
Introduction

The path of industrialization adopted by India after Independence emphasized building heavy industries, the role of the public sector and a high degree of protection. In 1991, economic reforms were introduced, the role of the public sector was reduced and measures for increasing efficiency and integration with international markets were taken. The last decade has also witnessed an increased awareness of the environmental impacts associated with economic and industrial activity, as reflected in the concerns voiced at the Earth Summit in 1992.

This chapter begins with an overview of the industrial sector in India, highlighting trends in production and the environmental impacts and social issues associated with industrial growth. Next the areas of concern in Agenda 21 with regard to the industrial sector are set out, followed by a brief overview of Indian industrial policies and legislation. To what extent industrial policy planning, in the 1990s in particular, has addressed Agenda 21 concerns for the sector is then discussed. Finally, strategies for incorporating these concerns in future industrial policies are presented as a possible course of action.

Overview of the sector

Industrial production grew at an average rate of 6.46% per annum in the period 1992/93 to 2000/01 (MoF, 2002). This growth was mainly on account of the manufacturing and electricity sectors, while the mining and quarrying sector witnessed much lower growth rates in production. This relative picture is reflected in the trend in the Index of Industrial Production for these sectors (Figure 6.1).

The overall industrial growth path in the 1990s has been marked by cyclical fluctuations with the industrial growth rate increasing to a high of 11.6% in 1995/96 before falling to 3.4% in 1998/99. There was a significant improvement in overall growth in industrial value added to 6.4% in 1999/2000 due to acceleration in growth rate of the manufacturing and construction sectors, which declined to 5% in 2000-01 (MoF, 2002). The targeted growth rate for the industrial sector in the Tenth Plan period is over 10%, in line with a targeted

GDP (Gross Domestic Product) growth rate of 8% (Planning Commission, 2001a).

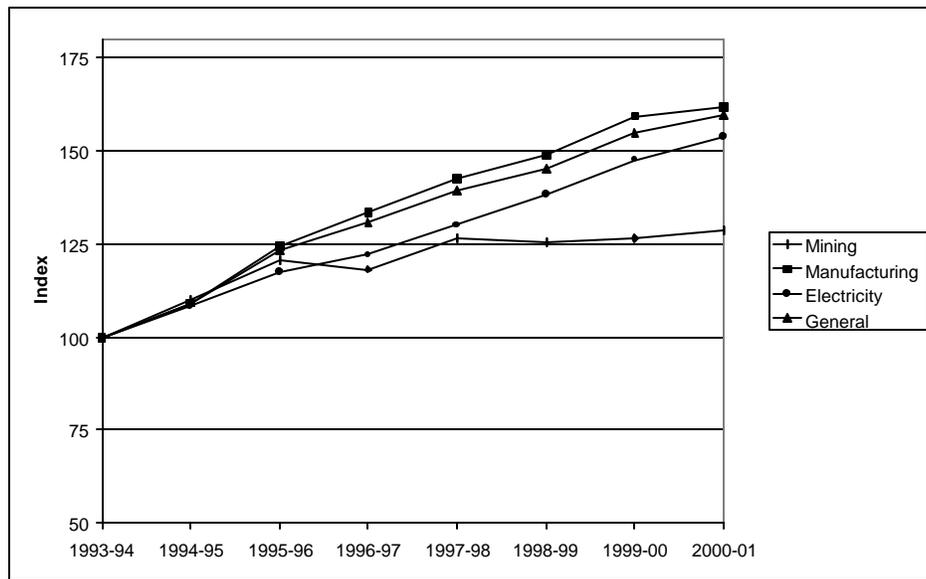


Figure 6.1 Index of industrial production (base year 1993/94=100)

Source. Data from MoF (2001)

Production trends and compound annual growth rates (CAGR) in selected industries in the last decade are shown in Table 6.1.

Table 6.1 Production of selected industries (**million tonnes**): 1990-99

Industry	1990-91	2000-01	CAGR (%)
Cement	48.4	99.5	7.4
Finished steel	13.5	29.3	8.0
Sugar	12.1	15.5 ^a	2.4
Fertilizers	9.0	14.7	5.0
Paper and paper board	2.1	3.1	3.9
Caustic soda	1.0	1.6	4.8
Aluminium	0.45	0.6	1.1

^a Figure is for 1998-99

Source. MoF (2002)

Environmental impact

The energy and resource intensity of industrial production has been associated with adverse environmental impacts. These can be categorized under four

heads: emissions, effluent discharges, generation of wastes including hazardous wastes and the production of ozone-depleting substances (ODS). The quantum of industrial solid wastes (non-hazardous) generated has nearly doubled in the last decade, from 77 MTPA (million tonnes per annum) in 1990 to 147.05 MTPA in 1999. In addition, about 7.2 million tonnes of industrial hazardous wastes are generated in the country (MoEF, 2000). A discussion of the extent of industrial emissions and effluent discharge is presented in the chapters on Atmosphere and Water.

Employment generation and labour welfare

The industrial sector is an important source of employment in the country. The estimate of employment in organised public and private sector stood at 27.9 million (MoF, 2002). In addition, large numbers are employed in the unorganized sector. In the context of economic reforms and restructuring of the industrial sector, changes in the labour market involving redeployment and retrenchment of labour would be associated with social costs. These costs would have to be minimized by providing for social security mechanisms. Most importantly, productive employment generation and labour welfare in the unorganized sector, where it will have the greatest poverty-reducing impact, will have to be ensured (ILO, 2001).

Industry and Agenda 21

The areas for action in the industrial sector as articulated in Agenda 21 emphasize the integration of environmental concerns in industrial planning, ensuring full participation in industrial activity, enhancing international trade and minimizing social costs. Four main issues can thus be identified for the industrial sector: environmental management, strengthening the role of the private sector, trade liberalization and environmental regulation and employment generation and labour welfare. These issues are discussed in the following sections.

Environmental management

Governments were urged to promote policies or programmes, including administrative, social or economic measures to encourage industrial development in a manner that would minimize adverse environmental impacts. Six key mechanisms were visualized in Agenda 21 for improved environmental management in the industrial sector:

- Incorporating environmental considerations in industrial development through proper siting policies and mandatory environmental impact assessments.
- Increasing efficiency in the production and use of materials, resources and energy.
- Improving existing pollution abatement technologies and developing new clean technologies, products and processes.
- Developing and implementing emission and effluent controls and standards.
- Ratifying multilateral environment agreements (MEA) such as the Montreal Protocol and the Basel Convention on the Transboundary Movement of Hazardous Wastes and their Disposal.
- Corporate environmental responsibility: The role of business in improving the efficiency of resource use, reducing risks and hazards, minimizing wastes and safeguarding the environment.

Strengthening the role of the private sector

Agenda 21 charts a path of full participation of business and industry in the implementation and evaluation of policies for promoting sustainable development. It calls upon them to recognize environmental management as among the highest corporate priorities and a key determinant of sustainable development. For industry to participate fully in the implementation of sustainable development activities, the role of the private sector has to be strengthened.

Trade liberalization and environmental regulation: implications for industry

The contribution of an open, equitable and secure multilateral trading system to achieving sustainable development by increasing financial resources and efficiency in allocation of resources was highlighted in Agenda 21. All countries were urged to implement commitments to halt and reverse protectionism and increase market access, particularly for products from developing countries. Developing countries for their part were to continue or initiate trade policy reforms and structural adjustment programmes.

Agenda 21 recognized the concerns of developing countries such as India, of environmental standards being used as a protectionist device. It therefore called for steps to be taken to ensure that environment-related regulations or standards including health and safety standards, did not constitute a means of

arbitrary or unjustifiable discrimination or a disguised restriction on trade. It also emphasized that environmental standards developed in advanced countries may not be applicable in developing countries.

Employment generation and labour welfare

The industrial sector is indispensable in achieving the overall objective of poverty alleviation by providing 'full and sustainable' employment opportunities. In addition, by ensuring a safe, clean and healthy working environment, the sector can contribute to improving the surrounding natural environment. Agenda 21 asked governments to establish arrangements with workers and employers to deal with industrial safety, health and environment at the workplace.

Review and analysis of policies and other developments in the industrial sector

Highlights of legislation, policies and programmes

Recent initiatives relevant to the industrial sector are set out below:

Table 6.2 Policy highlights

Year	Highlights of legislation policies and programmes
1989	Hazardous Wastes (Management and Handling) Rules <ul style="list-style-type: none"> ▪ Lists 18 types of waste categories and their levels, which if exceeded by an industry, compliance with the specified rules is required
1989	Manufacture, Storage and Import of Hazardous Chemical Rules <ul style="list-style-type: none"> ▪ Lists 434 toxic flammable and explosive chemicals and specifies guidelines for manufacture, storage and import of hazardous chemicals
1991	New Industrial Policy <ul style="list-style-type: none"> ▪ Reduction in scope of industrial licencing ▪ Reduction of number of areas reserved for the public sector ▪ Disinvestment of selected public sector enterprises ▪ Enhancing limits for foreign equity participation in domestic industrial undertakings ▪ Liberalization of trade and exchange rate policies
1991	Public Liability Insurance Act <ul style="list-style-type: none"> ▪ Required industries dealing with hazardous wastes to get liability insurance cover up to stipulated amounts ▪ Provided for relief to persons affected by accidents while handling hazardous wastes
1992	Ratification of the Basel Convention on the Transboundary Movement of Hazardous Wastes <ul style="list-style-type: none"> ▪ Restrictions on trade in hazardous wastes
1992	Environment Audit Notification <ul style="list-style-type: none"> ▪ Required all polluting units to submit an annual environmental

	statement to the State Pollution Control Board
1992	Accession to the Montreal Protocol <ul style="list-style-type: none"> ▪ Various projects in ODS consuming sectors submitted to the Multilateral Fund for assistance to change over to ozone friendly substitutes.
1993	National Minerals Policy <ul style="list-style-type: none"> ▪ Mines and Minerals (Regulation and Development) Act 1957 amended and the mining industry opened to the private sector for 13 non-fuel and non-atomic minerals, including foreign direct investment upto 50% equity participation.

<u>Year</u>	<u>Highlights of legislation, policies and programmes</u>
1994	Environmental Impact Assessment (EIA) Notification <ul style="list-style-type: none"> ▪ Environmental clearances mandatory for undertaking expansion, modernization or new projects in industries such as chemical fertilizers, pesticides, petrochemical complexes, bulk drugs and pharmaceuticals, distilleries, pulp, paper and newsprint, dyes and the cement industry.
1999	Environment (Siting for Industrial Projects) Rules <ul style="list-style-type: none"> ▪ Restricted or prohibited the setting up of specific new industries in sensitive areas such as national parks, sanctuaries, wetlands and archaeological monuments. ▪ Industries covered by this notification included chemical fertilisers, primary metallurgical industries, distilleries, tanneries, pesticides, bulk drugs and pharmaceuticals, pulp and paper and cement.

Based on the concerns for the industry sector highlighted in Agenda 21 and the policy highlights presented above, it is analysed below, to what extent these concerns have been addressed or incorporated in industrial policies. The analysis is segregated into achievements and areas that remain of concern.

Achievements

Environmental management

Over the past two decades, the government has developed and set standards for regulating emissions and effluents from polluting industries. These are discussed in detail in the chapter on Environmental regulation.

Programmes to monitor the status of pollution control in industry have been implemented and have yielded results measured by an increase in the number of units installing pollution control equipment. In 1996, 17 categories of industries covering 1551 large and medium industrial units were identified as highly polluting, of which 79% had adequate pollution control equipment

installed to be able to comply with environmental standards. In December 2000, 85% of the identified industrial units had adequate pollution control facilities in place (Figure 6.2).

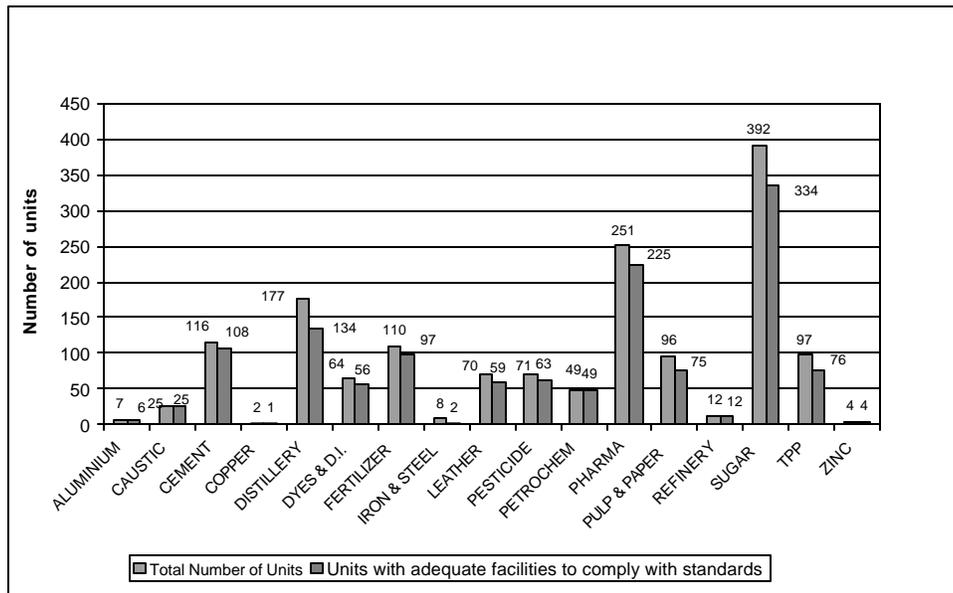


Figure 6.2 Status of pollution control in 17 industries

Source. Data from CPCB (2001)

To control the discharge of industrial effluents into water bodies, 851 industries located along rivers were identified in 1997 as 'grossly polluting industries'^a and directions were issued to them to install effluent treatment systems or face closure. Since the initiation of the programme, the number of industries that had not provided for effluent treatment or disposal after directions had been issued, had reduced to 22 from 851.

These programmes are complementary with other initiatives such as the setting up of Common Effluent Treatment Plants (CETP) for Small Scale Industry (SSI) clusters and the preparation of a zoning atlas for the environmentally-sound location of industries.

India has ratified both the Montreal Protocol and the Basel convention and various programmes and policies for implementing provisions under these MEAs have been developed. Details of these have been discussed in the chapters on Atmosphere and Environmental regulation.

Corporate environmental responsibility in India has taken the form of adoption of environmental management frameworks such as the ISO 14001.

^a Industries discharging 100 kg or more of BOD (Biological Oxygen demand) per day

Launched in India in 1996, it has become a well-recognized standard increasingly adopted by companies for increasing their competitive edge in domestic and international markets.

Strengthening the role of the private sector

Before 1991, a series of industrial policy resolutions beginning in 1948 gave primacy to the public sector. The recognition of the need to increase competitiveness and efficiency in Indian industry led to industrial reforms being introduced as part of the New Economic Policy in 1991. A highlight of these reforms was a reduction in the role of the public sector in industrial activities and opening them to the private sector.

The public sector reform process has focused on increasing viability, competitiveness and efficiency through restructuring, modernization, rationalization of capacity, product-mix changes, selective exit and privatization (Eighth Five-Year Plan, 1992-97). The role of the public sector has been redefined to focus on strategic, high technology and essential infrastructure and accordingly the number of industries reserved for it reduced to 4 from 17. The scope of industrial licencing has also been reduced, with the number of industries requiring licences limited to six (Ninth Five-Year Plan, 1997-2002). States have also initiated reforms of PSEs and programmes for privatization of these units have been drawn up in 12 states^a (Ninth Five-Year Plan, 1997-2002).

The strategy for disinvestment of PSEs adopted has involved the strengthening of strategic units, privatization of non-strategic units through gradual disinvestment or strategic sale and rehabilitation of weak units (MoF, 1999). The public sector industries classified as strategic are arms and ammunition^b, atomic energy and railway transport. For all other non-strategic public sector units, government equity is to be brought down to 26% or less, and the receipts from disinvestment and privatization to be used in meeting expenditure in the social sector, retiring public debt and restructuring of PSEs (MoF, 2000).

In 1999, a separate Department of Disinvestment was created to give a thrust to the disinvestment process and to establish a systematic policy approach to privatization. The government has completed strategic sales in 7 public sector companies and some hotel properties of Hotel Corporation of India and the Indian Tourism Development Corporation (ITDC). Disinvestment in another 6

^a Gujarat, Haryana, Karnataka, Kerala, Maharashtra, Orissa, Tamil Nadu, Rajasthan, Punjab, Uttar Pradesh, West Bengal and Assam

^b Including defence equipment, defence aircraft and warships

companies is expected to be undertaken this year, with estimated receipts as Rs 5000 crore (MoF, 2002a).

Trade liberalization and environmental regulation

The adoption of a New Industrial Policy in 1991 was accompanied by a series of complementary reforms in fiscal, trade and foreign investment policies, which gradually opened up the industrial sector to international competition. There was a shift in focus from import substitution to competitiveness in international markets, with trade liberalization contributing to reducing effective protection for industry.

The Foreign Direct Investment (FDI) policy was further liberalized and limits for foreign equity participation in domestic industrial undertakings were enhanced. In 1996, a list of nine industries, which included infrastructure, electronics and software, for which joint ventures upto 74% foreign equity would be automatically cleared, was approved. The number of industries eligible for automatic approval upto 51% foreign equity was also expanded from 35 to 48.

Domestic industry is increasingly open to competition from international markets, with quantitative restrictions on imports removed with effect from April 1, 2001 (Planning Commission, 2001a). Tariff levels have also been decreased drastically since the initiation of reforms. It is estimated that India's weighted import tariff has declined from around 90% at the start of reforms to around 34% in 2001/02 (Planning Commission, 2001a).

Employment generation and labour welfare

In India the poverty-alleviating role of employment generation is most apparent in the Village and Small Scale Industries (VSI) sector which is more labour intensive per unit of capital employed than large-scale industries. The sector comprises small scale industries, khadi and village industries, coir industries, handloom units, sericulture activities and small handicraft businesses. Khadi and village industries have an important role to play in promoting non-farm employment in rural areas and thus providing supplementary income.

The SSI sector contributes about 40% of industrial production in terms of value added, 7% of GNP (Gross National Product), one-third of total exports and employs the largest number of people, next only to agriculture (Gulati, 1997). In 1990/91, 43 million people were employed in the VSI sector, which increased to 58 million people in 1996/97 (Planning Commission, 2001b).

The growth of the VSI sector has been encouraged by an increase in plan outlays, both by the Centre and the state governments/union territories. Total outlays (central and state sector) for this sector increased from Rs 6800 crore in the Eighth Plan period (1992-97) to Rs 10,700 crore in the Ninth Plan (1997-2002) (Planning Commission, 2001b). This represents about 14% of total outlays for the industry and minerals sector.

Government policy towards employment generation has also emphasized self-employment, and several programmes promoting self-employment have been implemented, significant among these being the Prime Minister's Rozgar Yojana started in 1993.

Institutional mechanisms and legislation for ensuring adequate remuneration and protecting the rights of workers exist for the organized industrial sector. Government programmes for improving labour welfare in the unorganized sector have targeted the prevention of exploitation of child labour.

There has been recognition of the need to reassess and give greater attention to industrial safety, since an increasing proportion of the industrial workforce is exposed to occupational hazards, dangerous chemical substances and environmental pollution. Programmes for improving working conditions in factories, establishment of a system of chemical safety, strengthening the system of monitoring occupational health status and certification of protective equipment were envisaged in the Eighth Plan.

To provide training and develop skills of workers entering the industrial labour force, a National Vocational Training System comprising a network of over 2000 Industrial Training Institutes (ITI) has been established. The Central Board of Workers Education (CBWE) has developed schemes keeping in view the need to educate workers on industrial health, safety and environment (Eighth Five-Year Plan, 1992-97). In addition, to provide training to women participants in the workforce, a National Vocational Training Institute, Regional Vocational Training Institutes and ITI's specifically for women have also been set up.

Concerns

Environmental management

The implementation of environmental regulation in industry has had mixed results. While large-and medium-scale enterprises in the industrial sector have mostly been able to comply with environmental requirements, as shown by the status of pollution control in 1551 highly polluting large and medium industrial units, small-scale industries have faced difficulties complying. This has been

due to a lack of financial resources and technical expertise for installing pollution control equipment. The dispersed nature of these units has also made monitoring of their environmental performance difficult for the authorities.

The approach to environmental protection in industry has been predominantly in the form of regulatory or command-and-control measures rather than using economic instruments. Fiscal and budgetary instruments to promote the adoption of pollution control equipment have been used but these have focussed more on providing incentives (tax concessions, subsidies, soft financing, accelerated depreciation allowance), with a corresponding lack of taxes/charges/levies on polluting industrial activities (TERI, 2000). The concept of making the polluter pay has not been adequately incorporated into the development of instruments. Further, the provision of incentives has not been linked to environmental performance. As a result, the efficacy of the fiscal instruments in actually reducing industrial pollution can be questioned. Finally, there has been a focus on promoting the adoption of end-of-pipeline pollution control technology in industries rather than assessing potential for pollution reduction in the life cycle of the product.

Indian industry is characterized by low resource-use efficiency, particularly in energy use, where there is a wide gap between most industrial operations and their counterparts in the developed world (TERI, 2001b). The industrial sector consumes as fuel and feedstock over half of the total commercial energy consumption in the country. Energy consumption is concentrated in seven industries: fertilizers, aluminium, textiles, cement, iron and steel, pulp and paper, and chlor alkali which together account for 80% of total industrial energy consumption. High-energy use coupled with low-resource use efficiency implies not only increased costs but also adverse environmental impacts.

Suboptimal R&D (Research and Development) efforts has also been a problem area for Indian industry (TERI, 2001b). Large process industries mostly rely on overseas technology suppliers and there is a lack of indigenous capability. The R&D programmes of larger industries have been mainly in the form of technology adaptation or upgrading or removing constraints. Lack of local capacity results in the transferred technology seldom reaching the designed operational efficiency (TERI, 2001b).

Strengthening the role of the private sector

Progress on disinvestment of government equity in PSEs has been very slow; disinvestment has been undertaken for only a third of the 46 PSEs for which disinvestment or closure was recommended (Planning Commission, 2000).

Privatization has picked up in the latter half of 2001-02 and this momentum needs to be maintained.

Trade liberalization and environmental regulation

In addition to tariff barriers in certain sectors, a concern for Indian industry is the impact of international environmental regulation on competitiveness and the potential for a rise in 'green protectionism'. Many developed countries have set physical requirements for imported products such as standards and technical regulations, packaging, eco-labelling and recycling requirements. Indian exports from the textiles, machinery equipment, leather and chemicals industries have faced such environmental regulation.

The imposition of environmental regulation has significant trade implications for India, as the costs of compliance with these standards could be very large, particularly for the small-and medium-scale enterprises that form a sizeable proportion of the export sector. The technical and financial capacity of these firms to conform to environmental regulations set by developed countries is limited. The resulting loss of competitiveness, market access and export revenues could further limit ability to implement improved environmental standards.

Employment generation and labour welfare

Employment generation alone does not ensure poverty reduction, as a low recorded unemployment (less than 3% of labour force) coexists with a high incidence of poverty (more than 30% of households) (Ninth Five-Year Plan, 1997-2002). This is on account of the predominantly unorganized nature of the workforce, low productivity employment and very low wages.

Adequate levels of earnings, safe and humane conditions of work and access to minimum social security benefits are the major qualitative dimensions of employment which enhance quality of life of workers and their productivity (Eighth Five-Year Plan, 1992-97). While institutional mechanisms and legislation exist for ensuring these to workers in the organized sector, similar benefits are not ensured for workers in the unorganized sector.

Integrating Agenda 21 concerns – directions

From the foregoing discussion it may be seen that the concerns of Agenda 21 have been substantially incorporated in the decision making process in India. The directions in which future action needs to be taken are briefly indicated in the following section.

Environmental management

There exists a wide-ranging legal framework for environmental management. Along with strengthening the implementation, it is necessary that IT be complemented by the introduction of economic and market-based instruments such as charges on industrial emissions, effluents and wastes. This becomes all the more important in the context of liberalisation of the Indian economy. Incentives for the adoption of clean technologies and processes should be given and these should be linked to environmental performance.

There exists considerable scope for improving resource efficiency in Indian industry, with various studies estimating energy saving potential alone to be about 25%. To increase resource efficiency, measures such as recycling and use of secondary materials, development of mandatory energy efficiency norms for new process industries and energy labelling for equipment should be promoted (TERI, 2001b). A beginning in this direction has been provided by the Energy Conservation Act, 2001. In addition, voluntary agreements by industry associations on behalf of their members could be a means for improving energy efficiency. Some of these concerns can be addressed by the ongoing reforms which aim at greater use of markets and competition. Efficient pricing induced by these reforms will also promote more efficient use of resources.

Strengthening the role of the private sector

In the last decade the role of the private sector has been considerably strengthened. Disinvestment of the public sector will continue at an accelerated pace. Accordingly the Approach to the Tenth Five Year Plan calls for the creation of an industrial policy environment in which private sector companies and the erstwhile public sector units can become efficient and competitive. It also emphasises that industrial liberalization should be extended to the state level.

Trade liberalization and environmental regulation

The Approach to the Tenth Five Year Plan recognizes that although removal of quantitative restrictions on imports is an important step in opening the economy to foreign competition, import protection is still very high. Tariff levels of around 34% are still much higher than those prevalent in East Asian nations, which are about 10%. The need to bring down tariff levels further has been emphasized by successive governments and a lowering of India's tariffs to East Asian levels in a three year period has been announced (Planning Commission, 2000; Planning Commission, 2001a).

The increasing awareness of environmental issues in the international market can be turned into a competitive edge rather than a threat for Indian industry, with the adoption of environmental management systems and improved implementation of environmental legislation. There is a need for increased technology transfer on a non-commercial basis from developed countries. This transfer would be supplemented with local capacity building so that technologies can be effectively absorbed and used to bring down resource intensity.

Employment-generation and labour welfare

Strengthening of existing legislation and introduction of new legislation for the protection of interests of workers in the unorganized sector is required. Steps have been taken in this direction with the introduction of the Building & Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 and the Building and Other Construction Workers' Welfare Cess Act, 1996. These laws aim to regulate employment and conditions of service as also safety, health and welfare measures for a vulnerable section of workers in the unorganized sector.

In the organized sector also there is a need to balance the immediate interests of the workers and the long-term interests. The Approach Paper to the Tenth Plan calls for a more flexible labour policy that would encourage employment. This must be complemented by a social security system that would protect workers from the adverse consequences of a more flexible labour law.

References

Agenda 21, United Nations
<http://www.un.org/esa/sustdev>

CPCB. 2001

Summary status of pollution control in 17 categories of industries

Accessed from <http://envfor.nic.in/cpcb>.

Gulati M. 1997

Restructuring and modernisation of small medium enterprise clusters in India

United Nations Industrial and Development Organisation. 221 pp.

ILO. 2001

Country objectives

International Labour Organisation. New Delhi Area office

Accessed from <http://www.ilo.org/public/english/region/asro/newdelhi/counobj.htm>.

MoF. 1999

Budget Speech 1999-2000

Ministry of Finance, Government of India

Accessed from <http://finmin.nic.in/fub.htm>.

MoF. 2000

Budget Speech 2000-01

Ministry of Finance, Government of India

Accessed from <http://finmin.nic.in>

MoEF. 2000

Draft on Status of Implementation of the Hazardous Waste Rules, 1989

New Delhi: Ministry of Environment and Forests, Government of India.

MoF. 2002

Economic Survey 2001/02

New Delhi: Economic Division, Ministry of Finance

MoF. 2002a

Budget Speech 2001-02

New Delhi: Ministry of Finance, Government of India

Accessed from <http://finmin.nic.in>

Planning Commission. 2000

Mid term Appraisal of Ninth Five-Year Plan (1997-2002)

New Delhi: Planning Commission, Government of India. 510

Planning Commission. 2001a

Approach to the Tenth Five Year Plan (2002-07)

New Delhi: Planning Commission. 49 pp.

Planning Commission. 2001 b

Indian planning experience: A statistical profile

New Delhi: Planning Commission. 219 pp.

TERI. 2000

Greening the Budget: Background paper on Energy and Industrial sectors, pp. 1-29
New Delhi: Tata Energy Research Institute. 53 pp.

TERI. 2001

TERI Energy Data Directory and Yearbook (TEDDY)
New Delhi: Tata Energy Research Institute. 452 pp.

TERI. 2001b

DISHA (Directions, innovations, and strategies for harnessing action)
New Delhi: Tata Energy Research Institute. 368 pp.

Eighth Five Year Plan: 1992-1997

Vol. 2: pp 104-158

New Delhi: Planning Commission. 480 pp.

Ninth Five Year Plan: 1997-2002

Vol. 2: Thematic Issues and Sectoral Programmes, pp 407-419, 583-665

New Delhi: Planning Commission. 1059 pp.