

NATIONAL ENVIRONMENT POLICY 2004

(Draft for Comments: 15 August 2004)

**Ministry of Environment and Forests
Government of India, New Delhi**

National Environment¹ Policy

(Draft For Comments: 15th October 2004)

1. Preamble

A diverse developing society such as ours provides numerous challenges in the economic, social, political, cultural, and environmental arenas. All of these coalesce in the dominant imperative of alleviation of mass poverty, reckoned in the multiple dimensions of livelihood security, health care, education, empowerment of the disadvantaged, and elimination of gender disparities.

The present national policies for environmental management are contained in the *National Forest Policy, 1988*, the *National Conservation Strategy and Policy Statement on Environment and Development, 1992*; and a *Policy Statement on Abatement of Pollution, 1992*. Some sector policies such as the *National Water Policy, 2002*, have also contributed towards environmental management. Despite these policy documents a need for a comprehensive policy statement has been evident for some time in order to infuse a common approach to the various sectoral, cross-sectoral, including fiscal, approaches to environmental management. As our development challenges have evolved, and our understanding of the centrality of environmental concerns in development has sharpened, there is also a need to review the earlier objectives, policy instruments, and strategies.

This dynamic requires an evolving and flexible policy framework with a built in system for monitoring and review, and where necessary, revision. Sustainable development concerns in the sense of enhancement of human well-being, broadly conceived,² are a recurring theme in India's development philosophy. For this to occur, there is a need for balance and harmony between economic, social and environmental needs of the country.³ India also plays an important role in several significant international initiatives concerned with the environment. It is a party to the key multilateral agreements, and recognises the interdependencies among, and transboundary character of, several environmental problems.

The *National Environment Policy (NEP, 2004)* is a response to our national commitment to a clean environment, mandated in the Constitution in Articles 48 A and 51 A (g), strengthened by judicial interpretation of Article 21. It is recognised that maintaining a healthy environment is not the state's

¹ The "Environment" comprises all entities, natural or manmade, external to oneself, which provide value, now or perhaps in the future, to humankind. Environmental concerns relate to their degradation through actions of humans.

² The present day consensus reflects three foundational aspirations. First, that human beings should be able to enjoy a decent quality of life; second, that humanity should become capable of respecting the finiteness of the biosphere; and third, that neither the aspiration for the good life, nor the recognition of biophysical limits should preclude the search for greater justice in the world.

³ See Tenth Five Year plan 2002-2007, Volume II, Chapter 1.

responsibility alone, but also that of every citizen. A spirit of partnership should thus be realized throughout the spectrum of environmental management in the country. While the state must galvanise its efforts, there should also be recognition by each individual – natural or institutional, of its responsibility towards maintaining and enhancing the quality of the environment. The NEP, 2004 is also intended to be a statement of India's commitment to making a positive contribution to international efforts.

The NEP, 2004 has been motivated by the above considerations and is intended to mainstream environmental concerns in all development activities. It briefly describes the key environmental challenges currently and prospectively facing the country, the objectives of environment policy, normative principles underlying policy action, strategic themes for intervention, broad indications of the legislative and institutional development needed to accomplish the strategic themes, and mechanisms for implementation and review. It has been prepared through a process of extensive consultation with experts, as well as diverse stakeholders, and this process is also documented.

The NEP, 2004 is intended to be a guide to action: in regulatory reform, programmes and projects for environmental conservation; and review and enactment of legislation, by agencies of the Central, State, and Local Governments. It also seeks to stimulate partnerships of different stakeholders, i.e. public agencies, local communities, the investment community, and international development partners, in harnessing their respective resources and strengths for environmental management. On the whole, it is expected to do better than fiscal neutrality, and likely raise substantial resources from outside the fiscal regime to realize its objectives.

2. Key Environmental Challenges: Causes and Impacts

The key environmental challenges that the country faces relate to the nexus of environmental degradation with poverty in its many dimensions, and economic growth. These challenges are intrinsically connected with the state of environmental resources, such as land, water, air and their flora and fauna. The proximate drivers of environmental degradation are population growth, technology and consumption choices, and poverty, leading to changes in relations between people and ecosystems, and development activities such as intensive agriculture, polluting industry, and unplanned urbanisation. However, these factors give rise to environmental degradation only through deeper causal linkages, in particular institutional failures, resulting in lack of clarity or enforcement of rights of access and use of environmental resources, policies which provide disincentives for environmental conservation (and which may have origins in the fiscal regime), market failures, (which may be linked to shortcomings in the regulatory regimes), and governance constraints.

Environmental degradation is a major causal factor in enhancing and perpetuating poverty, particularly among the rural poor, when such degradation impacts soil fertility, quantity and quality of freshwater, air

quality, forests, and fisheries. The dependence of the rural poor, in particular, tribal societies on their natural resources, especially biodiversity, is self-evident. The poor are particularly vulnerable to loss of resilience in ecosystems.⁴ Large reductions in resilience may mean that the ecosystems, on which livelihoods are based, break down, causing distress. The loss of the environmental resource base can result in certain groups of people being made destitute, even if overall, the economy shows strong growth. Further, urban environmental degradation, through lack of (or inappropriate) waste treatment and sanitation, industry and transport related pollution, adversely impacts air, water, and soil quality, and differentially impacts the health of the urban poor. This, in turn, affects their capability to seek and retain employment, attend school, and enhances gender inequalities⁵, all of which perpetuate poverty.

Poverty itself can accentuate environmental degradation, given that institutional⁶ failures persist. For the poor, several environmental resources are complementary in production and consumption to other commodities (e.g. water in relation to agricultural production, fuel-wood in relation to consumption of food), while a number of environmental resources are a source of income or food (e.g. fisheries, non-timber forest produce). This is frequently a source of cumulative causation, where poverty, gender inequalities, and environmental degradation mutually reinforce each other. Poverty and environmental degradation are also reinforced by and linked to population growth, which in turn, depends on a complex interaction of diverse causal factors and stages of development.

Economic growth, in its turn, bears a dichotomous relationship to environmental degradation. On the one hand, growth may result in “excessive” environmental degradation through use of natural resources and generation of pollution aggravated by institutional failures. If impacts on the environmental resource base are neglected, an incorrect picture is obtained from conventional monetary estimates of national income. On the other hand, economic growth permits improvement in environmental quality by making available the necessary resources for environmental investments and generating societal pressures for improved environmental behaviour and institutional and policy change.

It is increasingly evident that poor environmental quality has adversely affected human health. Environmental factors are estimated as being responsible in some cases for nearly 20 percent of the burden of disease in

⁴ *Resilience is the capacity of an ecosystem to recover from shocks, and surprises, whether manmade or natural. If a system loses resilience, it may be rapidly transformed to a wholly different (and unwelcome) state when subjected to even a temporary perturbation.*

⁵ *For example, as money for medical treatment is preferentially allocated within households towards treatment of the wage-earning men folk.*

⁶ *Which may relate to both formal institutions such as legal rights over resources, and traditional, informal institutions, such as community norms of resource management.*

India⁷ and a number of environment-health factors are closely linked with dimensions of poverty (e.g. malnutrition, lack of access to clean energy and water). It has been established that interventions targeted at environmental management – e.g. reducing indoor air pollution, protecting sources of safe drinking water, sanitation measures, improved public health governance – offer tremendous opportunities in reducing the incidence of a number of critical health problems. It is also evident that these environmental protection measures would be difficult to accomplish without extensive awareness raising and education.

Institutional failures, referring to unclear or insufficiently enforced rights of access to and use of environmental resources, result in environmental degradation because third parties primarily experience impacts of such degradation, without cost to the agents responsible for the damage. Such rights – both community based and individual - are critical institutions mediating the relationships between humans and the use of the environment. Traditionally, village commons – water sources, grazing grounds, local forests, fisheries, etc., have been protected by local communities from overexploitation through various norms, which may include penalties for disallowed behaviour. These norms, may, however, be degraded through the very process of development, including urbanization, and population growth resulting from sharp reductions in mortality, and also through state actions which may create conditions for the strengthening of individual over communitarian rights and in doing so allow market forces to press for change that has adverse environmental implications. If such access to the community resources under weakened norms continue the resources would be degraded, and the livelihoods of the community would suffer.

Policy failures can emerge from various sources, including the use of fiscal instruments, such as explicit and implicit subsidies for the use of various resources, which provide incentives for excessive use of natural resources. Inappropriate policy can also lead to changes in commonly managed systems, with adverse environmental outcomes.

Another major set of challenges arise from emerging global environmental concerns such as climate change, stratospheric ozone depletion, and biodiversity loss. The key is to operationalize the principle of common but differentiated responsibility of countries in relation to these problems. Multilateral regimes and programmes responding to these global environmental issues must not adversely impact the development opportunities of developing countries. Further, the sharing of global natural resources must proceed only on the basis of equal sharing per-capita across all countries.

7 Hughes et. al. 2001: *Environmental health in India: Priorities in Andhra Pradesh*, Environment and Social Development Unit, South Asia Region, World Bank.

The causes, proximate and deeper, of degradation of key environmental resources are discussed below (Sec. 5.2).

3. The Objectives of NEP 2004

The principal objectives of this policy are enumerated below. These objectives relate to current perceptions of key environmental challenges. They may, accordingly, evolve over time:

i. Conservation of Critical Environmental Resources:

To protect and conserve critical ecological systems and resources, and invaluable natural and man-made heritage which are essential for life-support, livelihoods, economic growth, and a broad conception of human well-being.

ii. Intra-generational Equity: Livelihood Security for the Poor:

To ensure equitable access to environmental resources and quality for all sections of society, and in particular, to ensure that poor communities, which are most dependent on environmental resources for their livelihoods, are assured secure access to these resources.

iii. Inter-generational Equity:

To ensure judicious use of environmental resources to meet the needs and aspirations of present and future generations.

iv. Integration of Environmental Concerns in Economic and Social Development:

To integrate environmental concerns into policies, plans, programmes, and projects for economic and social development.

v. Efficiency in Environmental Resource Use:

To ensure efficient use of environmental resources in the sense of reduction in their use per unit of economic output, to minimize adverse environmental impacts.

vi. Environmental Governance:

To apply the principles of good governance (transparency, rationality, accountability, reduction in time and costs, and participation) to the management and regulation of use of environmental resources.

vii. Enhancement of Resources for Environmental Conservation:

To ensure higher resource flows, comprising finance, technology, management skills, traditional knowledge, and social capital, for environmental conservation through mutually beneficial multistakeholder partnerships between local communities, public agencies, and investors.

4. Principles

The above objectives are to be realized through various strategic interventions by different public authorities at Central, State, and Local Government levels. They would also be the basis of partnerships between public agencies, local communities, and various economic actors. However, these strategic interventions, besides legislation and the evolution of legal doctrines for realization of the objectives, need to be premised on a core set of unambiguously stated principles. The following principles, accordingly, would guide the activities of different actors in relation to this policy. Each of these principles has an established genealogy in policy pronouncements, jurisprudence, international environmental law, or international State practice:

- i. Human beings are at the Centre of Sustainable Development Concerns:**
Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature.
- ii. The Right to Development:**
The right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and 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.
- v. Economic Efficiency:**
In various public actions for environmental conservation, economic efficiency would be sought to be realized.⁸

This principle requires that the services of environmental resources be given economic value, and such value to count equally with the economic values of other goods and services, in analysis of alternative courses of action.

Further implications of this principle are as follows:

- a) “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

⁸ *Economic efficiency refers to the maximization of welfare across all members of a society, given its human, natural, and manmade resources, its technology, and the preferences of its members. Welfare is reckoned as the aggregate of net value realized by each member of society, in his or her subjective perceptions, on a common monetary metric.*

nexus with the original act. Such impacts are termed “externalities”. If the costs (or benefits) of the externalities are not re-visited on the party responsible for the original act, the resulting level of the entire sequence of production or consumption, and externality, is inefficient. In such a situation, economic efficiency may be restored by making the perpetrator of the externality bear the cost (or benefit) of the same.

The policy will, accordingly, promote the internalisation of environmental costs, including through the use of incentives based policy instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment.

b) Cost Minimization: Where the environmental benefits of a course of action cannot, for methodological or conceptual reasons, be imputed economic value (as in the case of “Incomparable Entities” [see below]), in any event the economic costs of realizing the benefits should be minimized.

Efficiency of resource use may also be accomplished by the use of policy instruments that create incentives to minimise wasteful use and consumption of natural resources. The principle of efficiency also applies to issues of environmental governance by streamlining processes and procedures in order to minimize costs and delays.

vi. Entities with “Incomparable”⁹ Values:

Significant risks to human health, life, and environmental life-support systems, besides certain other unique natural and man-made entities, which may impact the well-being broadly conceived of large numbers of persons, may be considered as “Incomparable” in that individuals or societies would not accept these risks for compensation in money or conventional goods and services. A conventional economic cost-benefit calculus would not, accordingly, apply in their case, and such entities would have priority in allocation of societal resources for their conservation without consideration of direct or immediate economic benefit.¹⁰

vii. Equity:

The cardinal principle of equity or justice requires that human beings cannot be treated differently based on irrelevant differences between them. Equity norms must be distinguished according to context, i.e. “procedural equity”, relating to fair rules for allocation of entitlements and obligations, and “end-result equity”, relating to fair outcomes in terms of distribution of entitlements and obligations. Each context, in addition, must be distinguished in terms of “intra-generational equity”, relating to justice within societies and in particular providing space for the participation of underprivileged men and women, and “inter-generational equity”, relating to justice between generations.

⁹ Termed “Incommensurable Values” in the relevant academic literature.

¹⁰ Examples of “Incomparable Entities” are unique historical monuments such as the Taj Mahal; charismatic species such as the Tiger; or unique landscapes, such as the Valley of Flowers.

Equity, in the context of this policy refers to both equity in entitlements to, and participation of the relevant publics in processes of decision-making over use of, environmental resources.

viii. Legal Liability:

Civil liability for environmental damage would deter environmentally harmful actions, and compensate the victims of environmental damage.

Conceptually, the principle of legal liability may be viewed as an embodiment in legal doctrine of the “polluter pays” approach, itself deriving from the principle of economic efficiency.

The following alternative approaches to legal liability may apply:

a) Fault based liability

In a fault based liability regime a party is held liable if it breaches a pre-existing legal duty, for example, an environmental standard.

b) Strict liability

Strict liability imposes an obligation to compensate the victim for harm resulting from actions or failure to take action, which may not necessarily constitute a breach of any law or duty of care.¹¹

ix. Public Trust Doctrine:

The State is not an absolute owner, but merely a trustee of all natural resources, which are by nature meant for public use and enjoyment, subject to reasonable conditions, necessary to protect the legitimate interest of a large number of people, or for matters of strategic national interest.

x. Decentralisation:

Decentralization involves ceding or transfer of power from a Central Authority to State and Local Authorities, in order to empower public authorities having jurisdiction at the spatial level at which particular environmental issues are salient, to address these issues.

xi. Integration:

Integration refers to the inclusion of environmental considerations in sectoral policymaking, the integration of the social and natural sciences in environment related policy research, and the strengthening of relevant linkages among various agencies at the Central, State, and Local Self-Government, charged with the implementation of environmental policies.

xii. Environmental Standard Setting:

Environmental standards must reflect the economic and social development situation in which they apply. Standards adopted in one society or context may have unacceptable economic and social costs if applied without discrimination in another society or context.

¹¹ *In terms of the Supreme Court's decisions in Shriram Gas Leak case and the Bhopal gas leak case, strict liability applies whenever the liable party damages a third party.*

Setting environmental standards would involve several considerations, i.e. risks to human health, risks to other environmental entities, technical feasibility, costs of compliance, and strategic considerations.

xiii. Preventive Action:

It is preferable to prevent environmental damage from occurring in the first place, rather than attempting to restore degraded environmental resources after the fact.

xiv. Environmental Offsetting:

There is a general obligation to protect threatened or endangered species and natural systems that are of special importance to sustaining life, providing livelihoods, or general well-being. If for exceptional reasons of overriding public interest such protection cannot be provided in particular cases, cost-effective offsetting measures must be undertaken by the proponents of the activity to restore as nearly as may be feasible the lost environmental services to the same publics.

5. Strategies and Actions

The foregoing statement of policy objectives and principles are to be realized by concrete actions in different areas relating to key environmental challenges. A large number of such actions are currently under way, and have been for several years, in some cases, for many decades. In some aspects new themes would need to be pursued to realize the principles and objectives. The following strategic themes, and outlines of actions to be taken in each, focus on both ongoing activities, functions, and roles, as well as new initiatives that are necessary. However, they are not necessarily a complete enumeration in each case.

5.1 Regulatory Reforms:

The regulatory regimes for environmental conservation comprises 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. Apart from the legislation which is categorically premised on environmental conservation, a host of sectoral and cross-sectoral laws and policies, including fiscal regimes, also impact environmental quality (some of these are discussed in the succeeding sections).

5.1.1 Revisiting the Legislative Framework:

The present legislative framework is broadly contained in the umbrella Environment Protection Act 1986, the Water (Prevention and Control of Pollution) Act, 1974, the Water Cess Act 1977 and the Air (Prevention and Control of Pollution) Act, 1981. The law in respect of management of forests and biodiversity is contained in the Indian Forest Act 1927, the Forest (Conservation) Act 1980, the Wild Life (Protection) Act 1972 and the Bio-diversity Act 2003. There are several other enactments, which complement the provisions of these basic enactments.

The following specific actions would be taken:

- a) Institutionalize a holistic and integrated approach to the management of environment and natural resources, explicitly identifying and integrating environmental concerns in relevant sectoral and cross-sectoral policies through review and consultation, in line with the NEP, 2004.
- b) Identify emerging areas for new legislation, due to better scientific understanding, economic and social development, and development of multilateral environmental regimes, in line with NEP, 2004.
- c) Review the body of existing legislation in order to develop synergies among relevant statutes and regulations, eliminate obsolescence, and amalgamate provisions with similar objectives, in line with NEP, 2004.
- d) Ensure accountability of the concerned levels of Government (Centre, State, Local) in undertaking the necessary legislative changes in a defined time-frame, with due regard to the Objectives and Principles of NEP, 2004, in particular, ensuring the livelihood and well-being of the poor.

5.1.2 Process related reforms

(i) Approach :

The recommendations of the Committee on Reforming Investment Approval & Implementation Procedures (The Govindarajan Committee identified delays in environment and forest clearances as the largest source of delays in development projects - Appendix I), will be followed for reviewing the existing procedures for granting clearances and other approvals under various statutes and rules. These include the Environment Protection Act, Forest Conservation Act, the Water (Prevention and Control of Pollution) Act, the Air (Prevention and Control of Pollution) Act and Wildlife (Protection) Act, and Genetic Engineering Approval Committee (GEAC) Rules under the Environment Protection Act. The objective is to reduce delays and levels of decision-making, realize decentralization of environmental functions, and ensure greater transparency and accountability.

(ii) Framework for legal action

The present approach to dealing with environmentally unacceptable behaviour in India has been largely based on criminal processes and sanctions. Although criminal sanctions, if successful, may create a deterrent impact, in reality they are rarely fruitful for a number of reasons. On the other hand, giving lower level officials the power to institute criminal prosecutions may provide fertile opportunities for rent-seeking.

Civil law, on the other hand, offers flexibility, and its sanctions can be more effectively tailored to particular situations. The evidentiary burdens of civil

proceedings are less daunting than those of criminal law. It also allows for preventive policing through orders and injunctions to restrain prospective pollution.

Accordingly, a judicious mix of civil and criminal processes and sanctions will be employed in the legal regime for enforcement, through a review of the existing legislation. Civil liability law, civil sanctions, and processes would govern most situations of non-compliance. Criminal processes and sanctions would be available for serious, and potentially provable, infringements of environmental law, and their initiation would be vested in responsible authorities. Recourse may also be had to the relevant provisions in the Indian Penal Code, and the Criminal Procedure Code.

5.1.3 Substantive Reforms

(i) Environment and Forests clearances

In order to make the clearance processes more effective, the following actions will be taken:

a) Encourage regulatory authorities, Central and State, to institutionalise regional and cumulative environmental impact assessments (R/CEIAs) to ensure that environmental concerns are identified and addressed at the planning stage itself.

b) Give due consideration, to the quality and productivity of lands which are proposed to be converted for development activities, as part of the clearance process. Projects involving large-scale diversion of prime agricultural land would require environmental clearance whether or not the proposed activity otherwise requires environmental clearance.

c) Encourage clustering of industries and other development activities to facilitate setting up of environmental management infrastructure, as well as monitoring and enforcing environmental compliance. Emphasize post-project monitoring and implementation of environmental management plans through participatory processes, involving the government, industry, and the potentially impacted community.

d) Prohibit the diversion of dense natural forests to non-forest use, except in site-specific cases of vital national interest. No further regularisation of encroachment on forests should be permitted.

(ii) Coastal Areas:

Development activities in the coastal areas are regulated by means of the Coastal Regulation Zone notifications and Integrated Coastal Zone Management (ICZM) Plans made under them. However, there is need to ensure that the regulations are firmly founded on scientific principles, in order to ensure effective protection to valuable coastal environmental resources, without unnecessarily impeding livelihoods, or legitimate coastal economic activity, or settlements, or infrastructure development.

The following actions would be taken:

a) Revisit the Coastal Regulation Zone (CRZ) notifications to make the approach to coastal environmental regulation more holistic, and thereby ensure protection to coastal ecological systems, coastal waters, and the vulnerability of some coastal areas to potential sea level rise. The Integrated Coastal Zone Management (ICZM) Plans need to be comprehensive, and prepared on scientific basis, with the participation of the local communities both in formulation and implementation. The ICZM Plans should be reviewed at pre-determined intervals to take account of changes in geomorphology, economies, and settlement patterns.

b) Decentralize, to the extent feasible, the clearance of specific projects to State environmental authorities, exempting activities, which do not cause significant environmental impacts, and are consistent with approved ICZM Plans.

(iii) Living Modified Organisms (LMOs):¹²

Biotechnology has an immense potential to enhance livelihoods and contribute to the economic development of the country. On the other hand, LMOs may pose significant risks to ecological resources, and perhaps, human and animal health. In order to ensure that development of biotechnology does not lead to unforeseen adverse impacts, the following actions will be taken:

a) Review the regulatory processes for LMOs so that all relevant scientific knowledge is taken into account, and ecological, health, and economic concerns are adequately addressed.

b) Periodically review the National Bio-safety guidelines and Bio-safety Operations Manual to ensure that these are based on current scientific knowledge.

c) Ensure the conservation of bio-diversity and human health when dealing with LMOs in transboundary movement in a manner consistent with the Multilateral Bio-safety Protocol.

(iv) Environmentally Sensitive Zones:

Environmentally Sensitive Zones may be defined as areas with identified environmental resources with "Incomparable Values" which require special attention for their conservation. In order to conserve and enhance these resources, without impeding legitimate socio-economic development of these areas, the following actions will be taken:

a) Identify and give legal status to Environmentally Sensitive Zones in the country with environmental entities with "Incomparable values" requiring special conservation efforts.

¹² *In general, Genetically Modified Organisms require evaluation of their potential benefits and harms as part of relevant regulatory processes. The subset of LMOs, may, however, owing to their potential for replication, involve environmental concerns.*

b) Formulate area development plans for these zones on a scientific basis, with adequate participation by the local communities.

c) Create local institutions with adequate participation for the environmental management of such areas to ensure adherence to the approved area development plans, which should be prepared in consultation with the local communities.

(v) Monitoring and Enforcement:

Weak enforcement of environmental compliance is attributed to inadequate technical capacities, monitoring infrastructure, and trained staff in enforcement institutions. In addition, there is insufficient involvement of the potentially impacted local communities in the monitoring of compliance, and absence of institutionalised public-private partnerships in enhancement of monitoring infrastructure.

The following actions would be taken:

a) Give greater legal standing to local community based organizations to undertake monitoring of environmental compliance, and report violations to the concerned enforcement authorities.

b) Develop feasible models of public-private partnerships to leverage financial, technical, and management resources of the private sector in setting up and operating infrastructure for monitoring of environmental compliance, with ironclad safeguards against possible conflict of interest or collusion with the monitored entities.

(vi) Use of economic principles in environmental decision-making:

It is necessary that the costs associated with the degradation and depletion of natural resources be incorporated into the decisions of economic actors at various levels to reverse the tendency to treat these resources as "free goods" and to pass the costs of degradation to other sections of society, or to future generations of the country.

At the macro-level, a system of natural resource accounting is required to assess whether in the course of economic growth we are drawing down, or enhancing, the natural resource base of production, including all relevant depletable assets. In addition, the environmental costs and benefits associated with various activities, including sectoral policies, should be evaluated to ensure that these factors are duly taken into account in decision-making.

The current near exclusive reliance on fiat based instruments for environmental regulation do not permit individual actors to minimize their own costs of compliance. This leads, on the one hand, to non-compliance in many cases, and on the other, unnecessary diversion of societal resources from other pressing needs. Economic instruments, of which a large, feasible suite has emerged through practical experience in several developed and developing countries, work by aligning the interests of economic actors with

environmental compliance, primarily through application of “polluter pays”. This may ensure that for any given level of environmental quality desired, the society-wide costs of meeting the standard are minimized. However, in some cases, use of economic instruments may require intensive monitoring, which too may entail significant societal costs. On the other hand, use of existing policy instruments, such as the fiscal regime, may significantly reduce or eliminate the need for enhanced institutional capacities to administer the incentive based instruments. In future, accordingly, a judicious mix of incentives based and fiat based regulatory instruments would be considered for each specific regulatory situation.

The following actions would be taken:

- a) Strengthen the initiatives being taken by the Central Statistical Organization in the area of natural resource accounting with a view to its adoption in the system of national income accounts.
- b) Develop and promote the use of standardized environmental accounting practices and standards in preparation of statutory financial statements for large industrial enterprises, in order to encourage greater environmental responsibility in investment decision-making, management practices, and public scrutiny.
- c) Encourage financial institutions to adopt appraisal practices, so that environmental risks are adequately considered in the financing of projects.
- d) Facilitate the integration of environmental values into cost-benefit analysis to encourage more efficient allocation of resources while making public investment and policy decisions.
- e) Prepare and implement an action plan on the use of economic instruments for environmental regulation in specified contexts.

5.2 Enhancing and Conserving Environmental Resources:

Perverse production and consumption practices are the immediate causes of environmental degradation, but an exclusive focus on these aspects alone is insufficient to prevent environmental harm. The causes of degradation of environmental resources lie ultimately in a broad range of policy, and institutional, including regulatory shortcomings, leading to the direct causes. However, the range of policies, and legal and institutional regimes, which impact the proximate factors, is extremely wide, comprising fiscal and pricing regimes, and sectoral and cross-sectoral policies, laws, and institutions. Accordingly, apart from programmatic approaches, review and reform of these regimes to account for their environmental consequences is essential. In addition, there is lack of awareness of the causes and effects of environmental degradation, and how they may be prevented, among both specialized practitioners of the relevant professions, including policymakers, as well as the general public, which needs to be redressed. In this subsection, in respect of major categories of environmental resources, the

proximate and deeper causes of their degradation, and specific initiatives for addressing them are outlined.

5.2.1 Land Degradation:

The degradation of land, through soil erosion, alkali-salinization, water logging, pollution, and reduction in organic matter content has several proximate and underlying causes. The proximate causes include loss of forest and tree cover (leading to erosion by surface water run-off and winds), excessive use of irrigation (in many cases without proper drainage, leading to leaching of sodium and potassium salts), improper use of agricultural chemicals (leading to accumulation of toxic chemicals in the soil), diversion of animal wastes for domestic fuel (leading to reduction in soil nitrogen and organic matter), and disposal of industrial and domestic wastes on productive land. These in turn, are driven by implicit and explicit subsidies for water, power, fertilizer and pesticides, and absence of conducive policies and regulatory systems to enhance people's incentives for afforestation and forest conservation. It is essential that the relevant fiscal, tariffs, and sectoral policies take explicit account of their unintentional impacts on land degradation, if the fundamental basis of livelihoods for the vast majority of our people is not to be irreparably damaged. In addition, to such policy review, the following specific initiatives would be taken:

- a) Encourage adoption of science-based, and traditional sustainable land use practices through research and development, pilot scale demonstrations, and large scale dissemination, including farmer's training, and where necessary, access to institutional finance.
- b) Promote reclamation of wasteland and degraded forestland through formulation and adoption of multistakeholder partnerships involving the land owning agency, local communities, and investors.
- c) Prepare and implement thematic action plans for arresting and reversing desertification.

5.2.2 Forests and Wildlife:

(i) Forests:

Forests provide a multiplicity of environmental services. Foremost among these is the recharging of mountain aquifers, which sustain our rivers. They also conserve the soil, and prevent floods and drought. They provide habitat for wildlife and the ecological conditions for maintenance and natural evolution of genetic diversity of flora and fauna. They are the traditional homes of forest dwelling tribals, the major part by far of whose livelihoods depend on forests. They yield timber, fuel-wood, and other forest produce, and possess immense potential for economic benefits, in particular for local communities, from sustainable eco-tourism.

On the other hand, in recent decades, there has been significant loss of forest cover, although there are now tangible signs of reversal of this trend. The principal direct cause of forest loss has been the conversion of forests

for agriculture, settlements, infrastructure, and industry. In addition, commercial extraction of fuel-wood, illegal felling, and grazing of cattle, has degraded forests. These causes, however, have their origins in the fact that the environmental values provided by forests are not realized as direct financial benefits by various parties, at least to the extent of exceeding the monetary incomes from alternative uses, including those arising from illegal use. Moreover, while since antiquity forest dwelling tribes had generally recognized traditional community rights over the forests, on account of which they had strong incentives to use the forests sustainably and to protect them from encroachers, following the commencement of formal forest laws and institutions in 1865, these rights were effectively extinguished in many parts of the country. Such disempowerment has led to the forests becoming open access in nature, leading to their gradual degradation in a classic manifestation of the "*Tragedy of the Commons*", besides leading to perennial conflict between the tribals and the Forest Department, and constituting a major denial of justice.

It is possible that some site-specific non-forest activities may yield overall societal benefits significantly exceeding that from the environmental services provided by the particular tract of forest. However, large scale forest loss would lead to catastrophic, permanent change in the country's ecology, leading to major stress on water resources and soil erosion, with consequent loss of agricultural productivity, industrial potential, living conditions, and the onset of natural disasters including drought and floods. In any event, the environmental values of converted forests must be restored, as nearly as may be feasible, to the same publics.

The National Forest Policy, 1988, and the Indian Forest Act, as well as the regulations under it, provide a comprehensive basis for forest conservation. However, it is necessary, looking to some of the underlying causes of forest loss, to take some further steps. These include:

- a) Give legal recognition of the traditional rights of forest dwelling tribes. This would remedy a serious historical injustice, secure their livelihoods, reduce possibilities of conflict with the Forest Departments, and provide long-term incentives to the tribals to conserve the forests.
- b) Formulate an innovative strategy for increase of forest and tree cover from the present level of 23 percent of the country's land area, to 33 percent in 2012, through afforestation of degraded forest land, wastelands, and tree cover on private or revenue land. Key elements of the strategy would include: (i) the implementation of multistakeholder partnerships involving the Forest Department, local communities, and investors, with clearly defined obligations and entitlements for each partner, following good governance principles, to derive environmental, livelihood, and financial benefits; (ii) rationalization of restrictions on cultivation of forest species outside notified forests, to enable farmers to undertake social and farm forestry where their returns are more favourable than cropping, and (iii) universalization of the Joint Forestry Management (JFM) system throughout the country.

- c) Focus public investments on enhancing the density of natural forests, mangroves conservation, and universalization of Joint Forestry Management.
- d) Formulate an appropriate methodology for reckoning and restoring the environmental values of forests, which are unavoidably diverted to other uses.
- e) Formulate and implement a “Code of Best Management Practices” for dense natural forests to realize the Objectives and Principles of NEP, 2004.

(ii) Wildlife:

The status of wildlife in a region is an accurate index of the state of ecological resources, and thus of the natural resource base of human well being. This is because of the interdependent nature of ecological entities (*“the web of life”*), in which wildlife is a vital link.¹³ Moreover, several charismatic species of wildlife embody “Incomparable Values”, and at the same time, are a major resource base for sustainable eco-tourism.

Conservation of wildlife, accordingly, involves the protection of entire ecosystems. However, in several cases, delineation of and restricting access to such Protected Areas¹⁴ (PAs), as well as encroachment of human settlements on these areas has led to man-animal conflicts. While physical barriers may temporarily reduce such conflict, it is preferable to address their underlying causes. These may largely arise from the non-involvement of relevant stakeholders in identification and delineation of PAs.

In respect of Wildlife Conservation, the following elements would be pursued:

- a) Expand the Protected Area (PA) network of the country, including Conservation and Community Reserves, to give fair representation to all bio-geographic zones of the country. In doing so, develop norms for delineation in terms of the Objectives and Principles of NEP, 2004, in particular, participation of local communities, concerned public agencies, and other stakeholders, to harmonize ecological and physical features with needs of socio-economic development. It must be ensured that the overall area of the network, in each bio-geographic zone would increase in the process.
- b) Paralleling multistakeholder partnerships for afforestation, formulate and implement similar partnerships for enhancement of wildlife habitat in Conservation Reserves and Community Reserves, to derive both environmental and eco-tourism benefits.

¹³ For example, the presence of predators (*“tigers”*) indicates that the prey base (*“deer”*) is sound, in turn indicating that the vegetative cover (*“grass”*) is healthy, for which the conservation of soil, water, and absence of pollution is essential. The last indicate conditions conducive to human health and livelihoods.

¹⁴ Protected Areas may include forest as well as non-forest ecosystems, e.g. deserts, marine sanctuaries, etc.

- c) Promote site-specific eco-development programmes in fringe areas of PAs, to restore livelihoods and access to forest produce by local communities owing to access restrictions in PAs.
- d) Strengthen capacities and implement measures for captive breeding and release into the wild identified endangered species.

5.2.3. Biodiversity, Traditional Knowledge, and Natural Heritage:

Biodiversity, comprises both genetic and ecosystems diversity. Loss of biodiversity is primarily due to degradation or alteration of ecosystems, in particular the habitats of site-specific species. Damage to such habitats arises from land degradation, forest loss, conversion of wetlands, pollution of and excessive water drawals from rivers, and loss of coastal ecosystems, the reasons for which have been discussed separately. Conservation of genetic diversity, in particular, is crucial for development of improved crop varieties resistant to particular stresses, new pharma products, etc., apart from ensuring the resilience of ecosystems. However, it is presently difficult to foresee the future potential of any particular genetic resource, and accordingly economic values are uncertain. Traditional Knowledge (TK), referring to ethno-biology knowledge possessed by local communities, relates to uses of various indigenous plant and faunal varieties, including in traditional medicine, food, etc., and is potentially an important means of unlocking the value of genetic diversity through reduction in search costs.

Natural heritage sites, including endemic “biodiversity hotspots”, sacred groves and landscapes, are repositories of significant genetic and ecosystem diversity, and the latter are also important bases for eco-tourism. They are nature’s laboratories for evolution of wild species in response to change in environmental conditions.

India is fortunate in having, through the efforts of dedicated scientists over many decades,¹⁵ developed vast inventories of floral and faunal resources, as well as ethno-biology knowledge. India is, thus well-placed to tap this enormous resource base for benefits for the country as a whole, and local communities in particular, provided that the genetic resources are conserved, and appropriate Intellectual Property Rights (IPRs) conferred on local communities in respect of their ethno-biology knowledge.

A large-scale exercise has been completed for providing inputs towards a National Biodiversity Action Plan. These inputs would be reviewed in terms of the Objectives and Principles of NEP, 2004, scientific validity, financial and administrative feasibility, and legal aspects. In any event, the following measures would be taken:

- a) Strengthen the protection of areas of high endemism of genetic resources (“biodiversity hot spots”), while providing alternative livelihoods and access to resources to local communities who may be affected thereby.

¹⁵ For example, in institutions such as Botanical Survey of India (BSI), the Zoological Survey of India (ZSI), the Bombay Natural History Society (BNHS), and others.

- b) Pay explicit attention to the potential impacts of development projects on biodiversity resources and natural heritage. In appraisal of such projects by cost-benefit analysis, assign values to biodiversity resources at or near the upper end of the range of uncertainty. In particular, ancient sacred groves and “biodiversity hotspots” should be treated as possessing “Incomparable Values”.
- c) Enhance *ex-situ* conservation of genetic resources in designated gene banks across the country. Genetic material of threatened species of flora and fauna must be conserved on priority.
- d) Formulate and adopt an internationally recognized system of legally enforceable *sui-generis* intellectual property rights for the country’s genetic resources, to enable the country, including where relevant the local communities, to derive economic benefits from grant of access to these resources.
- e) Similarly, formulate and adopt an internationally recognized system of legally enforceable *sui-generis* intellectual property rights for ethno-biology knowledge, to enable local communities to realize significant financial benefits from permitting the use of such knowledge. Set up an on-line database of the inventory of such ethno-biology knowledge, once the legal regime, domestic and multilateral, for their protection is in place.

5.2.4 Freshwater Resources:

India’s freshwater resources comprise the single most important class of natural endowments enabling its economy and its human settlement patterns. The freshwater resources comprise the river systems, groundwater, and wetlands. Each of these has a unique role, and characteristic linkages to other environmental entities.

(i) River Systems:

India’s river systems typically originate in its mountain eco-systems, and deliver the major part of their water resources to the populations in the plains. They are subject to siltation from sediment loads due to soil loss, itself linked to loss of forest and tree cover. They are also subject to significant net water withdrawals along their course, due to agricultural, industrial, and municipal use; as well as pollution from human and animal waste, agricultural run-offs, and industrial effluents. Although the rivers possess significant natural capacity to assimilate and render harmless many pollutants, the existing pollution inflows in most cases substantially exceed such natural capacities. This fact, together with progressive reductions in stream flows, ensures that the river water quality in the vast majority of cases declines as one goes downstream. The results include loss of aquatic flora and fauna, leading to loss of livelihoods for river fisherfolk, significant impacts on human health from polluted water, loss of habitat for many bird species, and loss of inland navigation potential. Apart from these, India’s rivers are inextricably linked with the history and religious beliefs of its peoples, and the degradation of important river systems accordingly offends their spiritual, aesthetic, and cultural sensibilities.

The broad direct causes of rivers degradation are, in turn, linked to several policies and regulatory regimes. These include tariff policies for irrigation systems and industrial use, which, through inadequate cost-recovery, provide incentives for overuse near the headwork's of irrigation systems, and drying up of irrigation systems at the tail-ends. The result is excessive cultivation of water intensive crops near the headwork's, which is otherwise inefficient, waterlogging, and alkali-salinization of soil. The irrigation tariffs also do not yield resources for proper maintenance of irrigation systems, leading to loss in their potential; in particular, resources are generally not available for lining irrigation canals to prevent seepage loss. These factors result in reduced flows in the rivers. Pollution loads are similarly linked to pricing policies leading to inefficient use of agricultural chemicals, and municipal and industrial water use. In particular, revenue yields for the latter two are insufficient to install and maintain sewage and effluent treatment plants, respectively. Pollution regulation for industries is typically not based on formal spatial planning to facilitate clustering of industries to realize scale economies in effluent treatment, resulting in relatively high costs of effluent treatment, and consequent increased incentives for non-compliance. There is, accordingly need to review the relevant pricing policy regimes and regulatory mechanisms in terms of their likely adverse environmental impacts.

The following comprise elements of an action plan for river systems:

- a) Promote integrated approaches to management of river basins by the concerned river authorities, considering upstream and downstream inflows and withdrawals by season, pollution loads and natural regeneration capacities, to ensure maintenance of adequate flows and adherence to water quality standards throughout their course in all seasons.
- b) Consider and mitigate the impacts on river flora and fauna, and the resulting change in the resource base for livelihoods, of multipurpose river valley projects, power plants, and industries.
- c) Consider mandating the installation of water saving closets and taps in the building byelaws of urban centres.

(ii) Groundwater:

Groundwater is present in underground aquifers in many parts of the country. Aquifers near the surface are subject to annual recharge from precipitation, but the rate of recharge is impacted by human interference. Deep aquifers, on the other hand, occur below a substratum of hard rock. The deep aquifers generally contain very pure water, but since they are recharged only over many millennia, must be conserved for use only in periods of calamitous drought such as may happen only once in several hundred years. The boundaries of groundwater aquifers do not generally correspond to the spatial jurisdiction of any local public authorities or private holdings, nor are they easily discernable, nor can withdrawals be easily

monitored, leading to the unavoidable situation of groundwater being an open access resource.

The water table has been falling rapidly in many areas of the country in recent decades. This is largely due to withdrawal for agricultural, industrial, and urban use, in excess of annual recharge. In urban areas, apart from withdrawals for domestic and industrial use, housing and infrastructure such as roads, prevent sufficient recharge. In addition, some pollution of groundwater occurs due to leaching of stored hazardous waste and use of agricultural chemicals, in particular, pesticides. Contamination of groundwater is also due to geogenic causes, such as leaching of arsenic from natural deposits. Since groundwater is frequently a source of drinking water, its pollution leads to serious health impacts.

The direct causes of groundwater depletion have their origin in the pricing policies for electricity and diesel. In the case of electricity, where individual metering is not practiced, a flat charge for electricity connections makes the marginal cost of electricity effectively zero. Subsidies for diesel also reduce the marginal cost of extraction to well below the efficient level. Given the fact that groundwater is an open access resource, the user then “rationally” (i.e. in terms of his individual perspective), extracts groundwater until the marginal value to him equals his now very low marginal cost of extraction.¹⁶ The result is inefficient withdrawals of groundwater by all users, leading to the situation of falling water tables. Support prices for several water intensive crops with implicit price subsidies aggravate this outcome by strengthening incentives to take up these crops rather than less water intensive ones.

Falling water tables have several perverse social impacts, apart from the likelihood of mining of deep aquifers, “*the drinking water source of last resort*”. The capital costs of pump sets and bore wells for groundwater extraction when water tables are very deep may be relatively high, with no assurance that water would actually be found. In such a situation, a user who may be a marginal farmer able to borrow the money only at usurious rates of interest, may, in case water is not found, find it impossible to repay his debts. This may lead to destitution, or worse. Even if the impacts were not so dire, there would be excessive use of electricity and diesel.

The efficient use of groundwater would, accordingly, require that the practice of non-metering of electric supply to farmers be discontinued in their own enlightened self-interest. It would also be essential to progressively ensure that the environmental impacts are taken into account in setting electricity tariffs, and diesel pricing.

Increased run-off of precipitation in urban areas due to impermeable structures and infrastructure prevents groundwater recharge. This is an additional cause of falling water tables in urban areas. In rural areas several cost-effective contour bunding techniques have been proven to enhance

¹⁶ *The marginal cost of extraction equals the marginal cost to the farmer of power (“zero”) or diesel, and a small labour and depreciation cost. The capital cost of a bore well as well as the flat rate connection charge are sunk costs and do not count in the marginal cost of water.*

groundwater recharge. A number of effective traditional water management techniques to recharge groundwater have been discontinued by the local communities due to the onset of pump sets extraction, and need to be revived. Finally, increase in tree cover, is also effective in enhancing groundwater recharge.

Pollution of groundwater from agricultural chemicals is also linked to their improper use, once again due to pricing policies, especially for chemical pesticides, as well as agronomic practices, which do not take the potential environmental impacts into account. While transiting through soil layers may considerably eliminate organic pollution loads in groundwater, this is not true of several chemical pesticides.

The following action points emerge:

- a) Take explicit account of impacts on groundwater tables of electricity tariffs and pricing of diesel.
- b) Promote efficient water use techniques, such as sprinkler or drip irrigation, among farmers. Provide necessary pricing, inputs, and extension support to feasible and remunerative alternative crops from efficient water use.
- c) Support practices of contour bunding and revival of traditional methods for enhancing groundwater recharge.
- d) Mandate water harvesting in all new constructions in relevant urban areas, as well as design techniques for road surfaces and infrastructure to enhance groundwater recharge.
- e) Support R&D in cost effective techniques suitable for rural drinking water projects for removal of arsenic and mainstream their adoption in rural drinking water schemes in relevant areas.

(ii) Wetlands:

Wetlands, natural and manmade, freshwater or brackish, provide numerous ecological services. They provide habitat to aquatic flora and fauna, as well as numerous species of birds, including migratory species. The density of birds, in particular, is an accurate indication of the ecological health of a particular wetland. Several wetlands have sufficiently unique ecological character as to merit international recognition as Ramsar Sites.¹⁷

Wetlands also provide freshwater for agricultural and domestic use, help groundwater recharge, and provide livelihoods to fisher-folk. They may also comprise an important resource for sustainable tourism and recreation.¹⁸ They may be employed as an alternative to power, technology, and capital intensive municipal sewage plants; however, if used for this purpose without proper reckoning of their assimilative capacity, or for dumping of solid and

¹⁷ For example, the Chilka Lake and the East Kolkata Wetlands.

¹⁸ For example, the Dal Lake (Srinagar), the Otacamund Lake, and the Nainital Lake.

hazardous waste, they may become severely polluted, leading to adverse health impacts. The inadvertent introduction of some alien species of flora in wetlands¹⁹ have also degraded their ecology.

Wetlands are under threat from drainage and conversion for agriculture and human settlements, besides pollution. This happens because public authorities or individuals having jurisdiction over wetlands derive little revenues from them, while the alternative use may result in windfall financial gains to them. However, in many cases, the economic values of wetlands' environmental services may significantly exceed the value from alternative use. On the other hand, the reduction in economic value of their environmental services due to pollution, as well as the health costs of the pollution itself, are not taken into account while using them as a waste dump. There also does not yet exist a formal system of wetland regulation outside the international commitments made in respect of Ramsar sites.

The following action points emerge:

- a) Set up a legally enforceable regulatory mechanism for identified valuable wetlands to prevent their degradation and enhance their conservation. Develop a national inventory of such wetlands.
- b) Formulate conservation and prudent use strategies for each significant catalogued wetland, with participation of local communities, and other relevant stakeholders.
- c) Formulate and implement eco-tourism strategies for identified wetlands through multistakeholder partnerships involving public agencies, local communities, and investors.
- d) Take explicit account of impacts on wetlands of significant development projects during the environmental appraisal of such projects; in particular, the reduction in economic value of wetland environmental services should be explicitly factored into cost-benefit analyses.
- e) Consider particular unique wetlands as entities with "Incomparable Values", in developing strategies for their protection.

5.2.5 Mountain Ecosystems:

Mountain ecosystems play a key role in providing forest cover, feeding perennial river systems, conserving genetic diversity, and providing an immense resource base for livelihoods through sustainable tourism. At the same time, they are among the most fragile of ecosystems in terms of susceptibility to anthropogenic shocks. There has been significant adverse impact on mountain ecosystems by way of deforestation, submergence of river valleys, pollution of freshwater sources, despoliation of landscapes, degradation of human habitat, loss of genetic diversity, retreat of glaciers, and pollution. The most significant proximate causes of these are illegal logging and commercial fuel wood collection, besides faulty construction of

¹⁹ e.g. *Water Hyacinth*.

infrastructure such as roads, power transmission lines and large dams, unplanned urbanization and lack of enforcement of building bye-laws, absence or disrepair of sanitation systems, setting up of polluting industries, climate change, and excessive use of agricultural chemicals. The underlying causes relate to absence of conducive policies to enable local communities to derive adequate financial returns from afforestation and non-consumptive use of forest resources, pricing policies for agricultural chemicals, inadequate enforcement of pollution standards, poor institutional capacities for urban and regional planning and municipal regulatory functions, and preparation of environmental impact assessments of infrastructure; besides absence of consensus on means of financing municipal infrastructure. Clearly, there is need to address these shortcomings through review of the relevant sectoral and cross-sectoral policies, and institutional capacity building. Additionally, the following elements of an Action Plan would be taken up:

- a) Adopt “best practice” norms for infrastructure construction in mountain regions to avoid or minimize damage to sensitive ecosystems and despoiling of landscapes.
- b) Encourage cultivation of traditional varieties of crops and horticulture by promotion of organic farming, enabling farmers to realize a price premium.
- c) Promote sustainable tourism through adoption of “best practice” norms for tourism facilities and access to ecological resources, and multistakeholder partnerships to enable local communities to gain better livelihoods, while leveraging financial, technical, and managerial capacities of investors.
- d) Consider particular unique mountainscapes as entities with “Incomparable Values”, in developing strategies for their protection.

5.2.6 Coastal Resources:

Coastal environmental resources comprise a diverse set of natural and manmade assets, including mangroves, coral reefs, estuaries, coastal forests, genetic diversity, sand dunes, geomorphologies, sand beaches, land for agriculture and human settlements, coastal infrastructure, and heritage sites. These provide habitats for marine species, which, in turn comprise the resource base for large numbers of fisherfolk, protection from extreme weather events, a resource base for sustainable tourism, and agricultural and urban livelihoods. In recent years there has been significant degradation of coastal resources, for which the proximate causes include poorly planned human settlements, improper location of industries and infrastructure, pollution from industries and settlements, and overexploitation of living natural resources. In the future, sea level rise due to climate change may have major adverse impacts on the coastal environment. The deeper causes of these proximate factors lie in inadequate institutional capacities for, and participation of local communities in, formulation and implementation of coastal management plans, the open access nature of many coastal

resources, and lack of consensus on means of provision of sanitation and waste treatment. The following further aspects may be addressed in an action plan:

- a) Mainstream the sustainable management of mangroves into the forestry sector regulatory regime, ensuring that they continue to provide livelihoods to local communities.
- b) Disseminate available techniques for regeneration of coral reefs, and support activities based on application of such techniques.
- c) Embody considerations of sea-level rise in coastal management plans, as well as infrastructure planning and construction norms.

5.2.7 Pollution Abatement:

Pollution is the inevitable²⁰ generation of waste streams from the production and consumption of anything. Pollution directly impacts the quality of the receiving medium, i.e. air, water, soil, or electromagnetic spectrum, and when this impaired medium acts upon a receptor, say, a living being, also impacts the receptor. In general, the impacts on the receptor are adverse, but not always.²¹ Typically, ecosystems have some natural capacities to assimilate pollution; however, these vary considerably with the nature of the pollutant and the ecosystem. In general, it is cheaper to reduce the emissions of pollution, than to mitigate it after generation, or to treat the receiving medium or receptor. The impacts of pollution may differentially impact the poor, or women, or children, or developing regions, who may also have relatively low contributions to its generation, and accordingly the costs and benefits of abatement may have important implications for equity.

(i) Air Pollution:

Air pollution may have adverse impacts on human health, as well the health of other living entities, manmade heritage, and life-support systems, such as global climate. Depending upon the lifetime of the pollutants, the location of the source, and the prevailing air currents, the receptors may be located at homestead, local, regional, or global levels, at time intervals from near instantaneous, to several decades.

²⁰ *“Inevitable”, as a consequence of the operation of a fundamental natural law, that of increase in entropy of systems taken together with their surroundings, a derivation from the second law of thermodynamics. “Inevitable”, however does not mean that waste generation cannot be reduced (upto a point) within the limits of the natural law.*

²¹ *For example, several organic waste streams may have adverse impacts on human health if ingested, but may have value as plant fertilizer.*

The direct causes of air pollution are emissions from the use of fossil energy, and other industrial processes, and some consumption activities.²² The deeper causes arise in a multiplicity of policy, and institutional, including regulatory shortcomings, in particular, inefficient pricing of fossil fuel based energy. Indoor air pollution, a special case, arises from the low societal status of women, leading to continued use of polluting, inefficient biomass stoves, besides pricing policies for agricultural chemicals which lead to substitution of biomass based fertilizer by chemicals, the biomass then being used inefficiently as fuel. These deeper causes need to be addressed through policies and programmes for redressing women's status, and dialogue aimed at consideration of the environmental impacts of pricing policies for agricultural chemicals.

In addition, the following specific actions need to be taken:

- a) Accelerate the national programmes of dissemination of improved fuel wood stoves, and solar cookers, suited to local cooking practices.
- b) Strengthen the monitoring and enforcement of emission standards for both point and non-point sources, with participation in monitoring by the local communities.
- c) Prepare and implement action plans for major cities for addressing air pollution for both point and non-point sources, relying on a judicious combination of fiats and incentive based instruments.
- d) Formulate a national strategy for urban transport to ensure adequate investment, public and private, in low-pollution mass transport systems.
- e) Promote reclamation of wastelands by energy plantations for rural energy through multistakeholder partnerships involving the land owning agencies, local communities, and investors.

(ii) Water Pollution:

The direct and indirect causes of pollution of surface (river, wetlands) water sources, groundwater, and coastal areas have been discussed above. The following comprise further elements of an action plan:

- a) Develop and implement, initially on a pilot scale, public-private partnership models for setting up and operating effluent and sewage treatment plants. Once the models are validated, progressively use public resources, including external assistance, to catalyze such partnerships. Enhance the capacities of municipalities for recovery of user charges for water and sewage systems.
- b) Enhance reuse of treated sewage and industrial wastewater before final discharge to water bodies.

²² For example, noise, smoking, cars.

- c) Enhance capacities for spatial planning among the State and Local Governments, with adequate participation by local communities, to ensure clustering of polluting industries to facilitate setting up of common effluent treatment plants to be operated on cost recovery basis.
- d) Promote R&D in development of low cost technologies for sewage treatment at different scales, in particular, replication of the East Kolkata wetlands model for sewage treatment to yield multiple benefits.
- e) Take explicit account of groundwater pollution in pricing policies of agricultural inputs, especially pesticides, and dissemination of agronomy practices involving their use.
- f) Develop a strategy for strengthening regulation, and addressing impacts, of ship-breaking activities on coastal and near marine resources.

(iii) Soil Pollution:

Similarly, the immediate and deeper causes of soil pollution have been considered above. The following are elements of an action plan:

- a) Develop and implement viable models of public-private partnerships for setting up and operating secure landfills and incinerators for toxic and hazardous waste, both industrial and biomedical, on payment by users, taking the concerns of local communities into account. The concerned local communities and State Governments must have clear entitlements to specified benefits from hosting such sites, if access is given to non-local users.
- b) Develop and implement strategies for clean up of pre-existing toxic and hazardous waste dumps, in particular, in industrial areas, and reclamation of such lands for future, sustainable use.
- c) Strengthen the capacities of local bodies for segregation, recycling, and reuse of municipal solid wastes, and setting up and operating sanitary landfills, in particular through competitive outsourcing of solid waste management services.
- d) Give legal recognition to, and strengthen the informal sector systems of collection and recycling of various materials; in particular enhance their access to institutional finance and relevant technologies.
- e) Promote organic farming of traditional crop varieties through research in and dissemination of techniques for reclamation of land with prior exposure to agricultural chemicals, facilitating marketing of organic produce²³ in India and abroad, including by development of transparent, voluntary, science-based labelling schemes.

²³ *There is considerable evidence of consumer preference for organic produce, which thereby may command a substantial premium.*

f) Develop and implement strategies for recycle, reuse, and final environmentally benign disposal of plastics wastes, including through promotion of relevant technologies, and use of incentive based instruments.

(iv) Noise Pollution:

Persistent exposure to elevated noise levels has been established to result in significant adverse health impacts. While in many instances, the identification of a particular sound as “noise” is unambiguous, in the case of others, such as “music” or “chanting” or “fireworks displays”, it is inherently subjective. In all such cases, societal well-being would require that exposure levels to third parties be maintained below levels at which significant adverse health impacts may occur. At the same time, it needs to be understood that certain environments in which people choose to live and work necessarily involve a certain level of noise. The following would comprise elements of an Action Plan on abatement of noise pollution:

- a) Make appropriate distinctions between different environments in terms of setting ambient noise standards, e.g. rural versus urban; educational and medical establishments versus other areas; night-time versus daytime in residential areas; areas in the vicinity of road, rail, and airport infrastructure; etc.
- b) Distinguish between noise standards and protection measures in the context of occupational exposure, and environmental exposure to third parties.
- c) Formulate noise emissions norms (e.g. loudspeaker, automobile horns, fireworks ratings) appropriate to various activities to ensure that exposure levels to third parties who are not participants in the activity do not exceed prescribed ambient standards.
- d) Encourage dialogue between State/Local Authorities and religious/community representatives on the adoption of enforceable specific durations, timings, and use of loudspeakers/fireworks, etc. in case temporary exceedance of prescribed ambient noise standards for observance of traditional religious/cultural/social events cannot be avoided.

5.2.8 Conservation of Manmade Heritage:

Manmade heritage reflects the prehistory, history, ways of living, and culture, of a people. In the case of India, such heritage is at the core of our national identity. At the same time, considerable economic value, and livelihoods may be derived from conservation of manmade heritage and their sustainable use, through realization of their tourism potential.

The criteria for, and processes of identification of heritage sites, besides legislation and fiscal measures to ensure that they are not damaged or converted by direct human interference, are outside the scope of the NEP, 2004. However, the impact of environmental quality on their conservation is an environmental policy concern. Heritage sites may be impacted by

pollution, or they may face threats of inundation or conversion by development projects. Several prominent heritage sites may be held to possess “Incomparable Values”.

The following action points would be pursued:

- a) In setting ambient environmental standards, especially for air quality, the potential impacts on designated heritage sites must be taken into account.
- b) Heritage sites considered to have “Incomparable Values” would merit stricter standards than otherwise comparable situations, and particular attention should be paid to monitoring and enforcement of environmental standards in their case. Integrated regional development plans should be drawn up, with participation of the local community, to shift polluting activities or render them much less polluting, to treat waste streams, to review transportation options, and adopt building norms which maintain the overall heritage ambience of the area.
- c) Impacts on designated heritage sites must be considered at the stage of developing the terms of reference for environmental impact assessments of projects, and consideration given to the potential impacts during appraisal, in terms of the Objectives and Principles of NEP, 2004.

5.2.9 Climate Change:

Climate change, resulting from anthropogenic emissions of a suite of gases (called “greenhouse gases” or GHGs) due to fossil fuel use, certain agricultural and industrial activities, and deforestation, leading to their increasing concentrations in the atmosphere, has the potential, over the next few generations, to significantly alter global climate. This would result in large changes in ecosystems, leading to possibly catastrophic disruptions of livelihoods, economic activity, living conditions, and human health. On the other hand, abatement of GHGs, would involve significant economic costs.

While climate change is a global environmental issue, different countries bear different levels of responsibility for increase in atmospheric GHGs concentrations. Further, the adverse impacts of climate change will fall disproportionately on those who have the least responsibility for causing the problem, in particular, developing countries, including India.

India’s GHG emissions at 1994 level were 1228 million ton (Mt) CO₂ equivalent (India’s initial National Communication to UNFCCC 2004), which is below 3% of global GHG emissions. In per-capita terms, it is 23 per cent of the global average, and 4 per cent of USA, 8 per cent of Germany, 9 per cent of UK and 10 per cent of Japan per capita emissions in 1994. In terms of the GHG intensity of the economy, in Purchasing Power Parity terms, India emitted a little above 0.4 tonne CO₂ equivalent per 1000 US dollars in 2002, which is lower than those of the USA and the global average. In terms of primary energy use, India’s share of renewable energy (being a non – GHG emitting energy form) at 36 per cent is far higher than industrialized

countries can hope to reach in many decades. Since GHGs emissions are directly linked to economic activity, India's economic growth will necessarily involve increase in GHGs emissions from the current extremely low levels. Any constraints on the emissions of GHGs by India, whether direct, by way of emissions targets, or indirect, will reduce growth rates.

On the other hand, India's policies for sustainable development, by way of promotion of energy efficiency, renewable energy, fuels mix, energy pricing, pollution abatement, afforestation, mass transport, besides differentially higher growth rates of less energy intensive services sectors as compared to manufacturing, results in a relatively GHGs benign growth path.

Anthropogenic climate change, significant responsibility for which clearly does not lie with India or other developing countries, may, on the other hand, have severe adverse impacts on India's precipitation patterns, ecosystems, agricultural potential, forests, water resources, coastal and marine resources, besides increase in range of several disease vectors. Large-scale resources would clearly be required for adaptation measures for climate change impacts, if catastrophic human misery is to be avoided.

Accordingly, the following would comprise essential elements of India's approach to multilateral efforts at addressing 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.

5.3 Environmental Standards, Management Systems, Certification, and Indicators:

5.3.1 Environmental Standards:

Environmental Standards refer both to the acceptable levels of specified environmental quality parameters at different categories of locations ("ambient standards"), as well as permissible levels of discharges of specified waste streams by different classes of activities ("emission standards").

It is now well understood that environmental standards cannot be universal, and each country should set standards in terms of its national priorities, policy objectives, and resources. These standards, may, of course, vary (in general, become more stringent) as a country develops, and has greater

access to technologies and financial resources for environmental management. Environmental standards also need to relate to other measures for risk mitigation in the country, so that a given societal commitment of resources for achieving overall risk reduction²⁴ yields the maximum aggregate reduction in risk.

Specific considerations for setting ambient standards in each category of location (residential, industrial, environmentally sensitive zones, etc.) include the reductions in potential aggregate health risks (morbidity and mortality combined in a single measure²⁵) to the exposed population; the risk to sensitive, valuable ecosystems and manmade assets; and the likely societal costs, of achieving the proposed ambient standard.

Similarly, emissions standards for each class of activity need to be set on the basis of general availability of the required technologies²⁶, the feasibility of achieving the applicable environmental quality standards at the location (specific or category) concerned with the proposed emissions standards, and the likely unit costs of meeting the proposed standard. It is also important that the standard is specified in terms of quantities of pollutants that may be emitted, and not only by concentration levels, since the latter can often be easily met through dilution, with no actual improvement in ambient quality. The tendency to prescribe specific abatement technologies should also be eschewed, since these may unnecessarily increase the unit and societal costs of achieving the ambient environmental quality, and in any case because a technology that is considered ideal for meeting a given emission standards may not be acceptable on other relevant parameters, including possibly other sources of societal risk.

The following specific actions would be taken:

- a) Set up a permanent machinery comprising experts in all relevant disciplines to review notified ambient and emissions standards in the light of new scientific and technological information as they become available, and changing national circumstances, ensuring adequate participation by potentially impacted communities, and industry associations.
- b) Strengthen the network for monitoring ambient environmental quality, including through participation by local communities, and public-private partnerships. Progressively ensure real-time, and on-line availability of the monitoring data.

5.3.2 Environmental Management Systems, Ecolabeling and Certification:

²⁴ *Environmental quality is not the only source of societal risk; virtually every activity of humans is fraught with risk. Other sources of risk, which may be regulated, include safety standards for vehicles, aircraft, water, food and pharma, contagious diseases (quarantine and immunizations), etc. Risk mitigation in each case involves societal costs; these must be weighed against the potential benefits*

²⁵ *E.g. "Disability Adjusted Life Years" (DALY)*

²⁶ *Specifically, that a range of technologies from numerous vendors should be available, to preclude windfall gains to one or a small set of manufacturers and resultant high costs of the technologies.*

Environmental Management Systems (EMS), such as ISO 14000, by requiring the adoption of standardized environmental management practices, documenting their actual use, and third party verification of the fact, may significantly ease the public burden of monitoring and enforcement of prescribed emissions standards. On the other hand, their adoption may involve transaction costs, which, for small and medium enterprises may be significant in relation to their total investment. Global harmonization of EMS²⁷, however, is a safeguard against adoption of arbitrary national EMS regimes to serve as non-tariff barriers.

Ecolabeling (and other voluntary certification mechanisms) differ from the EMS in that they address the preferences of environmentally conscious consumers, rather than ensuring adherence to national environmental standards. They may involve review of the entire product cycle, from sourcing raw materials, to final disposal of the product after use, and since they are concerned primarily with consumer preferences, may relate to external or ad-hoc, rather than national environmental standards. Further, at present, non-public bodies have established several labelling schemes in India's export destinations, with no satisfactory evidence of being based on scientific knowledge, or participation by the potentially affected producers. Moreover, they may be based on prescriptions of production processes, and not only of the product characteristics, and for this reason, their mandatory application is inconsistent with provisions of the WTO regime.

Ecolabels, etc., clearly have the potential to be employed as trade barriers, at least by competing firms in the export destinations, if not directly by their Governments. The obtaining of an ecolabel, especially one granted by an agency located in a developed country, may involve large transactions costs. However, ecolabeled products may command significant price premia, as well as ease of entry to markets. On the other hand, the fact of a large, rapidly growing, environmentally conscious consumer base in India itself, may provide the required leverage to realize significant advantages from mutual recognition of ecolabeling schemes.

The following actions would be taken:

- a) Encourage industry associations to promote the adoption of ISO 14000 among their members, through provision of technical and training support. Mainstream promotion of ISO 14000 in the small-scale sector in the various promotion schemes for the sector.
- b) Encourage adoption of EMS through purchase preference for ISO 14000 goods and services for Government procurement, except for items reserved for the small-scale sector at any given time. Mandate ISO 14000

²⁷ *Global harmonization of EMS however relates to achievement of national, not externally imposed emission standards.*

when a sufficient number of domestic suppliers for each good or service have ISO 14000 certification.²⁸

c) Formulate “Good Practice Guidelines” for ecolabels to enhance their scientific basis, transparency, and requirements of participation. Promote the mutual recognition of Indian and foreign ecolabels, which adhere to the Good Practice Guidelines, to ensure that Indian exporters enhance their market access at lower costs.

5.4 **Clean Technologies and Innovation:**

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

Barriers to the adoption of clean technologies are, first, the fact that many of them are proprietary, and protected by strong patent regimes held abroad. The vendors, accordingly, would be able to extract large premiums in the absence of competitive substitutes. Second, lack of capacity in development financial institutions for appraisal of proposals for switching existing production facilities to clean technologies. Third, the lack of coordination in R&D efforts in India aimed at developing a shelf of commercially viable clean technologies. The last should also be viewed against the fact that in future, almost all commercial transfers of production technology worldwide may be for clean technologies.

The following would comprise elements of an action plan:

- a) Encourage capacity building in the financial sector for appraising clean technology switchover project proposals.
- b) Set up a mechanism to network technology research institutions in the country, public and private, for cooperation in R&D for clean technologies. Promote the dissemination of the new technologies both in India and abroad.
- c) Consider use of revenue enhancing fiscal instruments to promote shifts to clean technologies in both existing and new units.

5.5 **Environmental Awareness, Education, and Information:**

Enhancing environmental awareness is essential to harmonize patterns of individual behaviour with the requirements of environmental conservation. This would minimize the demands placed on the monitoring and enforcement regimes; in fact, large-scale non-compliance would simply

²⁸ *Even firms which sell only part of their output to Government may be expected to obtain ISO 14000 certification, since it would not be cost-effective for them to maintain separate production lines for certified and non-certified products.*

overwhelm any feasible regulatory machinery. Awareness relates to the general public, as well as specific sections, e.g. the youth, urban dwellers, industrial and construction workers, municipal and other public employees, etc. Awareness involves not only internalization of environmentally responsible behaviour, but also enhanced understanding of the impacts of irresponsible actions, including to public health, living conditions, and livelihood prospects.

Environmental education is the principal means of enhancing such awareness, both among the public at large, and among focused groups. Such education may be formal, or informal, or a combination of both. It may rely on educational institutions at different levels; the print, electronic, or live media; and various other formal and informal settings.

Access to environmental information is the principal means by which environmentally conscious stakeholders may evaluate compliance by the concerned parties with environmental standards, legal requirements, and covenants. They would thereby be enabled to stimulate necessary enforcement actions, and through censure, motivate compliance. Access to information is also necessary to ensure effective, informed participation by potentially impacted publics in various consultation processes, such as for preparation of environmental impact assessments and environment management plans of development projects.

The following actions would be taken:

- a) Mainstream scientifically valid environment content in the curricula of formal education, at primary, secondary, tertiary, and professional levels, focusing on the content appropriate at each stage, and without increasing the course load overall. Special mid-career training programmes may be conducted for groups with special responsibilities, e.g. the judiciary, policy makers, legislators, industrial managers, city and regional planners, voluntary and community based organizations, etc.
- b) Prepare and implement a strategy for enhancing environmental awareness among the general public, and special groups, by professional production and airing of information products through diverse media catering to the different target groups. The media products should, as far as possible, eschew focusing on the achievements of public agencies, but instead document real world events of human interest. The production, as well as dissemination may involve public, private, and voluntary agencies.
- c) Enhance real-time, on line public access to monitoring information, both in respect of ambient quality, as well as major point sources of pollution. Archival data to be also made publicly available in convenient format.

5.6 Partnerships and Stakeholder Involvement:

Conservation of the environment requires the participation of multiple stakeholders, who may bring to bear their respective resources,

competencies, and perspectives, so that the outcomes of partnerships are superior to those of each acting alone. Implementing and policy making agencies of the Government, at Central, State, Municipal, and Panchayat levels; the legislatures and judiciary; the public and private corporate sectors; financial institutions; industry associations; academic and research institutions; independent professionals and experts; the media; community based organizations; voluntary organizations; and multilateral and bilateral development partners may each play important roles in partnerships for the formulation, implementation, and promotion of measures for environmental conservation.

In seeking to realize partnerships among these diverse actors, it is essential to eschew the confrontational posturing sometimes adopted in the past. While it is not possible that the interests and perceptions of all stakeholders will coincide on each occasion, nevertheless, it is necessary to realize that progress will be seriously impeded if the motives of other partners are called into question during public discourse. It is also essential that all partnerships are realized through, and are carried out in terms of the principles of good governance, in particular, transparency, accountability, cost effectiveness, and efficiency.

A number of specific themes for partnerships have been identified above. A generic classification of some, not exhaustive, possible partnerships is as follows:

- a) Public-Community Partnerships, by which public agencies and local communities cooperate in the management of a given environmental resource, each partner bringing agreed resources, assuming specified responsibilities, and with defined entitlements, e.g. Joint Forestry Management.
- b) Public-Private Partnerships, by which specified public functions with respect to environmental management are contracted out competitively to private providers, e.g. monitoring of environmental quality.
- c) Public-Community-Private Partnerships, in terms of which the partners assume joint responsibility for a particular environmental function, with defined obligations and entitlements for each, with competitive selection of the private sector partner, e.g. afforestation of degraded forests.
- d) Public-Voluntary Organization Partnerships, similar to public-private partnerships, in respect of functions in which voluntary organizations may have a comparative advantage over others, the voluntary organizations, in turn, being selected competitively, e.g. environmental awareness raising.
- e) Public-Private-Voluntary Organization Partnerships, in which the provision of specified public responsibilities is accomplished on competitive basis by the private sector, and the provision is monitored by competitively selected voluntary organizations, e.g. "Build, Own, Operate" sewage and effluent treatment plants.

5.7 Review of the Policy:

We live in a rapidly changing global community, in a rapidly developing, highly diverse country. The environmental issues that are salient as of now may evolve over time, and new ones may take their place. Scientific understanding of environmental matters would advance rapidly. Changes in economic structure, technologies, resource availability, in each case nationally as well as globally, are likely, as are evolution of global environmental regimes, and norms arising from jurisprudence.

To set forth an immutable National Environment Policy in this dynamic situation would be unwise. A prudent course would be to provide for updating every few years in light of new knowledge and developments, and a comprehensive review, perhaps overhaul, in about a decade.

The following provisions are, accordingly made for review, updating, and renewal of NEP 2004:

a) Undertake consultations every three years with groups of diverse stakeholders, i.e. researchers and experts, community based organizations, industry associations, and voluntary organizations, and update the National Environment Policy.

b) In the third of the three-year reviews, undertake a more comprehensive examination of the scientific and policy understanding of environmental issues, redefine the Objectives and Principles, and recast the Strategic Themes for Action. A new National Environment Policy should be the outcome.

5.8 Review of Implementation:

Any policy is only as good as its implementation. The NEP, 2004 outlines a significant number of new and continuing initiatives for enhancing environmental conservation. These require the coordinated actions of diverse actors, for the major part organized and stimulated by one or more public agencies.

While coordination and review mechanisms are necessary in respect of the individual action plans under each of the strategic themes at relevant operational levels, a formal, periodic high level review of implementation of the different elements of NEP, 2004 is essential. This would enhance accountability of the different public agencies responsible for implementation. It would also reveal practical issues in implementation, including absence of political will at concerned levels, or official indifference.

Accordingly, the Cabinet Committee on Economic Affairs (CCEA) may be requested to review the implementation of NEP, 2004, once a year, within three months from the close of the previous fiscal year. The findings of the CCEA in the review should be publicly disclosed, so that stakeholders are assured of the seriousness of the Government in ensuring implementation of the Policy.

6.0 Process of Formulation of this Policy: (To be documented on completion of the formulation process).