

14. Environment

The Indian Constitution in the Section on "Directive Principles of State Policy" assigns duties for the State and all citizens through Article 48 A and Article 51 A(g) which states that the *"State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife in the country"* and *"to protect and improve the natural environment including forests, lakes and rivers and wildlife, and to have compassion for the living creatures"*.

The governing principle in the development strategy is growth with sustainability. Environmental degradation is one of the concomitants of economic development so that the State has to trade off one against the other. There are *ten drivers of global* environmental deterioration - population growth; affluence of some; poverty of many; environmentally unfriendly technology; market failure to price goods like air, water and land; policy failure to correct such price distortions; scale and rate of economic growth; the nature of growth; consumerist culture and values and globalisation. Environmental degradation impacts soil fertility, quality and quantity of fresh water, air quality, forests and fisheries, climate change, stratospheric ozone depletion and biodiversity loss.

All forms of life - human, animal and plant - are closely interlinked and that disturbance in one gives rise to an imbalance in others. In our constitutional provisions and environmental legislation and planning objectives, conscious efforts have been made for maintaining environmental security along with developmental advances.

Environmental Sustainability Index:

Sustainability refers to meeting the needs of the present generation without compromising the needs of future generations. India is ranked 101st out of 146 countries analysed in the recently released Environmental Sustainability Index (ESI). Produced by a team of environmental experts from Yale and Columbia Universities, the 2005 report is most comprehensive, country-by-country environmental ranking system to date.

The Millenium Eco - system Assessment titled, "Eco-systems and Human Well Being" supported by United Nations and prepared by scientists from 90 countries reveals that damage done by human on biological diversity over a period of 50 years has been enormous. Growing population and resultant increase in consumption of biological and physical resources has exerted pressure on eco-systems. Some of the eco-systems have already reached their peak carrying capacity to provide services. Human induced impacts on eco-systems have triggered global climate change and 40 per cent of the agricultural land had been degraded in the last 50 year period. Added to this, nearly 60 per cent of the gifts of the natural world, called 'economic services' are being degraded. With acceleration in economic growth and development, the destruction of eco-system is bound to degrade in future.

Table : 1
Environmental Sustainability Index of High Population Density Countries

| ESI Rank | Country | ESI Score |
|----------|-------------------|-----------|
| 30 | Japan | 57.3 |
| 31 | Germany | 56.9 |
| 41 | Netherlands | 53.7 |
| 69 | Italy | 50.1 |
| 79 | Sri Lanka | 48.5 |
| 85 | Nepal | 47.7 |
| 101 | India | 45.2 |
| 102 | Poland | 45.0 |
| 106 | Rwanda | 44.8 |
| 109 | Jamaica | 44.7 |
| 112 | Belgium | 44.4 |
| 114 | Bangladesh | 44.1 |
| 118 | El Salvador | 43.8 |
| 122 | South Korea | 43.0 |
| 126 | Phillippines | 42.3 |
| 129 | Lebanon | 40.5 |
| 130 | Burundi | 40.0 |
| 139 | Trinidad & Tobago | 36.3 |
| 141 | Haiti | 34.8 |
| 145 | Taiwan | 32.7 |
| 146 | North Korea | 29.2 |

Source: 2005 Environmental Sustainability Index Report, Yale & Columbia University.

Sources of Environmental Degradation:

There are a number of sources of pollution jeopardizing the environment. They are:

- Omission of substances with high toxicity;
- Depletion and destruction of the natural resources;
- Cutting down and burning of the forests, overgrazing and denuding of grass land;
- Killing of wildlife and much of the fish and other water life and endangered creatures;
- Erosion of farm land of its productive topsoil;
- Ozone depletion;
- Green house effects and global warning because of unchecked emission of chlorofluoro carbon;
- Belching out of smoke from factory chimneys of industrial landscape;
- Indiscriminate use of plastics;
- Traffic congestion due to increasing number of vehicles and gas guzzlers;
- Land degradation;
- Failure to conserve the bio-diversity*;
- Indiscriminate disposal of bio-medical wastes and solid waste and
- Effluents from tanneries and resultant water pollution.

Pollution is a Negative Externality or Adverse Environmental Spillover:

Externalities are a direct effect on another's profit or welfare arising as an incidental by-product of some other persons' or firm's legitimate activity. When negative externality exists, there will be overproduction of a particular commodity, with the result the incidence

* Bio-diversity is threatened by forest fragmentation, habitat loss, physical alteration, pollution and introduction of exotic species that bring slow death to native species. Oil spills are having a devastating effects on coral reefs in the marine. A beneficial effect of bio-diversity is that it reduces global warming and thus climate changes.

of pollution will be high and social cost will exceed private marginal cost. Therefore, the external effect needs to be '*internalised*' by way of transforming the incidental by-product into a joint product that is priced in the market.

National Environment Policy:

The current National policies for environmental management are found in the National Forest Policy, 1988, the National Conservation Strategy and Policy Statement on Environment and Development, 1992, Policy Statement on Abatement of Pollution, 1992 and the National Water Policy, 2002. They have contributed to environmental management substantially. Objectives and principles of the latest draft National Environment Policy, 2004 are set out in a Box below:

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| <p>Box</p> <p>Salient Features of the National Environment Policy, 2004</p> <ul style="list-style-type: none">➤ <i>Conservation of Critical Environmental Resources:</i> 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.➤ <i>Intra-generational Equity: Livelihood Security for the Poor:</i> 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.➤ <i>Inter-generational Equity:</i> To ensure judicious use of environmental resources to meet the needs and aspirations of present and future generations.➤ <i>Integration of Environmental Concerns in Economic and Social Development:</i><ul style="list-style-type: none">➤ To integrate environmental concerns into policies, plans, programmes, and projects for economic and social development.➤ <i>Efficiency in Environmental Resource Use:</i> 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.➤ <i>Environmental Governance:</i> 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.➤ <i>Enhancement of Resources for Environmental Conservation:</i> To ensure higher flows comprising finance, technology, management skills, traditional knowledge, and social capital, for environmental conservation through mutually beneficial multi-stakeholder partnerships between local communities, public agencies, and investors. |
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Rationale for Government Intervention:

There is a rationale for Government intervention in controlling pollution which arises whenever the production or consumption of a good has spill over effects beyond the consumers and producers involved in the market and these spill over effects are not fully

reflected in market prices. Pollution is social bad. Too much of a good will be produced with the result there will be misallocation of resources, if they go unchecked. The internalization of an externality is a prerequisite to prevent the further side effects. In such a context Government have to intervene and regulate the activity in the interest of the public through imposition of a green tax or setting of environmental standards or taking of stringent action on the erring parties.

In order to regulate the functioning of highly polluting industrial concerns and other economic activities, the Governments both at the Centre and in the State have established regulatory and advisory bodies - the National Pollution Control Board (NPCB) and the State Pollution Control Board (TNPCB) respectively. In addition to TNPCB, the Department of Environment is also functioning at the State level to make Environment Impact Assessment (EIA) and to implement pollution control measures in major riverbeds and water courses. The TNPCB has been taking steps to internalise the external effects of adverse environmental spillovers to the extent possible in addition to keeping the 17 highly polluting (red category) industries under constant surveillance to see whether the '*tolerance margins*' of environment are in tact which the benign nature provides. The achievements of these two regulatory bodies are analysed below:

Department of Environment:

The Government entrusts the execution of major projects like pollution abatement in rivers such as Cauvery, Vaigai, Tamiraparani, Chennai city waterways, National Lake Conservation Programme etc. The Department of Environment takes up environmental awareness programmes through National Green Corps and eco-clubs.

Objectives and Achievements - Physical and Financial

| Name of the programme | Objectives | Project Areas and cost | Financial achievements up to 31.01.05 |
|--|--|---|---|
| 1 | 2 | 3 | 4 |
| 1. National River Conservation Programme - Abatement of Pollution in 5 Polluted Stretches of River Cauvery in Tamil Nadu, 1996-1997. | Interception and diversion works | Tiruchy, Erode, Bhavani, Kumarapalayam and Pallipalayam - Rs.36.2 crores - Project period 10 years. | Rs.19.45 crores |
| 2. Chennai City River Conservation Project, 2001 | Incepting and treating sewage in Chennai City Water ways | Cooum, Backingham Canal, Adayar Otteri, nullah, Captain cotton canal and Mambalam drain - Rs.491.52 crores. | Rs.288.53 crores |
| 3. National River Conservation Programme in 7 New Towns | Cleaning the rivers | Cauvery, Vaigai, Tamiraparani, Tiruchi, Srirangam, Thanjavur, Kumbakonam, Karur, Mayiladuthurai, Madurai and Tirunelveli - Rs.575.30 crores | Rs.234.45 crores (cost is borne by GOI and GOTN on 50:50 basis) |
| 4. National Lake Conservation Programme | Environmental upgradation through bio-remediation. | Ooty and Kodaikanal lakes - Rs.6.88 crores. | Rs.1.76 crores |

| 1 | 2 | 3 | 4 |
|--|---|---|----------------|
| 5. Coastal Zone Management | Protection of coastal areas and implementation of Coastal Regulation Zone Notification 1991. | Prohibiting construction of buildings, expansion of industries or reclamation of land upto 500 metres of high tide line. The notification has mandated the protection of mangroves that are storm barrier for coastal communities. The Supreme Court fixed the length from high tide line at 200 metres | - |
| 6. Environmental Information System | Provides information on state of environment, rich bio-diversity of the State and river cleaning activities. | Rs.0.12 crore | Rs.0.07 crore. |
| 7. National Green Corps | Start eco-clubs in schools and creation of eco-awareness. | Covering 2.50 lakh children spread over 4350 schools. | Rs.0.76 crore. |
| 8. Environmental Education - Clean and Green Street. | To get rid of solid waste in urban area, to separate biodegradable from non-biodegradable matter, trans-plant tree saplings and disseminate the importance of environmental conservation. | 40 school eco-clubs will be selected in Chennai city and each takes care of one street adjacent to their school - provision of Rs.18750/- per school under the scheme. | - |
| 9. Environment Research and Development Programme | To promote research in the sphere of solid waste management, lake conservation & bio-medical waste management. | To rope in universities in Tamil Nadu into this task. | Rs.0.10 crore |
| 10. Water Quality Monitoring Laboratory. | To undertake BLS and monitor water quality. | It covers towns under National River Conservation Programme and National Lake Conservation Programme | Rs.0.10 crore. |
| 11. Conservation of Coastal Eco-System | To develop coastal development and management through assessment of ecological value and potential damage from coastal development. | To groom mangrove plants, develop tourism and promote fisheries. A sum of Rs.0.17 crore has been sanctioned by both GOI and GOTN. | Rs.0.05 crore. |

Source: Policy Note on Forest and Environment Department, 2005-06.

In addition to the implementation of the above programmes, the Department has been presenting awards to environmentalists, conducting high pressure environmental education and awareness, environmental research and development, environmental amelioration through Self Help Groups, carrying capacity evaluation in Thoothukudi city, etc..

Tamil Nadu Pollution Control Board (TNPCB) - Review of Performance:

TNPCB adopts a holistic approach in regulating the polluting activities in the State. It acts as a watchdog of pollution levels. It is following both persuasive and compulsive methods while exercising its authority. *The Board's underlying principle is "polluter pays"*. It covers a wide range of environmental issues by implementing the following pieces of environmental legislation which are illustrative but not exhaustive.

- The Water (Prevention and Control of Pollution) Act, 1974 as monitored in 1978 and 1988.
- The Tamil Nadu Water (Prevention and Control of Pollution) Rules, 1983.
- The Water (Prevention and Control of Pollution) Cess Act, 1977 as amended in 1991 and 2003.
- The Water (Prevention and Central of Pollution) Cess Rules, 1978 as amended in 1992.
- The Air (Prevention and Control of Pollution) Act, 1981 as amended in 1987.
- The Tamil Nadu Air (Prevention and Control of Pollution) Rules, 1983.
- The Environment (Protection) Act, 1986. and
- The Environment (Protection) Rules, 1986.

Water Pollution Control:

Water pollution is being prevented and controlled by enforcing the Water Prevention and Control of Pollution Act 1974 as amended in 1988. The TNPCB categorizes the polluting industries into three, viz., Red, Orange and Green with reference to seriousness of water pollution. Under 'red' category, there are 17 industrial concerns which are prone to adverse environmental spill over. Under these 17 concerns of highly polluting industries, there are 191 plants as on 31.3.2004 and the details are presented below.

Table - 2 : 17 Categories of Highly Polluting Industries as on 31.3.2004

| Sl.No. | Category | No. of Industries |
|--------|------------------------------|-------------------|
| 1. | Aluminium | 1 |
| 2. | Caustic Soda | 3 |
| 3. | Cement* | 16 |
| 4. | Copper Smelter | 1 |
| 5. | Distillery | 15 |
| 6. | Dyes & Dye Intermediate | 1 |
| 7. | Fertilizer | 7 |
| 8. | Integrated Iron & Steel | 1 |
| 9. | Tanneries | 62 |
| 10. | Pesticide | 1 |
| 11. | Petrochemicals | 5 |
| 12. | Basic Drugs & Pharmaceutical | 16 |
| 13. | Pulp & Paper** | 5 |
| 14. | Oil Refinery | 3 |
| 15. | Sugar | 38 |
| 16. | Thermal Power Plant | 16 |
| 17. | Zinc Smelter | 0 |
| | Total | 191 |

* - 200 Tonnes per day & above; ** - Tonnes per day & above.

Source: The Tamil Nadu Pollution Control Board..

The industries which are highly polluting the atmosphere have to obtain letters of consent to establish' and 'consent to operate'. Till 31.12.04, the Board had issued 4,822

letters of consent to establish industries and 22,663 letters of consent to operate under the Water Act.

Water Quality Monitoring:

Water quality ensures health and human effectiveness. For attaining high water quality the Board is constantly watching the inland water quality through two major programmes, namely Monitoring of Indian National Aquatic Resources System and Global Environmental Monitoring System. The water quality of rivers, namely, Cauvery, Thamiraparani, Palar, Vaigai and lakes of Udthagamandalam, Kodaikannal and Yercard comes under the first category whereas water quality in Cauvery basin at Mettur, Pallipalayam, Musiri and ground water monitoring at Musiri comes under the second programme.

Common Effluent Treatment Plants (CETPs):

Leather industry creates emission of high incidence of pollution affecting the water quality in the neighbourhood but also tells upon the ambience. In order to arrest the effluents of waste from the leather industries, the Board has been directing the leather industry to come under the fold of Common Effluent Treatment Plants. In addition to the leather industry, textiles, dyeing, hotels and lodges are also bound to generate adverse externality. For coping with the incidence of pollution of varying proportion, the Board has established 33 Common Effluent Plants in different places. Establishment of the Common Effluent Treatment Plant impacted on the reduction in the quantum of pollution. The Common Effluent Treatment Plant constructed in Nagalkeni near Pallavaram is showcasing the effective role of the TNPCB in abatement of water pollution.

Table - 3 : Establishment of CETPs in different sectors

| Sl. No. | Sector | No. of CETPs formed | No. of CETPs under operation |
|----------------|----------------------------|----------------------------|-------------------------------------|
| 1. | Tanneries | 24 Schemes | 14 Schemes |
| 2. | Textile Bleaching & Dyeing | 25 Schemes | 18 Schemes |
| 3. | Hotels & Lodging houses | 1 Scheme | 1 Scheme |
| | Total | 50 Schemes | 33 Schemes |

Source: The Tamil Nadu Pollution Control Board..

The CETPs are entitled to get 25 per cent of the project cost as a State subsidy, 25 per cent as Central subsidy, 20 per cent by way of share capital collection and 30 per cent by way of loans from financial institution such as IDBI. The Board so far received Rs.25.90 crores from the State Government towards subsidy for 48 CETPs and released Rs.22.66 crores as on 31.3.2003. During 2003-04 & 2004-05 State subsidy of Rs.57.66 lakhs has been granted. The Government of Tamil Nadu have also released Rs.6.77 crores as State subsidy for 9 more common effluent treatment plants through Tamil Nadu Leather Development Corporation as 25 per cent of the project cost. The Government of India so far sanctioned Rs.20.60 crores as Central subsidy to 48 CETPs in Tamil Nadu of which Rs.19.40 crores has been released.

Air Pollution Control:

The Air (Prevention and Control of Pollution) Act, 1981 as amended in 1987 aims to prevent and control air pollution and preserve the air quality. As per the provisions of the Act, the State of Tamil Nadu is declared as an 'Air Pollution Control Area'. The Board monitors industrial emissions through regular inspections of the air pollution control

measures provided by the industries. Ambient air quality survey / stack emission survey are conducted to assess the quality of the emissions let out. In 2003-04, Ambient Air Quality surveys are conducted in 687 industries. The Board has granted 584 consent orders for establishment of industries and 925 consent orders to operate under the Air Act during the year 2003-2004.

Air Quality Monitoring:

Air quality is being monitored by the Board to assess the concentration of air pollutants arising out of emissions from industries as well as increasing vehicular population. In Chennai alone, ambient air quality is being monitored at three locations under National Air Quality Monitoring Programme (NAMP) and at five locations under Chennai Ambient Air Quality Monitoring Programme (CAAQM). Apart from Chennai, monitoring of ambient air quality is carried out at Thoothukudi, Coimbatore, Madurai, Salem and Tiruchirapalli. Besides, six continuous ambient air quality monitoring stations are established at Cuddalore, Tuticorin, Ranipet, Manali-Chennai, Royapuram-Chennai, Kottivakkam-Chennai to evaluate the levels of pollution.

Vehicular Emission Monitoring:

There has been a rapid increase in the number of vehicles, as a result of urbanization, economic growth and easy availability of finance. Apart from new vehicles, old vehicles also exist often with outdated technology and non-observance of emission norms. The quality of fuel supplied has also compounded the problem of vehicular pollution. In this regard, high octane and unleaded fuels are to be used by the vehicle owners. The European Union emission norms are a bench mark to measure and regulate vehicular pollution.

The Board is monitoring vehicular emission since 1992. In Chennai city, three vehicular monitoring stations located at Alandur, Ambattur and Vyasarpadi conduct monitoring of the vehicular emission from goods and transport vehicles on a continuous basis. In addition to this, vehicular emission is being monitored at Dindigul, Palani, Ooty, Chengalpattu and Katteri. The Board tested 51398 vehicles in 2003-04. It is found that 13206 vehicles exceeded the threshold limit during the first test. After rectification of defects, 1666 vehicles did not satisfy the emission standards. In order to reduce emission from vehicles, cleaner fuels like unleaded petrol, 3 per cent benzene level, low sulphur fuel have been introduced in Chennai. Auto manufacturers are also incorporating technological changes towards this end.

Hazardous Substances Management:

For the management of hazardous chemicals and hazardous wastes in an environmentally friendly safe manner, effective steps have been taken. The Board has identified 2117 units generating hazardous wastes as on 31.3.2004 for which 2000 authorizations under the Hazardous Wastes (Management and Handling) Rules, 1989 as amended were issued. For the establishment of secure land fill facility for the disposal of sludge generated from the treatment of textile dyeing effluents, sites at Tirupur and Karur have been identified. In addition, a site at Kancheepuram district has been identified for establishing a common hazardous waste treatment, storage and disposal facility through a private operator.

Bio-medical Waste Management:

Bio-medical Waste (Management and Handling) Rules, 1998 as amended seeks to address the problem of bio-medical waste management. So far, the Board has inventorised 317 Government hospitals and 1835 private hospitals. The health care units are obligated to take necessary steps for safe disposal of bio-medical waste through choice of common bio-medical waste treatment and disposal facility having autoclave, shredder, compactor, incinerator for anatomical wastes and secure land fill facilities. There are 10 sites identified for setting up of common facility for private sector health care units so far in Tamil Nadu. Two common facilities established at Kancheepuram District are under operation.

Municipal Solid Wastes Management:

The management of municipal solid wastes is being dealt with under the Municipal Solid Wastes (Management and Handling) Rules, 2000. The concept of segregation at source, reduction, recycle and reuse of waste is being encouraged for the management of municipal solid wastes. Most of the municipalities have started segregation of wastes at sources in some wards. A private agency has established a facility for composing the segregated waste of Thiruppur Municipality.

Environmental Standards:

The Ambient Air Quality Standards and Emission Standards are prescribed for polluting industries. So far the Board issued show cause notices to 28008 industries and closure orders to 4278 industries for not complying with the conditions prescribed. The respective figures for 2003-2004 are 3849 and 161.

Plastic Wastes Management:

Indiscriminate use and disposal of waste plastic items cause environmental problem. Hence, necessary steps to implement Recycled Plastic Manufacture and Usage Rules, 1999 are being taken. In 2001, a programme known as 'Children Against Plastics' was launched in the districts all over Tamil Nadu to sensitise the people to avoid use of plastics and consequential environmental impact. Regular awareness programmes are being conducted by the Board to illustrate the ill-effects of throw away plastics and eco friendly alternative to throw away plastics.

Land / Soil Degradation:

Controlling land/soil degradation is a sine qua non for ensuring food security, sustainable forestry, agriculture and rural development. India possesses wide variety of biomass and over 75000 species of fauna and 45000 species of flora. Many of them are endangered because there is a constant threat to the survival of the species. The forest wealth is dwindling owing to overgrazing, over-exploitation beyond "carrying capacity" of forests, encroachments and unsustainable practices. Bio-diversity is disturbed by overexploitation. Marine ecosystem in the form of mangroves, coral reefs, salt lakes and mud flats which are the habitat for endangered species got lost stabilization. Pollution along the coastline is threatening marine life. Hence, suitable measures to minimize the land and forest degradation are being taken.

Cleaner Technology:

Technologies adopted by industrial units are one of the sources from which the pollution of various types stems. In order to motivate the highly polluting industrial units to go in for cleaner technological options, the Board has taken various steps towards achieving the objectives. With active support and encouragement, industrial units in Tamil Nadu have switched over to cleaner technologies such as adoption of membrane cell instead of mercury cell in caustic soda manufacturing, adoption of dry process instead of wet process to reduce air pollution in cement factories, adoption of double conversion and double absorption technology in sulphuric acid manufacturing, gas carburizing instead of cyanide salt in heat treatment and cyanide free electroplating. The distillery units have responded to move towards zero effluent discharge by adopting bio-composting of effluents with press mud of sugar industry. Pulp and Paper industries are encouraged to go in for elemental chlorine free bleaching to reduce the formation of organo chlorides including dioxins. Industries consuming ozone depleting substances are systematically changing to environment friendly compounds.

Summing Up:

The Government is conscious of its role in safeguarding the environment and pursue the task of development with sustainability, environmental concerns are kept in mind and its impact assessment forms an integral part of project formulation. Monitoring and evaluation also address this imperative. The objective of ensuring inter-generational equity is enshrined in the planning process practised by the State.