



Analysis of Existing Environmental Instruments in India



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Preface

Environmental planning and management is a wide, expanding and rapidly evolving dynamic area. In India today development is having an increasing impact on the environment. The environmental issues are increasing on the agenda of government (including international agencies), private sector, non-governmental agencies and citizens. The proposed country programme and the proposed UNDP strategic plan 2008-2012 for effective environmental planning and development has a focus area on Energy and Environment. UNDP has sponsored this study at Administrative Staff College of India, Hyderabad for critical analysis of existing environmental instruments in India. During this study we had the opportunity to interact with a gamut of experts working in the field of environmental studies.

We would like to place on record our thanks to UNDP, New Delhi for giving us an opportunity to work on the project "**Analysis of Existing Environmental Instruments in India**". I would like to thank **Dr. Preeti Soni**, Head Environment Division UNDP, **Dr. SN Srinivas**, Programme Officer (Energy and Climate Change), **Dr. KS Murali**, Programme Officer (Environment) UNDP for their support during the execution of this project.

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Centre for Energy, Environment,
Urban Governance, and Infrastructure Development
Administrative Staff College of India,
Hyderabad

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Abbreviations

AP6	Asia Pacific partnership on clean development and climate
ASCI	Administrative Staff College of India
AT & C	Aggregate Technical and Commercial Loss
BEE	Bureau of Energy Efficiency
BOD	Biological Oxygen Demand
CBD	Convention on Biological Diversity
CDM	Clean Development Mechanism
CDP	Carbon Disclosure Project
CEA	Central Electricity Authority
CETP	Common Effluent Treatment Plant
CFL	Compact Fluorescent Lamp
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on Migratory Species of Wild Animals
CO ₂	Carbon dioxide
CPCB	Central Pollution Control Board
CREP	Corporate Responsibility for Environmental Protection
CTE	Consent to Establish
CTO	Consent to Operate
CSD	Centre for Sustainable Development
CSE	Centre for Science and Environment
CSR	Corporate Social Responsibility
ISO	International Organisation of Standardization
EIA	Environmental Impact Assessment
GHG	Green House Gases
GMO	Genetically Modified Organism
GOOS	Global Ocean Observing System
MDGs	Millennium Development Goals
MES	Markets for Ecosystem Services
MLD	Million Litres / Day
MNRE	Ministry of New and Renewable Energy
MoEF	Ministry of Environment and Forests
MSW	Municipal Solid Waste
NAPCC	National Action Plan on Climate Change
NCA	National CDM Authority
NCRD	National River Conservation Directorate
OECD	Organisation for Economic Cooperation and Development
PAH	Polyaromatic Hydrocarbons
PPP	Public Private Partnership
RSPM	Respirable Suspended Particulate Matter
S & L	Standards and Labeling
SME	Small and Medium Enterprises
SPCB	State Pollution Control Board
TSDF	Transport Storage Disposal Facility
UNFCCC	United Nations Framework Convention on Climate Change
UNDP	United Nations Development Program
WHC	World Cultural and Natural Heritage

Analysis of Existing Environmental Instruments in India

Executive Summary

The study "Analysis of Existing Environmental Instruments in India" was taken up by Administrative Staff College of India to review the existing environmental instruments in India. The study undertaken has reviewed various select instruments across the country, which is to protect the biodiversity and the environment. The study was carried out from January to December 2008. Consultations were carried out through mails, telephonic conversations and one to one basis with various stakeholders - academicians, key players in ministry of environment and forests, key experts in this field, research institutions, senior officials in forest departments across the country, members of the biodiversity boards, members of non-governmental organizations in the related field. The study has come out with the Action Plan in various areas of Legislation, Planning, Research and Capacity Building.

Following discussion papers were floated on the ASCI website on:

- ◆ Implementation of Environment and Energy Policies
- ◆ Legislative and regulatory mechanisms promoting low carbon development
- ◆ Standards and Codes for Pollution Control / more efficient use of natural resources
- ◆ Implementation of multilateral environmental agreements.
- ◆ Bio diversity -Ecosystem services

The various environmental issues that need to be addressed include:-

1. *Implementation of the hazardous waste management rules in identification and development of sites for the disposal of hazardous wastes around the country.*
2. *Inventorization of the forest resources has not been completed for major part of the country. Priority may be given to updating the Inventorization process.*
3. *Issues related to promotion of re-use and recycle of sewage and trade effluent on land for irrigation*
4. *Promotion of cleanliness of streams in different areas of the country*
5. *Carrying out monitoring of rivers of the state.*
6. *Collection and compilation of technical and statistical data relating to water and air pollution.*
7. *Estimation of the value of biodiversity is a challenge and focus must be given to impact of change in land use patterns.*
8. *Monitoring of pollution levels in major towns / cities of the States of the country.*
9. *Issues related to climate change and its impacts on water resources, forests and agriculture.*
10. *Promotion of research and transfer to technology in areas realated to energy efficiency techniques.*

This report is an independent publication commissioned by United Nations Development Program.



Introduction

The study "Analysis of Existing Environmental Instruments in India" was taken up by Administrative Staff College of India to review the existing environmental instruments in India. In order to develop effective environmental governance mechanisms the UNDP Country Office has commissioned the Centre for Energy, Environment, Urban Governance and Infrastructure Development (CEEUG&ID), Administrative Staff College of India to review the existing environmental instrument with the overall aim of supporting UNDP Country Office in designing programmes for effective implementation of the national environmental plan. The aim of the study is to identify critical issues and gaps from secondary sources and consult key stakeholders for cross-examination before including these into the background paper. ASCI produced series of Working Papers / Discussion Papers. These papers were developed to stimulate discussion and generate feedback, which were considered for analysis. The study was carried out from January to December 2008, wherein the desk review and consultations with various stakeholders in selected states of the country were conducted.

At present the development path of economic growth in India lacks resource management efficiency and ecological security concerns. Mid term review of UNDP country program (2002-2007) for India, highlights that burgeoning population and economic growth in the context of weak regulatory mechanisms that has resulted in further increase in environmental concerns. In 2006 Government of India announced the National Environmental Policy with emphasis on main-streaming environment in all the developmental activities. The UNDP Country Program for India (2002-2007) focused on promoting human development and gender equality; capacity development for decentralization; poverty eradication and sustainable livelihoods; and vulnerability reduction and environmental sustainability. The governance focus was on capacity building of local institutions and promotion of accountability. However, a mid-term review of the country program stressed need to move toward fewer and more strategic focus areas. To support the implementation of national flagship program and priorities as well as forging close linkages for capacity development at state and district levels. It was felt the key entry point to support commitments should be the state.

The proposed country program and the proposed UNDP strategic plan 2008-2012 for effective environmental planning and development have a focus area on 'Environment and Environment Programme'. The main aim (national priority) of the UNDP Country Program is "**to integrate development planning and environmental concerns to ensure containment of adverse effects, such as the threat to climate change, and the well-being of future generations**". The proposed country program (2008-2012) aims at -

'...evidence based advocacy, best practices and disaggregated profile will help inform decisions and policies'.

(Source- UNDP Country Program for India, 2008-2012)

As our development challenges have evolved, and our understanding of the centrality of environmental concerns in development has sharpened, it is realized that there is a need to review the national objectives, policy instruments, and strategies. ***It is indeed in this background the concern of UNDP attains significance as demonstrated by taking up the program for analysis of existing environmental instruments in India to implement any national environmental plan.***

The results of this study are presented in five chapters. Chapter 1 gives a brief on the environmental quality in India. Chapter 2 provides a brief understanding of the Environmental Instruments in vogue. Chapter 3 addresses the issues, concerns and gaps in environment and energy sector. Chapter 4 addresses issues, and gaps related to the biodiversity and ecosystem services. Chapter 5 provides the actions plans to address the issues raised.



Pollution from industrial sources

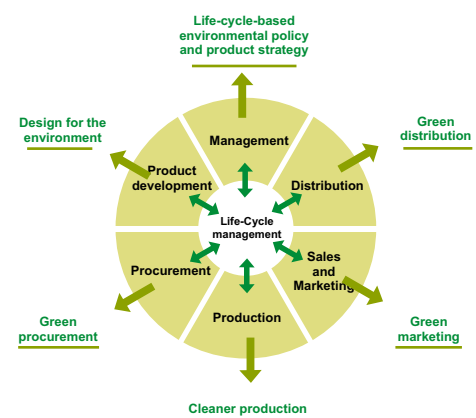
Chapter 1

Environmental Quality

Maintenance of environmental quality is essence of requirement for improving quality of life leading to sustainable development. It has been reported that environmental factors are responsible in many cases for nearly 20% of the burden of diseases in India and a number of environmental-health factors are closely linked with different dimensions of poverty (e.g. malnutrition, lack of access to clean energy and water). Hence, there is a need for balance and harmony between economic, social and environmental needs of the country. Environmental degradation is a major factor in enhancing and perpetuating poverty, particularly among the rural poor, and such degradation factors impact soil fertility, quantity and quality of freshwater, air quality, forests, and fisheries. Studies have shown the dependence of the rural poor, in particular, tribal societies on natural resources. It has been found that the poor are particularly vulnerable to loss of resilience in ecosystem.¹

Environmental planning and management is a widely expanding and rapidly evolving dynamic area. In India, today, development is having an increasing impact on the environment. The environmental issues are increasing on the agenda of government (including international agencies), private sector, non-governmental agencies and citizens. The environmental policies, plan, programs, norms and standards are also evolving to address the growing environmental concerns. The management of environmental problems is, by its nature, cross-sectoral and multi-jurisdictional. As such monitoring is to be based on a set of indicators that report whether the strategic objectives are being achieved. In addition, the indicators should be measurable, based on existing data, observable, collected over a regular interval, widely accepted, easy to understand, comparable, and balanced between positive and negative impacts.

In India, Ministry of Environment and Forests is the nodal agency in the administrative structure of the Central Government, for the planning, promotion, co-ordination and overseeing the implementation of environmental and forestry programs. The Ministry is guided by the principle of sustainable development and enhancement of human well-being. The Ministry of Environment and Forests is primarily concerned with the implementation of policies and programs relating to conservation of the country's natural resources including lakes and rivers, its biodiversity, forests and wildlife, ensuring the welfare of its animals and prevention and abatement of pollution. While implementing these policies and programs, the main objectives are conservation and survey of flora, fauna, forest and wildlife, prevention and control of pollution, afforestation and regeneration of degraded areas, protection of environment and ensuring the welfare of animals. These objectives are well supported by a set of legislative and regulatory measures aimed at the preservation and protection of environment. Beside these legislative measures, a National Conservation Strategy and Policy Statement on Environment and Development, 1992; National River Policy, 1988, a Policy Statement on Abatement of Pollution, 1992, and National Environment Policy, 2006 have also been evolved. These objectives are sought to be fulfilled through environmental impact assessment, eco-regeneration, assistance to organizations implementing environmental and forestry research, education and training, dissemination of environmental information and international cooperation and creation of environmental awareness.



¹ loss of resilience in ecosystem is the measure of resistance to disturbance and the speed of return to the equilibrium state of an ecosystem

Chapter 2

Status of Environmental Instruments in India

India has provided for the protection and improvement for the environment in its constitution and has taken several steps in planning and policies to overcome the environmental problems. In all its plans India has focused on the protection of environment. Planning in a rational way constitutes an essential tool for allround development as well as to protect the environment. Environmental regulation is seen to play different roles during different phases of the country's development. Initially, environmental regulation served a reactive purpose as a means of cleaning up after the new technologies and new industries. During this initial phase of development it is often assumed to be the case that environmental degradation is the obvious and unavoidable outcome from a process of economic growth. In the next phase of economic development it is realized that a more active approach to regulation is important for providing public goods in a period of economic growth. In this era, it is crucial to focus on environmental governance - giving effect to various mechanisms for registering demand, for monitoring performance and enforcing standards. These are all the means available for ensuring that society is able to compete against nascent industries in the allocation of environmental resources. In the third phase of environmental regulation, when government acts to promote pathways of economic growth that are compatible with environmental services, it becomes an important means for fostering certain forms of growth. An attempt is being made to identify the important environmental instruments available in India.

2.1 Environmental Legislation

According to the World Bank report (2007), by any benchmark, India has an extensive environmental management system with a comprehensive set of environmental laws, specific statutory mandates, regulatory instruments, and institutional frameworks to implement and enforce environmental policy objectives. Environmental legislation is on the national list. There are over two hundred laws relating to environmental protection. Key national laws for the prevention and control of industrial pollution include the following:

- ◆ The Water (Prevention & Control of Pollution) Act, 1974
- ◆ The Water (Prevention & Control of Pollution) Cess, Act, 1977
- ◆ The Air (Prevention & Control of Pollution) Act, 1981
- ◆ The Environment (Protection) Act, 1986
- ◆ The Hazardous Waste (Management and Handling) Rules 1989, 2003, 2008
- ◆ The Bio - Medical Waste (Management and Handling) Rules 1988, 2003
- ◆ The Municipal Solid Wastes (Management and Handling) Rules 2000
- ◆ The Plastics Manufacture and Usage Rules, 1999
- ◆ The Noise Pollution (Regulation & Control) Rules, 2000
- ◆ The Batteries (Management and Handling) Rules, 2001
- ◆ Environmental Impact Assessment Notification, 2006 as amended 2009
- ◆ National Environmental Policy, 2006
- ◆ Fly Ash Management Rule, 2008

The primary institutions responsible for the formulation and enforcement of environmental acts and rules include the Ministry of Environment and Forests (MoEF), the Central Pollution Control Board (CPCB), State Departments of Environment, State Pollution Control Boards (SPCBs) and Municipal

Corporations. Responsibility is shared between the centre and the states, with the central government having responsibility for policy and regulatory formulations and the state governments for ensuring implementation and enforcement of national policies and laws. The Central Pollution Control Board with the help of academics, research institutions and respective industry develops industry-specific emission standards which need to be approved by the Ministry of Environment and Forests. Standards are so developed that they are technically feasible and economically viable. Standards are reviewed time to time for tightening further along with the improvement in the availability of better abatement technologies. Respective State Pollution Control Boards are entrusted with the responsibility of enforcement and monitoring the standards. The few direct enforcement actions taken by the CPCB are generally done by the zonal offices. Under the Water Act, the Air Act and the Environmental Protection Act, the pollution control boards have the authority to issue and revoke consents to operate, require self-monitoring and reporting, conduct sampling, inspect facilities, require corrective action and prescribe compliance schedules. SPCBs cannot lower ambient environmental quality or emission standards fixed by the central government. It has been argued (Gupta, 1996) that although states cannot compete by lowering environmental standards in order to attract new investment, they can get around this by lax enforcement. The frequency of on-site visits to verify compliance is determined by the pollution potential (red/orange/green) and size (based on the value of capital investment) of the industry. Although CPCB has set its guidelines regarding the frequency of visits, individual states seem to have differing interpretation of the guidance and do not regard it as binding. For example, red category facilities are supposed to be inspected once a month in Gujarat, once per quarter in Orissa, and once every two years in West Bengal although the guidelines set by CPCB is once in three months for large and medium scale industries. Besides the Water and Air Acts, the SPCBs are also authorized to issue notifications for hazardous wastes, bio-medical wastes, municipal solid wastes and electronic wastes. An authorized committee is constituted to deal with handling and use of genetically engineered organisms.

One of the main environmental management instruments is:

- (i) an Environmental Impact Assessment (EIA), subject to public hearing and approved by MoEF;
- (ii) a Forestry Clearance, which requires a project proponent to deposit a compensatory afforestation payment; and
- (iii) a Consent to Establish (CTE) and Consent to Operate (CTO), issued by SPCBs.

A CTE is granted after an evaluation of the potential environmental impact and of the design of pollution control installations (OECD, 2007). Conditions for pollution control measures are part of a CTE. Upon verification of compliance with these conditions, a CTO is issued with emission and effluent limits based on industrial sector-specific standards, as well as self monitoring and reporting schedules. Most small-scale industries operate without any permits. These instruments are supplemented with economic instruments and other incentives, such as matching grants for the common effluent treatment plants (CETP) or "green awards" introduced by most SPCBs.

The enforcement powers include emergency measures of disconnecting water or power supply and facility closure, which are widely used in some States. According to the Hazardous Wastes (Management and Handling) Rules of 1989, SPCBs can, with CPCB approval, impose administrative fines for any violation of those rules.

Marine environment

The marine environment is facing a number of pressures, arising out of the needs of people, and the multiple uses that coastal and marine areas can be put to. These pressures contribute to the depletion of marine resources and degradation of the marine environment. The major objectives of Agenda 21² with reference to the marine environment are the preserving of ecologically sensitive areas, developing and increasing the potential of marine living resources, ensuring effective monitoring and enforcement with respect to fishing activities, improving the living standards of coastal communities, maintaining the health of the marine environment and addressing issues of critical uncertainty and climate change.

² Agenda 21 is a program run by United Nations related to sustainable development and deals with issues related to social and economic dimensions and conservation and management of resources for development.

The Indian Coast Guard is empowered to prevent capture of endangered marine species under the Wild Life (Protection) Act, 1972. A number of threatened marine species have been placed in Schedules I and III of the Wild life (Protection) Act, 1972. Some of these are the whale shark, sea horse, sea cucumber, sea shells and different types of corals. The most important of these is the whale shark, which is placed in Schedule I. To address the concern for conservation of marine living resources, in some marine areas which support high biodiversity, such as the Gulf of Mannar and Wandoor (Andaman) have been declared as marine national parks, while some other coastal areas such as the Malvan coast (Maharashtra) and the Gulf of Kutch (Gujarat) have been declared marine sanctuaries. The Gahirmatha beach (Orissa) where mass nesting of the endangered Olive Ridley turtle takes place was accorded marine sanctuary status in 1997. Five species of marine turtle are found in Indian coastal waters. These are the green sea turtle (*Chelonia mydas*), Olive Ridley (*Lepidochelys olivacea*), loggerhead (*Caretta caretta*), leatherback sea turtle (*Dermodochelys coriacea*), and hawksbill turtle (*Eretmochelyx imbricata*). Except for the Loggerhead, the other four species nest in India. The Bhitarkanika Wild Life Sanctuary is another globally important site for nesting for the Olive Ridley turtle. A total of 32 critical habitats which include the Gulf of Kutch, Gulf of Khambat, Gulf of Malvan, islands off Karwar, islands off Kochi and Lakshadweep islands have been identified in India. Such measures offer protection to the flora and fauna of the region and help prevent any damage to the marine ecosystem. India is a member of various committees of the Global Ocean Observing System (GOOS). This is a programme to collect long term systematic scientific oceanographic data at a national, regional and global level.

2.2 XIth Five-Year Plan

Indian planning process has continual improvement with reference to inclusion of issues related to environment right from the first five year plan period onwards. The eleventh five year plan identified issues related to environmental quality in greater detail. It is clear that during the XI Five-Year Plan, the National Environment Policies stated objectives and principles are to be realized as stated in the plan document, through concrete actions in different areas relating to the key environmental challenges faced. These challenges are intrinsically connected with the state of environmental resources, such as, land, water, air and flora & fauna. The eleventh plan is not only to continue the projects undertaken in the Ninth and Tenth Five Year Plans but also to introduce new initiatives specifically with reference to issues related to climate change and energy policies in the country. The plan emphasized new initiatives in terms of preservation of wildlife and bio-diversity, mitigation of land degradation through green cover, increasing of the green cover and environmental clearances etc. (Box. No. 1).

Box No. 1 Key Environmental issues addressed in XIth Plan

The eleventh five year plan identified issues related to environmental quality in greater detail. It is clear that during the XI Five-Year Plan, the National Environment Policies stated objectives and principles are to be realized as stated in the plan document, through concrete actions in different areas relating to the key environmental challenges faced.

Key issues :-

- ◆ *Improving Air and Water Quality*
- ◆ *Solid Waste Management*
- ◆ *Increasing Green cover*
- ◆ *Mitigating land degradation through Green Cover*

Some important issues include:

Improving Air and Water Quality

- ◆ Establishing a reasonably adequate monitoring network with contemporary technology.
- ◆ Emphasis on ongoing projects viz. National River Conservation Plan and National lake Conservation Plan.
- ◆ Finding ways of linking treatment of sewage and industrial effluents to the urban and industrial development planning
- ◆ To develop a working mechanism for monitoring and early warning systems for improving water quality.

Air pollution control from urban areas

As per ambient air quality monitoring conducted by pollution control boards in 342 monitoring stations, it has been reported that in 65 cities and towns the air quality is not meeting the national ambient air quality standard, specially for respirable suspended particulate matter (RSPM) and oxides of nitrogen (NO_x). Also in many cities specially in metropolitan cities the organic air pollutants like benzene and other VOC's poly aromatic hydrocarbons (PAH) etc are of serious concern.

Sewage pollution management

In India more than 33000 million liters/day (MLD) of municipal waste water is generated out of which only 7000 million liters are collected and treated, rest of the sewage is discharged in water bodies/surface water/open land without any treatment. This is one of the major source of water pollution that also results in water borne diseases in India.

Water quality in rivers and other water bodies

As per monitoring conducted in 1249 water quality monitoring stations, 86 polluted river stretches have been identified where BOD³ is more than 6 milligram / liter. Action plan to control water pollution from these polluted river stretches are being prepared by NRCD/MOEF.

Solid Waste Management

In the eleventh five year plan the same points, which were emphasized in the 10th five-year plan, are to be continued such as:-

- ◆ A Master plan for municipal solid waste to be generated
- ◆ The Bio-Medical Waste Management and Handling Rules have been emphasized to greater extent
- ◆ The scope of Common Effluent Treatment Plants scheme was enhanced to cover assistance for modernization and capacity expansion of existing plants.
- ◆ Schemes under the Clean Development Mechanism to direct measurement of temperature as well as visible effects like rise in sea levels will also be undertaken.
- ◆ E- Waste management

Municipal solid waste (MSW)

120000 Tonnes per day of municipal solid waste is generated, in the country out of which only 70% is collected and approximately 5% is treated and disposed as per the existing municipal solid waste management rules. The indiscriminate disposal of MSW is causing problems related to ground water quality, odour and esthetics. There is a need to properly collect and dispose of the solid waste. Also there is a need to create awareness regarding the recycle and reuse of the wastes. There is a need to identify across the country the Public Private Partnership (PPP) mode for the management of MSW.

E-wastes management

There is a large amount of e-waste that is being generated across various sectors namely. The quantity is approximately 400,000 tonnes. The guidelines for handling of e-waste have been recently formulated. It is necessary to set up common facility for e-waste management (collection, segregation, recovery of metals and reuse facility) in a Public Private Partnership mode. Studies have shown it is necessary to emphasis on the metal recovery to a large extent.

Mitigating land degradation through Green Cover

In the eleventh five-year plan emphasis is given on a programme for social forestry to support development and sustainable management of the common property resources through Panchayati Raj Institutions.

- ◆ Domestic and international trade on farm forestry produce by support price mechanisms and tariff regulation is to be considered.
- ◆ Forest management is to be encouraged raising farm forestry plantations to provide better market opportunities to the farmers.

³BOD L: Biological Oxygen demand

Increasing the Green Cover

The emphasis is given on the forest cover and density, and the following measures are to be implemented

- ◆ Target of area under forest and tree cover is to be increased to 33%
- ◆ It is proposed to rationalize forest regulations to allow industry to partner farmers in undertaking agro-forestry for augmenting the raw material base for forest based industries like paper and pulp.
- ◆ Encourage the corporate sector to participate in development of degraded land for forestry, without compromising communities' priorities.
- ◆ Rationalize rules and procedures under environmental laws to expedite investment, production and employment growth.

**2.3 Industrial Sector**

India has fairly large industrial sector, which has grown over years. In 2005, the industrial sector contributed to about 24% of GDP. Between 1999 and 2004, the industrial sector's value addition has grown at the rate of about 7% per annum. Even higher growth rates are expected in the future as a result of projected overall high economic growth rate of 8-9% annually. To address the environmental challenges in coordination with the state governments, the Central Pollution Control Board has identified 43 critically polluted areas across the Country.⁴ The chemical and engineering industries are at the top of the government's list, since they are the major contributors to air, water, and waste pollution.



These industries include integrated iron and steel plants, non ferrous metallurgical units, pharmaceutical and petrochemical complexes, fertilizers and pesticide plants, thermal power plants, textiles, pulp and paper, tanneries and chloroalkali units (OECD, 2006). Despite an enabling legislation and progress in institutional development, keeping up with the environmental challenges of rapid urban growth, industrialization, and infrastructure development (including provision of adequate environmental infrastructure to booming urban areas) has proved to be difficult. This is evident from the persistent high levels of environmental pollution in excess of national ambient standards. Depending upon their pollution potential, the industrial units are classified into three different categories: Red, Orange and Green. The Red category units have maximum pollution potential, the Orange category units have moderate pollution potential and the Green units have the least pollution potential. Further, considering the degree of pollution among the Red units, these are classified into Special Red and Ordinary Red categories. In addition, a few units under the Green category with no pollution potential are classified as Exempted category units. However, these classifications vary across the states.

Certain schemes were introduced to contribute towards reducing environmental degradation. CPCB has introduced the scheme on industrial pollution abatement through preventive strategies as an amalgamation of the three on-going sub-scheme viz. (i) Environmental Audit; (ii) Adoption of Clean Technologies in small Scale Industries, and (iii) Environmental Statistics and Mapping (CPCB, 2007). Environmental auditing or development of environmental statistics explicitly or implicitly involves some measuring and monitoring of pollutions.

In addition a Charter on Corporate Responsibility for Environmental Protection (CREP) was introduced. The Ministry of Environment and Forests and the industrial sector have entered into a partnership on voluntary

⁴ Ecological Impact Assessment Services : AIAS/5/2009-10

pollution control by releasing a charter on CREP. The CREP comprises a set of 153 guidelines that would assist the corporate sector in streamlining environmental management. It covers 17 highly polluting industries, which include aluminium, cement, chlor-alkali, copper, dyes and dye intermediates, fertilizer, iron and steel, pesticide, petrochemical, pharmaceutical, paper and pulp, sugar and zinc segments, tanneries, thermal power plants, distilleries, and oil refineries. The Charter is a commitment for partnership and participatory action of the concerned stakeholders. The Charter is also a road map for progressive improvement in environmental management systems and, it is not necessarily limited to compliance of end-of-the-pipe effluent and emission standards. In a number of industrial sectors, the targets set in the Charter are ahead of effluent and emission standards. The environment charter marks a shift from regulatory enforcement of pollution control norms to voluntary compliance by the industry to significantly enhance the quality of the environment.

Under the Charter of Corporate Social Responsibility (CSR) industrial housing is being adopted as one of the important measures for CSR. These industrial housing help maintain environmental hygiene and are also proving to be beneficial for society.

Small and Medium Enterprises (SMEs)

According to the MoEF, Small and Medium Enterprises (SMEs) account for 40% of industrial production. They employ limited pollution control technologies and are responsible for an estimated 70% of the total industrial pollution load nationwide (OECD, 2006). Small-scale industries also account for about 20% of total industrial energy consumption and until now most efforts have been concentrated on large-scale industries. The important large scale industries that are polluting in nature are stone crushers, hot mix plant, re-rolling mills, sponge iron plants, electroplating industries, tannery units, brick kilns, lime kilns, foundry etc. Thus, there is a huge potential for environmental improvements in SME sectors. Efforts are being made by various institutions on issues related to technology development, technology dissemination and capacity building in these SMEs. Some interventions are also undertaken in sectors related to glass, pharmaceuticals, sponge iron, foundry, thermal gasifiers etc. Collaborative efforts of MoEF, CPCB, SPCBs and industrial associations to provide technical information to SMEs on different environmental technologies and alternative approaches to pollution prevention are underway. Financial incentives to CETPs can lead to pollution reduction in future. West Bengal Pollution Control Board (WBPCB) has adopted a multi-pronged approach which incorporates a complete package of targeted regulation, a threat of enforcement, information dissemination, and both technical and financial assistance to comply. This package was adopted for stricter particulate emission standard and intensified enforcement efforts targeting units located in the same area. Also to facilitate compliance WBPCB created a fund with the support of the India - Canada environment facility to assist the small scale industries. This package can be used for wider application across the country.

While the total number of inspections conducted by different SPCBs is impressive (for example, in Andhra Pradesh, 24,565 inspections were carried out over the last three years), most SMEs are inspected very rarely or never at all. Solving the pollution problem of these industries is complex for various reasons, which include techno-economic problem, space constraints, lack of awareness etc (WBPCB, 2004). Their problems can be solved by a combination of pressure and persuasion, continuous negotiations with the associations of such industries and also arranging/facilitating financial assistance for taking necessary pollution control measures.

In addition, there are a very large number of unorganized enterprises (not registered as per SIDO - Small Industries Development Organisation) in India. There are about 15 million such units and it is estimated that 40% of them use energy for their processes. They use a variety of fuels, biomass fuels in the form of groundnut husk, paddy husk, firewood, waste oil, cotton waste, etc. some even use discarded tyres as fuel. These are used in very primitive type of stoves cause into enormous pollution impact on workers and neighbors. The unorganized enterprises do not come under the purview of State Pollution Control Board to implement guidelines of pollution verification and control that are applicable to large and registered SMEs.

A frequent argument from the industrial community is that new investments in large industrial projects bring modern and clean technologies, and big companies, particularly those with global market outreach, increasingly adhere to sound management practices. In reality, the impact of industrial growth is more nuance and complex. With about 40 percent of the total value of industrial production and over 4.5 million units across the country, the SME is a major engine for growth, employment and poverty reduction, raising a dilemma of balancing economic and environmental objectives. Given their diversity in terms of types, scales, financial and technical capacity etc, almost all stakeholders feel SMEs poses much bigger challenge in terms of pollution management.

Area-Based Environmental Management Programs approach to environmental regulation has been tried in India since 1991 through different CPCB and SPCB programs. For example, the CPCB and concerned SPCBs identified 24 "critically polluted/problem areas", action plans for which (including compliance monitoring measures) have been developed and are in various stages of implementation. While area based programs have an advantage of focusing regulatory and compliance monitoring efforts of the concerned SPCBs, they so far have had mixed success in India, mostly due to the lack of coordination of efforts targeting industry, municipal, and non point pollution sources.

In order to abate pollution from various sources, MoEF also notifies general as well as industry specific emission and effluent standards for various categories of industries under the provisions of the Environmental (Protection) Act (EPA), 1986. Based on development of new pollution control technologies and their feasibility, these standards are periodically reviewed and new ones are notified. For example CPCB sets the emissions standards for thermal power plants, with main pollution as particulate matter as sulphur content of Indian coal is low. According to CPCB officials, standards on NO_x coming from coal based power plants is not needed as combustion takes place in low temperature, however, in 1999, emissions limit on NO_x has been imposed on naphtha and natural gas based power plants. Emission standards for large industries are developed in consensus with the industry itself, taking into account the economic feasibility of the installation of abatement equipment. Although there is a review of the standards for air and water effluents, it was felt that it has to be taken up on a more regular basis.

MoEF/CPCB has identified 24 critically polluted areas where air quality has deteriorated due to emission from industries and other sources. Some of the areas are as follows:-

Name of the area	Major sources
Singrauli (U.P.)	Power plants, coal mining
Ankaleshwar(Gujarat)	Chemical industries
Vapi (Gujarat)	Chemical industries
Pattancheru (A.P.)	Pharmaceutical industries
Cochin (Kerala)	Oil refinery , chemical industry
Tarapur (Maharastra)	Chemical industries

Hazardous waste management

Similarly studies have shown that out of the 29716 industries, presently 8.14 million tonnes of hazardous wastes are being generated. As on date only 21 TSDF (Transport, Storage, and Disposal Facilities) exist. The hazardous wastes are stored in the industrial premises and create problems related to contamination if ground water and soil and air pollution in the area. This therefore has to be tackled on a war footing through promoting clean technologies to reduce generation of hazardous wastes. There is a need to undertake remediation of contaminated hazardous waste dump sites. Following are the issues to be taken up for proper hazardous waste management:-

- ◆ Setting of more TSDF in PPP mode.
- ◆ Proper scientific evaluation of TSDF as many TSDF are not working properly.

- ◆ Identification of Illegal dump site and remediation of those sites.
- ◆ Performance evaluation of hazardous waste incinerator.
- ◆ High calorific value hazardous waste can be used as partial fuel in cement kiln; this policy may be given more encouragement in national interest.

Fly Ash Management

Presently 112 million tonnes of fly ash is generated from 81 coal based thermal power station. It is expected to increase to 150 million tonnes when other large coal based power stations are commissioned as per ministry of power programme.

2.4 Climate Change

The Climate Change Division in the Ministry of Environment and Forests is the government nodal centre for the various programmes on Climate Change. The Ministry of Environment and Forests is the nodal Ministry in the Government of India for all multilateral environmental agreements. These include the UN Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol. India is a party to the Kyoto Protocol. India submitted its initial National Communication to the UNFCCC in June 2004 well ahead of schedule at the Subsidiary Body Meetings of the UNFCCC in Bonn. The elements of initial National Communication included an inventory of GHG emissions - Carbon Dioxide, Methane and Nitrous Oxide for the base year 1994. India is also a partner of the Asia-Pacific Partnership on Clean Development and Climate (APPCDC; commonly referred to as AP6). The Partnership consists of Australia, China, India, the Republic of Korea and the United States of America. The Policy and Implementation Committee (PIC) of the Asia-Pacific Partnership on Clean Development and Climate approved an initial set of projects and activities contained in eight sector-based Action Plans. The Partnership has established public-private Task Forces in eight key sectors: cleaner fossil energy, renewable energy and distributed generation, power generation and transmission, steel, aluminium, cement, coal mining and buildings and appliances.

The National Action Plan on Climate Change 2008, would be implemented through a core of eight National Missions (Box No. 2) comprising inter-sectoral groups involving relevant Ministries, civil society, private players and local governments. The plan identifies eight core national missions and is based on three broad principles:

- ◆ The primary responsibility of reducing Green House Gas (GHG) emissions is that of developed countries. They should show a demonstrable sincerity in initiating actions to address climate change.
- ◆ The development needs of developing countries are of prime importance
- ◆ The developed world should transfer resources and technologies at favorable terms to the developing world, thereby facilitating developing countries to move towards a sustainable development path.

Box No. 2 Missions in Climate Change Policy are:-

1. National Solar Mission
2. National Mission for Enhanced Energy Efficiency: Tradable Certification of energy efficiency and fiscal measures
3. National Mission on Sustainable Habitat: Energy Conservation Building Code; Urban Waste Management- electricity from waste; modal public transport
4. National Water Mission
5. National Mission for Sustaining the Himalayan Ecosystem
6. National Mission for a Green India -- carbon sinks etc
7. National Mission for Sustainable Agriculture: New thermal resistant crops, new credit and insurance mechanisms
8. National Mission on Strategic Knowledge on Climate Change

National Solar Mission: The NAPCC aims to promote the development and use of solar energy for power generation and other uses with the ultimate objective of making solar competitive with fossil-based energy options. The plan includes:

- ◆ Specific goals for increasing use of solar thermal technologies in urban areas, industry, and commercial establishments;
- ◆ A goal of increasing production of photovoltaics to 1000 MW/year; and
- ◆ A goal of deploying at least 1000 MW of solar thermal power generation.

Other objectives include the establishment of a solar research center, increased international collaboration on technology development, strengthening of domestic manufacturing capacity, and increased government funding and international support.

National Mission for Enhanced Energy Efficiency: Current initiatives are expected to yield savings of 10,000 MW by 2012. Building on the Energy Conservation Act 2001, the plan recommends:

- ◆ Mandating specific energy consumption decreases in large energy-consuming industries, with a system for companies to trade energy-savings certificates;
- ◆ Energy incentives, including reduced taxes on energy-efficient appliances; and
- ◆ Financing for public-private partnerships to reduce energy consumption through demand-side management programs in the municipal, buildings and agricultural sectors.

National Mission on Sustainable Habitat: To promote energy efficiency as a core component of urban planning, the plan calls for:

- ◆ Extending the existing Energy Conservation Building Code;
- ◆ A greater emphasis on urban waste management and recycling, including power production from waste;
- ◆ Strengthening the enforcement of automotive fuel economy standards and using pricing measures to encourage the purchase of efficient vehicles; and
- ◆ Incentives for the use of public transportation.

National Water Mission: With water scarcity projected to worsen as a result of climate change, the plan sets a goal of a 20% improvement in water use efficiency through pricing and other measures.

National Mission for Sustaining the Himalayan Ecosystem: The plan aims to conserve biodiversity, forest cover, and other ecological values in the Himalayan region, where glaciers that are a major source of India's water supply are projected to recede as a result of global warming.

National Mission for a "Green India": Goals include the afforestation of 6 million hectares of degraded forestlands and expanding forest cover from 23% to 33% of India's territory.

National Mission for Sustainable Agriculture: The plan aims to support climate adaptation in agriculture through the development of climate-resilient crops, expansion of weather insurance mechanisms, and agricultural practices.

National Mission on Strategic Knowledge for Climate Change: To gain a better understanding of climate science, impacts and challenges, the plan envisions a new Climate Science Research Fund, improved climate modeling, and increased international collaboration. It also encourages private sector initiatives to develop adaptation and mitigation technologies through venture capital funds.

To achieve the goals of the eight missions the following methods may have to be adopted:-

- a. Mitigation which means reducing Green House Gas (GHG) emissions
- b. Adaptation which includes preparing for climate impacts which cannot be avoided
- c. Technology which means not only develop cleaner methods but also use techniques which are adoptable in developed and developing countries and hence facilitate transfer of technology.
- d. Finance which encompasses mechanisms and investment flows that will enable developing countries to adapt and acquire cleaner technologies.



The main green house gas (carbon dioxide) and the main air pollutants seem to a large extent stem from the same sources. For a range of control initiatives, targeting these common sources thus typically implies abatement of both CO₂ and air pollutants. Several previous studies in both developing and developed countries have demonstrated that the near to medium term co-benefits of CO₂ abatement policies, which primarily consist of reduced damage to human health from air quality improvements, can offset a large fraction of the mitigation costs and even exceed the costs significantly in some cases. Greenhouse gas mitigation has been often found to lower emissions of other pollutants, lower pollution control costs and lower environmental impacts. Moreover, whilst the full benefit of emission reduction resulting

from climate mitigation policies may be experienced only by future generations atleast a few co-benefits will accrue to the present generation.

Increasing evidence exists that well-known air pollutants, especially tropospheric ozone⁵ and particles, play an important role in the climate system. Some greenhouse gases, such as methane, are also precursors for tropospheric (ground level) ozone. Reductions in methane emissions would have co-benefits in tackling the ozone problem, i.e. damages on agricultural crops and human health. Reductions in ozone precursor substances have an effect on the sequestration of carbon in the biosphere. Therefore, a combined analysis of greenhouse gas mitigation and air pollution control leads to substantially different conclusions about the cost-effectiveness of strategies than traditional approaches that analyse these two problems in isolation.

Climate change and air quality are linked through the chemistry of the atmosphere, as some air pollutants influence the lifetimes of GHGs. The synergetic effects on climate change and air quality are probably the most marked for low-income but rapidly growing regions of the world, i.e. mostly in Asia. As climate change policies induce significant changes from baseline for sulphur and nitrogen oxide emissions, they will bring substantial co-benefits in terms of reduced regional air pollution, and improved human health. For certain countries, air quality benefits could indeed be the major driving force for taking action and participating in a future climate regime. An OECD study (2001) highlighted the synergy between slowing greenhouse gas emission growth and improving local environmental quality in India. With the aid of a computable general equilibrium model, the study estimated for India the magnitude of ancillary benefits from limiting growth of greenhouse gas emissions to local air quality and the health of the urban population. The most important co-benefit is reductions in emissions of particulates with associated declines in mortality and morbidity.

In India, benchmarking of GHG emissions has not been set forth. Developments in markets, knowledge and technology, may enable industries to cut their carbon emissions, while increasing productivity. New companies may take environmental leadership and may put existing firms in a competitive disadvantageous position. Public concern about the environmental consequences can strengthen the market pressures favouring 'green' companies. This may affect ability to market products and ability to mobilize investments for perceived 'polluting industries'. Some initiatives include the Carbon Disclosure Project (CDP; Box No. 3), the Green Rating project by CSE, different initiatives by the World Business Council for Sustainable Development (WBCSD) have helped in industries disclose there GHGs.

The Government of West Bengal has taken a lead to identify key vulnerabilities of India to climate change, in particular impacts on water resources and coastal areas and to assess the need for adaptation to future climate change, and the scope for incorporating these in relevant programs, including watershed management, coastal zone planning and regulation, and health programs (Box No.4).

Thus it is understood that the climate change policy cannot stand alone, but should be viewed comprehensively vis-à-vis other policy areas of environment and energy. India and other large fast-developing countries are facing increasing pressure from developed countries to sign for binding caps on greenhouse gas emissions, possibly with the second commitment period of the Kyoto Protocol (post 2012). The Government and other stakeholders in India have opposed this, since it might interfere with the much-needed development of the economy. Also, greenhouse gas emissions are very low on a per capita basis.

⁵ Tropospheric ozone is a greenhouse gas and initiates the chemical removal of methane and other hydrocarbons from the atmosphere.

Box No. 3: The Carbon Disclosure project (CDP)

CDP was established in 2000 and provides a secretariat for institutional investors to request information on climate change from the companies in which they invest (CDP, 2007). In 2007, CDP expanded to India in collaboration with the World Wide Fund for Nature -India (WWF-India) and the

- ◆ Confederation of the Indian Industry (CII) ITC Centre of Excellence for Sustainable Development
- ◆ Opportunities and risks from climate change and strategies adopted to respond to this,
- ◆ Direct and indirect greenhouse gas (GHG) emissions
- ◆ Emission reduction strategies
- ◆ Corporate-level climate change management and governance

39 companies from 17 sectors (about 35%), responded which include 18 companies from high impact sectors. 15 (38%) companies reported Scope 1 (direct CO₂ emissions from fossil fuel burning) GHG emissions data. The number of companies that reported Scope 2 (CO₂ from imported sources) and Scope 3 (from other sources) GHG emissions data was lower 23% and 18% respectively. The majority of the companies that reported GHG emissions data have used the GHG protocol methodology. Disclosure may be expected to improve following increased familiarity with measurement tools and protocols. 26% of the responding companies provided details of emissions intensity. GHG emission per unit of output or input was the most common emission intensity ratio considered by the responding companies. Two companies reported emission intensity as a percentage of base year emissions. Emissions trading opportunities are being considered by 46% of the responding companies. 38% of the responding companies have allocated board or upper management level responsibilities for climate change issues.

Box No. 4: Climate change policy in West Bengal

The State of West Bengal presents an evidence of the increasing policy concern for climate change.

Climate Change Cell, including a Technical Cell would work on three activities:

1. The impacts on vulnerable societies and adaptation measures will be addressed in the Sundarbans (Ganges' river delta).
2. Coastal zone management with climate change proofing is to be carried along the coastal line.
3. Adaptation needs in Kolkata shall be identified and addressed. The activity shall afterwards be replicated in other cities

The Government of India has constituted the National Clean Development Mechanism (CDM) authority to act as the designated national authority for CDM projects from India. The NCA ensures that projects applying for CDM benefits contribute to the economic, social, technical and environmental well being of the nation. In China having 655 registered CDM projects is the leading Country followed by India with 466 projects as on November 2009, terms of the sector wise distribution of CDM projects within India, biomass based projects are leading the CDM scene. Demand side energy efficiency projects come second followed by hydro, wind, and cement. Fossil fuel switch projects, Biogas and landfill gas capture projects presently appear to constitute a small percentage to the total projects from India. As reported in 2007 end, on geographic distribution of CDM projects it is found that Karnataka has the maximum number of projects (34) approved by the NCA from India. Andhra Pradesh follows with 31 projects while Tamil Nadu has around 24 NCA approved projects, Rajasthan (22), Maharashtra (18) and Gujarat (18). The working group discussions also stressed the need to encourage Indian industry and municipal bodies to participate in the Clean Development Mechanism through capacity building for identifying and preparing CDM projects, including investment. There was a need to encourage Indian industry to participate in Clean Develop Mechanism through capacity building for identifying and preparing CDM projects, including in the financial sector (Box No.5)

Box No. 5 A case study on ITC

ITC has numerous ways to make their systems and processes environment-friendly, energy-efficient and responsive to climate change. Initiatives taken by ITC include (tobacco, hotels, paper, food). ITC has charted out a quiet but ambitious move to become the only corporation in the world to achieve triple green rating as it is already water positive, and is now moving to become both carbon positive and have zero solid waste.

In all its hotels, high-tech water treatment plants (that cost US\$ 100,000 each) ensure that the water used in the rooms, the kitchen and by the laundry department is recycled back for use in the hotel gardens, in the cooling towers for the ACs, etc. It has succeeded in registering as many as seven CDM projects accounting for one million CERs. The carbon sequestered during 2003-04 at 174,000 tonnes, offsetting carbon dioxide to the tune of 636,000 tonnes. As per current pulp requirements, the company needs only 4000 ha of plantations annually, but is actually covering more than 10000 ha, delivering bumper yields.

According to the All Indian Reporter of Supreme Court cases, the court between 1980 to 2000 resolved 104 environmental cases and many landmark judgments have been passed. It is clear that environmental law making has been result of various triggers which range from disasters, compulsions, international obligations and economic imperatives. This throws various kinds of challenges to the regulatory authorities and entrepreneurs alike. However, there are a growing number of voluntary incentives by the industry to demonstrate environmental stewardship to company shareholders, consumers, communities, consumers, and other key stakeholders. Many companies in India and internationally have implemented the Environmental Management Systems (EMS), such as ISO 14001, resulting in both economic and environmental benefits from improved performance and production efficiency. This is compelling many export oriented firms, such as chemical manufacturing facilities in Gujarat or pharmaceuticals firms in Andhra Pradesh, to adopt voluntary initiatives to demonstrate corporate responsibility as well as sustained environmental performance beyond strict regulatory compliance.

Chapter 3

Energy-Environment-Issues and Concerns

3.0 Introduction

India currently ranks as the world's seventh largest energy producer, accounting for about 2.49% of the world's total annual energy production. It is also the world's fifth largest energy consumer, accounting for about 3.45% of the world's total annual energy consumption in 2004. Since independence, the country has seen significant expansion in the total energy use in the country with a shift from non-commercial to commercial sources. As of February 2008, India has power generation capacity of 141,500 MW (MOP, 2008). 52.5% of the capacity is owned by state, 34% is owned by the central sector and private sector owns the remaining 13.5%. Concerning capacity by resources of generation, coal and natural gas account for respectively about 75300 MW and 14700 MW.

3.1 India's energy efficiency policies and programs

The energy policy of India is characterized by four major drivers:

- ◆ Rapidly growing economy, with a need for dependable and reliable supply of electricity, gas, and petroleum products;
- ◆ Increasing household incomes, with a need for affordable and adequate supply of electricity, and clean cooking fuels;
- ◆ Limited domestic reserves of fossil fuels, and the need to import a vast fraction of the gas, crude oil, and petroleum product requirements, and recently the need to import coal as well; and
- ◆ Indoor, urban and regional environmental impacts, necessitating the need for the adoption of cleaner fuels and cleaner technologies.

Activities in the energy sector may cause severe impacts on the environment right from the mining stage through the processing stage to the final use of fuels in power generation or for transport. Agenda 21 and the subsequent CSD sessions recognized the need to accelerate energy production to foster development and raise the living standards of people in developing countries. Improving accessibility of energy implies finding ways and means by which energy services can be delivered reliably, affordably and in an economically viable, socially acceptable and environmentally sound manner. Agenda 21 also gives primacy to the role of efficiency in energy production, transmission, distribution and consumption, and on the use of environmentally-sound energy systems, such as advanced fossil fuel technologies and new and renewable sources of energy for controlling environmental damage.

3.1.1 Energy Conservation Act 2001

Energy conservation has emerged as a major policy objective, and the Energy Conservation Act 2001 was enacted. This Act requires large energy consumers to adhere to energy consumption norms; new buildings to follow the Energy Conservation Building Code; and appliances to meet energy performance standards and to display energy consumption labels. The Act also created the Bureau of Energy Efficiency to implement the provisions of the Act. The planning commission had come out with an Integrated Energy Policy linked with sustainable development that covers all sources of energy and addresses all aspects of energy use and supply including energy security, access and availability, affordability and pricing, as well as efficiency and environmental concerns.

3.1.2 Electricity Act 2003 and National Electrical Policy 2005

The Electricity Act 2003 (EA2003) was also in place to consolidate the laws relating to generation, transmission, distribution, trading and use of electricity. It also called for rationalization of electricity

tariff, and promotion of efficient and environmentally benign policies. In compliance with the provisions of the above Act, the National Electricity Policy was notified in 2005 by the central government. The objectives of the National Electricity Policy (2005) are:

- ◆ To provide access to electricity for all households by next five years, meet full demand by 2012,
- ◆ Increase per capita availability of electricity to over 1000 units by 2012,
- ◆ To ensure financial turnaround and commercial viability of electricity sector and protection of consumers' interest.

Energy conservation and utilization of alternative forms of energy form two core issues that are to be addressed in order to achieve the desired objectives of the National Electricity Policy and plan. It is observed that the Energy Conservation and Electricity Act complement each other in moving towards energy security in which conservation and efficiency hold a key role.

In the VIIIth Five year plan Rs. 1000 crores was allocated for energy efficiency to provide targeted energy savings of 5000 MW and 6 million tonnes in the electricity and petroleum sectors respectively. The IXth Five Year plan proposed the Energy Conservation Act and the setting up of the Bureau of Energy Efficiency. The Xth Five Year plan proposed benchmarking of the hydrocarbon sector against the rest in the world. It also suggested demand side management specifically in the transport sector. Planning commission of India had the target in the Xth plan for an estimated saving of 95,000 Million Units (13% of the estimated demand) in the terminal year of 7,19,000 Million units. A study for the Asian Development Bank (ADB, 2003) estimated an immediate market potential of energy saving of 54,500 Million units. An estimate of the total volume of the energy efficiency consulting business (Audit, performance contract, engineering and technical assistance consultancy) is less than 1% of this potential (DSCL, 2004). With the AT&C losses in the country at approximately 40-50% all possible means of reducing energy consumption need to be exercised forthwith, and among the foremost areas where significant savings can make a substantial impact are:

- ◆ Mining
- ◆ Electricity generation, transmission and distribution
- ◆ Water Pumping
- ◆ Industrial production, processes, hauling
- ◆ Mass transport
- ◆ Building design
- ◆ Construction
- ◆ Heating, Ventilation and Air-Conditioning
- ◆ Lighting &
- ◆ Household Appliances



3.1.3 Integrated Energy Policy 2006

The integrated energy policy has made the following recommendations for India's energy security in the long run:

- a) The population of India is expected to reach 1.47 billion by 2031-32. In order to help millions of people living below the poverty line, an estimated level of eight percent growth is necessary. The report states that 'to fuel a sustained eight percent growth requires the basic capacities in the energy sector and related physical infrastructure such as rails, ports, roads and water grow by factors of three to seven times by 2031-32, alongside a 20-fold increase in nuclear and a 40-fold increase in renewable energy.
- b) The report also states that India's reliance on traditional non-commercial energy sources will rise in absolute terms to 185 Mtoe in 2031-32 from the current level of about 150 Mtoe, despite the share of traditional sources being reduced by about 20 percent. Therefore, it is important to ensure energy efficient mechanisms in place for residential and transport uses, in order to divert more energy for growth generating activities.

- c) The report states that alternative sources of energy coupled with energy efficient and conservation methods should be prioritised. Transport and residential sectors consume about 32 % of the total available energy. It was felt that the government must concentrate on ensuring efficient uses of energy in these two areas; more energy can be diverted for industries and growth generating enterprises, without having to increase the import dependence.
- d) The Integrated Energy Policy also looks at finding solutions to questions that are likely to pose serious threats to India's Energy future if not looked at concertedly, in the short term and long term perspectives. Bureau of Energy efficiency (BEE) is formulated to play both a regulatory and promotional role (Box No.6).

Box No. 6 Roles of BEE

Regulatory

- ◆ Develop minimum energy consumption standards and labeling design for equipment and appliances.
- ◆ Develop energy conservation building codes.
- ◆ Develop specific energy consumption norms.
- ◆ Certify energy managers and auditors.
- ◆ Define the manner and periodicity of mandatory audits.

Promotional

- ◆ Create awareness, organise training, educational curriculum on related subjects
- ◆ Promote R&D and strengthen consultancy
- ◆ Develop testing/certification protocols.
- ◆ Promote innovative financing and give financial assistance
- ◆ Implement international cooperation programmes on energy efficiency and conservation

3.2 Standards and Labeling (S&L)

The Standards and Labeling (S&L) programme has been identified as one of the key activities for energy efficiency improvements. The S&L programme, would ensure that only energy efficient equipment and appliance would be made available to the consumers. Initially, the equipment to be covered under S&L programme are household refrigerators, air-conditioners, water heater, electric motors, agriculture pump sets, electric lamps and fixtures, industrial fans and blowers and air-compressors. Energy labeling on voluntary basis for refrigerators and tubular fluorescent lighting has been launched in 2006. BEE formed a consortium of energy audit consultants to carry out energy audit in several important government buildings. BEE and the Central Public Works Department (CPWD) are in the process of implementing energy efficiency performance contracting projects in nine government buildings with an estimated annual savings of approximately 30 GWh with a simple payback of less than two years.

Another important initiative in the conservation sector that has been the introduction of compact fluorescent lamps (CFL) in many countries. It is estimated that 110 million American households can save energy to power a city of 1.5 million people by switching to CFL lamps. More recently, the Indian government has announced similar plans. The law of large numbers will play an important role in energy conservation, especially in the household sector. Rajasthan State introduced this scheme in the public sector. It is also felt that the Planning Commission and the Department of Atomic Energy also play a vital role in energy policy and energy conservation efforts.

3.3 Green Buildings

Today a variety of green building projects are coming up in the country - residential complexes, exhibition centers, hospitals, educational institutions, laboratories, IT parks, airports, government buildings and corporate offices.

The building code has provisions for

1. Building envelopes, except for unconditioned storage spaces or warehouses,
2. Mechanical systems and equipment, including heating, ventilating, and air conditioning,
3. Service hot water heating,
4. Interior and exterior lighting, and electrical power and motors

The technical capabilities of code implementing agencies are not adequate to support code implementation and verification. There is lack of knowledge among designers to analyze designs based on code requirements. Energy simulation capability to quantify savings based on energy efficiency parameters as defined by the code is very limited. Preliminary study indicates that the building construction industry is not geared to apply these measures practically on site. The energy conservation act empowers the state government to amend the energy conservation building codes to suit the regional and local climatic conditions. Most people feel that this provision may in longer run lead to large deviations from the ECBC that has been developed by the BEE and may lead to confusion among builders / developers / designers / confusion. There has been general lack of interest among builders to implement energy efficiency in their buildings because of the sheer dichotomy of the fact that "he who invests does not reap benefits of the investment". There are planning constraints on the site. There is an increase in initial building cost that restricts the builders from adopting energy efficiency measures in their buildings. Customer awareness being minimal works to the advantage of not demanding energy efficiency systems. Also the non-availability of efficient energy equipments in India is another major barrier. Equipments imported from abroad example from China, increases the cost of the equipment and also results into more time consumption for installation, which delays the project.

3.4 GHG Monitoring in power sector

The power sector in India is the single largest source of CO₂ emissions, contributing about 50% of the total emissions in the country. During 1985-2005, emissions from this sector have grown at the rate of 7.7% annually (Garg et al., 2006). Factory level monitoring of GHG emissions are not in place. All thermal power plants report the actual fuel consumption along with their quality (e.g. heat and ash content for coal) to the Central Electricity Authority (CEA). CEA brings out the plant wise CO₂ emissions, which are currently used for CDM purpose (for the calculation of grid co-efficient used for baseline). It is primarily based on calculation, taking into account fossil fuels (coal, oil and gas) consumed in the power plants, associated calorific values and an average oxidation factor. These figures are updated on regular basis based on their actual values.

It was felt that the methodology should be harmonized internationally. For example, power plants in India use net calorific value (or low heat value) whereas, high heat value (or gross calorific value) is used for any thermal calculation in USA. This may cause 2-3% difference in even emissions factor and hence overall emissions calculations.

In India's initial national communication to UNFCCC the IPCC (1996 Guidelines) Tier-I, II and III approaches were used to estimate GHG inventories. The choice of the approach for a sector depended on the quality and availability of activity data and emission coefficient as required by each approach. First National Communication has made the estimation of indigenous emission coefficients in several key sectors through direct field measurements using rigorous scientific methodologies, which have contributed to the accuracy and reliability of the GHG budget estimates. However, considerable uncertainties exist in the present emission estimates of GHGs from various sectors. It attempted to estimate actual emission factors for power plants, cement plants and steel plant, through actual stack level measurements, however, sample size was too low to generate some reliable estimates. For example, measurement was taken in only one steel plant and two to three power plants. It leaves scope for improvement in large number of sectors, primarily in industries, such as steel, chemicals etc. In its second communication, some of them may be addressed.

Over the past decade, energy efficiency in Indian industry has increased steadily. In the major energy-consuming industrial sectors, such as cement, steel, aluminium, fertilizers, etc., average specific energy consumption has been declining because of energy conservation in existing units, due to new capacity addition with state-of-the-art technology. In almost every industrial sector, some of the world's most energy-efficient

units are located in India. In most industrial sectors, India has a very broad band (in terms of efficiency), from world no. 1 to very poor performing industries. National-level technology transfer has functioned well in the cement industry, but not in the other sectors.

The energy-security approach appears to carry much more weight than the air-quality management approach, for two major reasons: Enhancing energy supply and access is the top priority for the Indian energy policy, while energy security comes in as a strong number two. Also, the link between air pollution and GHG emissions is so evident, that mandates immediate attention.

3.4.1 Coal thermal power plants

Coal is the mainstay of India's energy economy, and coal based power plants account for about two-thirds of the total electric generation installed capacity of about 135,000 MW. Coal thermal power plants comprise of units varying from 30 MW to 500 MW. Some of the units (smaller size) are as old as more than 40 years. Coal quality is an issue, which is deteriorating over years in terms of ash content and calorific value resulting from increasing use of open cast mining. Ash content can be as high as 45 to 50%. This causes operational difficulties in terms of frequent break down and poor boiler performance and pollution hazards (Box No.7). Coal power plants operated by the Central Government owned National Thermal Power Corporation are better performed with thermal efficiency in the range of 35-37%, whereas, state-owned coal power plants, most of which are old, operate with much lower efficiency of 20-30%. Each percentage increase in efficiency will result into 3% reduction in coal consumption and 3% reduction in CO₂/GHG and particulate emissions (Sharma, 2004).

High ash content coal used in thermal power plants is contributing to enormous problems of environmental degradation through gaseous emissions, particulate matter, fly ash and bottom ash and thereby health hazards. During Stack Emission, SO₂ and NO_x are released which subsequently get oxidised to sulphate (SO₄) and Nitrate (NO₃). The coal based thermal power generation will continue to dominate its role in future also as other energy sources have not yet succeeded to take its place.

The notification of Ministry of Environment and Forests dated 30th June 1998 stipulates the use of raw or blended or beneficiated coal⁶ with an ash content not more than 34% on an annual average basis effective 1st June 2001 (coal with higher than 34% of ash content will be banned from transportation of more than 1000 km of distance). Coal washeries to supply clean coal to power plants more than 1000 km from the coal mines have been made mandatory from June 2001. Coal beneficiation is desirable however, so far supply of washed coal is rare because of limited washery capacity. Sulphur content of Indian coal is generally low, less than 0.2%, therefore, SO_x emissions are not considered to be a problem. Since, combustions temperature is low, NO_x generation in coal power plants is also considered to be low, leaving particulate emissions as centre of attention. Coal based generation is also the main contributor to India's carbon dioxide emissions, linked to changes in global climate.

Box No. 7: Key Environmental Issues in the Power Sector

Coal-based thermal power has significant environmental effects due to gaseous emissions, particulate matter, fly ash and bottom ash, and water effluents. The impact is further exacerbated by the high ash content of India's coal and aging facilities lacking modern pollution control;

One of the most serious effects of coal power stations is land requirement for ash disposal and percolation of hazardous elements into ground water through ash disposal in ash ponds. Due to enormous quantity of ash content in India's coal, approximately 1 acre per MW of installed thermal capacity is required for ash disposal. If this trend continues, by the year 2014-2015, 1000 square km of land, equal to the size of the Hong Kong area, or 1 square meter per person, should be required for ash disposal only;

Coal is likely to remain the dominant fuel of the power sector for many decades to come. Options that can potentially mitigate both CO₂ and air pollution from coal use include coal washing; increased efficiency of power generation; cleaning the emissions (particulate, SO_x and NO_x filters); and carbon sequestration (capture of CO₂ during or after combustion).

⁶ Coal treated in processes called beneficiation to make it homogenous and customer need specific.

There is no economic rationale for carbon capture, since there is no potential use of the CO₂. Use of CO₂ for enhanced oil recovery is not relevant in India, since oil resources are scarce. This leaves increased generation efficiencies as the preferred option to reduce air pollution and CO₂ emissions. The current approach is to rehabilitate existing power plants and to install supercritical steam power plants, thereby increasing efficiencies from about 35-37% for typical new power plants to about 41%.

The Centre for Power Efficiency and Environment Protection (CenPEEP), which started in 1994 (funded by US Agency for International Development, USAID), is designed to reduce the emissions of GHG per unit of electricity generated by improving the efficiency of existing coal-fired power plants and by implementing advanced technologies for future coal-based power plants. Several implemented demonstration projects have been replicated, involving substantial technology transfer.

3.5 Renewable Energy

India's renewable energy policy contains important provisions for electrification of remote villages and hamlets. In these areas, emphasis is laid on local participation and decentralization of power generation facilities. Because of the high costs of connecting these remote villages to the national grid, it is economical to promote projects based on solar energy, biomass gasifiers and small hydropower plants. As of November 2004, 1744 remote villages and 572 remote hamlets were electrified under this programme. The government provides upto 90% financial assistance for non-conventional energy schemes in these areas.

The following are the details of installations of renewable energy in India as on March 2007.

Table 3.1 Renewable energy in India

S.No.	Installation	Capacity
1.	Biogas plant	3.89 Million
2.	Improved chullas	35.2 Million
3.	Wind power	6070 MW
4.	Small hydropower	1849 MW
5.	Biomass	1068.3 MW
6.	Solar photovoltaic	2.74 MW
7.	Solar water heating	1.5 million m ² (collector area)
8.	Waste to energy	45.98 MW

Perspective plan for renewable energy for urban, Industrial and commercial applications as per the XI Plan

The broad goals proposed for the year 2032 for applications in the urban areas and industry call for a significant scale-up over the next 25 years spanning five Plan periods. The major goals include 50 million m² of solar collector area for thermal applications, mainly solar water heating and 7500 MW of grid/captive power from bio resources, including urban and industrial wastes. Compared to the status in 2007, there is a massive build-up in capacity, which will require concerted action across various fronts, starting with the next Plan. The targets proposed for 2012 and indicative goals for 2022 and 2032 are reflected in the perspective plan given in Table 3.2.

The National Solar Mission of the NAPCC aims to promote the development and use of solar energy for power generation and other uses with the ultimate objective of making solar competitive with fossil-based energy options. The plan includes goals for increasing use of solar thermal technologies in urban areas, industry, and commercial establishments and increasing the production of photovoltaics to 1000 MW/year and deploying at least 1000 MW of solar thermal power generation. The National Mission for Enhanced Energy Efficiency is expected to achieve reductions in large energy-consuming industries, with a system for companies to trade energy-savings certificates, offering energy incentives, including reduced taxes on energy-efficient appliances and financing for public-private partnerships to reduce energy consumption through demand-side management programs in the municipal, buildings and agricultural sectors.

Table 3.2: Perspective Plan for renewable energy for urban, industrial and commercial applications

Programmes	2012	2022	2032
<i>Solar Energy</i>			
Solar thermal systems / devices	10 million m ² collector area	30 million m ²	50 million m ²
Energy efficient buildings	5 million m ² floor area (1000 buildings)	20 million m ²	40 million m ²
Akshay urja Shops	200 nos		
<i>Energy recovery from Urban and industrial wastes</i>			
Urban wastes	500 MW		
MSW	400 MW (100 cities)		
Industrial wastes	200 MW		
Other wastes	100 MW		

NAPCC's solar mission promises to promote use of solar energy in homes, commercial establishment and for power generation through photovoltaic, solar thermal and concentrating solar power. The mission does set a target of 80% coverage for all low temperature and 60% coverage for medium temperature solar energy applications in urban areas, industries and commercial applications. On conventional power generation, NAPCC discusses various options to introduce new technologies. Improving energy use efficiencies especially in industry is also discussed. Studies have also been carried out which estimate that CO₂ emissions from fuel and electricity use in industry could be reduced by 16% over BAU scenario by 2031. However certain gaps are seen that there is no mention of how the energy generation efficiencies in existing plants would be increased. NAPCC also hints at low expectations on increased energy efficiency as these measures would involve incremental and investment costs and may also need technology transfer from various countries and will look towards CDM or other multi lateral arrangements to achieve this goal.

3.6 Co-benefits in the energy sector:

- ◆ Energy efficiency: When CO₂ reductions are achieved through energy efficiency measures, fuel consumption will decrease, thereby improving energy security of energy supply. As India is facing rapid increases in energy demand and since there is still substantial room for efficiency improvements, the significance for energy security is paramount.
- ◆ Renewable energy: When CO₂ reductions are achieved by substituting fossil fuels with renewable energy sources, energy security is likewise improved. As India has a high renewable energy potential, also here the significance for energy security is considerable.
- ◆ Cleaner technologies: Research and advocacy for use of cleaner technologies (e.g. clean coal) are increasing worldwide. India will install large amounts of new power capacity, which allows for extensive use and adoption of advanced technologies. This is beneficial for technological innovation and economic growth.

This will furthermore improve the environmental performance of the energy sector, reduce the economic risks related to security of energy supply, reduce the import dependence, and improve the trade balance of India. Since 2004, the Indian economy has grown at a rate of over 9% per year, supported by an energy growth rate of less than 4% per year.

The risks in terms of energy security are expected to grow in the coming decades. Coal has long been the mainstay of India's energy supply, since India is endowed with significant coal reserves that are expected to last much longer than its oil and natural gas reserves. Coal consumption increased from 140 million tonne in 1984 to over 400 million tonne in 2004 with a growth rate of 5.4%. Thermal power plants using coal, account for 60% of our total generation capacity. Coal being abundant, cheap and locally available would remain a major resource of the Indian energy system for decades to come. However, due to a rapidly increasing transport sector, imports of oil products are destined to increase, thus increasing the challenges of energy security.

Focus in India is still on other priorities such as economic growth, air quality management and energy security. The co-benefits approach for India should be climate-centric and energy-security centric for Government. It should be air quality control for the general public and energy efficiency centric for industries. Although there is increasing awareness and pressure to address climate change, focus in India is still more on other priorities such as economic growth, access to electricity, air quality management, and energy security that would ultimately lead to climate change mitigation.

Chapter 4

Biodiversity-Ecosystem Services

Ecosystem services represent the transformations of natural assets (soil, water, biota) into 'products' of value to humans. A widely accepted definition of ecosystem services is "the conditions and processes through which ecosystems, and the species that make them up, sustain and fulfill human life". For many developing countries, the loss of ecosystem services will be a barrier to achieving the Millennium Development Goals (MDGs) to reduce hunger, disease and income poverty. Even if countries achieve the MDGs by 2015, the loss of ecosystem services will ultimately undo most of the benefits in the longer term. Although today's technology and knowledge can contribute to minimizing the human impact on ecosystems, their potential is unlikely to be deployed fully until ecosystem services cease to be perceived as free and limitless and their full value taken into account. Developing countries provide numerous services to the world, such as ecosystem services and the preservation of biodiversity, for which they are not compensated. For example, developing countries have committed themselves to the obligations of the Kyoto Protocol if they receive compensation for environment services. Markets for Ecological Services (MES) are defined as mechanisms that create a market for ecosystem services in order to improve the efficiency in the way the service is used and these include the establishment of carbon sequestration offsets, tradable development rights, tradable quota systems, eco-labeling and environment-certification and bio-prospecting, among others.

One of the main concerns relate to the impacts of human activities on biodiversity. Pressures can be physical (habitat alteration and fragmentation through changes in land use and cover), chemical (toxic contamination, acidification, oil spills, other pollution) or biological (alteration of population dynamics and species structure through the release of exotic species or the commercial use of wildlife resources). The main challenge is to maintain or restore the diversity and integrity of ecosystems, species and genetic material and to ensure a sustainable use of biodiversity. This implies strengthening the actual degree of protection of habitats and species, eliminating illegal exploitation and trade, integrating biodiversity concerns into economic and sectoral policies, and raising public awareness.

4.1 Biodiversity

The biodiversity related treaties include Convention on Biological Diversity (CBD), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Convention on Migratory Species of Wild Animals (CMS), the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar) and the Convention Concerning the Protection of the World Cultural and Natural Heritage (WHC). According to the CBD, habitat suitability mapping would help 'rehabilitate and restore degraded ecosystems and promote the recovery of threatened species, inter alia, through the development and implementation of plans or other management strategies' (Article 8, Paragraph f). This information would also help 'develop, where necessary, guidelines for the selection, establishment and management of protected areas' (Article 8, Paragraph b).

The development of markets for ecosystem services is an innovative and promising approach to attract private contributions, introduce sustainable resource management practices compatible with the Rio Conventions' objectives and principles, and contribute to the development of economic opportunities in poor, rural areas of the world. Markets have been established for four categories of ecosystem services for which there is an effective demand: carbon sequestration, water quantity and quality, biodiversity protection and landscape beauty. Two categories of services - carbon capture and biodiversity fall within the scope of application of the UNFCCC and CBD frameworks. Private

firms, foundations, NGOs and governments are increasingly involved in markets for ecosystem services. Private sector motivations are diverse and may result from regulated obligations, bottom-line considerations, marketing strategies, corporate social responsibility policies, or a willingness to seize new market segments.

4.2 Bioprospecting

It is important to treat bioprospecting in the context of a strong benefit sharing system among industries / firms, the ecosystem and the projected communities in such manner as that the sharing of knowledge for bioprospecting will multiply the faunal and floral diversity of that region and enrich the cultural ethics with sustained life-support systems. While pharmaceuticals are still the primary use, new uses such as biotechnology in agriculture and cosmetics are also becoming economically important. For bioprospecting to succeed as sustainable development, it must encourage companies that do research and development while also protecting the biodiversity of the region being utilized, benefit the country in question, and respect any indigenous knowledge of the organisms being used. (Box No.8) Bio-piracy of a number of high-value bio-resources, comprising mostly medicinal plants and animals, has emerged as a major threat to the rich biodiversity of the States (Box No 9).



Box No. 8 Traditional Knowledge

The Garhwal Himalayas along with Kumaun and a part of Himanchal Pradesh has unique characteristics of three provinces - Tibetan in the north, Upper Gangetic Plain in the south and eastern Himalayan provinces in the east. More than 8000 species of flowering plants grow in the Himalayas, with nearly 4000 species identified from the Garhwal Himalayan region along with great diversity. Despite its vegetational wealth, this part of the region enjoyed a significant place throughout its history. Some of the historical, archaeological and anthropological evidences prove the presence of human civilization during Mesolithic age (5000 BC) or Megalithic age (2600 BC). The first known historical race of Garhwal is Kole, which descended from Munda. Subsequently, the Kirata, Khasas, Sakas and many other races like Tangana, Partagana, Naga, Huns and Bhotia had intermixed and settled down in Garhwal Himalaya. These human races prospected the bio-resources traditionally. This region is represented by various tribes and communities with distinct dialects, cultures as well as traditional features, now locally identified as Dasolic, Maj-kummayys, Nagpuria, Salani, Jaunsaris, Bandhani, Raathi, Syura, Tehriyal, in different districts. Each of these groups has its own wisdom about the ethnic use of flowering and non-flowering plants. The indigenous flora utilized by the communities has substantial influences on their culture, customs, craftsmanship, ethos, religious rites, socio-cultural beliefs, food habits, settlement patterns and various other resource-based practices. It is necessary to trap this traditional knowledge and convert it to a databank and stored for future use.

The economic value of bioprospecting has received renewed attention since the advent of the CBD due to the potential importance the resulting valuation might have as an incentive to conserve global biodiversity. A variety of methods have been employed to develop estimates of the economic use value of biodiversity. It has been suggested that bio-prospecting could afford poorer countries a unique opportunity to develop their economies by spurring the development of domestic biotechnology industries.

Article 15 is important to the practice of bio-prospecting for a variety of reasons, but foremost for its explicit recognition in international law that states possess sovereign rights over their natural resources (including biodiversity) and can use these sovereign rights to establish legal regimes governing access to those resources. Acting as a counterweight to Article 15.1, Article 15.2 creates an obligation for states to facilitate access to their genetic resources. Article 15.3 further lessens burdens on access by appearing to exempt biodiversity resources collected before the CBD entered into legal force. Since the long history of bioprospecting resulted in the collection of many biological samples (and their deposit elsewhere than in the source country) before the CBD, Article 15.3 may create a significant legal avenue for use of biodiversity unauthorized by the country of origin.

This could offer potential benefits to institutions, herbaria, and botanical gardens whose collections include vast quantities of potentially valuable biodiversity.

Box No.9 Bio-piracy

In the State of Environment Report of Assam (2004) it has recorded 22 plants besides orchids, which are in the list of bio-resources affected by bio-piracy. According to recent reports "Many of the plant species are being collected every year from the region although no data is available on the quantity of collection. Generally plants are collected by forest-dwellers and some of them are semi-processed and handed over to the agents of companies situated outside the region," Some of the examples include:- The stem and barks of *Actinodaphne angustifloia* Nees are collected for medicinal use, while the infected wood of *A. malacensis* Lann is used for manufacturing essential oil. The stem and roots of *Aristolichia cathcartii* HK f.ext and *Asparagus recemosus* Wild are collected for medicinal uses. The stem and barks of *Beilschmiedia brandissi* HKF are widely used as a bonding agent for agarbatti. The entire plant of *Coptis teeta* Wall has medicinal attributes. The seeds of *Euryale ferox* Salsib are used for medicinal purposes as well as for food. While the fruits of *Illicium grifithii* HKF are used as spice and condiments, the flowers and seeds of *Mesua ferrea* L. have their use as medicinal and aromatic oil. The roots of *Pothos scandes* L are used for medicinal purposes. The entire plant of orchid species is generally pirated for ornamental uses.

Articles 15.4 and 15.5 provide a framework for proper behavior between source states and prospective bio-prospectors interested in gaining access to genetic resources. The first part of Article 15.4 - Access, where granted - suggests that source states do not have to agree to provide access at all. However, if access is to be granted, it shall be on mutually agreed terms between the source state and the party seeking access. The types of terms intended by this provision probably include those that specify how the genetic resources of interest are to be legally acquired (e.g., precisely where collecting may be conducted, what manner of collection is permitted, under what sort of supervision collecting is to occur), what uses of collected material are permitted (e.g., where research may be conducted, whether material may be sold to others), how access to the material may be restricted in the future, and how the source country and bio-prospector intend to share benefits arising from research on, and development of, any biodiversity collected.

In addition to the detailed requirements of Article 15.4,⁷ Article 15.5⁸ stipulates that access to genetic resources shall be subject to prior informed consent of the Contracting Party providing such resources. This also strengthens the hand of source countries because it requires full disclosure by bio-prospector of information pertinent to the negotiation of an access agreement. Prior informed consent implies several necessary conditions to an access agreement. Informed consent must be granted before the activity contemplated in the access agreement may commence. Consent must be made in the context of full and truthful disclosure by the bioprospector regarding how, where, and from what source he intends to collect the relevant genetic resources, what



specific uses, commercial or otherwise, he contemplates for those resources, and whether any third party not involved in negotiating the access agreement will gain access to the resources themselves or to any benefits owing from them. Consent certainly refers to the source country, but whether it also applies to other interested parties, such as local or indigenous groups, is ambiguous. Prudent bio-prospectors would likely benefit from securing prior informed consent from as many interested parties as feasible to avoid potentially costly complications. Article 15.5 allows a source country to exempt bio-prospectors from having to obtain prior informed consent. It is possible that bio-prospectors who contemplate becoming repeat players in a particular source country could earn themselves future preferential treatment by ensuring that they act with obvious good faith in scrupulously observing all the terms of their access agreement during the course of their activities.

⁷ Article 15.4 Mutually agreed terms in access & benefit sharing

⁸ Article 15.5 Prior informed consent in access & benefit sharing



Article 15.6 promotes two goals. First, states are urged to promote scientific research into the beneficial uses of genetic resources. Increased levels of scientific research may have the salutary effect of increasing the real and perceived economic valuation of in situ biodiversity, thus accelerating the accrual of benefits to both bio-prospectors and source countries. Second, any such research is to be conducted with the full participation of the source country, and, ideally, within the borders of the source state. The sort of benefits that might result from such cooperative research initiatives include scientific and technical training of source country personnel and enhanced alignment of interests in

conserving biodiversity between source country, bio-prospectors, and any other parties.

Article 15.7 urges countries that benefit from the fruits of bio-prospecting (e.g., new biotechnologies, medicines, or agricultural products) to share those benefits equitably with countries from whose biodiversity such benefits were developed. However, they are granted a large degree of discretion, and can employ whichever means they deem appropriate. Even so, such agreements must still provide for mutually agreed terms. Article 15.7 would seem to be directed more forcefully to benefits developed by the government of the source country itself, rather than non-governmental.

Article 16.3 urges that any technology developed using a source country's genetic resources be transferred back to that source country on favorable terms. Implementation of this provision is substantially complicated by three phrases: as appropriate, on mutually agreed terms, and where necessary. It is complicated by its potential conflict with both national and TRIPs legal regimes for patent protection. However, its attempt to align the incentives for the conservation of biodiversity of both source countries and other countries deriving benefits from bio-prospecting accords well with the first main goal of the CBD.

Article 19.1 and 19.2 reinforce Articles 15.6, 15.7, and 16.3 by attempting to ensure that source countries participate in and receive benefits from the research and development made possible by bio-prospecting for their genetic resources. However, Article 19 also serves a second distinct function that is likely to have an increasing, though indirect, impact on bio-prospecting for genetic resources. It provides guidelines for what has become known as biosafety. The Protocol implements Articles 19.3 and 19.4 by granting countries the legal authority to deny the importation of any GMO or GMO-derived product if the country deems it a threat to public health or the environment. Depending upon how it is interpreted and implemented, the Biosafety Protocol could have a significant impact on international trade involving many products of biotechnology. The richest potential source of the genetic resources needed to create GMOs is biodiversity. Thus, the Biosafety Protocol has the potential to influence decisions regarding whether or not to invest in bio-prospecting for novel genetic resources. Ironically, many of the countries who championed the Biosafety Protocol would also stand to gain most from increased bio-prospecting for the genetic resources than whose use the Protocol would restrict.



The magnitude of the challenge of slowing the rate of biodiversity loss is demonstrated by the fact that most of the direct drivers of biodiversity loss are projected to either remain constant or to increase in the near future. Moreover, inertia in natural and human institutional systems results in time lags-of years, decades, or even centuries-between actions being taken and their impact on biodiversity and ecosystems becoming apparent. The

Conference of the Parties (COP) has established goals and sub-targets for each of the identified focal areas to clarify the 2010 Biodiversity Target and promote coherence among the programs of work of the Convention by providing a flexible framework within which national and/or regional targets may be developed. Under decision V11/30 one of the key areas for guiding action included "reducing the rate of loss of the components of biodiversity, including (i) biomes, habitats and ecosystems; (ii) species and populations; and (iii) genetic diversity." Complete implementation of the provisions of the CBD relating to bioprospecting will likely take a many years, especially among less developed countries with weak institutional bases for legislation and enforcement. However, it is likely that the CBD will have a significant impact on bio-prospecting.



Chapter 5

Action items for implementation

The study undertaken has reviewed various select instruments across the country, which is formulated for environmental protection and sustainability. The study has come out with few Actions Items in various areas of energy - environment, climate change and biodiversity. In general it was found that there was a need to promote capacity building and awareness along with research and technology transfer. These issues are addressed in this Chapter. Based on the review of the policies and priorities identified in this study the following issues may be considered for further action.

Action Item 1: Review of standards for pollution control

The Central Pollution Control Board has been playing key role in controlling pollution by generating relevant data, providing scientific information, rendering technical inputs for formation of national policies and programs, training and development of manpower, through activities for promoting awareness at different levels of the government and public at large. The magnitudes of environmental damages resulting from overexploitation of natural resources and pollution are depending on carrying capacities of the ecosystems, and the levels of environmental standards chosen by different States and their enforcements. There is therefore a need for information gathering and processing to manage the environment.

Key issues to be addressed:

- a. Help in Inventorization of the red category industries across the country
- b. Carry out assessment of environmental status for a few industrial estates and assess their assimilative carrying capacity
- c. Work with the government in development of guidelines for pollution control for small-scale industrial units
- d. Help the regulatory authorities to review of Standards (for liquid effluents, leachates and gaseous emissions) and preparing documents in respect of different categories of industries: Fertilizer, Dye and Dye Intermediates, Bulk Drug, Basic Organic Chemicals, Pesticides, Petrochemicals, soda ash and SO₂ & NO_x for Power Plants
- e. Develop standards and guidelines for chemical waste high temperature incinerators and control of volatile organic compounds (VOCs) emissions from industries
- f. Help in reviewing the present status of management of solid and hazardous waste in integrated iron and steel plants

Action Item 2: Implementing the Environmental impact assessment notification

The EIA Notification 2006, has formed Expert Appraisal Committee (EAC) or State Expert Appraisal Committee (SEAC)⁹ for clearance of any proposed developmental activity. Public consultation is required for all Category A and Category B1 projects, with some exception (such as project activities in industrial estates or parks, expansion of roads and highways, building projects and category B2 projects).

Key issues to be addressed:

- a. Disseminate to the various stakeholders the process of the environmental clearances in developmental activities
- b. Advocacy of the new procedures of public consultation to various stakeholders

⁹ EC given by Ministry of Environment and Forests for category A and at State Environment Impact Assessment Authority for Category B

- c. Help the government in capacity building of the members of the committees formed for EIA clearances
- d. Disseminate the best practices in developed countries which can be adopted to the Indian Environment

Action Item 3: Handling E-wastes

Studies have shown that there is an unprecedented increase in the e-wastes generated across the country. No separate guidelines have been developed for handling and disposal of these wastes. Safe handling and disposal of these wastes are extremely important and critical.

Key issues to be addressed:

- a. Help the government in formulating proper regulations to handle e-wastes
- b. Document and disseminate practices followed by other countries to handle these wastes
- c. Help in evolving environmentally sound technologies for collection and recycling of electronic wastes
- d. Build capacities of the local bodies to handle the e-wastes and ensure the proper disposal
- e. Help in developing a mechanism to encourage public-private partnership for recycling of e-wastes

Action item 4: Air pollution control from urban areas

CPCB/MoEF has conducted source apportionment studies in six cities for high particulate matter in India to identify the major sources of RSPM. Also a number of health impact studies to see the impact of this pollutant on human health are available.

Key issues to be addressed:

A study needs to be undertaken in one or two cities to prepare a blue print for air pollution control and improvement of air quality. The action plan may include the following:-

- ◆ Improvement of inspection and monitoring (I/M) programme for in use vehicles. Pollution from in use vehicles is responsible for about 75% of vehicular air pollution in urban areas
- ◆ Stringent exhaust emission standard for vehicles i.e Stage (IV) and beyond
- ◆ Transportation fuel quality improvement
- ◆ Programme for checking of fuel adulteration
- ◆ Control of emission from DG sets in urban areas
- ◆ More use of clean transportation fuels (CNG,LPG, bio ethanol, biodiesel etc..)
- ◆ Air pollution control from small scale industries (stone crushers, brick kiln, sponge iron plants etc.)

Action item 5: Air quality improvement in industrial areas

Air pollution is seen as a major problem in industrial areas, studies need to be undertaken in at least one critically polluted area so that action plan can be prepared.

Key issues to be addressed:

One critically polluted area may be taken up to prepare an action plan to control air pollution which may include:

- ◆ Invenierization of polluting sources and pollution load from each source through emission factor
- ◆ Industrial emission control to achieve desired air quality
- ◆ Adoption of pollution prevention technologies other than process technology
- ◆ Promotion of clean coal technology
- ◆ Proper siting of industries
- ◆ Fugitive emission control
- ◆ Utilization of fly ash
- ◆ Emission control from thermal power plant

Action Item 6: Sewage Pollution management

Key issues to be addressed:

In one or two class one cities, strategy to control the sewage pollution may be prepared which may include:

- ◆ Low cost treatment system

- ◆ Optimum conveyance system for sewage
- ◆ Feasibility of alternate technologies for sewage treatment including decentralized sewage treatment plants and utilization of treated waste water for irrigation and other uses

Action Item: 7 Water pollution control from highly polluting industries

In India major industrial water pollution are from distilleries, paper and pulp industries, dye and dye intermediates, pharmaceutical industry and organic chemical manufacturing industry etc. For all type of water polluting industry effluent standards have been evolved by CPCB/MoEF. However some sectors like distilleries, small paper and pulp industry and dyes and dye intermediates the compliance of standard is poor.

Key issues to be addressed:

- ◆ Pilot scale study to demonstrate the zero discharge of effluent from one sector like distillery may be taken up
- ◆ This is possible by adopting improved technology like concentration of effluent in evaporator followed by incineration of concentrated effluent in boiler for power generation. This process is also entitled for CDM benefit

Action Item 8: Implementation of hazardous wastes management rules

CPCB, in addition to the implementation of Water and Air Act, has planned various programs relating to implementation of rules framed under the Environment Protection Act such as Hazardous Wastes (Management and Handling) Rules, Bio-medical waste, Municipal Solid Wastes and Plastics Waste. All states across the country are facing the problem of handling and disposal of hazardous wastes. The Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008, are being implemented by the state regulatory authorities.

Key issues to be addressed:

- a. Inventorization of hazardous wastes generated by the industries as per the new rules
- b. Inventorization of high calorific value hazardous waste in one sector (say pharmaceutical or pesticide) may be taken up and feasibility study of such waste to use in cement plant as partial fuel may be explored
- c. Study of the site selection for the disposal of hazardous wastes to be made across the country
- d. Help the authorities in solving environmental problems arising from transboundary movement of hazardous wastes and chemicals
- e. Advocacy to the stakeholders about the handling and disposal of these wastes
- f. To help in the development of proper strategies for regulatory bodies to help the users to minimize, recycle, treat and dispose off these wastes
- g. Performance evaluation of one TSDF including hazardous waste incinerator may be taken up and on the basis of study, guidelines for performance evaluation of TSDF may be evolved

Action Item 9: Fly Ash Management

For proper fly ash management areas are to be given major thrust and need to be studied. Fly ash may be used for manufacturing fly ash pozzolana cement. There is potential to produce 60 million tonnes of Portland Pozzolana Cement (PPC) in the country. Fly ash can be used for mine back filling. Major policy initiative in this regards may be taken jointly by ministry of coal, power, and mines.

Key issues to be addressed:

Case studies may be taken up to demonstrate how fly ash generated from a power/cluster of power plant can be managed using various option which may include:

- ◆ Adoption of clean coal technology
- ◆ Use of dry fly ash in manufacturing fly ash pozzolana cement
- ◆ Mine back filling using fly ash
- ◆ Ash dye construction using fly ash

Action Item 10: Municipal Solid Waste Management

Municipal solid waste disposal is presently governed by the Municipal Solid Wastes (Management and Handling) Rules, 2000. The magnitude of the problem of handling Municipal solid waste is large and universal across the country. It is largely the mandate of the local bodies.

Key issues to be addressed:

- a. Advocacy to the policy makers at the central and state level regarding the need to manage municipal solid waste and its potential for energy generation
- b. Initiate pilots to demonstrate the usage of municipal solid waste for energy generation
- c. Remove the barriers to promote solid waste use for energy
- d. Organize awareness programs for segregation of wastes and help to promote recycling or reuse of segregated materials
- e. Review the present guidelines of the municipal solid waste management and suggest suitable modifications

Action Item 11: Promotion of Green Buildings across the country

Today a variety of green building projects are coming up in the country - residential complexes, exhibition centers, hospitals, educational institutions, laboratories, IT parks, airports, government buildings and corporate offices. Preliminary studies carried out indicate that the building construction industry is not geared to apply these measures practically on site.

Key issues to be addressed:

- a. Build capacity of the line department to the concepts of the ECBC code
- b. Promote awareness among builders and developers of the benefits of low energy buildings
- c. Promote design and development efforts on PV technologies and PV system design
- d. Promote research and transfer of technology in areas related to energy efficient lighting and space conditioning technologies
- e. Showcase and demonstrate specific models in energy conservation in all states across the country

Action Item 12: Combating Climate change

India is one of the world's ten fastest growing economic countries and is expected to grow at more than 8% for the current decade. India presently ranks first in the world for foreign technology licensing, second in terms of availability of scientists and engineers, 9th in terms of quality of management schools, 12th in terms of firm level innovation, and 16th in terms of firm level innovation, as well as firm level technology absorption, having allowed foreign investment in almost all sectors and having the procedures for repatriation of capital and profits greatly simplified. India is globally perceived to have a favorable investment environment. From the study it has been found that the Climate Change policy of the Government of India is based on the fact that the primary responsibility of reducing GHG emissions is that of developed countries. They should show a demonstrable sincerity in initiating actions to address climate change. It is also expected that the developed world should transfer resources and technologies at favorable terms to the developing world, thereby facilitating developing countries to move towards a sustainable development path.

Key issues to be addressed:

- a. Need to identify key vulnerabilities for India to climate change, and its impacts particularly on water resources, forests and agriculture
- b. Organize workshops to disseminate CDM policy in India to policy makers, project developers and investors
- c. Help promote Indian Industry to participate in the Clean Development Mechanism process
- d. Provide capacity building for identifying and preparing CDM projects by Municipal bodies across the country

Action Item 13: Inventorization of forest resources

Assessing biodiversity of a diverse country like India is enormous task. Depiction of ecosystem harboring around 120,000 known plants, microbes and animals and perhaps another 400,000 not yet described species, is possible with the recent technological advances. Qualitative information on the distribution, status and utilization of India's biodiversity is important for planning its conservation. While some information exists, it is dispersed widely across the country among a large number of organizations. Moreover, most of it is not easily accessible in readily usable electronic form.

**Key issues to be addressed:**

- a. Identify the various biodiversity components
- b. Create an inventory of the biological resources available across the country
- c. Capture the traditional knowledge available with the tribal / local communities across the forests in India
- d. Support the National / State authorities in conserving the forests

Action Item 14: Bioprospecting

It is important to treat bioprospecting in the context of a strong benefit-sharing system among industries / firms, the ecosystem and the projected communities in such manner as that the sharing of knowledge for bioprospecting will multiply the faunal and floral diversity of that region and enrich the cultural and moral ethics with sustained life-support systems. While pharmaceuticals are still the primary use, new uses such as biotechnology in agriculture and cosmetics are also becoming economically important. Bio-piracy of a number of high-value bio-resources, comprising mostly medicinal plants and animals, has emerged as a major threat to the rich biodiversity of the States as well as the North-east regions.

Key issues to be addressed:

- a. Help promote partnership between the local community, forest / government departments and entrepreneurs
- b. Disseminate information on the important biological reserves that are to be conserved
- c. Promote research on biological properties that may help the present man
- d. Capacity building among the forest and other line departments on the issues related to bioprospecting and biopiracy

**Action Item 15: Capacity Building**

The study has found that there is a need to align the development and implementation of new area-wise and / or multi-sectoral environmental programs along with the institutional processes. The 73rd and 74th constitutional amendments set into motion the decentralization process and are expected to help in localized environmental management. To implement cross-sectoral integration and coordination for better environmental management capacity building at all levels has to be undertaken.

Key issues to be addressed:

- a. Capacity building of local bodies / local governments in implementing issues related to environmental management
- b. Capacity building to help improve environmental quality in the industrial estates
- c. To build capacities of regulatory authorities in monitoring environmental quality
- d. Capacity building of all concerned line departments on cross-sectoral issues with reference to conservation of environment
- e. General Environmental awareness campaigns for citizens

Chapter 6

Summary and Recommendations

Environmental instruments are necessary for implementation of national environmental management plan. A plethora of instruments exist in India which came into being with time. They seem to lack a system to co-ordinate them. Active deliberations and debate are needed to improve and make them effective.

Ecological concerns have been, more or less, overlooked in most cases of development planning, though awareness in this regard has steadily grown as a result of international activities as well as the measures taken under the statutes. The focus is on integration of development planning and environmental concerns.

In the context of environmental scenario in the country and the available environmental instruments, the issues including the concerns and gaps related to the sectors of environment and energy emerge significantly. Their analysis leads to specific action plans in the fields of standards for pollution control, implementation of the EIA notification, management of various kinds of wastes, promotion of green buildings and combating climate change. The vision extends to life cycle management in the entire gamut of development activities.

Rooted in the Constitution of India, environmental protection is reflected in all the five year plans for economic development. Gradually, environmental governance has emerged as the key to sustainable development. Environmental management system in India is founded on environmental legislation, development of environmental standards and establishment of institutions and instruments for enforcement of law. However, varying interpretations by States and multiplicity of agencies proves to be an impediment in the implementation of environmental programmes.

Detailed procedures have been introduced for grant of consent to establish and operate a potentially polluting activity and grant of authorization for handling and management of various kinds of wastes. Such procedures also include assessment of environmental impacts and public consultation. There is significant emphasis on the green cover, air and water quality, cleanliness of the rivers and lakes, clean development mechanism, corporate responsibility in environmental protection and conservation of natural resources and biodiversity. Special attention is given to critically polluted areas, which have been identified and to clean development mechanism for which a separate authority has been established.

The judiciary has contributed significantly by endorsing environmental protection through many landmark judgments. The industry too has responded voluntarily by adopting corporate social responsibility.

Energy and environmental issues are intertwined. In particular, the technology adopted for generation of electric power has specific risks and impact related to environment and has profound effect on sustainability of development. The recent emphasis on energy efficiency has already produced tangible modifications in building design and environmental benefits. The concepts of solar energy, green buildings and coal beneficiation have reached implementation stage. Ash utilization has significantly reduced the demand of land for ash disposal. Advanced technologies for generation of power have reduced the emission of carbon dioxide, which is the main green-house gas having impact on climate.

The key to successful implementation of national environmental management plan is the capacity and co-ordination of the environmental instruments. Many shortcomings emerge from lack of integration in the environmental laws, inadequate strength of certain instruments, gaps in research in the emerging areas of bio-technology and bio-prospecting, and the need for improvement in public participation. These shortcomings need to be addressed to achieve the desired capacity and co-ordination of the environmental instruments.

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Annexure I

Environmental Regulations and Legal Framework in India

Environment Protection - Indian Constitution Perspective

- a) The State's responsibility with regard to environmental protection has been laid down under Article 48-A of our Constitution, which reads as follows:
"The State shall endeavor to protect and improve the environment and to safeguard the forests and wildlife of the country".
- b) Environmental protection is a fundamental duty of every citizen of this country under Article 51-A (g) of our Constitution, which reads as follows:
"It shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures."
- c) Article 21 of the Constitution is a fundamental right, which reads as follows:
"No person shall be deprived of his life or personal liberty except according to procedure established by law."
- d) Article 48-A of the Constitution comes under Directive Principles of State Policy and Article 51 A (g) of the Constitution comes under Fundamental Duties.
- e) The State's responsibility with regard to raising the level of nutrition and the standard of living and to improve public health has been laid down under Article 47 of the Constitution which reads as follows:
"The State shall regard the raising of the level of nutrition and the standard of living of its people and the improvement of public health as among its primary duties and, in particular, the State shall endeavour to bring about prohibition of the consumption except for medicinal purposes of intoxicating drinks and of drugs which are injurious to health."
- h) The 42nd amendment to the Constitution was brought about in the year 1974 makes it the responsibility of the State Government to protect and improve the environment and to safeguard the forests and wildlife of the country. The latter, under Fundamental Duties, makes it the fundamental duty of every citizen to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures.

National Environmental Policy (NEP) 2006

The main components of the NEP are actions for: developing a more effective environmental management system; enhancing information and awareness; and investing in improved environmental management. The NEPs implementation strategy is outlined with sections on initial implementation, monitoring and evaluation, updating and revision.

Principles of NEP:

The NEP has evolved from the recognition that the development, which respects ecological constraints and the imperatives of justice, is only sustainable. The following principles will guide the activities:

- ◆ Human beings are at the center of sustainable development concerns and are entitled to a healthy and productive life in harmony with nature

- ◆ The right to development must be fulfilled so as to meet developmental and environmental needs of present and future generations equitably
- ◆ Environmental protection is an integral part of the Development process and cannot be considered in isolation from it, so as to ensure sustainable development
- ◆ Economic efficiency, which requires that the services of environmental resources be given economic value. Implications of this principle are as follows:
 - ◆ Polluter pays
Impacts of acts of production and consumption of one party may be visited on third parties who do not have a direct economic nexus with the original Act.
 - ◆ Cost minimization
 - ◆ Entities with incomparable values
 - ◆ Significant risks to human health, life and environmental life support systems, besides certain other unique natural and man made entities that may impact the well being of large number of persons, are considered as incomparable.
 - ◆ Equity, which refers to both equity in entitlements to, and participation of the relevant public, in process of decision making over use of environmental resources

Broad Objectives: The following objectives of the NEP were selected to be directly focused on environmental concerns, achievable and measurable:

- ◆ Encourage sustainable resource use- should help stakeholders to use renewable resources more sustainable.
- ◆ Support sustainable environmental practices - the NEP promotes policies, programs and projects that sustain the environment and the economy.
- ◆ Reduce or prevent pollution - Result in a situation where environmental damage is decreased or avoided altogether. This helps achieve the goals of Management and Development;
- ◆ Improve access to basic environmental infrastructure and services Should help people to enjoy better environmental quality. This supports the goals of Quality of Life, Management and Development;

The plans and programmes identified for 2007-08 are formulated based on the thrust areas identified by the Ministry of Environment and Forests under the National Environment Policy (NEP), 2006 and also as per the issues raised by the State Pollution Control Boards (SPCBs) and Pollution Control Committees (PCCs).

Environmental Legislations, Pollution Control Acts, Rules and Notifications Enforced - Key Environmental Legislations in India

Policies

- 1992 Policy Statement on Abatement of Pollution
- 1992 National Conservation Strategy and Policy Statement on Environment and Development
- 1998 National Forest Policy
- 2002 Wildlife Conservation Strategy
- 2006 National Environment Policy

Environment Acts

- 1927 The Indian Forest Act
- 1972 The Indian Wildlife (Protection) Act (amended 1993)
- 1973 The Water (Prevention and Control of Pollution) Act (amended 1988)
- 1977 The Water (Prevention and Control of Pollution) Cess Act (amended 1992)
- 1980 The Forest (Conservation) Act (amended 1988)
- 1981 The Air (Prevention and Control of Pollution) Act (amended 1987)
- 1986 The Environment (Protection) Act (amended 1992)
- 1988 The Motor Vehicles Act
- 1991 The Public Liability Insurance Act (amended 1992)
- 1995 National Environment Tribunal Act
- 1996 National Environment Appellate Authority Act
- 2002 The Wild Life (Protection) Amendment Act T
- 2002 The Biological Diversity Act
- 2003 The Water (Prevention and Control of Pollution) Cess (Amendment) Act

Environment Rules

- 1986 The Environment (Protection) Rules
- 1989 Hazardous Wastes (Management and Handling) Rules
- 1990 Forest (Conservation) Rules (amended 1992)
- 1991 Chemical Accidents (Emergency Planning, Preparedness and Response) Rules
- 1998 The Bio-Medical Waste (Management and Handling) Rules
- 1999 The Recycled Plastics Manufacture and Usage (Amendment) Rules
- 2000 The Municipal Solid Wastes (Management and Handling) Rules
- 2000 The Hazardous Wastes (Management and Handling) Amendment Rules (2003, 2008)
- 2000 The Ozone Depleting Substances (Regulation and Control) Rules
- 2001 The Batteries (Management and Handling) Rules
- 2002 The Noise Pollution (Regulation and Control) (Amendment) Rules
- 2003 The Recycled Plastics Manufacture and Usage (Amendment) Rules
- 2003 Bio-Medical Waste (Management and Handling) (Amendment) Rules
- 2003 Forest (Conservation) Rules
- 2003 Biological Diversity Rules

Environmental Notifications

- 1994 Environmental Impact Assessment Notification 1994, 2006
- 1998 Constituting the Taj Trapezium Zone Pollution (Prevention and Control) Authority
- 2008 Fly Ash Management Rule

International treaties/conventions/declarations on environment management

- a. United Nations Conference on the Human Environment - Stockholm 1972
- b. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 1975
- c. Ramsar Convention, 1971, 1975
- d. The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes, 1989
- e. United Nations Conference on Environment and Development (UNCED), 1992, 2002
 - Agenda - 21
 - Rio Declaration
 - Millennium Development Goals
- f. Framework Convention on Climate Change (FCCC), 1992
 - Kyoto Protocol, 1997
- g. The Vienna Convention, 1985
 - Montreal Protocol on Ozone depleting substances, 1992
- h. Convention on Biological Diversity, 1992 - Cartagena Protocol on Biosafety, Ratified on 17th January, 2003.
- i. Convention to Combat Desertification, 1996
- j. Rotterdam Convention on Prior Informed Consent Procedure for certain Hazardous Chemicals in International Trade, 2002
- k. Stockholm Convention on Persistent Organic Pollutants (POPs), 2001
- l. Chemical Weapons Convention, 2005
- m. Strategic Approach to International Chemicals Management (SAICM), 2006.

Brief on Few Important ACTS

ENVIRONMENTAL (PROTECTION) ACT, 1986

The Environment (Protection) Act, 1986 was introduced as an umbrella legislation that provides a holistic framework for the protection and improvement to the environment.

In terms of responsibilities, the Act and the associated Rules required for obtaining environmental clearances for specific types of new / expansion projects (addressed under Environmental Impact Assessment Notification, 2006) and for submission of an environmental statement to the State Pollution Control Board.

AIR (PREVENTION AND CONTROL OF POLLUTION) ACT 1981

The objective of this Act is to provide for the prevention, control and abatement of air pollution, for the establishment, with a view to carrying out the aforesaid purposes, of Boards, for conferring on and assigning to such Boards powers and functions relating thereto and for matters connected therewith.

Decisions were taken at the United Nations Conference on the Human Environment held in Stockholm in June 1972, in which India participated, to take appropriate steps for the preservation of the natural resources of the earth, which, among other things, includes the preservation of the quality of air and control of air pollution.

Therefore it is considered necessary to implement the decisions foresaid in so far as they relate to the preservation of the quality of air and control of air pollution.

WATER (PREVENTION & CONTROL) ACT, 1974

The objectives of the Water (Prevention and Control of Pollution) Act are to provide for the Prevention and Control of Water Pollution and the maintenance or restoration of the wholesomeness of water for the establishment, with a view to carrying out the purposes aforesaid, of Boards for the prevention and control of water pollution, for conferring on and assigning to such Boards powers and functions relating thereto and for matters connected therewith.

WILDLIFE PROTECTION ACT, 1972

According to the Wildlife Protection Act, 1972 "wildlife" includes any animal, bees, butterflies, crustacea, fish and moths; and aquatic or land vegetation, which form part of any habitat. In accordance with Wildlife (Protection) Amendment Act, 2002 "no alternation of boundaries / National Park / Sanctuary shall be made by the State Govt. except on recommendation of the National Board for Wildlife (NBWL)".

Further, in terms of Supreme Court Order dated 13.11.2000 the State Govts. have to seek prior permission of Supreme Court before submitting the proposal for diversion of forestland in National Park sanctuaries.

Whenever, any part of Wildlife Sanctuary / National Park is getting affected by a hydro project the forest proposal in respect of such project is entertained by MoEF, GOI only after permission of de-reservation / de-notification of Wildlife Sanctuary /National Park has been accorded. After recommendation of Standing Committee of NBWL proposal for de-reservation/ de-notification is ratified by Hon'ble Supreme Court.

THE BIOLOGICAL DIVERSITY ACT, 2002

The Ministry of Environment and Forests has enacted the Biological Diversity Act, 2002 under the United Nations Convention on Biological Diversity signed at Rio de Janeiro on the 5 June, 1992 of which India is also a party. This Act is to "provide for the conservation of biological diversity, sustainable use of its components, and fair and equitable sharing of the benefits arising out of the use of biological resources, knowledge and for matters connected therewith or incidental thereto." As per the provision of act certain areas, which are rich in biodiversity and encompasses unique and representative ecosystems are identified and designated as biosphere reserve to facilitate its conservation. All restrictions are applicable to protected areas like National Park and Sanctuaries are also applicable to these reserves.

HAZARDOUS WASTES (MANAGEMENT AND HANDLING) AMENDMENT RULES, 2003, 2008

These Rules classify used mineral oil as hazardous waste under the Hazardous Waste (Management & Handling) Rules, 2003 that requires proper handling and disposal. Organisation will seek authorisation for disposal of hazardous waste from concerned State Pollution Control Boards (SPCB) as and when required.

OZONE DEPLETING SUBSTANCES (REGULATION AND CONTROL) RULES, 2000

MoEF vide its notification dt. 17th July 2000 under the section of 6, 8 and 25 of the Environment (Protection) Act, 1986 has notified rules for regulation/ control of Ozone Depleting Substances (ODS) under Montreal Protocol. As per the notification certain control and regulation has been imposed on manufacturing, import, export, and use of these compounds. Organisations as per provisions of notification shall phase out all equipment, which uses these substances, and is aiming at CFC free organization.

THE ELECTRICITY ACT, 2003

This Act seeks to create a framework for the power sector development by measures conducive to the industry. Electricity Act does not explicitly deal with environmental implications of activities related to power transmission. The applicable legal provisions under this Act are as follows: Section 68(1) - sanction from the Ministry of Power (MOP) is a mandatory requirement for taking up any new project. The sanction authorizes SJVN to plan and coordinate activities to commission new projects.

THE FOREST (CONSERVATION) ACT, 1980

This Act provides for the conservation of forests and regulating diversion of forestlands for non-forestry purposes. When projects fall within forestlands, prior clearance is required from relevant authorities under the Forest (Conservation) Act, 1980. State governments cannot de-reserve any forestland or authorize its use for any non-forest purposes without approval from the Central government.

5 YEAR PLANS - ENVIRONMENT

The First & Second Five-Year Plans:

After the formal independence, the Planning Commission of India prepared the first documented plan in 1952 under the chairmanship of the then Prime Minister of India. The main objective of this plan was to raise the living standard of people and to increase the National Income and Per capita Income by 20% and 17% respectively and open revenues for all people. But in the first and second plan there were no concrete steps for prevention of environmental degradation. Only few scattered forest and soil conservation policies were undertaken. The Forest Policy Revolution act of May 12, 1952, suggested maintaining one thirds of its total land area under forests.

The Third Five-Year Plan:

In the third 5-year planning it was proposed not only to intensify some of the programs initiated under the first and second plans, but also to put special emphasize on more intensive forest and soil conservation programs. Steps were taken both for utilization of forest resources as well as to protect the forests. Different afforestation programs and river valley projects were in focus.

Fourth and Fifth Five-Year Plans:

The fourth 5-year plan showed no new dimension in environmental concern. Only some few forests policies and programs were merged with Animal Husbandry and Fisheries section. Fifth plan also goes to same direction. There were no such new areas. Only few forestry programs had taken place. But in this plan emphasize was given to improve urban environmental condition basically in the slum areas.

The Sixth Five-Year Plan:

Concern of environmental problem made its first footsteps in the 6th five-year planning. Steps were taken for water pollution, air, noise and land pollution separately. Though plans and programs in the field of soil conservation and public health forests and wild life protection, industrial hygiene etc. had been in existence in India for many decades, but the first formal recognition of the need for integrated environmental planning was made when the Govt. of India constituted the National Committee on Environmental Planning and Coordination (NCEPC) in 1972.

The Seventh Five-Year Plan:

The 7th plan was the continuation of previous plan with some new improvements. The basic approach to the 7th plan was sustainable development in harmony with environment. With the realization that poverty and the state of under development led to many of the environment problems; confronted by nature, the understanding that development is the way of environmental management. However, another way of environmental problems have arisen as unintended side effects of the very attempts of development. The plan was made in the following framework:

Pollution monitoring and control

Environmental pollution impact on human health and well being is both direct (inhalation of polluted air or intake of contaminated water) and indirect (loss of soil fertility, death of aquatic life). The Central Board for the prevention and control of water pollution spearheads the effort such as assessment and control of coastal pollution and strengthening the National River Water Quality Monitoring. A major program on prevention of pollution of Ganga was planned.

Environmental Impact Assessment (EIA)

It was proposed to induce socio-economic industries and department as well as different agencies whose projects impinge on environmental quality, to establish technical cells for Environmental Assessment.

Eco-development

Most of the programs for environmental management deal with pre-planning for eliminating or at least minimizing environmental degradation. One of the major objectives of Eco-development was restoration of already degraded ecosystem through practical field scheme such as land reclamation, afforestation and cleaning of water bodies etc.

The Eighth Five-Year Plan:

The scenario of environment and forests continues to cause concern and the destruction and degradation of forests are taking a heavy toll of our soil and water resources. In the 8th plan, in addition to a number of national level bodies which have been constituted by the Ministry on Environment and Forests, the Planning Commission had set up several expert group/committees to formulate long term sectoral policies and to reconcile the conceptual confrontation between environment and development. Submission of an environmental statement by the polluting units to the concerned State Pollution Control Board was made mandatory through notification under Environmental Pollution Act (1986).

Adoption of Clean Technologies In Small Scale Industries

This scheme seeks to promote the development and adoption of clean technologies, including waste re-use and recycling and to link research and development to prevent pollution.

Environmental Statistics and Mapping

Under the scheme, activities relating to collection and analysis of environmental data and its direction on an atlas were thought to carry out. Some other important programs were

- ◆ World Bank Assisted Industrial Pollution Control Project (Phase I and II)
- ◆ Strengthening EIA
- ◆ National River Conservation Program
- ◆ Integrated Afforestation and Eco-Development Project.

The Ninth Five-Year Plan:

One of the objectives of 9th five-year planning was to ensure environmental sustainability of the developmental process through social mobilization and participation of people at all levels.

Forests: For ecological sustainability, different afforestation programs and all round development of the villages for the well being of forests were planned to initiate. Involvement of NGOs in areas of awareness building and community education was planned to encourage.

Specific Programs

- ◆ People's involvement and role of information
- ◆ Citizen's Monitoring Committees were established under the National River Conservation
- ◆ People at large and the university systems, particularly science, engineering and medical facilities were planned to involved in monitoring and enforcement work.

Area Specific Programs

- ◆ National River Conservation Program (launched in 1995 to clean stretches of major rivers in the country.
- ◆ Integrated Development Programs for Himalayan Regions
- ◆ Strengthening Central Pollution Control Board

The Tenth Five-Year Plan:

The tenth plan is mainly a coordination of some previous projects with some new initiatives. The plan emphasized in different pollution problems continuing from the ninth plan as follows:

Air Pollution

- ◆ The CPCB has established a national air-monitoring network covering 290 stations spread over 90 cities and towns. To reduce vehicular pollution, emission standards and restrictions were imposed for petrol and diesel driven vehicles.
- ◆ Twenty-four critically polluted areas have been identified across the country and an action plan has been devised for the control of pollution in these areas.

Water pollution

- ◆ Emphasize was given on mainly ongoing projects viz. National River Conservation Plan and National lake Conservation Plan. No other new initiatives made in this plan.

Solid waste

- ◆ Master plan for municipal solid waste
- ◆ The Bio-medical Waste Management and Handling Rules have been emphasized in new form.
- ◆ The scope of Common Effluent Treatment Plants scheme was enhanced to cover assistance for modernization and capacity expansion of existing plants.
- ◆ Schemes under the Clean Development Mechanism: Direct measurement of temperature as well as visible effects like rise in sea levels

Annexure II

Discussion Paper on

Implementation of Environment and Energy Policies

State of Art

The main objectives of conservation and survey of flora, fauna, forest and wildlife, prevention and control of pollution, afforestation and regeneration of degraded areas, protection of environment and ensuring the welfare of animals are achieved through a set of legislative and regulatory measures which are aimed at protection of the environment. However these agencies will be assisted by citizen groups that includes locals, nominated experts who are vigilant to observe whether the legislative measures are getting implemented or not. The details of National Conservation Strategy and Policy Statement on Environment and Development 1992, National River Policy 1988, a Policy Statement on Abatement of Pollution-1992, and National Environment Policy 2006, that were evolved were made available by means of booklets and widely publicized so that public can react for any valuation of their general recommendations and brought to the notice of monitoring body. These objectives should be achieved through environmental impact assessment, eco-regeneration, assistance to organizations implementing environmental and forestry research, education and training, dissemination of environmental information and international cooperation and creation of environmental awareness for their active public participation. For the success of any government measure, public participation is a must. This specific aspect of public participation has been highlighted in all documents.

During the 11th Five-Year Plan, the National Environment Policies stated objectives and principles that are to be realized through concrete actions in different areas relating to the key environmental challenges faced. These challenges are intrinsically connected with the state of environmental resources, such as, human, animal, land, water, air and flora & fauna of the environment under consideration. The drivers of environmental degradation are population growth, inappropriate technology in particular and lopsided choices of consumption patterns, intensive agriculture with inputs of more than needed chemicals, and accelerated inappropriate locations of industrial establishment and unplanned urbanization developments leading to creation of slums.

The National Environment Policy seeks to extend and expand the coverage and fill in gaps that still exist in the policies. The National Environment Policy, 2006 (NEP) enunciates the following key principles: -

- i. **Human Beings are at the Centre of Sustainable Development Concerns:** - Human beings are at the centre of the concerns for sustainable development. Even though they are the polluters and stakeholders, they are entitled to a healthy and productive life and should live in harmony with immediate natural environment.
- ii. **The Right to Development:** Development is always dynamic. The right to development must be fulfilled, so as to equitably meet developmental and environmental needs of the present and more so future generations.
- iii. **Environmental Protection is an Integral part of the Development Process:** In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.
- iv. **The Precautionary Approach:** Where there are credible threats of serious or irreversible

damage to key environmental resources, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation. The thought that environmental protection is expensive must be modified taking into the saving of the deteriorate quality of environment.

- v. **Economic Efficiency:** In various public actions for environmental conservation, economic efficiency would be sought to be realized as much as possible since the scale of measuring efficiency is still nebulous regarding natural systems. Nature has less efficient activities that have multiple units of activity.

Despite this strong policy and institutional framework, environmental degradation continues due to the greed of man in many areas and a general public dissatisfaction with the situation grows. The legislation also requires updating to address new environmental risks and assessment by expanding to include public or stakeholder participation in monitoring and control. Action may be required to be taken in the following areas:

- (i) The Regulatory Framework must be made to cope with Environmental Pressures irrespective of the origin of sources;
- (ii) Matching Regulatory Capacity with Growing Mandates of meeting sustainable development that is defined with any particular case.

The focus of the policy and regulation is to control the industrial polluters like large industries and power plants. Although monitoring of the large has to continue, SMEs which are contributing approximately 70 percent of the total industrial pollution load have also to be monitored regularly with freshly framed regulatory legislation.

The policies in the country have to look into issues relating to municipal and domestic sources of pollution, due to the large volume of untreated sewerage and domestic waste entering the natural water bodies. Small unit cleaning / resource recycling, that can be economical and operate on thumb rule process must be designed and implemented

Hospital wastes, e-wastes and garbage burning are pollution sources that are not addressed and are increasingly compromised in their effectiveness towards control of pollution. Proper segregatory methods at the source will make much of the waste recyclable for the same or other purpose. "Use once and throw" policy should be discontinued. Nature recycles many things with built in recycling mechanisms.

Air pollution from transportation sector, dust from not properly laid roads is increasing by the day. Levying heavy fines must help in controlling improper dumping of waste materials. Environmental management efforts on noise, way side fires, misuse of land for sanitary needs have to be focused.

Several States have already done integrating environmental objectives in the State Industrial Policy. Linking industrial promotion incentives (soft loans) to environmental risks and performance has strengthened the environmental performance by some industries.

On the energy front there are a number of policies to Promote Energy Efficiency and Renewable Energy:

- (i) **Electricity from Renewables:** The Electricity Act, 2003, requires State Electricity Regulatory Commissions to specify a percentage of electricity that the electricity distribution companies must procure from renewable sources. Several Commissions have already suggested many measures in almost every industrial sector. Some of the world's most energy-efficient units are located India using renewables. This has contributed to acceleration in renewable-electricity capacity addition, and over the past three years, about 2,000 MW of renewable-electricity capacity has been added in India every year, bringing the total installed renewable capacity to over 11,000 MW. Of this, a little over 7,000 MW is based on wind power; India now has the fourth largest installed wind capacity in the world. The National Hydro Energy Policy has resulted in the accelerated addition of hydropower in India, which is now over 35,000 MW. Government estimates indicate that the total potential for power from renewable energy sources is over 180,000 MW, of which just over 10,000 MW has been installed so far. If government plans materialize, renewable energy will be contributing approximately 10 per cent of the total electricity generation capacity in the country by 2012.

Other than wood burning, dry leaves and other dry plant materials converted into bricketts may give a very small resource. All industries have to have green cover which increased and improved may provide some fuel.

Animal / human powers, both direct and indirect, were used earlier. Even now modified technologies may make the older systems more efficient and extremely eco-friendly.

The wind energy market in India is the most matured with grid-connected wind power currently competing with commercial power. Indian wind turbine manufacturers are emerging as global leaders, having made several overseas investments and acquisitions in 2006. The local wind energy market is, however, constrained by grid specifications and evacuation capacity. Wind energy to pump up surface water/ ground water should be tried.

Biomass energy and energy from urban wastes are also commercially viable. Other than PVC plastic, the rest of the plastic materials are burnable in pellet form and can be used for power generation. But these remain on the lower end of the spectrum in attracting financing because of the high-perceived technology risks and the lack of fuel guarantees.

Solar energy is the most expensive technology currently, but makes the most sense for remote and standalone applications. Solar heat energy for power generation is in its infancy but can be encouraged.

- (ii) **Enhancing Efficiency of Power Plants:** Coal is the mainstay of India's energy economy, and coal-based power plants account for about two-thirds of the total electric generation installed capacity of about 135,000 MW. In addition, the Electricity Regulatory Commissions are also linking tariffs to efficiency enhancement, thus providing an incentive for renovation and modernization. New plants are being encouraged to adopt more efficient and clean coal technologies, and four new plants under construction have adopted the more-efficient supercritical technology for power generation.
- (iii) **Introduction of Labeling Programme for Appliances:** An energy labeling programme for appliances was launched in 2006, and comparative star-based labeling has been introduced for fluorescent tube lights, air conditioners, and distribution transformers.
- (iv) **Energy Conservation Building Code:** An Energy Conservation Building Code (ECBC) was launched in May 2007, which addresses the design of new, large commercial buildings to optimize the building's energy demand. Nearly 100 buildings are already following the code, and compliance with it has also been incorporated into the environmental impact assessment requirements for large buildings.
- (V) **Energy Audits of Large Industrial Consumers:** In March 2007, the conduct of energy audits was made mandatory in large energy-consuming units in nine industrial sectors. These units, notified as "designated consumers" are also required to employ "certified energy managers", and report energy consumption and energy conservation data annually.

In the power sector, minimizing the environmental impacts at the local, regional and global level is aimed. More focused efforts to promote the uptake of energy efficiency and conservation measures on the ground are necessary. Considerable enhancement in energy efficiency and environmental considerations in coal-fired power plants is needed. It may be useful to include environmental performance indicators in the Power sector so that sufficient focus and integration is given to this.

Forests are a renewable natural resource. They are a national asset to be protected and enhanced for the well-being of the people and the Nation. The principal aim of Forest Policy must be to ensure environmental stability and maintenance of ecological balance including atmospheric equilibrium, which is vital for sustenance of all life forms, human, animal and plant. The basic objectives of the National Forest Policy are:

- ◆ Maintenance of environmental stability through preservation and, where necessary, restoration of the ecological balance that has been adversely disturbed by serious depletion of the forests of the country.
- ◆ Conserving the natural heritage of the country by preserving the remaining natural forests with the vast variety of flora and fauna, which represent the remarkable biological diversity and genetic resources of the country.

- ◆ Checking soil erosion and denudation in the catchment areas of rivers, lakes, reservoirs in the "interest of soil and water conservation, for mitigating floods and droughts and for the retardation of siltation of reservoirs.

Various reviews show inadequacy of data regarding forest resources, which is a matter of concern. Priority needs to be accorded to completing the survey of forest resources in the country on scientific lines and to updating the information.

Wildlife Related Policy

The country has set up a representative network of scientifically managed protected areas to ensure ecological security and the conservation of biodiversity and the environment. The eco-development of areas adjoining national parks and sanctuaries has reduced park- people conflicts and supports the livelihoods of millions of rural poor and tribal populations. Ecotourism has been declared a thrust area to support local livelihoods

Issues for discussion forum included:

- ◆ Has the environmental policy helped in the abatement of pollution from various sources?
- ◆ How effectively the existing environmental instruments are helping in the improvement of the environment?
- ◆ What is the preparedness of the various agencies at district, state and central level to implement the policies in place?
- ◆ What are issues encountered in the disposal of e-wastes, municipal solid and liquid wastes, biomedical wastes?
- ◆ How the policies are adequate / inadequate to address these issues?

Experts' opinion through discussions, has been briefly incorporated into this discussion paper.

The priority areas to be looked at include:-

- a. Creating awareness in the public regarding environmental pollution control.
- b. Identification, development and adoption of clean production technologies
- c. Implementation of the hazardous waste management rules in identification and development of sites for the disposal of hazardous wastes around the country.
- d. Solutions to problems related to e-waste disposal.
- e. Focus on the gaps in the implementation of Energy policy is the immediate need of the hour.
- f. Inventorization of the forest resources has not been completed for major part of the country. Priority may be given to updating the inventorization process.

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Annexure III

Discussion Paper on

Standards and Codes for Pollution Control / more efficient use of natural resources

State of Art

The impacts of pollution may differentially affect the poor, especially women, or children, or any developing regions, which may also have relatively low contributions to its generation, and accordingly the costs and benefits of abatement may have important implications for equity. The regulatory regimes for environmental conservation comprise a legislative framework, and a set of regulatory institutions. Inadequacies in each have resulted in accelerated environmental degradation on the one hand, and long delays and high transactions costs in development projects on the other. In fact paucity of funds is also an additional factor / apart from legislation, which is categorically premised on environmental conservation mostly, a host of sectoral and cross-sectoral laws and policies, including fiscal regimes, impact environmental quality. In short, the principal Objectives of National Environmental policy 2006 to meet the current perceptions of key environmental challenges can be summarized as:-

1. Conservation of critical environmental resources like water and land space
2. Intra-generational Equity: livelihood security for the poor
3. Integration of environmental concerns in economic and social development
4. Efficiency and economy in environmental resource utilization/
5. Environmental governance
6. Enhancement of resources for environmental conservation

The Central Pollution Control Board has been playing key role in controlling pollution by generating relevant data, providing scientific information, rendering technical inputs for formation of national policies and programmes, training and development of manpower, through activities for promoting awareness at different levels of the government and public at large. CPCB, in addition to the implementation of Water and Air Act, has planned various programmes relating to implementation of rules framed under the Environment Protection Act such as Hazardous Wastes (Management and Handling) Rules, Bio-medical waste, Municipal Solid Wastes and Plastics Waste.

Keeping in view the growing environmental challenges, the Government of India has promulgated number of legislations and amendments to them from time to time. The Law Commission in its 186th Report, has inter-alia recommended establishment of 'Environment Courts' in each State, consisting of judicial and scientific experts in the field of environment for dealing with environmental disputes besides having appellate jurisdiction in respect of appeals under the various pollution control laws.

Some of the thrust areas identified for improvement

- ◆ Development of standard and guidelines for chemical waste incinerators, control of volatile organic compounds (VOCs) emissions from industries, guidelines for asbestos mining, fugitive emission control from coal and fly ash storage section in power plants, management of solid and hazardous waste in integrated iron and steel plants, utilization of spent wash for composting, utilization of liquid effluents from pulp and paper and distilleries for irrigation, water conservation in sugar industries, distilleries etc.

- ◆ Inventorisation of Red category of industries and undertaking assessment of environmental status in a few industrial estates as well as assessing their assimilative carrying capacity of pollution load.
- ◆ Identification of hazardous waste streams and minimizing of waste in; paint industries, iron and steel, aluminum, sodium dichromate, galvanizing, textile and dyeing industrial sectors.
- ◆ Evolving environmentally sound technologies for recycling of electronic wastes.
- ◆ Identification of dump site and preparing remediation plan for identified sites.
- ◆ Review of standards (for liquid effluent and gaseous emissions) and preparing documents in respect of different categories of industries; fertilizer, dye and dye intermediates, bulk drug, basic organic chemicals, pesticides, petro-chemicals, soda ash, SO₂ & NO_x for power plants, BOD plants for iron and steel, non-recovery type coke oven and coal briquetting plants, primary copper, zinc and lead, aluminum, SO₂ & NO_x for cement, fermentation maltries/ breweries, soft drinks, soap and detergents, plaster of paris products, tanneries etc.
- ◆ Follow-up on implementation of Corporate Responsibility for Environmental Protection (CREP) in respect of 17 categories of industries such as; oil refineries, petrochemicals, dye and dye intermediate, sulphuric acid plants, fertilizer, tanneries, pesticides, pharmaceuticals, thermal power plants, iron & steel, cement, etc.
- ◆ Guidelines for pollution control for small scale industrial units, handicraft establishment that use natural resources giving different types of remedial measures from collecting the pollutants and sending them to small scale treatment facility and similar cooperative common pollution control organizations.

Focus in the 11th Five Year Plan

It was proposed that during the 11th Five Year Plan, a detailed study to assess the status, strength, weakness and regulatory demand - supply gap of the SPCBs and CPCB must be undertaken. An assessment report consisting of members from regulatory agencies, experts in environmental management, civil law and social scientists, nominated members from educational institutions and or NGOs who are actively pursuing environmental issues is needed to strengthen the hands of environment regulatory agencies with powers to proceed against pollution law breakers for not implementing the suggested pollution abatement methods within the stipulated time are to be undertaken.

It was also proposed that apart from regulating the large industrial establishments, the regulation must definitely be extended to small and medium scale enterprises, municipal sources of pollution, commercial establishments generating wastes and pollution, transport sector, construction activities etc. The regulation must also extend to product, packaging and disposal regulation.

Provision for receiving and acting on complaints from citizens and processes the same with transparent transactions is to be considered. This is important to compare and balance the other reports from agencies.

Improving the resource consumption efficiency would require appropriate 'resource pricing' control and appropriate 'environmental taxes' on offenders from communities or complexes. Resource pricing can be influenced either directly via taxes or charges, or indirectly via regulatory constraints or tradable permits must be studied.

Regulations must shift their attention to monitoring and regulating toxins. For example we must also set standards for SO_x for power plants using imported coal with higher sulphur content. Methods to spread the information through local media, workshops and awareness camps may be tried.

There is an imperative need to

- ◆ To ensure policy, legislation and implementation with stipulated implementation time to follow a seamless & logical path;
- ◆ To accommodate & internalize judicial pronouncements and international commitments.
- ◆ To bring in cohesion, overcome overlaps, avoid inconsistencies, conflicts and contradictions; and avoid interferences from individuals or institutions.

- ◆ To make sectoral approach give way to an integrated, coordinated and holistic approach both in law-planning, law-making and law enforcement (-forest, Wildlife and Biodiversity laws);
- ◆ To restore primacy to EPA and to make it a truly an overarching and umbrella law to guide, steer, enable and facilitate better environmental governance with transparency;
- ◆ To reform laws as to make them absorb the Constitutional spirit of decentralized governance -role for local bodies- both in administration and justice dispensation-

Issues for discussions:

- ◆ What are the gaps in the implementation of the legislations / Acts formulated by Governing bodies.
- ◆ Can action plans help bridge these gaps
- ◆ Should more emphasis be given to municipal wastes
- ◆ Are the powers given to regulatory agencies sufficient for implementation of the Legislation / Acts
- ◆ Preparedness of the agencies to handle e-wastes
- ◆ Involvement of citizens and media
- ◆ Special care to be taken at the city expanding suburbs for wastewater disposal and ground water pollution
- ◆ Implementation of bio-recycling with an eye on resource enrichment
- ◆ Identification and preparing a protected dumping ground for disposal of harmful wastes in cities having advanced hospital care
- ◆ Promote mulching organic wastes and establishing green belts.
- ◆ Tree plantations and looking after the needs like watering, trimming, protection from animals and men for next 2-3 years.

During the discussions it emerged that the focus should be on

- ◆ Issues related to promotion of re-use and recycle of sewage and trade effluent on land for irrigation.
- ◆ Promotion of cleanliness of streams in different areas of the country.
- ◆ Carrying out monitoring of rivers of the state.
- ◆ Collection and compilation of technical and statistical data relating to water and air pollution.
- ◆ Monitoring of pollution levels in major towns / cities of the states of the country.
- ◆ Organizing training programmes, seminars and workshops regarding pollution control.
- ◆ The magnitudes of environmental damages resulting from overexploitation of natural resources and pollution are location-specific, depending on regional carrying capacities of the ecosystems, meteorological factors and the levels of environmental standards chosen by different States and their enforcements, there is therefore a need for endogenous capacity building both in information gathering and ability to process the information for managing the environment.

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Annexure IV

Discussion Paper on

Legislative and regulatory mechanisms promoting low carbon development

Climate Change is one of the most important global environmental problems. The average temperature of the earth's surface has risen by 0.6 degrees C since the late 1800s. It is forecasted to increase by another 1.4 to 5.8 degrees C by the year 2100. Even if the minimum predicted increase takes place, it will be larger than any century long trend in the last 10,000 years. The sea level rose on an average by 10 to 20 cm during the 20th century, and an additional increase of 9 cm is forecasted by the year 2100.

Today India is one of the world's ten fastest growing economic countries and is expected to grow at more the 8% for the current decade. India presently ranks first in the world for foreign technology licensing, second in terms of availability of scientists and engineers, 9th in terms of quality of management schools, 12th in terms of firm level innovation, and 16th in terms of firm level innovation, as well as firm level technology absorption having allowed foreign investment in almost all sectors and having the procedures for repatriation of capital and profits greatly simplifies. India is globally perceived to have a favorable investment environment.

Sustaining such steep growth rate would create a major demand for energy in the country. Due to the growth in major energy intensive sectors such as power generations, steel, cement, fertilizers, and transport, India's energy consumption has increased manifold. Since fossil fuels are (coal, petroleum and natural gas) the primary sources of energy in the country, the increased energy consumption has also resulted in substantially large GHG emissions.

Of the total installed capacity for power in India 66% is form fossil fuels whereas renewable form a miniscule 4.9% of the total supply. The ministry of power aims to add another 100000 MW of capacity by the 2012 of which more than 10,000 Mw would be from renewable sources. India has always been at the forefront of the international efforts to mitigate climate change. India is a party of the UNFCCC and it acceded to the Kyoto Protocol on 25th August 2002. India hosted the 8th conference of parties at New Delhi and has held the presidency of the cop for the year 2002-2003.

The policy of the GoI on climate change is based on three broad principles:

- ◆ The primary responsibility of reducing greenhouse gas emissions is that of developed countries. They should show a demonstrable sincerity in initiating actions to address climate change.
- ◆ The development needs of developing countries are of prime importance
- ◆ The developed world should transfer resources and technologies at favourable terms to the developing world, thereby facilitating developing countries to move towards a sustainable development path.

The CDM represents a step forward from Activities Implemented Jointly (AIJ) to a crediting regime. AIJ was proposed, under considerable reservations by developing countries, as a pilot phase to operationalize Article 4(2) of the FCCC. After great deliberation on participation in AIJ, the GoI set up the AIJ Working Group in the MoEF, and issued a set of guidelines for submission of AIJ projects to the government. Under a set process to evaluate and approve AIJ projects, a number of projects have been approved with the aim of gaining experience in implementing AIJ-type activities.

The Government of India has constituted the National CDM authority (NCA) to act as the designated national authority for CDM projects from India. The NCA ensures that projects applying for CDM benefits contribute to the economic, social, technical and environmental well being of the nation.

India holds the number one position in the world in terms of the quantum of CDM projects registered. The scenario is even more encouraging when India is compared against other Asian countries. India accounts for a massive 69% for all the projects registered from Asia followed by China with a modest 13%. Although growing economies like Malaysia and Indonesia have a very small number of projects registered, they are slowly but surely gathering momentum in the CDM arena.

In terms of the sector wise distribution of CDM projects within India biomass based projects are leading the CDM scene; demand side energy efficiency projects come second followed by hydro, wind, and cement. Fossil fuel switch projects, Biogas and landfill gas capture projects presently appear to constitute a small percentage to the total projects from India. Once such projects are registered, CER volumes from India are expected to increase substantially.

Based on geographic distribution of CDM Projects it is found that Karnataka has the maximum number of projects (34) approved by the NCA from India. Andhra Pradesh follows with 31 projects while Tamil Nadu has around 24 NCA approved projects, Rajasthan (22), Maharashtra (18) and Gujarat (18).

India therefore, with a fast growing economy with a favorable investment environment and with a strong CDM related organizational apparatus, is one of the most attractive non-annex-1 country for CDM project development. And the figures confirm this assertion, of the total projects registered with UNFCCC almost one third are from India.

Accordingly to National Environmental Policy 2006, the following will comprise essential elements of India's response to climate change:

- a) Adherence to the principle of common but differentiated responsibilities and respective capabilities of different countries in respect of both mitigation of GHGs, and adaptation measures.
- b) Reliance on multilateral approaches, as opposed to bilateral or plurilateral or unilateral measures.
- c) Equal per-capita entitlements of global environmental resources to all countries.
- d) Over-riding priority of the right to development.
- e) Identify key vulnerabilities of India to climate change, in particular impacts on water resources, forests, coastal areas, agriculture, and health.
- f) Assess the need for adaptation to future climate change, and the scope for incorporating these in relevant programmes, including watershed management, coastal zone planning and regulation, forestry management, agricultural technologies and practices, and health programmes.
- g) Encourage Indian industry to participate in the Clean Development Mechanism (CDM) through capacity building for identifying and preparing CDM projects, including in the financial sector.
- h) Participate in voluntary partnerships with other countries both developed and developing, to address the challenges of sustainable development and climate change, consistent with the provisions of the UN Framework Convention on Climate Change.

Some Achievements made in India

- ◆ The Policy and Implementation Committee of the Asia-Pacific Partnership on Clean Development and Climate approved an initial set of projects and activities contained in eight sector-based Action Plans. The Partnership consists of Australia, China, India, the Republic of Korea and the United States of America.
- ◆ Meetings of National CDM Authority were held periodically to consider the CDM Projects for grant of Host Country approval. Till March, 2007, the National CDM Authority has approved 526 projects in the field Biomass based Cogeneration, Energy efficiency, Municipal Solid Waste; Renewables such as Wind, Small Hydro projects etc. These projects would generate 357 million Certified Emission Reductions (CERs) by the year 2012, if all these projects successfully get registered with the CDM Executive Board.

- ◆ An Inter-Ministerial delegation from India participated in the 24th Session of Subsidiary Body meetings to the United Nations Framework Convention on Climate Change (UNFCCC) and the First Session of the Adhoc Working Group (AWG) on further commitments for Annex-I Parties under the Kyoto Protocol from May 18-26, 2006.

According to the working group of the Planning Commission it is suggested to:

- ◆ Identify key vulnerabilities for India to climate change, in particular impacts on water resources, forests, coastal areas, agriculture, and health.
- ◆ Assess the need for adaptation to future climate change, and the scope for incorporating these in relevant programmes, including watershed management, coastal zone planning and regulation, forestry management, agricultural technologies and practices, and health programmes.
- ◆ Encourage Indian industry and municipal bodies to participate in the Clean Development Mechanism (CDM) through capacity building for identifying and preparing CDM projects, including investment.
- ◆ Participate in voluntary partnerships with other countries both developed and developing, to address the challenges of sustainable development and climate change, consistent with the provisions of the UN Framework Convention on Climate Change and provide assistance to ozone depleting solvents consuming industries particularly the CTC and those engaged in servicing ODS based refrigeration equipment and promotion small and medium enterprises.

The following are some of the key elements of the Indian stand on the CDM.

- i. The use of flexible mechanisms to meet commitments should be supplemental to domestic effort and an upper limit to their use should be defined.
- ii. Sinks should not be included in the CDM.
- iii. The 'share of proceeds from certified project activities' shall be a stipulated percentage of the differentials of the costs incurred by the developed country Party in reducing GHG through a project activity in a developing country and of the project costs that would have been incurred had the GHG reduction activity taken place in the developed country funding the project.
- iv. The operational entities to certify emission reductions shall be designated by the COP/MOP.
- v. A national system of monitoring, verifying and reporting under the CDM shall be established.

Issues for discussion:

- ◆ How to encourage participation from all sectors, in general and industry in particular to participate in Clean Development Mechanism initiatives.
- ◆ What is the mechanism in place to address issues related to CDM.

From the discussion carried out with various sectors it was found to encourage Indian industry to participate in Clean Develop Mechanism through capacity building for identifying and preparing CDM projects, including in the financial sector. It is essential to review CDM policy in India and the potential for projects in renewable energy, industrial energy efficiency, power generation, and transport. Focus was also on need to organize several CDM workshops for policymakers, project developers, and investors. There is a need to also focus on renewable energy and energy efficient technologies, joint forestry management programs and water resource management which would help in resource management for sustainable development.

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Annexure V

Discussion Paper on

Implementation of multilateral environmental agreements

State of Art

Although considerably debated over the past decade, the relationship between international environmental rules and the international trading system has not been clarified yet. The absence of an adverse ruling by the World Trade Organization (WTO) on a Multilateral Environmental Agreement (MEA) trade measure seems to demonstrate that these regimes do not conflict in practice.

There are some general benefits of ratifying, implementing, complying with, and enforcing MEAs - and costs associated with not complying:

- ◆ Protecting Public Health and the Environment: MEAs have a range of environmental and public health benefits, the specifics of which vary from MEA to MEA and State to State. These benefits tend to be both short- and long-term.
- ◆ Improving Governance: In addition to providing substantive norms of environmental protection, many MEAs improve environmental governance, as well as generally promoting transparency, participatory decision making, accountability, and conflict resolution.
- ◆ International Political Comity and Respect: Most MEAs address environmental and public health challenges that are shared by many nations. Many nations contribute to the problem, and many suffer the consequences.
- ◆ Solidarity: States may wish to become a party to an MEA to support other States in the environmental challenges they face. In such instances, the particular goals of the MEA might be noble, worthy, and of great importance to other States (for example in the same region), but may be a lower domestic priority.
- ◆ Technical and Financial Assistance: Often, a State needs to be a party to an MEA in order to access funding from the MEA Secretariat, multilateral sources (such as the GEF), and certain bilateral sources. Moreover, if a State is not complying with an MEA, this could jeopardise existing funding. Technical assistance is achieved through technology transfer etc.
- ◆ Trade: In certain instances, MEAs contain provisions that impose obligations on Parties vis-à-vis their trade with non-Parties. The Montreal Protocol and CITES are typical examples.
- ◆ Facilitating Changes in Domestic Environmental Law: While environmental problems may be evident, a Government or Parliament may be reluctant to develop the necessary laws and institutions to address the problems. MEA can elevate the international importance of a particular environmental problem, providing additional motivation domestically as well as internationally to address the problem.

India has signed and ratified a number of key multilateral agreements on environment issues in recognition of, the transboundary nature of several environmental problems, impact on chemical industry and trade and has made efforts to comply with its commitments. Efforts have been made to network and enhance environmental cooperation by participating in regional and bilateral programmes. The need to enhance our own capacity to comply with our commitments and enable flow of resources is clearly evident.

In International cooperation following steps have been identified:

- ◆ Avail of multilateral and bilateral cooperation programs, for capacity building for environmental management, particularly in relation to commitments under multilateral instruments.
- ◆ Participate in mechanisms and arrangements under multilateral agreements for enhancing flows of resources for sustainable development.
- ◆ Provide assistance to other developing countries, in particular for scientific and technical capacity building for environmental management.

International Co-operation and Sustainable Development

The Ministry of Environment and Forests is the nodal Ministry in the Government of India for all Multilateral Environmental Agreements. These include along others the Convention on Wetlands of International Importance, especially as Waterfowl Habitat, Vienna Convention for the Protection of the Ozone Layer, Montreal Protocol on Substances that deplete the Ozone Layer, UN Conventions on Biological Diversity, UN Framework Convention on Climate Change, UN Convention to Combat Desertification, Kyoto Protocol, the Basel Convention on Trans-boundary Movement of Hazardous Substances, Stockholm Convention on Persistent Organic Pollutants, Rotterdam Conventions, Ramsar Convention etc. International Co-operation & Sustainable Development Division is the nodal point within the Ministry to co-ordinate all international environmental cooperation and sustainable development issues.

Important events

- ◆ A Meeting of the India-EU Environment Forum discussed issues related to waste Management with specific reference to issues on Management of Urban Solid Waste and Hazardous waste.
- ◆ In the dialogue between India-UK on Sustainable Development formation of working groups in four identified areas of cooperation viz. Wildlife, Corporate Social Responsibility, Sustainable Forestry and Desertification was initiated.
- ◆ The India- Finland Joint Working Group on Environment discussed areas of cooperation between the two countries and future course of action.
- ◆ A new bilateral agreement with Mauritius in the field of environmental cooperation was entered.
- ◆ 34 projects and 15 Small Grant Initiatives under India-Canada Environment Facility (ICEF), have been approved so far which is worth Rs. 251.5 crore. The project has ended in December 2007, as a result of the bilateral assistance.
- ◆ An Agreement on Forestry Cooperation between the Ministry of Environments and Forests, Republic of India and the State Forestry Administration of the Peoples Republic of China was signed.

It is believed that the WTO and the multilateral trading system will be effective instruments for serving the needs of the weakest section of the society in all parts of the world. However, no single pattern, no single package of measures can be considered to be accepted universally. The developing countries are still understanding the implementation of the agreements and its full utilization.

As an example the latest of the issues is reported to be the liberalization for services between EU and India. However, EU has not included agriculture in the list, since EU does not export farm commodities such as rice and wheat on which Indian agriculture depends heavily. The EU exported only value added agricultural products. Also EU has initially identified 416 negative items, a wide range from basic chemicals, petrochemicals, allied chemicals, plastics electrical machinery and some classes of vehicles. This will reduce the trade between the two. Initially it was agreed that 90% of the traded products will be included in the bilateral agreement. Similar issues may continue to arise.

Developing countries often find themselves on the receiving end of environmental regulations. They have trouble implementing the standards which often change too quickly, do not take into consideration the needs of the developing countries and are also not sometimes supported by clear scientific evidences.

Issues:-

- ◆ Environmental Negotiations under the Doha agenda and its linkages with sustainable development.
- ◆ Relationship between multilateral environmental agreements and WTO rules.
- ◆ Issues related to liberalization of environmental goods and services.
- ◆ Frequently changing environmental standards that affect the developing countries.

Discussions pointed out that the intergovernmental organizations should help in the promotion of private investments that support MEAs. Focus should be on providing technical and financial assistance for market development for alternatives to ozone depleting substances. Estimation of the value of biodiversity is a challenge and focus must be given to impact of change in land use patterns. The environmental problems arising from the transboundary movement of hazardous chemicals and wastes and POPs in developing countries are attributable to lack of scientific information about their harmful effects, asymmetric information between the exporting and the importing countries causing market failures, lack of access to environmentally sound technologies/products and difficulty in environmentally safe disposal of hazardous wastes, and differences in environmental standards between developed countries and developing countries. These problems could be solved by capacity building in scientific management and free exchange of information about proper use / disposal of the chemicals / wastes. Provision of environmentally sound technologies / products under favourable terms through multilateral funds could help in improvement of environmental standards.

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