

2004 ESRI International Collaboration Projects

Measures for global warming prevention in India

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Summary

Measures to mitigate the problem of global warming are being studied and implemented on a worldwide scale under the United Nations Framework Convention on Climate Change. Nevertheless, emissions of greenhouse gases (GHGs) are even forecast to increase owing to the influence of developing countries such as China, India, Russia, and Brazil, which have huge populations and are projected to achieve considerable economic growth. As such, these countries are coming to the fore as key players in prevention of global warming.

At present, India's GHG emissions per capita of population are much lower than those in developed countries in terms of quantity. In terms of purchasing power parity, however, they are on basically the same level. Furthermore, India's population is bound to increase, and the country is expected to eventually become the world's largest GHG emitter. For these reasons, to a large extent, measures to prevent global warming in India will determine the effectiveness of the prevention worldwide.

The measures now being taken by India are not aimed primarily at prevention of global warming but are nevertheless effective for this purpose, such as antipollution measures. However, there are issues in the implementation aspect, and many observers are of the opinion that the steps are not as effective as they should be. The main factor behind this situation is thought to be the combination of the physical size of the population and country, which are both about ten times as large as Japan's to begin with, and a frail fiscal budget which, although the biggest among the developing countries, is only about one-tenth as high as Japan's. In addition, the fairly strong authority of the state governments and the delegation of execution to them are also thought to be causes in this connection. At the same time, it must not be overlooked that, in recent years, the Supreme Court has issued environment-related orders against the backdrop of rising awareness among the public, and that measures are gradually taking more effect.

Although issues remain in regard to governmental regulation and other matters in the implementation aspect, measures to prevent global warming could presumably make steady progress in the future along with a further rise in public awareness and skillful use of foreign energies. Among the Kyoto mechanisms, the Clean Development Mechanism (CDM) would presumably be important for the use of foreign energies, but it is also thought that, in many cases, projects would not be feasible for CDM because of barriers associated with costs and conditions. Similarly, as viewed from the perspective of heightening civic awareness and other facets of capacity-building, the conventional yen loan projects and education for employees in the plants already sited in India by Japanese firms will undoubtedly retain their importance.

India is regarded as requiring foreign financial aid in the promotion of domestic measures as well. For Japan, which is finding it difficult to reduce its own emissions, cooperation with India is crucial in light of the latter's large margin for reduction. This points to the need for determination of measures for the effective operation of conventional aid in such forms as yen loans and foreign reSource) s within India as well as their influence on CDM, etc

Introduction

Measures to mitigate the problem of global warming are being studied and implemented on a worldwide scale under the United Nations Framework Convention on Climate Change. Nevertheless, emissions of greenhouse gases (GHGs) are even forecast to increase owing to the influence of developing countries such as China, India, Russia, and Brazil, which have huge populations and are projected to achieve considerable economic growth. As such, these countries are coming to the fore as key players in prevention of global warming.

The Kyoto Protocol contains GHG emission reduction targets, but mainly for developed countries; no such targets are set for developing ones. Resolution of the global warming problem will demand approaches to reduction of GHG emissions by developing countries, and especially those such as China and India.

In forums of international discussion, these developing countries are asserting their right to pursue economic advancement and refusing to accept emission reduction obligations. Within their borders, meanwhile, they are being confronted with worsening air pollution, water pollution, and other environmental problems on a local scale. Their governments are consequently taking action on their own to reduce GHG emissions as well as resolve these local environmental problems.

Focusing on India, whose population is expected to exceed that of China eventually, this research was undertaken to set forth the measures actually being taken in the context of the emission reduction and determine the thinking behind them. This was used as footing for definition of prospective approaches to Japanese-Indian interaction related to emission reduction on both the governmental and private-sector levels, and identification of advisable involvement between the two countries in this area.

1. Research perspectives

This research viewed the measures for prevention of global warming in India and the cooperative ties with Japan from the perspectives outline below.

- 1) Outline of measures by principal
- 2) Relationship between global warming prevention measures and other policy measures

This research sets forth measures in terms of type of principal, for the following reasons. In the first place, a look at the ties of cooperation between India and Japan reveals that the Japanese government is furnishing official development assistance (ODA) and other intergovernmental aid to India, and that interchange is also proceeding on the private-sector level, as exemplified by the success of the Multi-Suzuki automobile in the Indian market. It should be noted, however, that the private-sector interaction grew out of partnerships between Indian state enterprises and private Japanese firms, and changed in the course of the former's privatization. Furthermore, the methods of Japanese aid include other official flows (OOF) such as loans made from government-affiliated

financial institutions directly to companies and funding from the Japanese government through bodies such as the New Energy and Industrial Technology Development Organization (NEDO) and Japan External Trade Organization (JETRO) for cultivation of the private-sector market in India. In other words, various principals have been involved in the Japanese-Indian interaction.

Another factor is the connection between measures to prevent global warming and measures of other types. The former are often discussed in terms of improvement of energy efficiency and other extensions of measures to combat ordinary air pollution, for example. It can also be pointed out that, in India, pollution and low levels of energy efficiency and productivity are more widely perceived as real problems than is global warming. Viewed from the standpoint of India and other developing countries, global warming is a problem that was caused chiefly by the wasteful energy use by the developed countries to date. It would be difficult for India to promote domestic measures to prevent global warming unless it held benefit for the country. It is true that various measures to fight pollution, make more efficient use of energy, and conserve resources are exerting a positive influence as regards the problem of global warming in reality. As this suggests, in the case of developing countries, measures that indirectly reduce GHG emissions may be more practical than those aimed directly at such reduction.

In light of the above matters, it was considered valuable to survey the current status of measures to prevent global warming among principals of each type.

2. Research procedure

The initial phase of research consisted of a survey of existing documentation (books, papers, etc.) to gather information on measures for global warming prevention, related measures, and economic reform in India. This was followed by an interview survey conducted in India to learn about the latest circumstances, in view of the paucity of literature on Indian measures for global warming prevention available in Japan, and the treatment of such measures along with other environmental measures and the economic situation in the country-specific reports prepared by the Japan International Cooperation Agency and other governmental institutions.

There were three series of interviews, as outlined below.

* First series: May 2004 (Delhi)

- Subject: researchers and research institutes
- Contents: collection of information on the trends in global warming research and countermeasures in India

* Second series: August 2004 (Delhi and Mumbai)

- Subject: government, industrial groups, and research institutes
- Contents: Indian national policy, policy measures in industry as a whole, approaches to

industrial regulation, etc.

* Third series: November - December 2004 (Delhi, Ahmadabad)

- Subject: governmental institutions, local governments, industrial groups, individual companies
- Contents: governmental capacity for implementation, situation on the local governmental level, specific approaches of individual companies, etc.

In addition, interviews were held with Japanese ministries and agencies, governmental institutions, and companies during the months of October and November 2004.

This research summarizes the findings of these interviews and presents the current status of measures for global warming prevention in India and the key points regarding room for cooperation by Japan.

This report is comprised of five chapters.

Chapter I presents the worldwide activity surrounding prevention of global warming in recent years and status of GHG emissions, particular in connection with the Kyoto mechanisms, in order to afford a grasp of India's position in the context of such measures.

Chapter II sets forth the current situation in India in this regard. It evidences the importance of cooperation with India in outlooks on Japanese measures for prevention of global warming.

Chapter III describes the current measures for prevention of global warming in India, with summaries of the basic perspectives, detailed approaches, and issues involved in these measures.

Chapter IV views the interchange between Japan and India at present, and traces the trends for each type of principal. This is used as footing for delineation of the areas of inadequacy in the current interchange and putative issues faced by the respective principals.

Assimilating the results of the preceding chapters, Chapter V considers the question of what must be done to promote cooperation between India and Japan in the area of global warming prevention over the coming years. By way of conclusion, it summarizes the current status, recent approaches, and future directions.

Acknowledgement

Interviews were a major means of this research and were conducted with numerous parties in Japan and India. A list of these interviewees is presented for the perusal of the reader in the Appendix.

The authors hereby acknowledge their indebtedness to all concerned parties, and especially to two people: Ms. Neeru Dhal, who not only handled interpretation between Japanese and the languages of English, Hindi, Punjabi, and Gujarati, but also provided information on and insights into various aspects of Indian culture, customs, and life; and Mr. Marik Rabinder of The Energy Research Institute, who served as a mediator on the occasion of the first visit to India. Without their precious help, this research could not have proceeded smoothly.

I. The importance of India in the context of the global warming problem

1. Activity surrounding the Kyoto Protocol

On 27 October 2004, the upper house of the Russian Federal Assembly passed a proposal in favor of ratification of the Kyoto Protocol. This raised prospects for completion of the ratification process in early November of that year and effectuation of the Protocol in February 2005. Now that the Protocol's effectuation is viewed as a virtual certainty after it was jeopardized when the United States of America disengaged from it, concern is shifting from the prospects for ratification to implementation of the three flexibility mechanisms recognized under it: 1) the emission trading system, 2) Joint Implementation (JI) projects for emission reduction by Annex I signatory countries, and 3) the Clean Development Mechanism (CDM) for implementation of projects in non-Annex-I (developing) signatory countries.

Figure I- 1 Negotiations and agreements related to the Kyoto Protocol

Conference	Month and year held	Site	Outline
COP-4	Nov-98	Buenos Aires	COP 4 resulted in formulation of the Buenos Aires Plan of Action (BAPA), and determination of the detailed rules for operation of the Protocol, the scheme for assessment of compliance by signatory countries, the procedure for calculation of emission levels and amounts of reduction, and credit rules for carbon absorption.
COP-6	2000/11/1 July-2001	Hague Bonn	The Conference was carried over to the following year because of failure to reach an agreement on funding problems, use of the mechanisms, compliance, and the Emergency Appeal about Sinks in Land Use, Land-Use Change and Forestry (LULUCF). However, a political agreement was reached on the compliance section. The settlement of major matters was left to COP 7.
COP-7	Nov-01	Marrakech	There was continued discussion on the Bonn Agreement, and the Marrakech Agreement was adopted.
COP-8	Oct-02	New Delhi	COP 8 reaffirmed that development and poverty were priority issues for developing countries, and recognized the existence of a shared but differing responsibility among the signatory countries. It resulted in adoption of the Delhi Declaration on climate change and sustainable development.
COP-9	Dec-03	Milan	COP 9 produced an agreement on the rules and procedures for new afforestation and reforestation activities in the CDM regulations during the first commitment period.

Source) : Cop-10 Earth Negotiations Bulletin

2. Progress of measures for global warming prevention in Japan

In Japan, countermeasures for global warming are presented in the Guideline of Measures to Prevent Global Warming prepared by the Ministry of Environment. Approaches in specific sectors (such as industry and transportation) are also being studied by bodies such as the Industrial Structure

Council.

The Council estimates that the number of additional nuclear power stations to be constructed will be revised downward from the original range of 10 - 13 to four, and that the demand for power will expand due to the further diffusion of IT equipment and peripheral devices accompanying the spread of broadband Internet. In the residential sector, it foresees the diffusion of large-screen TV sets to offset the energy-reducing effect of the switch from cathode ray tubes to liquid crystal displays. It also thinks that the number of automobiles on the road will increase by 30 percent relative to the 1990 level, and that this will cancel out the improvement of fuel efficiency. In all, conditions will make it extremely difficult to reduce GHG emissions by 6 percent relative to 1990.

There is a difference of stance between the Ministry of Environment and Ministry of Economy, Trade and Industry (METI) in respect of the use of economic mechanisms.. Basically, the latter is opposed to regulations that would impair economic activities, and advocates respect for the voluntary approaches in industry. It is therefore negative toward the imposition of environmental taxes and the allocation of emission quotas to enterprises. The latter, on the other hand, takes a positive attitude toward both environmental taxes and quota allocations. This difference of stance between the two ministries makes it difficult for Japan to take concerted action, and is a cause of the current lack of progress in countermeasures.

FigureI- 2 Difference between the Ministry of Environment and METI in respect of stance on global warming prevention

Ministry of Environment		METI
Thinks the Kyoto Protocol targets ought to be met even if environmental taxes and other compulsory measures are required	Basic perspective	Opposed to compulsory measures impairing economic activities; advocates respect for voluntary approaches by industry
In favor of imposition and use of revenues for replacement with energy-saving equipment, etc.	Environmental tax	Skepticism about effect, and apprehension about the adverse impact on industrial competitiveness and the national life; wariness about instatement
Promotion of allocation of emission quotas among domestic enterprises	Emission trading	Opposition to quota allocations on the grounds that they impair economic activities; promotion of schemes to encourage voluntary corporate efforts

Source) : page 4, morning edition, 19 June 2004, Japan Economic Journal

Against the background of the interministerial difference of stance noted above, the Japanese government and related institutions have announced the following approaches since October 2004.

- ① Announcement of the Ministry of Environment estimate that the 6-percent reduction target could be reached with imposition of a tax of 3,600 yen per ton of carbon and use of the revenue to promote the use of energy-saving equipment.
- ② Transfer of subsidies to firms that earn emission quotas by carrying out projects for energy

conservation in other countries

- ③ Establishment of the Japan GHG Reduction Fund by the Japan Bank for International Cooperation (JBIC) and the Development Bank of Japan (DBJ) together with 31 private enterprises
- ④ Establishment of a scheme for low-interest financing by the DBJ for investment in energy-saving facilities to prevent global warming

In the private sector, meanwhile, the Japan Business Federation prepared a plan for voluntary action on global warming. The plan calls for efforts to curtail the CO₂ emissions from the industrial and energy conversion sectors in 2010 to no more than the level in 1990. In fiscal 2003, actual emissions from these sectors came to 502.39 million tons CO₂, 1.0 percent more than in fiscal 2002 but 0.6 percent less than in fiscal 1990 (see Note 1).^{*} However, it has been observed that Japanese companies are essentially reluctant to undertake CDM or JI projects because Japan lacks a concrete framework for emissions trading at present (see Note 2)^{**}. FigureI-3 lists the CDM and JI projects that have been approved by the government so far.

^{*}Note 1 : <http://www.keidanren.or.jp/japanese/policy/vape/index.html>

^{**} Note2: Yuji Mizuno “The Clean Development Mechanism: Current Activities of Japan”, International Review for Environmental Strategies, Volume5, No.1, 2004, p.306.

FigureI- 3 List of CDM/JI projects approved to date

Date of approval	CDM/JI	Applicant	Host Country	Project Name	Expected credits (t of CO ₂ /y)
2002.12.12	JI	NEDO	Kazakhstan	The Model Project for Increasing the Efficient Use of Energy Using a Gas Turbine Cogeneration System	62,000
2002.12.12	CDM	Toyota Tsusho Co.	Brazil	V&M Tubes do Brasil Fuel Switch Project	1,130,000
2003.3.22	CDM	Electric Power Development Co., Ltd.	Thailand	Rubber Wood Residue Power Plant Project in Yala	60,000
2003.7.15	CDM	INEOS Fluor Japan Ltd.	South Korea	HFC Decomposition Project in Ulsan	1,400,000
2003.7.29	CDM	The Kansai Electric Power Co., Inc. (on behalf of e7 fund)	Bhutan	e7 Bhutan Micro Hydro Power CDM Project	500
2003.12.03	CDM	Japan Vietnam Petroleum Company	Vietnam	Rang Dong Oil Filed Associated Gas Recovery and Utilization Project	680,000
2004.5.19	CDM	Sumitomo Corporation	India	Project GHG Emission Reduction by Thermal Oxidation of HFC-23 in Gujarat	3,380,000
2004.6.29	CDM	Chubu Electric Power Co., Inc.	Thailand	A.T.Biopower Rice Husk Power Project	84,000
2004.7.22	CDM	Electric Power Development Co., Ltd.	Chile	Graneros Plant Fuel Switching Project	14,000
2004.10.1	CDM	Tokyo Electric Power Co., Inc.	Chile	Methane Capture and Combustion of Swine Manure Treatment for Peralillo	79,000
2004.10.1	CDM	Tokyo Electric Power Co., Inc.	Chile	Methane Capture and Combustion of Swine Manure Treatment for Corneche & Los Guindos	84,000
2004.10.1	CDM	Tokyo Electric Power Co., Inc.	Chile	Methane Capture and Combustion of Swine Manure Treatment for Pocillas and La Estrella	249,000

Source) : Ministry of Economy, Trade and Industry News Release 2004.10.1.

Apart from CDM and JI projects, several firms are making contributions the World Bank's Carbon Fund and the JGRF. Effectuation of the Kyoto Protocol is likely to quicken approaches to use of the flexibility mechanisms in Japan as well.

FigureI- 4 Japanese firms contributing to the World Bank Carbon Fund

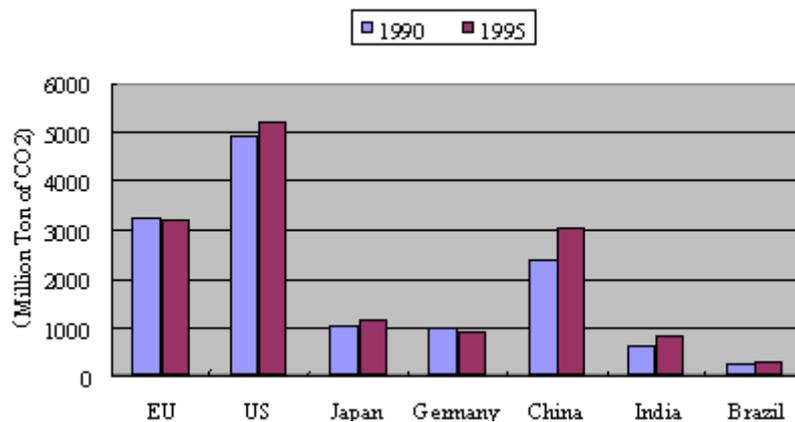
World Bank Carbon Fund	Minimum Contribution	Participating Japanese firms
Prototype Carbon Fund (PCF)	US\$5 million	Chubu Electric Power Co., Inc Chugoku Electric Power Co., Inc. Kyusyu Electric Power Co., Inc Mitsubishi Corporation Mitsui & CO., Ltd Shikoku Electric Power Co., Inc. Tokyo Electric Power Co., Inc. Tohoku Electric Power Co., Inc.
Community Development Carbon Fund (CDCF)	US\$2.5 million	Daiwa Securities SMBC Principal Investments Co., Ltd. Idemitsu Kosan Co., Ltd Nippon Oil Corporation Okinawa Electric Power Co., Inc
BioCarbon Fund (BCF)	US\$2.5 million	Tokyo Electric Power Co., Inc. Okinawa Electric Power Co., Inc

Source) : Information from <http://carbonfinance.org> (accessed July 24,2004)

3. Status of GHG emissions

In terms of tons, the CO₂ emissions from India are on approximately the same level as those from Germany or Japan, but they increased over the years 1990 - 1995. CO₂ emissions from China are about three times as high as those from India. Japan emits about 1 billion tons of CO₂ per year. To attain its Kyoto Protocol target of a 6-percent reduction, it will therefore have to reduce these emissions by about 60 million tons.

FigureI- 5 Comparison of CO₂ emission levels in various countries

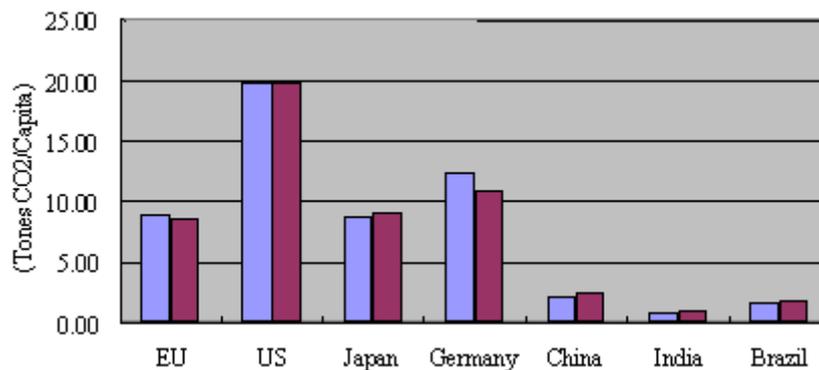


Source) : TERI Energy Data Directory and Year book 2002/3 p.446, Figure 19.

Original Source) : TERI(1999) "Climate of Concern: Bridging the Gap" p.163

In per capita terms, in contrast, India's CO₂ emissions are only about one-tenth as high as those in Japan. In the same terms, the ratio of China's to Japan's is about 1:3.5.

FigureI- 6 Comparison of per capita CO₂ emission levels



Source) : TERI Energy Data Directory and Year book 2002/3 p.447, Figure 20.

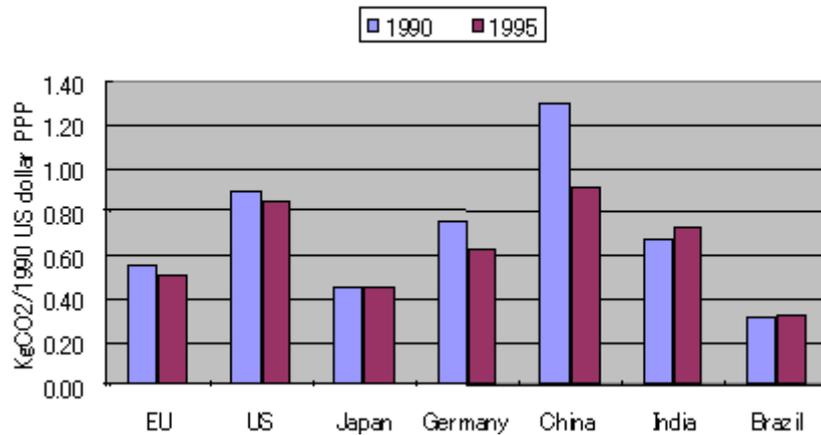
Original Source) : TERI(1999) "Climate of Concern: Bridging the Gap" p.163

At any rate, India's level of emissions in these terms is much lower than Japan's.

In terms of purchasing power parity, in contrast, India's GHG emissions are higher than Japan's.

This indicates that India's CO2 emissions are high for its purchasing power. One of the chief causes is presumably the energy efficiency of the equipment used in India, which is much lower than that in Japan. This suggests that India would find it easier to reduce emissions by improving equipment efficiency than would Japan.

FigureI- 7 CO2 emission levels in PPP terms



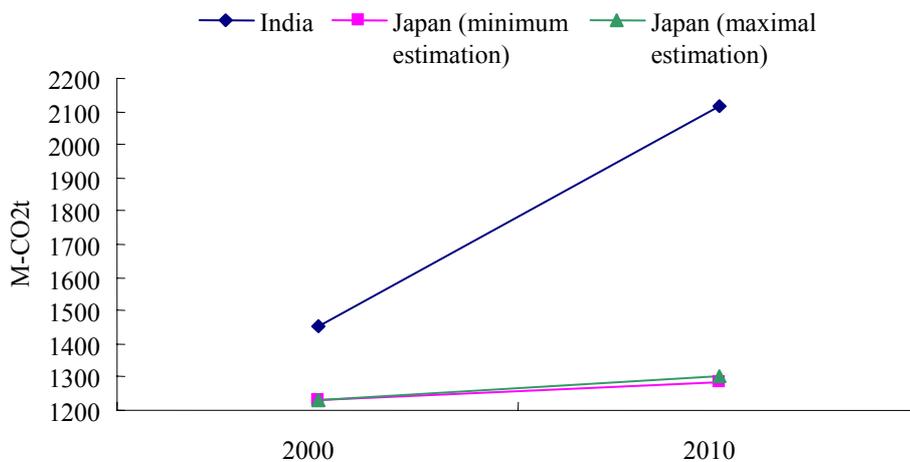
Source) : TERI Energy Data Directory and Year book 2002/3 p.447, Figure 21.

Original Source) : TERI(1999) "Climate of Concern: Bridging the Gap" p.163

In other words, India's current emission levels are lower than Japan's in absolute and per capita terms but higher in purchasing power parity terms.

To view the future outlook, the Asian-Pacific Integrated Model (AIM) was used to forecast the trend of GHG emissions in CO2 equivalent. The results are shown in FigureI-8. It can be seen that India's emissions are expected to increase much more rapidly than Japan's. Considering this huge forecast level, it will undoubtedly be crucial to curtail India's emissions.

FigureI- 8 Forecast of CO2 emissions in Japan and India by the AIM



Source) : P.R. Shukla etc. "Conclusion: Policy Insights, AIM Cooperation and Road Ahead", Climate Policy Assessment for India, p.178, Table8. And "Kongo no Chikyu Ondanka Taisaku ni Tsuite" ("Future Measures to Prevent Global Warming"), the interim report of the global environment subcommittee of the environment committee of the Industrial Structure Council (August 2004), page 48.

4. India as a partner in measures for global warming prevention

As noted in the comments on comparison in PPP terms, India is thought to have a higher prevalence of inefficient energy utilization equipment. It is one of the non-Annex-I countries, and efforts to reduce GHG emissions in India could be more efficient than those in Japan. If so, it would make more sense for Japan and India to cooperate in measures to prevent global warming.

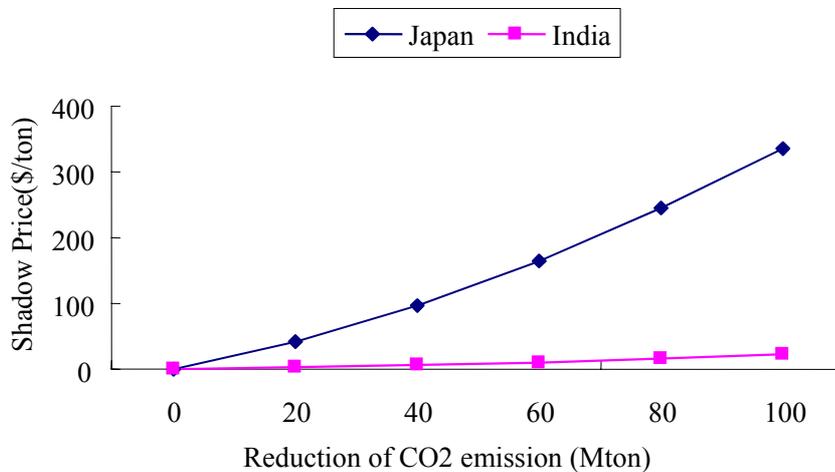
In this connection, a comparison was made between India and Japan in respect of the marginal reduction cost curve. This comparison applied MIT (?) estimates.

Based on the MIT estimates, the marginal reduction cost in India is lower than that in Japan at all reduction levels. At a reduction of 60 million tons, which represents Japan's 6-percent target, the gap is just under 200 dollars per ton. Cooperation between the two in reduction of CO2 emission levels may therefore be expected to hold much benefit for Japan as well as for India.

FigureI- 9 Estimated coefficients of marginal GHG reduction cost

	a	b	R2
Japan	0.0155	1.8160	0.9938
India	0.0015	0.0790	0.9970

Estimated Model $P(\$/\text{ton})=aQ^2+bQ$ (Q=Carbon emissions reduction, Mton)



Source) :A. Denny Ellerman, Henry D. Jacoby and Annelene Decaux, "The Effects on Developing Countries of the Kyoto Protocol and CO2 Emissions Trading", p.31

Because the MIT coefficients were on the total basis, FigureI-10 presents the units of reduction on the field-specific basis for reference purposes.

FigureI- 10 Units of GHG reduction in India

Technology	Greenhouse gas emissions reduction	Investment cost	Cost-effectiveness (dollars/tonne CO ₂)
Transport sector			
CNG (compressed natural gas) car	0.017 kilogram/passenger kilon	10 965 dollars/unit	4 500
CNG bus	0.41 kg/P-km	31 000 dollars/unit	12
Mass rapid transport system	—	1.4 billion dollars	0
BOV (battery-operated vehicle) (three-w	—	2 444 dollars/unit	0
Two-wheeler (four-stroke)	0.0014 kg/P-km	1 156 dollars/unit	30 000
Renewable energy for power			
Small hydro	1.3 kg/kWh	1 950 dollars/kilowatt	88
Wind farms	1.3 kg/kWh	1 405 dollars/kW	257
Biomass	1.6 kg/kWh	710 dollars/kW	102
Solar thermal	1.3 kg/kWh	3 730 dollars/kW	592
Solar PV (photovoltaic)	1.6 kg/kWh	5 952 dollars/kWp	541
Agriculture sector			
Agro-based gasifier	1.6 kg/kWh	760 dollars/kW	119
Wood-based gasifier	1.6 kg/kWh	694 dollars/kW	115
Wind-based shallow pumping	1.6 kg/kWh	1,157 dollars/kW	173
Wind-based deep wells	1.6 kg/kWh	2,149 dollars/kW	176
PV pump	1.6 kg/kWh	8,598 dollars/kWp	1,602
Power generation			
Cogeneration	1.50 kg/kWh	900 dollars/kW	10
Combined cycle	0.96 kg/kWh	818 dollars/kW	54
Inter-cooled steam injected gas turbine	0.76 kg/kWh	947 dollars/kW	77
Pressurized fluidized bed combustion	0.18 kg/kWh	1894 dollars/kW	503
Integrated gasification combined cycle	0.23 kg/kWh	1578 dollars/kW	340
Pulverized coal super-critical boilers	0.18 kg/kWh	1202 dollars/kW	342
Coal washing	0.125 kg/kWh	11 dollars/tonne a year	179
Domestic lighting			
Compact fluorescent lamps	6.49 teragram/year	8 dollars/unit	—
36 watt fluorescent	0.09 Tg/year	0.9 dollars/unit	—

Source

ADB (Asian Development Bank) 1998. **Asia Least-cost Greenhouse Gas Abatement Strategy**. Manila, The Philippines: ADB

II. Current status of India

1. Recent situation

Recent years have seen the rise of a new middle class with margin for purchase of automobiles, electrical appliances, and other durable consumer goods in India. One of the main factors thought to lie behind this rise is economic stabilization, as represented by the average GDP growth rate of over 6 percent for the period 1992 - 1999, the narrowing of its range of fluctuation, and improvement of the macro balance. Another is the evident shift from the public to the private sector as the main force in investment. An additional one is the steady expansion of the service sector led by IT outsourcing.

Nevertheless, India still faces problems such as an absolute shortage of infrastructure (power, railways, roads, etc.), the lack of prospects for shrinkage of the fiscal deficit on the state and national levels, and the decrease in the annual average rate of increase in production of foods and grains.

This chapter views the recent trend of India's status, economy, and finances, and sets forth the need for involvement by Japan and other developed countries in the solution of its problems in light of its tremendous size, even with efforts by the Indian government.

2. Status

1) Outline

In physical area, India is about ten times as large as Japan. This multiplier is about the same as that for population. Although the country is about ten times as large, the budget in the general governmental sector is only about one-tenth high as Japan's. While the government is taking measures for various domestic problems, the existence of the 100-fold gap is one reason why they are not having much effect.

Figure II-1 Comparison of Japan and India in respect of area, population, and governmental budget (FY2000)

Japan		India
378	Area (thousands of Km ²)	3288
1.27	Population (hundreds of millions, 2002)	10.05
89 trillion yen (31.8 trillion Rs)	National government budget (general account)	2.78 trillion Rs
157 trillion yen (56.1 trillion Rs)	Total budget in the governmental sector (ordinary account)	5.96 trillion Rs

Source) : prepared from the Indian and Japanese official budget statements.

2) Population

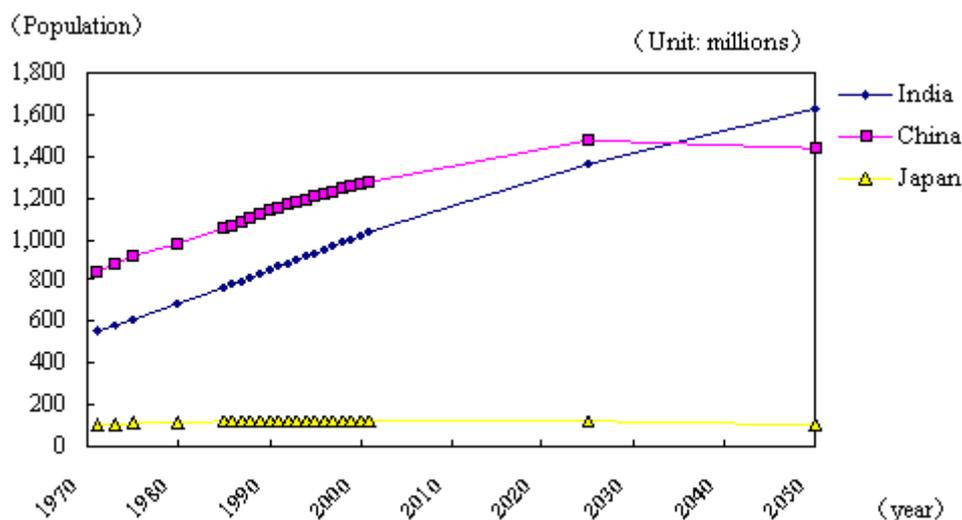
According to data from the United Nations Population Fund (UNFPA), in 2004, India had a population of about 1,081.2 million, the highest in the world after China at 1,313.3 million. The world population came to about 6,377.6 million, and India accounted for a remarkable 16 percent of it.

As shown in the figure below, India's population has been steadily increasing since 1970 and grew at a very high average annual rate (1.8 percent) over the years 1990 - 2000 (according to the 2002 World Bank report). In contrast, China's population, the largest in the world, has been growing, but at a decreasing rate that has been under 1 percent in recent years, partly due to the "one-child" policy taken to curtail the pace of growth. In 2004, the rate of increase was only 0.7 percent, much lower than those of the past. In 2002, India posted a growth rate of 1.5 percent, which was somewhat lower than those of the 1990s, but still higher than the corresponding world average of 1.2 percent. India's population is anticipated to continue increasing.

The Population Reference Bureau made a projection of India's population as of 2025 and 2050 on the assumption of continuation of the current trend. The population is projected to pass the 1.6-billion mark in 2050, overtake that of China, which is anticipated to record negative population

growth beginning before that year, and make India the most populous country in the world.

FigureII-2 Population trends (India, Japan, and China)



Source) : data from the UNFPA and the Institute of Energy Economics, Japan; forecasts for 2025 and 2050 are from the Population Reference Bureau.

3) Infrastructure

Properly speaking, discussion of infrastructure must consider social capital, institutional capital, and other elements of the "soft" infrastructure. The discussion in this section, however, shall be confined to the "hard" infrastructure elements that provide the foundation for economic activities, such as roads and communications.

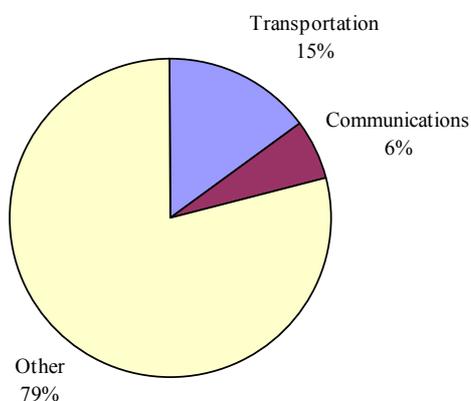
Infrastructure may be characterized (defined) as follows (see Note 1).¹

- * Necessary but not directly contributing to production
- * Absolutely required in advance of development
- * Cannot be imported
- * Fixed in place
- * External economy
- * Supplied by state governments

Infrastructure is the underlying support of economic activities. The elements here are communications, roads, road transport, marine transport, railways, and air transport. While transmission lines and other components of the power sector are also included, these will be treated separately in the section on energy. Infrastructure (transportation and communications) accounts for 21.3 percent of all expenditures in the tenth five-year plan (2002 - 2007).

¹ P.R.Shukla Subdoh K. Sharma~ "Climate Change and India ~ Vulnerability Assessment and Adaptation"Ch.9

Figure II-3 Composition of the tenth five-year plan (from 2002 to 2007)



Source) : prepared by the Planning Commission

Current status of infrastructure in India (see Note 2)²

This section sets forth the status of infrastructure in India by sector, i.e., communications, roads, marine transport, railways, and air transport.

² Based on pp. 335 - 376 of 2003 edition of the "Indian Economic and Industrial Data Handbook," AID International, Ltd.

i) Communications

Although the number of fixed-circuit subscribers is declining in Japan, it is steadily increasing in India and now reaches about 40 million.

Figure II-4Number of telephone subscribers

	Installed capacity of fixed circuits in India (tens of thousands of circuits)	Number of NTT telephone subscriptions (tens of thousands of contracts)
1990	582	-
1991	678	-
1992	797	5,760
1993	980	5,878
1994	1,203	5,988
1995	1,463	6,104
1996	1,774	6,146
1997	2,126	6,038
1998	2,605	5,847
1999	3,277	5,544
2000	3,991	5,209
2001	-	5,074

Source) : prepared from the 2001 edition of the Indian Department of Telecommunication Annual Report and data from the Japanese Ministry of Internal Affairs and Communications (MIC)

ii) Roads and road transport

In India, the extended length of roads increased by about 30 percent over the past ten years. Japan recorded a corresponding increase of only about 5 percent during the same period (excluding expressways). This underscores the rapid pace of road construction in India.

Figure II-5 Extended length of roads

Km, as of March 31	India			Japan
	A. Highway	B. City street	C. Project roads	Ordinary roads
1991	1,601,684	186,799	209,737	1,115,592
1992	1,619,604	189,352	212,485	1,119,790
1993	1,633,010	195,150	222,057	1,125,482
1994	1,651,891	202,013	224,606	1,130,778
1995	1,678,902	204,577	225,481	1,136,631
1996	1,843,922	212,920	245,673	1,141,600
1997	1,917,335	231,573	249,880	1,146,092
1998	1,952,213	236,055	269,427	1,149,969
1999	2,017,600	237,866	270,523	1,155,439

Note: The term "project roads" indicates roads built for a specific purpose related to forestry, irrigation, electrical power, etc. Such roads correspond to farm and port roads in Japan.

Source) : prepared with data from the Indian Ministry of Road Transportation & Highways and the Japanese road statistical annual (2003).

Over the 25-year period beginning in 1975, the number of vehicles on the road underwent an approximately 2.5-fold increase in Japan as compared to a roughly 20-fold increase in India. Over the last ten years, automobile ownership in India has doubled. In the recent past, there has been a decline in the rate of increase in the number of buses and rise in that of trucks. This contrasts with the trend in Japan, where the number of trucks in 2000 was less than in 1990.

Figure II -6 Number of registered vehicles

Thousands of vehicles	India				Japan			
	Registered vehicles	Subtotal of private automobiles	Subtotal of trucks	Subtotal of buses	Ownership volume	Subtotal of passenger cars	Subtotal of buses	Subtotal of freight vehicles
1975	2,472	766	335	114	28,366	17,378	220	10,768
1980	4,521	1,059	473	140	37,915	23,646	229	14,040
1985	9,170	1,607	822	223	46,151	27,790	231	18,130
1990	19,152	2,694	1,238	298	57,669	35,152	246	22,271
1991	21,374	2,954	1,356	331	59,802	37,311	248	22,243
1992	23,507	3,205	1,514	358	61,515	39,165	248	22,102
1993	25,505	3,361	1,603	364	63,228	41,061	247	21,920
1994	27,660	3,569	1,691	392	64,992	42,956	245	21,791
1995	30,295	3,841	1,794	423	66,950	45,069	243	21,638
1996	33,786	4,204	2,031	449	68,618	47,215	242	21,162
1997	37,332	4,672	2,343	484	69,719	48,684	240	20,795
1998	41,368	5,138	2,536	538	70,562	49,968	237	20,357
1999	44,875	5,556	2,554	540	71,460	51,222	236	20,001
2000	48,393	6,042	2,681	559	72,370	52,449	236	19,685
2001	-	-	-	-	73,067	53,487	234	19,345

Source) : prepared with data from the Indian Ministry of Road Transportation & Highways and the Japanese road statistical annual (2003).

iii) Marine transport

Whereas the number of merchant ships (excluding cargo ships) has declined in Japan over the last 30 years, it has more than doubled in India. Nevertheless, the number in Japan is still six times as high as that in India.

Figure II -7 Number of merchant ship bottoms

Number of merchant ships	India			Japan
	Coastal	Ocean-going	Total	
1971	62	193	255	4,147 ^{notel}
1981	65	338	403	4,559
1985	95	273	368	4,578
1989	151	254	405	3,797
1990	16	256	272	3,990
1991	169	246	415	4,047
1992	187	254	441	4,082
1993	202	241	443	4,231
1994	206	231	437	4,073
1995	219	251	470	3,899
1996	231	253	484	3,835
1997	232	244	476	381
1998	247	237	484	3,685
1999	269	21	290	3,567
2000	312	237	549	3,343
2001	329	228	557	3,316

Note: 1970 data

Source) : prepared with data from the Indian Ministry of Shipping and the Japanese marine transport handbook (the base data are from Lloyd's shipping statistics).

iv) Railways

The extended length of railway track has not changed much in recent years. In India, rail transport dates from the days of British colonization and has a history of more than 100 years. In contrast, the trends of the freight volume and number of passengers each show an approximately 20-percent increase over the five-year period beginning in 1996. In addition, the transport volume has increased by about 10 percent on the ton-kilometer basis and 30 percent on the passenger-kilometer basis. These figures indicate a decline in the average transportation distance for freight and increase in that for passengers.

Figure II -8 Indian railway statistics

	1996	1997	1998	1999	2000	2001
Extended length of track (100 km)	62.8	62.5	62.8	62.8	63.0	N.A.
Freight transport volume (MT)	423.4	445.5	441.6	478.2	504.2	521.2
Freight transport (billion ton-	280.0	286.8	284.3	308.0	315.5	336.4
Number of passengers (million)	4,153.0	4,348.0	4,411.0	4,585.0	4,833.0	5,093.0
Passenger-kilometers (million	357.0	380.0	403.0	430.7	457.0	493.5

Source) : Ministry of Railways

v) Air transport

Domestic air transport service is in supplied by Indian Airline and private carriers, and international air transport service, by Indian Airline and Air India. The infrastructure is managed by the Airports Authority of India (AAI). Two leading firms have the status of designated private carriers, and carried a total of 6.7 million passengers (52.6 percent of the total) in 2001.

The number of aircraft has not changed much over the last five years. There also has not been much change in the number of passengers. There has, however, been an increase in the number of transit passengers and the cargo handling volume. This indicates an increase in the number of passengers and cargo handling volume of non-government carriers.

Figure II -9 Air transport statistics

		1996	1997	1998	1999	2000	2001
Number of aircraft (planes)	Air India	28.0	26.0	26.0	26.0	26.0	28.0
	Indian Airline	54.0	54.0	53.0	53.0	52.0	53.0
Number of passengers (hundreds of thousands)	Air India	29.5	30.6	31.7	33.5	33.0	31.3
	Indian Airline	81.7	83.8	80.1	59.3	59.9	55.3
Number of transit passengers (hundreds of		364.9	365.3	369.7	390.0	420.3	399.8
Cargo handling volume (thousands of tons)		681.2	705.9	699.0	97.0	842.2	854.3

Source) : Ministry of Civil Aviation

vii) Conclusion

In India, the availability of infrastructure and services varies depending on the city. In big cities, it is also possible to procure funds from the capital market.

Municipal entities and state development departments have a lot of influence on development of urban infrastructure. The City Challenge Fund (CCF) was instituted to support the reform of municipal entities. In this connection, results are being achieved by certain programs, such as Megacity, Integrated Development of Small and Medium Towns (IDSMT) and AUWSP (for accelerated expansion of the urban water supply). The IDSMT was initiated in 1979 and is under way in 1,310 medium and small cities. The Megacity program began in 1993 and is making progress in the five cities of Mumbai, Kolkata, Chennai, Hyderabad, and Bangalore. Support from the national government is limited in terms of both funding and the scope of cities. In fiscal 2001, the government recognized 100-percent foreign direct investment (FDI) in urban infrastructure, but such projects have not yet materialized, due to constraints related to land acquisition and use in cities.

Formerly, there was little interest in high-speed mass transit systems in major cities, but the picture has been changing in recent years, as evidenced by the placement of the Metro into service in Delhi. The JBIC is providing soft loans for this program. The completion of the first phase is expected to result in a decrease of 2 million passengers per hour per day in automobile transport, a savings of 5 billion rupees per year in fuel costs, a reduction of 2,500 in the number of buses, and an increase in the average bus speed from 10.5 to 14.5 kilometers per hour.

3. Diplomacy

1) Recent diplomatic stance

Backed by its population, which is projected to top 1.5 billion in 2050, India has recently been diplomatically active in various fields, including economics, international politics, and disaster relief. In the economic sphere, it is deploying a "Look East" policy for expansion of its trade with the ASEAN member countries, and has concluded an FTA with Thailand as a first step in this direction. On the international political scene, it is, like Japan, taking action aimed at becoming a permanent member of the UN Security Council. In the field of disaster recovery, it refused to accept donations and teams from other countries in the wake of the Sumatra tsunami in December 2004 and is endeavoring to achieve a recovery on the strength of its own efforts.

While these moves have elicited comments about emphasis on pride and dignity, the Indian government is not oriented toward isolationism; it is instead developing an autonomous foreign policy.

2) Status of Japan-India relations

Japan has maintained amicable ties with India ever since the establishment of relations in 1952. The two countries reached an agreement on the construction of a "global partnership" in the 21st century on the occasion of the visit by then-Prime Minister Yoshiro Mori in August 2000. They subsequently released a joint communique on the occasion of the visit to Japan by then-Prime Minister Atal Bihari Vajpayee in December 2001. This was followed in 2003 by a visit to India by Yoriko Kawaguchi, then-Minister of Foreign Affairs.

The Ministry of Foreign Affairs (MOFA) intends to further strengthen ties with India in line with its perception of that country as the largest in Southwest Asia as well as the largest in the world after China, and in light of the many unstable countries in Southwest Asia (such as Afghanistan), the need for heightening India's stability, and India's importance for sea lane security.

In December 2003, a symposium open to the public was held on the subject of strategy for mutual cooperation in the new age keyed by India's emergence as a global power. This symposium served as a venue for a deepening of discussion on future Japanese approaches to cooperation with India. It could also be taken as an indication of India's growing importance to Japan in the economic aspect as well.

Extension of Japanese ODA to India was temporarily suspended in response to India's development and testing of nuclear arms, but India was the top recipient of the same in fiscal 2003. The main factors behind this No. 1 rank are as follows: 1) the contraction of ODA for China, which had been roundly criticized as too generous; 2) the increased presence of India as an investment destination to follow Southeast Asia by virtue of its large population and rapid GDP growth, coupled with a recognition of the need for infrastructural conditioning there; and 3) a large impoverished class and other features indicating deep needs for aid. In addition, the two countries have confirmed policy for joint efforts toward the goals of building a global partnership and winning permanent seats on the UN Security Council. Relations between the two countries may therefore be

termed extremely favorable (see Note 3)³

³ From the MOFA website.

4. Economy

1) Economic situation

(1) Trend of economic indicators

India's rate of GDP growth was somewhat low from (fiscal) 1991 to 1993, when the country was under supervision by the International Monetary Fund, but has stabilized and been in the area of 7 percent in more recent years. Meanwhile, the inflation rate has subsided to that of 5 percent (in terms of wholesale prices). There has been some fluctuation in retail prices.

As for the balance of international payments, India has been posting surpluses in both the trade and current balances, and its foreign exchange reserves are steadily building. Nevertheless, the amount of FDI comes to just a little over 1 percent of the GDP.

Although economic transactions with other countries are on a low level overall, stable growth is apparently being driven by the expansion of the domestic market.

Figure II -10 Indicators for the Indian economy

	実質GDP成長率(%)	インフレ率(%)		国際収支(対GDP比率:%)			外貨準備残高
		卸売物価	消費者物価	貿易収支	経常収支	外国投資	
FY1991	1.5	13.7	13.5	-1.0	-0.3	0.1	92.2
FY1992	4.5	10.1	9.6	-2.3	-1.7	0.2	98.3
FY1993	6.0	8.4	7.5	-1.5	-0.4	1.5	192.5
FY1994	7.0	12.5	10.1	-2.8	-1.0	1.5	251.9
FY1995	7.3	8.1	10.2	-3.2	-1.7	1.4	216.9
FY1996	7.5	4.6	9.4	-3.9	-1.2	1.6	264.2
FY1997	5.0	4.4	6.8	-3.8	-1.4	1.3	293.7
FY1998	6.8	5.9	13.1	-3.1	-1.0	0.6	324.9
FY1999	6.4	3.3	3.4	-3.8	-0.9	1.2	380.4

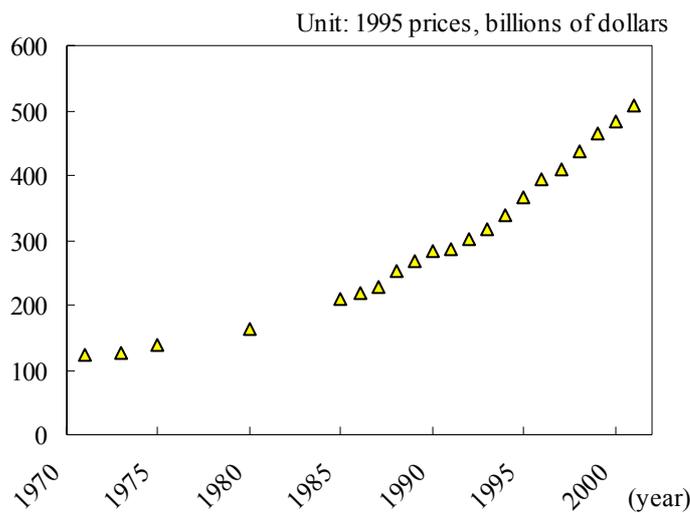
Source) Reserve Bank of India, *Handbook of statistics on Indian Economy*, various year

The succeeding section views the trend of the GDP and its level per capita of population.

i) India's GDP

FigureII-11 shows the trend of India's real GDP. It can be seen that the total amount showed a steep increase beginning in the late 1980s and reached 508 billion dollars in 2001. This figure is the fourth-largest in Asia. In 2003, India recorded GDP growth of 8.2 percent. The causes of this growth include the firm trend of agricultural production due the favorable monsoon season, the quickening of corporate activities, and (above all) the high rates of growth in the manufacturing and service sectors. Over the years 2000 - 2002, however, the GDP growth rate was much lower, on the order of 4 percent. The sag stemmed from factors such as the jump in international crude oil prices, the overall deceleration of the global economy, and other external factors as well as internal ones including a big decline in production in the agricultural sector, which is at the core of the industrial structure, due to drought in the monsoon season. Although the rate of GDP growth is consequently unstable because of susceptibility to various influences, India is anticipated to continue achieving generally high rates of economic growth.

Figure II -11 GDP trend

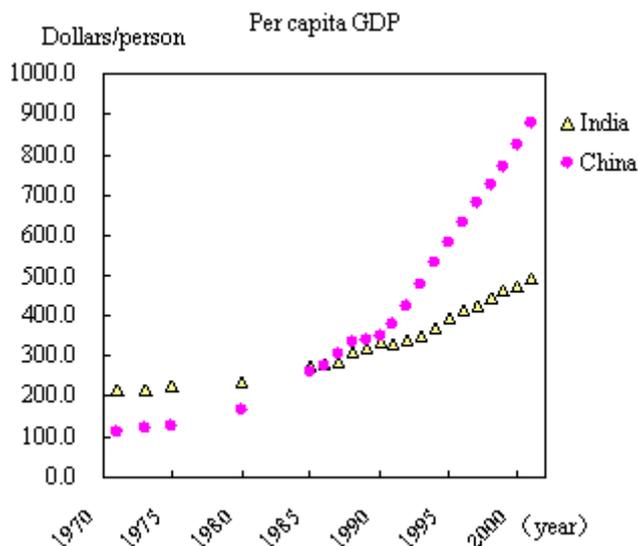


Source) : Institute of Energy Economics (IEE), Japan

ii) Per capita GDP

As noted in the preceding section on population, India has a vast population, and this gives it a GDP which is among the highest in the world in absolute terms. In per capita terms, in contrast, it's GDP level is very low; it came to only about 470 dollars in 2002. This section compares the trend of per capita GDP with that in China, the most populous country in the world. In the late 1970s, both China and India had a per capita GDP of about 200 dollars. At present, however, the Chinese figure of about 950 dollars is nearly twice as large as the Indian one of about 470 dollars. The chief cause of this gap is the difference in respect of acceptance of FDI. China has accepted a lot of FDI in anticipation of its steady economic advancement, and this has added further impetus to that advancement. The fact is that China greatly broadened its acceptance of FDI after instatement of the liberalization line. In 2002, its incoming FDI amounted to 52.74 billion dollars. In India, on the other hand, incoming FDI in the same year was much lower at only 4.3 billion dollars. This gap is linked to that in respect of per capita GDP. In view of its increasing population and economic trend, India is widely expected to become an attractive market, and to make dramatic economic strides. This would be reflected in increasing FDI and a gradual rise in the per capita GDP (see the ARC report).

Figure II -12 Per capita GDP



Source) : calculations from population and GDP data.

(2) Course of economic policy

This section summarizes the type of economic policy taken under the main administrations since independence.

i.) Indian independence (1947) and subsequent years

After winning independence, India strove for maximum effective use of domestic resources under a managed economy that leaned toward socialism. It also emphasized development of heavy industries and promoted import-replacing industrialization.

ii.) Narashimha Rao administration (1991 - 1996)

The Rao administration embarked on a program of substantial economic reform. The onset of the foreign exchange crisis experienced under the managed economy of the socialistic order prompted a shift to a line of economic liberalization. The specific steps taken included relaxation of regulations regarding industrial licensing, active acceptance of FDI, reform of the trade system, currency devaluation, and switch to a floating exchange rate. As a result, the average economic growth rate reached 6 percent during the 1990s. (This administration fell after its defeat in the 1996 general elections, and the domestic political situation remained fluid until 1999.)

Under the banner of a "second generation" of economic reform, the National Democratic Alliance administration pursued a rebuilding of the national finances and structural adjustment. Besides implementing tax reform and cutting expenditures, it set about reforming policy on industry, trade and exchange, and finances. Its action led to strong economic growth and the emergence of a large middle class.

iv.) UPA administration (May 2004 -)

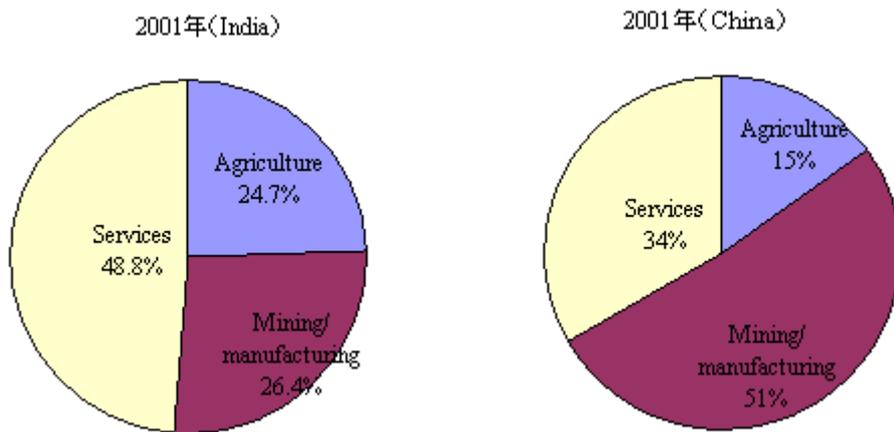
The United Progressive Alliance administration emphasizes measures for rural communities, poverty, and employment, and aspires to economic growth accompanied by jobs. Specifically, it is aiming for job-creating economic growth at rates on the order of 7 or 8 percent. It also espouses economic reform with compassion. It has taken a stance of active reform including a hike in the ceiling on foreign interest in joint ventures and investment liberalization in infrastructural fields. This attitude, however, has been overshadowed by its caution on issues such as amendment of labor law and privatization of state enterprises, which could have a bigger impact on employment (reference: the MOFA website).

(3) Industrial structure in India

i). Breakdown of GDP by sector in India and China

A breakdown of the 2001 GDP by industrial sector shows that agriculture accounted for a share of about 25 percent. The corresponding share in China was only 15.2 percent, and underscores the deep dependence on agriculture in India. The biggest difference from China is the reversal of the shares occupied by mining/manufacturing and services. In India, the highest share belongs to the service sector.

Figure II -13 GDP breakdowns by sector in India and China (2001)

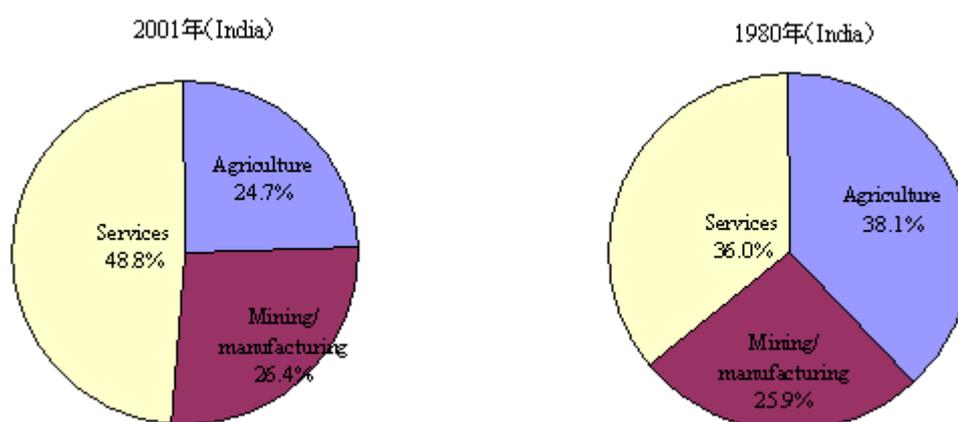


Source) : Asian Development Bank

ii). Breakdown of GDP by sector in 1980 and 2001

Comparison of the GDP breakdowns by sector in 1980 and 2001 reveals a substantial contraction of the agricultural share and expansion of the service share, indicating the shift in the economic structure toward the service sector.

Figure II -14GDP breakdown by sector in India



Source) : Asian Development Bank

(4) Trade

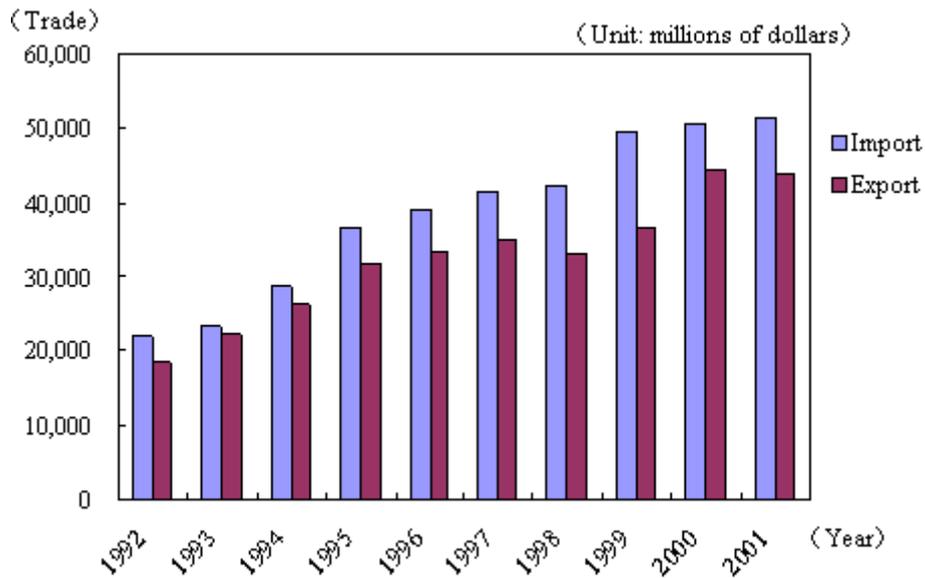
i).Aggregate trade

As shown in FigureII-15, India's export and import have been steadily growing.

In 2001, India's main export items were jewelry/precious metals, ready-made clothes, crude oil/petroleum products, cotton yarn/cotton goods, and medicine/fine chemicals. It also exported high-value-added products such as computer software and pharmaceuticals. Although such items occupy a small share, their export is anticipated to expand. In contrast, the share occupied by the traditional items such as raw cotton, tea, coffee, and spices is in decline. The main import items in 2001 were oil and petroleum products, followed in order by pearls/jewelry, gold/silver, chemical products, and general machinery.

Developed countries such as the United States of America, the United Kingdom, Germany, and Japan take the majority of India's export. However, their share is headed for decline over the long term, and big increases have been recorded in those occupied by China, Singapore, and the United Arab Emirates. India's main Source) s of import are also developed countries such as the United States, the United Kingdom, Japan, and Germany. As in the case of export, the share occupied by these countries is contracting along with the big expansion of that held by China.

Figure II -15 Trend of India's import and export



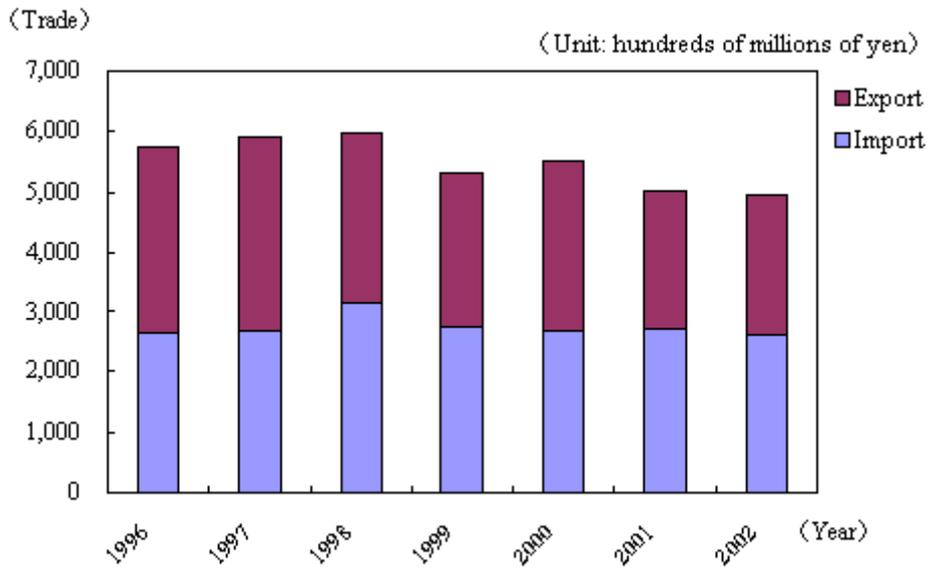
Source) : AID International, Ltd., Indian economic and industrial data handbook, 2003 edition (the base data are from DGCI&S)

ii). Trade with Japan

In fiscal 2002, Indian export to Japan amounted to 233.9 billion yen, and consisted mainly of jewelry, marine products, and textile products. The import totaled 262 billion yen and consisted mainly of mechanical equipment and electronics products.

In December 2002, the JIBCC held a joint meeting in Bangalore for participation by groups representing the economic circles of both countries for the purpose of encouraging trade and investment. This was followed by the staging of talks on public-private investment by governmental and business representatives from each country in Delhi in January 2003, and the trade talks, also in Delhi, in February 2004.

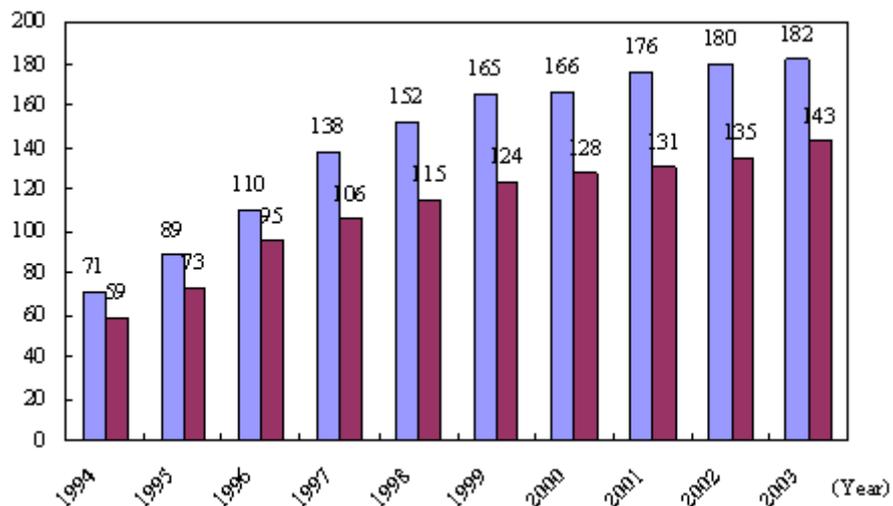
Figure II -16 Indian trade with Japan (notification basis)



Source) : MOFA website <http://www.mofa.go.jp>

Japanese firms are actively developing business in India. As shown in Figure II -17, there has been a steady increase in the number of corporate establishments and siting firms from Japan in India.

Figure II -17 Number of Japanese establishments and siting firms in India



Source) : Toyo Keizai Shimbun Co., "Overview of the Number of Companies with Offshore Sites" (Japanese title)

iii). Current status of Japanese FDI in India

According to JETRO, Japanese investment in India continues in a trend of significant decline.

Amid this overall decline, investment is running high in the automotive field, which now accounts for about 80 percent of the total (including investment related to components and two-wheeled vehicles). The surge in this field derives from factors such as the siting by many Japanese firms, the ability to Source) components from Indian firms avid about selling to Japanese firms, and other conditions facilitating development of business.

The Indian side is hoping to do work outSource) d from Japanese firms in the IT and biotech fields.

In the IT field, nevertheless, almost all such Indian business is with US firms; transactions with Japan account for only 3 or 4 percent of the total. Outsourcing in the IT field consists largely of call center operations and business process services. The language barrier and difference of business customs hinder development of such business with Japan. In response, IT firms are searching for ways of selling products and packages to Japan.

In the biotech field, transactions with Japan are stagnant due to the inability to find first-rate Indian partners (see Note 4).⁴

iv). Issues in promotion of trade and investment with Japan - focus on "white goods"

In the field of home electrical appliances, too, many Japanese manufacturers have sited in India. In the case of "white goods" (refrigerators, washing machines, etc.), however, LG, Samsung, Whirlpool, and other firms sourcing from indigenous ones have an extremely high share of the Japanese manufacturers, on the other hand, exhibit various sales patterns. Manufacturers that have plants in India (such as Matsushita, which has nine) sell through distributors, while others (such as Sony) sell via ASEAN countries.

This is because, in the case of Japanese firms, there are tough sourcing conditions (Green Partner, etc.) and Indian firms generally cannot clear them Sony, for example, suspended its production in India in July 2004, in the judgment that, under the Thai-India FTA, import of finished TV sets from Thailand would offer lower tariffs.

Because of these constraints, Japanese manufacturers must depend on import for their supply of components, and this drives up costs. The inability to lower their prices in a market weighted toward low-cost goods is presumably one factor behind their low share. JETRO and the Japanese government are seeking more reasonable tariff levels for raw materials, components, and finished products.

The Indian government also is hoping for India's growth as a site of manufacturing, and is currently having relevant matters studied in a task force instituted in the Chemical Committee.

Other factors discouraging siting are taxation (differences from state to state and sudden changes) and the underdeveloped state of the infrastructure (roads and power). The latter compels the construction of back-up facilities, which drives up cost considerably.

⁴ Based on an interview with the JETRO New Delhi Center

v). Approaches by the Japanese government

These days, the focal concerns of the Japanese government are FTA negotiations, the ASEAN countries, and China; there is not much margin for commitment of human resources to deal with trade and investment with India. Nevertheless, the positioning accorded to India as a trade and investment partner is rising.

Against this background, Mr. Shoichi Nakagawa, Minister of Economy, Trade and Industry, paid a visit to India along with members of the Japanese Chamber of Commerce and Industry and the JIBCC. On this visit, he met with ranking officials of the Indian government including Mal Naht (?), Minister of Commerce and Industry, and P. Chidambaram, Minister of Finance, as well as Mr. Yogendra Modi (?), Chairman of the FICCI, and other representatives of the Indian business community.

The Japanese side is proposing the start of dialogue to explore possibilities extending to the conclusion of an economic partnership agreement (EPA) or FTA, and the Indian side concurs with this proposal (see Note 5).⁵

In December 2004, talks between Indian Prime Minister Manmohan Singh and Japanese Prime Minister Koizumi Junichiro yielded an agreement on the launch of a joint study group for closer economic ties between the two countries (see Note 6).⁶

In its international financing operations, the JBIC⁷ utilizes sources such as postal savings, welfare pension insurance, and national pension insurance for base funds for export financing, import financing, investment financing, untied loans, and capital subscription in the overseas projects of Japanese firms.

According to the JBIC, although many Japanese firms want to do business in India, there have been few cases of actual investment over the last few years. The JBIC is considering action to improve the investment climate through untied loans, but such projects have not yet appeared.

As one of the "BRICs" countries, India may seem to be garnering as much attention as China, but there has been little action taken with regard to it among Japanese firms as compared to the latter. The JBIC is of the view that its projects for India depend on the future course of siting by Japanese firms.

Another conceivable approach is partnership between the JBIC and banks in India. Procurement of funds from overseas, however, is thought to have poor prospects due to the great limitations associated with the external commercial borrowing (ECB) guidelines which were revised and enacted in February 2004. Partnership is not under discussion between the JBIC and Indian banks.

⁵ From the website of the Japan Chamber of Commerce and Industry

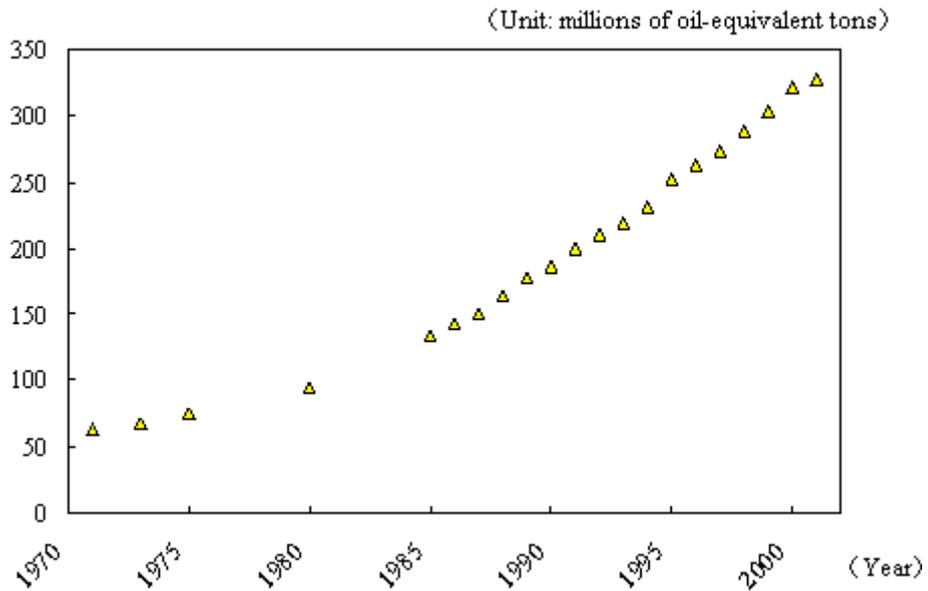
⁶ From the JETRO website

⁷ Based on an interview with the JBIC head office and New Delhi office

(5) Energy consumption

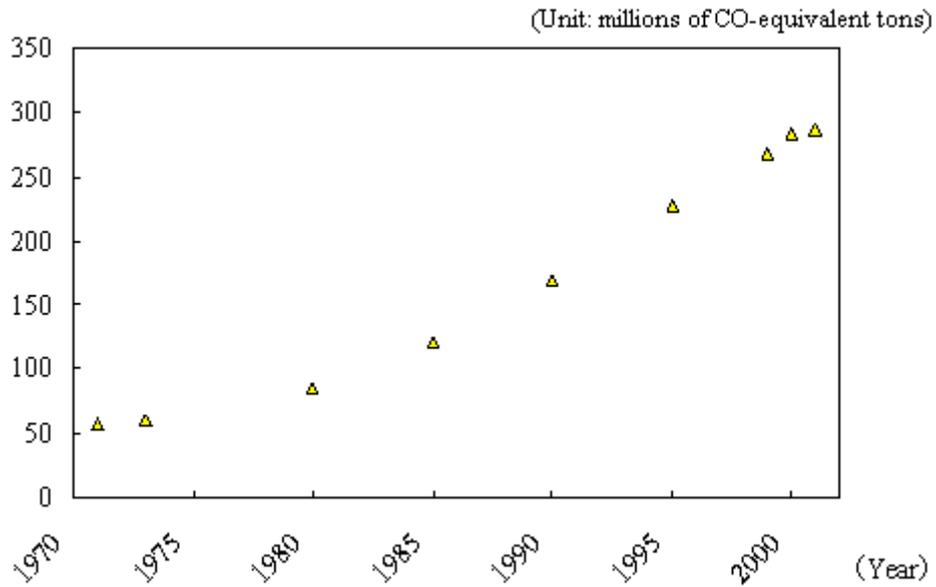
FigureII-18 and FigureII-19 show the trend of primary energy consumption and CO2 emissions in India. It can be seen that both consumption and emission levels have been increasing by the year.

Figure II -18 Primary energy consumption



Source) : IEE-Japan

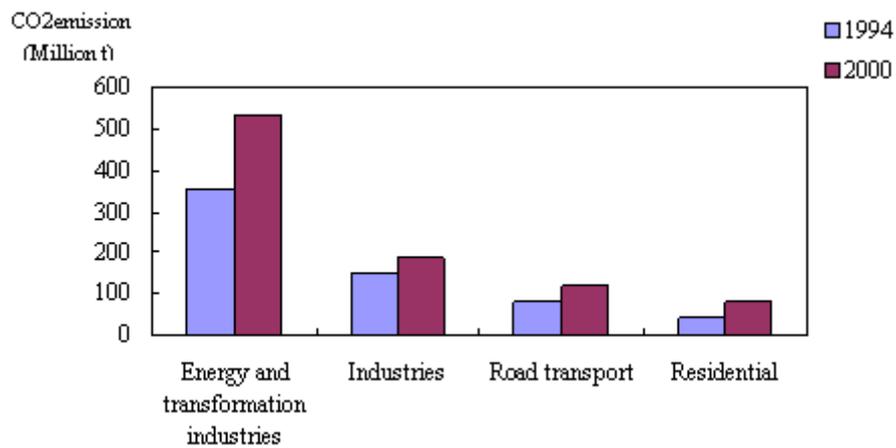
Figure II -19 CO2 emissions



Source) : Ibid

Figure II-20 compares the CO2 emissions accompanying fuel combustion in 1994 and 2000. CO2 emissions rose in each sector. The comparison shows that the increase was biggest in absolute terms in the energy and transformation industries and in rate terms in the residential sector.

Figure II -20 CO2 emissions accompanying fuel consumption



Source) : National Strategy Studies, *CDM Implementation in India*

FigureII-21 shows the breakdown of energy supply and demand in 2000. The residential sector accounted for 218.9 million (oil-equivalent) tons, or 55.8 percent, of the total energy consumption. Taken together, transport and industrial use of fuel amounted to 155.5 million tons, or 39.6 percent.

As for the breakdown by type of fuel, the "other" category had the biggest share at 200.0 million tons, or about half of the total. This pattern is due to the extensive use of brushwood and charcoal as traditional energy reSource) s in Indian homes. India depends on import for about 75 percent of its supply of oil, but its supply of other energy reSource) s is self-sufficient.

Figure II-21 Energy supply and demand

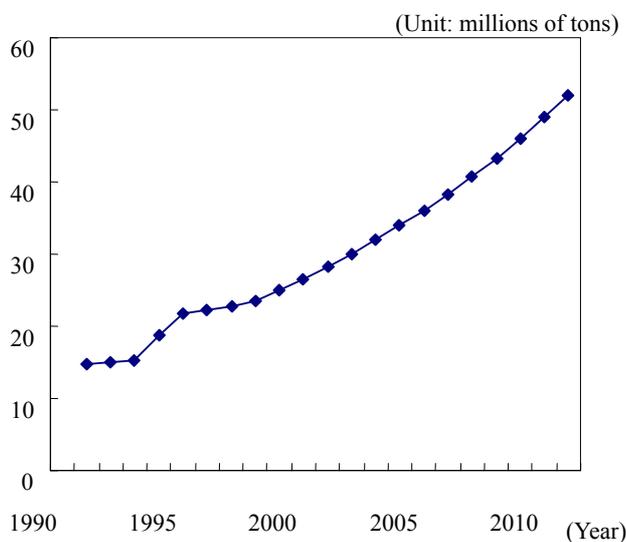
(Unit: millions of tons, oil-equivalent)

Consumption	Oil	Gas	Coal	Power	Other	Total
Transport	46.0	0.0	0.0	0.7	0.0	46.7
Industrial	13.0	5.2	51.3	16.3	23.0	108.8
Residential	22.5	0.2	0.2	19.0	177.0	218.9
Non-energy	10.5	7.3	0.0	0.0	0.0	17.8
Total	92.0	12.7	51.5	36.0	200.0	392.2

Source) : ARC report

India's utilization of energy has been steadily increasing. FigureII-22 presents actual and forecast levels for consumption of steel as representative of a mass-energy-consuming industry. The forecast levels are based on comparison of the most recent data (2002-2003) with previous years, and premised on a continuation of the prevailing trend. It can be seen that the forecast envisions a constant increase.

Figure II -22 Steel consumption - actual and forecast



Source) : Ministry of Steel

The actual trend for ex-factory shipments of cement, the product of another industry that consumes energy in massive quantities, is also one of substantial increase.

Figure II-23 Cement shipments

Unit:???????

	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003
Cement shipment	81,406	93,840	93,300	102,380	111,070

Source) : Indiainfoline

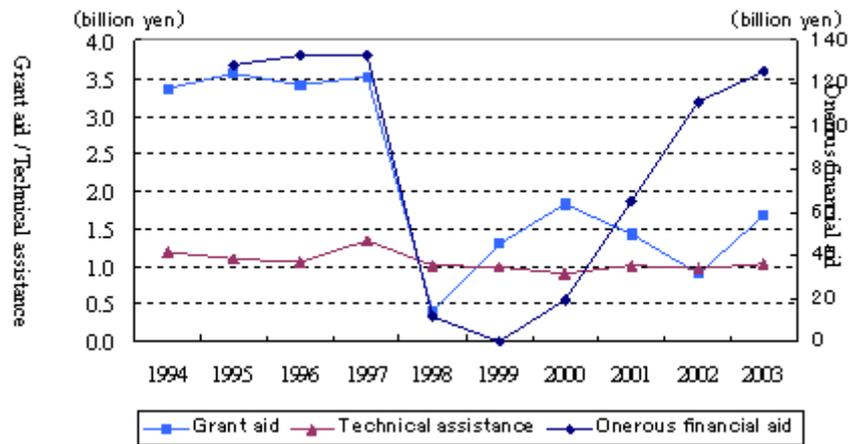
2) Economic cooperation

(1) Policy on economic assistance for India

In the view of the Japanese government, India has needs for a lot of assistance considering its approximately 260 million poor. It also regards India as occupying a very important position internationally as a recipient for attainment of the Millennium Development Goals (MDG) adopted by the United Nations.

In fiscal 2003, India was the top recipient of yen loans and also ranked first for ODA (1998 - 2002) from the Development Assistance Committee (DAC) countries. On the bilateral basis, Japan is India's biggest donor.

Figure II -24 Economic assistance for India (over the last ten years)



Source) : prepared by NRI based on data from the Economic Cooperation Bureau of the MOFA.

Japanese policy on ODA specifically for India revolves around the following three concerns: 1) cooperation contributing to economic growth, 2) mitigation of poverty, and 3) environmental improvement. The government is planning to announce country-specific ODA plans during this fiscal year. It is making active use of yen loans as effective tools of diplomacy with India. These loans are on a large scale; when grant aid and projects for which applications are currently pending are included, they total about 300 billion yen. The scale is anticipated to rise to the level of 1 trillion yen in the near future.

Yen loans are needed to lure investment, and there are earnest requests for them from the Indian government, too. They are made mainly for projects in the power sector and other types of infrastructural improvement. However, Japan is rated highly and is providing assistance not only with the "hard" infrastructural elements per se but also "soft" aspects such as helmets and other safety measures on construction sites as well as process management and other management aspects. The mitigation of poverty and resolution of the fiscal deficit are vital tasks, but Japan is not actively providing aid for them because of aversion to external involvement by the Indian government on the grounds of interference with domestic matters.

India has among the highest repayment capabilities of all developing countries and also a high rate of foreign currency reserves. As such, it is achieving fairly stable economic growth. The Japanese government intends to assist its own efforts to grow out of developing country status (see Note 8).⁸

Figure II -25 Particulars of economic cooperation for India (over the last ten years) 1

⁸ Based on an interview with the MOFA

Unit: billion yen

	Onerous financial aid		Grant aid		Technical assistance	
1994	1257.65		33.63		11.93	
	Plan for construction of a pumping-up power plant on the left bank of the Srisailam	225.67	Plan for improvement of equipment for training of seamen (national bond 2/2)	6.32	Acceptance of trainees	118 persons
	Plan for construction of transmission lines at Srisailam (II)	95.46	Plan for preparation of a center for manufacturing materials for Indira	6.79	Dispatch of specialists	24 persons
	Plan for construction of transmission lines for a gas turbine power plant in	158.21	Plan for improvement of medical apparatus at Osmania Hospital	7.57	Dispatch of a study team	133 persons
	Plan for addition of a third unit at the Bakreswar thermal power plant	205.2	Plan for construction of the Nisamdin bridge (detailed design)	0.52	Presentation of materials	93 million yen
	Plan for modernization of the Cotakdam A thermal power plant	50.92	Support for increased production of food	7	Project TA	2 projects
	Plan for widening and improvement of Highway 5 (II)	58.36	Debt relief	4.57	Development study	2 projects
	Plan for widening and improvement of Highway 24	48.27	Preservation of document records for the national archives	0.34		
	Plan for improvement of waterworks and sewerage in Madras	170.98	Grassroots grants (9 projects)	0.52		
	Plan for preservation and management of Bhopal Lake	70.55				
	Plan for promotion of environmental preservation	45.25				
	Plan for development of forest (tree planting) in Gujarat	42.19				
1995	1287.74		35.63		11.09	
	Plan for total environmental preservation in the Atapadi district	51.12	Plan for improvement of the Kalawati Salan national children's hospital	12.17	Acceptance of trainees	151 persons
	Plan for development of forest (tree planting) in Gujarat	157.6	Plan for improvement of materials for water quality control	2.44	Dispatch of specialists	26 persons
	Plan for improvement of waterworks and sewerage in Bangalore (IV)	284.52	Plan for construction of the Nisadin bridge	4.44	Dispatch of a study team	55 persons
	Plan for improvement of waterworks and the hygiene environment in regional	86.7	Plan for development of superior seeds	6.62	Presentation of materials	216 million yen
	Plan for modernization of the Kumool Cuddapah water conduit	160.49	Support for increased production of food	5	Project TA	2 projects
	Plan for dismantling of ships at Pipbababu port	70.46	Debt relief	3.87	Development study	2 projects
	Plan for construction of the Anphara transmission system	120.2	AV materials for the Madhya Pradesh cultural center	1.09		
	Plan for construction of a hydropower plant at Dhauliganga	56.65				
	Plan for cultivation of small enterprises	300				
1996	1327.46		34.06		10.51	
	Plan for improvement of the transmission network in the northern region	84.97	Plan for construction of the Nisadin bridge (national bonds 2/3)	16.62	Acceptance of trainees	169 persons
	Plan for improvement of the transmission network in West Bengal	110.84	Plan for eradication of polio	7.68	Dispatch of specialists	25 persons
	Plan for repair of a hydropower plant in Umiam	17	Debt relief (primary portion)	1.69	Dispatch of a study team	95 persons
	Plan for construction of a hydropower plant in Tuirial	116.95	Support for increased production of food (feed)	5	Presentation of materials	87.5 million yen
	Plan for construction of a coal-fired power plant in Simhadri	198.17	Debt relief	1.51	Project TA	1 projects
	Plan for construction of a high-speed transport system in Delhi	147.6	Presentation of materials to the Tamil Nadu center of science and technology	0.5	Development study	4 projects
	Plan for improvement of transportation facilities in Calcutta	106.79	Grassroots grant aid (22 projects)	1.07		
	Plan for tree planting in Karnataka	159.68				
	Plan for tree planting in Tamil Nadu	133.24				
	Plan for waterworks and sewerage improvement in Kerala	119.97				
	Plan for irrigation facilities on the Rajghat Canal	132.22				

Notes. 1. Fiscal years are based on the date of signature of official documents for onerous aid and on the budget year for grant aid.

2. Figures for monetary amounts are based on official documents for onerous and grant aid (excluding debt extensions and refinancing) and on actual JICA costs for technical assistance.

Source) : data from the Economic Cooperation Bureau, MOFA

Figure II -26 Particulars of economic cooperation for India (over the last ten years) 2

		Unit: billion yen			
	Onerous financial aid		Grant aid	Technical assistance	
1997		1327.25	35.26	13.35	
	Plan for construction of transmission lines in Simhadri Vizag	106.29	Plan for construction of the Nisadin bridge (national bonds 3/3)	6.72	Acceptance of trainees 179 persons
	Plan for construction of a pumping-up power plant on the left bank of the Srisaialam (III)	144.99	Plan for improvement of the Kalawati Salan national children's hospital (1/2)	4.94	Dispatch of specialists 26 persons
	Plan for construction of a hydropower plant at Dhauliganga (II)	163.16	Plan for eradication of polio (2/2)	3.92	Dispatch of a study team 125 persons
	Plan for construction of the Bakreswar thermal power plant	341.51	Plan for construction of a ship for dredging harbors	12.48	Presentation of materials 78.9 million yen
	Plan for dredging of the Tuticorin port	70.03	Debt relief	1.35	Project TA 2 projects
	Plan for development of forest in Punjab	61.93	Debt relief	1.17	Development study 4 projects
	Plan for sericulture in Madhya Pradesh	22.12	Presentation of visual materials to the Indian Museum in Calcutta	0.5	
	Plan for sericulture in Manipur	39.62	Grassroots grant aid (20 projects)	1.19	
	Plan for irrigation at Rengali	77.6	Support for increased production of food	3	
	Plan for cultivation of small enterprises (VI)	300			
1998		115.37	3.98	10.19	
	Plan for addition of a third unit at the Bakreswar thermal power plant (II)	115.37	Debt relief	1.86	Acceptance of trainees 168 persons
			Debt relief	0.22	Dispatch of specialists 36 persons
			Grassroots grant aid (34 projects)	1.9	Dispatch of a study team 40 persons
					Presentation of materials 145.3 million yen
					Project TA 2 projects
					Development study 4 projects
1999	none			9.83	
			Plan for eradication of polio (via UNICEF)	9.09	Acceptance of trainees 204 persons
			Debt relief	0.18	Dispatch of specialists 30 persons
			Debt relief	0.78	Dispatch of a study team 29 persons
			Debt relief	0.51	Presentation of materials 160.9 million yen
			Grassroots grant aid (31 projects)	2.36	Project TA 2 projects
					Development study 1 projects
2000		189.26	18.29	9.03	
	Plan for construction of a coal-fired power plant in Simhadri (II)	121.94	Plan for eradication of polio (via UNICEF)	9.56	Acceptance of trainees 188 persons
	Plan for construction of a high-speed transportation system in Delhi (II)	67.32	Emergency grant aid for flood damage	0.53	Dispatch of specialists 43 persons
			Emergency grant aid for earthquake damage	5.43	Dispatch of a study team 44 persons
			Debt relief	0.53	Presentation of materials 124.52 million yen
			Grassroots grant aid (35 projects)	2.24	Project TA 2 projects
					Development study 1 projects

Notes. 1. Fiscal years are based on the date of signature of official documents for onerous aid and on the budget year for grant aid.

2. Figures for monetary amounts are based on official documents for onerous and grant aid (excluding debt extensions and refinancing) and on actual JICA costs for technical assistance.

Source) : data from the Economic Cooperation Bureau, MOFA

Figure II -27 Particulars of economic cooperation for India (over the last ten years) 3

		Unit: billion yen				
	Onerous financial aid		Grant aid		Technical assistance	
2001		656.59		14.34	10.15	
	Plan for construction of a coal-fired power plant in Simhadri (III)	274.73	Plan for eradication of polio (via UNICEF)	9.72	Acceptance of trainees	266 persons
	Plan for construction of a high-speed transportation system in Delhi (III)	286.59	Debt relief	0.64	Dispatch of specialists	21 persons
	Plan for construction of transmission lines in Simhadri Visak (II)	64	Debt relief	0.61	Dispatch of a study team	67 persons
	Plan for improvement of the transmission network in West Bengal (II)	31.27	Presentation of audio materials to the India National Center	0.01	Presentation of materials	91 million yen
			Grassroots grant aid (52 projects)	3.36	Project TA	2 projects
					Development study	3 projects
2002		1112.39		9.05	9.6	
	Plan for construction of a coal-fired power plant in Simhadri (IV)	56.84	Plan for eradication of polio (via UNICEF)	7.5	Acceptance of trainees	182 persons
	Plan for increase in the capacity of the Bakreswar thermal power plant	367.71	Grassroots grant aid (30 projects)	1.55	Dispatch of specialists	32 persons
	Plan for construction of a high-speed transportation system in Delhi (IV)	340.12			Dispatch of a study team	78 persons
	Plan for forest development in Punjab	50.54			Presentation of materials	107.3 million yen
	Plan for tree planting and preservation of biological diversity in Rajasthan	90.54			Project TA	2 projects
	Plan for improvement of sewerage in cities in the Yamuna river basin	133.33			Development study	3 projects
	Plan for preservation of historical sites and development of tourism at Ajanta and Ellora (II)	73.31				
2003		1250.04		16.63	10.34	
	Plan for construction of a high-speed transportation system in Delhi (V)	592.96	Plan for eradication of polio	8.31	Acceptance of trainees	202 persons
	Plan for construction of a pumping-up hydropower plant in Bururia (II)	235.78	Plan for improvement of medical apparatus at the Sir JJ Hospital and Kama and Albrez maternal hospital	7.59	Dispatch of specialists	29 persons
	Plan for construction of a hydropower plant at Dhauliganga (III)	138.9	Grassroots grant aid	0.73	Dispatch of a study team	115 persons
	Plan for irrigation at Rengali	63.42			Presentation of materials	111.5 million yen
	Plan for modernization of the Kurnool Cuddapah water conduit	47.73			Project TA	2 projects
	Plan for repair of a hydropower plant in Umiam (No. 2)	19.64			Development study	2 projects
	Plan for improvement of waterworks in Jaipur	88.81				
	Plan for management of forest resources and mitigation of poverty in Haryana	62.8				

- Notes. 1. Fiscal years are based on the date of signature of official documents for onerous aid and on the budget year for grant aid.
 2. Figures for monetary amounts are based on official documents for onerous and grant aid (excluding debt extensions and refinancing) and on actual JICA costs for technical assistance.

Source) : data from the Economic Cooperation Bureau, MOFA

5. Finances

(1) Trend of financial indicators

India has continued to record deficits in the governmental sector in recent years. The extent of deficit, however, has stayed on the order of 5 percent relative to the GDP.

This deficit has resulted in a shortage of funds for attraction of investment and infrastructural improvement, and is one factor behind the sluggish pace of such improvement in India.

Figure II -28 Trend of financial indicators in the entire governmental sector (confirmed)

(As percentage of GDP: %)	Fiscal deficit		Primary deficit		Net RBI credit	Current deficit
	Gross	Net	Gross	Net		
FY1990	8.33	5.73	4.32	3.35	2.75	3.47
FY1991	5.89	3.99	1.58	1.45	0.89	2.64
FY1992	5.69	4.28	1.29	1.65	0.60	2.63
FY1993	7.01	5.35	2.74	2.83	0.03	3.81
FY1994	5.71	3.99	1.35	1.19	0.21	3.07
FY1995	5.10	3.59	0.86	0.91	1.68	2.52
FY1996	4.90	3.41	0.53	0.66	0.14	2.40
FY1997	5.87	4.16	1.54	1.50	0.85	3.06
FY1998	6.43	4.54	2.01	1.82	0.67	3.85
FY1999(revised)	5.59	4.93	0.90	1.99	-0.29	3.77
FY2000(budgeted)	5.10	4.60	0.46	1.64		3.55

Gross fiscal deficit = gross expenditures - (current account revenue + loan repayment income + income from sale of holdings in public corporations)

Primary deficit = gross fiscal deficit - interest paid

Net RBI credit (deficit financing) = net increase in the net credit balance of the national government relative to RBI

Current deficit = current account expenditures - current account revenue

Source)) Reserve Bank of India, Annual Report 1999-2000, p.214

In some areas, on the other hand, the economy is rapidly growing, as exemplified by the growth in the four southern states accompanying the development of IT industry. However, it is questionable whether all states are benefiting from the "new economy" in the news these days. It was consequently decided to view social and economic indicators for each state to determine the status as regards gross state domestic product (GSDP), fiscal position, and infrastructure of both the "soft" and "hard" types.

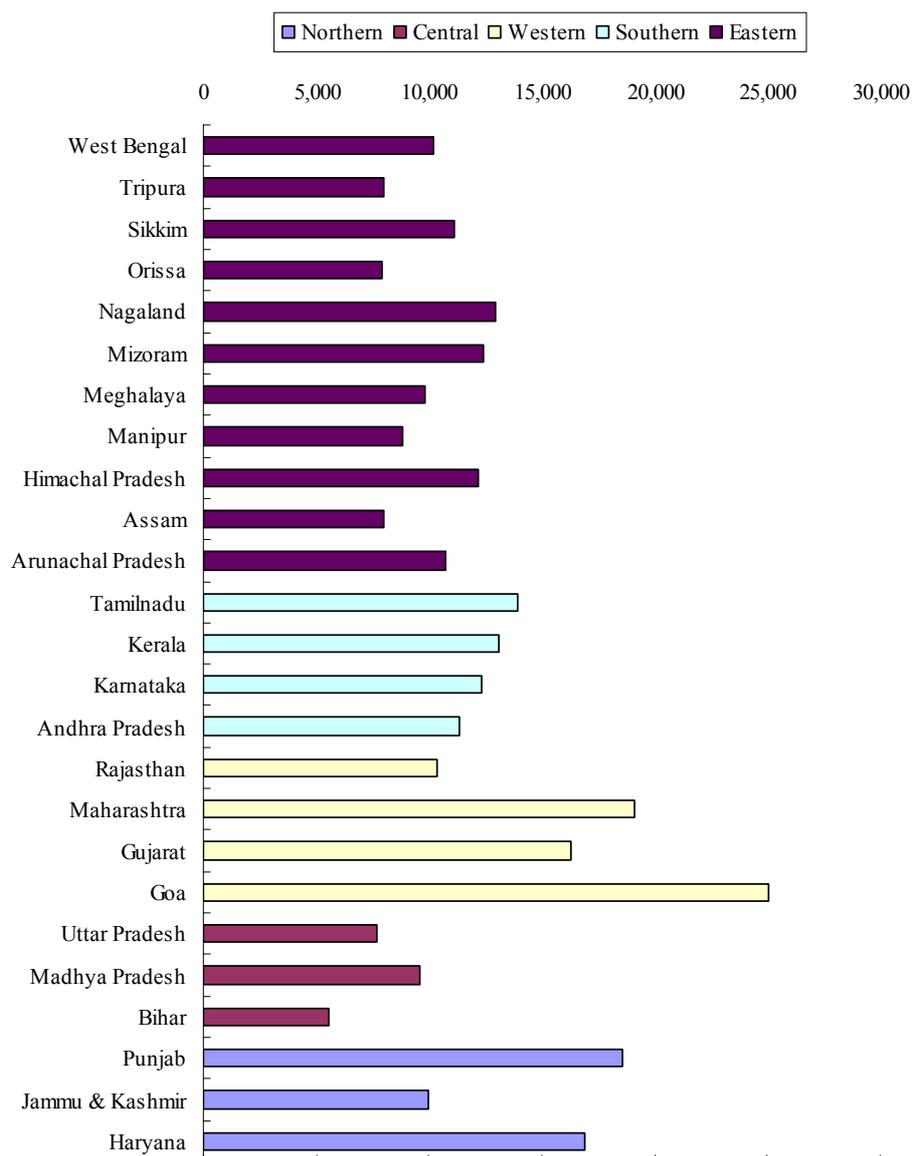
The status of advancement varies greatly depending on the state. Besides the four southern states, levels of wealth are relatively high in the states containing former colonial centers (e.g., Mumbai, Goa, and Calcutta) as well as states near Delhi. In contrast, the situation is harsh in the eastern states north of Bangladesh and the central states including cities such as Bhopal.

Like China, which is marked by great economic disparity between the coastal regions and the western and northeastern regions, India has a big gap between the comparatively well-off states in the western, northern, and southern regions and the poor ones in the central and eastern ones.

A. Gaps between states appearing in economic indicators

Figures for GSDP are highest in the western region including Mumbai, Ahmadabad, and Goa as well as the Delhi region, and lowest in Bihar and other parts of the central region. In the southern region, where IT industry is emerging, GSDPs are not very high. However, these data extend only to 1997, and GSDPs are thought to be higher in the four southern states in more recent years.

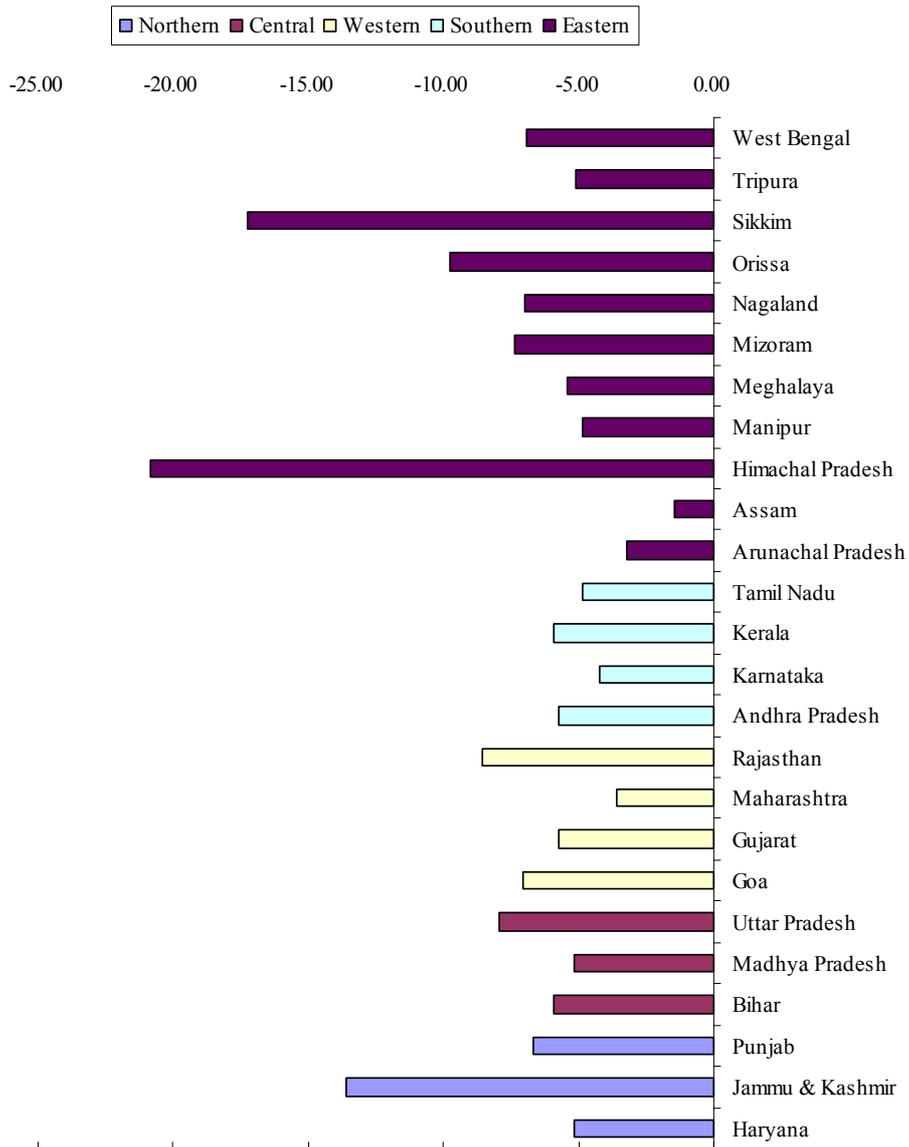
Figure II -29 Average GSDP, 1994 - 1997



Source) : Central Statistical Organisation, Government of India

Figure II-30 shows the level of fiscal deficit in each state as an indicator of financial position. The final statements for fiscal 1998 indicate wide interstate gaps as opposed to interregional gaps. Overall, however, the extent of deficit is lowest in the southern four states and highest in the eastern states.

Figure II -30 Level of state fiscal deficit, 1998



Source) : Central Statistical Organisation, Government of India

Figure II -31 compares the GSDP and the status of infrastructural conditioning. The average GSDP from 1994 to 1997 is on the horizontal axis, and the indicator for infrastructural conditioning, on the vertical axis. Although the data are a little old, they are the latest available.

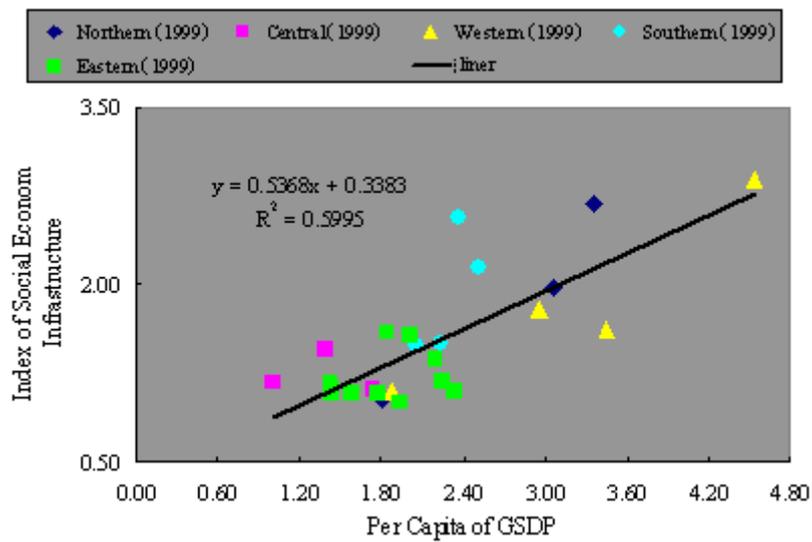
It can be seen that there is a fairly strong correlation between the GSDP values as indicators of economic power and the indicators for infrastructure. The correlation is even stronger with the

exclusion of Kerala, a tourism center. This shows that a state's economic power is basically correlated with its level of infrastructure.

Viewing the trend by region, it can be seen that the southern region occupies a relatively average position. The eastern and central regions have low levels of both economic power and infrastructure. In the western and northern regions, there are big interstate gaps.

India therefore has wide interregional disparities, and it is presumably vital to provide support for states with low levels of income and infrastructure, regardless of the growth of the IT industry and other developments.

Figure II -31 and status of infrastructure



Source)) T.C.A. Anant, K.L. Krishna and Uma Datta Roychoudhry (1999)