to 33% of the total land area of the country. An expenditure of ₹46,000 crore is projected under the Mission for coverage of 10 million hectares over the next 10 years.</p>

7.	<p>National Mission for Sustainable Agriculture</p> <p>Nodal Agency: Ministry of Agriculture and Cooperation/ DARE</p>	<p>This mission would develop strategies to make Indian agriculture more resilient to climate change, new varieties of thermal resistant crops, new credit and insurance mechanisms and improving productivity of rain-fed agriculture. The main focus of the Mission would be food security and protecting land, water, biodiversity and genetic resources for sustainable production of food.</p> <p>The proposed adaptation and mitigation activities under the Mission require an additional budgetary support of ₹1,08,000 crore out of which ₹91800 crore will be required during the 12th plan period.</p>
8.	<p>National Mission on Strategic Knowledge on Climate Change</p> <p>Nodal Agency: Ministry of Science and Technology</p>	<p>This mission is intended to identify the challenges of, and the responses to, climate change through research and technology development and ensure funding of high quality and focused research into various aspects of climate change.</p> <p>Additional fund of ₹150 crores is required in the 11th plan period for implementing the Mission activities. Provision of ₹1050 crore is required under the 12th plan period for achieving mission/sub-mission programme initiatives.</p>

