Appendix 2

India Country Review

A.2 Sustainable Development Outlook: India*

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1. Serious problems from economic growth

The relationship between economic growth and some indicator of environmental degradation is usually explained in environmental economics literature in terms of an inverted-U shaped curve (known as the Environmental Kuznets Curve or EKC). Various authors have tried to explain the shape of EKC through different economic hypotheses.[2] Empirically it has been observed that one common feature of developing countries is that the rising part of their EKC is widely stretched so that the turning point of EKC is reached at high levels of economic growth. It implies that for most of these countries, an increase in economic growth (usually measured in terms of an increase in per capita real gross domestic product (GDP)) leads to an increase in environmental degradation. The view that in developing countries the relationship between increase in per capita real GDP and increase in environmental degradation is positive is expressed in most of the global reports including the Global Monitoring Report or GMR (2007) on Millennium Development Goals (MDGs).

If we compare the Human Development Reports (HDRs) with that of the MDGs we find that the common link between the two is poverty reduction and environmental sustainability. One of

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[2] See Barbier (1997) for an extensive survey of literature on this topic.

the key capabilities of human development is having a decent standard of living and one of the essential conditions of human development is environmental sustainability. If we look at the MDGs we find that MDG1 focuses on reducing poverty and hunger whereas MDG7 focuses on ensuring environmental sustainability. MDG7 emphasizes on integrating sustainable development into country's major policies and on reversing the loss of environmental resources. In a resource dependent economy it implies a strong link between this goal and poverty reduction.

Environmental problems in India can be broadly classified into two categories; a) the problems arising due to negative effects of the very process of development and b) the problems arising from the conditions of poverty and underdevelopment. The first category deals with the impact of various efforts to achieve economic growth and development and the continuing demand generated by the economically advanced sections of the community on the country's natural resources .The second category deals with the impact of poverty on the availability of natural resources of the Indian economy. In fact poverty, hunger and environmental degradation are closely linked with each other in most of the developing economies including India. The problem is particularly important among the rural poor (which constitutes a large part of India's population) when such degradation affects soil fertility, quantity and quality of water, forests, wildlife and fisheries etc. Among the various environmental problems facing the Indian economy in course of its drive towards economic growth two major environmental problems are deforestation along with forest degradation and pollution from freshwater resources. In Table 1 we list the major environmental impacts of various developmental activities to fight against underdevelopment.

Table 1: Impacts of Some of the Developmental Activities on the Environment

Developmental Activities	**Major Impacts on the Environment**
Forest Clearing and Land Resettlement	Extinction of rare species of flora and fauna, creation of condition for mosquito breeding leading to infectious diseases such as malaria, dengue etc.
Use of Pesticides	Pesticides used in agriculture sometimes go into the food chain or in water bodies that may result in harmful health hazards.
Agro Industries	Large amount of highly polluting organic wastes, surface water pollution.
Timber Extraction	Degrades land, destroys surface oil, reduces production potential of future forests.
Urbanization and Industrialization	Concentration of population in urban centres makes huge demands on production in rural areas and put pressures on land, air and water pollution.
Water Resource Projects e.g. Dam, Extensive Irrigation	Human settlement and resettlement, spread of waterborne diseases, reduction of fisheries, siltation, physical changes, e.g. temperature, humidity.

Source: Compendium of Environment Statistics, 2007, Central Statistical Organization (CSO),Government of India.

Forests play an important role in protecting environment and meeting livelihood needs. It contributes significantly to the economic, social and environmental well being of a country and hence conservation of forests is a prerequisite for sustainable development. Depletion of forest resources can be viewed from two angles: quantitative and qualitative. Quantitative aspects include forest cover and its distribution, deforestation, demand and supply of forest products etc. Mainly commercial demand for timber, legally or illegally, drives the felling of trees. When land under forest is needed for mining, agriculture and grazing we find that the possibility of deforestation increases. Quality of forests (forest degradation) depends on the day-to-day human use and misuse of forests. In India nearly 7 crores tribals and 20 crores non-tribals are dependent upon forests for their livelihoods (Report of the National Forest Commission or Report of the NFC, 2006). As a result of this forest degradation is taking place in a rapid pace. Degraded forest is accounted for about 41% of forest cover. Out of this 70% of the forests have no natural regeneration and 50% of forests are prone to fire (Report of the NFC, 2006).

Forests provide various benefits to mankind including improvement in the quality of environment. They provide goods and services and maintain life support systems like timber, fuelwood, fodder, a wide range of non-timber products and also provide natural habitats for biodiversity, means for recreation along with eco-tourism etc. They also help in watershed development, regulate water regime, conserve soil and control floods.

Various ecological functions of forests have been examined in the Indian context by authors like Kadekodi and Ravindrnath (1997), Haripriya(2001), Hadker, Sharma, David and Muraleedharan (1997), Chopra(1998)etc. Kadekodi and Ravindranath(1997), for example, have examined the value of carbon store at the all India level and suggested Rs.1.2 per hectare benefit using indirect estimates. Haripriya (2001) has estimated value of carbon store at Rs.20125 per hectare and aggregate of Rs.1292 billion from Indian forests using species miscellaneous forest inventory data. For more details about functions of forests in India one can refer to the works of Hadker, Sharma, David and Muraleedharan (1997) on Borivili National Park, Mumbai, and Chopra (1998) on Periyar Tiger Reserve and Bharatpur Keoladeo National Park.Degradation of forest resources has a detrimental effect on soil, water and climate, which in turn affects human and animal life. This has created global concern for protection and preservation of forests.

India's freshwater resources consist of river systems, groundwater and wetlands. Indian rivers are subject to siltation from sediment loads due to soil loss, net withdrawals along their course due to agricultural, industrial and municipal use, as well as pollution from human and animal wastes, agricultural run offs and industrial effluents.

Box 1 : The Koshi River Example

The Koshi river is a transboundary river between Nepal and India and is one of the largest tributaries of the river Ganga. Over the last 250 years, this river has shifted its course over 120 kilometers from east to west. The main reason behind this is attributed to the heavy silt that it carries during the monsoon season. Although the rivers possess significant natural capacity to absorb many pollutants, the existing pollution inflows in many cases substantially exceed such natural capacities. The mix of pollutants along with progressive reduction in stream flows causes decline in river water quality in the downstream. It affects livelihoods of the fisherfolk and causes significant impact on human health from polluted water. On 18 August 2008the Koshi river picked up an old channel it had abandoned over 100 years ago near the border with Nepal and India. Approximately 2.7 million people were affected as the river broke its embankment at Kusaha in Nepal thus submerging several districts of Nepal and India. It is reported as the worst flood in the area in 50 years. The Prime Minister of India declared it as a natural calamity.

In India from the point of view of groundwater we find that the water table has been falling rapidly in many areas of the country in recent decades. This is mainly due to heavy demand from agriculture, industry and urban use causing withdrawal in excess of annual recharge. In urban areas, apart from withdrawals for domestic and industrial use, the major sources of groundwater demand are housing and infrastructure, such as roads. 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 causes like leaching of arsenic and fluoride from natural deposits. Since groundwater is frequently a source of drinking water, its pollution and contamination leads to serious health impacts.[3]

2. Identification of priority issues in order to promote sustainable development

Economic growth bears a dichotomous relationship with environmental degradation. On one hand economic growth may result in environmental degradation through large-scale exploitation of natural resources. On the other hand economic growth results in improvement of environmental quality by making available the necessary resources for environmental investments and creating the necessary environmental ambience through institutional and policy change. It is to be noted that in India poor environmental quality has adversely affected human health. For example, nearly 20 percent of the burden of disease in India 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). Institutional failures, implying insufficiently enforced property rights and access to and use of environmental resources, result in environmental degradation. Traditionally, in India, village common water resources, grazing grounds, local forests, fisheries etc. are protected by local communities from overexploitation. However, these norms may fail due to the very process of economic growth resulting in large-scale urbanization and high population growth (due to sharp reduction in mortality) causing degradation of the natural resources. It ultimately affects the livelihood of the concerned community.

As India’s development challenges have evolved, the understanding of the role of environmental concerns in development has sharpened. Sustainable development takes into account all these environmental concerns and broadly deals with enhancement of human well being that is considered as a recurring theme in India’s development policy. It requires a balance and harmony among economic, social and environmental needs of the country. The major

[3] According to the Union Ministry of Water Resources in India, eight districts of the state of West Bengal and one district of the state of Bihar are arsenic-contaminated. At present the arsenic problem is also spreading in some of the districts of the states of Uttar Pradesh and Assam.

national policies in recent years related to environmental management in the Indian context are National Forest Policy or NFP (1988); the National Conservation Strategy and Policy Statement on Environment and Development or NCSPSED (1992); the Policy Statement on Abatement of Pollution or PSAP (1992). Some sectoral policies like the National Agricultural Policy or NAP (2000); National Population Policy or NPP (2000) and National Water Policy or NWP (2002) have also contributed towards environmental management. Finally, the National Environment Policy or NEP (2006) has attempted to extend the coverage and fill the gaps that still exist in light of the existing policies and also in terms of present knowledge and accumulated experience.

Focusing on India's forestry sector we find that some site-specific non-forest activities may be beneficial for the society in the sense that the benefits from the non-forest activities significantly exceed the benefits provided by the particular tract of the forest. Maintenance of forests involves a cost to the states, not only in terms of direct costs of manpower and associated infrastructure but also in terms of the opportunity cost of maintenance. However, it is to be noted that large-scale forest loss would lead to catastrophic and permanent change in the country's ecology leading to major stress on water resources and soil erosion .It ultimately leads to loss of agricultural productivity, industrial potential and living conditions along with increasing vulnerability to natural disasters including droughts and floods.

In 1988 India adopted the NFP with the aim to increase the country's forest cover to one-third of the total land area. In some states of India we find forests along with substantial non-forest wastelands. In those states it may be easily possible to convert the wastelands to agricultural lands. Again it may not be feasible to convert forest areas to agricultural lands in hilly tracts. In some other states that have negligible forest cover, soil and climatic conditions barely support dryland farming and are not conducive to development of forest cover. A change in the land utilization pattern implies an increase or decrease in the proportion of area under different land uses at a point in two or more time periods. Table 2 shows land utilization pattern in India from 1951 to 2006.

Table 2. Land Use Pattern in India, 1951-2006(in million hectares)

Classification	1950-51	1960-61	1970-71	1980-81	1990-91	2000-01	2001-02 *	2003-04*	2005-06*
I. Geographical Area	328.7	328.7	328.7	328.7	328.73	328.73	328.73	328.73	328.73
II. Reporting Area for Land Utilization Statistics (1 to 5)	284.32	298.4	303.7	304.1	304.86	306.06	305.11	305.4	305.27
1. Forests	40.48	54.05	63.91	67.47	67.8	69.02	69.57	69.72	69.79
2.Not Available for Cultivation**	47.52	50.75	44.64	39.62	40.48	42.41	41.79	42.24	42.5
3.Other Uncultivated Land (excluding fallow land)***	49.45	37.64	35.06	32.31	30.22	28.49	27.36	26.98	26.91
4.Fallow Land	28.12	22.82	19.88	24.75	23.36	24.91	24.96	25.49	24.18
5. Net Area Sown	118.75	133.2	140.27	140	143	141.23	141.43	140.97	141..89
III.Net Irrigated Area	20.85	24.66	31.1	38.72	47.78	55.08	56.67	56.62	60.2

Source: Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India(2007-08), and www.indiastat.com ,Data India Net Private Limited (2009).

- Provisional figures

** Not available for cultivation means non agricultural uses and barren and unculturable land

***Other uncultivable land implies permanent pasture and other grazing land, land under miscellaneous tree crops and groves not included in net area sown and culturable wasteland.

Table 3: Comparative Situation of Forest Cover in India, 2001-2005

States/UTs	Total Forest Cover (in Sq Kms)			Change in 2003(col 3-col 2)	Change in 2005(col 4- col 3)
	2001	2003	2005		
1	2	3	4	5	6
Andhra Pradesh	44637	44419	44372	-218	-47
Arunachal Pradesh	68045	68019	67777	-26	-242
Assam	27714	27826	27645	112	-181
Bihar	5720	5558	5579	-162	21
Chhattisgarh	56448	55998	55863	-450	-135
Goa	2095	2156	2164	61	8
Gujarat	15152	14946	14715	-206	-231
Haryana	1754	1517	1587	-237	70
Himachal Pradesh	14360	14353	14369	-7	16
Jammu & Kashmir	21237	21267	21273	30	6
Jharkhand	22637	22716	22591	79	-125
Karnataka	36991	36449	35251	-542	-1198
Kerala	15560	15577	15595	17	18
Madhya Pradesh	77265	79429	76013	2164	-3416
Maharashtra	47482	46865	47476	-617	611
Manipur	16926	17219	17086	293	-133
Meghalaya	15584	16839	16988	1255	149
Mizoram	17494	18430	18684	936	254
Nagaland	13345	13609	13719	264	110
Orissa	48838	48366	48374	-472	8
Punjab	2432	1580	1558	-852	-22
Rajasthan	16367	15826	15850	-541	24
Sikkim	3193	3262	3262	69	0
Tamil Nadu	21482	22643	23044	1161	401
Tripura	7065	8093	8155	1028	62
Uttaranchal/	23938	24465	24442	527	-23

Uttarakhand					
Uttar Pradesh	13746	14118	14127	372	9
West Bengal	10693	12343	12413	1650	70
Andaman & Nicobar Islands	6930	6964	6629	34	-335
Chandigarh	9	15	15	6	0
Dadra & Nagar Haveli	219	225	221	6	-4
Daman & Diu	6	8	8	2	0
Delhi	111	170	176	59	6

Source : 1.Forest Survey of India, Government of India

2. www.indiastat.com, Government of India

From Table 2 we find that the land use pattern in India is more or less stable since 1950-51. Again from Table 3 we find that the states that have shown significant increase in forest covers are Bihar, Himachal Pradesh, Uttar Pradesh, Karnataka, Tamil Nadu, Gujarat, Manipur, Tripura, West Bengal and Meghalaya.

The poor are highly vulnerable to the loss of resilience in ecosystems. Large-scale reduction in resilience causes distress of the ecosystem that ultimately affects the livelihood of the poor people. This may happen even if the economy faces high rate of growth. It is increasingly evident in India that poor water quality has adversely affected human health of poor people mostly living in rural area. Again urban environmental degradation due to lack of waste treatment, sanitation treatment and industry and transport related pollution has adversely affected air, water and soil quality.

Water pollution is a common problem facing both the urban and the rural poor. It comes from mainly three sources: domestic sewage, industrial effluents and run off from activities such as agriculture. In India the Central Pollution Control Board (CPCB) along with State Pollution Control Board (SPCB) of various states is operating over last few years the water quality-monitoring network for monitoring aquatic resources of the country. It comprises 784 stations in 26 states and 5 union territories of the country. On the basis of the results obtained during the year 2003 we find that organic pollution is the predominant form of pollution of aquatic resources.

The direct causes of river degradation in India are linked to various policies and regulatory regimes related to irrigation systems, agricultural production and industrial use. Policies and regulatory regimes related to agricultural activities and industrial use are not only related to river degradation but also groundwater pollution. The irrigation tariffs are insufficient for proper maintenance of irrigation systems. In particular, resources are not available for lining irrigation canals to prevent seepage loss. It causes reduced flow of river water. Pollution loads that are mixed with river water are also linked to pricing policies leading to inefficient use of agricultural chemicals. Pollution of groundwater in India from agricultural chemicals, especially chemical pesticides, are also linked to their improper and inefficient use and one of the main reasons behind this is pricing policies related to agriculture. Pollution regulations in India are not designed in such a manner so that there is clustering of industries in order to facilitate effluent treatment plants. This results in high costs of effluent treatment that ultimately causes the failure to meet the requirements for setting such treatment plants by a large number of firms causing ultimately river degradation.

One of the major reasons of groundwater depletion in India is the pricing policy of diesel. Groundwater being an open access resource, subsidies for diesel reduces the marginal cost of extraction resulting in its overextraction through pumpsets even below the efficiency level. It causes fall in the water table. Apart from this, support prices for several water-intensive crops with implicit price subsidies aggravate the problem as the farmers have more incentive to take up these crops rather than the less water-intensive ones. Overexploitation and inadequate recharge of groundwater also causes serious problem like increase in salinity leading to adverse health impact and loss of land productivity, especially in costal areas.

In order to identify the priority issues for promoting sustainable development in the context of an economy like India one should start with the objectives of NEP (2006) of the Government of India (GOI). The objectives can be listed as follows.

(i) Conservation of critical environmental resources which are essential for enhancement of livelihood and human well being along with economic growth.

(ii) Intra-generational equity and ensuring that the poorer sections of the society have secured access to these resources.

(iii) Inter-generational equity.

(iv) Integration of environmental concerns in economic and social development

(v) Efficiency in environmental resource use.

(vi) Good governance regarding management and regulation of the use of environmental resources.

(vii) Enhancement of resources for environmental conservation through mutually beneficial multistakeholder partnerships among local communities, public agencies, academic and research community, investors and multilateral/bilateral development partners.

Thus we find that the objectives are designed in a manner so that human beings remain at the centre of concerns for sustainable development. The right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations. To achieve these objectives priority should be given for protection of the country's forestry sector and freshwater resources so as to enhance the livelihood of poor people along with reduction in poverty and hunger.

The main reason behind priority to protection of forests is due to the fact that in India the forestry sector plays a multi-dimensional role in the context of its attempt to achieve the path of sustainable development. It is through protection of forests not only critical environmental resources are conserved so that biodiversity can be protected, but also protection of forests help to meet the needs of the poor, given that a large proportion of India's poor are dependent on forests. Apart from this, wide scale afforestation helps the economy to have low level of greenhouse gas (GHG) emissions. Thus importance should be given to formulate an innovative strategy for the forestry sector in order to protect the existing forests along with to increase forest cover through afforestation of degraded forestland and wastelands. It can be achieved through multistakeholder partnerships involving the Forest Department, landowning agencies, local communities and investors. Together with this, for participatory management of the forestry sector priority should be given so as to adopt community based practices in forest management like Community Forest Management (CFM), Joint Forest Management[4] (JFM) and their variants with assured participation of women throughout the country.

The main reason behind protection to fresh water resources follows from the fact that in India unsustainable use of freshwater resources can always be linked with health problems[5] and its sustainable use can be considered as a step towards enhancement of livelihood of the fisherfolk and also to promote irrigational activities. In other words sustainable freshwater resource

[4] Of all the managed systems CFM and JFM are the most popular ones. JFM is a participatory forest management system between village community and the State Forest Department that came into effect from June 1990.This is the most popular of all the managed systems. Since 1990 all the states have been trying to bring more and more forest area under this system. CFM is actually self-initiated forest protection by the villagers. CFM is also popular in state like Orissa.

[5] One can consider various cases like how groundwater pollution causes drinking water problem in rural India ultimately leading to various health problems in almost every year. One such example is the case of arsenic problem and related health problems in the state of West Bengal, India.

management can be considered as a major drive towards sustainable management of *'watershed plus'*. Regarding freshwater resources emphasis should be given on integrated approaches[6] to management of river basins by the concerned river authorities in order to take into account the interface between land and water, pollution loads and natural regeneration capacities. The aim should be to ensure maintenance of adequate water flows along with maintenance of water quality standards throughout the year. Apart from this, optimal utilization of fertilizers, pesticides and insecticides in agricultural fields should be encouraged for improving groundwater quality. Priority should be given to implement a comprehensive strategy for regulating use of ground water by large industrial and commercial establishments on the basis of a careful evaluation of aquifer capacity and annual recharge. Finally, wetland conservation, including conservation of village ponds and tanks, should be integrated into sectoral development plans for poverty alleviation and livelihood improvement. Efforts for conservation and sustainable use of wetlands should be linked with the ongoing rural infrastructure development and employment generation programmes.

3. Existing Relevant National Policies or Laws.

The main theme of the NEP (2006) is based on the fact that while conservation of natural resources is necessary to secure livelihoods and well-being of all, the most secure basis for conservation is to ensure that the people dependent on a particular resource obtain better livelihood from the conservation of the resource rather than from the degradation of the resource.[7]

The NEP (2006) emphasizes on reduction in delays in environmental decision-makings, greater transparency and accountability in such decision-makings and decentralization of environmental functions .In order to make the clearance processes more effective it proposes a few action plans. Some of the major aspects of the action plans are stated as follows.

(i) To encourage regulatory authorities both Centre and State should institutionalize regional and cumulative environmental impact assessments (R/EIA) for appraising and reviewing new projects.

[6] The NWP (2002) along with NEP (2006) emphasizes on this strategy.

[7] Article 51-A(g) of the Indian Constitution states that it is the fundamental duty of every citizen of this country to protect the environment. The State's responsibility in this regard has been laid down in Article 48-A of India's Constitution.

(ii) To encourage clustering of industrial units to facilitate setting up of environmental management infrastructure and also for monitoring of activities that affect the environment.

(iii) To restrict diversion of dense natural forests and areas of high endemism of genetic resources, to non-forest purposes. These are mainly for site-specific cases of vital national interest. Apart from this there will be no further permission of cases involving direct or indirect encroachment to forests.

In this context it is relevant to mention that the action plan, as proposed in NEP, in connection with climate change considers various aspects that include assessment of the scope of incorporating watershed management, coastal zone planning and regulation, forestry management etc. in relevant programmes on climate change.[8]

Regarding degradation and depletion of natural resources NEP states that they should be incorporated into the decisions of economic actors at various levels. At the macro-level a system of natural resource accounting is essential to examine whether as a result of economic growth there is enhancement or depletion of natural resource base of the country. Integration of economic factors with environmental compliance can be done through application of the principle of "polluter pays". This may ensure that for any given level of environmental quality desired, the society-wide cost of meeting the standard is minimized.

We now focus on some of the aspects of the action plan related to freshwater resources. The major elements of the action plan regarding water pollution, as mentioned in the NEP, can be listed as follows:

(i) To develop and implement at the pilot level public-private partnership models for setting up and operating effluent and sewage treatment plants. Once the models are validated, public resources along with external assistance can be used progressively so as to have a catalytic effect on the partnership. In fact emphasis should be given for enhancement of municipalities for recovery of user charges for water and sewage systems.

(ii) To prepare and implement action plans for preventing water pollution in major cities. Public-private partnerships can be encouraged for treatment, reuse and

[8] The action plan on climate change, as mentioned in NEP, also aims to provide encouragement to Indian industry to adopt Clean Development Mechanism (CDM). Apart from this, it suggests to participate in voluntary partnership with various developed and developing countries to address the challenges of sustainable development and climate change consistent with the provision of the United Nations Framework Convention on Climate Change (UNFCC)

recycle where applicable of sewage and wastewater from municipal and industrial sources before final discharge to water bodies.

(iii) To take measures to prevent pollution of water bodies from waste disposals on lands.

(iv) To take explicit account of groundwater pollution in pricing policies of agricultural inputs.

From the legal point of view the GOI has taken various steps for environmental protection. The Environmental (Protection) Act was introduced in 1986 as an umbrella legislation to provide a holistic framework for protection and improvement to the environment. More particularly, The Wildlife (Protection) act was introduced in 1972 and was amended in 1983,1986,1991 and 2002. The Water (Prevention and Control of Pollution) Act was introduced in 1974 with the objective to prevent and control water pollution. The Act was amended in 1988. Apart from this the Water (Prevention and Control of Pollution) Cess Act was introduced in 1977 and was amended in 1991.The Forest (Conservation) Act was introduced in 1980 for conservation of forests and regulating diversion of forestlands for non-forest purposes. This law was later amended in 1988 in line with NFP (1988) of GOI. The Ministry of Environment and Forests has enacted the Biological Diversity Act in 2002 under the United Nations Convention on Biological Diversity (UNCBD) signed in Rio de Janeiro on 5th June 1992 of which India was also a party. The Act aimed to provide conservation of biological diversity, sustainable use of its components, fair and equitable sharing of the benefits arising out of the biological resources etc.[9]

The GOI has advocated for a judicious mix of civil and criminal processes for any environmentally unacceptable behaviour. The proper enforcement will be done through a review of existing legislation. Civil laws may govern most situations of non-compliance. Criminal processes may deal with more serious infringements of environmental laws.

4. The Problem from Implementation of Existing Relevant Policies or Laws

The key environmental challenges mentioned in NEP are more of general type and less of India-specific. It is more concerned with speeding up of clearances than introducing comprehensive reform. Apart from this there is huge amount of ambiguity regarding

[9] Many other acts/rules were introduced by the GOI to promote sustainable development. Examples of few such acts/rules are Air (Prevention and Control of Pollution) Act which of 1981 (amended in 1988); Hazardous Wastes (Management and Handling) Amendment Rules, 2003;Ozone Depleting Substances (Regulation and Control) Rules, in 2000 etc.

implementation of the various policies. As it is not possible to discuss here all the aspects related to implementation of various policies we confine ourselves only to those cases that are someway or other related to the forestry sector and water pollution.

Regarding conservation of resources the NEP proposes to complement current efforts with multi-stakeholder partnerships involving the forest department, local communities, NGOs, 'universalisation' of JFM etc. The most crucial of all these is the relationship between local communities and the forest department. The policy proposal has stated for 'legal recognition of traditional rights'. This is ambiguous unless the role of forest department in the context of its relationship with local communities is clearly specified. In India, for example, the state of West Bengal is not fulfilling its poverty alleviation potential through JFM. In fact, there is disillusionment among the local people about JFM. For most of the forests of West Bengal, the forest department is the dominant partner and the local communities are excluded from decision-making. The forest department is more interested in development of forests rather than on improvement of livelihood. In other words, the forest department has delinked livelihood development from forest development in most parts of the state. Due to this de-linking, in the forests of the northern part of West Bengal nowadays we find that the stakeholders follow a participatory type forestry management and it is more of CFM type than of JFM type.

Apart from the issues related to JFM in the Indian context, the issues related to impediments of sustainable development of non-timber forest production are also important. For illustrative purposes we can say that inadequate organizational structures acts as an impediment to procurement of non-timber forest products (NTFPs). This problem is matched with lack of development of small-scale industries based on NTFPs.[10]

From the point of view of biodiversity protection only little changes are considered in institutional arrangements. The NEP has addressed the issue of multi-stakeholder partnership for enhancement of wildlife in 'conservation reserves'. It has also stressed on building up a 'community reserve' so that the local communities associated with forestry will be encouraged to find alternative livelihoods. Inspite of the announcement of the new measures their implementations are not clearly mentioned in NEP.

One major issue demanding the attention of policy makers is the question of water pollution from increasing economic activity. The most polluting among the various sources are city

[10] See Lele, Mitra and Kaul (1994) for details.

sewage and industrial waste discharged into the rivers. Over the last fifty years though the number of industries in India has grown rapidly, water pollution is concentrated within a few subsectors, mainly in the form of toxic wastes and organic pollutants. In fact a number of large and medium-sized industries covered by the Ganga-Action Plan do not have adequate effluent treatment facilities. Most of these industries include sugar mills, distilleries, leather processing industries and thermal power stations. The NEP (2006) has stressed on public-private partnerships for setting up effluent treatment plants. It is not possible for the small-scale industries to set up these plants, as they cannot afford enormous investment in pollution control equipments due to their low profit margins. Hence, the feasibility of public-private partnership for all type of industries regarding setting up of effluent treatment plants is questionable.

In the context of water pollution from industrial wastes one can refer to the case of water pollution due to discharge of effluents by factories in Khari River in the city of Ahmedabad, India.[11] This city has the highest number of composite textile mills in the country. As a result of this we find that over the years there is a subsequent increase in the number of small scale and medium scale dye and dyestuff manufacturing units in this area. Most of these industrial units are located in industrial estates promoted by the Government of Gujarat through Gujarat Industrial Development Corporation (GIDC). Three such industrial areas causing high volumes of flow of effluent to the river stream are Naroda, Odhav and Vatva on the eastern periphery of Ahmedabad city. Common effluent treatment plants (CETPs) were set up in all three industrial estates after Gujarat High Court passed orders that these plants should be set up. The CETPs are designed to meet the requirements of standard water pollution parameters like chemical oxygen demand (COD), biological oxygen demand (BOD), pH etc. However, they are not designed to meet standards related to total dissolved solids (TDS) and heavy metals. Apart from this continuous discharge of effluents to medium and deep aquifers through deep tube wells by medium and small-scale industries in the above-mentioned industrial areas has resulted in high level of groundwater contamination. All these factors have affected the health of the local people. People are forced to drink polluted water due to the absence of alternative sources. To tackle these problems in December 2003 a core group was formed. This core group was actually a subgroup of Sabarmati Stakeholder's Forum (SSF). Thus it consisted of the various stakeholders who are affected by the water pollution along with representatives of industrial association, representatives of CETPs, various NGOs and Government officials. The stakeholders in the form of the core group were successful in alleviating the problems of effluents discharged by factories on Khari river in the eastern periphery of Ahmedabad city.

[11] For details see Mudrakartha, Sheth and Srinath (2006).

The use of land for agriculture and the practices followed in cultivation mainly in the form of use of fertilizers and pesticides used to affect quality of groundwater in India. The NEP (2006) has focused on prevention of water pollution from waste disposal on lands and surface flow of waste–mixed water, but implementation of such a policy may create problem in the sense that the issue of land-water linkage is not being properly addressed in the present water and land policies. For example, in many areas surface flows of water in the past have helped to prevent increase in soil salinity by leaching of the salts. So there is a need for comprehensive land-water resource management for implementation of the policies related to water pollution due to agricultural runoff.

5. Summary

In India we find poverty and environmental degradation are closely linked with each other and any attempt to achieve sustainable development must deal with enhancement of human well being and improvement of livelihood of the poor. It requires a balance and harmony between economic, social and environmental needs of the country. Among the various environmental problems facing the Indian economy, two major environmental impediments to achieve sustainable development are large-scale deforestation and pollution from freshwater resources. One of the major objectives of the NEP (2006) is conservation of natural resources to secure livelihoods and well being of all in the country. To achieve this objective priority should be given to protection of the country's forestry sector and freshwater resources so as to enhance the livelihood of poor people along with reduction in poverty and hunger. So far the NEP (2006) has yet to achieve its goal as at present almost 27.5% of the rural and urban poor combined lives below the poverty line.[12] It cannot be denied that the NEP(2006) has focused on various objectives that are considered as major issues in achieving sustainable development. However, the problem lies in the implementation of those policies. For example, if we focus on the forestry sector we find that the policy proposal has stated for legal recognition of traditional rights. This is effective in the context of JFM only when the relationship of the forest department with local communities is clearly specified. In India, the state of West Bengal was the pioneer of JFM but at present it is not fulfilling its poverty alleviation potential through JFM leading to disillusionment about the programme. This is mainly because of the fact that the forest department is the dominant partner and there is lesser people's participation than that was

[12] This figure is taken from Economic Survey2007-08, Government of India (2008).It has been calculated on the basis of 61st round of National Sample Survey.

expected at the time of initiation of the programme.

Regarding water pollution though the NEP (2006) has stressed on public-private partnerships for setting up of effluent treatment plants, the feasibility of such programme, especially for small-scale industries, is questionable in the Indian context. We have also mentioned earlier that the effectiveness of the policy of prevention of pollution from waste disposal requires a clear-cut analysis of land-water linkage in the Indian context.

Apart from the above-mentioned issues, the policy makers should also take into account an important area like prevention of air pollution, especially vehicular pollution, to check urban environmental degradation and also to protect the health of the urban poor. Another important area in the context of its move towards sustainable development is related to conservation of biodiversity and use of traditional knowledge. Finally, comes the issue of GHG emissions. This is linked to conservation of forest resources. Forests contribute to process of carbon sequestration and act as carbon sink, which is important for reduction of GHG emissions and global warming.

India is a fast developing country and its economic structure, technologies and resource availability are fast changing. Inspite of these changes poverty is one of the major problems of the country. Herein lies the question of implementation of the existing policies. The prospects of NEP are not bleak provided they are properly implemented.So in India periodic reviews of implementation of the environmental policies are essential.[13] Apart from review of the existing environmental policies attempts should also be made to bring the environmental policies as a part of India's development programme. It will be a first step towards mainstreaming of sustainable development policies. It is expected from that it would be possible for India to achieve this goal provided the policies are implemented in a comprehensive manner with participation of people from all sectors of the society.

[13] The NEP(2006) is relatively new and it requires periodic review to examine whether the policies proposed can be properly implemented.

List of Abbreviations

BOD	Biological Oxygen Demand
CDM	Clean Development Mechanism
CETPs	Common Effluent Treatment Plants
CFM	Community Forest Management
COD	Chemical Oxygen Demand
CPCB	Central Pollution Control Board
EKC	Environmental Kuznets Curve
GDP	Gross Domestic Product
GHG	Green House Gases
GIDC	Gujarat Industrial Development Corporation
GMR	Global Monitoring Report
GOI	Government of India
HDR	Human Development Report
IPRs	Intellectual Property Rights
JFM	Joint Forest Management
MDG	Millennium Development Goals
NAP	National Agricultural Policy
NCSPSED	National Conservation Strategy and Policy Statement on Environment and Development
NEP	National Environment Policy
NFP	National Forest Policy
NPP	National Population Policy

NTFPs	Non-timber Forest Products
NWP	National Water Policy
PSAP	Policy Statement on Abatement of Pollution
R/EIA	Regional and Cumulative Environmental impact Assessment
SPCB	State Pollution Control Board
SSF	Sabarmati Stakeholder's Forum
TDS	Total Dissolved Solids
UNFCC	United Nations Framework Convention on Climate Change
UNCBD	United Nations Convention on Biological Diversity

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