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वहाँ है खुशहाली।।

Ministry of Environment and Forests
GOVERNMENT OF INDIA

REPORT TO THE PEOPLE ON ENVIRONMENT AND FORESTS 2009-2010

Report to the People on Environment and Forests 2009–2010

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Ministry of Environment and Forests
Government of India

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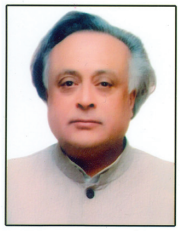

जयराम रमेश
JAIRAM RAMESH

सत्यमेव जयते

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Foreword

India has been fortunate to have had leaders who thought far ahead of their times and foresaw the environmental crisis facing us today – before the term "sustainable development" was coined, before climate change became a buzzword. Smt. Indira Gandhi set the stage for India to be a leader in balancing the development imperative with that of ecological security, and demonstrated this many times over, including when she decided against the Silent Valley project and declared it a national park. She is responsible for the triumvirate of Acts that govern our environment today: The Air Act, 1981; Water (Prevention and Control of Pollution) Act, 1974; and most importantly, the Forest (Conservation) Act, 1980. Taking cue from her and many others who have followed, I believe that it is once again time for India to lead from the front and show that poverty alleviation can occur without impoverishing the environment – to re-define sustainable development. As a country, we must reduce emissions, preserve biodiversity and protect our pristine forests and unique wildlife, not because we need to fulfill international commitments but because it is in our best interest to do so.

The Hon'ble President of India in her address to the Joint Session of Parliament on 4th June 2009 announced the preparation of five Annual Reports to the people, including a report on environment. I am therefore pleased to release 'The Report to the People on Environment' prepared by our team in the Ministry of Environment and Forests, which is the nodal ministry in our administrative system for planning, promoting, overseeing the implementation of India's environment and forestry-related policies and programmes.

When I took charge of this Ministry twelve months ago, I realized the enormity of the challenge and the tough choices India faces as a country. While a number of things have been accomplished over the last twelve months, as you will see in the Report, I believe a lot needs to be done – we have a long and challenging road ahead. In treading this path, we will constantly endeavor to reflect on our core principles and use them as the guiding light. We must integrate economic development and environmental protection. Identifying the socio-economic and ecological trade-offs involved in every project, and making informed decisions is integral to this approach. Strengthening the capacity of the Ministry and its associated institutions and putting in place a robust institutional structure for environmental governance will continue to remain my top priority. I will also continue to encourage and institutionalize transparency in everything we do (Our website, which is being updated on a real-time basis with information on almost everything we do, is a step in this direction).

A year on, it is only fitting that we take stock of our progress and outline our goals for the future. In this sense, the information contained in this report is more than just a performance review. Because the work we do, or don't do, affects your future, I encourage you to engage with us in this process. I look forward to hearing from you.

Jairam Ramesh

(Jairam Ramesh)
31st May 2010

Contents

List of abbreviations

ACA	Additional Compensatory Afforestation
ALRI	Acute Lower Respiratory Infection
AR4	Fourth Assessment Report
BMC	Biodiversity Management Committee
BMW	Biomedical waste
BS	Bharat Stage
CA	Compensatory afforestation
CAMPA	Compensatory Afforestation Management and Planning Authority
CBD	Convention on Biodiversity
CBWTF	Common biomedical waste treatment facility
CEPI	Comprehensive Environmental Pollution Index
CITES	Convention on International Trade in Endangered Species
CNG	Compressed natural gas
CPCB	Central Pollution Control Board
CREP	Corporate responsibility for environment protection
CRZ	Coastal Regulation Zone
CSS	Central sector scheme
EIA	Environmental impact assessment
ENVIS	Environmental information system
ETP	Effluent treatment plant
E-waste	Electronic waste
FDA	Forest development agency
GAP	Ganga Action Plan
GEAC	Genetic Engineering Approval Committee
GM	Genetically Modified
GMO	Genetically Modified Microorganism
HMO	Hazardous microorganism
IIT	Indian Institute of Technology
IPCC	Intergovernmental Panel on Climate Change
IT	Information technology
IUCN	International Union for Conservation of Nature
JFM	Joint Forest Management
JFMC	Joint Forest Management Committee
JICA	Japan International Cooperation Agency
LCS	Low-cost sanitation
LPG	Liquefied petroleum gas
MAB	Man and the Biosphere
MAI	Mean annual increment
MoEF	Ministry of Environment and Forests
MoU	Memorandum of understanding
MSW	Municipal solid waste
NAAQS	National Ambient Air Quality Standards
NAMP	National Air Quality Monitoring Programme
NAPCC	National Action Plan on Climate Change
NBA	National Biodiversity Authority
NCR	National Capital Region
NEAC	National Environmental Awareness Campaign
NEP	National Environment Policy
NEPA	National Environmental Protection Authority
NGC	National Green Corps
NGO	Non-government organization
NGRBA	National Ganga River Basin Authority
NLCP	National Lake Conservation Programme
NPV	Net present value
NRCP	National River Conservation Programme

NTFP	Non-timber forest products
NWCP	National Wetland Conservation Programme
PA	Protected area
PAH	Poly-aromatic hydrocarbons
PBR	People's biodiversity register
PCA	Penal compensatory afforestation
PET	Poly-ethylene Terapthalate
PIL	Public interest litigation
PPP	Private-Public Partnership
PRI	Panchayati Raj Institutions
PVC	Poly-vinyl chloride
RFD	River front development
SBB	State Biodiversity Board
SFM	Sustainable forest management
SME	Small and medium enterprise
SPCB	State Pollution Control Board
SSFE	Small-scale forest enterprises
STP	Sewage treatment plant
TDI	Toluene Di-isocyanate
ToR	Terms of reference
TSDF	Treatment storage and disposal facility
UNESCO	United Nations Educational Scientific and Cultural Organisation
UT	Union territory
WLS	Wildlife sanctuary
WMC	Waste minimisation circle
WQM	Water quality monitoring

Executive summary

The vision of a country includes pursuing a development process that is environmentally sustainable. The Ministry of Environment and Forests (MoEF) has sought to achieve this aim of conserving and protecting the environment by implemening various policies and programmes.

The present report aims to generate greater awareness and environmental consciousness amongst our citizens. The objective of the report, therefore, is to generate a national debate among various stakeholders on the key environmental issues and challenges that must be addressed to ensure a rapid and sustained economic growth.

The *Annual Report to the People on Environment* is presented in four chapters. The first chapter sheds light on the mandate of the MoEF and explains the need for this report. The chapter also includes major policies and programmes of the Ministry and its achievements for 2009-10 and goals for 2010-11.

The second chapter presents the *State of the Environment* covering:

- Air environment
- Water environment
- Solid waste management
- Forestry
- Biodiversity and wildlife
- Coastal resource management and
- Climate change and its impact

Environmental themes provide their present state and issues of concerns, related policy and legal measures and recent initiatives taken by the Ministry to address these issues. Issues for debate under each of these themes have also been discussed. The third chapter discusses the need for inclusive growth, while the fourth chapter presents issues for debate for each of these themes in detail.

The key issues for the air environment are increase in ambient air pollution in urban areas and indoor air pollution due to use of biomass as cooking fuel in rural areas. MoEF as a response to check air pollution levels has introduced the new National Ambient Air Quality Standards (NAAQS) in 2009 for the extended list of 12 pollutants which are more closely related to health. The Ministry is also working towards development of monitoring protocols for indoor air pollution.

The key issue for water environment is pollution of surface water sources, including rivers and lakes. The Central Pollution Control Board (CPCB) has identified 150 polluted stretches of rivers in the country in five priority categories depending upon the risk, that is, degree/ frequency of violation with respect to water quality criteria for drinking water source. To tackle the pollution of water bodies, the Ministry is facilitating setting up of sewage treatment plants to capture untreated sewage under river and lake conservation programmes. The most recent initiative of the Ministry includes setting up of the National Ganga River Basin Authority (NGRBA) to tackle pollution of River Ganga.

The critical issue regarding solid waste management is lack of proper disposal facility to prevent pollution from waste disposed on land. The unsanitary disposal sites become prolific breeding grounds for insects and rodents, which are carriers of various diseases. To address this issue, the Ministry has supported development of common waste treatment and disposal facilities both for hazardous, as well as biomedical wastes. The Ministry has also

facilitated trial runs for possibility of using higher calorific value hazardous waste as a possible source of fuel in cement kilns, thereby reducing the demand for fossil fuel. This also provides solution to managing hazardous waste in a responsible and safe manner.

The critical issues for the forest sector include degradation of forest resources, forests fires and livelihood issues of forest-dependent communities. The Ministry has taken initiatives under the National Afforestation Policy (NAP) to increase the forest and tree cover in the country. The Ministry is also facilitating participation of local communities in afforestation activities involving Panchayati Raj Institutions by promoting plantation on vacant or degraded land. A new State Plan Scheme—Accelerated Programme of Restoration and Regeneration of Forest Cover—has been introduced during the year 2009-10 for providing additional central assistance to afforestation efforts.

Rise in the cases of bio-piracy highlights the urgent need to resolve complexities in access and benefit sharing of the available resources to ensure their benefits reach the traditional users. The above aspect has been recognised by the Convention on Biological Diversity (CBD) Act 2002, which establishes three broad goals: (1) conservation of biological diversity, (2) sustainable use of its components, and (3) fair and equitable sharing of the benefits derived from the use of genetic resources. The Ministry has taken several measures to protect and conserve some of the ecologically rich and sensitive areas which are currently covered through protected area networks. The Ministry is also supporting setting up of botanical gardens to conserve rare plant species.

The Ministry is providing support for protection, conservation and development of tiger reserves. In order to conserve tigers, after rapid assessment of tiger reserves, intensive independent assessments are also planned. The tiger is at the apex of the food chain and its conservation ensures the health of the entire ecosystem.

The key issue for coastal resources is degradation of mangroves and corals due to various developmental activities. Apart from the Coastal Regulation Zone Notification issued in 2008, the Ministry is making concerted efforts towards conservation and plantation of mangroves and protection of corals in the coastal states and island systems.

Climate change affects many natural and human systems. The key sectors expected to be affected are coastal areas, water resources, forests, agriculture and health. To mitigate the impacts of climate change, the Government of India has launched National Action Plan on Climate Change in 2008.

CHAPTER 1

Mandate of the Ministry of Environment and Forests

1.1 Need for the Report

It has been the continued endeavour of the Ministry of Environment and Forests to strengthen the policy and regulatory frameworks that govern the environment and forests of the country. Over the last one year, various measures both institutional as well as legislative, have been initiated or given a renewed impetus. Numerous initiatives have moved from the stage of concept to implementation, while many other new concepts have been initiated.

The legislative bedrock of the work of the Ministry is based on three laws: the Environment (Protection) Act 1986, the Forest (Conservation) Act 1980 and the Wildlife (Protection) Act 1972. These three flagship laws are comprehensive umbrella legislations that provide the Ministry with the requisite authority to undertake all manner of conservation and protection actions.

1.2 Mandate of the Ministry

The Ministry of Environment and Forests (MoEF) is the nodal agency in the administrative structure of the Central Government for the planning, promotion, co-ordination and overseeing the implementation of India's environmental and forestry-related policies and programmes.

The broad objectives of the Ministry are:

- 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
- Ensuring the welfare of animals.

In achieving these objectives, the Ministry is guided by the principle of sustainable development and enhancement of human well-being. These objectives are well supported by a set of legislative and regulatory measures, aimed at the preservation, conservation and protection of the environment. Besides the legislative measures, the National Conservation Strategy and Policy Statement on Environment and Development, 1992; National Forest Policy, 1988; and the National Environment Policy, 2006 also guide the Ministry's work.

The Ministry also serves as the nodal agency for international cooperation on matters pertaining to environment and natural resource conservation.

1.3 Key achievements in 2009/10

In the year 2009–10, a number of initiatives have been launched or given renewed impetus. Some salient initiatives are described below.

1.3.1 Climate Change

1. Announced India's intent to reduce the emissions intensity of its GDP by 20%–25% between 2005 and 2020, thus making a major contribution to mitigating climate change.
2. Expert Group on Low Carbon Strategy for Inclusive Growth established/set-up under the Planning Commission to develop a roadmap for low-carbon development.
3. Hosted Delhi high level conference on 'Climate Change: Technology Development and Transfer', that adopted the 'Delhi Declaration', which became a key input in the international climate negotiations.

4. Released India's GHG Emissions profile—a summary of five independent studies—which show that India will remain a low-emission economy even in the year 2030.
5. Convened Ministerial Meeting of BASIC countries – Brazil, South Africa, China and India—to discuss collaboration in climate change negotiations and broader collaboration.
6. Launched the Indian Network for Climate Change Assessment (INCCA), in October 2009, as a network-based programme to make science, particularly the '3 Ms'—Measuring, Modelling and Monitoring—the essence of our policy-making in the climate change space. It brings together over 120 institutions and over 220 scientists from across the country.

1.3.2 Compensatory Afforestation Management (CAMPA)

The Supreme Court directed creation of a Compensatory Afforestation Fund, in which all funds received from user agencies towards compensatory afforestation were to be deposited. However for seven years between 2002 and 2009 the fund could not be accessed by any of the states because of a disagreement on the manner of its disbursement:

1. To resolve the deadlock the MoEF moved the Supreme Court to give effect to an adhoc CAMPA authority that would in the interim period monitor discharge and monitor the use of funds. It was agreed that ultimately this body would give over control to the state CAMPAs.
2. By the end of January 2010, following national level sessions on the disbursement and use of CAMPA, 22 states/UTs have operationalised their accounts.
3. Out of the received amounts of approximately 13,000 crore in the ad hoc CAMPA, the state CAMPAs have so far been allocated approximately Rs 1000 crore.

1.3.3 Mission Clean Ganga

1. The 'Mission Clean Ganga' Initiative was launched with the first meeting of the National Ganga River Basin Authority (NGRBA) held on 5 October 2009 under the chairmanship of Prime Minister. It was decided that under 'Mission Clean Ganga', no untreated municipal sewage and industrial effluents will flow into the river Ganga by year 2020. The allocation for the NGRBA was doubled to Rs 500 crore for the financial year 2010-11.
2. New projects worth Rs 1394.11 crore were cleared, including projects worth Uttar Pradesh (Rs 800 crore), Bihar (Rs 440 crore), West Bengal (Rs 105 crore) and Uttarakhand (Rs 45 crore). These include projects for development of sewer networks, sewage treatment plants and sewage pumping stations, electric crematoria, community toilets, development of river fronts, resuscitation of canals, and public campaigns.
3. These measures signify the importance and urgency that Ministry is placing on the River Ganga, which has such an important place in our culture, and which is so central to the livelihoods of millions of our people.
4. In addition to these measures, the Ministry is negotiating a major loan of about US$ 1 billion with the World Bank for Ganga cleaning, which is progressing on track.

1.3.4 Coastal Regulation Zone

The MoEF has drafted comprehensive amendments to the Coastal Regulation Zone Notification of 1991. These amendments seek to improve the present provisions for protection and regulation for the use of the land within 500m of the coast and 100m along the tidal influenced water bodies.

1. The Minister E&F chaired national level consultations across various coastal states to hear the concerns of the all affected stakeholders. A committee was also constituted under the chairmanship of Dr. MS Swaminathan to address the shortcomings in the 1991 Notification.
2. The MoEF has thereafter prepared a comprehensive set of amendments to strengthen the CRZ Notification, 1991. Special protection status has been given to Navi Mumbai and Greater Mumbai, Kerala, Sunderbans and Goa.
3. The Draft Notification is currently on the Ministry's website, available in various languages, to elicit comments and views from the general public.
4. At the same time a major programme—Integrated Coastal Zone Management Project—is being launched with the support of the World Bank. This envisages spending Rs 1155 crore over a period of five years for mapping the national coastal hazard line, and setting up of a Centre for Sustainable Coastal Zone Management in Chennai. The Project will also undertake pilot projects in coastal zone management in Gujarat, West Bengal and Orissa.

1.3.5 Initiatives for the rights of forest dwellers

The Ministry of Environment and Forests, keeping in mind the need for ensuring compliance with the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006, has undertaken various measures in 2009–10:

1. The MoEF issued a circular dated 30 July 2009 to all states directing while forwarding/submitting the proposals for diversion of forest lands for non-forest purposes, proper care for observation of all the rights of the forest dwellers under the Forests Rights Act, 2006, will be taken failing which, permission for diversion will not be granted.
2. On 11 February 2010, the MoEF, jointly with the Ministry of Tribal Affairs, constituted a high powered committee under the Chairmanship of Dr. N.C. Saxena to look into the issues concerning the implementation of the Forest Rights Act 2006.

1.3.6 Pollution Control

1. The MoEF developed a Comprehensive Environmental Pollution Index (CEPI), for environmental assessment of 88 industrial clusters in the country, as part of a study by the Central Pollution Control Board (CPCB). CEPI, which combines effects of air, water and soil pollution, is intended to be used as early warning tool for categorizing industrial clusters/areas in terms of severity of overall pollution levels. Based on this assessment, 43 industrial clusters have been identified as critically polluted. Preparation of action plans for remediation of these critically polluted clusters is in progress.
2. Revised National Ambient Air Quality Standards 2009 were released by the Ministry. As per these norms, the residential and industrial areas will have the same standards. The new standards include limits for benzene, ozone, benzo(a) pyrene, arsenic, nickel and ammonia which were not covered in 1994 standards.

1.3.7 Issues of Genetically Modified Food Crops

1. The Genetic Engineering Approvals Committee (GEAC), established under the Ministry, in October 2009, assessed the case for large scale trial and environmental release of Bt brinjal, the first GM food crop in India. Given the important policy implications of the decision at the national level, it decided its recommendation for environmental release may be put up to the Government for taking final view on the matter.
2. Subsequently, based on the views of various stakeholders during public consultations organized across the country, and adopting a cautious, precautionary principle-based approach, a moratorium has been imposed on commercialization of Bt brinjal, until independent scientific studies establish the safety of the product from the point of view of its long-term impact on human health and environment, including the rich genetic wealth of brinjal existing in our country.

1.3.8 Renewed Impetus to Science

The MoEF was envisaged as a science-based Ministry. Over the years, its scientific focus has been eroded. This is now being renewed. A number of initiatives have been put in place this year.

1. A Global Advisory Network Group on Environmental Sciences (GANGES), a new forum, comprising the world's leading environmental scientists of Indian origin, established to advise the Government of India on the country's environmental sciences agenda.
2. A National Environmental Sciences Fellows Programme, to provide our most promising young scientists the opportunity to do cutting-edge research on critical environmental issues in collaboration with leading institutes and scientists in India and the world. This will help create a cadre of top class Indian environmental scientists for the future.
3. An Expert Committee to Enhance the Scientific Capacity of MoEF, to take a fresh look at the scientific manpower and infrastructure in the Ministry so that they remain cutting edge.
4. An Action Plan to enhance Forestry Sciences, following a special meeting of the Minister with over 100 Indian Forest Service Officers with PhDs. A number of decisions related to upgrading the scientific capabilities of India's forestry establishment were taken.

1.3.9 Western Ghats

1. Given the environmental sensitivity and ecological significance of the Western Ghats region and the complex interstate nature of its geography, as well as the possible impacts of climate change

on this region, the Ministry has constituted the Western Ghats Ecology Expert Panel under the chairmanship of Prof. Madhav Gadgil. The Panel will assess the current status of ecology of the Western Ghats region, demarcate areas which need to be notified as ecologically sensitive zones, and recommend the modalities for the establishment of the Western Ghats Ecology Authority under the Environment (Protection) Act, 1986 which will be a professional body to manage the ecology of the region and to ensure its sustainable development with the support of all concerned states.

2. Convened a meeting of MPs from the Western Ghats on 4 March 2010 and agreed to set up a Parliamentary Forum in the Western Ghats.

1.3.10 Himalayas

1. Launched Phase II of the Himalayan Snow and Glacier Monitoring Programme, through the Space Application Centre, Ahmedabad, to continue the monitoring of seasonal snow cover for the entire Himalayas and monitoring the retreat /advance of the glaciers in representative basins.
2. Released the Report titled 'Governance for Sustaining Himalayan Ecosystem (G-SHE): Guidelines and Best Practices', putting together key guidelines related to the governance and management of the Himalayan ecosystem, along with case studies. A meeting of Chief Ministers of Himalayan states was also held.
3. Released a Discussion Paper titled 'Himalayan Glaciers: A State-of-Art Review of Glacial Studies, Glacial Retreat and Climate Change' which summarises the state of knowledge on Himalayan glaciers.

1.3.11 Sundarbans

1. The Sundarbans would be a key component of the proposed Integrated Coastal Zone Management Project, with an allocation of Rs 191.20 crore for various initiatives in the region. These include allocations for ecotourism, coastal erosion protection, livelihood improvement of village communities, and construction of cyclone shelters.
2. Indo-Bangladesh Forum on the Sundarbans is being established to jointly address issues of the region, recognising that the entire Sundarbans region is one ecosystem — 40 per cent of which is in India and the remaining 60 per cent in Bangladesh.

1.3.12 Transparency in environmental and forestry clearances

1. There has been a determined effort to bring greater transparency and professionalism in the granting of environmental and forestry clearances. The status of all pending cases is now available with relevant details on the MoEF website. Environmental appraisal committees have been reconstituted to ensure that there is no conflict of interest. Regular monitoring of pending cases in crucial sectors is taking place with the ministries concerned. This is already having impact.
2. Fourteen strategic defence roads have been given final forest approval, another 11 have been given first-stage approval and a further 10 have been cleared by the Standing Committee of the National Board for Wildlife.
3. Coal mining projects will get environmental approval based on the ultimate production capacity thereby obviating the need for repeated clearances when expansion takes place.
4. A system of mandatory accreditation of EIA/EMP consultants has been introduced by the MoEF to improve the quality of impact assessment reports submitted by project proponents.

1.3.13 Website

As part of a continuous and ongoing process to bring more transparency and citizen-friendliness into its functioning and to become a more accountable and transparent ministry, the MoEF launched a new website with a brand new interface on 29 September 2009.

1. The website provides a comprehensive, online database for all documents and reports published by the Ministry across all divisions. Press statements are issued through the medium of the website. Draft legislations and rules are regularly put up for inviting comments.
2. The website is updated on a real time basis that is, information is disclosed on the website as soon as it is discussed. Queries received from users are addressed by a dedicated web team.

1.3.14 Wildlife

1. Tripartite MoUs with all tiger states, to ensure reciprocal commitments to address ecological and administrative issues have been signed, with the Central and State Governments and Field Directors as signatories with clear responsibilities.
2. Guidelines for the Special Tiger Protection Force have been revised to include role for local communities in protection and conservation of tiger reserves.
3. In principle approval for four new Project Tiger Reserves has been granted – Ratapani (MP), Sunabeda (Orissa), Pilibhit (UP) and Sahyadiri (Maharashtra).
4. Special crack-teams have been sent for improving the status of tiger reserves affected by left wing extremism.
5. 'mStripes', a state-of-the art monitoring programme for tigers, to ensure better protection and forecasting of the ecological status in the surrounding areas has been launched.
6. TigerNet, a website for real time monitoring of tiger- related crime has been launched and all such information is being put in the public domain.
7. Several steps taken to strengthen the Wildlife Crime Control Bureau (WCCB) and increased resources have been provided for the organisation.

1.3.15 Finance Commission Grant

1. The Thirteenth Finance Commission has provided Rs. 5000 crore as 'Forest Grant' to states for five years from 2010-11, for forest protection and development. The grant is linked to the extent of standing forest in each state and essentially rewards states for maintaining the forest cover. The criteria used for providing the grant to states are (i) total forest area of the state, (ii) share of forested area greater than the national average, and (iii) the quality of forest as measured by density. All data on forested areas and on the forest density are as defined and quantified in the State of Forest Report, 2009.

1.3.16 National Green Tribunal

A Bill to set up a National Green Tribunal (NGT) has been passed by the Parliament.

1.4 Goals for the next year (2010-11)

The key policy initiatives and other important measures planned for the next year (2010-11) include the following:

1. Finalisation and launch of the Green India Mission under the National Action Plan on Climate Change, with clear objectives, targets and institutional structure. This is to be done following a series of public consultations across India on the draft mission document, which is being placed on the Ministry's website.
2. Amendments to the Wildlife (Protection) Act, 1972, to reflect concerns related to wildlife which are not adequately reflected in the current legislation.
3. Launch of a comprehensive, real-time, web-based monitoring system utilizing remote sensing images and GIS, to monitor works undertaken with CAMPA funds in the States. Ultimately, this system will be extended to the National Afforestation Programme as well as investments made under the Green India Mission
4. Launch of the Integrated Coastal Zone Management project, with pilot projects in Gujarat, Orissa and West Bengal.
5. Cumulative Environmental Impact Assessments (EIAs) for key regions to replace case-by-case approvals. In addition, carrying capacity studies in selected river-basins to be undertaken.
6. Series of programmes to protect biodiversity in the International Year of Biodiversity (2010). As a mark of its commitment to biodiversity conservation, India will also host the Eleventh Conference of Parties to the Convention on Biodiversity in October 2012.
7. Finalisation and notification of new Plastics (Manufacture, Usage and Waste Management) Rules, to reflect recent concerns on use of plastics.

CHAPTER 2

State of the Environment

2.1 Introduction

The basic purpose of the *state of environment* reporting is to present an overview of the environmental situation, create awareness about environmentally sustainable development, and enable policy formulation and articulation of strategy based upon analytical and informed decision-making.

This chapter presents an overview of different environmental components – viz. air, water, solid waste, land and forestry, and biodiversity and wildlife resources, particularly in the last ten years and highlights the issues and challenges faced by the country along with measures undertaken by the Ministry to address these challenges.

2.2 Air environment

Increased vehicular fleet, industrial expansion, and increase in use of diesel generator sets have contributed towards increase in air pollution levels in almost all Indian cities. While ambient air pollution is a concern in most of the urban centres of the country; the problem of indoor air pollution plagues the rural areas of the country.

2.2.1 Ambient air quality

The Central Pollution Control Board (CPCB), which was constituted as the statutory organisation in 1974, has established the National Air Quality Monitoring Program (NAMP) to determine the air quality status and trends in various cities of the country. At present, three criteria air pollutants – sulphur dioxide (SO_2), nitrogen dioxide (NO_2), and fine particulate matter (PM 10) – are regularly monitored at 411 stations across 167 cities in the country. Apart from these pollutants, limited monitoring of other pollutants such as PM 2.5, ammonia, ozone, hydrocarbons (benzene, toluene, xylene), poly-aromatic hydrocarbons (PAHs), and heavy metals (e.g. lead), is carried out at select locations in some cities.

Figure 2.1 shows the percentage of cities with critical, high, moderate, and low levels of SO_2, NO_2

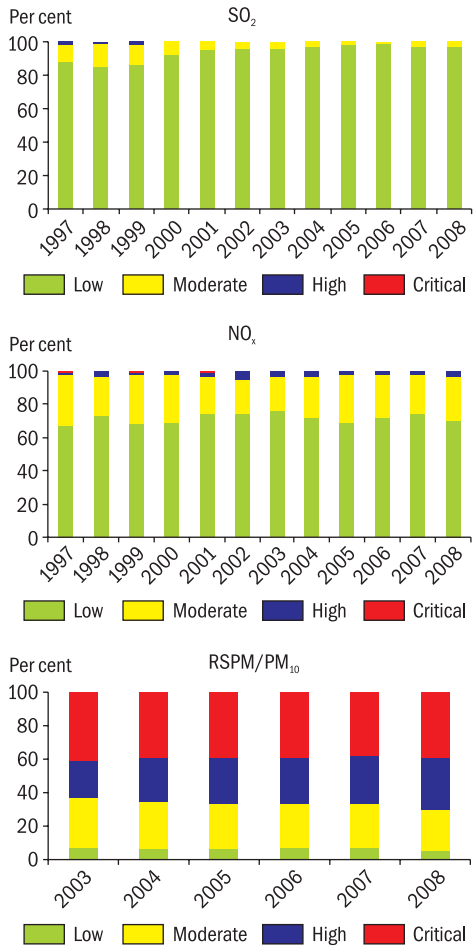

Figure 2.1 Percentage of monitoring stations exceeding NAAQS for the period 1997-2008.
Low: < 0.5 times of standard; Moderate: 0.5-1.0 times of standard; High: 1.0-1.5 times of standard; Cirtical: >1.5 times of standard
Source CPCB

and fine particulate matter (PM_{10}). It is seen that fine particulate matter (PM_{10}) has been a major concern as more than 60% of cities have high and critical levels of pollution recorded for the year 2008. In recent years, the percentage of stations showing high PM_{10} levels has increased. The cities in Northern India have high PM_{10} levels not only because of human activities but also due to higher natural background dust level and meteorological influences.

In case of SO_2, cities falling under low pollution category have increased from 81% in 1997 to 95% in 2008.

In case of NO_2, majority (>60%) of the cities lie in the low pollution category. During the period 2000-04, about 6%–8% of the cities showed high pollution levels. But after 2005, percentage of cites under the high pollution category has reduced.

2.2.2 Indoor air pollution

Apart from ambient air pollution, indoor air pollution is also a cause of concern in rural households mainly due to the use of biomass as a domestic fuel. While majority of households, in urban areas, use cleaner fuel such as LPG (liquefied petroleum gas), most households in rural areas are still using biomass for cooking.

Biomass used in traditional cook-stoves in rural Indian kitchens is the major source of particulate matter, carbon monoxide, and other pollutants. PM_{10} levels in the kitchens (using biomass) are higher.

The CPCB is working in association with Indian Institute of Technology, New Delhi to develop standard monitoring protocol.

2.2.3 Policy and legal measures

The Air (Prevention and Control of Pollution) Act, 1981, and the Environment (Protection) Act, 1986, lay down various emission standards. National Ambient Air Quality Standards (NAAQS) were adopted in 1982, and revised and notified in 1994 by the CPCB. These standards were revisited and notified for 12 pollutants (Table 2.1) in November 2009.

The revised standards have been developed in consonance with global best practices and in keeping with the advancement in technology and research. Some of the salient features include:

- Land-based standards which were applied earlier, have been done away with, so that industrial areas will have to conform to the same standards, as the residential areas
- The standards shall be applicable uniformly, with the exception of stringent standards for NO_2 and SO_2 in the Ecologically Sensitive Areas
- The previous standards for residential areas have been uniformly applied for fine particulate matter (PM_{10}), carbon monoxide, and ammonia. More stringent limits for lead, SO_2, and NO_2 have been prescribed, even for residential areas
- SPM as parameter has been replaced by fine particulate matter ($PM_{2.5}$), which is more relevant for public health
- Other new parameters, such as, ozone, arsenic, nickel, benzene, and benzo(a)pyrene have been included for the first time under NAAQS based on CPCB/IIT research, World Health Organisation (WHO) guidelines and European Union (EU) limits and practices

Table 2.1 New National ambient air quality standards

	Residential, industrial, rural, and other areas		Ecologically sensitive areas (notified by Central government)	
Pollutant	24-hourly standard (µg/m³)	Annual standard (µg/m³)	24-hourly standard (µg/m³)	Annual standard (µg/m³)
SO_2	80	50	80	20
NO_2	80	40	80	30
PM_{10}	100	60	100	60
$PM_{2.5}$	60	40	60	40
Ozone	180*	100**	180*	100**
Lead	1	0.5	1	0.5
CO	4000*	2000**	4000*	2000**
NH_3	400	100	400	100
As (ng/m³)		6		6
Benzene		5		5
BaP(ng/m³)		1		1
Ni (ng/m³)		20		20

Annual: Annual arithmetic mean of 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals

24 hourly or 8 hourly or 1 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

* 1-Hourly, ** 8-Hourly

Source CPCB

In addition, National Ambient Noise Monitoring Network is being established. During 2010/11, 70 monitoring stations would be established in seven cities for initiating ambient noise monitoring.

2.2.4 Impacts and key issues

Polluted air can impact both human health and the ecosystem. High levels of Acute Lower Respiratory Infection (ALRI) symptoms have been recorded in the country.

Higher levels of ozone can cause serious damage to the crops which include foliar injury, accelerated ageing, decreased plant growth, altered plant metabolism, and reduced crop yield. Air pollutants can also cause considerable damage to the buildings mainly due to acid rain.

2.2.5 Issues for debate

The key challenges regarding air pollution management are:

- Preparation of roadmap for monitoring ambient air as per the revised NAAQS, 2009
- Development of monitoring protocols for ambient air (as per the revised NAAQS, 2009) and indoor air quality parameters
- Devise prevention strategies to curb PM_{10} and NO_2 pollution in urban environment
- Prepare strategy to reduce/check ambient noise levels in the urban environment

2.3 Water environment

Clean and adequate good quality water is one of the most crucial inputs for human survival and sustainable development, thereby, necessitating its careful management and use. Increasing population, urbanization, and growing demand from agriculture and industry have brought the country's water resources under pressure.

2.3.1 Impacts and key issues

The quality of surface water sources (like rivers, lakes, and pond and wetlands) and groundwater sources is an issue of concern. The pollution load on rivers has increased over the years due to rapid urbanization and industrialization. Abstraction of water for irrigation, drinking, industrial use, and power compounds the challenge.

The CPCB has identified 150 polluted stretches of rivers in the country in five priority categories depending upon the risk, that is, degree/frequency of violation with respect to water quality criteria for drinking water sources. This has been done on the basis of analysis of the water quality data for the years 2002–2008.

2.3.2 Conservation of rivers

The launching of the Ganga Action Plan (GAP) Phase I as a centrally funded scheme, in 1985, was the beginning of the river cleaning programme, with the objective of improving the water quality of the Ganga to acceptable standards by intercepting, diverting, and treating the sewage. GAP Phase I was extended to GAP Phase II, which was approved in various stages during 1993-96. GAP Phase II was merged in late 1996, with the National River Conservation Plan (NRCP), a centrally sponsored scheme for pollution abatement in rivers. The major rivers are Ganga along with Yamuna, its major tributary. Pollution abatement works under the NRCP are implemented on a cost-sharing basis between the Centre and states through implementing agencies nominated by the states and functioning under their control.

2.3.3 Water quality monitoring of rivers

Under the NRCP, water quality of rivers is regularly monitored to evaluate the impact of pollution abatement schemes under implementation in towns, located along identified polluted stretches of rivers.

Presently, Water Quality Monitoring (WQM) is carried out by scientific institutes/universities of repute, situated along the river, having necessary infrastructure facilities and capability to undertake this activity. Monthly monitoring of water quality is done for nine core parameters and site-specific heavy metals. Performance monitoring of sewage treatment plants, as third party evaluation, is also included under WQM, as and when the sewage treatment plants (STPs) are commissioned. A uniform protocol on WQM has been notified for guidance on sampling and analysis.

Besides Ganga, water quality monitoring has also been undertaken for rivers namely, Yamuna, Western Yamuna Canal, Gomti, Hindon, Satluj (Punjab), Cauvery (Tamil Nadu), Tunga, Bhadra and Tungbhadra in Karnataka, and the waterways

in Chennai (Tamil Nadu). The present number of monitoring stations is 158 in 10 rivers and waterways in the country.

2.3.4 Policy and legal measures

The principle legislation on pollution of surface and groundwater resources is the Water (Prevention and Control of Pollution) Act 1974. State Pollution Control Boards (SPCBs) are also authorised to levy and collect a water cess under the Water (Prevention and Control of Pollution) Cess Act 1977 on water consumed by persons operating and carrying on certain types of industrial activities. This cess is collected with a view to augment the resources of the Central Board and the State Boards for the prevention and control of water pollution.

2.3.4.1 National River Conservation Plan

The NRCP covers polluted stretches of 38 rivers in 167 towns spread over 20 States. The total sanctioned cost of schemes taken up so far under the Plan is more than Rs 5000 crores. The works undertaken for pollution abatement in rivers under the Plan include interception and diversion to capture the raw sewage flowing into rivers through open drains and diverting them for treatment by (STPs) set up under the Plan. The non-core works under the Plan include River Front Development (RFD), Low Cost Sanitation (LCS), Electric Crematoria, and Improved Wood Based Crematoria, etc. A total sewage treatment capacity of 4000 million litres per day has been created under the Plan. Creation of civic infrastructure for sewage management and disposal are also being implemented under other central schemes, such as Jawaharlal Nehru National Urban Renewal Mission, Urban Infrastructure Development Scheme for Small and Medium Towns, as well as under state schemes. Prevention and control of industrial pollution is being taken care of by the SPCBs.

The pollution abatement works undertaken has reduced the pollution load in the rivers. For example, with the works completed so far under GAP Phase I and II, in spite of a phenomenal increase in urban population in cities along the banks of the river, the water quality of the river Ganga has shown improvement at major locations over its pre-GAP quality.

2.3.4.2 National Lake Conservation Plan

The National Lake Conservation Plan (NLCP) was launched in 2001. Conservation measures under this Plan cover 58 lakes in 14 states. Prominent among these are: Lake Powai in Mumbai (Maharashtra), Dal Lake in Srinagar (Jammu and Kashmir), Lakes Nainital and Bhimtal in Uttarakhand, Lakes Ooty and Kodaikanal in Tamil Nadu, Lake Mansagar in Jaipur (Rajasthan), and several smaller lakes in Karnataka. The works on the conservation of 18 of these lakes has been completed so far.

2.3.4.3 National Wetland Conservation Programme

With an intention to provide policy guidelines, the Government of India operationalized the National Wetland Conservation Programme (NWCP) in collaboration with the concerned state governments during the year 1987. The programme aims to provide policy guidelines for the conservation and management of wetlands in the country, providing 100% financial assistance for undertaking conservation measures in identified wetlands. It also aims to monitor implementation of the programme, and prepare inventory of the wetlands. So far the Ministry has identified 115 wetlands under the NWCP and financial assistance is made available to state governments on the basis of Management Action Plans and for undertaking multi-disciplinary research projects by academic/management/ research institutions in order to suggest measures for better conservation and management options.

2.3.5 Recent initiatives

The Central Government set up the National Ganga River Basin Authority (NGRBA) on 20 February 2009 under the chairmanship of the Prime Minister, as an empowered planning, financial, monitoring, and coordinating authority to ensure effective abatement of pollution and conservation of the river Ganga by adopting a holistic approach with the river basin as the unit of planning. The first meeting of the NGRBA held on 5 October 2009 resolved that by the year 2020, it will be ensured that no untreated municipal sewage or industrial effluent flows into the Ganga. Several measures like priority action for pollution hotspots, constitution of State River Conservation Authorities (SRCAs) for better coordination, signing of tripartite Memorandum of Agreements with states/urban local bodies for improved implementation and operation

and maintenance of assets have been initiated under the NGRBA.

2.3.6 Issues for debate

Urban water supply and sanitation are important basic needs for improving the quality of life and enhancement of productive efficiency of the people. With the enhancement of drinking water supply to urban areas, wastewater generation is increasing. If this wastewater is not collected, treated, and disposed of properly, it will directly contribute to the pollution of the local freshwater supplies thereby affecting both public health and the ecosystem.

Urban environmental management is one of the most pressing issues as the trend of urbanization continues globally. Among the challenges faced by urban planners is the need to ensure ongoing basic human services such as the provision of water and sanitation.

The sewage generation from Class-I and II towns has been estimated by the CPCB at 38 254 million litres per day (mld), out of which only 11 787 mld is being treated. Therefore, a capacity gap of 26 467 mld needs to be urgently addressed.

2.4 Solid waste management

Solid waste generation is predominantly an industrial and urban problem, which has exacerbated over the years due to changing lifestyles and increasing consumerism, resulting from rapid urbanization, and economic growth. There is a need to set up adequate waste collection, processing, and disposal facilities to cope with the rising levels of waste generation to protect human health and the environment.

Municipal solid waste

As per CPCB estimates, around 57 million tonnes per annum of municipal solid waste (MSW) is presently generated in the country. Since disposal of MSW is primarily through landfills, increasing quantities of waste will require more land for its disposal, rendering the limited resource out of productive use.

The MSW in India has high moisture content (45%–65%) and calorific value, at 550-3600 kcal/kg. The density of waste is 330-560 kg/m^3, and the C/N (carbon/nitrogen) ratio is between 25 and 30. The organic fraction of the MSW is hence suitable for composting. At present, the country has a rated capacity of processing around 6000 tonnes per day of mixed waste into compost. However, the efficiency of the compost plants needs to be enhanced for them to become competitive.

It is estimated that about 10 000 tonnes per day of plastic wastes are generated in India, which amount to about 9% of the total waste generation. Although nearly 60% of this waste is recycled, the management of certain types of plastics like thin polythene bags and PET bottles still remains a matter of concern due to low collection efficiency.

Industrial solid wastes

According to recent estimates, 6.23 million tonnes of hazardous wastes are being generated by 36 135 industrial units in the country, as compared to 4.4 million tonnes from 26 566 units in 2006.

In addition to hazardous waste, about 130 million tonnes of fly-ash is generated from thermal power plants.

Biomedical waste

Biomedical waste (BMW) comprises waste generated from hospitals, health care facilities, and health research laboratories. BMW is estimated to be only a small fraction of the MSW generation. About 80% of this waste – called 'general waste' – is non-infectious and if segregated can be managed as MSW. However, the remaining 20% is infectious and hazardous and hence is required to be treated in dedicated facilities.

E-waste

The IT industry in India has witnessed unprecedented growth in recent years, leading to a significant increase in e-waste generation. The city of Mumbai currently tops the list of major e-waste generating cities, at around 11 017 tonnes per annum, followed by Delhi at 9730 tonnes, Bangalore 4648 tonnes, Chennai 4132 tonnes, and Kolkata 4025 tonnes.

Recycling of e-waste involves handling toxic materials such as lead, cadmium, mercury, brominated flame retardant, and polyvinyl chloride (PVC). All these result in environmental and health hazards if not properly handled. Though, there are 14 authorised e-waste recyclers, there is a need to enhance the recycling facilities.

2.4.1 Policy and legal measures

The Ministry notified the Municipal Solid Wastes (Management and Handling) Rules in 2000, making

it mandatory for municipal authorities to set up waste processing and disposal facilities, identify sanitary landfill sites, and improve existing dumpsites. The compliance however remains low, mainly because of the inability of municipalities to implement waste segregation, and lack of institutional and financial means to implement waste processing and disposal schemes.

Efforts have been initiated for bringing the informal waste recycling sector into the formal stream for e-waste collection and segregation to form a cooperative/society and then get registered with the CPCB.

To address industrial waste issues, the Ministry notified the Hazardous Wastes (Management and Handling) Rules in 1989 (amended in 2000 and 2003) and Hazardous Wastes (Management, Handling and Transboundary Movement) Rules in 2008. The 1989 Rules were drafted to enable regulatory authorities to control the handling, movement, and disposal of hazardous wastes generated within the country. The amendment in 2000 and 2003 were largely aimed at harmonizing the definition of hazardous waste with provisions of the Basel Convention. The 2008 Rules bring issues of e-waste management into the ambit of hazardous waste management.

The Biomedical Waste (Management and Handling) Rules were issued in 1998 (amended in 2000 and 2003). The Rules are based on the principle of segregation of general waste from BMW. They lay out colour codes for containers, and treatment and disposal options for 10 categories of waste. The state governments have taken initiatives for setting up of Common Biomedical Waste Treatment Facilities (CBWTFs) for processing and disposal of waste.

2.4.2 Impacts and key issues

The indiscriminate littering and dumping of waste causes severe health risk to people, either through direct exposure or indirectly through contamination of surface and groundwater. The unsanitary disposal sites become prolific breeding grounds for insects and rodents, which act as disease vectors. Burning of garbage in open dumps causes air pollution leading to release of certain extremely hazardous persistent organic pollutants such as dioxins and furans.

Solid waste dumps also impact the global environment by releasing methane, which is a highly potent greenhouse gas. Besides environmental concerns, the social dimension of the problem also needs due attention. Solid waste disposal sites in India are often a source of livelihood for the urban poor, who locate their residences in proximity to these sites, making them highly susceptible to health disorders.

The mechanism of disposal of hazardous wastes lacks proper enforcement resulting in abandoned hazardous waste dumps. These abandoned disposal sites have the potential to cause soil and groundwater contamination due to heavy metals and other toxic compounds, some of which bio-accumulate through the food chain, thereby posing long-term health risks.

2.4.3 Recent initiatives

2.4.3.1 Treatment/disposal facilities

Common treatment, storage, and disposal facilities (TSDFs) have been developed for the disposal of land-disposable hazardous waste at 26 different places in 13 states—Gujarat (8), Maharashtra (4), Uttar Pradesh (3), Andhra Pradesh (2), and one each in Himachal Pradesh, Madhya Pradesh, Punjab, Rajasthan, Tamil Nadu, West Bengal, Karnataka, Kerala, and Daman and Diu. There are 10 incinerators in these common facilities. In addition, there are 127 captive incinerators spread across 12 states in the country to treat incinerable waste.

2.4.3.2 Co-incineration of high calorific value waste

CPCB has carried out trial runs for co-incineration of high calorific value hazardous waste streams such as Effluent Treatment Plant (ETP) sludge, TDI (toluene di-isocyanate) tar waste, paint sludge, refinery sludge, and tyre chips in cement kilns. The CPCB has also issued guidelines on co-processing of waste in cement, power, and steel industry sectors in February 2010. In addition to identifying possible waste streams which can be co-processed, the CPCB also provides waste acceptance criteria and emission standards for facilities processing such wastes.

2.4.3.3 Hazardous waste recycling

The CPCB provides registration to facilities equipped to recyle hazardous waste. Registration is provided for waste processors in the following categories:

- Lead waste processing
- Non-ferrous metal processing
- Used/waste oil processing

- E-waste recycling
- Paint sludge processing

2.4.3.4 Clean technology initiatives

Clean technologies, as distinct from 'end-of-pipe' abatement technologies, minimize the generation of waste streams in the production processes and utilize waste from other processes, rather than treating the waste after generation. In general, clean technologies are less intensive in use of raw materials and energy than conventional technologies, which rely on pollution abatement after generation. For this reason, they may also offer significant cost advantages to the producer. Key initiatives taken by the Ministry are:

- Development and adoption of clean technology options for Small and Medium scale Enterprises (SMEs)
- Financial assistance for pilot-scale demonstration projects to research institutions of the country for development and promotion of clean technology
- The Ministry has taken initiatives to create a Database for Clean Technologies available in India and abroad and networking of all the research institutions who are engaged in developing clean technologies. A study has also been initiated to find out the possibilities to provide financial assistance to SMEs and to develop capacity building in the financial institutions for quick appraisal of the clean technology projects.

2.4.3.5 Waste minimisation circles

To reduce and utilize the waste generated by SMEs, waste minimization circles (WMCs) have been established. These aim to reduce both resource and energy intensity in the participating SME units in a holistic manner. A total 153 WMCs have been established till date in 41 industrial sectors, which benefit 6000 SME units. Operation of these WMCs have resulted in reduction in the use of resources such as water (10%-35%), electricity (15%-20%), fossil fuel (10%-20%), raw materials (10%-20%), wastewater generation (10%-30%), air emissions (5%-10%), and solid waste (5%-20%). Use of WMCs has also resulted in yield improvement of 2%-5% in participating units.

2.4.3.6 E-waste recycling facilities

According to the CPCB, fourteen e-waste recycling units, with annual installed capacity to handle 61370 tonnes of waste have been set up in different parts of the country. These units are authorized by respective SPCBs to handle and recycle e-waste in an environmentally sound manner.

2.4.3.7 Inventory of abandoned dumps

Inventory of abandoned dumps was carried out by SPCBs. There are at present 92 abandoned dumps spread across various states. Rehabilitation of these waste dumps has been initiated by respective SPCBs. A pilot project for remediation of contaminated sites and to draw up the National Action Plan with the assistance of the World Bank has been under taken.

2.4.3. 8 Fly ash utilization

In recent years, due to sustained efforts of various initiatives and fly ash use notifications in 1999 and 2009, the utilization of fly ash has gone up considerably (around 66.64 million tonnes per annum) and power plants are now getting revenues for giving fly ash to various users instead of having to pay for its pick-up.

2.4.3.9 Common biomedical waste treatment facilities

Common Biomedical Waste Treatment Facilities (CBWTFs) have been set up in various cities for treatment of bio-medical waste generated in various hospitals and nursing homes. At present there are 177 CBWTFs operational in India. The CPCB monitors the performance of these CBWTFs and provides guidelines to improve their compliance with the BMW rules.

The Ministry has a scheme for providing financial assistance to set up CBWTFs under the public–private partnership (PPP) mode. The scheme for providing financial assistance for setting up common treatment and disposal facilities for hazardous and biomedical wastes and for recycling of e-waste is being revamped, so as to make it more attractive to state governments.

2.4.3.10 Awareness creation

The CPCB has developed a 40-minutes video film on bio-medical waste management in order to generate awareness about safety standards. The film covers all aspects of bio-medical waste management—segregation, packaging, storage, transportation, and treatment and disposal vis-à-vis the regulatory requirements under the Biomedical Waste (Management and handling) Rules, 1998, and amendments thereof. The film has been useful in imparting training to all those concerned directly or

indirectly with generation and management of bio-medical waste.

2.4.4 Issues for debate

While we do have a robust regulatory framework in place, the main challenge is to ensure effective implementation for sustainable waste management. Some of the priority areas that need to be considered are:

- Incentivizing PPP for creating the required treatment/disposal infrastructure
- Promoting utilization of hazardous waste as supplementary resource of energy
- Managing the exponential growth of e-waste by putting in place a separate regime of regulatory frameworks and channelizing e–waste from the informal sector to the formal sector to ensure recycling in an environmentally sound manner
- Capacity building of agencies/ bodies both at the central and state levels responsible for implementation and monitoring of waste management rules. This would include strengthening the customs personnel at ports to prevent illegal entry of hazardous wastes into the country.

Apart from these issues, there are four main issues affecting propagation of Clean Technology and Waste Minimisation Schemes. These are:

- Adoption of Clean Technologies by the SME sector;
- Development of Indigenous Clean Technologies for SMEs, which are economical and suitable to Indian conditions;
- Provision of financial assistance to SMEs for switching over to cleaner options; and
- Need to establish at least 500 WMCs across the country.

2.5 Forestry

India's forests support a rich collection of biological diversity, supply a range of products and ecosystem services, and provide the basis of livelihood for millions of forest communities in the country. The rising pressure for supply of goods and services is resulting in the over-utilization of the country's forests. In spite of relatively stabilized forest cover and marginal improvement since the 1990s, the quality of the resource remains a concern.

The forest and tree cover of the country is 78.37 million hectare (m ha), accounting for 23.84% of the geographic area of the country. Out of this, the forest cover is about 69.09 m ha, which constitutes 21.02% of the geographic area of the country. Of this 8.35 m ha (2.54%) is very dense forest, 31.90 m ha (9.71%) is moderately dense forest, and the rest 28.84 m ha (8.77%) is open forest, including 0.46 m ha of mangroves. The forest cover of India increased from 65.96 m ha in the 1997 assessment to 69.09 m ha in the current assessment, that is, an increase of 3.13 m ha (4.75%). India is one of the few developing countries in, which, despite biotic pressure and economic development, the forest cover continues to increase.

2.5.1 Policy and legal measures

Under the provisions of the Forest (Conservation) Act, 1980, prior approval of the Central Government is essential for diversion of forest land for non-forestry purposes. The basic objective of the Act is to regulate the indiscriminate diversion of forest land for non-forestry uses and to maintain a logical balance between the developmental needs of the country and the conservation of natural heritage. These guidelines have been issued under the Act, from time to time to simplify the procedures, cut down delays, and to make the Act more user-friendly. To ensure this, recently, new rules under this Act have been framed and notified in January 2003 by the Ministry.

The Ministry has been proactively involved in coordinating the implementation of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 along with the Ministry of Tribal Affairs.

For diversion of forest lands for non-forestry purposes such as developmental needs for drinking water projects, irrigation projects, power transmission lines, railway lines, roads, power projects, defence-related projects, mining, and so on, compensatory afforestation is stipulated and catchment area treatment plan, wildlife habitat improvement plan, and rehabilitation plan are being implemented to mitigate the ill effects of diversion of such vast areas of green forests. To accelerate afforestation activities, an *ad hoc* Compensatory Afforestation Management and Planning Authority (CAMPA) had been established. Funds of over Rs 13000 crores were credited by the state government and union territories, received from the user agencies towards compensatory

afforestation, additional compensatory afforestation, penal compensatory afforestation, Net Present Value, and all other amounts recovered from such agencies under the Forest (Conservation) Act, 1980. In July 2009, guidelines were issued by the Government of India for setting up of state CAMPA for administration of the fund and to utilize the resources so collected for undertaking protection and regeneration of forests, infrastructure development, wildlife protection, and other related activities.

To create awareness about forestry and plantation issues among the people, World Forestry Day is being observed on 21 March by this Ministry.

2.5.2 Externally aided projects

The Ministry, in order to supplement the efforts to increase the forest cover, is also implementing ten state-level externally aided projects through various state governments and one central-level capacity building project, with financial aid from external donor agencies like Japan International Cooperation Agency (JICA) and the World Bank. These projects are reimbursed their actual expenditure as per the loan agreements. The funds are utilized for rehabilitation of forest land with the aim to increase forest cover, improve the quality of life in the villages adjoining forests, ensure people's participation, strengthen JFM institutions, augment availability of fuel-wood and fodder, promote farm forestry, agro-forestry, water and soil conservation measures, encourage tree growing on private land, and greening of the urban areas in accordance to the objectives envisaged in various projects under implementation.

2.5.3 Impacts and key issues

2.5.3.1 Degradation of forests

Degradation of forest is an important issue. It affects provision of various services by the forests. Some of the important factors responsible for degradation include demand and supply gap of forest products, encroachments, shifting cultivation, and forest fires.

2.5.3.2 Demand and supply gap of fuel-wood, fodder and timber

There exists a substantial demand-supply gap of forest products such as fuelwood, fodder, and timber. This often leads to unsustainable utilisation, thereby, resulting in degradation of the forests.

2.5.3.3 Forest fires

Fires affect a large area of forests in the country. Most of these fires are manmade and are created to facilitate extraction of a variety of Non-Timber Forests Products (NTFPs) like tendu leaves, sal seeds, and honey; to have a good yield of grass, and for clearing the forests for shifting cultivation purposes. Forest fires result in loss of biodiversity and affect the productivity of the entire ecosystem.

2.5.3.4 Livelihoods of forest dependent communities

More than 100 million rural people depend on the sale of NTFPs for their livelihoods. It is estimated that NTFP-based small-scale enterprises provide up to 50% income for 20%-30% of the rural labour force. However, in India the potential of the forests for provision of livelihoods and economic incentives is still under-achieved.

Collection and trade in many of the revenue generating forest products like tendu leaves, some medicinal and aromatic plants and timber from valuable species like teak and deodar are controlled by the state. Communities are provided wage labour towards harvesting and other activities.

In addition, small-scale forestry enterprises (SSFEs) produce a range of products including charcoal, sawn timber, furniture, paper, ply board, and herbal medicines. The importance of this sector can be gauged by the fact that 98% of sawmills, 87% of the plywood factories, and 94% of the paper mills of the country fall in this category. A large number of SSFEs operate informally. Usually, they use outdated technologies, operate under sub-optimal conditions, and have poor vertical integration that results in inefficiencies and low returns.

2.5.4 Recent initiatives

Efforts are being made by the Government to bring more area in the country under tree/forest cover to reach the target of 33% as mandated in the National Forest Policy, 1988, by afforestation on degraded wastelands.

Initiatives have also been undertaken, to enhance community participation through a new scheme of *Afforestation through PRIs* (Panchayat Van Yojna) being undertaken for afforestation on vacant public land involving PRIs. The scheme aims at bringing all unutilized/underutilized non-farming village land under tree cover with village institutions having decision-making authority on its management.

Decentralization of forests management by involving local people in regeneration and management of degraded forests is also a focus area of the Ministry. A new state plan scheme titled Accelerated Programme of Restoration and Regeneration of Forest Cover has been introduced during 2009-10 for providing additional central assistance to afforestation efforts.

To promote Sustainable Forest Management (SFM) through market-driven mechanism, the Ministry has constituted a National Forest Certification Committee for development of forest certification criteria, certification process, and accreditation criteria for timber and non-timber forest products.

For managing mangroves more effectively, the Ministry has decided to work out modalities for setting-up a 'National Institute for Research in Mangroves and Coastal Bioresources' in West Bengal, in proximity to the Sundarbans.

2.5.5 Issues for debate

2.5.5.1 Low productivity

The forest productivity in India is low compared to the global average. The Mean Annual Increment (MAI), which is a measure of forest productivity, is 0.7 cu m/ha for Indian forests as against the world average of 2.1 cu m/ha. This has resulted in a demand-supply gap in various forest products thus leading to forest degradation.

2.5.5.2 Ownership and management

Though ownership of forests is largely with the government, with forest departments being the biggest custodian, there is increasing involvement of communities in management of forests over the years. The JFM programme is emerging as the alternative management strategy in India. It is estimated that around 100000 Joint Forest Management Committees (JFMCs) formed under JFM are managing around 28% of the total forest area of the country in collaboration with the state forest departments. However, 69% of the forest area continues to be managed by the government, predominantly, the forest departments alone.

2.6 Biodiversity and wildlife

India is recognized as a mega-diverse country owing to its rich biodiversity, which has evolved over the millennia across its varied bio-geographic zones (Figure 2.2). It is home to over 91200 species

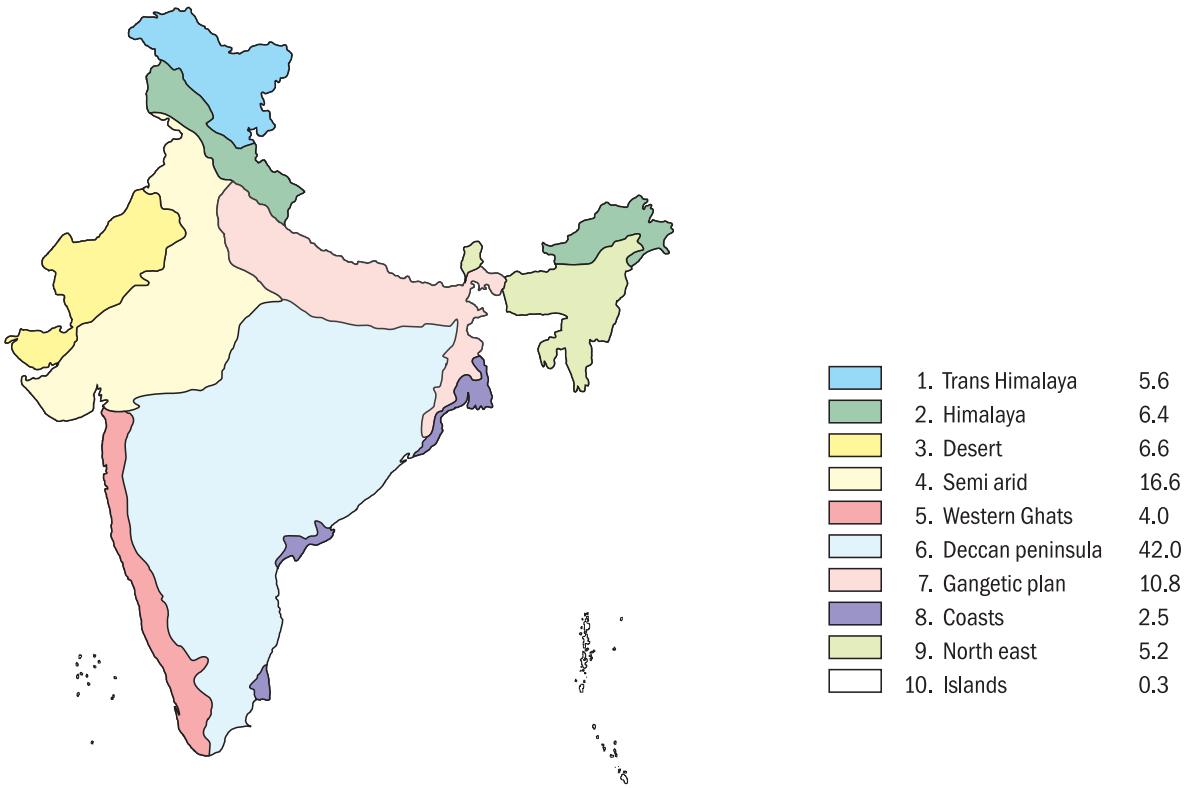

Figure 2.2 Bio-geographic zones in India

of animals and 45500 species of plants and has four identified hotspots.

India is home to about 7.6% of all mammalian species, 12.6% of avian species, 6.2% of reptilian species, and 6.0% of flowering plant species. Due to increasing anthropogenic pressures, many species are under threat.

2.6.1 Policy and legal measures

India has enacted a national legislation titled the Biological Diversity Act, 2002 and Biological Diversity Rules, 2004 to give effect to the provisions of the Convention on Biological Diversity (CBD), to which, India is a party. The salient features of the Act include:

- Ensure conservation and sustainable use of biodiversity;
- Regulate access of biological resources, associated knowledge for fair and equitable benefit sharing;
- Respect and safeguard the knowledge of local communities regarding biodiversity;
- To secure sharing of benefits with local people as conservers of biological resources and associated knowledge;
- Declare areas of conservational relevance as Biodiversity Heritage Sites;
- Protect and rehabilitate threatened species through a three-tier institutional structure in consonance with the Panchayati Raj system of India.

The three-tier institutional structure includes the National Biodiversity Authority (NBA), State Biodiversity Boards (SBBs), and the local-level Biodiversity Management Committees (BMCs).

NBA performs the functions of laying down procedures and guidelines to govern the activities provided under the Biological Diversity Act. The other functions of NBA include:

- Building up database and documentation system;
- Creating awareness through mass media;
- Training of personnel;
- Taking necessary measures in the areas of intellectual property rights (IPR);

Each state (except union territory) is required to establish an SBB. The Board advises the State Government on matters relating to conservation and equitable sharing of benefits and regulate commercial utilization of any biological resource by Indians.

As prescribed under the Act, every local body shall constitute a Biodiversity Management Committee (BMC). The main function of the Committee is to prepare People's Biodiversity Register (PBR) and advise State Boards or concerned authorities on decisions relating to the use of biological resources and associated knowledge. The BMCs are intended to be part of the Panchayati Raj system of the Indian Government at the village level. The Act also provides for a Biodiversity Fund at national, state and local levels.

Wildlife (Protection) Act, 1972 amended from time to time provides for a strong legal instrument for the creation of protected areas and conservation of wildlife in the country. A vast protected area (PA) network has been instrumental in the conservation of biodiversity, especially wildlife in India. These PA networks consist of national parks, wildlife sanctuaries (WLS), conservation and community reserves. At present, India has 661 PAs, covering about 4.76% of the country's geographical area. There are 39 Tiger Reserves and 27 elephant reserves. Five PAs have been declared as World Heritage Sites by UNESCO, in view of their uniqueness and richness in flora and fauna. Some of the landmark initiatives taken to protect and conserve wildlife in the country are: the launch of Project Tiger (1973) and Project Elephant (1992) and the implementation of CSS of 'Assistance to National Park and Sanctuaries'. The latter scheme is now modified and renamed as 'Integrated Development of Wildlife Habitats' to include programmes for conservation of wildlife outside PAs and programmes for recovery of endangered species like snow leopard, hangul, vulture, sanghai deer, gangetic dolphin, wild buffalo, and bustards. India is signatory to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), International Union for Conservation of Nature and Natural Resources (IUCN), International Whaling Commission, Convention of Migratory Species, and the World Heritage Convention.

As per the findings of the recent (2008) all India estimation of tigers using the refined methodology, the total country-level population of tigers is 1411 (mid-value); the lower and upper limits being 1165 and 1657 respectively. The recent assessment of the tiger population is based on determining spatial occupancy of tigers throughout potential tiger

forests and sampling such forests using camera traps in a statistical framework. This assessment is not comparable to the earlier total count using pugmarks owing to several shortcomings in the latter method. The new findings indicate a poor status of tiger population in areas outside tiger reserves and protected areas. By and large, the tiger population in tiger reserves and protected areas of such states is viable, though it requires ongoing conservation efforts. Reintroduction of tigers in Sariska and Panna are the programmes, which are unique and first of its kind in the world.

In the past one decade, there has been a shift away from state control to a more people-centric approach, for management of PAs, mainly to elicit community participation and foster harmony amongst all concerned stakeholder, and hence achieve the overall aim of conserving biodiversity. Also, the relocation package, following the report of the Tiger Task Force, has been enhanced to Rs 10 lakh per family from the earlier norm of Rs 1 lakh. This is expected to facilitate creation of inviolate areas, at least in the core area to begin with.

2.6.2 Impacts and key issues

The key issues for biodiversity and wildlife conservation are 1) fragmentation and degradation of wildlife habitats which is adversely affecting the population of many wild animal species. Increase in man–animal conflict is also linked to this; 2) increase in demand for wildlife and wildlife products globally, resulting in poaching; 3) increase in livestock population in and around PAs. It is one of the reasons for decline in herbivore population and a constant threat for spread of disease in wild animals.

2.6.3 Recent initiatives

The Ministry has taken several measures to protect and conserve some of the ecologically rich and sensitive areas, which are currently covered through the PA networks.

Under the Biosphere Reserve scheme, states have been advised to prepare a long-term perspective plan to analyse issues related to loss of rare plants. In order to facilitate effective rescue and rehabilitation of endemic rare plants, lead gardens are being promoted in each phyto-geographic zone of the country. Nine such lead gardens have already been adopted for improving their facilities.

In the wake of the tiger crisis in Sariska, a Tiger Task Force was constituted by the National Board for Wildlife, chaired by the Prime Minister, to strengthen tiger conservation in the country. The recommendations of the Tiger Task Force, by and large, have been implemented. These include amendment of the Wildlife (Protection) Act in 2006; creation of the National Tiger Conservation Authority w.e.f. 4th September, 2006; creation of the Wildlife Crime Control Bureau w.e.f. 6 June 2007; all-India tiger estimation, using the refined methodology, as approved by the Tiger Task Force; finalizing the relocation of villages from the core/ critical tiger habitats; enhanced village relocation package, issuing guidelines for delineation of buffer areas and initiatives for developing ecotourism guidelines to benefit local people; assessment of tiger reserves by an independent panel and placing the same in the Parliament, guidelines for preparing Tiger Conservation Plan, and suggesting strategies for protection of each reserve including those affected by left-wing extremism.

2.6.4 Issues for debate

Rise in the cases of international bio-piracy highlight the urgent need to resolve complexities in access and benefit sharing of the available resources to ensure that its benefits reach the traditional users.

The above aspect has been recognized by the Convention on Biological Diversity (CBD), which establishes three broad goals: (1) conservation of biological diversity, (2) sustainable use of its components, and (3) fair and equitable sharing of the benefits derived from the use of genetic resources.

Important issues related to tiger conservation is to mainstream tiger conservation in the human dominated landscapes. Here it is important to mention that tiger is at the apex of the food chain and its conservation ensures the health of the entire ecosystem.

2.7 Coastal resource management

The Ministry accords high priority to protecting our nation's mangroves and coral reefs. The Coastal Regulation Zone Notification (1991), recognizes the mangrove and coral reef areas as ecologically sensitive and categorizes them as CRZ-I (i), this implies that these areas are accorded protection of the highest order.

The NEP, 2006 recognizes mangroves and coral reefs as important coastal environmental resources. They provide habitats for marine species, and a resource base for sustainable tourism. The Policy requires Integrated Coastal Zone Management. Mangrove plantation is perceived as one of the important components of Integrated Coastal Zone Management.

The scheme on conservation and management of mangroves and coral reefs was initiated in 1987. The main activities under the scheme are survey and demarcation, afforestation and restoration of mangroves, regeneration of corals, alternate and supplementary livelihoods, protection measures, and education and awareness. A 100% central assistance is provided to states/UTs for implementation of approved Management Action Plans.

Two mangrove sites in the country are internationally recognised, viz. RAMSAR recognition for Bhitarkanika and UNESCO-MAB recognition for Sunderbans. Both Bhitarkanika and Sunderbans are rich in mangrove forests and the recognition is based on the richness of their biodiversity.

As per the latest 'India State of Forest Report 2009', mangrove cover in India is spread over an area of 4639 km^2 in the coastal states/UTs of the country. Compared with the 2005 assessment, there has been an increase of 58 km^2 in mangrove cover because of plantations and protection measures in Gujarat, Orissa, Tamil Nadu and West Bengal mainly due to activities have been carried out under the ministry's Centrally Sponsored Scheme on Conservation and Management of Mangroves. Decrease in mangrove cover in Andaman and Nicobar Islands is attributable to the after-effects of the tsunami.

2.7.1 Policy and legal measures

To protect the coastal environment and regulate the development activities in coastal stretches of the country, the Ministry issued the Coastal Regulation Zone (CRZ) Notification, 1991 under the Environment (Protection) Act, 1986.

The Notification imposes restriction within the inter-tidal area, that is, land area between low tide and high tide lines, and 500 m from the high tide line on the landward side. The coastal stretches are categorised into CRZ-I (ecologically sensitive), CRZ-II (urban), CRZ-III (rural) and CRZ–IV (Andaman and Nicobar and Lakshadweep islands).

The Notification prohibits certain development activities in the CRZ area, which include new industries, highrise buildings, reclamation and solid waste management among others. The activities that are permitted in CRZ area include foreshore requiring facilities like ports, harbours, dwelling units for fishermen and local communities, and so on.

2.7.2 Recent initiatives

Keeping in mind the changing scenario of the coastal environment and impact of climate change, the ministry is taking the following steps for coastal management:

- A draft Island Protection Zone Notification has been issued, providing special dispensation for Andaman and Nicobar and Lakshadweep Islands, inviting suggestions
- A major project initiated with a cost of about Rs 115.5 crore with the assistance of the World Bank. The project includes demarcation of hazard line along the coast, setting up of National Centre for Sustainable Coastal Management, developing pilot Integrated Coastal Zone Management projects in Gujarat, Orissa and West Bengal
- A pre-draft Coastal Regulation Zone, 2010 issued, inviting comments from people

2.7.3 Issues for debate

- Regular and periodic documentation of mangroves and associated flora and fauna
- Capacity-building pertaining to bio-prospecting for drugs and other useful compounds from marine flora and fauna, patenting useful innovations—as may be appropriate—including, *inter alia*, benefit-sharing with the local communities
- Annual monitoring of mangrove cover is necessary and every state should use existing capabilities or can develop relevant capabilities.
- Proper institutional mechanisms need to be developed for involving local stakeholders, including local communities, in mangrove restoration and conservation programmes. The mangrove plantation programme should have the objective of increasing floral diversity in addition to increasing mangrove cover
- Capacity-building of the frontline forestry staff for coral monitoring through periodic upgradation of their skills and knowledge, to ensure the

enforcement of various rules and regulations to protect the precious coastal resources

- Policy provisions for mangroves that occur on privately-owned lands, and revenue lands among others. Economic valuation of conserving coastal and marine biological resources

2.8 Climate change and its impact

Global warming refers to warming of the earth resulting from build up of green house gases of anthropogenic origin in the atmosphere. This causes an increase in the average global temperatures of the earth's near-surface air and oceans. The warming of the globe is largely the result of emissions of carbon dioxide and other greenhouse gases from industrial processes, fossil fuel combustion, and changes in land use such as deforestation.

In general, the impacts of climate change will be disproportionately higher for developing countries and the poor of all countries, thus exacerbating inequities in access to adequate food, clean water, and other resources. India, with its geophysical and climate characteristics, is vulnerable to the occurrence of extreme events. The country is highly susceptible to climate change, not only because of high physical exposure, but also because livelihoods and economic activities are closely tied to the natural resource base.

2.8.1 Observed changes in temperature and rainfall

The observed changes in temperature and rainfall over the past 100 years in the Indian region display wide variations. However, the increase in temperature is dependent on the season, that is, the temperature is higher in post-monsoon and winter, and reduces during the monsoon. The spatial pattern of linear trends in temperature over the Indian region (Figure 2.3) shows that the warming trend is significant over the west coast, central peninsula, and north-east India, whereas cooling trend is observed over north-west India.

Climate models are the best tools to understand the impacts of climate change on different sectors (like water, agriculture, and extreme events) at both global and regional scales.

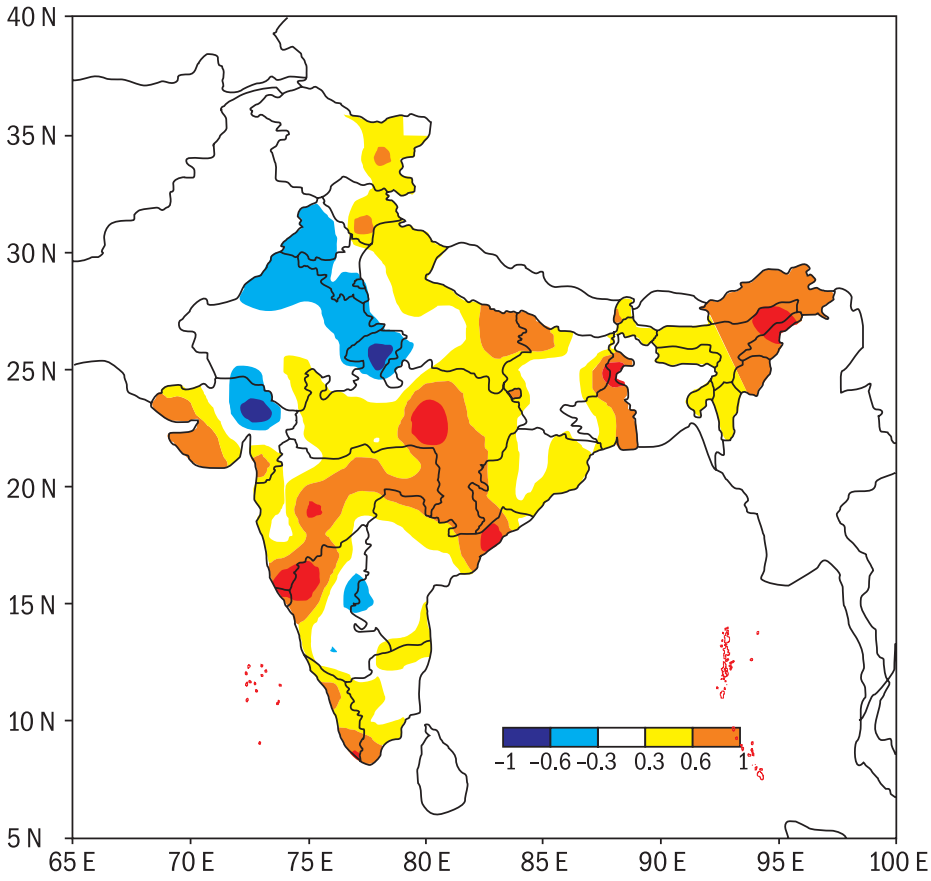

Figure 2.3 Spatial patterns of linear trends in temperature over India for 1901-2000.
Source IMD

2.8.2 Projections of temperature and rainfall over Indian region

The multi-model mean performance over the Indian region as depicted by the IPCC- Assessment Report 4 (AR4) shows that almost all the models have similar kind of bias over the South Asian region and there is an increasing tendency of extreme events over Indian region.

2.8.2.1 Projected impacts

It is quite apparent from the evidence that many natural and human systems are being affected by regional climate changes, particularly rise in temperature. India being tied to its natural resource base stands to face adverse consequences of climate change in addition to the demands of the increasing population.

Some of the major threats that India is expected to face due to climate change are listed in India's Initial National Communication. These projected expected impacts cut across various sectors, and natural systems, and are summarised in Table 2.3.

2.9 Education and awareness for conserving environment

Raising the awareness of people about the emerging issues and the connections between their life styles and environment is essential for environment protection and conservation.

Table 2.3 Expected impacts of climate change across various sectors and natural systems

Sector	Physical and Ecological Impacts	Socio-Economic Impacts	Cross-Cutting Issues	Vulnerable areas/ Sectors
Coastal areas	Sea level rise of 0.5 m	High potential costs in Mumbai and Chennai	Health; environmental degradation caused by mining, tourism, and so on	Coastal mega-cities, smallholder farmers in disaster-prone areas
Water resources	Gross per capita water availability in India will decline from ~ 1820 m^3/ yr in 2001 to ~1140 m^3/yr in 2050. The river basins of Mahi, Pennar, Sabarmati, and Tapi will experience water scarcities and shortage	Increased flooding initially due to glacial melt, followed by reduction in flows of snow-fed rivers. Impacts on the downstream population could include destruction of settlements, lack of water supply, and damage to livelihoods	Changes in water flows and sediment yields can affect hydropower generation and water supply; infrastructure and agricultural lands; and loss of biodiversity	Areas facing extremes of water availability (droughts and floods), hilly and mountainous regions
Forests	A study by the Indian Institute of Science shows a large-scale shift in forest types in India under current and future climate scenarios	In India nearly 200,000 villages rely on forests and forest products for their livelihood. The supply of forest products and consequently, the livelihoods of forest-dependent communities	Change in biodiversity (endangered species diversity) and associated implications on ecological balance	Forests
Agriculture	In India, it is estimated that a temperature rise of 2°C could lower the yields of staple crops such as wheat and rice by 10% and reduce farm revenues	Endangered livelihoods of agriculture-dependent communities and implications on food security	Changes in soil properties and distribution and frequency of infestations by pests, insects, and diseases	Farming
Health	Increase in transmission windows (TWs) for malaria.	Excess mortality due to heat stress. Increasing mortality from extreme temperature and weather events	Change in socio-economic and ecological systems, rise in vector-borne diseases, agricultural productivity changes, and malnutrition	Additional areas where malaria has not been reported

To foster awareness about environment the ministry had launched a scheme on Environmental Education and Awareness in 1983-84. The two major programmes undertaken in the scheme are:

National Green Corps Programme: The Ministry embarked on a major initiative for creating environmental awareness among children by launching National Green Corps (NGC) in 2001-02. In less than nine years that the programme has been in operation, it has grown into a mass movement for maintaining and preserving the environment. Overall 1,30,000 eco-clubs have so far been established in NGC schools across the country.

National Environmental Awareness Campaign: The National Environmental Awareness Campaign (NEAC) was launched in mid-1986 with the objective of generating environmental awareness at the national level. In this campaign, nominal financial assistance is provided to NGOs, schools, colleges, universities, research institutes, women and youth organisations, army units, and government departments all over the country for conducting awareness raising and action-oriented activities. During 2009-10, a total of 11,738 NGOs and other organisations conducted awareness campaigns across the country.

2.9.1 Environment Information System

Realizing the need for environment information, the Ministry set up an Environmental Information System (ENVIS) in 1983 as a comprehensive network on information collection, collation, storage, retrieval, and dissemination to various users including decision-makers, researchers, academicians, and policy planners. ENVIS network, at present, consists of a chain of 76 network partners located in various reputed organizations, institutions, universities, states, and UTs spread across the country working on subject-specific and state-specific issues.

CHAPTER 3

Need for inclusive growth

3.1 Introduction

The MoEF acknowledges the importance of inclusive growth, not just in promoting the conservation of natural resources, but also in ensuring informed and participatory decision-making about the development path the country wants to take in future.

Various sections of society have a stake in and/or an impact on the environment and forest resources, each of which needs to be facilitated for effective participation. The profile of these sections of society includes:

- Local community representatives (these should be prioritized in any developmental process, since they are dependent on local environment and its resources and area adversely impacted by environmental damage);
- Central government agencies/ministries, state and local governments;
- Civil society (NGOs, non-government institutions), and;
- Business/industry/developmental sectors.

There is a pressing need to involve the local community, particularly the marginalized section of the society, to ensure their meaningful participation. This would essentially mean their involvement in:

- Framing, revising/changing, and implementation of various policies and laws and notifications related to environmental and forest-related issues;
- Formulation and implementation of action plans, strategies, and so on;
- Monitoring and evaluation of all the above

3.2 Prerequisites for meaningful participation

Such meaningful participation of relevant stakeholders in the planning and implementation processes would require timely and adequate dissemination of information to those concerned in relevant languages and forms.

It is believed that participation is more effective if citizens can contribute right from the inception of the process. This is particularly important for those sections of the society who are most likely to be affected (e.g. the poorest or most marginalized people in and area who are impacted by a project), or who may find it hardest to make their voices. The participation process must also include an adequate feedback mechanism, providing participants with information on how their inputs have been considered, and reasons for changes/rejection, if any.

Meaningful participation of various sections of society can be ensured through various means, including:

- Inputs based on public announcements (e.g. on the ministry or relevant state department's website, or through advertisements in local media);
- Public consultation for new policies/laws/action plans, or changes in these, if any;
- On-site public hearings for specific proposed projects, e.g. in environmental clearance process ;
- Focused group workshops (involving different sections of the society, separately and jointly);
- Holding regular dialogue forums on policies/laws/action plans, specific projects, and specific schemes/activities such as protected areas;

- Creation of a constitutional, non-juridical mechanism to monitor the implementation of relevant laws, policies, regulations, and programmes, and to act as a citizens' grievance redressal mechanism outside of the courts;
- Mandatory participation of PRIs with full local community participation in decisions affecting their lives and resources, including clearance procedures for development projects, with a provision of feedback to the communities on how their inputs have been considered

Enhancing environmental awareness is essential to ensuring individual cooperation in our efforts towards environmental conservation. Awareness involves not only internalization of environmentally-responsible behaviour, but also enhanced understanding of the impacts of irresponsible actions on public health, living conditions, sanitation, and livelihood prospects. The Ministry has taken and continues to take, various steps to keep the stakeholders involved in its various initiatives.

CHAPTER 4

Issues for debate

4.1 Introduction

Conservation of the environment requires the participation of multiple stakeholders. Each of these plays an important role in the formulation, implementation, and promotion of measures for environmental conservation. A necessary prerequisite for transparent inclusive growth is the meaningful participation of various stakeholders; especially the project-affected marginalized sections of the country. In this chapter, some of the critical issues for the country's environment conservation efforts have been discussed.

4.2 Issues affecting the environment

The environment-related problems can no longer be viewed as the side effects of the development process. It is more than likely that by ignoring the state of its environment, India may jeopardize its efforts in growth and human resource development.

The increasing instances of public interest litigations (PILs) on environment, forestry/wildlife/mining/tourism issues is a reflection of the fact that even where legislation is well-designed, its implementation needs to be effective. To address this issue, the ministry is working on setting up the NEPA, which will focus on enforcement and monitoring of environment laws in the country.

Till date, the use of economic instruments to control pollution in India has been limited to the use of subsidies for pollution control equipment and rebates on the water cess. More recently, bank-guarantee for specific environment performance has been mandated by the State Pollution Control Boards to improve compliance. However, there is a need to have an administrative mechanism to impose civil penalties for violation of environment norms.

4.3 Air environment

The main source of increase in ambient air pollution levels is increasing urbanization coupled with a rapid increase in number of private vehicles. The prevalent use of biomass for cooking in rural areas causes indoor air pollution and adversely affects health. Women and young children are especially vulnerable as they are the exposed to the fumes.

The ministry has recently revised its National Ambient Air Quality Standards and has introduced more comprehensive monitoring strategies. It is also developing protocols for various parameters of ambient air as well as indoor air. It is also working on initiating comprehensive national ambient noise quality monitoring in urban areas.

4.4 Water environment

The key challenges identified for maintaining acceptable water quality and quantity and providing equitable access to people across the country are:

- Water quality concerns due to pollution and over use;
- Increased demand of water due to rapid population growth;
- Intensified industrial, commercial, and residential developments near major water bodies;
- Agricultural run-offs as residual fertilizer, pesticides and feedlot wastes;
- Unscientific felling of trees leading to catchment's degradation ;
- Over-fishing ;

- Unsustainable tourism ;
- Inadvertent introduction of some alien species in wetlands

Though a lot of progress has been made in providing sewage treatment facilities to cities and towns, effective treatment of sewage is still limited to 31%. Much of the untreated sewage still finds its way to various water bodies and is a major cause of their pollution. The key issue here will be improving coverage and efficiency of treatment systems. Focus must be on using low-cost decentralized measures for the treatment of wastewater.

4.5 Solid waste management

While we do have a robust regulatory framework in place, the main challenge is to ensure effective implementation for sustainable waste management. Some of the priority areas that need to be considered are:

Incentivising public-private partnership for creating the required infrastructure. Setting up of TSDFs across the country is one such example. Twenty five TSDFs are currently in operation and eight more are under construction. There is a need to expand and strengthen this model.

Promoting utilization of hazardous waste as supplementary resource of energy. Encouraging co-processing for recovery of energy, especially from wastes which have high calorific value. Use of high calorific value hazardous wastes in cement kilns is being promoted as a safe alternative to conventional incineration, subject to implementation of suitable safe guards. The cement industry spread across the country makes this option a viable one. An additional benefit is that no waste is generated during subsequent processing. Use of such waste in power and steel plants is also being explored.

Managing the exponential growth of e-waste by putting in place a separate regime of regulatory framework, and channelizing e–waste from the informal sector to the formal sector to ensure recycling is done in an environmentally sound manner. Promoting the 'Extended Producers Responsibility' concept to develop a network of collection centres for end of life electrical and electronic products is another option.

Capacity-building of agencies/ bodies, both at the central and state levels, responsible for implementation and monitoring of waste management rules is another alternative. This would include strengthening the customs personnel at ports to prevent illegal entry of hazardous wastes into the country.

4.6 Forestry

The key issue in this sector is ensuring the judicious and sustainable utilisation of natural resources to minimise the degradation of forests.

Broadly, the gap between demand and supply of forest products needs to be plugged by reducing demand. This can be done by encouraging more efficient use of forest products and providing for alternative sources of fuel, fodder, and timber and augmenting supply by enhancing the productivity of different types of land. The livelihood rights of forest-based communities need to be respected in conservation efforts, even as new livelihood and revenue options are explored.

For reducing the demand-supply gap on forest produce, production forestry needs to support and supplement conservation forestry measures, as mandated under the Forest Conservation Act. The degraded areas can be brought under multipurpose tree plantations as part of a partnership between the state forest department and JFM committees.

While JFMCs are constituted at the village level for the regeneration of forests, presently they are not backed by legal authority. The provision of legal backing for JFMCs needs to be looked at.

4.7 Biodiversity and wildlife

The challenges in this sector include:

- To prevent poaching of flagship species like tiger, rhino, elephants, and so on;
- To check fragmentation and degradation of wildlife habitats and corridors;
- To reduce instances of human–wildlife conflict;
- To control illegal trade in wildlife products;
- Creation of inviolate areas for tiger and other flagship species, and;
- Voluntary relocation of people from core areas

4.8 Coastal resource management

The key issues identified for effective coastal resource management include the following:

- Regular and periodic documentation of mangroves and associated flora and fauna. The process need to be institutionalised at important R&D centres

across the country. The areas rich in taxonomic diversity are to be identified and managed as mangrove germplasm preservation centres to conserve the genetic diversity of mangroves

- Capacity-building activities pertaining to bio-prospecting for drugs and other useful compounds from marine flora and fauna, patenting useful innovations—including benefit-sharing with the local communities—need to be undertaken.
- Annual monitoring of mangrove cover is necessary and every state should use existing capabilities or may develop capabilities in this respect. Such annual monitoring should also focus on identified vulnerable mangrove areas
- Proper institutional mechanisms need to be created for involving local stakeholders, including local communities, in mangrove restoration and conservation programmes. The mangrove plantation programme should have the objective of increasing floral diversity in addition to increasing mangrove cover.
- Capacity building of the frontline forestry staff for coral monitoring through periodic upgradation of their skills and knowledge, to ensure the enforcement of various rules and regulations to protect the precious coastal resources needs to take place.
- Policy provisions need to be enacted for the mangroves that occur on privately owned lands, and revenue lands, among others. Economic valuation of conserving coastal and marine biological resources needs to be undertaken.

4.9 Climate change

Given the vulnerability of large sections of India's population to climate change, and keeping in mind the national strategy to address climate change as reflected in the NAPCC, the two key challenges that have to be addressed by various stakeholders in the short term are:

- How should we involve various stakeholders, including the State Governments, in implementing the NAPCC?
- How should India achieve a low-emission sustainable development growth model using a voluntary approach?

Answers to these two questions will help the economy and its various sectors to grow sustainably, while enhancing the capacity of the society and stakeholders at various levels to adapt to adverse effects of climate change.