India’s Transport Sector: The Challenges Ahead

Volume 2: Background Papers
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The World Bank Group
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Abbreviations and Acronyms

AITD : Asian Institute of Transport Development
BG : Broad Gauge
BOT : Build, Operate, and Transfer
CFS : Container Freight Station
CMIE : Center for Monitoring Indian Economy
CNG : Compressed Natural Gas
CONCOR : Container Corporation of India Limited
CRF : Central Road Fund
CRR : Central Road Research Institute
DA : Development Authority
DTC : Delhi Transport Corporation
DUMTA : Delhi Unified Metropolitan Transport Authority
EAS : Employment Assurance Scheme
EDI : Electronic Data Interchange
EIA : Environmental Impact Assessment
EMP : Environmental Management Program
FHWA : Federal Highway Authority
GDP : Gross Domestic Product
GIS : Geographical Information System
GOI : Government of India
HDC : High-Density Corridor
HR : Human Resources
IDS : Institutional Development Study
IFI : International Financial Institutions
IIT : Indian Institute of Technology
IPT : Intermediate Public Transport
IR : Indian Railways
IRCTC : Indian Railways Catering and Tourism Corporation
IT : Information Technology
JNP : Jawaharlal Nehru Port
JVC : Joint Venture Company
KRC : Konkan Railway Corporation
LRDSS : Long Range Decision Support System
MG : Meter Gauge
MIS : Management Information Service
MMR : Mumbai Metropolitan Authority
MOF : Ministry of Finance
MOR : Ministry of Railways
MORD : Ministry of Rural Development
MORTH : Ministry of Road Transport and Highways (formerly MOST)
MOST : Ministry of Surface Transport
MT : Metric Tons
MUTP : Mumbai Urban Transport Project
NHAi : National Highways Authority of India
NHDP : National Highway Development Program
NMT : Non-Motorized Transport
NTPC : National Transport Policy Committee
OED : Operations Evaluation Department
PMGSY : Pradhan Mantri Gram Sadak Yojana
PRED : Panchayat Raj Engineering Department
PSO : Public Service Obligations
PWD : Public Works Department
RAILTEL : Railways Telephone
RBD : Roads and Buildings Department
R&D : Research and Design
RDC : Road Development Corporation
RIS : Road Information System
ROW : Right-of-way
RTO : Regional Transport Office
SE : Superintending Engineer
SEB : State Electricity Board
SPV : Special Purpose Vehicle
SRDC : State Road Development Corporation
SRTU : State Roads Transport Undertaking
S&T : Science and Technology
STA : State Transport Authority
TEU : Twenty-Foot Equivalent Units
TPU : Transport Planning Unit
UDD : Urban Development Department
UIDC : Urban Infrastructure Development Corporation
UMTA : Unified Metropolitan Transport Authority
UNCITRAL : United Nations Commission on International Trade
VRS : Voluntary Retirement System
WBM : Water Bound Macadam
WTO : World Trade Organization
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1. Highway

Alok Bansal, Anil Bhandari, D.P. Gupta, Piers Vickers

A. INTRODUCTION

The supply of roads, both in terms of capacity and quality, has not kept pace with the tremendous growth in demand for road transport in India (see Box 1.1). It has been argued that there are growing, though limited, opportunities for private sector participation. But because of the nature and history of the provision of roads, public funds and public management will remain the predominant shapers of the sector for the foreseeable future.

Box 1.1: The Road Sector - Some Key Statistics

Road Transport Demand - Key Changes in Recent Years
- The total vehicle fleet has grown from 0.3 to 12.5 million between 1951 and 1998 (excluding a further 25.5 million motorized two-wheelers).1
- Trucking fleet registrations have increased 32 times, from 82,000 in 1951 to 2.64 million in 2000.2
- The road sector's share of freight traffic has increased from 11 percent in 1950 to over 70 percent in 2000.3
- Freight ton-km and passenger-km by road grew 12 percent and 8.4 percent per year respectively during the 1990s.

Road Network - Key Characteristics
- The total length of national and public works department (PWD) roads has increased 3.4 times between 1951 and 1995.
- Most of the national highways are two-lane, single or intermediate lane; only 2 percent of national highways are four-lane. 23 percent of the state highways are two-lane and the rest single or intermediate-lane.4
- Approximately 80-90 percent of the national and state highways are suitable for a standard axle load of 8.16 tonnes and are not structurally adequate for the permissible axle loads of 10.2 tonnes.5
- Over 50 percent of the national and state highways, and a higher percentage of other roads, are in bad condition.6

Road Operations - Key Characteristics
- About 25 percent of national and state highways are congested.
- Average truck and bus speeds are in the range of 30-40 km/h on national and state highways.7
- An estimated Rs 200-300 billion is lost to the economy annually due to road network capacity and quality constraints.8
- Annual road safety toll: at least 75,000 deaths, 1.7 million serious injuries and 6.4 million minor injuries, economic losses of about Rs 550 billion.9

1 MOST, Motor Transport Statistics, 1997
2 ibid
5 Op cit, Malik 2000
6 Based on data collected on roughness on state roads for various projects prepared under the World Bank State Road Infrastructure Development TA Loan - 4114-IN
7 Inferred from limited survey quoted in A Bhattacharya, "The Indian Truckers and His Travails", The Asian Journal, Volume 7, No 2, June 2000.
9 G Tiwari, "Transportation Safety Issues - Institutional Restructuring Proposed for India", IIT Delhi, 2001
2. A number of state PWDs and the National Highways Authority of India (NHAI) have undertaken independent institutional audits over the past few years. In addition, the Central Road Research Institute (CRRI) hosted a national seminar on institutional reform in June 2000. Together, these activities have produced a considerable amount of information on how road agency staff view the main problems in the sector, and how these problems are currently being addressed; as well as how the performance of Indian road agencies compares with their international counterparts. Overall, the consensus is that road agencies in India, with a few exceptions, are traditional bureaucratic organizations that lack both autonomy and external pressures for optimal performance. They also operate using outdated processes. But reforms have been initiated, and the results of the institutional audits suggest that the variance in performance is beginning to widen—some proactive road agencies have been making considerable progress in improving service delivery while others have been left behind.

3. This paper examines the key issues facing the sector and reviews the experience of reforms at national and state levels over the last five years. On this basis it proposes areas of focus for future development.

B. ORGANIZATIONAL STRUCTURES

4. A major concern facing most road agencies in India is inappropriate organizational structure. These agencies, typically belonging to a government ministry or department, generally have little or no autonomy. They have dual functions as both clients and deliverers of road services. In many cases, they also have multiple mandates that include roads at various administrative levels, government buildings and irrigation. They often lack a sound legal basis that would provide the necessary incentives for senior management and staff to perform. Political interference in decision making is common. Also, consultation with road users is extremely limited, and the involvement of road users in sector management is almost non-existent.

5. Indian road agencies often operate in the absence of clear strategic goals, mission statements, performance-monitoring indicators or investment plans. Performance evaluation is merely input based—focusing solely on accounting for expenditure against budget and adherence to what may sometimes be antiquated procedure, rather than the physical or operational condition of the roads in their charge. Senior management may propose measures and policies, but they often have little delegated power of decision. State and national ministers or cabinets are usually required to endorse higher value procurement or senior management changes. Staff is subjected to exhaustive and restrictive financial and administrative regulations, multiple layers of approval and limited delegation of authority. These factors serve to stifle personal initiative and slow the movement of files to a snail's pace. Finally, agencies are still frequently subject to instability and insecurity in funding. This hinders sound strategic planning and programming of works, while at the same time harming the private construction industry that relies on the timely payment of dues.

6. A variety of activities has been initiated to reorganize the framework within which road agencies operate. At the national level, the establishment of the NHAI in 1995 is a significant milestone. NHAI is a semi-autonomous agency with a firm legal basis that operates only as a client for planning and procuring road construction; it will also be involved in road maintenance in the future. Once the overall annual program is agreed upon, NHAI has been delegated the authority to enter into contracts of any size without further government approval. Since 1997, personnel decisions, except at the Member level, are taken by the Chairman or his agent. Within the organization, there is greater delegation of authority to staff than in the more traditional Indian road agencies. The result is that decision making is quicker. NHAI has recently constituted a Road Users' Advisory Committee with representatives of road users, business, states, and the construction industry. This Committee met for the first time in early 2001 and will convene quarterly to guide NHAI in its operations and make it more responsive to user demands. Thus NHAI's institutional framework represents the current state of the art among road agencies in India in moving towards commercially oriented road management.

7. Positive changes are also taking place at the state level, though institutional reforms are not yet as dramatic as those in NHAI. Several agencies are focusing their mandate by:

- Divesting rural roads to local governments (e.g. Kerala, Orissa, and Karnataka) or to dedicated central agencies (e.g. Andhra Pradesh).
- Splitting roads from buildings and/or irrigation functions.
- Creating single-purpose departments or ministries (e.g. the Tamil Nadu Highways and Rural Works Department).
- Divesting government construction plant and equipment (e.g. Kerala, Andhra Pradesh).
• Establishing mechanisms for broader participation (e.g. Karnataka).

• Creating Road Development Corporations (RDCs) as implementing agencies with clear mandates and a capacity to raise private finance (e.g. Tamil Nadu, Gujarat, Karnataka, Maharashtra). The RDCs work with minimum staff and outsource most of the activities related to design, construction supervision and actual works. Their experience has so far been positive: their autonomy allows these authorities or corporations to maintain a distance from government, and they have been able to perform more effectively.

8. Indicative of these changes of institutional framework, some PWDs are developing mission or vision statements that better reflect the roles and customer focus that modern road agencies aspire to the world over (Box 1.2).

9. These initiatives are, however, still limited—in scope, and in the number of road agencies (roughly a third of all state PWDs) implementing them. Key areas that need to be tackled in the short term include:

• Moving toward a clear separation of client and provider functions, or at least into different departments with separate accounts.

• Establishing mechanisms for non-government stakeholders to participate in decision making through advisory committees and, in time, executive road boards.

• Establishing output-oriented agency-level performance indicators as well as associated monitoring mechanisms effective in exerting pressure on agency management to perform.

C. HUMAN RESOURCES

10. One of the key constraints—and arguably the most challenging one—facing road agencies in India is staffing. With the exception of NHAI and a small number of RDCs, Indian road agencies are significant employers,10 frequently overstuffed by international standards (see Table 1.1). There has been a freeze on new hiring in many states for over a decade. As a result, the average age of staff in many agencies is over 50, and there are big age gaps in staff hierarchies that cannot be addressed by hiring only from the graduate level. Agency workforces lack diversity in skills, with an overwhelming preponderance of traditionally educated engineers who have limited exposure to emerging issues such as contract and environmental management. The situation is exacerbated by the high transfer rate that precludes specialization in technical areas and consistent leadership. This in turn inhibits high levels of technical expertise and effective leadership. Salaries are below market rates, though numerous perks and job security are often cited as offsetting benefits. Career advancement is invariably slow, with performance playing second fiddle to seniority in promotion decisions. Individual staff members frequently do not work to a clear job specification and are not held accountable for poor performance or rewarded for good performance.

11. Typically, human resource (HR) issues are not managed by professionally qualified, full-time senior

Box 1.2: Indian Road Agency Mission Statements - A Sample

Rajasthan: To meet the state’s need for the provision and management of the state road network to prescribed standards within the strategic policy framework set by the Government of Rajasthan, and thus promote the economic well being and the quality of life of the people in an environmentally and socially sustainable manner.

Orissa: To provide and maintain the state road network within the policy framework set by the government and thus promote the economic well being and quality of life of the people in an environmentally and socially sustainable manner.

NHAI: To meet the nation’s need for provision and maintenance of the national highway network to world standards within the strategic policy framework set by the Government of India, and thus promote the economic well being and quality of life of the people.

Karnataka Vision: To create and maintain the finest road network in India by 2010.

Source: Various Institutional Development Study (IDS) Reports undertaken for several state PWDs and NHAI, 1998-2000.

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10 The 1995 report by the World Bank, *India: Transport - Long Term Issues*, estimated that there were about 280,000 in the PWDs.
Table 1.1: Various HR Indicators for a Number of Indian Road Agencies

<table>
<thead>
<tr>
<th>Item</th>
<th>NHAI PWD</th>
<th>Karnataka PWD</th>
<th>Uttar Pradesh PWD</th>
<th>Gujarat PWD</th>
<th>Kerala PWD</th>
<th>Andhra Pradesh PWD</th>
<th>Mizoram PWD</th>
<th>Rajasthan PWD</th>
<th>Madhya Pradesh PWD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Km of Main Agency roads</td>
<td>14,250</td>
<td>41,800</td>
<td>120,000</td>
<td>70,609</td>
<td>22,000</td>
<td>61,000</td>
<td>4250</td>
<td>74,947</td>
<td>62,000</td>
</tr>
<tr>
<td>No of main agency staff</td>
<td>200</td>
<td>4,100</td>
<td>23,616</td>
<td>11,000</td>
<td>3,056</td>
<td>7,000</td>
<td>1350</td>
<td>2,362</td>
<td>9,500</td>
</tr>
<tr>
<td>Non engineer tech. staff?</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>No. of heads of agency in last 5 years</td>
<td>1 N/k*</td>
<td>5</td>
<td>1</td>
<td>N/k</td>
<td>1</td>
<td>N/k</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Agency Staff/100km</td>
<td>1 4</td>
<td>9.8</td>
<td>19 7</td>
<td>27 6</td>
<td>16 7</td>
<td>12</td>
<td>32</td>
<td>3 2</td>
<td>15 2</td>
</tr>
<tr>
<td>Gang labour/100km</td>
<td>0</td>
<td>0</td>
<td>50</td>
<td>29</td>
<td>0</td>
<td>8 2</td>
<td>15</td>
<td>N/k</td>
<td>66</td>
</tr>
</tbody>
</table>

* N/k is not known

Source: Various IDS Reports, 1998-2000

directors, but treated as an adjunct to senior management, absorbing much of their precious time and energy. Although there is no supporting data, investment in training as well as professional and managerial development appears very limited—certainly well below the 1-2 percent of administrative costs that many modern organizations invest in their staff.

12. These HR problems are endemic throughout the public services in the country, and it would be very difficult for managers of road agencies to tackle these problems in isolation from broader civil service reform. Yet these issues are, arguably, among the most important constraints faced by the agencies in improving performance. NHAI is currently setting the standard for India with a lean workforce that is reasonably diversified in age and skills. One of the five members of the Authority is responsible for HR, and a training officer has been hired on contract to take forward the implementation of a comprehensive professional development program for all NHAI staff. A recent institutional audit of NHAI noted that staffing policies are still based on Government of India (GOI) civil service norms. The report concluded that although this confers some benefits to both parties, these norms are likely to inhibit the drive for greater flexibility and responsiveness. This will be an area that NHAI may need to revisit in the future.

13. At the state level, some reforms have been implemented. For example, in Andhra Pradesh, actions are being taken to improve the transparency of postings and transfers, and the Engineer-in-Chief has instituted a performance appraisal system that clearly identifies the targets for various types of works expected from the Superintending Engineer (SE) of each district. In Karnataka, the cabinet is considering a proposal that an Engineering Board make decisions on postings rather than the Minister.

14. The various RDCs that have been established also have more flexible HR arrangements. This allows hiring from a broader array of professions to meet specific emerging needs—in financial, social and environmental management for instance. However, while these measures are creating centers of excellence, it is less clear whether the residual workforce in PWDs is being adjusted concurrently. At some point in the not too distant future, the PWDs must actively explore ways to effectively address overstaffing and lack of professional diversity. In other parts of the world, this has been achieved through natural wastage, corporatization of clearly commercial activities, and negotiated management buyouts or contracts with existing private sector providers.

15. Overall, HR reforms in road agencies have been limited so far. This is not surprising, given that they operate within a broader civil service framework, and that actions to reduce overstaffing or change terms and conditions of service are intensely politicized. The most
likely source of significant progress in this area is, arguably, from those states that implement broad-based
civil service reforms. For example, as part of its
Economic Restructuring Program, the Government of
Karnataka is in the process of implementing a
comprehensive reform of public service including:

- Actions to reduce transfers by a target of 60 percent and introduce greater transparency in transfers (e.g. through a monitoring system on the Internet) and, possibly, new legislation.
- Improvements in personal performance reviews.
- Identification and elimination of redundant departments.
- Actions to reduce subjectivity in recruitment and give greater weight to competitive examinations.

In addition to these broad-based civil service reforms, the road user and general public must be provided with the means to monitor road agency performance and bring "bottom-up" pressure to bear on senior management. 

16. Another much discussed implementation challenge is that underdeveloped road construction and consulting industries hinder the sector's progress. At a recent seminar on the highway contracting industry in India, for instance, it was argued that the industry suffered from inadequate levels of technology, poor plant management, continuing high labor input, poor capitalization of businesses; as well as lack of finance and access to cost-effective modern technologies. However, it is not clear to what extent these issues are in themselves causes of poor performance in the sector. They could also be viewed as a manifestation of inadequate and inconsistent demand from road agencies, who often ask contractors to provide surrogate banking facilities in the form of late payments as well as road-related works or services. In Kerala for example, plan works are paid after a delay of about 18 to 24 months, and non-plan works after 6 to 12 months. In FY1999-00, Rs 528 crores was pending on plan and non-plan works when the total budget was only Rs 379 crores. When the biggest potential client by far has such a payment record, the supply of high-quality contractors in a state is bound to be limited.

17. A number of actions have been taken to address these implementation challenges. First, procurement is

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**Box 1.3: Asset Management by the Madhya Pradesh PWD**

The institutional audit undertaken by the PWD identified the following problems

- No ongoing process to identify needs and planning responses.
- New works prioritized by the District Planning Committees largely on non-technical grounds.
- Field officers determine non-plan priorities based on engineering judgment, but come under local pressure to make decisions on non-technical grounds.
- Reliable roughness and condition data are not available; while traffic surveys are conducted, levels of traffic may be falsified.
- Diversion by district officials of PWD resources, professional staff, labor and vehicles, to non-road activities.
- Weak procurement and supervision of construction contracts.
- Ineffective maintenance of in-house implementation, especially since fixed labor costs, (leave alone materials and fuel) are now not even covered by non-plan allocation.

Among the responses recommended are:

- Developing and maintaining an asset database.
- Preparing and following a strategic master plan.
- Using more effective planning to help reduce political influence on road investment decisions.
- Applying and rigorously adhering to design standards.
- Imposing standard procurement rules/documents and relying more on result-oriented contract agreements.
- Continued selective outsourcing of commercial activities.

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13 See, for example, Navin Gargshankar et al, "Civil Service Reform: A Review of World Bank Assistance", Executive Summary of the World Bank OED Report (No. 19599), 1999


one area where Indian road agencies are already overhauling traditional mechanisms. In the Andhra Pradesh roads and buildings department (RBD) for example, contract documentation has been standardized, tendering processes have been improved, and new mechanisms for dispute settlement are being adopted. In Tamil Nadu, a Transparency in Tenders Act passed in 1998 regulates the procedure for inviting and accepting tenders. A Commissionerate of Tenders has been established with adequate delegated powers to evaluate bids and award contracts. Karnataka has also been particularly proactive (Box 1.4).

18. As far as design, supervision, and construction and maintenance are concerned, GOI has made concerted efforts to stimulate and enhance the impact of private sector participation in the construction of road works (see Box 1.5). These efforts appear to be paying dividends. For example, the number of companies applying for pre-qualification and competing for contracts is increasing; and the timely completion of road projects, within the budget and of high quality, is becoming the norm for NHAI. This is especially commendable because its expenditure on new works has increased by over 16 times between 1997 and 2000. Consultants are increasingly being used to undertake feasibility studies and detailed designs, environmental and social impact studies, and road safety audits and supervision, leading to higher quality and greater accountability. However, the focus on transparency and accountability in contract administration has to be continued, with an equal emphasis placed on quality control and cost. Ensuring prompt payment is critical for developing the contracting industry. Some experimentation with design and build or turnkey projects, which are becoming popular internationally, is also warranted.

**Box 1.4: Improving Procurement in Karnataka**

The Karnataka Transparency in Public Procurements Act was passed in October 2000. The Act aims to streamline the procedure for inviting, processing and accepting tenders, and to enforce the publishing of a "Tender Bulletin" at state and district levels. The PWD published the first Tender Bulletin in December 2000. Measures have been adopted to improve the operational efficiency and transparency of road works including:

- Packaging of road and bridge works to Rs 10 million and above and prohibiting the splitting of works.
- Updating PWD Schedule of Rates every year.
- Establishing a Commissionerate of Tenders to approve tenders valued between Rs 10 and 50 million.
- Imposing time limits for evaluation and acceptance of tenders.
- Making pre-qualification of contractors for road and bridge works compulsory.


**Box 1.5: Measures to Encourage and Enhance Construction by Private Contractors**

<table>
<thead>
<tr>
<th>Land Acquisition</th>
<th>NH Act amended for faster acquisition of land. Contract award only after site free from encumbrances.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shifting of utilities</td>
<td>Advance arrangements made for timely shifting of utilities.</td>
</tr>
<tr>
<td>Environment Clearances</td>
<td>Procedures streamlined. EMP provided to contractors for large projects.</td>
</tr>
<tr>
<td>Dispute Resolution</td>
<td>UNCITRAL provisions incorporated in the Indian Arbitration and Conciliation Act. Dispute Review Board increasingly used prior to arbitration.</td>
</tr>
<tr>
<td>Import of Equipment</td>
<td>Duty-free import of most major construction equipment. Bitumen imported under General License.</td>
</tr>
<tr>
<td>Domestic Price Preference</td>
<td>Provision being removed for few selected large projects.</td>
</tr>
<tr>
<td>PQ of Contractors</td>
<td>Experience of non-lead partners now required for PQ (pre-qualification) of consortium. The nature and share of work responsibilities to be spelt out in the bid offer.</td>
</tr>
<tr>
<td>Timely completion</td>
<td>Bonus for early completion, quicker client decision making and payment.</td>
</tr>
<tr>
<td>Repatriation of profits</td>
<td>Streamlined procedures.</td>
</tr>
</tbody>
</table>
19. Measures are also being taken to improve the implementation of maintenance. The productivity of force account labor may be improved by introducing a system of mobile gangs, as has been proposed in the draft Road Maintenance Policy for Assam. A few states like Maharashtra and Andhra Pradesh have made further progress with their move to replace the gang system with performance-based maintenance contractors covering both routine and periodic maintenance. In Karnataka, the RDC is in the process of making three-year, input-based, routine and limited periodic maintenance contracts on about 8,000 km of state highways. NHAI is also undertaking a few pilot projects outsourcing maintenance of NH segments to private contractors. These actions should improve maintenance performance in terms of road quality and unit costs.

20. Unfortunately, no state appears to have been able to retrench gang laborers concurrently with contracting out maintenance. The best they do is freeze hiring, allowing natural attrition to take place. This fixed cost, however, continues though laborers are doing no work where maintenance has been contracted out, or where lack of funds prevents the purchase of materials or fuel. Other countries have dealt with the problem of redundancies during the outsourcing of activities such as maintenance, by stipulating that the contractor must take on a portion of public employees in return for guaranteed or subsidized work for a certain period. In the longer term, as road works are increasingly contracted out, Indian road agencies—especially those with large numbers of gang laborers as in Uttar Pradesh and Madhya Pradesh—must find similar solutions to tackle surplus unskilled labor. Careful negotiation between public sector unions and potential contractors, as well as strong political leadership, are key elements in the success of such initiatives.

D. FINANCING

21. There is almost universal agreement that there has been inadequate financing of roads in the past. As a share of total plan expenditure, allocations to roads have declined consistently over successive plan periods (see Table 1, Annex 1.1). More recently, however, GOI and some state governments have begun reversing the declining trend and addressing the low level of funding for the sector.

22. The funding for the two main road agencies, MORTH (Ministry of Road Transport and Highways, formerly Ministry of Surface Transport or MOST) and NHAI, has been consistently increased over the past few years; and there has been progressive transfer of responsibility from the former to the latter (see Table 2, Annex 1.1). In terms of maintenance expenditure, the working group for the Ninth Plan (1997-2002) estimated that approximately Rs 700 crores was needed per year to maintain the national highway network. By this standard, the level of funding for maintenance appears adequate. But it is not clear to what extent the working group took into account the current condition of the network in arriving at this estimate (i.e. significant backlog); and whether the maintenance standards used to generate it are adequate for many of the higher-traffic highways. According to other estimates (see Table 1.2), the level of maintenance funding has been inadequate.

Table 1.2: National Highway Maintenance Funding, Rs in Crores

<table>
<thead>
<tr>
<th>FY</th>
<th>Funds Required</th>
<th>Funds Available</th>
<th>Shortfall</th>
<th>% shortfall</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995/96</td>
<td>535</td>
<td>288</td>
<td>246</td>
<td>46</td>
</tr>
<tr>
<td>1996/97</td>
<td>570</td>
<td>372</td>
<td>198</td>
<td>35</td>
</tr>
<tr>
<td>1997/98</td>
<td>600</td>
<td>497</td>
<td>102</td>
<td>17</td>
</tr>
<tr>
<td>1998/99</td>
<td>1,050</td>
<td>549</td>
<td>500</td>
<td>47</td>
</tr>
<tr>
<td>1999/00</td>
<td>1,250</td>
<td>703</td>
<td>547</td>
<td>43</td>
</tr>
</tbody>
</table>


23. Road financing has also been problematic at the state level, with low levels of funds. In addition, there has been a bias towards investment in rural access rather than maintenance and rehabilitation of the most economic roads (Table 1.3).

24. However, there had been significant progress in addressing these financial problems. Perhaps the most important development over the past 5 years is the proper implementation of a Central Road Fund (CRF). India has had a CRF since the 1930s and a Resolution of Parliament in 1988 sought to entrench its role. But it was not fully adopted until the 1998 budget and a further Resolution of Parliament in 1999, which gave the CRF real teeth by stipulating additional cesses on petrol and diesel. This created a fund with an annual income of over Rs 50 billion. The revamped CRF was formalized through an Act of Parliament in late 2000.

25. On the one hand, the CRF brings with it considerable new resources. It displays some of the characteristics of a so-called "second generation" road fund in that these additional resources (i) come from extra road user payments without abstracting from the consolidated budget; and (ii) are generated through an
Table 1.3: Maintenance Funding for Core Networks of Various Road Agencies, Rs in Crores

<table>
<thead>
<tr>
<th>Item</th>
<th>NHA!</th>
<th>MORTH</th>
<th>Karnataka PWD</th>
<th>Uttar Pradesh PWD</th>
<th>Gujarat PWD</th>
<th>Kerala PWD</th>
<th>Andhra Pradesh PWD</th>
<th>Tamil Nadu HWD</th>
<th>Mizoram PWD</th>
<th>Madhya Pradesh PWD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required</td>
<td>1,250</td>
<td>–</td>
<td>330</td>
<td>645</td>
<td>479</td>
<td>320</td>
<td>412</td>
<td>440</td>
<td>24</td>
<td>459</td>
</tr>
<tr>
<td>Expenditure</td>
<td>703</td>
<td>–</td>
<td>148</td>
<td>240</td>
<td>297</td>
<td>142</td>
<td>210</td>
<td>253</td>
<td>85</td>
<td>139</td>
</tr>
<tr>
<td>Actual/Exp (%)</td>
<td>56</td>
<td>–</td>
<td>45</td>
<td>37</td>
<td>62</td>
<td>44</td>
<td>51</td>
<td>58</td>
<td>36</td>
<td>30</td>
</tr>
<tr>
<td>Maintenance</td>
<td>121,837</td>
<td>–</td>
<td>35,407</td>
<td>20,000</td>
<td>101,810</td>
<td>61,435</td>
<td>50,731</td>
<td>42,167</td>
<td>30,660</td>
<td>22,400</td>
</tr>
<tr>
<td>Rupees per km</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Various IDS Reports, 1998-2000

explicit tariff (one rupee on each liter of both petrol and high-speed diesel).

26. On the other hand, the CRF also displays some characteristics of a "first generation" road fund (see Table 1.4). First, the revenue is not clearly separated from GOI general taxes. The fuel cess initially accrues to the consolidated fund and is then passed on to the respective road agencies in line with the Act. The result is an element of uncertainty and the possibility of delays. Second, the CRF is managed by the Ministry of Finance (MOF) and not by some empowered road board with public and private representation. Hence the fund can be used to meet a multitude of economic, social and political ends rather than to provide a mechanism for road users to obtain what they need, and are willing to pay for. There is, however, a proposal currently under discussion to establish a road fund committee - comprising representatives of the Ministries of Road Transport and Highways, Rural Development, Finance and Planning and NHAI - as well as the possibility of an advisory committee with user representation.

27. Third, the CRF is, at present, an accounting mechanism without any capacity of its own to negotiate work programs with road agencies, scrutinize disbursement applications, or commission financial and technical audit reports of expenditure. This means that it has not yet sought to impose financial discipline on benefiting road agencies. Indeed, although the allocation between road agencies is prescribed under the Act, there are as yet no supporting regulations detailing how the tariff might be changed. Similarly, there are no guidelines on how disbursement procedures can be used to strengthen financial discipline, guard against weak governance, and encourage implementation of national policies at state and local levels.

28. The revenues accruing to the national highways are slated for exclusive use on the implementation of the National Highway Development Program (NHDP) for the foreseeable future. Budgetary grants are used to fund any residual construction of non-NHDP national roads and the maintenance of the national network. Even without any further development of the CRF towards a second generation road fund, given the emerging capacity of NHAI as a modern road agency, these funds are likely to be used efficiently and effectively to create a critical national asset.

29. However, the impact that the CRF funds will have on roads outside the national highway system is less clear. The potential CRF transfers to states represent very significant additional resources for the state networks. On average, approximately Rs 80,000 will be available for each kilometer of state highway through the CRF, a figure greater than what almost any state is currently investing in its core road network (see Table 1.5). Again, the potential investment in rural roads made possible by the CRF represents a quantum jump in the funding of these roads.

30. These substantial transfers can encourage better management and reform if minimum requirements are applied to their access, and if there is adequate ex-post monitoring of their use by the managers of the CRF. Under section 10(v) of the CRF Act 2000, the central government is responsible for the "release of funds to the states for specific projects and the monitoring of such projects and expenditure incurred thereon". MORTH has issued a circular on the procedure states should employ to access and use CRF funds for the share allocated to state roads. The circular stipulates, inter alia, that at least 70 percent, 15 percent and 5 percent should be allocated for construction, periodic maintenance and road safety respectively. The CRF can also be used for R&D and staff development. The states' proposals are to be presented to MORTH for approval. At the end of each FY, the states are to furnish a certificate on the use of CRF funds. Future allocations will be linked to the amount utilized in the previous year. These procedures
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>National</th>
<th>Uttar Pradesh</th>
<th>Andhra Pradesh</th>
<th>“Good practice” or second generation road fund</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overseeing</td>
<td>Central government, principally MOF</td>
<td>State Government plus 15 person Advisory committee chaired by Min. of PWD, 2 private sector members</td>
<td>Not stipulated</td>
<td>Public private executive board, strong (possibly independent) chairperson</td>
</tr>
<tr>
<td>Type of entity</td>
<td>Accounting mechanism managed by MOF</td>
<td>Accounting mechanism managed by DOF</td>
<td>Accounting mechanism managed by DOF</td>
<td>Separate legal agency, established by law</td>
</tr>
<tr>
<td>Own staff</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes, small secretariat, independent of any road agency if funds channeled to all road planning engineering and financial skills</td>
</tr>
<tr>
<td>Overseeing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of entity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Own staff</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eligibility of uses</td>
<td>Construction and maintenance of NH, construction of RR, construction and maintenance of SH/MDR</td>
<td>Maintenance of all state or LG roads (but has been used for new construction)</td>
<td>Leveraging private finance</td>
<td>O&amp;M first call, then new investment, clear criteria for allocation between road agencies</td>
</tr>
<tr>
<td>Main sources of revenue</td>
<td>Fuel cess</td>
<td>Fuel cess</td>
<td>50% of incremental revenues on MV tax, MV fees, plus taxes on fuel spares, tires</td>
<td>Fuel levy, annual license fees, heavy vehicle fees, fines, transit fees, weight distance charges, tolls</td>
</tr>
<tr>
<td>Annual revenues (Rs Crores)</td>
<td>5800</td>
<td>200</td>
<td>Not determined</td>
<td>Not determined</td>
</tr>
<tr>
<td>Portion of total maintenance</td>
<td>i) 100% for NH, but dedicated for now to NHDP ii) Unknown but likely large % for SH maintenance iii) Dedicated for new construction of RR</td>
<td>30%</td>
<td>Not determined but main road agency receives about 80% of requirements</td>
<td>100% of maintenance</td>
</tr>
<tr>
<td>requirements</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusting charges</td>
<td>Amend act</td>
<td>Amend GO</td>
<td>Not stipulated</td>
<td>By board with government consent</td>
</tr>
<tr>
<td>Deposit mechanism</td>
<td>Through consolidated fund</td>
<td>Through consolidated fund</td>
<td>Through consolidated fund</td>
<td>Direct monthly deposit, collection can be by contract</td>
</tr>
<tr>
<td>Financial procedures</td>
<td>Not yet fully specified, Act enables regulations on same, MORTH letter 10/00 stating some procedures for states</td>
<td>None</td>
<td>None</td>
<td>Prescribed by regulation</td>
</tr>
<tr>
<td>Auditing</td>
<td>Comptroller and Auditor General</td>
<td>Comptroller and Auditor General</td>
<td>None</td>
<td>AG or independent auditor, technical as well as financial audits</td>
</tr>
</tbody>
</table>

are very new and have yet to be put into effect, and it is imperative that MORTH monitor their implementation and impact over a period of time to ensure that the CRF becomes a force for good planning and financial discipline at the state level. A small portion of the CRF needs to be earmarked for the proper administration, planning and supervision of the fund. In the US, the Federal Highways Trust Fund allocates up to 1.5 percent by law to the Federal Highway Administration which then manages the fund on behalf of the government, and a further 2 percent is allocated to receiving states to plan and supervise implementation.

31. There has also been some experimentation with dedicated road funds at the state level. Both Uttar Pradesh and Andhra Pradesh have established these funds, while Tamil Nadu has a rural road fund. The Uttar Pradesh fund provides similar benefits to the sector, though on a different scale from the CRF, with significant additional financial assistance dedicated to roads through...
Table 1.5: Potential Annual Allocation of CRF Revenues (from fuel only)

<table>
<thead>
<tr>
<th></th>
<th>Petrol Rs, millions</th>
<th>Diesel Rs, millions</th>
<th>Total Rs, millions</th>
<th>%</th>
<th>$ equivalent at Rs 46/$</th>
<th>Rs per km</th>
</tr>
</thead>
<tbody>
<tr>
<td>National highways</td>
<td>4,600</td>
<td>14,375</td>
<td>18,975</td>
<td>33</td>
<td>412,500,000</td>
<td>328,856</td>
</tr>
<tr>
<td>Rural roads</td>
<td>25,000</td>
<td>25,000</td>
<td>50,000</td>
<td>100</td>
<td>1,260,869,565</td>
<td></td>
</tr>
<tr>
<td>State roads</td>
<td>2,400</td>
<td>7,500</td>
<td>9,900</td>
<td>17</td>
<td>215,217,391</td>
<td>79,646(^{16})</td>
</tr>
<tr>
<td>Rail safety</td>
<td>1,000</td>
<td>3,125</td>
<td>4,125</td>
<td>7</td>
<td>89,673,913</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>8,000</td>
<td>50,000</td>
<td>58,000</td>
<td>100</td>
<td>1,260,869,565</td>
<td></td>
</tr>
</tbody>
</table>

Source: Staff estimate based on allocations as stated in CRF Act 2000 and fuel consumption in 1999.

levies on fuel. Though experience to date has been limited, it indicates that state road funds also appear to suffer limitations similar to those encountered by the CRF. In other words, substantial improvements can be made. For example, in UP, despite the stipulation by Government Order that the first call on the fund is maintenance, about 15 percent was channeled in the last financial year to widening state highways. A number of other states including Gujarat, Karnataka, Kerala, Maharashtra, Mizoram, Orissa, Rajasthan and Tamil Nadu are actively moving, though at varying speeds, towards the establishment of state road funds. All aspire to the management of these funds in a commercial and transparent manner as "second generation" road funds, with the significant involvement of non-government stakeholders in fund management.

32. Several other measures have been attempted to mobilize more public funding for road agencies. First, governments are increasingly borrowing from multilateral financial institutions to augment the financing of new investment. These institutions include the World Bank (approximately $1.6 billion approved to date since 1992); the Japanese Bank for International Cooperation (JBIC) ($320 million approved to date); and the Asian Development Bank (ADB) (approximately $870 million to date). In addition, NHAI is trying to secure additional external assistance of $4.4 billion for the NHDP, primarily from the World Bank, ADB and JBIC. Andhra Pradesh, Gujarat and Karnataka have already obtained World Bank loans for highway rehabilitation and maintenance. UP, Kerala, Mizoram, Tamil Nadu, Madhya Pradesh and possibly some other states are likely to access the funds of international financial institutions (IFI) funds in the near future.

33. Second, overall government spending at the national level, and in reforming states, is being shifted towards high priority development spending—such as elementary and secondary education, health and roads. Several states have made commitments in their sector policies to raise funding levels by certain amounts, or to certain levels. Finally, within the sector, expenditure is being increasingly focused on the most economic roads or core network - the NHDP being a prime example of this refocusing of existing resources.

34. Efforts are being directed at both national and state levels to bring private sector project finance into road development and maintenance, principally through BOTs and operation and maintenance (O&M) concessions (see Box 1.6). In all, approximately 7 major privately financed road projects (plus a number of smaller projects, i.e. under $5 million at state level) totaling Rs 10.1 billion have already reached financial closure, with about 20 projects worth approximately Rs 15 billion due in the near future.\(^{17}\)

35. The government has initiated several measures to encourage private sector participation in financing national highway infrastructure projects:
   - GOI to carry out all preparatory work including land acquisition and utility removal.
   - ROW (right-of-way) to be made available to concessionaires free of all encumbrances.
   - NHAI/GOI to provide capital grant up to 40 percent of project cost to enhance viability on a case-to-case basis.
   - 100 percent tax exemption for five years and 30 percent relief during any 10-year period.
   - Concession period allowed up to 30 years.
   - Foreign direct investment up to 100 percent equity partners for construction of roads and bridges.

\(^{16}\) Assumes that all funds go to 124,300 state highways only, though the Act states that it can be used for other state roads.

Box 1.6: Private Maintenance Contract - Madhya Pradesh

In 1996, the Madhya Pradesh PWD awarded a toll-based maintenance contract on 143 km of State Highway 18 from Bhopal to Dewas to a private sector contractor. The terms of concession were as follows.

1. Period of concession: 3 years.
3. Initial Improvement of road costing Rs 2.0 crores and subsequent renewal of 20 percent of the road p.a.
4. Bids were invited on the basis of maximum payment to the PWD during the concession period.
5. The concession was awarded to the party who offered Rs 4.5 crores.
6. The annual maintenance program schedule had to be approved by PWD and work was to be carried out in line with the "manual for maintenance works".

Result: The concessionaire carried out the maintenance and paid the contract amount to the government. Collecting the toll from the vehicles was no problem as the riding quality had improved significantly and the travel time had reduced. The concessionaire spent a sum of Rs 7 crores, including the initial investment, over the 3-year period on maintenance of the road. The concession could not be continued as the road was converted to a national highway. Source: Madhya Pradesh PWD.

- Associated housing and real estate development financing of infrastructure - i.e. reducing the perceived high risks of investment through sectoral reforms.

37. In addition, NHAI and a number of state road development corporations (SRDCs) are raising additional funds in the financial markets through bond offerings, backed with national or state government guarantees. NHAI has raised Rs 10 billion so far out of a total of Rs 120 billion that it hopes to raise to fund the NHDP through bond issues. The NHAI issue was facilitated by the policy decision to exempt the bond from capital gains tax. Tamil Nadu, Madhya Pradesh, and Maharashtra have also issued bonds through their respective RDCs, and Karnataka has taken out bank loans.

38. There has been debate about the relative merits of raising private funding through project finance as opposed to the issuance of bonds by road agencies. The nominal cost of money is clearly lower with government entities issuing bonds, given their perceived lower risk in comparison to BOT concessionaires. However, additional potential benefits, such as minimization of the whole life costs of roads and the reduction of the administrative burden on the road agency, would be derived from BOTs even when there is no limited or no transfer of traffic risk (as in concessions with shadow toll or annuity based

References:

19 Op cit, World Bank 2000
payments). Though this debate continues in other parts of the world, little consensus has been reached. It remains to be seen what benefits can be gained, in terms of efficiency, from packaging road works into long term contracts. Careful monitoring and evaluation of the various innovative financing mechanisms used in India are needed if future decisions on funding road improvements are to be based on sound reasoning.

39. The overall effect of these various new sources of funding is a significant increase in the availability and focus of future finance for the sector. These additional resources will place new pressures on road agencies to perform as lack of funds - a long used argument to explain poor agency performance - will no longer stand the scrutiny of politicians, road users and the general public.

40. However, the sustainability of these sources, and the ability to repay the substantial borrowing being undertaken, remains to be seen. With the central government and a number of state governments guaranteeing all this borrowing, off-budget contingent liabilities are growing. For example, a recent review of the investment program for NHAI suggests that without additional sources of revenue, NHAI's capacity to borrow from the market will be curtailed within the next 5 to 10 years. Further investigation of the impact and risks of borrowing by NHAI and other empowered road agencies is thus warranted. In the medium term, as improvements on the roads become a reality, it seems likely that GOI will have to consider options for increasing revenues - the most obvious options being real increases in either the fuel cess and/or toll tariffs. This will not be easy, but the choice of option would benefit from consultation not just within the government, but also between the government and the broader community.

E. ROAD-RELATED TAXATION,
GOVERNMENT REVENUES AND PRICING

41. The major taxes currently levied on the road transport sector are:
- Union customs duty, excise duty and central sales tax levied by the central government.
- Motor vehicle tax, passenger and goods tax, sales tax and entry tax levied by the states.
- Octroi and tolls levied by local bodies.

Road-related taxation suffers from a number of problems, including the multiplicity of taxes; variations in the basis and rates at which these are levied (the average annual tax burden on commercial vehicles varies from Rs 914 in Nagaland to Rs 48,105 in Haryana); the high costs to all parties in collecting some taxes, especially the passenger and goods taxes, sales tax and octroi; and the lack of links between government policies and tax structure, for example its use to encourage multi-axle vehicles. However, contrary to popular opinion in India, road taxes, at 1.2 percent as a portion of GDP and approximately 6.2 percent of total central and state government revenue, are not particularly high compared to international standards (see Table 3, Annex 1.1). The union excise duty on diesel and petrol is levied at 16 percent and 24 percent respectively, again reasonable by international standards.

42. Road-related government revenue charges accrue mostly at the union level, with between 38-42 percent of all proceeds going annually to the states between 1993 and 1997 (see Table 4, Annex 1). Revenues increased substantially over these years. Until the introduction of the diesel and petrol fuel cesses in 1998 and 1999, none of these road-related taxes was dedicated to road spending as road user charges. Other than a few direct tolls levied on some bypasses and bridges, there have been no explicit pricing signals for road use; and cost recovery, at least for maintenance, has not been a clearly articulated policy goal.

43. There has been some movement over the last few years towards rational road pricing, and also increasing and more transparent cost recovery from road users. In the medium to longer term, this area will certainly become more important as road agencies are granted increasing autonomy in raising funds, as the desire to manage demand grows, and as the impact of substantial sector debts takes hold. Also, given that road users already

24  For example, see the report of the working group on the use of dedicated cess revenues, PM’s Task Force on Infrastructure, July 1999
21  A recent semi-independent review of BOT highway projects in the UK concluded that the contracts, in this case based on shadow tolling and more recently, performance payments for lane availability, have delivered "value for money”. Cost savings (compared with the public sector comparator) have ranged from marginal to substantial with the average cost saving being 15 percent UK Treasury, DBPO - Value for Roads, 2000
24  ibid
24  However, at the state level, there is a wide range in the share of road tax as a portion of states’ own tax revenues, from 2.6 percent in Tripura to 47.8 percent in Nagaland ibid
contribute generously to the public purse, with less than 60 percent of total sector tax revenues being returned to the sector, the willingness of road users to pay higher general taxes is likely to be far lower than their willingness to pay for hypothecated user charges. In 1996, the Mohan Report recommended that substantial portions if not all the revenues from taxes on motor vehicles and transportation fuel be earmarked for road development. In the current context, this is unlikely to happen, as it would imply a substantial loss of funds for other competing sectors. However, both the national and some state governments are moving towards the "user pays" principle in road pricing. The CRF has additional fuel cesses as a major element of its revenue stream and the Uttar Pradesh and Andhra Pradesh funds also rely on fuel levies.

44. A number of state and national road projects are experimenting with levying direct tolls on roads and bridges. The major attraction of tolls as road user charges is that they are related to use and can be used to impose market discipline on both suppliers and users. They are also clearly separable from general taxes and can be reasonably simple to collect (with technology making it simpler each year). For example, tolls have been imposed on a section of the four-lane highway, Jaipur-Kotputli of NH-8, beginning April 1998, with collection contracted out. There has been no significant resistance so far, though the truckers' association has questioned the quantum of toll rate. But to date, only a few hundred kilometers of roads in India are directly tolled, compared to China's 4,700 km, Indonesia's 470 km, Japan's 9,200 km, Malaysia's 1,200 km, and the Philippines' 168 km.

45. The opportunities for direct tolling of most existing national and state networks are probably limited. A report by a working group of the Prime Minister's Task Force on Infrastructure in 1999 argued against direct tolling, suggesting that access control on the existing networks is impractical, still rather expensive, and would create high social costs by way of community severance. A recent market survey of potential private sector providers of toll roads indicated that concern over the ability and willingness of users to pay direct tolls is an important financing constraint. Thus widespread direct tolling as a significant road pricing and cost recovery tool is unlikely till the implementation of any future restricted access expressway network, and the growth of public acceptance of direct charging.

46. Road users often express the view that there is considerable scope for moving towards a more rational basis for road taxation, pricing and increasing cost recovery; or, at the very least, for road maintenance if not also for some new investment. Unfortunately, there is, at present, no empirical basis for recommending changes in the road user charging policy, as no comprehensive analysis of the issue has been conducted for over 10 years. A review of the various existing road user taxes and charges, their relation to highway expenditures, the appropriate level of general taxation on road transport, users' willingness to pay for road services, and consultation on feasible options, is required for an in-depth understanding of the issues, and the recommendation of an appropriate pricing framework.

F. INFORMATION SYSTEMS

47. A final area where most Indian road agencies need to make improvements is in information systems. Senior managers generally have little understanding and appreciation of the importance of information technology in improving the performance of their agencies. They rarely have personal computers in their offices and are even less likely to use them. Outside externally funded projects, little or no resources are devoted to systems improvements and staff training. The little investment there is tends to be ad hoc, compartmentalized and unbalanced. The result is that in most road agencies, a few of the staff become gatekeepers of information and core processes that increasingly rely on IT. In addition to investment in hardware, software and staff development, most agencies need a reliable and comprehensive system for collecting critical information - such as asset condition, traffic flows, road accidents and financial information to feed key databases and improve future decision making.

48. There is, however, evidence of some progress in relation to improvements in information systems. For example, the Maharashtra PWD has made a considerable investment in IT, putting in place a Management Information Service (MIS) for works, inventory and personnel, and piloting a pavement management system in one or two circle offices. Its website even provides up-to-the-minute information on traffic conditions on some key routes. Tamil Nadu has an interactive website where procurement and common information is available to the

27 Op cit, World Bank 2000
28 MOST, Road User Charge Study, April 1989
encroachment demonstrating the nature, scale and impact of either persons killed for every 10,000 vehicles in India, it is only posting to the traffic management or road safety unit is the worst in the world: with just one percent of the agencies have begun to appreciate the importance of 52. Another complex but critical area where road distortions in the transport market. Although some road on vigilantism (see Box 1.7).

safety; overloading of commercial vehicles; and other encouraging - except perhaps self-regulation that borders operational problems that will become increasingly and enforcement ineffective. At the core of the problem is a vulnerable institutional framework to manage overloading, a framework that has few positive incentives for enforcing the rules on the roads. To date, experience in dealing with overloading effectively has not been encouraging - except perhaps self-regulation that borders on vigilantism (see Box 1.7).

52. Another complex but critical area where road operational performance requires drastic improvement is road safety. The road accident record in India is among the worst in the world: with just one percent of the world’s vehicle population, India accounts for 6 percent of the world’s road accidents. While there are 20.3 persons killed for every 10,000 vehicles in India, it is only 2.1 in the US, 4.1 in Brazil, 5.3 in the Philippines and 15.5 in Sri Lanka. During the year 1996-97, about 369,000 road accidents resulting in 75,000 fatalities were

G. ROAD OPERATION

49. The road sector exhibits several deteriorating operational problems that will become increasingly important for road agencies to deal with. These relate to ribbon development and encroachment; poor traffic management and unplanned access to highways; uncoordinated location of utilities; inadequate road safety; overloading of commercial vehicles; and other distortions in the transport market. Although some road agencies have begun to appreciate the importance of traffic management, few or no resources are devoted to traffic efficiency improvements on the roads, and a posting to the traffic management or road safety unit is often viewed as a punishment.

50. There seems to be a lack of statistics demonstrating the nature, scale and impact of either encroachment or adjacent utility issues. However, road users familiar with large sections of the national and state networks will attest to these issues presenting significant asset management problems. Some governments have tried to manage this problem by passing or amending existing legislation to strengthen the ability of road agencies to enforce a right-of-way. For example, in Tamil Nadu, a new Highways Act empowers the authorities to stop ribbon development, enter into agreement for development and maintenance of highways, evict unauthorized encroachments in the highway boundary, and adopt a simplified procedure for land acquisition for highway construction.

51. In relation to overloading, studies carried out in 1997 by NHAI on certain stretches of national highways reveal that between 40-80 percent of two-axle trucks carry loads exceeding the prescribed limits (single-axle, 10.2 tonnes). At the state level, various strategic options studies conducted as part of preparation for World Bank-financed projects indicate that overloading is rampant, and enforcement ineffective. At the core of the problem is a vulnerable institutional framework to manage overloading, a framework that has few positive incentives for enforcing the rules on the roads. To date, experience in dealing with overloading effectively has not been encouraging - except perhaps self-regulation that borders on vigilantism (see Box 1.7).

Box 1.7: Dealing with Truck Overloading through Self-Regulation

Overloading has always been a problem in Karnataka State. The Trucking Association in Karnataka stated that effective axle load enforcement is very limited. A 1994 law empowers the Motor Vehicle Inspectorate to issue a notice to offload excess loads from vehicles allowed to proceed. However, not a single notice has been issued since the law was enacted. Only “on the spot fines” have been imposed. Also, the actual receipt of the fine is very low. As diesel prices have escalated, many small operators have turned to extreme overloading as the way to make ends meet, with up to 20 tonnes per axle being loaded. In the face of government ineffectiveness in enforcement, group of members of the trucking association have recently taken to pulling over vehicles themselves and insisting that excess load is removed. This exercise was also conducted by the association’s members in 1992-93 and was highly effective. There are many privately operated weighing stations in the state.

Source: World Bank project preparation mission

reported. Accidents are highly concentrated among certain road users and certain roads. Among vehicles, trucks are responsible for about 30 percent of the total fatalities on intercity roads although they form only 5 percent of the vehicle population.\textsuperscript{30} Pedestrians, cyclists and other vulnerable road users make up a disproportionate share of deaths and injury. In Mumbai, 75 percent of road fatalities are pedestrians. The national highways, while representing only 2 percent of the total road length, account for about 25 percent of total road fatalities. Trends suggest that the situation is getting worse each year. With ambitious road building plans being implemented at national and state levels, rapid growth in car ownership and use, and the country being home to one sixth of the world's population, the Indian road transport system has the potential to create a public health problem of global proportions.

53. Inevitably, the causes of this problem are complex. A seminar on road safety management hosted by the Indian Roads Congress (IRC) highlighted some of the key causes of the decline in road safety. These include the rapid growth in transport demand without concurrent investment in improved facilities; poor planning, design, construction and operation of roads; ineffective institutional frameworks; poor inter-agency coordination and lack of funding. For commercial vehicles, overloading, long hours of crew duty, low levels of training, aggressive driving and intoxication are among the major contributory factors to accidents.\textsuperscript{31} Tackling this multi-causal problem is not simple, and will require concerted action at national, state and local levels.

54. Several agencies are active in addressing road safety, and some important steps have been taken by the national, state and city governments, as well as by non-government bodies, to improve performance. These include:

- The establishment of a National Road Safety Council and a number of similar institutions at the state level.
- The establishment of road safety cells in agencies such as MORTH and state PWDs.
- The production of many world-class technical documents, including a Manual for Safety in Road Design by MOST (now MORTH), an Accident Investigation and Prevention Manual, and numerous design standards by IRC and MOST.
- Innovation in enforcement, such as the establishment of a Highway Patrol and Road Safety Authority by the Government of Haryana; the collaboration between the police and an NGO, the Institute of Road Traffic Education, in Delhi; and a joint public private partnership (PPP) being established in Bangalore to deliver a "Road Safety Drive 2000".

55. But better focused, coordinated and funded strategies are required at national, state and city levels to address the problem more effectively, and prevent a major public health disaster, as road networks are enlarged and vehicle use escalates. MORTH is currently leading the search for such strategies by developing a national policy document and associated action plan. The critical areas that this will need to address include improving the assigning of responsibilities to specific organizations for road safety (and possibly personal responsibilities too in terms of professional duty of care); funding the variety of activities at various levels that international experience suggests are necessary to tackle safety effectively; ensuring coordination between activities; and involving a broader array of stakeholders in the decision making and implementation process.

56. One option that appears to offer a solution to the problems of operating roads is corridor management. At the national level, the government is considering the feasibility of delegating road operation and maintenance to the private sector under corridor management contracts - covering prevention of encroachment, control of ribbon development, access control, regulating the use of ROW, maintenance works and road safety. NHAI is developing the details of how this would work. The Authority intends to develop the concept through pilot programs that establish two Corridor Management Units. Careful and independent monitoring of the experience gained during these pilots will help make future decisions about expansion to, or adaptation for, other parts of the national and state networks; or, alternatively, rejection of the concept.

57. A final key operational issue is distortions in road freight and passenger transport markets. These serve to reduce the positive impact of good roads on the economy and society. In trucking, there are many non-physical barriers to the efficient movement of goods, including:

- High rates of unofficial taxation up to 25 percent of en route expenses (see Table 5, Annex 1).
- Time wasted by the numerous inspections and collections of tax en route (stops made by the

\textsuperscript{30} Op cit, Bhattacharya 2000

\textsuperscript{31} ibid.
Regional Transport Office (RTO), commercial tax collecting agencies, police and border post staff).

- The lack of a system for vehicle inspection, maintenance and certification.
- Low levels of technology.
- Weak enforcement of road rules.\(^3\) There is absolute ease of entry that has resulted in an excessively fragmented industry with 77 percent of the fleet held in firms with between 1-5 trucks.\(^3\) One likely result of this fragmentation is the low level of investment by the industry. Consequently the vast majority of trucks are still two-axle, old, poorly maintained, and poorly driven by inadequately trained and motivated drivers. Some argue that this fragmentation has also led to a poor information market and the growing domination of brokers. This in turn reduces the profitability of operators and their willingness to invest.

58. Again, in relation to public passenger transport, there are a number of non-physical barriers to the efficient movement of people. Some of these are inadequate competition, inappropriate regulatory regimes and weak regulatory capacities, roadside harassment, distortionary tax systems and inconsistently applied labor laws. A considerable portion of public transport is still delivered by public sector operating companies that are asked to meet social obligations imposed on them through controlled tariffs and minimum service standards.\(^3\) These obligations, while laudable in intent, create significant fiscal burdens on many states. They also undermine the financial sustainability of public operating companies and have the potential to distort the market in unintended ways. And in the absence of detailed studies, it is not clear to what extent the benefits of state subsidies for public transport are captured by the poor who are the intended beneficiaries, rather than by monopoly service providers or the non-poor general public.

59. These distortions in road transport operations have tremendous financial, economic, social and environmental implications. By addressing these distortions through regulatory, fiscal and institutional reform, GOI and state governments can maximize the benefits arising from the huge public investments in infrastructure. Such reforms can unleash as much benefit to the economy as infrastructure improvement. Indeed the reforms themselves can better target and protect the social obligations necessary to meet policies of equitable access to road transport services. There is, however, a lack of sound and up-to-date data on the extent and nature of these distortions, as well as limited analysis of their causes. Further research is warranted to help decision makers adopt sensible policy measures.

H. CONCLUSIONS AND WAY FORWARD

NATIONAL LEVEL

60. There is no doubt that the last few years have witnessed tremendous changes for the better at the national level. There is strong political commitment towards improved service delivery. To achieve this, NHAI is now firmly established as a premier road agency striving to attain international standards by delivering an ambitious program of improvements. The CRF and other sources of public and private finance have brought unprecedented levels of funding to the sector at the national level. Experience to date suggests that the new arrangements are delivering better services and changing public opinion.

61. Over the short to medium term, a number of issues are likely to stimulate active debate at the national level. At NHAI, the development of the advisory committee, currently in its infancy, will ensure an effective and meaningful role in keeping the NHDP on track. It will also foster continued public support for this critical national investment. The financial sustainability of the NHDP will require close monitoring. As experience of the various financing options being experimented with - BOTs, corporate bond issues, and government borrowing - grows, so must appropriate analysis. Finally, granting the Authority greater autonomy in human resource issues will help meet international standards.

62. For the CRF, the short to medium term issues include the overseeing, monitoring and cess rate setting arrangements. In view of the CRF's volume of funds, and the importance of the NHDP, it is likely that there will be more calls within India to "professionalize" or

\(^{3}\) B. Puri, "Regulatory Regime, Negative Externalities", *The Asian Journal*, Volume 7 No 2, June 2000

\(^{9}\) Op cit., Malik 2000

\(^{3}\) Of the 55,800 routes serviced by the SRTUs in 1996/97, 19 percent were profitable, 60 percent covered the variable costs and 20 percent did not cover even the variable cost. *Motor Transport Statistics, 1997*
institutionalize the management of the CRF. This could be facilitated, for example, by establishing a dedicated independent secretariat to receive and vet road agency work programs, as well as monitor performance against these work programs; and by clarifying and ultimately regulating disbursement/auditing procedures (e.g. the Federal Highway Authority or FHWA in the United States). In addition, GOI will need to consider the option of giving non-government stakeholders at least some advisory function in the management of the CRF. This may be especially important, as increasing financing requirements strain existing revenue sources, and new sources of income need to be explored.

63. For MORTH, the most pressing issues will be adapting its own structure to its role as it evolves in the future. This will imply a decreasing role as a road agency as physical works are incrementally delegated to NHAI; and a stronger mandate as a road transport ministry and as the policy making, coordinating, monitoring and regulating body for the sector. The central government can play a very important role in encouraging reform at the state level. MORTH may seek to establish itself as a "knowledge bank" of good practice, and as a monitor of road agency performance for the sector. MORTH also intends to lead initiatives to put in place an improved environment for managing road safety. These are roles that MORTH already plays—by producing model contracts and design specifications for example—but there is scope for further expansion as well as benefits in these areas.

64. A final major issue at the national level is addressing the longer term need for major capacity enhancement in the form of expressway development. This now requires active consideration and analysis. In addition to widening existing roads to four lanes along existing ROWs, MORTH has advocated a 20-year plan to build about 15,800 km of expressways along critical corridors. However, financing and implementation arrangements are at a conceptual stage of development. Further study is required on how best to integrate the major road and rail networks, ensure the most appropriate modal split, and have the recommendations subject to public consultations, debate and final acceptance. The expressways require a long lead time in planning, fixing alignments, acquiring land, and dealing with resettlement and rehabilitation of affected people; as well as in preparing the detailed engineering and actually constructing the network. Hence the rapid initiation of more substantive preparatory work in this direction is advisable.

**State Level**

65. At the state level, there has also been considerable progress in an environment where there is, typically, tremendous inertia. Some states are tackling years of poor sector performance. This is being done by clearly allocating responsibilities to empowered road agencies; giving them more commercial freedom, especially through the mechanism of RDCs; ensuring adequate funding and at the same time bringing "top-down" and "bottom-up" pressure to bear on senior management to deliver better services. Additional finances coming from various sources, the sounder policy environment, and growing political interest in sector performance are likely to exert increasing pressure on state PWDs to deliver.

66. However, there is still considerable scope to deepen and broaden these early reforms. This will help raise additional finances, manage resources as effectively and efficiently as possible, make agencies more responsive to non-government interests and initiate a focus on new concerns such as road operation and demand management.

**Short term priorities include:**

- The clear separation of road from other non-road PWD mandates.
- Initiating the separation of client and producer functions by altering reporting lines and accounting procedures.
- Enhanced planning, programming and budgeting of works.
- A focus on performance targets and monitoring.
- Increasing opportunities for other stakeholders/road users to contribute to overseeing the sector.
- Greater use and better management of the private sector for commercial activities.

In the longer run, agencies will have to tackle the **harder issues:**

- Human resource policies and practices.
- Establishment of more autonomous road agencies by distancing them from government.
- Corporatization and privatization of commercial services.
- Creating a formal executive role for road users and other non-government interests in decision making.

Both short and longer term actions will require high quality leadership, political commitment and close linkages to broader civil service reforms - qualities already
present in a number of states, but which need to be extended to all the states of the union.

67. An increasing divergence in performance is likely as some state road agencies pursue reforms. GOI needs to consider how reforms can be encouraged and facilitated in all 30 states. There will naturally be an element of demonstration effect - the high profile actions of NHAI and other performing road agencies will encourage states to undertake change. Apart from this natural tendency, there may be merit in looking for other mechanisms that will use those on the fast track to drag along those on the slow track. These mechanisms might include periodic workshops or seminars to showcase good practice, email networks, websites, twinning arrangements between PWDs, or some form of annual award for innovation—to be presented by a well-respected national institution such as IRC, CRRI, MORTH or some body representing business interests. A league table of performance could be produced and updated annually to quantify and benchmark service delivery, and the progress of individual states. Finally, the considerable inter-government transfers being made by the CRF can influence state-level action through minimum access hurdles, monitoring, and bonus funds for high performers.
### Table 1: Expenditure on the Road and Transport Sector, 1951-96

<table>
<thead>
<tr>
<th>Subsector</th>
<th>Expenditure under the Plan Periods (Rs billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Plan (All Sector)</td>
<td>19.68</td>
</tr>
<tr>
<td>Total Transport Sector</td>
<td>4.34</td>
</tr>
<tr>
<td>Road Sector</td>
<td>1.35</td>
</tr>
<tr>
<td>Transport Sector as % of Total Plan</td>
<td>22.05</td>
</tr>
<tr>
<td>Roads Sector as % of Total Plan</td>
<td>6.86</td>
</tr>
</tbody>
</table>

#### Share of Transport & Communication Sector on GDP

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Percentage of Total GDP</td>
<td>11.01</td>
<td>12.63</td>
<td>14.25</td>
<td>16.69</td>
<td>17.78</td>
<td>20.05</td>
</tr>
</tbody>
</table>

**Source:** Anil Bhandari, *Review of Road Sector*, unpublished report, World Bank, 1998

### Table 2: Annual Expenditure for MORTH and NHAI (Rs Crores)

<table>
<thead>
<tr>
<th>Year</th>
<th>MORTH</th>
<th>NHAI</th>
<th>MORTH and NHAI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Recurr'</td>
<td>Capital</td>
<td>Total</td>
</tr>
<tr>
<td>1996/97</td>
<td>375</td>
<td>940</td>
<td>1,315</td>
</tr>
<tr>
<td>1997/98</td>
<td>500</td>
<td>1,444</td>
<td>1,944</td>
</tr>
<tr>
<td>1998/99</td>
<td>559</td>
<td>1,684</td>
<td>2,243</td>
</tr>
<tr>
<td>1999/00</td>
<td>706</td>
<td>2,172</td>
<td>2,878</td>
</tr>
</tbody>
</table>

**Source:** GOI Expenditure Budget 1997-98 etc, Volume 2.
Table 3: Comparative Spending and Taxation of the Road Sector, 1996-97

<table>
<thead>
<tr>
<th>Country</th>
<th>Road taxes as % of GDP</th>
<th>Road expenditures as % of GDP</th>
<th>Road taxes as % of total Government Revenue</th>
<th>Road expenditure as % of road taxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kenya</td>
<td>4.7</td>
<td>3.4</td>
<td>2.8</td>
<td>71.4</td>
</tr>
<tr>
<td>USA</td>
<td>1.1</td>
<td>1.3</td>
<td>3.6</td>
<td>113.2</td>
</tr>
<tr>
<td>India</td>
<td>1.2</td>
<td>0.735</td>
<td>6.2</td>
<td>57.7</td>
</tr>
<tr>
<td>Japan</td>
<td>1.2</td>
<td>3.9</td>
<td>6.3</td>
<td>330.8</td>
</tr>
<tr>
<td>Korea</td>
<td>3.2</td>
<td>2.6</td>
<td>10.5</td>
<td>80.8</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>2.1</td>
<td>0.4</td>
<td>11.2</td>
<td>20.7</td>
</tr>
<tr>
<td>France</td>
<td>3.7</td>
<td>0.8</td>
<td>18.3</td>
<td>21.8</td>
</tr>
<tr>
<td>UK</td>
<td>3.5</td>
<td>0.8</td>
<td>9.6</td>
<td>23.6</td>
</tr>
<tr>
<td>Spain</td>
<td>2.7</td>
<td>0.8</td>
<td>15.0</td>
<td>29.0</td>
</tr>
<tr>
<td>Italy</td>
<td>4.8</td>
<td>1.4</td>
<td>15.4</td>
<td>29.7</td>
</tr>
</tbody>
</table>


The expenditure is based on assumption of 100 percent of line item for "transport and communication" for revenue and capital expenditure at central and state levels, i.e. it is likely to be an overestimate of total road expenditure. If 75 percent of this sum is assumed to go toward roads, then road taxes as portion of GDP would be 0.5 percent and expenditure as a portion of taxes would be 43 percent.
Table 4: Road-Related Revenues at Central and State Levels, 1992-97, Rs Crores

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Center</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Import duty</td>
<td>459</td>
<td>706</td>
<td>1122</td>
<td>1463</td>
</tr>
<tr>
<td>Excise Duty</td>
<td>1423</td>
<td>1846</td>
<td>2446</td>
<td>3201</td>
</tr>
<tr>
<td>Diesel excise</td>
<td>2136</td>
<td>1681</td>
<td>2832</td>
<td>3838</td>
</tr>
<tr>
<td>Petrol excise</td>
<td>1358</td>
<td>1523</td>
<td>1631</td>
<td>2116</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>5376</td>
<td>5756</td>
<td>8031</td>
<td>10618</td>
</tr>
<tr>
<td><strong>State</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MV taxes and fees</td>
<td>1526</td>
<td>1988</td>
<td>2554</td>
<td>3226</td>
</tr>
<tr>
<td>Sales taxes on petrol</td>
<td>1558</td>
<td>1474</td>
<td>1743</td>
<td>1897</td>
</tr>
<tr>
<td>Taxes on Traffic</td>
<td>908</td>
<td>961</td>
<td>1536</td>
<td>1424</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>3992</td>
<td>4423</td>
<td>5833</td>
<td>6547</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>9368</td>
<td>10179</td>
<td>13864</td>
<td>17165</td>
</tr>
</tbody>
</table>


Table 5: Sample Survey of En Route Expenses - Mumbai/Delhi

<table>
<thead>
<tr>
<th></th>
<th>Rs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diesel and oil</td>
<td>4,199</td>
</tr>
<tr>
<td>Crew</td>
<td>600</td>
</tr>
<tr>
<td>RTO and Police</td>
<td>2,420</td>
</tr>
<tr>
<td>of which</td>
<td></td>
</tr>
<tr>
<td>official</td>
<td>600</td>
</tr>
<tr>
<td>unofficial</td>
<td>1,820</td>
</tr>
<tr>
<td>Octroi etc</td>
<td>85</td>
</tr>
<tr>
<td>of which</td>
<td></td>
</tr>
<tr>
<td>official</td>
<td>25</td>
</tr>
<tr>
<td>unofficial</td>
<td>60</td>
</tr>
<tr>
<td>Toll fees</td>
<td>64</td>
</tr>
<tr>
<td>Broker’s commision</td>
<td>45</td>
</tr>
<tr>
<td>Loading/unloading</td>
<td></td>
</tr>
<tr>
<td>of which</td>
<td></td>
</tr>
<tr>
<td>official</td>
<td>149</td>
</tr>
<tr>
<td>unofficial</td>
<td>30</td>
</tr>
<tr>
<td>Others</td>
<td>99</td>
</tr>
<tr>
<td>of which</td>
<td></td>
</tr>
<tr>
<td>official</td>
<td>30</td>
</tr>
<tr>
<td>unofficial</td>
<td>69</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>8,100</td>
</tr>
</tbody>
</table>

Source: Report of the Study on Trucking Operations in India, AITD.
2. Rural Roads

Ashok Kumar, Zhi Liu, Piers Vickers

A. INTRODUCTION

1. Developing roads in the vast rural areas of India is vital for improving the quality of life of the majority of people in the country. It is equally important for the successful implementation of various government programs for agriculture modernization, poverty alleviation, employment generation, and rural industrialization. There is a considerable body of evidence that demonstrates the links between rural road investment, poverty and growth in India. For example, in an empirical study of 85 randomly drawn districts, it was found that road investment contributed directly to the growth of agricultural output, increased use of fertilizer, and commercial bank expansion. Another recent study using state-level data over two decades on the effectiveness of various government expenditures (such as R&D, irrigation, roads, education, power, and health), found that government spending on rural roads had the largest impact on rural poverty as well as a significant impact on productivity growth. The study estimated that for every Rs one million invested in rural roads, 165 people would be lifted out of poverty. A household survey conducted in the state of Andhra Pradesh indicated that rural road improvements led to substantial reduction in freight charges, increase in household income, more employment opportunities, and expansion of cultivated land (Figure 2.1).

2. The existing rural road network has a total length of about 2.7 million km. Despite the importance of rural roads, about 40 percent of the 661,000 villages in India are not connected with all-weather roads, though there is a wide disparity in connectivity among states. Many villages still rely on earth tracks that are unsuitable for motorized traffic due to poor riding quality, and which become practically impassable during the rainy season because of missing bridges and culverts. Much of the network is under-developed, of low standard and poor quality, structurally weak, poorly maintained, and

Figure 2.1: Impact of Rural Roads Improvement
Rural Transport Surveys (1997) - Andhra Pradesh Economic Restructuring Project

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Shenggen Fan, Peter Hazell, and Sukhadeo Thorat, Linkages between Government Spending, Growth and Poverty in Rural India, International Food Policy Research Institute, 1999
extremely deteriorated. The poor condition and inadequate coverage of the rural network is a major constraint to rural development and poverty alleviation. The lack of roads means that an estimated 20-30 percent of the agricultural, horticultural and forest produce gets wasted because of inability to transport the produce to marketing and processing centers.

3. For half a century, GOI has placed substantial emphasis on improving the connectivity of villages through several programs. Rural roads receive a major share (typically half) of funding available from various employment generation programs of the government. GOI is committed to providing accessibility to the remaining 40 percent of villages. The commitment, if fully realized, would involve upgrading/construction of about 1,100,000 km of rural roads at a cost of about Rs 1,100 billion. Recently, GOI launched a national program called "Prime Mantri Gram Sadak Yojana" (Prime Minister’s Rural Road Program) aiming at all-weather road access to all habitations with a population of 1,000 and above by the year 2003, and those with a population above 500 by the year 2007. Besides providing connectivity to about 100,000 habitations, the program also aims to upgrade about 500,000 km of existing rural roads. The major source of funding of the program is the CRF, which will allocate about Rs 25 billion in 2001 to rural roads. This allocation is expected to increase with increasing consumption of diesel.

4. The current estimated value of the existing rural road network, based on the value of construction work, is about Rs 2,400 billion. The maintenance of the existing rural road network requires about Rs 50 billion per annum, out of which only 20-30 percent is available. Preserving this investment without adequate funds for maintenance is indeed a tough challenge. Traditionally, the solution to the problem has been to seek more budgetary allocations rather than improve the efficiency of use of existing funds.

5. Although investments in rural roads are extremely beneficial, the rural population does not get the full value of the investments because of the current inefficient use of funds. Most government programs are designed to address the immediate rural accessibility problem without a carefully designed policy and institutional framework to ensure the sustainability of these programs. These programs tend to focus on physical connectivity instead of services, and their implementation is subject to heavy political influence. Resource allocation favors investment over maintenance. In short, the existing mechanisms are not delivering the desired results.

6. The key issues in the sector include:
   - **Inadequate funds.** The government is committed to provide road access to all the villages but is constrained due to shortage of funds.
   - **Outdated planning, programming and budgeting,** with not enough emphasis on economic priorities.
   - **Outdated design and construction standards,** making for expensive road construction as well as poor road performance.
   - **Poor construction quality,** resulting in overall low service life of the roads.
   - **Gross neglect of maintenance** and diversion of maintenance funds to fresh construction, leading to premature deterioration of road assets and a huge backlog of maintenance.
   - **Lack of inter-agency coordination.**
   - **Limited implementation capacity,** giving rise to delays in decision making and project completion.
   - **Lack of accountability** and effective mechanisms for monitoring and controls.

**B. RURAL ROAD PLANNING AND POLICY**

7. Current state-level planning practices define numerical targets for village connectivity but, typically, ignore alternative ways of achieving the same numerical targets. This can make a tremendous difference to the costs of achieving the very same numerical targets. There is no guidance on key issues -- such as where the villages should be connected to, design and construction standards, and the prioritization of villages. These decisions are left to local interpretation, so that the rural road network often grows in a haphazard fashion. Thus it is common to see rural roads which lead nowhere; road works remaining incomplete without bridges and culverts; and multiple road connections provided to one village while other villages remain without a single connection. The end result is regional imbalance in the growth of the network.

**POLICY FRAMEWORK**

8. There are tremendous opportunities for enhancing the efficiency of rural road investments through improved policies. But this calls for the development of a national policy framework that emphasizes the sustainable management of rural road assets, and the use of economic criteria for rural road investment decision making. All the rural road programs should be undertaken within
such a rational and comprehensive policy framework (see Box 2.1).

**RURAL ROAD NETWORK MASTER PLANNING**

9. A district-level master plan should be prepared through widespread and informed consultation to identify the network required to ensure basic access to each village. Basic access can be defined as one all-weather road connection from each village/habitation to the nearest market center or higher level road. The network required for this basic access can be described as a core network.

10. Given that 40 percent of the villages still lack all-weather road access, the first priority on equity grounds should be given to bringing the core network to an all-weather standard. This requires both fresh construction and upgrading of the existing network on a least cost basis. Clearly, ongoing and adequate maintenance of the core network must also be prioritized. Only after fully meeting the investment and maintenance requirements of a core network should any remaining funds be applied to non-core rural roads.

11. In addition to the basic access roads between villages and market centers (or the core rural road network), there will be additional demand for farm roads leading to the fields, for roads between villages, and other roads required for social purposes. A framework needs to be developed to meet the requirements of these non-core roads. The government’s responsibility for such roads should be decided on the basis of fund availability. Realistically speaking, this will mean the majority of inputs to maintain such roads will have to come from adjacent local communities themselves, with the role of government restricted to providing limited financial support and technical assistance (see Box 2.2).

**ESTABLISHING CRITERIA FOR INVESTMENT DECISIONS AND PRIORITIZATION OF INDIVIDUAL ROAD LINKS**

12. Most rural road investment decisions are at present subject to considerable political influence, with little or no consideration of economic priorities. For example, in developing network master plans in three districts in Andhra Pradesh, 15 percent of the blacktop roads and 25 percent of the water board macadam (WBM) roads were not identified by local stakeholders as part of the core road network - an indication of over-investment in some links.38

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**Box 2.1 : State Rural Road Policy Framework - The Andhra Pradesh Example**

The government of Andhra Pradesh adopted the following policy framework for rural roads in 1997:
- Preparing Rural Road Master Plans for each district, defining a "core network" to provide basic access to each village.
- Giving first priority to bring the core network to all-weather standards and allocating all the available funding to upgrade the core network.
- Creating community road associations to develop non-core roads on a cost-sharing basis.
- Adhering all ongoing rural road programs to the policy framework.
- Providing adequate funding for the maintenance of the core network.
- Developing and introducing a computerized maintenance management system to prepare an annual maintenance plan.
- Executing all maintenance works through competitive bidding.
- Empowering Panchayat Raj Engineering Department (PRED) engineers to execute annual maintenance plans.
- Developing and introducing optimal standards for rural roads.
- Blacktopping only for roads carrying traffic above an economically justified threshold.
- Introducing improved quality assurance procedures.
- Introducing low-cost mechanized equipment for rural road construction and maintenance.
- Constituting an "Inter-Agency Coordination Committee for Road-Related Issues".
- Modernization, technology upgrading, and capacity building of PRED.

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Box 2.2: Community Participation in Rural Roads

In many countries, the costs of local access roads are shared between government and benefiting local communities.

- Private road cooperatives manage about 70 percent of the road network in Sweden, with subsidies ranging from 40 to 80 percent from government.
- In China, government provides material, equipment, and technical assistance, and local communities provide voluntary labor for road construction.
- 78 percent of the road network in Finland is privately owned and managed through road cooperatives that receive funding from central government, municipalities, and cooperative members. In 1990, government, municipalities, and cooperative members provided $30 m, $40m, and $50 m respectively.
- In Lesotho, government provides limited financial assistance and training in labor-based work methods to villagers who wish to construct rural roads and paths on a voluntary basis.
- In India, in Uttarakhand State and parts of Punjab, paths, tracks, and footbridges are being constructed on a cost-sharing basis with local communities located in remote and inaccessible areas (Integrated Watershed Management Project). Communities generally contribute voluntary labor and are actively involved in planning and execution of works. In some cases, communities voluntarily construct the road formation, and cross-drainage works are provided under the project.

13. Most rural roads have very low initial traffic volumes, and the expected benefits of improvement come primarily through increased socioeconomic opportunities. These increase traffic, but are difficult to forecast and quantify in monetary terms. Moreover, rural road investment programs in India often cover large areas, where needs include both improvement of existing all-weather passable roads for the purpose of traffic efficiency, and the provision of basic access for poverty reduction. Allocating limited budgets often means choosing between poverty-focused and efficiency-oriented road works. Also, rural roads selected for intervention are often screened from a vast road network.

To maintain a degree of equity among villages, the spatial balance of the program must be considered along with economic criteria when selecting individual roads for investment. So a set of rational criteria, including but not limited to economic criteria (cost-benefit and cost-effectiveness analysis as appropriate), need to be identified, then used to make investment decisions at national, state and local levels.

Mobilization of Additional Financial Resources

14. It is imperative to increase the funds currently available for rural road programs, and ways to deepen and broaden sources of funds need to be explored. Certainly there is scope for greater community participation; non-governmental sources can also be tapped. In China, an annual "road maintenance fee" is charged on the basis of vehicle type, and the funds are used for road maintenance.

In some states in India - including Haryana, Punjab, Uttar Pradesh, and Rajasthan - an agricultural cess is charged at the rate of 2 percent of the cost of the agricultural produce brought to markets for sale. A major part of this cess is dedicated to use on rural roads. Uttar Pradesh has established a road fund by dedication of the marginal revenue increase from a rise in sales tax on transport fuels. Funds are applied to the entire state network, including maintenance of rural roads.

C. Technical Standards

15. Current rural road technologies are largely traditional and have not undergone any major changes for several decades. Technologies are generally borrowed from those developed for highways, without realizing the potential savings which could be achieved if the technologies are developed according to the specific needs of rural roads. It is possible to introduce cost-effectiveness analysis and bring down the overall life-cycle cost of rural roads, through improved designs, improved material specifications, and new/improved technologies. Effective mechanisms can be developed to identify various technological advancements made in developed and developing countries, and these mechanisms can be converted and tailored into locally usable manuals and guidelines.

16. Establishing optimal design standards: Rural roads differ widely in terms of traffic, population served, and the functions to be served. The current design standards are too general, and do not take adequate
account of these parameters. A village is generally considered connected only if provided with a blacktopped road. This approach disregards the relationship between traffic demand and required standards, and often leads to over-design. This is of particular relevance at present, as most unconnected villages and habitations have a relatively low population so that the amount of traffic may be insufficient to justify a blacktopped road. Suitably designed earth and gravel roads can even serve traffic up to 200 vehicles per day, and such roads are widely used in many developing and developed countries for rural areas. In Finland, for example, about 70 percent of the roads are gravel-surfaced roads; the United States has hundreds of thousands of kilometers of gravel roads. Rural roads should be classified according to the traffic served, and optimal design standards should be developed for traffic category (Table 2.1). As a policy, blacktopped roads should be constructed only when traffic reaches an appropriate economic threshold. Conventional roads for small habitations in hill areas are generally not suitable due to high costs, and environmental and topographical considerations. In such cases, all-weather access can be provided with paths and tracks. Spot improvements such as providing missing bridges and culverts, or other drainage improvements, are likely to be very cost-effective in such cases.

Table 2.1: Functional Design Standards Adopted by the Andhra Pradesh Economic Restructuring Project

<table>
<thead>
<tr>
<th>Average Daily Traffic</th>
<th>&gt;150 vehicles per day</th>
<th>&lt;150 vehicles per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road Surface Type</td>
<td>Blacktop</td>
<td>Gravel</td>
</tr>
<tr>
<td>Formation Width</td>
<td>7.50 m</td>
<td>6.00 m</td>
</tr>
<tr>
<td>Pavement Width</td>
<td>3.75 m</td>
<td>3.75 m</td>
</tr>
</tbody>
</table>

17. Developing and promoting cost-effective road designs and material specifications: The current methods of pavement design for rural roads do not take adequate account of traffic level, soil type, drainage requirements, material availability, and the level of service required for rural roads. There is an immediate need to develop and promote cost-effective designs of road pavements, bridges, culverts, cross-drainage works which take into account traffic, soil, drainage, and environmental parameters. The current material specifications and quality control criteria are mainly developed for highway conditions, and they aim at higher standards than those required for rural roads. These specifications and quality control criteria must be reviewed and revised to ensure cost-effective design and construction that promotes the use of local materials and skills.

18. Introducing low-cost mechanized equipment: Construction methods for rural roads are mainly labor-based and they create a desirable direct employment effect. However, the use of labor-intensive techniques should not be allowed to create low productivity, poor quality, slow speed of implementation, or human drudgery. There is considerable scope to improve traditional labor-based methods through improved roads and low-cost mechanized equipment.

19. Introducing quality assurance procedures: The current quality standards of works are generally poor, leading to high maintenance costs and low service life. Many rural roads are constructed without any basic system for quality control. Putting in place suitable quality assurance systems with the necessary facilities and institutional setup will help secure value for money that goes into public investment in rural roads.

D. RURAL ROAD MAINTENANCE

20. Many agencies construct rural roads without a sustainable maintenance arrangement in place. Although data on the extent of the problem is limited, a major part of the rural road network is in poor condition. Pavements are often worn out only a few years after paving. The huge capital investments made in the past are now being rapidly eroded due to an almost total absence of even basic maintenance. Governments at national, state and local levels need to re-prioritize maintenance to overcome the problem. Sustainable policies need to be developed and established:

- The core rural road network should be considered an essential public service and sufficient and continuous funds must be ensured for their maintenance.
- A rational balance needs to be struck between extension of the network and consolidation and upkeep of existing core network.
- Innovative ways of mobilizing funds for maintenance and establishing cost recovery mechanisms need to be identified.
- Simple maintenance management systems need to be used to prepare annual maintenance plans so that scarce resources can be applied where needed the most. This includes establishing a computerized database containing an asset inventory, periodic condition and traffic surveys to assess the network condition, and identification of maintenance needs for preparation of annual maintenance plans.
More efficient ways for executing maintenance works must be promoted by introducing competition in service delivery, converting existing gang labor into micro-enterprise contractors, and involving local communities.

New/improved maintenance techniques and work methods must be introduced.

Maintenance works should be monitored better.

E. INSTITUTIONAL ISSUES

21. The poor condition of rural roads in India has much to do with institutional weaknesses. While the institutional arrangement for rural roads varies by state, the following issues need to be addressed in most states.

22. **Defining the role of different levels of government:** The roles of central, state, and local governments need to be clearly defined. The Ministry of Rural Development (MORD) should assume leadership in essential policy enunciation/adjustments and institutional changes, as well as in financing, technology transfer, human resources development, and monitoring of rural road development in different states. MORD should also provide technical assistance to the states, and organize pilot schemes across the country to test new policies, standards or procedures, then disseminate the results of science and technology findings. MORD also has a role in assessing the efficiency of state-level organizations in building, operating and managing their rural road networks by adopting a system of performance monitoring. The coordination of multiple agency funds and programs of rural roads should also be done by the center. It is not clear that MORD is currently fulfilling these roles and strategies, and hence its processes and skills need to be modified to reflect these core responsibilities.

23. The major responsibilities for rural roads—including financing, planning, execution, maintenance, and management—should continue to be with state governments.

24. Panchayat Raj Bodies at district, block and village levels are expected to play an increasingly pivotal role in the construction and management of rural roads. Thus the need to establish close coordination among various rural road organizations and local government levels has acquired a new dimension and significance. Suitable frameworks as well as mechanisms for the effective participation of these levels of government have to be evolved.

25. **Developing an efficient and improved framework for planning, design, construction, maintenance, and management of rural road networks:** In most states a number of organizations are involved in rural road construction, and the responsibilities are not clearly defined. Most of these agencies work in isolation, and there is duplication of resources. At the same time, arrangements for maintenance are not ensured. It is essential that responsibilities for planning, construction, and maintenance for different categories of rural roads be clearly defined in each state.

26. **Capacity building and modernization of the rural road industry:** The road construction industry is generally oriented towards higher-class roads so that there is a lack of service providers for rural roads. There is an acute shortage of trained manpower, equipment, and quality control facilities for rural road works, and most of the work force engaged in rural road works is unskilled. Capacities of various categories of staff engaged in rural road development should be strengthened through suitable skills and systems building programs. Both the construction and consulting industries need significant expansion and strengthening to cope with the increasing work load and quality expectations of the forthcoming rural road program.

27. **Strengthening monitoring and control mechanisms:** Suitable mechanisms for monitoring and control of rural road programs are lacking. These should be established at the national, state, and local levels.

28. **Management information system (MIS):** One of the central problems in the planning and management of rural roads is the lack of reliable information on key aspects such as road condition and traffic volumes. A computerized database, preferably in a Geographical Information System (GIS) environment, should be created at national, state and district levels. All the relevant information - such as length of different types of roads, village accessibility, funds available and expenditure incurred under different programs, unit costs, availability of road building materials, maintenance history, road inventory, traffic level, and network condition - should be included in the database and periodically updated.

29. **Developing a framework for community participation:** Community participation offers significant potential for mobilizing the support of local communities in resource generation, land acquisition, and tailoring the rural road programs to local needs. The government's role is mainly to build up the capacity of local communities to manage their road network. This is
of special relevance for access to small population groups that generally remain outside the reach of current government programs. Developing a suitable framework would encourage local communities to assume responsibility for their roads, with limited financial support from the government.

30. Establishing need-based and performance-related criteria for fund allocation: There is a wide variation in the growth of rural roads in different states and regions - connectivity varies by state from 40 to 100 percent. Central funds can be used as a mechanism to redress imbalances. Allocations to states must use rational criteria that prioritize new basic accessibility and preservation of the core road network. Central funds can also be used as incentives for states to modernize their rural road sector. Allocations of central funds could be linked to performance indicators and conditionalities— including preparing master plans, quality assurance, adaptation of optimal standards, and establishing maintenance management systems.

F. Making Change Happen

31. The most important potential instrument that GOI has to influence the implementation of the preceding recommendations at state and local levels consists of the grants made from the CRF under the Pradhan Mantri Gram Sadak Yojana (PMGSY). This program is likely to represent about a third to a half of the total public expenditure on rural roads in most states for the foreseeable future. If properly structured, these grants can provide a powerful incentive for change.

32. Since the CRF legislation dedicates the rural road component for road development, it is critical that the program provides strong incentives for adequate state and local government financing, and management of the extended networks after construction. Guidelines on the use of funds have been issued to all states, and these cover some of the areas already identified in this paper. For example, the guidelines require competitive contracting in packages between Rs 1-5 crores with contract clauses for performance guarantee up to five years, although the issue of contractors’ qualification is not addressed. There is also a requirement to develop a district master plan. But the extent of consultation on the plan is limited to local MPs and members of the State Assemblies; it does not explicitly include representatives of other interested parties such as road users and the farming community. MORD intends to engage independent monitors to undertake technical audits, thereby helping ensure adequate quality control.

33. All the same, much can be done to improve the administration and management of the PMGSY.

- **First**, MORD itself needs adequate resources to manage the program. Other successful road funds dedicate a portion of the revenue to administration of the fund. In the United States, for example, the Federal Highway Trust Fund is managed by the Federal Highway Administration (FHWA), which receives up to 1.5 percent of the revenue by law. This ensures that the fund administration is capable of setting and enforcing appropriate rules for access to and use of the grants, and for effective monitoring and auditing.

- **Second**, the CRF law allows GOI to establish rules through publication in the Official Gazette. There is a case to turn the MORD guidelines into official rules to provide a firm legal basis for their adoption.

- **Third**, the guidelines themselves can be toughened in the following areas:

  - **Introduction of clear guidance on rational criteria, economic and/or socioeconomic, to identify investments to be made.** The current guidelines merely state that “plans would be subject to close technical scrutiny so as to arrive at the most economical cost of achieving the targets of the program.”

  - **Application by the receiving state and local governments of some modest sum for planning, supervision and audit of the projects funded under the program.** This could possibly include capacity building activities for the first few years of the program. In the US for example, states can use up to 2 percent of receipts for planning and research; NHAI receives 3 percent for its management of the NHDP. (At present, no agency fee is permissible, and there is limited scope to use the funds for anything but civil works contracts. In-house supervision of works is expected.)

  - **Imposition and enforcement of conditions on meeting a minimum level of state/local rural road maintenance funding.** This could possibly imply applying some minimum level of cost sharing with states and/or local government as is the practice in many other centrally sponsored schemes such as EAS and JGSY.

  - **Use of more rigorous disbursement procedures that better promote financial discipline at the local level.** This could be done, perhaps, by using reimbursements rather than ex ante transfers, as opposed to the
biannual central release to states. The states are required to pass on the funds within 15 days to the districts, and the result may simply be that the money remains unused in district level accounts.

- Requiring due consultation with all stakeholders in the district planning process.
- Setting clear economic criteria for deciding on the blacktopping of roads. This is to be done with the presumption that funds will be used for engineered all-weather gravel roads unless traffic met certain minimum levels (say around 150 vehicles per day).

34. The following actions are recommended for the rural road subsector in the short to medium term:

- Prepare, at the district level, a "core network" plan to provide basic access to all villages through community participation.
- Use the criterion of traffic level to select appropriate design standards for all-weather rural roads.
- Provide adequate funding for maintenance of "core network".
- Involve community in provision and maintenance of roads other than those in the "core network".
- Develop planning and monitoring capacity at the local level.
- Ensure inter-agency coordination for road-related issues.
- Use the leverage provided by CRF transfers to encourage state and local governments to adopt sound policies and use effective implementation systems.
A. INTRODUCTION

1. India's economic reform, aimed at economic liberalization, was set in motion in 1991. It has triggered unprecedented private sector led economic growth at a rate of 6-6.5 percent per year during the last decade. Significant policy initiatives were implemented in the initial couple of years of reform, but there has been little action to deepen the economic reform process for several years thereafter. But with the formation of the new central government in 1999, the reform process has gathered some momentum and several important decisions have been taken by the central and state governments.39 There are indications that political support for deepening the economic reform process is gradually increasing, and that resistance of administrative ministries to the reform process is on the wane. The general perception is that policy makers realize that reform is an essential prerequisite for the economic development of India at the targeted GDP growth rate of 7-8 percent per year.

2. With the economy on track for a planned growth at 7-8 percent per year, the demand for freight and passenger transport is expected to grow at around 10 percent a year. At present, however, India's transport system, especially surface transport, is highly congested, and the sector performance is poor and inefficient by international standards. This raises an important question: how is India's transport sector to be prepared to meet the rapidly growing transport demands?

3. Both GOI and the World Bank examined this question extensively a few years back. In 1995, the World Bank published a sector report, India: Transport Sector - Long Term Issues, which examined how the sector should respond to the national economic reform initiatives and other emerging factors—including urbanization, technological changes, and social and environmental concerns. It proposed a number of policy and institutional reforms required for the sector to change the way it conducts business during the transition from a controlled to a market-oriented economy (Box 3.1). This paper reviews the present status of various issues in the railway subsector, and attempts to identify strategies and initiatives that will help provide the required capacity and quality of service in rail transport.

B. RAILWAYS: A VITAL PART OF INDIA'S TRANSPORT SECTOR

4. Indians can be proud of the contributions of Indian Railways (IR) to the development of the nation. It is fair to say that the achievements of the Indian economy through the early 1990s would have been impossible without IR. At the turn of the century, however, IR is approaching a financial and operational crisis that will prevent it from serving the country as well in the future unless the required reforms are implemented.

5. As India looks forward to the new century, IR faces three critical challenges:

- First, India's increasing reliance on market forces and its WTO-driven external trade focus will necessarily precipitate dramatic changes in the Indian economy, its transport sector, and especially in IR.

- Second, political perceptions rooted in the planned economy imposed uneconomic functions on IR, and these functions will be unsustainable in a competitive market context.

- Third, as in every other country facing rail reform, allowing IR to languish in a situation of inadequate financing and conflicting policy leadership will eventually create a large-scale financial and transport disaster. This in turn will act as a major constraint on economic growth.

6. IR is vertically integrated. Besides carrying out the core business of rail transport, it also owns and

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39 These include the following corporatization of department of telecom, reform of the nationalized banks with a provision for downsizing work force (VRS), opening the insurance sector to the private sector including foreign participation, reform in the power sector including corporatization and privatization of SEBs, privatization of sick public sector companies, downgrading the Steel Authority of India and a framework for VRS, disinvestment of Air India and Indian Airlines and leasing the airports of 4 metro cities, steps to corporatize ports and setting up port terminals by the private sector, disinvestment in oil sector corporations (IBP), privatization of the State Trading Corporation and Minerals and Metals Trading Corporation, ordinance on road fund, and strengthening and empowering NHAI for the implementation of NHDP (allocation of cess on diesel and petrol)
Box 3.1: The 1995 World Bank Report

This report recommended a number of sector policy reform initiatives by sector activity, keeping in mind that some initiatives will be difficult to implement without strong political will. The key initiatives are as follows:

**Easier Reforms**

Seaport operations: Shifting government’s task from providing infrastructure and services to regulating private sector operations.

Intercity bus operations: Shifting focus toward a regulatory policy that promotes public safety and low fares. Intercity trucking: Reducing the number of police checkpoints and/or increasing their efficiency; exploring a substitute revenue measure (e.g. a road fund) that allows the abolition of octroi collections.

**Difficult Reforms**

Highway construction: Contracting out engineering services and civil works to the private sector; setting up state (and a national) road funds through earmarked taxes on fuel, to finance road investment and maintenance.

Rail: Corporatizing IR’s manufacturing operations; depoliticizing provision of railway services, especially passenger services; running passenger services as a commercial venture instead of a social service; converting redundant facilities to viable private sector industrial and commercial operations, as one way to generate revenues or employment opportunities for redundant labor.


(manages activities such as the design and manufacture of rolling stock, overhaul and re-manufacture of rolling stock, construction projects, schools, technical institutes, housing, hospitals, and hotels. In all, IR supports a workforce of about 1.6 million constituting 6 percent of the 27 million people employed in the organized sector. IR is organized as an independent Government Ministry of Railways. Operating control and management is vested in 9 zonal railways, each of which is an integrated, geographic monopoly interchanging traffic with all other zones. The railway system is further subdivided into about 60 divisions each headed by a Divisional Railway Manager. The Konkan Railway Corporation (KRC) is a separate entity, although partly owned by IR. The Delhi Metro Rail Corporation, recently formed to provide urban rail transport in Delhi, is an independent entity.

7. IR’s roots are in the planned economy, and this has necessarily yielded an organization driven largely by production concerns, and essentially disconnected from market forces. It also bears a large burden of imposed social functions. The Ministry of Railways (Railway Board) combines the functions of policy, enterprise management and regulation. The organizational structure of IR continues along functional lines with very little focus on customers and businesses. IR continues to cross-subsidize passenger services, own and operate non-core activities, and retain government accounting systems that are not designed to provide financial information for informed business decisions. The freight tariff continues to be one of the highest in the world. As a result, IR has continued to lose market share to the road subsector in spite of the fact that Indian road infrastructure is poor. Thus it would be appropriate to conclude that the Indian economic reform of the last decade has, so far, bypassed the railways.

**URGENCY FOR RAILWAY REFORM**

8. At present, IR faces two possibilities: significant change through reform, or a financial and operational collapse. Thus India has high stakes in getting rail reform right. These reforms must be based on proved and accepted general principles emerging from the international experience of railway reform, and adapted to fit the Indian environment.

9. Though Indians often argue that India is "different", there is much in common between the IR challenge and the experience of rail reforms in other countries. Such experience indicates that the question for India and IR is not the need for change, or even the general direction of change. Instead, the question is how to define options, how to fit them to Indian conditions and objectives, how to evaluate the options, and how to implement the decisions. Implementation will be the key to successful change because IR is still vital to the economy. Disruption of services would be disastrous, and many of the changes needed must be accompanied by suitable "safety net" protections for affected groups.
However, it is essential that a road map for the reform of IR be prepared and implemented with a sense of earnestness and urgency.

10. IR's concern about its future led to the setting up of an expert group chaired by Rakesh Mohan, Former Director General, National Council of Applied and Economic Research (NCAER). The group's report, issued in August 2001, recommends several strategies to enable IR to meet challenges in terms of its financial health, growth in demand, changing customer needs and excess manpower. The Mohan Report recommends that "the imperative is to get started fast on a program of restructuring and reform." It further states that "the evidence for rapid, deep seated change is clear, compelling and overwhelming."

THE NETWORK

11. The Indian Railways network can be broadly divided into the following segments:

- High-density corridors (HDC), consisting of the quadrilateral joining the 4 metropolitan cities and the diagonals. On most of these corridors the current utilization exceeds the nominal capacity. Since higher than average traffic growth is projected on such corridors, substantial capacity enhancements are required over the next 10-15 years.

- Connecting lines that feed the HDC, handling mostly mineral traffic. The traffic growth is dependent on the specific product and the emerging market conditions.

- Alternative routes, including some recently converted from meter gauge (MG) to broad gauge (BG) that could provide relief to HDC, by rerouting traffic over relatively lower density, though longer, routes. However, it will be necessary to establish the cost-effectiveness of such alternative routes.

- Low-density lines, both on BG and MG, have uneconomic traffic density with little prospects of traffic growth. These also include isolated MG lines that are no longer connected to the MG network and have negligible freight traffic.

FINANCIAL PERFORMANCE AND STATUS

12. Investments in railways have traditionally been funded by the central government (budgetary support: a loan in perpetuity on which railways pay a dividend @ about 7 percent) and through internal accruals. However, in recent years there has been a scaling down of budgetary support from a peak of 75 percent in the Fifth Plan (1975-80) to 25 percent in the Ninth Plan (1997-2002). The railways resorted to market borrowing to partly finance its capital needs. In 2000-01, capital investments were funded in proportion of 20, 54 and 26 percent by budgetary support, internal resources and market borrowings respectively. IR deferred its dividend payment to the central government and under-allocated funds for maintenance and asset renewal, thus substantially increasing internal accruals. The last five years have seen a deterioration in the financial performance of the railways, and it is no longer able to generate any operating surplus (see Box: 3.2). At the same time, it is unable to deploy adequate resources for maintenance and renewal of assets. This, coupled with reducing budgetary support from GOI and heavy market borrowing, has seriously impaired its ability to invest in additional capacity and service improvements. IR is, indeed, facing a financial crisis, and that makes the need for measures to improve its financial health all the more urgent.

OPERATIONS

13. IR operations are characterized by a dominance of passenger traffic and the long haul of bulk commodities. IR operates about 8000 passenger trains daily. By and large there has been a steady growth in freight as well as passenger traffic over the past five decades. In terms of transportation output, in the last eight years (1990-91 to 1998-99), the passenger and freight traffic has grown at a little over 3 and 2.4 percent per year respectively, although slower than the growth of the economy as a whole. The passenger business has two major components—suburban and non-suburban services. IR faces capacity constraints on its high-density corridors, on which substantial traffic growth is anticipated. IR's LRDSS analysis (LRDSS Phase II Analysis Report) concluded that IR needs to pay special attention to augment capacity in carefully selected links.

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40 In March 1999, IR's network consisted of about 63,000 route-km (of which 44,216 route-km or 70 percent was 1676 mm BG tracks), and it serviced 6,896 stations. It carried 4,411 million passengers (494 billion passenger-km) and lifted 442 million tons of freight (284 billion ton-km). About 14,000 route-km was electrified. The network had 2,785 electric and 4,586 diesel locomotives, about 40,000 passenger coaches and 250,000 freight wagons in service. BG contributes about 95 percent of freight output (ton-km) and 90 percent of passenger output (passenger-km). In 1998-99, 44 percent of passenger train km and 60 percent of BG freight gross ton-km were operated on electric traction. The total staff employed was 1,578 million. The capital at charge was 36,829 crores and total investment was of the order of Rs 54,000 crores.
Box 3.2: The Financial Performance of Indian Railways

In the year 1998-99, IR generated a revenue of Rs 29,619 crores. The total working expenses were Rs 27,835 crores. Net revenue before dividend was 2,141 crores and rate of return on capital at charge was 5.8 percent. The operating ratio stood at 93.3 percent. In the following year (1999-00), the net revenue, return on capital and operating ratio stood at 2,736 crores, 6.9 percent and 93.3 percent respectively. The budget estimates for 2000-01, however, show a deteriorating financial position, with the net revenue, return on capital and operating ratio slipping to 1,792 crores, 4.2 percent and 98.8 percent respectively. As a result, IR has deferred a dividend payment of 1,500 crores. In reality, IR has a negative operating cash flow as it allocated inadequate funds for maintenance and renewal of assets. For example, the arrears of track renewal amount to as much as 15,000 crores. Thus it is clear that IR is facing a financial crisis and eroding its capital base.

The budgetary support from the central government has been declining and is around 25 percent in the ongoing Ninth Plan (1997-2002) as compared to a peak of 75 per cent in the Fifth Plan (1975-1980). For several years now, IR has been resorting to market borrowings to partly finance its capital needs. Accordingly the lease payments have gone up from 0.42 per cent of ordinary working expenses in 1987-88 to nearly 11 per cent in 2000-01. The ability of IR to generate internal resources stands greatly impaired.

It estimated that "with growth in freight traffic, 25 percent of rail links will experience traffic approaching or exceeding charted capacity by the year 2006-07."

14. The utilization of wagons in terms of net ton-km per wagon day to BG has shown an improving trend - it has increased from 986 in 1980-81 to 1,904 in 1998-99. The average speed of freight trains has, however, stagnated at around 24 km per hour for several years, mainly due to increasing congestion on high-density corridors and the high failure rate of infrastructure and rolling stock. Terminal detentions to wagons are comparatively high, and there is considerable scope for reducing these detentions. Not only does the comparatively high failure rate lower average train speeds, but it also causes erosion of capacity, especially on high-density corridors. Utilizing data on a sample of train failures by including delays, LRDSS carried out a simulation of train operations to study the impact on line capacity. This analysis concluded that the highest incidence of failure on trains was contributed by wagon failures, and that the present rate of train failures caused a loss of about 20 percent of line capacity. The study also indicated that a 50 percent reduction of failure of assets would result in a gain of 9 percent in line capacity. It concluded that any investment made on failure reduction yielded high returns, and that the payback period was less than a year on saturated routes that were freight-dominant. Recent studies have concluded that substantial investments are required to enhance operational efficiency and capacity, and reduce unit costs through technological upgradation (Box 3.3). This is true for several areas, including traction, higher payload/tare wagons, higher axle loads, improved signaling, mechanized handling at terminals, improved maintenance and reliability of assets, and freight traffic management systems.

Box 3.3: Technology and IT Inputs

IR has belatedly initiated several technological upgradations in recent years. These include the introduction of state-of-the-art electric and diesel locomotives (though in small numbers), replacement of four-wheel wagons with bogie wagons, adoption of air brakes, relaying track with 60 kg, 90 ultimate tensile strength rails on high-density routes, long and short welded rails, extensive use of concrete sleepers, mechanized track maintenance, use of panel interlocking at stations, introduction of solid state interlocking, and track circuiting including Audio Frequency track circuits. But IR continues to employ the comparatively light axle load of 20.3 tons for freight traffic. The freight wagons have rather unfavorable payload to tare ratio between 2.3 and 2.7. The use of IT in operation management and maintenance systems is minimal. Only recently, a computer-based "freight operations information system" on one zonal railway has been installed as a pilot. The use of older technologies, and the unsatisfactory quality of manufacture and maintenance of railway assets, leads to the high incidence of failures. The result is an adverse effect on operational efficiency, service quality, safety and productivity of assets. These in turn adversely affect unit costs, capacity and IR's market share.
15. Technology upgradations of assets and maintenance systems, coupled with intensive use of IT in operations and management and maintenance systems, could help IR overcome problems related to capacity, productivity, quality of service, safety, unit costs and market share.

**CROSS-SUBSIDY OF PASSENGER SERVICES**

16. IR has one of the lowest ratios of unit passenger fare to freight rate. Passenger services, particularly second class and suburban, are heavily subsidized, and in 1999-00, IR suffered a loss estimated at over Rs 4,100 crores on passenger business. The provision of passenger services below cost also encourages passenger travel by rail, and this increases losses. Decisions to introduce and continue to run passenger trains are not based on demand analysis, and many have poor occupation rates. The removal of distortion in passenger pricing and eliminating poorly patronized passenger services are thus important issues that need to be addressed on a priority basis.

17. Comparing IR with China Railways, which is also part of a ministry and serves a large country and population, reveals some interesting facts. Passenger services ran at a loss in China as well, given concern about the ability of masses to pay the real cost of passenger services. Initially, in order to conserve capacity for freight traffic and minimize losses on passenger services, efforts were made to minimize passenger services by rationing travel. Later, it was realized that a better approach would be to raise passenger fares and use the surplus generated to increase capacity and quality of service. Between 1994 and 1998, China Railways raised passenger fare by 75 percent. Its ratio of passenger fare to freight tariff changed from 0.86 in 1994 to 1.15 in 1998—as compared with 0.30 for IR.

18. IR needs to analyze the cost of providing various types of passenger services to help determine their financial viability. According to a study conducted by LRDSS, the total cost of running a slow passenger trains is the highest among all types of passenger services. However, these trains have the lowest tariff and some have poor occupation ratios. IR currently runs about 3,200 slow passenger trains daily; and these, conceivably, contribute the maximum loss in passenger business. Even at full occupancy, these trains make heavy losses (Box 3.4). They also consume a substantial proportion of scarce line capacity on high-density routes. If the financial health of IR is to be ensured, it is important to review the need, pricing and composition of such trains so that losses on such services are eliminated. It has been observed that with the development of an extensive road network and the availability of frequent bus and other public services on roads, the rationale of such services on railways does not exist any more. Hence IR must consider the withdrawal of trains causing heavy losses.

19. Rationalizing passenger fare structure may slow down the passenger traffic growth—which would not only help minimize losses, but would also help carry more profitable freight traffic. Another approach to help eliminate passenger subsidy is to gradually change the mix

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**Box 3.4: The Profitability of Stopping Passenger Trains**

Short-distance stopping passenger trains not only drain capacity but also remain nonviable even at 100 percent occupancy at the present levels of tariffs. This is illustrated by the following sample calculation:

<table>
<thead>
<tr>
<th>Description</th>
<th>Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of hauling a coaching train in per km</td>
<td>Rs 301.94</td>
</tr>
<tr>
<td>Cost of hauling a passenger train for 250 km</td>
<td>Rs 75485</td>
</tr>
<tr>
<td>Average rate charged per passenger per km in 2nd class</td>
<td>Rs 0.11</td>
</tr>
<tr>
<td>Earnings with 100% occupancy</td>
<td>Rs 22000</td>
</tr>
<tr>
<td>Loss per trip</td>
<td>Rs 53485</td>
</tr>
<tr>
<td>Earnings with 70% occupancy</td>
<td>Rs 15400</td>
</tr>
<tr>
<td>Loss per trip</td>
<td>Rs 60085</td>
</tr>
<tr>
<td>Cost of MST (Monthly Season Ticket) per trip up to 150 km</td>
<td>Rs 5.50</td>
</tr>
<tr>
<td>Earnings with 100% occupancy with MST</td>
<td>Rs 4400</td>
</tr>
<tr>
<td>Loss per trip</td>
<td>Rs 71085</td>
</tr>
<tr>
<td>Earnings with 70% occupancy with MST</td>
<td>Rs 3080</td>
</tr>
<tr>
<td>Loss per Trip</td>
<td>Rs 72405</td>
</tr>
</tbody>
</table>
of passenger services and reduce the proportion of loss-making services. Subsidies, if any, need to be appropriately targeted and the costs of public service obligations (PSO) borne by institutions that promote PSO.

**RAILWAY SAFETY**

20. The safety of trains is a prime concern of both IR and railway users. Official railway statistics on accidents show that there is no significant increase in the rate of accidents and resulting deaths. But in the past few years, there have been a number of accidents involving passenger trains, and a large number of lives have been lost. These incidents have once again focused the attention of public and the government on this issue. Collisions and derailments of passenger trains, with the attendant havoc and loss of life and property, are given major coverage in the media, leading to the inevitable outcry for measures to improve railway safety.

21. A high-powered Railway Safety Review Committee appointed to study accidents on IR completed its work recently, and it has made several recommendations to improve railway safety. Some of the important recommendations call for substantial investments, to the tune of Rs 15,000 crores, and their implementation would depend largely on the availability of financial resources. Thus improvement in railway safety is also dependent on IR’s ability to generate financial resources. A ministerial statement made in parliament conceded that "the safety preparedness (on railways) had suffered long years of neglect because of successive decline in investment and the long delay in bringing about reforms at the structural level." In view of its precarious financial state, IR has made a request to the central government for a one-time grant of Rs 15,000 crores to rehabilitate over-aged assets and implement measures to prevent accidents and enhance railway safety. In a recent decision, IR has imposed a surcharge, effective October 2001, to improve railway safety. It is estimated that this surcharge will raise Rs 5,000 crores over a period of 6 years.

**PERFORMANCE AND STAFF PRODUCTIVITY**

22. Comparing the performance of IR with other railways (Annex 3.1) reveals that:

- IR is among the larger railway systems of the world in terms of route-km and passenger and freight outputs.
- Its performance in terms of operating ratio is in dangerous territory.
- The traffic density on IR is modest and has scope for increase. This shows potential for more intensive use of existing network and infrastructure.
- IR has the lowest employee productivity among the major railway systems, and there is a significant potential for increasing staff productivity.
- IR has the lowest ratio of passenger fares to freight rates, indicating that passenger fares have been kept unusually low. The comparison highlights the substantial cross-subsidization of passenger services from freight revenues.
- The Purchasing Power Parity-based freight revenue per ton-km of IR is by far the highest of the major railways considered in the comparison.
- Since IR is a passenger-dominated railway, low passenger fares have forced it to raise freight rates to a very high level.

23. Improved staff and asset productivity, coupled with rationalization of passenger tariff, would enable IR to offer competitive freight rates as well as raise internal resources for expansion of capacity, increase in operational efficiency, and improvement of quality and service.

**STAFF COSTS**

24. Concerned about its low staff productivity, IR has made efforts to reduce staff since the early 1990s. It has succeeded in reducing staff at an average of 2 percent per year since 1994; but despite these efforts, IR has one of the lowest levels of staff productivity among the major railway systems in the world. This is partly due to the vertically integrated character of IR: it carries out several non-core activities besides its main business of running trains. The other contributing factors are the low level of mechanization resulting from low capital inputs and use of older technologies; archaic labor practice of single skills; and inability to shed surplus staff. Staff costs have been escalating, and as IR staff is paid government salary scales that are not linked to productivity, staff costs have risen much faster than productivity in recent years. For instance, during the period 1981/82-1998/99, there was a 137 percent real increase in wages against a 78 percent increase in productivity. Considering the total IR staff of 1.578 million, staff cost (including pensions) as proportion of gross traffic receipts, increased from 40 percent in 1995-96 to 53 percent in 1998-99. This level of staff cost is unsustainable and is already depriving funding for maintenance and asset rehabilitation. Unless
effective measures are taken to contain staff costs, the projected increase - 65 percent of revenue by the year 2010—is a foolproof recipe for financial disaster.

25. A benchmarking exercise for staff productivity and costs with other railways of the world can at best be indicative, since railways have different gauge, axle load, product mix, traffic lead, service level, technology and unit staff costs. Railways also carry out varying extents of non-core activities. A comparison of staff productivity and ratio of staff costs and revenue of IR with three large railway systems is shown in Table 3.1. The staff cost to revenue ratio on China Railways—which has a network about the same size as IR but with transport output about 2.4 times—is only 15 percent of revenue. (China Railways had a staff strength of over 3.0 million, but it separated its non-core activities in 1998 and reduced staff to 1,567 million.) It is clear that there is considerable scope for IR to improve staff productivity, and consequently, its staff costs. If its staff productivity caught up with that of China Railways, the staff cost-revenue ratio would possibly fall to below 25 percent.

26. IR has identified a number of measures to correct its staff size, but so far it has failed to execute them. Successful implementation of such measures calls for the satisfactory addressing of issues arising from labor redundancy. IR also requires a strategy and an action plan that includes the facility to retrain and reassign staff, and where necessary, downsize. The need for downsizing would of course be minimized if IR were able to embark on a high-growth path. IR also needs to develop systems for the effective management of the labor downsizing process—including retraining and redeployment of staff, and providing an adequate safety net for the affected employees.

NON-CORE ACTIVITIES

27. IR is involved in several activities other than its core business of providing transport services. These include catering, hotels, manufacture and overhaul of rolling stock, construction projects, schools, technical institutes, housing, and hospitals. This has diverted the management's attention from its core business, and deprived the non-core activities of the professional attention they need to perform efficiently. Also, in-house units have not been exposed to market competition, so that products have not kept pace with current standards for technology, reliability and quality. There is an urgent need to unbundle IR's non-core activities and hive these off. The Ninth Plan document has the following comments on the vertically integrated character of IR:

- The rationale for continuing with the present vertically integrated monolithic structure needs to be re-examined in the 21st century environment.
- Integrated monopolies should be unbundled.
- Various manufacturing units of the railways should be spun off into separate companies, and their costing and pricing determined on commercial principles.

28. So far, IR has not taken any significant steps to divest itself of its non-core activities. This reluctance seems to stem from the perception that the Indian political and social system is not yet ready for such

Table 3.1: Comparison of Employee Productivity and Cost

<table>
<thead>
<tr>
<th>Railway</th>
<th>Year</th>
<th>Route length km.</th>
<th>Transport Units (t-km+p-km) million</th>
<th>Employee (000)</th>
<th>Employee Productivity, TU/Employee (000)</th>
<th>Staff cost/revenue percent</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indian</td>
<td>1999</td>
<td>62,809</td>
<td>684,397</td>
<td>1,250@</td>
<td>547@</td>
<td>42@</td>
<td>@Based on the assumption that out of 1,578 million employees on IR, 1,250 million are engaged in providing transport services and the rest on non-core activities</td>
</tr>
<tr>
<td>China</td>
<td>1999</td>
<td>67,400</td>
<td>1,662,416</td>
<td>1,567</td>
<td>1,061</td>
<td>15</td>
<td>Non-core activities separated in 1998</td>
</tr>
<tr>
<td>US (Class I)</td>
<td>1999</td>
<td>193,578</td>
<td>2,064,708</td>
<td>178</td>
<td>11,599</td>
<td>*26</td>
<td>*excluding cost of fringe benefits, 36% including benefits</td>
</tr>
<tr>
<td>South Africa</td>
<td>1999</td>
<td>25,555</td>
<td>105,675</td>
<td>44</td>
<td>2,402</td>
<td>44</td>
<td></td>
</tr>
</tbody>
</table>

Box 3.5: Benchmarking IR Performance against the Konkan Railway Corporation (KRC)

Benchmarking IR performance against that of KRC indicates considerable scope for the reduction of IR staff costs. This conclusion is particularly significant since the mounting wage bill is a critical problem for IR: the wage bill rose from 39 to 53 percent of revenue between 1994 and 1999. KRC has succeeded in keeping its staff and other costs lower by adopting innovative practices and modern technology for operation and maintenance of the railway system.

A benchmarking exercise for an operational railway line (264 km long) of Western Railway was undertaken by KRC to compare the staff deployment and cost implications of maintenance of assets. Western Railway had 1316 employees against a total staff strength of 677 on KRC. The scope for staff reduction was particularly high for the engineering and electrical departments.

The above comparison reveals that by internal benchmarking within the railway systems operational in the country, the staff strength can be reduced to about half. To achieve this reduction in staffing levels, a capital investment of about Rs 15 crores would be necessary. Such capital costs, however, have a low payback period of less than a year.

KRC adopted the following practices to bring down the cost of operation and maintenance:

- Reduction in permanent railway staff to about 25 percent of IR norms by replacing the IR practice of "preventive maintenance" of track with "predictive maintenance", and by adopting totally mechanized maintenance using rail mobile maintenance vehicles, modern equipment and machines. As a result, the permanent railway staff strength on KRC compares favorably with the staffing norms being followed on US railroads.

- Extensive use of computers and IT to reduce manpower and transaction cost, and achieve better managerial control. An enterprise-wide Resource Planning System speeded up the decision making process within KRC and significantly reduced HR requirement. The train operation on real-time basis is achieved through a single control office situated at the corporate office. The online system provides total control over operation, as well as transparency and seamless integration with all "infrastructure" departments.

- Use of modern technology for signaling and telecom systems, including technological features such as specially designed points and crossings with thick web switches requiring less maintenance and replacement, use of glued joints, and use of integrated power supply so that a large number of battery banks could be done away with.

- Significant reduction in electrical staff deployed for lighting of stations, maintenance of pump houses and general lighting of staff colonies.

initiatives. But meanwhile, this inaction has a profound negative impact on the core as well as non-core activities of IR.

29. The rolling stock manufacturing units were set up within the railways in line with the government policy to expand the public sector, localize manufacture and conserve foreign exchange. At that point of time, manufacturing capability in India was limited, foreign exchange scarce, and the private sector was unable and unwilling to make investments in rolling stock manufacture—especially for a single customer like the railways. Since then, the objectives of self-sufficiency and indigenization have been adequately fulfilled. Due to its weak financial position, IR has not been able to invest in its manufacturing units, and most of them suffer from obsolete machinery, old technologies and dated designs of products. The pace of technological upgradation for locomotives as well as passenger coaches has been slow because of assured orders, poor motivation of management and lack of resources. This deprives IR of cost-effective and more efficient products for use in its core business.

30. Meanwhile, the process of globalization has accelerated: protectionist barriers have been dismantled, and de-regulatory measures introduced. Thus the railway production units need restructuring to face the challenge of changes in economic policy by improving their products, efficiency and productivity.

31. In September 2000, the Asian Institute of Transport Development (AITD) carried out a study on reshaping the production units of IR. The study concluded that these units should be corporatized to facilitate formation of joint ventures with strategic partners who are leaders in technology (Box 3.6). The Rakesh Mohan Report makes similar recommendations.
The corporatization of production units would be an interim phase leading to the formation of a joint venture with a strategic partner. Management contracts, concessioning, and public offering of stock are not considered suitable options, as these would not help in the continuous induction of cutting-edge technology.

Disinvestments can proceed smoothly if governments make early efforts to develop a labor strategy that secures employee support for change and provides a social safety net. This calls for the involvement of workers and labor unions in the reform process.

The burden that these enterprises are imposing on society is, simply put, too heavy to bear. Continued government support for state enterprises is at the expense of society as a whole, diverting scarce resources to benefit a small number of citizens, rather than to social sectors that benefit the overall economy and the poor.

Source: 'India’s Railways: Reshaping of Production Units, AITD,’ September 2000.

Some steps have been taken to privatize/ corporatize non-core activities. GOI has approved the establishment of a fully owned subsidiary of IR called RAILTEL, to develop a nationwide broadband telecom and multi-media network by laying an Optic Fiber Cable network along the railways’ ROW. Some of the existing telecom assets on IR will be transferred to the corporation and be part of IR’s equity contribution to the corporation. The plan is to divest minority stake in equity to private players, including financial institutions and telecom companies. A fully owned subsidiary of IR (IRCTC) has been formed to manage catering and tourism services. IRCTC is also engaged in developing online passenger ticket sales by the private sector using IR’s passenger reservation system. This will initiate private sector participation in the sale of passenger tickets.

MULTI-MODAL SERVICES

At present, IR carries mainly bulk cargo, and non-bulk cargo forms only 2-3 percent of its freight traffic. With the changing demand pattern for freight and business practices (Box 3.7), even long distance non-bulk traffic is moved by road transport. The present size of the non-bulk transport market between metropolitan cities has been estimated at 150 million tons. This is a segment comprising high-value goods that can withstand higher transportation freight tariff provided the desired quality of service is provided. The service parameters for this traffic segment are very different from those IR provides for bulk freight traffic. Thus the railways’ current share of this market segment is negligible. A recent IR study (LRDSS, 1997) projected that even with the present policies, level of service and pricing, the container traffic on IR will grow from 8 to 39 million tons between 1999 and 2007. The growth will be much faster if policies promote multi-modalism and integrated logistic solutions. Hence the need for IR to seriously pursue the non-bulk market with an emphasis on facilitating multi-modal transport services.

IR initiated serious attempts to provide multi-modal services with the establishment of the Container Corporation of India Limited (CONCOR). Initially, CONCOR concentrated on the export-import traffic and provided services between ports and the hinterland. Since 1995, it has been actively pursuing domestic traffic, as this segment offers substantial opportunity for growth.

Logistics forms an important element of cost for fast-moving consumer goods (FMCG). High competition, lost sales due to product unavailability, high inventories, obsolescence and lowered time to market are some of the complexities associated with this industry, and these require efficient logistics. P&G, a leading player in the FMCG market in India, has outsourced logistics operations to focus on its core operations while reducing costs incurred in this area.

A third party logistics firm has been handling these operations of P&G in India. The logistics provider manages warehousing and transportation, and also provides many value-added services (e.g. packing and information service). As an outcome of improved, correct and timely information on stocks, there was an optimal cross-flow of inventory which resulted in savings. Another important benefit to P&G has been that all logistics-related costs are converted into variable costs. The savings generated from this transition are being shared with the service provider, so that there is incentive to reduce costs further.
Many of its services have road as well as rail transport legs, and increasing proportions of cargo is stuffed and de-stuffed at the premises of the customers. The volume of business handled by CONCOR has grown rapidly. It handled nearly 900,000 TEUs (Twenty-foot Equivalent Units, 8.3 million tons) in 1999-00, in comparison to 109,000 TEUs handled in 1991-92. Refrigerated container services are also provided.

35. **Total logistics solution:** One of the important components of multi-modal transportation is the provision of total logistics solution. It is expected that specialized integrated logistic solution companies will emerge to meet market needs, provided the railways show interest in this business segment and are able to provide the high quality and reliable service that is the basic requirement for success. These companies will create integrated physical distribution centers at the rail freight terminals along the lines of the Freight Plazas being set up in Japan. These large-scale facilities provide sorting and storage of freight at the terminal, thereby eliminating the double handling which is the present practice.

36. **Double-stack and customized container services:** International experience, particularly the experience in North America, shows that double-stack container services lower costs significantly. IR has the potential to develop specific routes for double-stack container services. Similarly, there is market potential for customized containers to suit specific commodities and products, and IR would benefit by exploiting these opportunities.

37. **Pricing of rail services:** Multi-modal transportation has the inherent disadvantage of multiple handling of cargo at the interface points of different modes. Each additional handling adds to the cost of transportation. Inter-modal transportation can be viable only if the rail tariff for freight services reflects the true costs of energy efficiency of the rail mode, and if, at the same time, road tariff reflects the full road user charges and vehicle operating costs. The rail mode of transport has been assessed to be at least four times more energy-efficient than road. This is not reflected in the tariff, which, for most commodities and a large number of distance segments, is higher than the road tariff.

38. The Bank carried out an exercise in 2000-01 in the Delhi-Mumbai corridor to evaluate the traffic demand and the financial viability and sustainability of providing multi-modal services along a dedicated rail corridor. The traffic data on road was collected from various studies along this corridor and analyzed to develop the origin-destination (OD) matrix for different commodity types. Four hub locations were identified using the OD matrix, and all the traffic within a distance of 150 km from these nodes were attached to them to arrive at a revised OD matrix. All traffic that can be containerized was identified to estimate total demand. Based on estimated demand and the operational parameters within railways, a single line rail corridor was justified for construction. The results of the simulation of developing a dedicated corridor (Annex 3.2), reveal that by charging 10 percent premium over the prevailing inter-terminal freight rates by road, the financial rate of return at constant prices would be 11.78 percent—which is financially viable and sustainable. The multi-modal system would reduce travel time to only 24-36 hours compared to 72 hours on road. Substantial economic benefits would also accrue due to reduced energy consumption and pollution, as well as less need of land. The financial and economic benefits would be enhanced if this route were developed for double-stack container operation.

**MORE INTENSIVE COMPETITION FROM ROAD**

39. The competition between railways and roads will intensify in the coming years with substantial investments to improve the highway network in India. For the most part, the highways being improved run parallel to the high-density railway routes. In addition, larger capacity and modern technology trucks that offer advantages of higher speed, reliability, and lower unit cost, are also being progressively introduced. Thus the railways need to substantially improve quality of service, customer focus and service profile to meet the challenge of more intense competition for the transport market.

40. IR has not yet responded to the changing economic and business environment. It continues to serve the bulk transport market and has not focused on non-bulk high margin traffic. The tariff for freight services is very high and service quality poor. A recent independent survey shows that the level of satisfaction with the railways was about half that with road services (Box 3.8). Enhanced capacity alone would not enable IR to protect or enhance its share of the transport market. It needs to take concerted action to improve the quality of services offered to "long haul bulk" as well as "low-volume, high-value" traffic, and take other measures to enhance customer satisfaction.
The decline in rail coefficient for certain commodities in the long haul-bulk segment is cause for concern. Why are the railways losing traffic to roads in this segment? A consultant in a study conducted in April 1999 ("All India Shipper Survey") identified the following parameters, on each of which the railways have a lower level of satisfaction compared to road.

<table>
<thead>
<tr>
<th>Service-Quality Parameters</th>
<th>Hygiene Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliability</td>
<td>Loss &amp; Damage</td>
</tr>
<tr>
<td>Availability</td>
<td>Customer Information</td>
</tr>
<tr>
<td>Core-Product Specifications</td>
<td>Adaptability</td>
</tr>
<tr>
<td>Price</td>
<td>Customer Friendliness</td>
</tr>
<tr>
<td>Transit Time</td>
<td>Negotiability</td>
</tr>
<tr>
<td>Connectivity</td>
<td>Accessibility</td>
</tr>
<tr>
<td>Product-suitability</td>
<td>Ease of payment</td>
</tr>
<tr>
<td></td>
<td>Claim processing time</td>
</tr>
</tbody>
</table>

The Shipper Survey indicated a weighted average score of level of satisfaction of 3.91 for rail as against 7.82 for road on a scale of 10. The railways compared unfavorably with roadways on all the criteria involved. The score of railways, especially on certain criteria like ease of payment, connectivity, negotiability, and claim-processing time, is much lower than those for roadways. The above ratings indicate that the railways have to gear up on almost all fronts to meet the challenge posed by the roadways.


**CUSTOMER PERCEPTION OF IR**

41. The following is a summary of customer perception of the services provided by IR:

- **Poor service quality of passenger services and declining safety record.** IR should provide safe, fast, comfortable and socially responsible service at reasonable prices.
- **Inadequate capacity.** IR should add capacity on growth corridors and meet the transportation needs of the growing economy.
- **High freight tariffs, inconsistent transit time, complex procedures and poor staff attitude towards customers.**
- **Market-driven services covering areas of comparative advantage should be provided.** The focus should be high-quality services (prompt wagon availability, consistent transit time, user-friendly and courteous customer interface). IR should provide a service profile that meets changing customer requirements (Box 3.9).

**CHALLENGES IN FORGING LINKAGES WITH MARKET FORCES**

42. In very broad terms, IR serves four distinct market functions - freight, intercity passengers, suburban passengers, and a wide range of non-core functions. IR is the world's largest passenger railway (in passenger-km) and the fourth largest freight carrier (in ton-km). Each of these four functions poses a different challenge if a better linkage with market forces is to be established.

43. **Freight:** The role of IR in the freight sector has been shrinking partly because of a natural shift toward trucking, as highways are built to serve a requirement for higher value transport; and partly because IR has not been able to meet shipper capacity or quality requirements at an acceptable price. Studies are unanimous in concluding that India definitely needs a larger rail freight role in the coming decades. But the studies also agree that IR cannot meet these needs unless it can create, and react to, market incentives; and unless IR's social roles can be funded directly, rather than through the unsustainable policy of taxing freight shippers to fund social subsidies. A rough calculation suggests that if IR's social burdens were paid directly (by the users or the government or a combination of both), freight tariffs could be reduced by over 40 percent (with no other changes in efficiency). Such a reduction would immediately increase IR's competitive position, reduce India's freight costs significantly, and also increase the competitiveness of its products. Such a scenario would require IR to make investments to create sizeable additional capacity.
Box 3.9: The Neglected Customer

Freight movement generally involves the use of more than one mode. The transport of commodities by rail is increasingly becoming part of a multi-modal logistics chain, which is often integrated in the production or sales process. Door-to-door quality control of the transport chain will become even more important for the freight customer. An important quality factor will, therefore, have to be a consignment tracking system along the transport chain.

Today, the freight customer does not see IR as being responsive to any of these requirements, or to customer's needs. Rail freight rates are higher than road freight rates in a large number of commodities and distance segments. The approach to the customer is seen to be bureaucratic with a "take-it-or-leave-it" attitude, and the customer is not involved in deciding freight policy and pricing. Claims and their settlement, packing standards etc. also leave considerable scope for improvement.

The freight customer demands:

- One-stop shopping with intelligible and simple documentation, customer-friendly interface, ease of payment.
- 100 percent reliability (better than road transport).
- Better availability of the right type of wagons and capacity.
- Flexible total transport solutions in space and time.
- Predictable delivery date and time.
- Competitive and stable prices.
- Very high transport safety.
- Regular departures and arrivals.
- Quick settlement of claims.


44. Intercity passenger: Intercity passenger services have gradually evolved into two groups - longer-haul, higher-quality and higher-priced services, and a large number of low quality, extremely low-priced services. Studies show that the higher-quality services are (or could be) roughly self-supporting, while the lower-quality services serve a limited demand and at the same time generate large deficits and consume capacity on congested main lines. IR also runs a very large number of relatively short-distance passenger services on branch lines. These services incur heavy losses due to low fares and poor patronage. The practice in other countries, (and indeed, EU law), is now based on direct contracts between government and railways to provide social services with two immediate benefits. One is that economic damage to the railways and the economy is eliminated, and the second benefit is that government can directly define the quality and cost of social services to be provided.

45. Suburban passenger: IR operates, very efficiently, three of the largest and most intense suburban passenger services in the world: Mumbai, Chennai and Kolkata. These services have increasingly suffered from the competition for resources within IR, because IR has had to focus on its national objectives, leaving it unable to fund local investments. Practice elsewhere aims at disentangling suburban services from purely national funding and control, and shifting the planning, and at least some of the funding requirements, to localized agencies. This approach was initiated in India in Mumbai (Mumbai Urban Transport Project or MUTP II), and it could be applied to Chennai and Kolkata as well once MUTP II is underway.

46. Non-core functions: IR has gradually piled up a wide range of non-rail activities. Analyses of these activities have concluded that as in the case of other market economies, the non-core activities have become non-competitive (in both cost and technological terms), and a managerial distraction.

**C. A Vision for Indian Railways**

...
playing an important role in the Indian transport market. A vision for IR may be summarized as follows:

- **Transform services profile** in line with customer needs and provide high quality of service.
- **Increase capacity** to meet growth in demand.
- **Competitive pricing.**
- **Increase freight market share.**
- **Increase profits** to generate resources for capacity expansion and improving service quality.

48. The rationale with reference to the macro-objectives of the country and the means to achieve this vision is summarized in Annex 3.3 ("A Vision for Indian Railways"). New strategies will be required to achieve this vision: IR will need to break from tradition, change mindsets and become a customer-focused aggressive player. Two main strategies are recommended:

(i) Customer focus.
(ii) Competition within railways.

**CUSTOMER FOCUS**

49. IR needs to concentrate on the following aspects that have a direct bearing on the implementation of the customer-focus strategy:

- **Capacity increase** through higher efficiency, cost-effective technology upgradation, more intensive usage of existing assets and adding new assets in growth segments.
- **Provision of customer-driven transport services** that includes integrated logistics, multi-modal transport, reliable transit time, time-tabled departures, guaranteed transit time, consignment tracking systems, customer-friendly interface and new services using dedicated rolling stock (automobiles, commodities etc.).
- **Pricing action** to reduce and target subsidy, rationalize costing systems and take measures to increase asset and labor productivity.
- **Maintain and increase market share** through market research, aggressive marketing, market-related competitive pricing, and introduction of new products and services.
- **Developing an appropriate regulatory framework** to ensure safety, fair competition, and protection of customers' interests.

50. **International experience**: Most major railway systems have experienced the effects of competition from other modes of transport—especially highways, that have seen the introduction of modern trucks that are faster, carry higher payload, and have lower unit operating costs. They have adjusted to the consequences of liberalization of economies on the transport market that led to more intense competition, shorter leads and the demand by customers for a much higher quality of service. To protect their market share and viability, the railways have, in different degrees, responded with a reorganized management structure—that focuses on businesses and customers, improved asset and staff productivity, redefined service profiles to match changing customer requirements, targeting of higher-margin market segments and shedding of non-core activities. Essentially, the railways have had to transform themselves to market-responsive entities in order to remain in business (Box 3.10). The fundamental change has been that service is tailored to meet the specific needs of the customer, and pricing varies accordingly. Thus freight rates are very flexible. Another important service feature is customer access to accurate information on tracking consignments and expected delivery time at destination. The claims procedures are simple and speedy, and claims are settled within days.

51. At the international level (mainly in North America and EU countries) some of the more successful innovations in services provided are:

- Multi-modal container services including double-stack operation.
- Roadrailer and piggyback services.
- Scheduled freight services that operate irrespective of load availability.
- Guaranteed freight services similar to courier services for small packets.
- Special rail service for transport of motor vehicles.
- Services with specialized wagons for commodities such as cement, chemicals and grain.

52. IR needs to adopt a fundamentally new approach to customer orientation and flexibility, and organize a much faster response to market needs. Some of the essential steps would be to:

- Accumulate and analyze data on the transport market, customer needs and competitive modes, and develop appropriate initiatives to expand market share.
- Recognize that aggressive marketing efforts, supported by delivery of promised level of service, are essential for enhancing market share.
- Develop and offer custom tailored transport solutions.
Box 3.10: Railway Reform in China

The Chinese Railway, overseen by the Ministry of Railways (MOR), is one of the world's largest railway systems. Its network is comparable in size to that of IR but the total transport output and the density of traffic over the MOR network is more than twice that on IR.

MOR's railway reform process is part of China's national policy for the move to a market economy that promotes commercialization of state-owned enterprises, competition, and private sector participation in activities so far carried out solely by the state. MOR is developing the reform process with great care, and is inclined to experiment with alternatives before arriving at the final format. A high-level unit reporting to a Vice-Minister is driving the reform process and has developed a set of long term railway restructuring options that are now awaiting review at the political level. However, MOR has realized that several reform initiatives are within its own powers and has, in the meanwhile, begun implementing several of them. The reform process is likely to be carried out in stages over a period of about five years or longer.

The Chinese Government will, in the medium term, alter the railway-to-government relationship, and separate the responsibility for policy formulation and regulation from that of enterprise management. It will also develop a system of supporting socially required but commercially nonviable services (PSO).

Traditionally, MOR carried out a large variety of non-rail transport activities, including manufacture of rolling stock, civil construction, running of schools and universities, and design and development. In 1998, MOR separated most of the non-core activities into "Enterprises" which operate as legally independent commercial enterprises, with some of them being moved out of MOR. For example, all construction companies have already been moved out of MOR as independent entities, and now compete with each other to secure business from MOR and other customers. Rolling stock manufacture and repair units are now part of a holding company, LORIC. With the separation of the non-rail transport activities in 1998, the labor force has been reduced from 3.3 to about 1.57 million.

The existing 14 geographical administrations of MOR have been converted into semi-autonomous legal entities. Each administration manages and operates the assets (infrastructure and rolling stock) allocated, while MOR carries out overall coordination of inter-administration traffic. Each entity will pay MOR annual fees for the use of assets allocated, and each is responsible for financial results and viability. These entities are responsible for the locally based component of future investment planning and funding. In the future, some part of the rolling stock fleet will be procured by the independent rail administrations. Multiple buyers and two local suppliers, as well as foreign suppliers expected to enter the market in the liberalized trade regime as China joins WTO in 2001, would provide a competitive environment for rolling stock supply.

The policy for enterprise organization is evolving. In the near term, as a transition measure, MOR is examining a "Predominant Enterprise" model structure for administrations in which the predominant enterprise controls the infrastructure, and "secondary" operators are allowed access to the infrastructure for a fee. In China, freight is the predominant enterprise, so a series of "secondary" passenger companies (local and national level) will be formed to operate integral freight enterprises. As part of ongoing railway reform, passenger enterprises have been formed in 4 of the railway administrations on an experimental basis in the year 2000. They are responsible for managing major passenger stations, operating long-distance express (inter-administration) and local trains (that originate and terminate within respective territories), managing rolling stock depots for maintenance of passenger coaches, sale of tickets, and providing services on its trains. In the longer term, MOR and the government may opt for a total separation model—in which all operators are independent of infrastructure and all pay access fees. Also open are the questions of how (and where) to promote rail vs. rail competition and the possibility of private ownership of some of the operating companies.

MOR will control the passenger and freight tariffs in the initial stage of reform, but later administrations are expected to have freedom in fixing tariffs on the basis of service costs and the state of competition. An initial methodology, based on costing systems introduced earlier, has been developed to arrive at infrastructure and locomotive user fees the passenger companies are to be charged. However, it is expected that the user fee methodology will be refined further as experience is gained with the operation of experimental "passenger enterprises".

Given the strong motivation within MOR to carry out railway reform, the process has commenced in earnest. The Chinese government and MOR perceive this as an essential step to meet the challenges posed by the changing market environment and competition from the development of an expressway road network. The final format of the reformed railway will evolve over time, based on the various experiments being carried out. This approach will minimize the risk of damage resulting from disruption in rail services during the transition period of restructuring the railways.

COMPETITION

53. Competition is a key factor in achieving improved productivity, lower prices, higher quality of services, and products and services that respond to changing customer needs. A certain degree of competition exists between rail and road transport, but the level of competition varies widely with volume, distance, and customer needs regarding transit time, reliability of service, value of goods etc. For example, road transport offers little competition to railways in the transport of bulk commodities over distances exceeding about 500 km. In fact either of the modes enjoys a near-monopoly for certain commodities and distances. The competitive environment suffers further when there is paucity of capacity in one or both modes of transport. Effective competition requires that there should be more than one service provider in each transport subsector, and that the demand does not exceed the subsector capacity. The ownership characteristics of the service-providing entities competing in the subsector may not be the critical factor unless government ownership results in bureaucratic procedures and inflexibility that prevent the operating entity from responding to changing market conditions quickly. This, to some extent, is the case with IR.

54. IR can provide the necessary customer focus and compete effectively with road only if its efficiency, productivity and reliability are substantially enhanced. Internal competition in the railways would be an effective strategy to achieve higher efficiency and productivity within the subsector.

D. INSTITUTIONAL CHANGES

55. Railways play an important role in the Indian economy. The country’s economic growth would be hampered if the railways were not in a position to provide transportation capacity and quality of service required by the growing transport market, a market that is also changing in character as the Indian economy globalizes. In its present form and structure, IR is unlikely to respond to the challenges of market changes and increasing demand in capacity, due to constraints imposed by its traditional supply-led organizational structure, and limited investment resources for expansion and technological upgradation. Thus restructuring IR is essential to provide the institutional framework required to help meet the needs of the emerging economic and business environment.

ORGANIZATIONAL STRUCTURE

56. Certain institutional changes in the railways are inevitable to create a market-driven organization that promotes customer focus, and generate a competitive environment in the subsector. The important change required is separating the functions of the Railway Board for policy, regulation and enterprise management. Another essential step is to reorganize the management structure by businesses down to divisions to improve customer focus, market response, and profitability. Upgrading the accounting and costing systems for proper cost allocation is also required. One option to obtain a competitive environment within the railways would be to set up the zonal railways as independent entities responsible for asset usage, services, investments and profits.

57. In such a structure, the zonal railways would maintain their respective infrastructure and provide intra and inter-zonal transport services but would compete with each other. At a later date, zonal railways could also allow other entities to use infrastructure on payment of user charges. Zonal railways would develop sophisticated costing and pricing systems to ensure that user charges and tariffs are related to real costs. When allowed, independent service providers (new entities) can compete with zonal railways and with each other. Zonal railways must be given limited freedom to fix tariffs, and would be responsible for sourcing and servicing investments. The investment decisions of zonal railways will be essentially driven by business considerations. The State, however, should continue to fund strategic/social infrastructure. Zonal railways will provide PSO services only if a sponsor is willing to make good the losses.

58. Other institutional changes recommended are as follows:

- The Railway Board (Ministry of Railways) will carry out policy function and collect return on investments from zonal railways mainly on the basis of existing assets. It will also be responsible for the country’s strategic railway operational requirements.
- An inter-zonal operational coordination entity and an independent regulatory body must be set up to oversee safety, user interest and fair competition.
- The railways should exit from non-core business as well as low-density loss-making branch lines. It must seek private sector buyers/partners for non-core business. The lease/concession of
loss-making branch lines to private sector/labor cooperatives need to be explored so as to minimize losses.

**E. Restructuring Loss-Making Branch Lines**

59. It is imperative for IR to develop an innovative approach to minimize losses on a large number of low-density branch lines which account for significant losses. The first step would be to obtain reliable estimates of losses incurred on each such line. The next step would be to consider various options for eliminating or reducing losses. One option would be to put on "concession" the essential railway infrastructure of such lines for an extended period (20 years or more), where the concessionaire would be required to provide specified services at the minimum and pay a fee to IR. Some of these lines would act as feeders for freight traffic to the core rail network of IR. The excess assets (land, structures, rolling stock etc.) would be liquidated or used for non-railway purposes to raise capital and/or revenue. In some cases, where there is little freight traffic, IR may end up with negative concessions—it may pay the concessionaire for operating the line. Such concessions would be attractive as long as they are awarded on a competitive basis and IR is able to minimize losses, i.e. the fee paid is less than the losses incurred at present. In a few cases, it may be possible to close such lines or operate them as PSO where a sponsor is willing to make good the losses incurred by operating such lines. The international experience is that a private sector concessionaire is able to operate the loss-making branch lines at profit since it manages the line as a small business with high productivity and an acute business focus.

**ENVIRONMENT FOR REFORM**

60. There are certain essential requirements to bring about the desired institutional changes in the railways. These include:

- Strong political support and mandate for railway reform.
- National policy on surplus labor (retaining, re-deployment and downsizing).
- Reform process to be driven from outside the railways by an empowered body mandated to achieve objectives within a limited time frame.
- Appreciation of the fact that institutional changes are a prerequisite for developing "customer focus" and "competition", and that since the state will not have adequate funds, private sector participation will create a competitive environment and provide investments to upgrade technology and systems, and creation of new assets and competing entities.

61. In a recent announcement in 2000, the Indian Prime Minister stated that the railways, as a key aspect of infrastructure, need urgent reforms; and that the management of the railways needs radical restructuring to separate rail operations from planning and policy making. The preceding restructuring suggestions are in line with the government's recently declared policy. It is important, however, that railway restructuring be carried out without delay, and in a manner that ensures meeting the objectives of customer focus and competition.

**F. The Mohan Report**

62. Given its concern about the future, IR set up an expert group chaired by Rakesh Mohan, Former Director General, National Council of Applied and Economic Research (NCAER). In its report released in August 2001, the expert group identified the following key issues:

- IR is facing a financial crisis that needs to be addressed sooner rather than later.
- Freight market share is down and falling, mainly due to low quality and overpriced services.
- There is a large backlog of investments that cannot be funded by the state under the current setup, as the state does not have adequate resources.
- The majority of investments are politically motivated and loss-making. IR must invest only in remunerative projects.
- IR has a large workforce, but low productivity and growing staff costs as a proportion of total costs.
- IR is plagued by inefficiency and lack of market incentives.
- It is clear that the option of continuing with the current system and structure that is outdated, and not aligned with the organizational strategy, is not feasible.

63. The Mohan Report pointed out that "the imperative is to get started fast on a program of restructuring and reform." In addition, "the evidence for
rapid, deep seated change is clear, compelling and overwhelming." The report recommends:

- Institutional separation of policy, regulation and business functions; policy makers to set policy and pay for what they ask for; setting up of a regulator that would fix competition rules and pricing.
- IR to be corporatized as a business entity with a clear commitment from the government that it will have the freedom to manage and be allowed to operate on commercial lines.
- A clear differentiation between social obligations and performance imperatives.
- Commercialization of IR that includes spinoff non-core businesses, adoption of lines of business structure and commercial accounting format.
- New management that provides a leadership team committed to changing the status quo.
- Review of legislation and making the changes needed.

64. The present report generally endorses the analysis and conclusions of the Mohan Report, but it recommends, in addition, measures to introduce competition within the rail subsector (see the preceding section on institutional changes).

G. IR IN THE COMING DECADE

65. IR's adaptation to the new economic environment will be no easier that it has been for the sector in the US, Japan or the EU. Fortunately, experience elsewhere has also established that though painful, reform is possible, and that the process must be based on several principles that have increasingly been accepted in India in other sectors.

- First, the railway enterprise function should be separated from the government's policy development, regulatory and social support functions. In practice, this means that the railway as a business enterprise will be distanced from the government while policy functions are lodged in appropriate ministries.
- Second, enterprise functions should become lines of business, including social services that are performed under compensatory contract with government.
- Third, the organization of the railway enterprise will emerge as a mixture of factors and objectives including geography, market locations and dispersion, balance of passenger versus freight traffic, intra and inter-modal competition objectives, and the desired role of public versus private sector in the provision of rail assets and services.
- Finally, non-core activities should be managed separately, or even fully separated from the railway enterprises so that management attention can achieve an appropriate focus on core activities.
### Annex 3.1

**Comparison of Size and Productivity of Major Railways**

<table>
<thead>
<tr>
<th>Railway</th>
<th>Years</th>
<th>Total route km</th>
<th>P-km (000,000)</th>
<th>Freight ton-km</th>
<th>Ratio of p-km to</th>
<th>Staff</th>
<th>Operating ratio</th>
<th>Employee productivity (000 of TU per employee)</th>
<th>Employee per km of line</th>
<th>Traffic density (000 of TU per km)</th>
<th>Ratio of pass. fares to freight rates</th>
<th>Freight revenue per ton-km (PPP)</th>
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</thead>
<tbody>
<tr>
<td>India</td>
<td>1999</td>
<td>62809</td>
<td>403884</td>
<td>284270</td>
<td>59</td>
<td>1578400</td>
<td>99</td>
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<td>25.1</td>
<td>10912</td>
<td>0.30</td>
<td>0.062 (1995)</td>
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<td>1567000</td>
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<td>193578</td>
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<td>11533</td>
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<td>11.0</td>
<td>24650</td>
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<td>8908</td>
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<td>NA</td>
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</table>

**Source:** World Bank Railway data, IR Year Book (1998-99) and Transnet Annual Report 1999

**Note:**

(i). PPP - Purchasing Power Parity For purposes of comparisons national currencies are either converted into a hard currency such as US $ or PPP. The latter is based on relative purchasing power of a country's currency ascertained from the cost of a carefully balanced set of goods and services within the countries being compared. IMF has developed PPP conversion rates for most world economies.

(ii). Operating ratio (percent) is derived from expenses / revenue.

(iii). TU - Traffic unit of output (p-km for passenger plus t-km for freight).

Each country’s average passenger fare and freight tariff adjusted to reflect the movement over the world average leads for passenger and freight services.

* US data pertains to freight railways only.
Dedicated Rail Corridor between Delhi and Mumbai for High-Quality Multi-Modal Service: An Investment Study

1. It is perceived that with changing market needs the demand for fast, safe, flexible and reliable transport will increase. Such a service can be provided through container trains between two major terminals with provision of two or more intermediate terminals provided en route. All terminals would operate as hubs that capture containerized traffic from the catchment area, say within a radius of 200 km. Containers will be transported to the nearest terminal by road and then transported on the dedicated rail corridor. At the destination end, if so required, the containers will be transported by road. A study carried out to evaluate the viability of a separate dedicated rail corridor for multimodal traffic between Delhi and Mumbai with intermediate terminals at Kota and Vadodara, showed that such a rail corridor would be financially viable and would generate substantial economic benefits.

2. Delhi-Mumbai is one of the high-density transport corridors of India, and rail as well as road capacities are fully stretched. On an average, a total of about 9000 loaded trucks move over this corridor every day. The total annual freight traffic currently moving over this road route aggregates to nearly 30 million net tons, and this traffic is expected to grow. An analysis of the products currently moving by road reveals that almost all of these are high-value, transit time-sensitive cargo and a large proportion of this traffic is containerizable.

3. The existing railroad infrastructure between Delhi and Mumbai consists of a double line, flat electrified route with a predominance of multiple aspect color light signaling system. Almost the entire route is operating at near capacity levels of 60 trains each way. In the next few years, the projected traffic growth will outstrip the existing capacity, thereby necessitating further investment over the route.

4. The project envisages the development of a dedicated high-speed non-electrified single line of 1340 km between Delhi and Mumbai with major inter-modal terminals at Mumbai and Delhi, and minor en route terminals at Kota and Vadodara. Container train services over this route will be operated at a maximum speed of 100 km per hour and will cover the entire distance of about 1340 km in 24 hours or less. Based on simulation results, it has been established that this line will be able to handle a total number of 48 trains (24 each way), while maintaining the requisite transit times and reliability standards necessary for capturing the road traffic. With an inter-station block distance of 20 km, a total of 6 crossing stations will be constructed along this route. A typical train will consist of 45 flats headed by a modern 4000 horsepower locomotive. Each flat will carry a single 40-ft or two 20-ft containers. The moving dimensions will provide for double stack containers, to ensure that running high-speed double-stack container trains is possible at a future date. While arriving at the potential rail demand over this corridor, it has been assumed that one 20-ft container will carry as much load as that carried by 2 trucks. The rail share of the projected traffic was assumed at 75 and 50 percent for long (>800 km) and medium (400-800 km) hauls respectively. At the start of the operations, 16 trains each way will be required and this will increase to 22 trains each way over the next 6 years.

5. The investment estimate is based on the assumption that the track will be built along the existing alignment and that IR will provide, free of cost, 90 percent of the land necessary for laying the third track. However, 10 percent of the land along the route would be acquired. In addition, the cost of land at four terminals was also considered. The cost estimates include cost associated with the formation, ballast and tracks, panel interlocking equipment at each of the stations, and installation of axle counters. It is assumed, however, that the optic fiber communication link between Delhi and Mumbai is available for use. The signaling and communication system costs are for a computerized train control system operated from a central point over the route.

6. Investment in the area of rolling stock is based on a cycle time of 90 hours for the rakes moving between Delhi and Mumbai. The capital costs for locomotive and wagon maintenance were included as a part of the total
investment. The total number of locomotives and wagons aggregate to 72 and 3240 respectively. At constant prices, the total capital investment is estimated at Rs 5751 crores. The rolling stock procurement and signaling and terminal related investments have been staggered suitably.

7. The maintenance costs for track, signaling equipment and rolling stock has been based on the existing IR costs, though the actual costs are likely to be lower. Maintenance cost associated with the equipment at terminals has been assumed at 7 percent of the total investment made. At the peak level of utilization of this route, the annual maintenance, thus calculated, aggregates to Rs 102.7 crores. Operations costs including fuel cost and staff cost amounts to Rs 135.4 crores at the peak level of traffic.

8. The revenue is based on a 10 percent premium over the prevailing inter-terminal freight rates by road. With this tariff structure, the peak level annual freight potential at the traffic level of 44 trains per day works out to Rs 1100.48 crores. This calculation assumes an empty return ratio to vary between 0.1 to 0.25 between different loading/unloading points. Although a high potential for movement of the high value parcel and courier traffic over rail does exist, this has not been considered for the purposes of this study. The possibility of air cargo shifting to rail has also not been considered in this analysis.

9. Warehouse facility, which has been planned at each of the terminals, will serve as an inventory management center for different commodities being carried over the route. Supply chain management as well as provision of complete logistics solutions will also be offered to the shippers. Revenue generated at warehouses has also been considered.

10. With these assumptions, the distribution of various revenues and expenses at different levels of traffic has been tabulated in crores of rupees in the following table:

<table>
<thead>
<tr>
<th>Trains per day</th>
<th>32</th>
<th>34</th>
<th>36</th>
<th>38</th>
<th>40</th>
<th>42</th>
<th>44</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenues</td>
<td>746.7</td>
<td>832.4</td>
<td>890.2</td>
<td>976.0</td>
<td>1033.8</td>
<td>1058.4</td>
<td>1100.5</td>
</tr>
<tr>
<td>Maintenance Costs</td>
<td>90.5</td>
<td>94.0</td>
<td>94.7</td>
<td>98.3</td>
<td>99.3</td>
<td>100.0</td>
<td>102.7</td>
</tr>
<tr>
<td>Operating Cost</td>
<td>104.2</td>
<td>115.9</td>
<td>115.9</td>
<td>127.2</td>
<td>127.2</td>
<td>127.2</td>
<td>135.4</td>
</tr>
<tr>
<td>Net Revenue</td>
<td>552.0</td>
<td>622.5</td>
<td>679.6</td>
<td>750.5</td>
<td>807.3</td>
<td>831.2</td>
<td>862.4</td>
</tr>
</tbody>
</table>

All in Rs Crores

11. The project is scheduled to be completed in five years, and revenues will start flowing in from the sixth year. From a traffic level of 32 trains per day in the sixth year, the daily services will increase by two trains every year so as to reach 44 trains in 11 years after the project has been started.

12. Assuming a total project life of 25 years, and constant costs and prices, the Internal Rate of return works out to 11.78 percent. At the typical funding rate of 2 percent (including commitment charges) above the London Inter Bank Offer Rate (LIBOR), the Net Present Value is Rs 1572.19 crores. The project is, therefore, considered financially viable. Substantial economic benefits due to lower land use, reduced environmental pollution, lower energy consumption and shorter transit times will also accrue. Besides, such a project would form the backbone of an integrated transport system.
Annex 3.3

A VISION FOR INDIAN RAILWAYS

1. India, Micro-Objectives
   - Includes: Rapid economic development
     - Poverty reduction
     - Improved quality of life

2. Transport Sector
   - Adequate capacity
   - Higher quality of service to meet emerging customer needs
   - Internationally competitive transport costs
   - Accessibility and area development

3. Railways
   - A vital player in transport sector
   - Resource cost advantage for several commodities and medium / long distances
   - Vision
     - Transform its services profile in line with customer needs and provide high quality of service
     - Increase capacity
     - Lower prices
     - Increase market share

4. Railways - Means to Achieve Vision
   - Break from tradition, change mindset and become a customer focused aggressive player Main strategies.
     - Customer focus
     - Competition within railways
   - Technology upgradation
     - Achieve higher asset reliability and substantial reduction in failure rate
     - Upgrade operating practices
   - Change mindset of managers and front line staff.
   - Change organization structure from 'functional' to 'businesses'.
   - Empower front-line staff and make them accountable for performance and profit.
   - Strengthen internal systems to capture important parameters on timely basis.

5. Customer Focus
   - Capacity increase
     - Higher efficiency and usage of existing assets
     - Add new assets in growth segments
   - Customer-driven transport services:
     - Integrated logistics
     - Reliable transit time
     - Time-tabled operations
     - Guaranteed transit time
     - Tracking systems
     - Customer-friendly interface
   - Serve new markets using customized rolling stock (automobiles, commodities, unitized parcel services etc.)
   - Pricing:
     - Rationalize costing systems
     - Reduce and target subsidy
     - Increase asset and labor productivity
   - Market share
     - Market research
     - Marketing/customer relations
     - Market-related competitive pricing
     - New products and services
   - Regulatory framework

6. Competition within Railways
   - Zonal railways compete as commercial enterprises.
   - Zonal railways continue to maintain infrastructure and provide intra and inter-zonal transport services but allow other entities to use infrastructure on payment of user charges. New entities provide competing services
   - Zonal railways develop sophisticated costing and pricing systems.
   - Independent service providers (new entities) compete with zonal railways and each other
   - Zonal railways given freedom to fix tariffs.
   - Zonal railways responsible for sourcing and servicing investments State may fund strategic/social infrastructure.
   - Zonal railways provide PSO services only if a sponsor is willing to make good losses. PSO is provided at no profit.
## RECOMMENDED INSTITUTIONAL CHANGES

### 7. Institutional Changes

- Separate functions at Railway Board for
  - Policy
  - Regulation
  - Enterprise Management
- Reorganize management structure by businesses down to divisions to improve customer focus, market response and profitability. Upgrade accounting systems for proper cost allocation
- Set up zonal railways as independent entities responsible for asset usage, services, investments and profits. Operate in competitive environment.
- Ministry of Railways carries out policy function and collects return on investments from zonal railways mainly based on existing assets. Also looks after country's strategic railway operational requirements
- Set up inter-zonal operational coordination entity funded by zonal railways.
- Set up independent regulatory body to oversee safety, user interest and fair competition.
- Railways exit from non-core business as well as low-density loss-making branch lines. Seek private sector buyers/partners for non-core business.
- Lease/concession loss-making branch lines to private sector/labor cooperatives to minimize losses

### 8. Essential Requirements for Institutional Changes

- Political support and mandate for railway reform
- National policy on surplus labor (retraining, re-deployment and downsizing)
- Process to be driven from outside the railways to achieve objectives within a limited time frame.
- Railway restructuring does not mean outright privatization. The drivers are "customer focus" and "competition". Private sector participation is sought to provide investments and create competitive environment.
- Private sector investments encouraged to upgrade technology, systems, creation of new assets and competing entities as state will not be able to fund these on its own.
- Private sector participation by way of investments and management will bring in private sector culture of value for money, efficiency, innovation, quick response to changing market needs etc.
4. Restructuring Indian Railways

Yash Pal Kedia

A. OBJECTIVES AND KEY TARGETS

1. IR is in urgent need of restructuring to enable it to meet the expectations of the national economy. At present, IR's performance is much below expectations. In particular:

- Freight currently handled by IR (475 million tons per year) represents a relatively small share of the total traffic, and the railways have failed to carry all the bulk and long-distance traffic on offer.
- The freight tariff, at about US$/0.62/ton-km, is about the highest in the world, indicating monopoly pricing and a possible explanation for IR's declining share of the freight market.
- In spite of the high freight tariff, the operating ratio hovers at around 100 percent. This not only imposes a heavy strain on the national budget, but also puts the future of the railways at risk.

2. The government should require IR to justify the very rationale of its existence—by ensuring that it carries all long-distance and bulk traffic on offer at affordable prices, and in line with customers' expectations. In the next 5 years, IR should be required to meet the following targets:

- Freight traffic to be nearly doubled, or increased to about 800 million tons a year.
- Average freight tariffs to be moved down by about 30 percent.
- Operating ratio, after taking into account a realistic provision for depreciation, to be brought below 70 percent or so.

These targets, though challenging, are attainable. Obviously, the railways' improved performance will have a tremendous impact on the economy: reduced transport costs; reduced congestion on the roads; reduced level of pollution; lower budgetary allocations for road building and maintenance; and substantially less drain on the national budget.

B. RESTRUCTURING STRATEGIES

3. Even though there is apparently an increasing realization at all levels - political, bureaucratic, intellectual - that a radical restructuring of IR is essential, there is no evidence that something concrete is about to happen. The reason for this could lie in the absence of a real champion for change. GOI's public stance appears to be against substantial privatization of the railways, discontinuation of publicly supported loss-making services, and massive non-voluntary separation of surplus staff—three almost unavoidable ingredients of a genuine restructuring plan. Some top railway officials favor a near status quo, believing that increased resources and autonomy of the Railway Board is all that it will take to turn the railways around. The unions have already taken a stand against any substantial staff retrenchments. That leaves only the customers - and they, though in desperate need for quality transport services at lower costs, seem to be less organized, and somewhat helpless, in championing the required change. Thus an effective restructuring strategy needs to focus not only on developing a well-thought out restructuring plan, but also on strategies to generate momentum for change and create "champions for change" in the process.

4. It is obvious that the future expectations from the railways cannot be met through incremental efficiency improvements. (See Annex 4.2 for a discussion...
of some incremental recommendations. At the same time, given the size and complexity of IR, a deep-rooted work culture, and a feeling of having done well in the past, it will be almost impossible to get acceptance for a very detailed and complete restructuring plan at the outset. Nor should this be attempted. The first phase of restructuring should focus on an initial set of strategic actions that are fundamental to achieving the key objectives: traffic growth, tariff reduction, and improved financial performance. A possible scenario of subsequent restructuring designs and decisions should also be developed, but implemented only after refining them in consultation with new players and stakeholders. An outline of a possible restructuring plan is discussed in the following sections (see Annex 4.1 for Summary).

C. THE FIRST PHASE OF RESTRUCTURING - PROMOTING INTRA-RAIL COMPETITION

5. Promoting effective intra-rail competition is the only way to achieve the key objectives listed in the preceding section. The key components of such a strategy would be:

- Establishing precise yearly targets for traffic, tariff, and operating ratio.
- Licensing independent public/private/mixed operators to handle the different streams of freight traffic.
- Establishing operating procedures to enable the optimal operation of licensed operators.
- Enhancing the reliability and capacity of infrastructure through improved management, concessions, management contracts etc.
- Establishing a framework for the leasing/sale of railway wagons, locomotives, and other equipment.
- Establishing a framework for the retrenchment of surplus staff.
- Establishing an institutional framework to implement the preceding actions effectively.

6. Establishing key objectives of restructuring: The current focus of IR is the improvement of its financial position. To that extent, it has been calling on the government to (i) pay for public service obligations such as passenger services, uneconomic branch lines, and other uneconomic activities carried out by IR at the behest of the government; (ii) create a level playing field between road and rail, and provide equitable financial support for the rehabilitation and upgrading of railway infrastructure; and (iii) provide financial support for the retrenchment of surplus staff. While all these are valid objectives, they can be realized without restructuring the railways. However, the specific objectives of increasing IR’s share of the freight market, reducing the average freight tariff, and reducing the operating ratio cannot be achieved without a radical restructuring of IR. The nature of restructuring would very much depend upon the objectives that IR is required to achieve. A 5 percent growth in traffic per year, or a marginal reduction in tariff, may not require any restructuring at all. But almost doubling freight traffic in five years, and a 30 percent reduction in average tariff, would call for radical change in the way the railways are organized and operated.

7. Licensing freight operators: As the first strategic action to promote intra-rail competition, IR should license public/private/mixed operators to manage the different streams of freight traffic - such as oil, cement, coal, fertilizer, food grains and petroleum products. By focusing on specific commodities and specific sets of customers, and by offering customer-oriented pricing and service packages, these freight operators could bring about a substantial shift of freight traffic from road to rail as well as capture a much bigger share of the growth in freight traffic. Also, the competition among the operators should improve quality of service and productivity and bring down costs, thus leading to a substantial reduction in transport costs to customers.

8. This proposed strategy should find easy acceptance within the railways because the CONCOR plan was conceived and implemented by the railways; and the CONCOR experience has yielded positive results with the traffic growing by 4 to 5 times since the incorporation of the company. The options open to IR for licensing freight operators, in decreasing order of the competitive environment that the option would create, are:

- Licensing all operators that meet the selection

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45 Even though the latest recommendations of the expert group appear to be quite radical, their impact on the key objectives is unlikely to be more than marginal.

46 This optimism is to some extent based on the experience of CONCOR. Though CONCOR is predominantly a public sector undertaking and has a virtual monopoly of the container traffic on rail, it has been able to increase the railways’ share of the container traffic almost five-fold since CONCOR’s inception, mainly by focusing on the special needs of the customers. A competitive environment with more than one operator licensed to handle container traffic could be expected to lead to even better quality of service and reduced tariffs and, consequently, to a further increase in container traffic.
criteria to operate on an all-India basis for all streams of traffic:

- Licensing a limited number of operators to operate on an all-India basis for all or specific streams of traffic.
- Setting up a number of wholly-owned government companies for different streams of traffic to be progressively divested, as well as licensing a few private operators to operate on an all-India basis for all or specific streams of traffic.
- Setting up a number of wholly-owned government companies for different streams of traffic to be progressively divested.

9. Operating procedures: Irrespective of the option selected by the government, it would be advisable to establish the operating procedures - such as access charges, allocation of responsibility for accidents, and operational performance - for the open access regime. In particular, the pricing for the use of infrastructure is a complicated exercise. Any pricing formula would need to satisfy a number of criteria, some of them in conflict with one another:

- First, the tariffs should be strongly correlated to the costs incurred for the provision of infrastructure and related services so as to be equitable for the different operators.
- Second, the pricing structure should generate enough revenues for the infrastructure entity and enable it to maintain the infrastructure according to specified standards, as well as earn an acceptable return on this investment and effort after meeting the requirements of maintenance, depreciation, and concession fees.
- Third, the pricing structure should not pose any undue constraints on the operators in using "Ramsey pricing" as a tool, either to prevent the loss of current traffic, or to attract additional traffic.
- Fourth, the pricing structure needs to be non-discriminatory for any of the existing or new operators.
- Fifth, the pricing structure needs to be easy and straightforward to compute, without forcing the operators to disclose sensitive information about their tariffs and customer contracts.
- Finally, the pricing structure should promote enhancement of operating efficiency and productivity.

For example, if part of the access charges are fixed on the basis of slots used irrespective of the train load, it would lead to longer trains, which in turn would help overcome capacity constraints and encourage the use of non-preferred time slots. Similarly, basing access charges on gross ton-km or wagon-km would encourage the use of more efficient wagons with less tare weight and more payloads, as the charges for the whole wagon would be the same. On the contrary, basing access charges on net ton-km would tend to inhibit fresh investments in wagons. Though complex, the very idea of separating infrastructure from operations means that issues critical for increasing the railways' share of traffic will be considered. Eventually, a balanced approach to infrastructure pricing is possible with the different players interacting with one another.

10. As the licensed operators become operational and the traffic begins to grow, constraints to growth will also begin to make themselves felt. The two key constraints likely to emerge are infrastructure and wagons, and these will need to be addressed. It is obvious that the new players, the licensed operators, will collectively pressurize IR to address these issues.

11. Improving infrastructure quality through concessions: Track capacity is already considered a constraint, even for the current level of traffic. This is bound to get worse as soon as the licensed operators commence operations. But having signed contracts for moving the operators' trains, IR will be forced to take action that will augment capacity. In the initial stages, some enhancement of capacity is possible by:

- Ensuring that the train lengths are the longest permissible.
- Encouraging the use of more efficient wagons by appropriate differentiation of the access charges.
- Improved train scheduling and monitoring and coordination.
- Improved maintenance of the system and fewer disruptions through failure of locomotives, signaling systems, speed restrictions etc.
- Encouraging the use of less-favored slots through incentives.
- Encouraging the use of any other measures identified through intensive internal/external studies.

\[47 \text{ As indicated earlier, a train with wagons with a higher payload to tare weight ratio can carry more payload per train, thus increasing throughput with the same number of trains}\]
In the next stage, the railways may have to make selective investments targeted at real bottlenecks; and finally, it may become necessary to make substantial investments. Given IR's problems with mobilizing funds and with increasing the efficient working of the corridors, a good alternative would be concessioning the infrastructure on a corridor-by-corridor basis.

12. By concessioning, the government will continue to own the infrastructure while awarding long term rights to the private sector to manage the infrastructure. This arrangement is quite different from simple contracting for maintenance or management. Under concessioning, the concessionaires will earn revenue from the access fees paid by operators; in return they will have contractual responsibility for moving the operators' trains according to the agreed terms and conditions. Such contracts do not usually require any government input, and the concessionaires share the major risk. The key question is whether the concessionaire will be prepared to make heavy investments in infrastructure on the basis of traffic forecasts and take all the risk. The UK experience in this regard has not been very encouraging. However, the conditions of the concession can stipulate heavy fines in case the concessionaires fail to move the goods on offer. This would impose on the concessionaires the responsibility of enhancing capacity when traffic begins to grow. This provision may not be sufficient, however, and it may become necessary to involve all operators in a deal whereby the operators back their traffic projections by agreeing to penalties and reimbursement of fixed incremental costs in case of non-materialization of traffic.

13. Concession is quite different from privatization, and is not in conflict with the government's intention to maintain control of the infrastructure. If the government does not favor concessions, it has to come up with both the funds and expertise to provide capacity. It will be subject to pressure from the operators, and through them, the customers, to perform. Failure to perform will invoke criticism at the political level, and even demand for compensation from the operators. Infrastructure concessioning is a workable route, and it needs to be fully explored.

14. A framework for leasing wagons: Contractually, the licensed operators would have the responsibility of procuring their own wagons. Since IR has sufficient wagons for most categories of traffic, a strategy profitable to both operators and IR would be for the operators to lease wagons from IR. Leasing, however, requires complex and specialized transactions. With IR's lack of expertise in this area, the logical solution would be for IR to establish one or more wagon leasing companies and transfer the total wagon holding to these companies. IR will also then have to lease wagons from these companies for its own use. Wagon leasing arrangements will:

- Facilitate entry and exit of operators and promote competition.
- Force the leasing company to use a different pricing policy for different types of wagons.
- Eventually require the leasing companies to modernize the wagon fleet on demand form the operators.
- Relegate obsolete or old-technology wagons to underutilized lines.48
- Force leasing companies to make the wagons more reliable and meet the standards set in the agreements between the wagon leasing companies and the operators.

15. These arrangements will not preclude the operators from buying their own wagons or from leasing them from some other company that happens to own wagons. That could also trigger the setting up of private leasing companies in direct competition with the government-established companies, particularly for new and special-purpose wagons. As a consequence, the cost of acquiring and maintaining wagons should reduce, and the design and quality of wagons improve.

16. A framework for the retrenchment of surplus staff: The railways are aware that a substantial percentage of the staff currently employed is surplus and should be retrenched. But in the absence of a restructuring plan, there is no pressure to retrench this surplus. If, however, the actions listed are undertaken such as the licensing of freight operators, the concessioning of infrastructure, and the leasing of wagons - the licensed operators, leasing companies, and the concessionaires would employ staff they really need,

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48 The current wagon fleet has a very poor payload to tare weight ratio, around 2.7. By computer-aided designing, the ratio can be taken to a level of 4 or so, which would mean that the same wagon would be able to carry about 5 tons more. A new wagon can recover the cost in 5 years. Assuming a lead of 500 kgs and a tariff of 4 US cents/ton-km, one wagon trip means additional revenue of about US$300. For a turnaround of 5 days, or 70 trips/year, the savings/year would be US$21,000 or a payback period of between 3 to 4 years. This excludes savings in locomotives.
leaving the remaining staff as redundant with the railways. This redundant staff would need to be retrenched. The issues underlying staff retrenchment are certainly complex, but they need to be addressed all the same.

17. It is imperative that modalities for staff retrenchment be settled and the staff given a menu of options to choose from. The financing of severance payments can be arranged through loans, an escrow account in which all license and concession fees are deposited, and other means that need to be explored. If the government is unable to reach an agreement with staff unions, or to raise funds for staff retrenchment, it would be better to send the staff on transition leave with full pay—until the staff resign, find alternative employment, or are retired/retrenched. This alternative is far superior to the option of perpetuating the inefficiencies of the structure by providing the staff with some work. The number on transition leave will also serve as a standing reminder to the government that something has to be done.

18. An institutional framework: Licensing freight operators, concessioning infrastructure, leasing equipment, and rationalizing staff are complex and specialized operations that require establishing specialized units within the railways, or perhaps specialized subsidiary companies with appropriate professionals. At least three such units/companies are considered necessary:

(i) A unit/company to propose, negotiate and finalize freight-operating licenses, infrastructure concessions, lease agreements (for wagons to begin with, and eventually for locomotives and other specialized equipment, and perhaps passenger-service franchises in the future).

(ii) A unit/company to deal with staff separations including the development and implementation of social mitigation measures.

(iii) An autonomous body to provide economic and technical regulation.

D. Subsequent Phases of Restructuring and Possible Actions

19. Corporatization of wagon maintenance workshops: The next natural step would be for the leasing companies to demand service from the wagon workshops and bind them to contractual arrangements. The leasing companies may also float tenders to select the workshops for maintenance of their stock. The workshops belonging to IR differ widely in size, capacity, capitalization, level of modernization, costs and quality of maintenance. Naturally, the leasing companies will gravitate towards the most efficient ones. But the workshops, with their present structure and powers, will hardly be in a position to bid for and manage these contracts. For the workshops to be able to that, they would need to be corporatized. There is also the possibility of the freight operators or wagon leasing companies acquiring an interest in the maintenance workshops through different arrangements with IR—such as concessions, equity participation, or outright purchase. Alternatively, the incorporation of the workshops could begin with 100 percent government equity, to be divested later. It is also possible that some of the smaller and inefficient workshops would fail to get any business from the leasing companies and will either have to be closed or sold to the private sector. A 1981 study that looked into the rationalization of workshops recommended that the number of workshops be halved; this would have permitted economies of scale and a concentration of efforts at modernization. This recommendation could now be implemented.

20. Framework for the leasing of locomotives: In all probability, infrastructure concessionaires could bear the responsibility for operating the trains, in which case they would need locomotives. This provides a rationale for the leasing of locomotives similar to the one for wagon leasing. The concessionaires could also buy locomotives of their own, but it would be to their advantage as well as that of IR if the current fleet of locomotives were utilized first.

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48 An informal study indicated that those workshops that benefited most from the Bank-financed workshop modernization project had the highest unit cost of overhaul in India. The input of new technology increased the capitalization of these workshops without gaining extra workload. The unit costs in these workshops were sometimes 4 times the cost in small workshops untouched by modernization.

49 This type of corporatization, resulting from market needs, would display very different behavior compared to those that are undertaken solely as a matter of reform in the hope that a corporatized unit would perform better than a government department. In the latter, the customer would have remained the same and there would be no competition, whereas in the former, the leasing companies would have many options and would not be obliged to place orders on any of the corporatized units. This would make the corporatized units operate in a competitive environment so that they would be forced to perform or die. In any case, IR has far too many workshops, and previous efforts to rationalize these workshops have not met with any success. The emergence of a competitive environment for wagon maintenance would force rationalization of the maintenance capacity along with modernization of the workshops.
21. Corporatization of locomotive maintenance workshops: The same rationale applies as that for wagon maintenance workshops.

22. Corporatization of locomotive manufacturing units: The manufacturing units will need to have long term contracts with locomotive leasing companies. Based on the traffic needs, the concessionaire will, to a large extent, determine the design of locomotives. While translating the need into active designs, the leasing company, while translating the need into active designs, may seek collaborations, then use the locomotive manufacturing workshops to manufacture the locomotives in line with the specifications. In any case, the corporatized locomotive units will need such linkages to survive. Perhaps the leasing companies will take a controlling interest in the manufacturing units along with some of the prominent locomotive manufacturers around the world. Such arrangements would bring in the necessary modern designs and manufacturing processes, leading to improved quality, enhanced productivity, and reduced costs.

23. Privatization of non-core functions/assets: Once restructuring is completed, the need for non-core services will change radically. This would be an appropriate time to plan the privatization of non-core assets and services.

24. Concessioning/franchising of passenger services: As the process of restructuring gets under way, IR will be left mainly with the running of passenger services. It could be leasing locomotives and paying access charges for the use of track. Gradually, the railways can develop a strategy for concessioning/franchising of passenger services by trains, routes, or type of service. IR could also hand over some services (local passenger, commuter) to states and local authorities. Other issues for action would include identifying PSO, defining subsidies for such services, discontinuation of such services, and establishing leasing companies for coaches with downstream corporatization of coach maintenance units and manufacturing units.

25. Is GOI prepared to adopt this strategy? It should be prepared, because:

- The rationale for restructuring is basically economic, with huge payoffs in terms of increased share of freight traffic for the railways and reduced costs of transportation.
- The licensing of operators is a continuation of the strategy pursued by the government with very encouraging results.
- The concessioning of infrastructure does not really amount to privatization, to which the government appears to have certain reservations.
- Corporatization of manufacturing enterprises and maintenance companies would be undertaken as a natural continuation of the restructuring process, and with clear indications from the market and key stakeholders - hence with reasonable assurance of success.
### Restructuring IR - A Summary of Strategic Actions

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Strategic Action</th>
<th>Expected Outcome</th>
<th>Possible Targets/Goals</th>
<th>Difficulty of Acceptance in a scale of 1 to 10 (10 most difficult)</th>
<th>Rationale for the Acceptance Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Phase 1 Actions - Promoting Intra-Rail Competition</td>
<td>Acceptance of the need for restructuring</td>
<td>Freight: 800 m³/yr in five years; Tariff 30% less; Operating Ratio 70%</td>
<td>-</td>
<td>GOI has already established CONCOR with good results</td>
</tr>
<tr>
<td>2</td>
<td>Licensing of Operators for different streams of freight traffic</td>
<td>Increased Freight Traffic on rail; Reduced transport costs; Improved quality of service</td>
<td>800 m³/yr in 5 years</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Establishing Operating Procedures - access charges; allocation of responsibility for accidents, operational performance etc</td>
<td>Non-discrimination; Providing right incentives for enhancing efficiency</td>
<td></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Establishing a Framework for Wagon Leasing. The framework could include establishing a separate subsidiary company with 100% government equity to start with while allowing private leasing companies as well</td>
<td>Easier entry and exit of operators; Increased competition among operators; Increased utilization of the existing wagon fleet</td>
<td>Establish leasing operations prior to licensing of operators</td>
<td>-</td>
<td>GOI has already established a number of subsidiary companies and given a sound rationale for this operations, there should be no difficulty in establishing a leasing company or allowing private leasing companies</td>
</tr>
<tr>
<td>5</td>
<td>Concession Infrastructure: corridor-wise and specially-bundled track</td>
<td>Unbiased allocation of infrastructure; Reduced cost of infrastructure maintenance; Improved reliability and capacity of infrastructure; Increased but appropriate investments in infrastructure.</td>
<td>One corridor to be concessioned on a pilot basis within one year</td>
<td>6</td>
<td>GOI wishes to keep the infrastructure within its control and is averse to privatising it. Yet, concessions would allow GOI keep ownership and hence may persuade it to accept concessioning.</td>
</tr>
<tr>
<td>S.No.</td>
<td>Strategic Action</td>
<td>Expected Outcome</td>
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<td>-------</td>
<td>-----------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>6.</td>
<td>Staff retrenchment</td>
<td>Pre-requisite for restructuring; Reduced operating costs; Increased operating efficiency.</td>
<td>Innovative and diversified packages and schemes would be required; Social program must accompany retrenchment</td>
<td>6</td>
<td>Innovative and diversified packages and schemes would be required, Social program must accompany retrenchment.</td>
</tr>
<tr>
<td>7.</td>
<td>Corporatize and privatize Locomotive maintenance workshops</td>
<td>Easier leasing of locomotives; Reduced cost of maintenance of locomotives; Improved reliability of locomotives</td>
<td>100% government-owned to start with and divestment later</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Establish Locomotive Leasing companies</td>
<td>Increased attractiveness of the concession; Increased utilization of the existing locomotives fleet</td>
<td>100% government-owned to start with and divestment later</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Corporatize and privatize Locomotive maintenance workshops</td>
<td>Easier leasing of locomotives; Reduced cost of maintenance of locomotives; Improved reliability of locomotives</td>
<td>100% government-owned to start with and divestment later</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Corporatize and privatize locomotive manufacturing units</td>
<td>Easier modernization of locomotives; Reduced cost of manufacturing locomotives; Improved reliability of locomotives</td>
<td>100% government-owned to start with and divestment later</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Privatize non-core services, assets, and functions</td>
<td>Making restructuring easier; Completion of the restructuring process Reduced losses</td>
<td>Innovative privatization models would be required</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Rationalization, privatization, and discontinuation of passenger services</td>
<td>Improved quality of service; Reduced cost of providing services; Reduced losses and need for financial support</td>
<td>More thought required on ways to privatize</td>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>
Comments on the Strategic Actions Proposed from Time to Time

1. One such strategy does focus on separation of infrastructure from operations, and on generating intra-rail competition. However, the effectiveness of the strategy has been considerably diluted by the recommendation that:
   a. The infrastructure, which is currently rated as the most serious constraint to effective operations, be retained in government hands, thus raising the possibility of perpetuating the existing constraint; and
   b. The infrastructure providers also be allowed to be one of the competing operators, thus raising questions about the level playing field.

2. Another strategy recommends delegating more powers to the zonal railways and making them compete with one another. Since no private participation is recommended, this strategy is unlikely to go far in improving performance or bringing out effective competition.

3. Another recommendation is for the government to allow an increase in passenger fares or compensate the railways for its losses on account of these services. Two main points have, however, been ignored. First, the cost of operations is very high at present, and with the restructuring of railways and a reduction in the operating costs, the losses on passenger services will also come down. After all, the occupancy ratio of the passenger services in India is high, and there is a huge advantage of scale. Second, if common costs are allocated to passenger services on an incremental cost basis, it is doubtful that the passenger services would be found to be loss-making even now.

4. Yet another recommendation is to separate policy and operations functions. IR is probably unique in that the Secretary of the Ministry of Railways is also the Chief Executive of the railways. It is a moot point whether separation of these functions would work to the advantage of the railways or otherwise. It might well turn out to be a good suggestion. The issue, however, is that in all ministries except the railways, the policy and execution functions are separate. But the efficiency of these ministries or the parastatals under them does not stand out as significant. The fact is that this recommendation is hardly likely to lead to an immediate increase in traffic; and instead of finding universal acceptance, the recommendation is likely to raise controversy, passions, and violent protest. This kind of reform lulls everyone into believing that serious change is afoot, when in fact, it can be predicted with certainty that nothing significant is really likely to happen.
5. Ports
Sanjeev Dhar

A. INTRODUCTION

1. India’s coastline of 5660 km is dotted with 12 major ports and 140 minor ports. The major ports are under the control of the central government, and the minor ports the respective state governments.

2. Major ports: Of the total seaborne traffic of 333 million tonnes in 1999-2000 in India, 82 percent was handled at 11 major ports. (The twelfth port, Ennore, is yet to become operational.) The rest was handled by a large number of minor ports. The traffic handled at these ports for the year 1999-2000 is presented in Table 1, Annex 5.1, and the commodity mix in Figure 1, Annex 5.1. The data shows that over the past 25 years, cargo volume has increased by over 400 percent, with container traffic registering significant and sustained growth.

3. Minor ports: In 1999-00, these ports handled, in aggregate, seaborne trade of 61MT (metric tons). The share of break bulk and containerized cargo was insignificant. The Gujarat state ports’ share of cargo handled has been the highest—at 70 percent of all cargo handled by minor ports. The traffic handled at these ports is presented in Table 2, Annex 5.1. These state ports have immense untapped potential for handling larger volumes of seaborne trade. Initiatives have now been taken by the maritime state governments to invite private investment and participation in the development of state-owned ports. The ongoing endeavors—widely hailed in India and elsewhere—have inspired the hope that by 2002, some of these ports will be ready to handle relatively large volumes of India’s coastal and international trade. Several deep draft port projects are at various stages of development under private entrepreneurship in the states of Gujarat, Andhra Pradesh, Orissa, Maharashtra, Kerala and Tamil Nadu. In Andhra Pradesh, the port of Kakinada is also slated for further expansion.

4. Institutional and legal framework: Major ports are under the control of the Ministry of Shipping (MOS). In 1997, the Tariff Authority for Major Ports (TAMP) was formed to act as a tariff regulator for the major ports. Figure 5.1 shows the institutional relationships among MOS, TAMP and the major ports, and the relationship of MOS to the Council of Ministers and Parliament.

B. CORPORATIZATION AND COMMERCIALIZATION OF MAJOR PORTS

5. In line with the policy of economic liberalization, in early 1999 GOI announced the decision to corporatize major ports in a phased manner to enhance the efficiency and quality of services to port users. The government also announced its intention to enhance the decision making authority of the port management; to promote private investments and speedy execution of projects; to manage operations professionally, with operational freedom and flexibility in taking commercial and investment decisions; and to present financial results following transparent disclosure of accounting policies. This was preceded by an ADB-funded technical assistance (TA) study.51

6. As a first step, the government has corporatized Ennore under the Indian Companies Act 1956. It has also been decided that the youngest trust port, the Jawahar Lal Nehru Port (JNP), will be converted into a public limited company. In line with the recommendation of the TA study, this process may be followed by corporatizing the Haldia Dock Complex, de-linking it from the Calcutta Port Trust. In the second phase, the other major ports may be considered for corporatization according to the following schedule:

Kandla, Tuticorin and New Mangalore: in two years.
Mumbai, Paradip, Visakhapatnam and Chennai: in three years.
Mormugao and Cochin: in four years.
Kolkata: in five years.

7. Once corporatized, the ports will act as landlords and provide only common user facilities. The land will be

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51 Ministry of Surface Transport, Enhanced India Ports Policy Implementation, 1998
leased to specialized terminal operators to develop and operate the terminal facilities. The port will be completely autonomous, free to fix its own tariff. It will not be under the administrative control of MOS or under the regulatory control of TAMP—the port itself will exercise both regulatory and operational controls over the terminal operators.

C. COMPETITION AND REFORM PROCESS

8. Competition between major and minor ports: The percentage of minor ports traffic has been increasing since 1995. It was generally assumed that minor ports would complement major ports and add to the nation’s port capacity. In a few cases, however, minor port development is in direct conflict with the existing facilities at major ports. For instance, the port of Kandla handled 42 MT of crude/POL products in 1998-99, but only 35 MT of Crude/POL in 1999-2000. The reason was that a part of the cargo had shifted to Sikka, a minor port nearby. Similarly, the development of container handling facilities at Mundra and Pipavav is viewed as a threat to the container traffic of Kandla and JN ports. Again, Dharna Port (in Orissa), which would save US$4-5 per tonne in freight charges, would also attract traffic from Haldia and Paradip. In response to these various developments, GOI has set up a Maritime States Development Council for the purpose of coordination (see Box 5.1).

9. Reforms on the private sector participation front: The major policy initiative taken by GOI is to open up the port sector, so far an exclusive preserve of the state, for private sector participation. This has been done not merely to bridge the resource gap, but also to bring in the latest technologies and management practices. Detailed and transparent guidelines governing private sector entry/participation in port development/management have been issued by the government (see details in Annex 5.2).

10. These guidelines are comprehensive as well as friendly to private sector participation. But some issues
Box 5.1: Setting up a Maritime States Development Council

To ensure the coordinated development of minor and major ports, GOI decided, in May 1997, to set up a Maritime States Development Council — comprising Ministers in charge of ports in the respective states, with the Ministry of Surface Transport (MOST) as its Chairman.

The Terms of Reference of the Maritime State Development Council are:

- To assess, in consultation with state governments, the future development of existing and new minor ports by the respective Maritime States, either directly, or through captive users and private participation.
- To consider the adequacy of the existing legal framework and statutory/legal clearances required for such development, and recommend any changes/amendments required to provide a conducive legal regime for such development.
- To ensure formulation of a Master Plan/Perspective Plan for the development of minor ports in the country.
- To monitor the development of minor ports, captive ports and private ports in the Maritime States with a view to ensure their integrated development with major ports.
- To assess the requirement of other infrastructure requirements such as roads/rail/inland waterway transport (IWT) and make suitable recommendations to the concerned Ministries.

The senior officers of the Council had a number of meetings and arrived at the following conclusions:

- There is a need for integrated development of major and minor ports.
- A 20-year Perspective Plan is required. Subject to modifying the RITES recommendations in the light of the views expressed by the participants, the Council decided to recommend that the ports identified in the Vision 2020 Report be adopted to form such perspective plans, and that future efforts be focused on the development of these ports. It was also decided that a subgroup be formed to make appropriate modifications of the RITES report of recommendations.
- Each port must have an Environment Management Section.
- The Council should consider setting up a Port Infrastructure Fund by levying a cess on cargo. Proposed amendments to the Indian Ports Act, 1908 were discussed in detail and accepted with some suggestions for further modifications. It was decided that the written comments of the state governments on the draft amendments should be taken into appropriate account in finalizing the legislation.

which have been left out by the guidelines/amendments to the Major Port Trust Act have been holding back the increased pace of private sector participation in the port sector. These issues are:

- Cooperation between major and minor ports.
- Equity participation by major ports in Special Purpose Vehicles (SPVs) promoted by foreign ports.
- Bilateral arrangements with foreign governments for port development.
- Joint marketing/service tie-ups with foreign port operators/mainline shipping lines.

11. The development of new ports/berths requires environmental clearance from different agencies. The government has initiated steps to facilitate this process, and identified MOS as the nodal agency (see Box 5.2).

12. Reforms on the fiscal front: GOI has announced a number of fiscal incentives to financial institutions providing finance for infrastructure projects—including ports, investors and private operators undertaking projects. Foreign equity investment up to 74 percent equity for infrastructure projects is automatically approved. Pending radical changes, the major ports have been delegated considerable financial and administrative powers by MOS to facilitate speedy investment decisions. Ports can now borrow directly from multilateral agencies such as the World Bank and the ADB without the intermediation of GOI. GOI will, however, provide the sovereign guarantee required by the lending agencies. Also, to ensure uniform procedure for the tendering of privatization projects in major ports, a draft tender document and model concession agreement has been prepared in consultation with financial institutions and approved by the Ministry.
Box 5.2: Reforms for Speedy Environmental Clearances

To facilitate speedy environmental clearance of port projects, the power to accord such clearances for projects falling within the port limits of both major and minor ports has been delegated to MOS (formerly MOST or the Ministry of Surface Transport), the nodal Ministry concerned with ports. Detailed guidelines that set out the procedure for obtaining environmental clearance have been issued. An Empowered Committee has been set up to consider and accord environmental clearance to such projects. The classification of the Coastal Zones where different regulations for port construction apply are as follows:

- **CRZ I**: Ecologically sensitive areas like marine parks, reserve forests, mangroves, breeding grounds for marine life, monument centers and the area between high tide & low tide—No green field port development permitted in certain sensitive areas.
- **CRZ II**: Area already developed up to the shoreline like city centers—Construction permitted only beyond the coastal road but port facilities can be developed along the shoreline.
- **CRZ III**: Area relatively undeveloped & does not fall under CRZ I & II—Construction permitted beyond 200 m from the shoreline, port facilities can be developed along the shoreline.
- **CRZ IV**: Coastal areas of Andaman & Nicobar, Lakshadweep etc.—Port facilities can be developed.

The request for environmental clearances shall necessarily contain the following:

- No objection from the district administration and the state Pollution Control Board.
- A detailed EIA study with a suitable Environmental Management Program (EMP).
- The impact on the socioeconomic condition of the surrounding areas.
- A detailed resettlement and rehabilitation plan for the population affected by the project.

13. **Reforms on the regulation and legal front**: Fully conscious of the fact that the present port legislation—the Indian Port Act, 1908 and major Port Trusts Act, 1963—are very old and may even be irrelevant in the present liberalized regime of economy, the government initiated a comprehensive review of these Acts by constituting a committee headed by C. Babu Rajiv, Chairman, Cochin Port Trust, to review and recommend changes in the existing port-related legislation with the following objectives:

- To identify provisions in the statutes that are no longer required due to changes in maritime/port activities over the years.
- To identify the provisions that are in tune with the present need of the ports to operate in a commercial climate and in harmony with the liberalization of the economy.
- To examine whether the existing statutes can be unified/simplified into a single statute.

14. The Committee has recommended consolidating the existing Indian Ports Act 1908 and the Major Ports Act 1963 in a new act aimed at creating a model decentralized port. Such a model will have operational and administrative autonomy, promoting competition and professionalizing port management; attract private investment and participation in port activities; and ensure implementation of detailed guidelines on private investment and management of port activities issued by GOI.

15. **Creation of Traffic Authority for Major Ports (TAMP)**: By amending the Major Port Trust Act of 1963 in 1997, GOI created TAMP (or the Authority) to deal with tariff-related issues of the major ports. TAMP is mandated to:

- Frame a scale of rates for specified port services performed by a Major Port Trust Board or persons authorized by the Board.
- Frame a scale of rates for the use of any property in possession of the Board for specified purposes, including vessel berthing and docking, transportation, leasing of land or storage areas, and any other use of land or facilities belonging to or provided by the Board.
- Frame a scale of rates for different classes of goods and vessels.
- Fix fees for pilotage, port dues and other services to vessels.

16. However, this Amendment to the Act also allowed the Major Ports Trust Boards and GOI to
establish their own rates in certain cases, regardless of the rates fixed by TAMP:

- The Board may lease facilities in its possession by auction or tender at a rate higher than that set by TAMP.
- The Board may exempt any vessel or goods from payment of any charges.
- GOI may, if it deems necessary in the public interest, direct TAMP to cancel or modify any rates in force.
- TAMP can have control only over the major ports covered under the Indian Major ports Act 1963, and not over the ports that are corporatized.

17. With limited powers vested in TAMP by law, inadequate definition of its role and functions as a regulator of tariffs, and limited professional and industry-specific resources, this regulator faced significant challenges in discharging its primary responsibility of ensuring fair prices and a level playing field for all users and service providers at the major ports. For example, although Terminal Handling Charges by private operators may constitute a significant proportion of the total cost of moving cargo through the ports, there is no explicit provision in law empowering TAMP to regulate tariffs for Terminal Handling charged by private operators. There is also no provision for requisitioning records, summoning and cross-examining witnesses, enforcing orders and imposing penalties for non-compliance. TAMP generally follows a consultative model of regulation, listening to all the parties who express an interest in its deliberations.

D. STRATEGY FOR PORT DEVELOPMENT

18. The GOI-initiated study, the Perspective Plan for Port Sector—Vision 2020, estimates that traffic at Indian ports will increase to three times the volume of the present traffic. GOI has adopted the following strategy to augment the handling capacity of ports to meet the estimated total traffic of 424 million tonnes, including 4.6 million TEUs by 2005:

- **Private sector participation in major ports and development of minor ports.** Of the estimated Rs 161 billion required during the Ninth Plan (1997-2002), 39 percent would be through the private sector.

- **Capacity augmentation through improvement in productivity.** Indian ports have one of the lowest rates of productivity in handling cargo (Box 5.3).

This affects the turnaround time of vessels, resulting in the increase of freight rates for the users, as the delays suffered by the vessels at the port are passed on to the customers.

**Capacity augmentation through improvement of manpower productivity.** The comparison of manpower productivity with international ports and the private operated berths in India (Box 5.3) clearly brings out the need to enhance the manpower productivity at ports. This would increase the capacity of the existing ports by 7 million tonnes, but it is also one of the more difficult issues that needs to be addressed, given its social implications. Most Indian ports have redundant labor and have high operation costs though wage rates are quite low.

**Progressive realignment of the workforce in consistency with modern traffic and cargo handling requirements.** The present labor situation in most Port Trusts is likely to deter the entry of private operators and investors. The cost of such realignment, which must naturally be designed to be socially acceptable, should be considered as a first investment towards the modernization of the port sector.

**Development of container terminals in all major ports and an increase in capacity through new ports and berths at the major and minor ports.**

TRANSPORT NETWORK CONNECTION AND INTER-MODALISM

19. The lack of a good physical connection between an identified port and inland transport has been cited as one of the major hurdles in the port development process. To address this issue, private port developers have entered into joint venture partnership with the Indian Railways to develop inland connections (see Chapter 6 on railways). Changes are also being made in the Multi-Modal Transport Act to facilitate the efficient movement of cargo to/from ports to inland. Some issues of inter-connectivity and cargo transfer between the port railway and IR still need to be addressed to improve efficiency and reduce delays at the interface of the two systems.

CUSTOMS PROCEDURE FOR CLEARANCE OF CONTAINERIZED CARGO

20. Clearing a shipment through a port entails a process consisting of a number of key activities that can be time-consuming. These activities include port operations,
Box 5.3: Manpower Productivity at Ports

The container handling rates and turnaround time of vessels at some of the Indian ports and a few selected international container ports are given below. The international benchmark for container vessel turnaround time is 24 hours, while at ports like Singapore it is less than 12 hours. There are large differences in productivity levels among Indian ports. While the vessel turnaround time at JNPT and Cochin is about 37-50 hours, it is 145 hours at Chennai. The shipping lines pass on the ship demurrage cost at Chennai to the shipper at a rate of US$100/TEU.

### Productivity at Indian Ports

<table>
<thead>
<tr>
<th>Name</th>
<th>Crane Productivity</th>
<th>Berth Throughput</th>
<th>Average Vessel Turnaround time (hrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average (moves/hr)</td>
<td>Peak (moves/hr)</td>
<td>Average (TEU/Day)</td>
</tr>
<tr>
<td>JNP Terminal</td>
<td>16.7</td>
<td>26.5</td>
<td>908</td>
</tr>
<tr>
<td>Nav Sheva International</td>
<td>25</td>
<td>35</td>
<td>1570</td>
</tr>
<tr>
<td>Container Terminal (NSICT) at JNP</td>
<td>11.1</td>
<td></td>
<td>299</td>
</tr>
<tr>
<td>Chennai</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mumbai (Ballard Pier)</td>
<td>12</td>
<td>350</td>
<td></td>
</tr>
<tr>
<td>Cochin</td>
<td>8</td>
<td>353</td>
<td></td>
</tr>
</tbody>
</table>

The manpower productivity at Indian ports, private container terminals and select international terminals in this part of the continent for container handling are as follows:

<table>
<thead>
<tr>
<th>Name of Port</th>
<th>Productivity per person (TEU/Person)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mumbai Port</td>
<td>220</td>
</tr>
<tr>
<td>Chennai Port</td>
<td>210</td>
</tr>
<tr>
<td>Cochin Port</td>
<td>270</td>
</tr>
<tr>
<td>JNPT Terminal</td>
<td>330</td>
</tr>
<tr>
<td>NSICT Terminal (JNP)</td>
<td>733</td>
</tr>
<tr>
<td>Singapore Port</td>
<td>2303*</td>
</tr>
<tr>
<td>West Port (Malaysia)</td>
<td>1080</td>
</tr>
</tbody>
</table>

*Note: Numbers in () comprise the number of cranes at a berth.

*Source: Data collected from various ports, 2000.*

customs, inspections, and transfer to and from land transport, and there are obstacles to speedy clearance in each of these areas. The new terminals set up recently in India are well planned, with state-of-the-art equipment. This has reduced delays on the port account; but considerable delays due to customs clearance still continue.

21. The customs procedures entail the review of documents for any discrepancies and checking that the goods are consistent with the documents. The inspection process of scrutinizing the documents for each consignment takes two to three days. The inspection of goods in the transit shed or container freight station (CFS) takes another one to three days, assuming the lock and seal are not tampered with in the case of import containers. The manual process is applicable to 100 percent of the traffic, contrary to the international practice of 4-5 percent of sample checks.

22. The clearance process is also affected by the amount of paperwork involved in documentation, and
the method used to handle this paperwork. Exporters have to process a large number of documents—over 20 with multiple copies—for a single shipment; this requires an enormous amount of work and adds to the cost. The repetition of information and the layout of forms involved in the paperwork also contribute to delays.

23. The modernization of the container shipping industry, and the excellent and frequent feeder vessel connectivity between a few Indian container ports and regional hub ports, has accelerated the speed with which goods arrive at the destination port. But this does not extend to the arrival of the shipping documents (bill of laden). With the delay in the shipping documents reaching the consignee, the transfer of the bill of laden, and the right to claim goods shipped, takes considerable time. These delays obviously create additional costs relating to the custody and insurance of the goods at the port premises; and again, this cost is passed on to the shipper by the shipping lines in the form of increased terminal handling charges.

24. In order to speed up the process of documents and customs clearance, world ports began to implement Electronic Data Interchange (EDI) in the 1980s; but India became a member of the UN/Asia EDIFACT Board only in 1993. Even now, it is only private port operators such as the Nava Sheva International Container Terminal (NSICT), a few international logistics companies that have recently come to India in the area of warehousing and truck transportation, major shipping line agents such as CMB, P&O, and Maersk, and CONCOR, that have adopted EDI for business communication. Among the Indian major ports, only JNP took the initiative to implement EDI. The success of the DI at JNP has encouraged other users to adopt the same system. As a first step, about 40 members have been permitted to log on to the port system through security passwords for certain inquiries. JNP has also formed a "Message Development Group" to standardize the documents for sea transport. The group consists of members from the Mumbai Custom House Agents Association, the Videsh Sanchar Nigam Limited (VSNL), CONCOR, SCI, and other multi-level operators (MLOs) such as CMB and Maersk. In view of the initial success at JNP, the government has directed all container-handling ports to implement EDI within a time frame of two years.

PRIORITIES FOR THE PORT SECTOR

25. Social issues: Addressing the port labor question is likely to remain crucial for any sustainable private sector development in existing major ports. This may require significant funding.

26. Institutional: Implementing the corporatization strategy, then concessioning out operations, is clearly the route to take. The success of concessioning will depend in part on the alleviation of unnecessary constraints on the concessionaire - a process that is now underway—and the settlement of the labor issue.

27. Sector regulation: Establishing a regulatory mechanism that maintains a genuine distance from the political structure would be significant progress. (TAMP is still under ministerial tutelage).

28. Transport facilitation: This is a major concern, and it includes customs. Customs clearance procedures are still far too cumbersome and time-consuming, with 100 percent physical controls for containers. The development of electronic messaging may help, but the system is unlikely to change at a fundamental level unless there is an awareness - at the appropriate levels—of the penalties that continue to be imposed on India's trade. A full-fledged customs modernization program, backed up by strong political will, seems to be in order. The World Customs Organization could help design and implement such a program, and the World Bank could help with the funding.
Table 1: Major Traffic, Indian Ports (1999-2000)  

(000 T)

<table>
<thead>
<tr>
<th>Commodity Ports</th>
<th>POL</th>
<th>Iron Ore</th>
<th>FRM</th>
<th>Coal</th>
<th>Containers</th>
<th>Others</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kolkata</td>
<td>5,622</td>
<td>75</td>
<td></td>
<td></td>
<td>2,117</td>
<td>2,497</td>
<td>10,311</td>
</tr>
<tr>
<td>Haldia</td>
<td>10,822</td>
<td>472</td>
<td>3,224</td>
<td>3,284</td>
<td>436</td>
<td>2,452</td>
<td>20,690</td>
</tr>
<tr>
<td>Paradip</td>
<td>2,219</td>
<td>1,025</td>
<td>643</td>
<td>5,953</td>
<td>1,497</td>
<td></td>
<td>13,637</td>
</tr>
<tr>
<td>Visakhapatnam</td>
<td>15,289</td>
<td>5,680</td>
<td>3,064</td>
<td>4,011</td>
<td>262</td>
<td>7,101</td>
<td>39,511</td>
</tr>
<tr>
<td>Chennai</td>
<td>10,054</td>
<td>6,187</td>
<td>1,159</td>
<td>9,230</td>
<td>414</td>
<td>3,976</td>
<td>37,443</td>
</tr>
<tr>
<td>Tuticorin</td>
<td>462</td>
<td>869</td>
<td>3,580</td>
<td></td>
<td>1,633</td>
<td>3,449</td>
<td>9,993</td>
</tr>
<tr>
<td>Cochin</td>
<td>9,946</td>
<td>415</td>
<td>107</td>
<td>49</td>
<td>1,247</td>
<td>1,033</td>
<td>12,797</td>
</tr>
<tr>
<td>New Mangalore</td>
<td>8,318</td>
<td>6,386</td>
<td>189</td>
<td></td>
<td>117</td>
<td>2,591</td>
<td>17,601</td>
</tr>
<tr>
<td>Mormugao</td>
<td>1,143</td>
<td>14,832</td>
<td>113</td>
<td>474</td>
<td>209</td>
<td>50</td>
<td>18,226</td>
</tr>
<tr>
<td>Jawaharlal Nehru</td>
<td>1,427</td>
<td>132</td>
<td>790</td>
<td></td>
<td></td>
<td>10,680</td>
<td>14,976</td>
</tr>
<tr>
<td>Mumbai</td>
<td>16,782</td>
<td>889</td>
<td>829</td>
<td></td>
<td>1,134</td>
<td>8,210</td>
<td>46,303</td>
</tr>
<tr>
<td>Kandla</td>
<td>34,613</td>
<td>1,517</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>46,303</td>
</tr>
<tr>
<td>All Major Ports</td>
<td>116,697</td>
<td>34,242</td>
<td>10,195</td>
<td>26,579</td>
<td>10,503</td>
<td>27,691</td>
<td>271,872</td>
</tr>
</tbody>
</table>

Source: Ministry of Shipping

Table 2: Minor Ports, India  

(Million T)

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gujarat</td>
<td>17.2</td>
<td>19.2</td>
<td>26.8</td>
<td>22.9</td>
<td>46.6</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>3.7</td>
<td>2.6</td>
<td>4.7</td>
<td>5.2</td>
<td>5.9</td>
</tr>
<tr>
<td>Goa</td>
<td>0.062</td>
<td>0.062</td>
<td>0.3</td>
<td>0.2</td>
<td>2.0</td>
</tr>
<tr>
<td>Karnataka</td>
<td>0.3</td>
<td>0.4</td>
<td>0.5</td>
<td>0.4</td>
<td>0.5</td>
</tr>
<tr>
<td>Kerala</td>
<td>-</td>
<td>--</td>
<td>0.2</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>0.1</td>
<td>0.03</td>
<td>0.3</td>
<td>0.5</td>
<td>0.4</td>
</tr>
<tr>
<td>Pondicherry</td>
<td>0.06</td>
<td>0.05</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Andhra Pradesh</td>
<td>2.3</td>
<td>2.2</td>
<td>1.8</td>
<td>4.2</td>
<td>4.9</td>
</tr>
<tr>
<td>Orissa</td>
<td>0.2</td>
<td>0.1</td>
<td>0.2</td>
<td>0.1</td>
<td>0.7</td>
</tr>
<tr>
<td>Andaman &amp; Nicobar Islands</td>
<td>0.3</td>
<td>0.4</td>
<td>0.6</td>
<td>0.7</td>
<td>0.7</td>
</tr>
<tr>
<td>Total</td>
<td>24.2</td>
<td>24.9</td>
<td>35.4</td>
<td>36.3</td>
<td>61.2</td>
</tr>
</tbody>
</table>

Source: Ministry of Shipping
Figure 1: Trends in Cargo at Major Ports
Annexure 5.2

Guidelines for Private Sector Participation in the Major Ports

1. The underlying objective of these guidelines is to improve port infrastructure to enable the handling of increasing volumes of foreign and coastal trade. Private participation is allowed in the following activities:
   - Leasing of port assets.
   - Construction/creation of additional assets, such as:
     a) Construction and operation of container terminals.
     b) Construction and operation of bulk, break bulk, multipurpose and specialized cargo berths.
     c) Warehousing, CFS, storage facilities and tank farms.
     d) Cranes/handling equipment.
     e) Setting up of captive power plants.
     f) Dry-docking and ship repair facilities.
   - Leasing of equipment for port handling and leasing of floating crafts from the private sector.
   - Pilotage.
   - Captive facilities for port-based industries.

2. Port Trusts are to identify specific projects for implementation through private participation, and to frame necessary regulations consistent with the Guidelines to facilitate private sector involvement. The Guidelines on privatization provide that foreign investors can also be considered if they obtain the necessary clearances and get registered, or undertake to do so as a Company under the Indian Companies Act.

3. The Guidelines further provide that the ports should ensure that private investment does not result in the creation of private monopolies, and that privatized facilities are available to all users on equal and competitive terms. However, in the case of berths constructed or taken on lease by private entrepreneurs, they would be permitted to give priority berthing to their own ships, and service other ships on a first-come, first-serve basis. The private entrepreneurs will be obliged to protect national interests; honor priority berthing orders of the central government; abide by the various statutory requirements on the protection of the environment such as anti-pollution measures, safety, and conservancy, and also abide by the directives issued by the government/port in this regard from time to time.

4. The Guidelines envisage private sector participation in the construction and operation of container terminals, cargo berths, warehousing, CFS, storage facilities and tank farms, as well as captive power plants for a period not exceeding 30 years on a BOT basis. The upper limit of 30 years duration gives enough liberty to the Board.

Policy Guidelines for Land Waterfront Management at Major Ports

5. This set of guidelines contain, inter alia, the following:
   - Wherever land has been leased on the basis of competitive bidding and when the lease period has been invariably indicated, no extension of lease should be considered.
   - The Port Trust land/waterfront should be generally leased out for port-related activities only on the basis of competitive bidding. As for non-port related activities, the proposals should be considered in accordance with the Master Plan and the Land Use Plan of the port and strictly on the basis of competitive bidding.
   - Wherever the lands have to be allotted for a commercial activity that is open to both public and private sectors, the PSUs may also be required to participate in the competitive bidding process. But wherever the activity is
restricted to the government sector, as in the case of the import of crude oil and certain petroleum products, the Port Trusts should consider the proposal either by calling for competitive bidding among the government oil companies, or by leasing the land on the advice of the Ministry of Petroleum and Natural Gas/OCC.

- There should be no automatic renewal in the lease deed.
- The lease rent shall bear an escalation @ 5 percent (compounded) per annum except for the properties of Mumbai Port Trust where a 4 percent escalation p.a. shall apply as per the compromise formula and in line with the decision of the Mumbai High Court.
- The Port Trusts should reaffix the base of lease rent every five years. The lessee should pay a premium equivalent to the minimum of one year’s lease rent to the port.
- The lessee should be required to obtain all statutory clearances.
- The lessee should follow all safety norms as specified by competent authorities.
- Proposals for allotment of land to religious institutions should not be entertained.
- Port land should not be leased to port employees for the construction of houses.

Guidelines for Private Sector Participation in Ports through Joint Ventures and Foreign Collaborations

6. The overall objective of this guideline is to permit joint ventures between major ports and foreign ports, between major ports and minor ports, and between major ports and companies. The main conditions for implementation are:

- The foreign port(s) may implement the scheme by promoting an Indian company in the form of Special Purpose Vehicle (SPV), without equity contribution from major port(s), or
- A Joint Venture Company (JVC) may be incorporated under the Indian Companies Act with equity participation from major port(s). Major ports will maintain the controlling stake in the JVC necessary for blocking a special resolution.

7. There can be no objection from the legal angle if any foreign port comes forward to promote an Indian company in the form of an SPV without equity contribution from the Port Trust. The Major Port Trusts Act does not prohibit a foreign port from undertaking the services through an Indian company formed for the purpose. Such a company will have to comply with the regulations applicable to foreign investments in infrastructure-related activities. JVCs under the Indian Companies Act with equity participation from Major Port Trusts cannot be set up under the Major Port Trusts Act as it stands now.
6. Urban Transport

Alok Bansal, Zhi Liu, Balakrishna Menon, Arun Mokashi, N. Ranganathan

1. This paper provides an overview of urban transport issues in India. Rather than covering every aspect of urban transport, it focuses on those areas that require significant efforts for policy and institutional reform. The paper first reviews the trends of urbanization and motorization that are changing the nature and magnitude of transport problems in Indian cities. This is followed by a critical assessment of institutional weaknesses that are responsible for many urban transport problems. Building on the current thinking of the government, the paper proposes short-term actions that aim to improve urban transport performance, especially bus transport; as well as medium-term actions that aim to address the fundamental weaknesses of urban transport institutional arrangements.

A. URBANIZATION

2. The Indian population is fast urbanizing. The urban population is expected to grow from the current level of 300 million to 410 million by 2010. The role of cities in the national economy has been growing in importance, as the share of urban GDP over the national total has grown from 50 percent in the early 1990s to 60 percent in 2000. However, urban growth is also accompanied by a shift of poverty concentration from rural to urban areas. Today, about 70 million urban residents, representing 23 percent of the total urban population, live below the national poverty line.

3. Urban transport is a crucial component of urban infrastructure. It provides access to opportunities, supports urban economic activities, and facilitates social interactions. Poor transport not only constrains urban economic growth, but also degrades quality of life—mainly through congestion, pollution, accidents, and community severance. The extent to which Indian cities contribute to macro-economic performance and poverty reduction will be closely linked to how efficiently their transport systems move people and goods upon which their socioeconomic activities depend.

4. Urban transport used to be a major concern only in a few of the largest cities such as Mumbai, Delhi, and Kolkata. This is no longer the case, as a number of cities have grown to the rank of a million-plus population. Among the largest are the three megacities, Mumbai (16.4 million), Kolkata (13.2 million) and Delhi (12.8 million). They are followed by Chennai, Bangalore, Hyderabad, Ahmedabad, Pune, Surat, Kanpur, Jaipur, Lucknow, and Nagpur, the population of which range from 2.1 million to 6.4 million; and 22 other metropolitan cities of more than one million population each.\(^5\) In addition, there are over 300 cities with a population between 100 thousand and one million, and over 3,400 cities between 5 thousand and 100 thousand. Given this wide spectrum of city size, it is impossible to make any simple generalization about urban transport issues in India.

5. Urban transport problems are inherently more complex in larger cities, especially in metropolitan cities with multiple jurisdiction. Because of their complexity, their solutions require detailed attention and micro-level management. The growing number of large cities and the resulting demand for new and improved urban transport services poses an increasingly tough challenge to many state governments, who have long assumed major responsibilities for urban transport infrastructure and service delivery. Also, a special challenge is faced by the large metropolitan cities where multiple jurisdiction makes it especially cumbersome to deal with the spillover effect of urban transport problems in an integrated manner.

B. MOTORIZATION IN CITIES AND ITS IMPACTS

6. Similar to experience elsewhere, urban transport problems in India are becoming acute mainly because of rapid motorization. The increasing use of motor vehicles in cities has been rapidly changing the mode-split structure. It has also helped alter land use patterns from compact to more dispersed, which in turn reinforces the use of personalized motor vehicles. At present, motor vehicle ownership in India, including two-wheelers and three-wheelers, is just a little over

\(^5\) Office of the Registrar General, India, *Census of India 2001* (Provisional)
40 vehicles per 1,000 population. This is low compared to high-income countries and some other developing countries, but its growth is rapidly gathering momentum. During the last decade, motor vehicle ownership in India has expanded at roughly 10 percent a year. But the growth in the 15 metropolitan cities registered over 15 percent a year during the same period, significantly higher than the national average. This growth pattern is expected to continue with the growth of per capita incomes, especially in urban areas. The growth will also be further reinforced by the central government policy of relying on a strong domestic auto market for the development of a viable auto industry.

Motorization has brought a higher level of mobility to the urban economy (mainly through intercity road transport), and to the high-income segments of the urban population. But its adverse impacts are also substantial—the most significant of these impacts being road congestion, air pollution, and traffic accidents. While these impacts are inherent to motorization, the excessively high level of impacts experienced in many Indian cities has a lot to do with the lack of effective public actions to mitigate them.

The urban transport scene in India is, typically, a high mix of noisy traffic comprising two-wheelers, three-wheelers, cars, buses and trucks, all fighting for road space. The streets in most Indian cities are old and narrow, occupying only 6-10 percent of land area. Growing traffic and limited road space have reduced peak-hour speeds to 5-10 km an hour in the central areas of many major cities. Severe traffic congestion is also evident in many smaller cities, especially on their central streets that are part of the national or state highways, where intercity traffic mixes with local traffic and commercial activities.

Traffic congestion is detrimental to the quality and efficiency of bus transport. In Mumbai, buses carry 59 percent of road-based person trips, but use only 5 percent of the road capacity. The remaining 95 percent is used by private vehicles, intermediate public transport (IPT) vehicles, and trucks. It is easy to foresee that increasing traffic congestion will seriously threaten the viability of bus operations if no public actions are taken to deal with congestion.

Despite the relatively low level of motorization, motor vehicle emissions already comprise a major source of air pollution in Indian cities: they are estimated to be responsible for 60 to 70 percent of the air pollution. Two-stroke engine vehicles, which constitute about 60 percent of the total vehicle population in India, are a major source of motor vehicle emissions. Nearly all three-wheelers and the majority of two-wheelers are equipped with a two-stroke engine. Two-wheelers and three-wheelers account for over 70 percent of the vehicle population in most large cities (Table 6.1). Despite the large number of high polluting vehicles on the roads, few cities have an effective inspection and maintenance program to detect illegal emission levels and to enforce standards. Most cities except the metropolitan cities still use leaded gasoline, which adds a particularly dangerous component to air pollution. In addition, motor vehicles, especially two-stroke engine vehicles,

Table 6.1: Share of 2-wheelers and 3-wheelers, 1997

<table>
<thead>
<tr>
<th>City</th>
<th>Motor vehicle population</th>
<th>2-wheeler</th>
<th>3-wheeler</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahmedabad</td>
<td>631,019</td>
<td>77%</td>
<td>7%</td>
</tr>
<tr>
<td>Bangalore</td>
<td>972,375</td>
<td>73%</td>
<td>6%</td>
</tr>
<tr>
<td>Kolkata</td>
<td>587,576</td>
<td>44%</td>
<td>2%</td>
</tr>
<tr>
<td>Delhi</td>
<td>2,847,695</td>
<td>66%</td>
<td>3%</td>
</tr>
<tr>
<td>Cochin</td>
<td>226,185</td>
<td>60%</td>
<td>13%</td>
</tr>
<tr>
<td>Mumbai</td>
<td>796,913</td>
<td>41%</td>
<td>12%</td>
</tr>
<tr>
<td>Hyderabad</td>
<td>769,401</td>
<td>87%</td>
<td>7%</td>
</tr>
<tr>
<td>Jaipur</td>
<td>448,625</td>
<td>74%</td>
<td>2%</td>
</tr>
<tr>
<td>Kanpur</td>
<td>246,801</td>
<td>79%</td>
<td>2%</td>
</tr>
<tr>
<td>Lucknow</td>
<td>330,753</td>
<td>80%</td>
<td>3%</td>
</tr>
<tr>
<td>Chennai</td>
<td>889,819</td>
<td>73%</td>
<td>4%</td>
</tr>
<tr>
<td>Nagpur</td>
<td>238,576</td>
<td>78%</td>
<td>6%</td>
</tr>
<tr>
<td>Patna</td>
<td>219,513</td>
<td>69%</td>
<td>5%</td>
</tr>
<tr>
<td>Pune</td>
<td>476,372</td>
<td>74%</td>
<td>8%</td>
</tr>
<tr>
<td>Surat</td>
<td>361,838</td>
<td>85%</td>
<td>5%</td>
</tr>
</tbody>
</table>


This comparison should be interpreted with caution. Two-wheelers and three-wheelers account for a significant share (about 60 percent) of the motor vehicle fleet in India, while 4+ wheel vehicles dominate the motor vehicle fleet in developed countries. Typically, the share of 4+ wheel vehicles in the vehicle population increases with per capita income.

Motor Transport Statistics, various years, MOST.

Transport surveys conducted by RITES for a number of Indian cities. For details, see RITES, Traffic and Transportation Policies and Strategies in Urban Areas in India, Report prepared for MOUD, 1998.

generate intolerable noise levels. Motor vehicle pollution affects the health of all income groups, but its impact on the poor is likely to be more severe as they are the least protected and the more frequently exposed to the hazards of pollution.

11. Indian cities face a growing risk of traffic accidents, and are considered to be more accident-prone in spite of a relatively low level of vehicle population. In 1997, the latest year with available statistics, the number of accidents in 15 metropolitan cities was 75,605 with 6,242 fatalities. In the same year, the Delhi metropolitan region, where motor vehicle ownership reached 2.8 million, recorded over 11,000 traffic accidents, 24 percent of which were fatal. Because there is little provision of transport facilities to separate the motor vehicle traffic from rickshaws, bicycles and pedestrians, non-motorized vehicles and pedestrians face a higher risk of traffic accidents. According to recent statistics, only 5 percent of those killed were in vehicles; the rest were pedestrians and cyclists. This is alarming, given the large volumes of pedestrians and non-motorized vehicle traffic in Indian cities. Nearly 30-40 percent of person trips in most cities is made on foot. Person trips by non-motorized transport (NMT) account for 10 percent of the non-walking journeys in Delhi, 24 percent in Ahmedabad, 24 percent in Chennai, 33 percent in Hyderabad, and 55 percent in Lucknow. The accident risk endangers and displaces both pedestrians and NMT. Again, the urban poor, who are more likely to travel on foot than the non-poor, probably face higher traffic accident risks.

C. Institutional Arrangements

12. Road congestion, vehicle emissions, and traffic accidents are inherent to the increasing use of motor vehicles. At the national level, there is no lack of technical knowledge and technical advice for solutions to these problems. Many urban transport experts in India are familiar with successful experiences around the world, and aware of a wide range of policy and technological options. Some successful experiences in mitigating the adverse impacts of motorization have also emerged from a few Indian cities in recent years. But most Indian cities have failed to effectively address these problems because they are not equipped with the appropriate institutional capacity and the needed financial resources. The following institutional weaknesses prevent authorities from translating knowledge into actions:

- Fragmented functional responsibilities for urban transport among central, state, and local authorities, without one in charge of overall coordination and outcomes.
- Lack of technical capacities for urban transport management, especially at the local level.
- Lack of financial resources at the state and local levels for funding urban transport infrastructure investments and maintenance, combined with insufficient attention to cost recovery and user charges.
- Absence of enabling policy, regulatory and financial frameworks for private sector participation in a range of urban transport operations and infrastructure financing.

13. The functional fragmentation of responsibilities among central, state and local authorities for policy, planning, investment, operations and maintenance, and management of urban transport-related infrastructure and services, can be illustrated by the allocation of responsibilities among agencies typically found in large cities (Table 6.2). The complexity of urban transport institutions is further illustrated by the example of Mumbai Metropolitan Region (MMR) (see Box 6.1).

14. Not only is the central government involved in the policy aspect, it is also directly involved in the provision of suburban rail service through IR in a few cities—Mumbai, Kolkata, Delhi, and Chennai. Moreover, MORTH and NHAI are responsible for the national highways, including the stretches within the urban areas, and local governments have no role in the operations and management of these national highway projects.

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58 India is phasing out leaded gasoline, and aims to complete the phase-out in 2 years
61 Suburban railways was the exclusive responsibility of IR till the establishment of the Mumbai Rail Vikas Corporation (MRVC), which was created and owned by both IR and the State Government of Maharashtra for the planning and implementation of the rail component under the proposed Mumbai Urban Transport Project (MUTP). Eventually, MRVC will be responsible for operating and managing suburban rail services in the Mumbai Metropolitan Region (MMR)
Table 6.2: Urban Transport Institutions and their Responsibilities

<table>
<thead>
<tr>
<th>Policy</th>
<th>Central</th>
<th>State</th>
<th>Local</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport planning</td>
<td>MOUD</td>
<td>UDD (P)</td>
<td>MC</td>
</tr>
<tr>
<td>Land use planning</td>
<td>MORTH, NHAI</td>
<td>UDD</td>
<td>DA (P)</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>PWD (P)</td>
<td>DA (P)</td>
<td>MC</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>MORTH, NHAI</td>
<td>PWD</td>
<td>MC  (P)</td>
</tr>
<tr>
<td>Suburban rail</td>
<td>Indian Railways</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bus transport planning</td>
<td>SRTC</td>
<td>MC, Bus Corp, (P)</td>
<td></td>
</tr>
<tr>
<td>Bus service operations</td>
<td>SRTC</td>
<td>Bus Corp (P)</td>
<td></td>
</tr>
<tr>
<td>Bus terminal &amp; depot operations</td>
<td>MORTH</td>
<td>STA (P)</td>
<td></td>
</tr>
<tr>
<td>Bus regulations and licensing</td>
<td>MORTH</td>
<td>STA</td>
<td></td>
</tr>
<tr>
<td>Traffic management</td>
<td>Police (P)</td>
<td>MC</td>
<td></td>
</tr>
<tr>
<td>Traffic engineering</td>
<td>Police</td>
<td>MC  (P)</td>
<td></td>
</tr>
<tr>
<td>Traffic enforcement</td>
<td>Police</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor vehicle registration</td>
<td>STA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor vehicle safety and emission regulations</td>
<td>STA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Acronyms**

- DA: Development Authority, which is UDD's line agency at the local level
- MC: Municipal Corporation
- MORTH: Ministry of Road Transport and Highways
- MOUD: Ministry of Urban Development
- NHAI: National Highways Authority of India
- PWD: Public Works Department
- SRTC: State Road Transport Corporation
- STA: State Transport Authority
- UDD: Urban Development Department

Note: (P) denotes primary responsibility.

- Stretches though they are heavily used for urban transport.
- According to the allocation of Business Rules, the Ministry of Urban Development (MOUD) is the nodal ministry for the policy and coordination of matters related to urban transport. But MOUD has little leverage to influence policy making at the state and local levels.

15. The state governments are the major players in urban transport for most cities. Most urban local bodies (ULBs) rely heavily on capital grants and inter-governmental transfer from the states for almost all urban transport infrastructure capital expenditures, and a significant portion of recurrent expenditures. Moreover, the state governments are heavily involved in urban transport policy, planning, capital investments, and even the operations of major services through state-level departments (such as PWD), corporations (such as SRTC), and specialized agencies (such as DA and STA). The dominant role of the states in urban transport has a lot to do with the inter-governmental relations that give state governments wide powers of administrative and financial control over municipal bodies. These relations have substantially weakened India’s municipal finance: they essentially de-link financial sources from benefit areas, and provide little incentive for municipalities to develop their own institutional and financial capacities to address urban infrastructure issues.

16. Except for a few large municipalities, local governments are generally weak players in urban transport. The local governments' primary responsibilities are in the operations and maintenance of urban transport infrastructure, including the maintenance of urban roads and the enforcement of traffic rules. The development authority is a locally based line agency of the state Urban Development Department (UDD). It is responsible for the master planning of the city, zoning, and land use decisions. Many development authorities have, however, expanded their responsibilities to take on housing construction as well as construction of roads and other infrastructure facilities in new development areas. This leads to a number of institutional obstacles to maintenance and accountability. It would be more efficient if the roads in new development areas were constructed and maintained by the municipal agency right from the start.

17. It is not uncommon, in different parts of the world, to find many government agencies involved in urban transport. The central issue in India, as in many other countries, is that the responsibilities assigned to different agencies are, overall, not responsive to the cities' demand. Although public agencies are together responsible for nearly all aspects of urban transport—including planning, financing, construction, operation, and regulation—as individual agencies, they operate only on the basis of departmental priorities and procedures rather than the city's needs. There is no one agency in charge of the overall outcomes and of multi-agency coordination.

18. There is a pronounced separation between infrastructure investment and its operations and maintenance in terms of functional responsibilities. For most cities, large-scale capital investments are made by
Box 6.1: Urban Transport Institutions in the Mumbai Metropolitan Region (MMR)

The existing transport planning and management structure in the MMR comprises numerous public agencies and corporate bodies independent of one another, and by large, acting according to their own policies and plans. There is no single authority to ensure complete coordination. Responsibilities for the general direction of urban development and urban transport rest with the State Government of Maharashtra through the Mumbai Metropolitan Region Development Authority (MMRDA), a regional agency under the State Department of Urban Development. While an agency like MMRDA is generally required for planning and coordinating land use and transport development in a metropolitan area, MMRDA has little influence on the planning and provision of suburban rail services, which rest with IR. The allocation of resources for rail services is subject to the approval of the Central Planning Commission. The suburban rail services are run by two zonal railways, Western Railways and Central Railways, which operate within the MMR as independent agencies with separate lines, separate policies, and without significant service integration. Each of these two railway organizations has different ideas about the limits of their responsibilities and their resolution. Road planning and construction is the responsibility of the State Public Works Department, while maintenance rests with the Municipal Corporation of Mumbai. The planning and implementation of traffic management schemes is a responsibility of the Municipal Corporation, but it has little technical capacity for this increasingly important task. All these institutional arrangements have seriously limited the demand-responsiveness of public agencies, which holds the key to the functioning of an urban transport system.


D. Urban Transport Funding

21. Urban infrastructure development in India is primarily funded by budgetary support from the central and state governments, and to a much lower and even negligible extent, local governments, through their Five-Year Plans. These resources are supplemented with funds from the Life Insurance Corporation of India (LIC), Urban Infrastructure Development Corporations (UIDCs), and multilateral and bilateral financing agencies. The funds come through the government as grants or loans according to a predetermined formula. Direct central funding is primarily for large projects such as mass transit for large cities. The Five-Year Plans have produced various centrally sponsored schemes implemented by a separate agency or organization at the state and local levels. At the state level, funds are mobilized through budget subventions, borrowings (from internal and external sources), and through agencies such as state UIDCs, which raise funds with state government guarantees. Private sector entry in urban transport infrastructure financing has been discouraged by the lack of clear policy support and a regulatory environment, as well as by the long gestation period and massive size of capital investments.

22. The Rakesh Mohan Committee Infrastructure Report (1996) projected the investment requirement for the development, operation and maintenance of urban
Box 6.2: Inconsistency in Land Use Planning and Transport Planning

In Bangalore, India, land use regulations enforced by the urban development authority prevent the densification and the creation of new office space in the city center. However, the state government is planning a major investment in a light rail transport system, the construction of which depends on the creation of new jobs in the current central business district and therefore on the building of new office space. Simultaneously, new technological parks are built in distant suburban areas (outside of range of the light rail lines) to try to create enclaves of adequate infrastructure and services while the city center infrastructure is left to deteriorate. The Bangalore Revised Comprehensive Development Plan 2000 plans for 3 concentric ring roads, which would further contribute to the dispersion of population and main industrial inconsistency between different projects. This implies that the appraisal of either is dependent on the strategic priority given to the other.


infrastructure (including water supply, sanitation, solid waste disposal, roads and streets lighting), over the 10-year period 1996-2005, at Rs 2,804 billion. This translates into Rs 930 per urban resident per year. The projected availability of funds going by the present pattern is Rs 1,558 billion, or Rs 516 per urban resident per year. To clear all maintenance backlogs and to meet new capital investment, the report noted that investments in urban infrastructure would have to be increased by at least 30 percent per annum. Obviously, the investment need far exceeds the funding capacity of the government.

23. The ULBs are empowered by the 74th Amendment of the Indian Constitution to take responsibility for urban transport. But most ULBs do not have adequate capacity to finance urban infrastructure. Their revenues comprise mainly inter-governmental transfer from the state (about 50 percent of total ULB revenues); property tax revenues (typically somewhere around 45 percent); or octroi (only in a few states).62 Most of the time, ULB revenues are barely sufficient for salaries and recurrent expenditures, and most capital investments are funded through borrowing, often from the state UIDCs. Revenues from user charges imposed on publicly provided infrastructure services are minimal. The principal revenue sources from transport include one-time motor vehicle registration charges, road taxes, fuel levies, public transport fares, parking fees, and tolls—but all these constitute only a small fraction of public expenditure on urban transport.

24. The 74th Amendment envisages administrative and fiscal decentralization to the local government level. Despite the landmark constitutional amendment, the progress of devolution has been slow. Part of the problem is the devolution of responsibilities from the central government to local governments without the latter being provided adequate funding capacity—either through satisfactory inter-governmental transfer arrangements, or the authority to raise additional tax revenues. As almost all the states are currently in fiscal difficulties, and some even in fiscal crisis, urban transport financing has also got caught up in the morass of state fiscal difficulties and the lack of municipal capacity to generate own revenues. With fiscal policy issues unresolved at the state level, it is not entirely clear in which direction municipal financial reform should head. As long as this situation continues, most cities will not be able to finance major urban transport infrastructure.

E. PUBLIC TRANSPORT OPERATIONS

25. Public transport is the backbone of urban transport in India. Bus transit prevails in most metropolitan cities, except a few where it has never developed into a significant mode (e.g. Lucknow where the share of person trips by public transit is less than 5 percent). In the largest metropolitan cities, suburban rail plays a significant role. In almost all cities, IPT provides a viable supplement to bus and suburban rail.

26. Despite its important role, the public transport sector is facing a number of operational problems. Some of these problems are due to external factors. For example, road congestion is degrading the quality of bus services. Squatter settlements near the suburban rail right-of-way seriously hamper the normal operations of suburban rail services, as is the case in Mumbai. The higher air quality standards adopted at the local level force bus operators to replace their highly polluting diesel buses with more environment-friendly buses (such as CNG-fueled buses), and this means additional financial burden

62 Octroi is still a major source of revenue for some ULBs in Gujarat, Maharashtra, and Manipur, and for most ULBs in Orissa and Punjab.
for the operators. Yet most of the operational problems are caused by mismanagement of the sector (Box 6.3).

27. Bus operations are undertaken by a combination of public and private operators, with variations by city. Bus terminals and depots are for the most part provided by the state and local agencies (intra-city terminals by local agencies and intercity terminals by state transport agencies). Services are provided by both public and private operators. The private sector is increasingly active in providing bus services in many cities. But the fear that the private sector might exploit monopolistic power, and deprive vulnerable groups and the urban poor of their right to mobility, has forced many state-owned agencies (such as SRTC) and local bus corporations to maintain their hold on public transport in spite of their inherent inefficiencies.

28. Except for the few largest metropolitan regions, bus operations are regulated by the state transport authorities (STAs), which have few skills or capacities in dealing with the intricacies of urban bus operations. Fares are typically set at the state level, mostly on an ad hoc and political basis not commensurate with principles of pricing, cost recovery or affordability. Under political influence, the state governments are often forced to keep bus fares at affordable prices, and this seriously undermines the financial viability of bus operations.

29. There are more localized regulatory and political factors that impact bus operations. The complexity of these problems is best illustrated by the case of Delhi, where bus services are provided by a mix of state-operated, private-contracted, private-licensed, and illegal operators. STA sets all private and public bus fares, issues permits for private buses and minibuses, enforces bus and service standards, and sometimes intervenes to change the bus routes originally planned by the state-owned operator Delhi Transport Corporation (DTC). DTC operates 3,200 buses from its own fleet. It also contracts around 2,600 buses from the private operators, who provide vehicles, drivers and fuel under the contract. DTC provides conductors to ensure revenue collection and full route running, and carries out scheduling, administration and marketing. These contracted private operators are guaranteed a minimum of 225 km per day. In addition to several thousand licensed private operators, there are around 1,500 buses operating illegally.

30. Private buses operate commercially and so receive no subsidies. In contrast, DTC makes large

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**Box 6.3: Public Transport in the Mumbai Metropolitan Region (MMR)**

Public transport plays a dominant role in MMR. The suburban rail services carry a total of almost 6 million passengers per day. The bus services within Mumbai Municipality are exclusively provided by a self-accounting municipal company, BEST (which also runs an electricity supply business). BEST carries over 4.5 million passengers per day, 65 percent of whom make a transfer to rail. Taken together, rail and bus services carry 88 percent of the region’s motorized personal trips.

Despite its crucial role, public transport in Mumbai faces formidable problems:

- Passengers of trains as well as buses suffer from overcrowding. Rail passenger congestion is at crisis level.
- The squatter settlement development near and on the rail right-of-way seriously reduces train speeds, increases commuter time, stress and tension, and hampers track maintenance work.
- With growing car ownership, road congestion seriously degrades the quality of bus operations.
- Financially, both suburban rail services and BEST bus services are unable to achieve full cost recovery despite overcrowding. The rail services still require financial support for capital investment. This is partly due to the fact that suburban rail fares in Mumbai are among the lowest in the world on a passenger-km basis. BEST’s bus operating costs cannot be covered by fare revenues; its cost recovery ratio is about 90 percent. Its capital investment and operating deficits are funded through cross-subsidization from its moneymaking electricity supply business. With staff-bus ratio at 10, labor costs comprise a big contributing factor to the high operating costs. With the state government policy allowing the entry of the private sector in electricity supply, there will be increasing pressure to unbundle or privatize the BEST electricity business. Obviously, there is a need to look for alternate strategies to finance bus operations and services in the medium to long term.

*Source: World Bank project documents for the Mumbai Urban Transport Project*

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losses, mainly due to uneconomic fare levels, surplus staff and the large number of concessions and free passes. Table 6.3 presents a comparison of operating statistics between DTC and private buses.

Table 6.3: Comparable Performance of DTC and Private Buses

<table>
<thead>
<tr>
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<tr>
<td>Fleet utilization (%)</td>
<td>82.6</td>
<td>93</td>
</tr>
<tr>
<td>Vehicle utilization (km/bus/day)</td>
<td>216</td>
<td>246</td>
</tr>
<tr>
<td>Passengers/bus/day</td>
<td>751</td>
<td>1584</td>
</tr>
<tr>
<td>Dead km/day</td>
<td>107</td>
<td>4</td>
</tr>
<tr>
<td>Staff/bus</td>
<td>9.56</td>
<td>4.6</td>
</tr>
<tr>
<td>Fuel efficiency (km/liter)</td>
<td>3.8</td>
<td>3</td>
</tr>
<tr>
<td>Income/bus/day (Rs)</td>
<td>1321</td>
<td>2700</td>
</tr>
<tr>
<td>Income/km (Rs)</td>
<td>6.12</td>
<td>10.97</td>
</tr>
<tr>
<td>Total cost/km (Rs)</td>
<td>17.15</td>
<td>7.73</td>
</tr>
<tr>
<td>Net earning/km (Rs)</td>
<td>-11.03</td>
<td>3.24</td>
</tr>
</tbody>
</table>


31. There is more to be learned from the reform experience of public transport in Delhi, which has undergone a major change in recent years. In 1992, Delhi became the first Indian city to liberalize the city bus market for the entry of private operators. About 3,000 carriage permits were issued to bus owners with 5 or less vehicles. The city routes were opened for private operations on a 60:40 split in favor of DTC. However, the overall quality of city bus services worsened almost immediately. The reason for this is best summarized by Marwah et al (2001): “Since licenses were given on the basis of political connections and graft, little or no regulatory control was exercised and soon enough the operators became an organized vested interest standing in the way of any change for better service.” Private operators developed fierce driving tactics to compete with DTC for passengers. This not only caused mounting revenue losses for DTC, but it also led to a dramatic increase in accidents. The DTC bus fleet fell from around 3,000 to around 600, and its market share shrank to only 14 percent. The combined size of the city bus fleet fell to 4,500—an all-time low. The situation improved in 1996 when the ownership of DTC was transferred from the national to the local government, and STA tightened the enforcement of vehicle maintenance checks on private buses. However, DTC continues to face financial problems arising from low fares and high operating inefficiencies.

32. It is believed that public transport operations in Indian cities can be changed for the better by improving the enforcement of regulations and the operating efficiency of public enterprises. However, the central question is whether these measures will lead to a long term solution to the problems of public transport. The key to a long term solution is in finding the right mix of competition and regulation. Are there any other options that would better promote and manage competition? Indian cities are still learning how to manage private bus operations. As demonstrated by the Delhi experience, the outcomes with private bus operations have been mixed, and in some cases negative, due to the limits imposed on fares and the absence of satisfactory enforcement of regulations that ensure regular service and safe operations. Given the political culture of Indian cities, any effort to improve regulations without improving enforcement is just a waste of time. Many small private bus operators compete by ignoring the regulations or using bribery of enforcement officers. The enforcement problem is often related to the broader urban governance issue, and may not be effectively addressed by the transport sector alone. In view of such concerns, some city managers seek to facilitate the establishment of a private bus joint venture between a local operator and a nationally respected company with a certain interest in local public transport (such as a bus-manufacturing firm). This option has its appeal, but it is not clear how competition will be promoted under such an arrangement.

F. THE STRATEGIC THINKING OF THE CENTRAL GOVERNMENT

33. Over the last two decades, the strategic thinking for urban transport development and management by the central government has been evolving, but has also remained quite consistent. In 1978, the central government established the National Transport Policy Committee (NTPC) to review and recommend policies for the development of the national transport system, including urban transport (see Box 4). However, these recommendations have not been translated into real actions or real outcomes in most Indian cities. The failure could be explained by various reasons. For example, spatial decentralization was favored by the central government partly because of a lack of understanding of the role of urban agglomeration in the national economy, and partly because of a lack of effective means to deal with the negative externalities associated with urban growth. In fact, the spatial decentralization approach has not been successful in India or elsewhere. The NTPC recommendations rightly
Planning for spatial decentralization. Appropriate planning is required to develop new urban centers with employment opportunities, housing and other civic amenities, so migration to existing urban agglomerations is discouraged.

Giving priority to bus transport. Bus transport should be the principal urban mode. Priority should be given to strengthen and optimize bus services, and every effort should be made to divert traffic from personalized modes to the public transport system.

More policy attention to intermediate public transport. IPT was recognized as an important supplement to public transport.

Improving traffic management. Traffic management priority should be given to pedestrians, cyclists and public transport.

A strengthening central institution to ensure the quality of transport/land use studies. A suitable organization should be established at the center to supervise and monitor the transport/land use studies for various cities.

A single transport authority for overall coordination. The authority should be set up as part of the regional development authority in the metropolitan cities for overall charge of all modes of transport including the rapid rail transit system. At the operational level, these regional authorities could appoint separate boards for separate modes or activities.


emphasized public transport and traffic management, but there was lack of dissemination from the center to the cities. There was no line ministry in charge of urban transport matters at the time when NTPC made its recommendations. Finally, the fragmented institutional arrangements at the local level prevented cities from implementing most of the recommendations.

34. A 1998 report prepared by RITES and endorsed by MOUD reflects much of the current strategic thinking of the central government on urban transport issues. The report reviewed urban transport problems in the light of rapid urbanization and motorization trends, and made a number of policy recommendations in the spirit of the 74th Amendment to the Indian Constitution. The following paragraphs highlight the key recommendations.

35. Institutional: Among the center, state and the city, the city should have the major responsibility to plan, finance, improve, regulate and operate all components of urban transport consistent with the land use plan of the city. Each city with a million-plus population should have a Unified Metropolitan Transport Authority (UMTA) to assist in this respect. UMTA will act as "client" on behalf of the city in all matters concerning urban transport. All funds of all components of urban transport need to be routed through it (see Box 5 for details of the proposed Delhi UMTA Bill). For cities with a population of less than one million, a Transport Planning Unit (TPU) should be created under the Planning/Development Authorities. In addition, all cities should create a Traffic Engineering Cell in local bodies to prepare and implement transport system management measures.

36. Financial: Each state should initiate a non-lapsable Urban Transport Fund, making funds available to UMTAs to finance mass transit facilities and capital-intensive infrastructure facilities, or to service loans taken for such purposes. The accruals from dedicated levies from user/non-user beneficiaries in the concerned cities need to be directly credited to this fund. The levies may include the following: (i) enhanced property tax; (ii) property transaction surcharge; (iii) a cess on petroleum oils sold in cities; (iv) surcharge on sales tax on tires, tubes and motor parts; (v) a levy of one to 2 percent of wage bill of industrial and commercial establishments employing over 50 persons; (vi) development levy on properties falling on a corridor extending for one km on either side of proposed busways, light rail transit (LRT), metros etc.;

In fact, the transfer of urban transport matters to the Urban Development Ministry was a part of the actions taken on NTPC recommendation (RITES, Traffic and Transportation Policies and Strategies in Urban Areas in India, Report prepared for MOUD, 1998, pp. 2-4).

RITES, Traffic and Transportation Policies and Strategies in Urban Areas in India, 1998. The desire for spatial decentralization was repeated in this report as an urbanization policy recommendation.

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Box 6.5: The Proposed Delhi Unified Metropolitan Transport Authority (DUMTA) Bill

The Delhi Unified Metropolitan Transport Authority (DUMTA) Bill is currently under consideration by GOI. The Bill envisages setting up a unified institutional framework to plan and coordinate the Delhi transport system. It provides for the constitution of an Authority with the Lt. Governor of Delhi as its Chairman, and 5 full-time functional members who are professionals with knowledge and experience in the areas of urban transport planning, technology, economics and finance, HR development and law.

The main functions of DUMTA include the following:

- Advise the Delhi Government in the formulation of policies for Delhi transport system planning, development operation and management.
- Plan the Delhi transport system so as to ensure integration between land use and transport system, and integration among the sub-modes of the transport system.
- Select an optimal mix of public mass transport system technologies for Delhi and plan for their development and operation.
- Mobilize resources, both land and capital, from various sources, and allocate resources to the various component sub-systems in a rational and transparent manner.

The Bill clearly distinguishes between policy and planning on the one hand, and system operations on the other. DUMTA will be responsible for policies and planning. System operations will be the responsibility of the concerned agency/company, which is independent in its day-to-day management. Moreover, the Bill makes a provision for setting up a User's Committee independent of DUMTA, to monitor the performance of DUMTA and provide a forum for the users and the general public. The Committee will report to the Government of Delhi.

(vii) increase in registration charges and road tax on vehicles except buses and IPT; and (viii) a surcharge of passenger fares.

37. Land use/transport planning: For all cities with a population of one million and above, it should be made mandatory that land use transport integrated models be developed and different alternatives tested before the Master Plans are developed based on this interaction. (This has, for instance, been done recently for Chennai.) For cities with a smaller population, this procedure may be expensive and time consuming. In such cases, land use planning can be done on the basis of basic localized trend studies, travel desires and available and affordable transport facilities, and after studying the interaction between the two, by using simpler generalized approaches. Moreover, transport strategies in cities should be based on minimum investment needs, and intensive use of the infrastructure available, utilizing low and medium-cost methods; and, at the same time, planning for the development of long term transport projects such as high capacity rail corridors on a continuing basis, when the city's population approaches or crosses the population level of 2 million.

38. Public transport: Bus services should be privatized to the extent possible, especially while expanding facilities, so that liability in this respect is reduced, and the funds which would otherwise have been used in running such services can be used for infrastructure development. Cities with a population less than one million should preferably have 100 percent private bus operation. Cities with a population more than one million should have an urban bus transport corporation that owns 30 percent of its own buses, and contracts 70 percent of buses from private contractors and operators. The fare structure of the bus and intra-urban/suburban trains should be made compatible with each other in cities where both transport systems are available, so that these services can be integrated. This will require a revision of IR policy so that a separate city-specific suburban rail fare structure can be evolved.

39. Intermediate public transport: The role of IPT should be to provide a convenient and comfortable alternative to the use of personalized transport to work and education centers. This can be done by the introduction of shared IPT, i.e. taxis, autos, and vans plying on point-to-point or fixed route and

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*The RITES report proposed a 70 percent share of private operations as a "desired" minimum level of private participation, without specifying why this was desirable. Despite its apparently arbitrary choice, the suggested 70 percent private participation could be a useful target for large cities, where the public sector still plays a significant role in providing bus services urbanization policy recommendation."
pickup/dropping points. IPT should also be encouraged to act as feeder service for public transport, and not in competition with it.

40. Non-motorized transport: Pedestrian and cycle facilities should be provided and maintained at adequate standards. All arterial/sub-arterial roads should be provided with footpaths as recommended by the Indian Roads Congress. Cycle tracks or lanes should be given priority in all small and medium-sized cities, and on the major city corridors with over 10 percent share of cycle traffic.

41. The preceding recommendations are broadly in line with the principles of public policy for urban transport development and management adopted in many parts of the world. While they point to some useful directions for urban transport policy and institutional reform, the question that remains is how to effectively implement the recommended actions at the state and local level. Unfortunately, the RITES report has not been widely circulated, and it is highly likely that most cities are not even aware of it. All the same, MOUD has adopted several of the key recommendations as policy, and it has been granting aid to cities that are ready to follow the policy.

G. DEVELOPING ACTION PLANS TO GET THE FUNDAMENTALS RIGHT

42. The major challenge for urban transport agencies in India is how to improve the urban transport situation, or at least prevent the situation from worsening, while at the same time developing the much needed institutional, financial, and technical capabilities to address the more fundamental issues. There are a number of actions that cities should take in the short to medium term. Improving bus operations, implementing traffic management, and controlling motor vehicle pollution are obviously among the short term actions. In the medium term, strategies are needed to reform urban transport institutions and to boost resources for urban transport. Cities should move from being providers of transport infrastructure and services to facilitators, and promote competition and private sector participation in the provision of services and facilities. The most important first step for local governments is to develop a time-bound action plan based on a shared strategic vision for urban transport and socially accepted principles for policy. The central government strategy regarding institutional and financial aspects should provide a good basis for the action plans.

THE ROLE OF THE CENTRAL GOVERNMENT

43. As a point of departure, it is important for the central government to refine and disseminate MOUD policy recommendations through the publication of policy guidelines, workshops for knowledge sharing, and perhaps financial support for pilot reform programs in selected cities.

44. Many policy makers and urban transport experts in India consider the formulation of a National Urban Transport Policy to be essential in the Indian context, because such a policy would have ramifications for both institutional framework and financing responsibilities. It is suggested that the policy should clarify responsibilities for urban transport policy making, planning, investment, operations and maintenance, and day-to-day management. The policy should also outline the broad policy framework for financing and operations of urban transport infrastructure and services. The RITES report should provide a good basis for the policy, but successful international experiences should be given more attention, and if possible, introduced. The institutional framework must be clear about the allocation of strategic functions, and for this particular matter, there is a good model to follow (see Box 6.6).

THE ROLE OF THE STATE

45. The states need to recognize that in principle, urban transport is a local subject, and hence the long-term responsibility for urban transport planning, financing, and operations lies with the ULBs. The long term role of the state lies in strengthening the ULBs to achieve the required capacities for doing this. However, it is unrealistic to expect that most ULBs are in a position to assume the major responsibility for financing urban transport in the short to medium term. Thus state funding of specific infrastructure and services is expected to continue for the foreseeable future, but the funding should be gradually reduced in line with the growth of local financial capacity. It is also important that devolution of state funds to local governments for capital improvement programs be tied to improvements in institutional and financial capacities, as well as to commensurate matching contributions from the local government.

46. Linking to the future role of the state, it should also be recognized that many ULBs possess good potential to improve their municipal revenues by reforming the current revenue sources, as well as by
improving their collection efficiency. Tremendous scope exists for enhancing municipal revenues by reforming property tax administration, cost recovery for services, and introducing better targeted user fees (such as parking fees).

**BUS TRANSPORT**

47. Improving public transport operations is essential in the short term to prevent the further deterioration of urban transport problems. Much can be achieved, for example, by introducing competition (including competition for the market), allowing more flexibility on fares, and enhancing safety and environmental regulations. Opportunities also exist for a marked improvement in publicly operated bus services if the public operators are made accountable and subject to market competition. To achieve all these, however, a policy framework that specifies the role of the market and the government is essential to deal with the problems associated with the public provision of bus services. Under the policy framework, the local governments should work out a reform action plan for bus transport.

48. The current role of specific government agencies as both regulator and provider will need to be re-examined, in the light of the unfair competition that may prevail under such circumstances, and in the light of the excellent scope for private sector participation in financing and management of all aspects of bus service provision in metropolitan cities.

49. Bus operations are local matters, and relevant agencies at the local level must be equipped with the required capacities for regulating and planning public transport. There is also a need to put in place transparent and independent fare-setting mechanisms that will ensure the financial sustainability of such operations. In this context, the current practice of RTAs serving as the nodal agency to regulate bus services in most cities needs to be re-examined, since there is a need for greater integration between transport planning and traffic management, and public transport operations at the local level.

**TRAFFIC MANAGEMENT**

50. The need for traffic management is eminent in Indian cities. International experiences demonstrate that...
prudent traffic management schemes can improve traffic efficiency by up to 45 percent. As an alternative to creating more physical capacity through major investment in urban transport infrastructure, many cities in India have made modest attempts to make more effective use of existing road capacity through traffic engineering techniques. Some cities have attempted to translate these techniques into traffic management schemes to reduce demand (e.g. banning of goods vehicles, one-way streets), or to give priority to moving people rather than vehicles by providing facilities for high-occupancy vehicles such as buses. Unlike traffic management measures, which seek to manage existing traffic flows more effectively, traffic restraint measures seek to discourage the use of cars so that other road users, especially public transport, pedestrians, and goods vehicles, may benefit. The main restraint measures in use in Indian cities are parking controls. However, no attempts have so far been made to introduce area-licensing schemes in any city.

51. Indian cities should step up their effort at traffic management. The ULBs should be encouraged to set up traffic engineering and management units with defined functional responsibilities, and with the participation of traffic planners, engineers, and the traffic police. Primarily, these units should prepare traffic management schemes, implement them, monitor performance, and make improvements on a day-to-day basis. A major constraint for the establishment of such a permanent traffic management unit is the freeze on hiring adopted by many municipal governments undergoing fiscal stress. But this can be overcome by contracting out the planning and engineering design work to the private sector.

52. Regulating traffic or parking requires that effective enforcement be taken against violations. Most cities in India depend on their police to take action against traffic offences. The police in the large metropolitan cities are always overworked due to increasing crime. Traffic offences are low on their priority list and tend to get neglected. A more effective alternative may be for the traffic agency to be also responsible for enforcement. The agency would have a higher incentive to aspire to stricter standards; besides, the fine amount collected could get ploughed back into the transport fund.

**Motor Vehicle Pollution Control**

53. With motorization still at an early stage, there are opportunities to introduce pro-environment policies with some initial cost but with relatively high long term benefits. As international experience shows, motor vehicle pollution control strategies can be very effective. These include policies on cleaner fuels (in particular, a move to unleaded gasoline), and mandates on motor vehicle emissions. In the short term, the main target should be two-stroke engine vehicles (see Box 6.7 for options).

54. In recent years, India has witnessed some encouraging progress in controlling motor vehicle pollution. Emission control regulations have been tightened. Some major cities are improving their monitoring and enforcement programs. Delhi has provided financial incentives to owners to replace old polluting three-wheelers with new, less polluting ones (Masami et al, 2000). More recently, Delhi has mandated that all passenger vehicles for commercial purposes (buses, taxicabs, and three-wheelers) use compressed natural gas (CNG), and the conversion is ongoing. However, the process of fuel conversion in Delhi has not been coordinated well with CNG supply, and the supply shortage has resulted in long queues outside gas stations.

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**Box 6.7: Reducing Emissions from Two-Stroke Engines**

Emissions from the existing fleet of two-stroke gasoline engines can be reduced by:

- Ensuring that drivers use the correct type and quantity of lubricant.
- Improving vehicle maintenance.
- Improving the quality of gasoline.

For new vehicles, emissions can be reduced by:

- Redesigning two-stroke engines to decrease scavenging losses and the amount of lubricant needed.
- Installing catalytic converters to further reduce tailpipe emissions.

Some of the measures can be achieved through regulation. Others require the mass education of drivers, vehicle owners, regulators, and even the public, which has a role in bringing political pressure to bear on the problem.
