



Synthesis Paper on
Strengthening Policy Reforms for Transport Infrastructure
Development

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1. Introduction

This paper presents the results of a series of eight research papers commissioned by the Asian Development Bank and the Department of Economic Affairs, in the area of transport infrastructure development in India. The research was intended to provide primary insight in the relevant area, through a mix of field study, technology assessment, socio-economic analysis, primary data collection and analysis of managerial and policy implementation, as appropriate in each area. The research was steered by an advisory group. The eight papers cover a wide range of specific issues in different sectors within the overall transport sector. The paper also places these issues in the context of the overall transport scenario, and points to the consolidated policy implications of implementation of the recommendations of the authors. Secondary objectives were also to initiate networking in the academic and professional research community in the area, and to enable policy makers to tap such resources at a high level.

2. Transport scenario in the country

Some key features of the transport scenario as a whole are highlighted, as a setting up of the canvas on which the research has taken place.

Increasing share of road transport: The mobility and flexibility that road offers, accompanied by a substantial increase in the supply of road infrastructure, has led to a big shift in the modal shift in freight towards road, away from rail. Coastal shipping and pipeline have also become significant modes in the last few years, primarily at the cost of the rail share. This has implications for road infrastructure investments, in terms of capacity and quality of roads, over and above access considerations.

Increasing urbanization: The overall demographic and sociological forces in the country have led to a larger fraction of the population moving to urban areas. This leads to increased requirements of passenger and freight, apart from specific urban transportation needs, per se. Urban transport therefore needs a focused and proactive approach to investments.

Increasing personalized transport: Especially in urban passenger transport, the considerations of mobility and flexibility have led to increased personalised transport in almost all regions in the country. Uncontrolled growth in this sector leads to road congestion and environmental pollution. Investment planning needs to consider both providing for two wheeler usage and appropriate alternatives to wean the two wheeler user towards public transport.

Increasing commercial orientation of infrastructure development: Rather than infrastructure provisioning by government being taken for granted, it has now come to be accepted that the user would pay for use of quality infrastructure. This has enabled a commercial orientation to infrastructure development, either entirely by government or through public private partnerships. While the former has implications for financing and pricing, the latter also has the advantage of leveraging private entrepreneurship.

Increasing sensitivity to public costs: Inadequate transport infrastructure has implications on public costs to do with safety, environment, energy, congestion and wear and tear. It would be important to internalise these externalities through appropriate pricing, taxation and regulation.

Increasing co-ordination through the governmental structure: Four central ministries – Ministry of Shipping, Road Transport and Highways (Department of Shipping and Department of Road Transport and Highways), Ministry of Civil Aviation, Ministry of Railways, Ministry of Urban Development and several user ministries (e.g. coal, petroleum, steel and mines, agriculture, tourism) are involved in transport and related infrastructure development at the Central Government. In addition, state and local level transport and related departments are also involved. All this raises the complexity and therefore the imperative need for better co-ordination in a sustained manner.

Moving towards a supply chain perspective: Transportation is not an end, but part of a larger process that adds economic value, both for freight and passenger segments. This is best achieved by an appropriate supply chain perspective, which would involve terminal development, multi-modalism and information technology and co-ordinating with other actors in the chain.

3. Positioning of the research

Following a series of discussions of the advisory group, the research topics were developed to intentionally focus on specific issues in the various transport sub-sectors. This was done so that a degree of specificity and sharpness would emerge in each area, leading to implementable suggestions where possible. Many issues also need to be looked upon in a larger context, which objective this synthesis paper partly attempts to fulfil.

The eight areas identified for this group of research papers are listed below. They comprise one in trucking, two in the road sector, two in waterways, one each in civil aviation and railways and one in urban transportation per se. The rationale for the research agenda, as stated by the advisory group, is given below for each area.

a) *Policy framework for enhancing quality of trucking services*

Trucks currently contribute to over half of the domestic freight movement and the share is increasing. With road developments and the need for better logistics, the quality of trucking services needs to improve. The research would cover current market structure, technology status and government policy measures in the sector.

b) *Design of a road traffic data recording system on a continuous basis*

There is almost no data on the profile of road traffic in the country. Such data is essential to draw up an optimal design of a national network of roads of all grades, and capacity enhancements to various sections of the network. The research would suggest ways and means of continuous recording of essential details of traffic movements at select points on main highways using modern IT.

c) *Key features of the contracting frameworks and reforms needed for greater private participation in the roads sector*

Given that a lot more road development is in the offing, increased private participation in the roads sector is considered as the way forward. This research would establish the required contracting framework, covering incentive compatibility, contract negotiations and toll structuring.

d) *Viability of inland water transport in India*

Inland waterways appear to be a potentially attractive mode of transportation. The research would examine the parameters that could render inland water transport as a viable infrastructure, if at all.

e) *Infrastructure and institutional bottlenecks in the development of coastal shipping*

Given India's coastline, coastal shipping is a viable and environmental friendly mode of domestic transport and as a feeder to export-import trade. It has not taken off due to a variety of bottlenecks, though it has been successful in specific corporate-driven demand situations like

coal, oil and cement. The research would seek to address some of the main constraints to the further development of the sector.

f) *Rationalization of allocation of landing rights for civil aviation*

In the civil aviation sector, a good part of the anticipated growth is likely to come through private participation in airports as well as airlines. Landing rights, negotiated bilaterally, have not lent the necessary security to airlines and airports for private participation. There is a need to understand the current negotiating process, the political-economy behind it, the need to bring in flexibility and the implications on traffic into airports and for airlines.

g) *Improvement of railway finances – hiving off non-core activities*

The tenth plan stresses improvement of railway finances. The incomplete agenda of reforms in this area needs to be taken up. A component of this is the hiving off of non-core activities from the railways. The research would focus on areas for hiving off, and would include a review of why earlier policy prescriptions on this matter could not be implemented.

h) *A framework for modelling the optimal modal mix for urban passenger transport, given considerations of congestion, pollution and lack of safety*

Urban passenger transportation in India has come to result in significant externalities such as congestion, pollution, and lack of safety. The aim of this research is to develop a model that would indicate the optimal modal mix, given these considerations. Choices in the modal mix would need to include non-motorized and personal transport.

The research process included two technical workshops in which the authors presented their proposals and findings and obtained feedback from the advisory group, a panel of discussants and the other authors. The primary findings of each of the eight research papers are summarized in the next section.

4. Findings of the research

a) *Policy framework for enhancing quality of trucking services [Srinivasa-Raghavan and Thukral, 2005]*

This paper addresses issues affecting the trucking sector in India in various dimensions: 1) the attributes of service quality, 2) the structure of the industry and its consequences, 3) vehicle technologies, 4) road infrastructure, 5) taxation of road users. The paper points to linkages between the actions of road users, the environment under which they operate and the impact on overall quality.

The important reforms suggested in the paper are as below.

A1 Larger fleet sizes are in a position to provide better service levels for the user. The policy environment, specifically the Motor Transport Worker's Act and financing guidelines for lending institutions do not favour amalgamation of fleet and continue to push the industry structure towards single truck owner/operators.

A2 Technology upgradation in the trucking industry is low, and the existing duopoly/oligopoly has to give way to a more competitive industry in which there are at least half a dozen producers of trucks. The important elements of truck technology include road-friendly suspension systems, multi-axles, power steering and improved tyres. These technologies would help increase the payload of the vehicles and also reduce the stress on the road surface. This would, in turn, enhance private gain while maintaining public good. The most direct policy option would be to reduce dynamic loads on road infrastructure by introducing a regulatory requirement for road-friendly suspensions.

A3 Incentives are needed to encourage vehicles to use more axles. These incentives could be in terms of pricing and specific tax differentials both at the manufacturing and operational stages.

For example, at the manufacturing stage, two-axle trucks should attract higher duties as compared to three-axle trucks. Similarly, vehicles fitted with air suspensions should be given duty exemptions as an incentive to the operators. At the operational stage, the use of pricing differentials could be extended to the levy of toll charges/user fees. Differential charges can also be set for vehicles with more axles that cause less road damage.

A4 The motor vehicle and road user taxes need to be made more related to the costs incurred by the road sector and need to move towards a uniform and efficient mode of implementation. Suggestions have been made in this regard. Inter-state and other check posts hinder movements and cause wastages in excess of the savings in tax evasion, and a single market model akin to that in the European market can be adopted.

A5 Trucks account for a disproportionately high proportion of accidents on Indian roads and an insurance regime with premiums linked to driver performance would go some way in reducing accidents.

A6 There is a need to bring about uniformity in the design of pavements across the road network. User charges need to be tied in to road maintenance.

A7 The problem of truck drivers driving in unsafe operating conditions by working long hours is a serious one and can be controlled only by self-regulation and facilitation in various dimensions, for example, by providing utilities or by spreading awareness. Provision of wayside facilities should become an integral part of road development, such as the National Highway projects.

A8 In order to ensure the smooth and socially consistent application of the law, it is necessary that not only the law should be simple and enforceable, it should also adopt the principle of third-party regulation and adjudication. It is, therefore, recommended that a Road Transport Regulatory Authority be set up.

b) *Design of a road traffic data recording system on a continuous basis [Swamy, Raju and Kumar, 2005]*

This paper 1) assesses the need for different kinds of data regarding road traffic in the country and 2) suggests a framework for data collection, including the fields of data, the collection frequency and the organisational set up for data collection.

The main recommendations of the research are as follows:

B1 There is a need for reliable information on (i) classified volumes on select road networks, (ii) origin and destination data, (iii) axle load information. A web based integrated traffic record system is suggested, starting with coverage of the National and State highways and later including other important roads. Web access charges for users of this data and dissemination through CD also could be considered.

B2 It is not necessary that government departments should carry out these activities as at present. Instead, research/education institutions and private agencies could be utilized to collect information on a contract basis. This would free some of the resources that are being spent presently. This could be used to upgrade technologies for information/data collection like replacing men with sensors.

B3 Technology based information gathering is required as information generation on manual system is neither dependable nor timely. 3-4 pilot projects with different technology options (shortlisted in the paper as axle sensor based counters, vehicle length based counters, and machined vision based counters, apart from manual counts) could be tried. Given the scale of requirements, indigenous technology may be tried and given an opportunity to develop.

B4 Assigning NSSO with the responsibility of data collection and management under the ministry appears a feasible idea. The Indian Roads Congress and the Indian Statistical Institutes could play appropriate supporting roles in data compilation, storage, analysis and dissemination. Not all data are required to be collected with similar frequency. Therefore, without compromising on the comparability of related information, it would be useful to stagger various types of data overtime like the NSS special surveys for some and regular surveys for others.

B5 The Advisor (Transport) in the Planning Commission is suggested as the custodian of the comprehensive set of data with the Chief Engineer (Planning) of the Ministry of Road Transport and Highways as the Nodal officer, with a corresponding state level structure

B6 The guidelines of the Ministry of Road Transport and Highways for traffic counts need to be moderated and applied judiciously to take into account statistical validity and functionality (such as the factoring in of abnormal conditions, seasonalities, increasing vehicle types, homogeneity of traffic type in a given road section, and highlighting certain types of traffic).

c) Key features of the contracting frameworks and reforms needed for greater private participation in the roads sector [Morris, 2005]

This paper 1) highlights the opportunities offered by private sector financing and participation in the road sector and assesses the successes and limitations of the experience in India in this regard, and 2) suggests ways of enhancing the scope, extent and quality of the participation of the private sector.

The main recommendations of the research are as follows:

C1 Larger sections and rationalized sections (to allow for more point-to-point or route based traffic, rather than administrative convenience) should be earmarked for tolling and annuities.

C2 Shadow tolling based on automatic measurements of traffic at well-chosen points is a good way to make toll payments and annuities efficient.

C3 DBFO (Design-Build-Finance-Operate) contracts are recommended so that private sector innovations in design can be quickly operationalised. Design of roads also includes the provision of shoulders and pavements, service roads, pedestrian walkways and underpasses, and proper intersection management.

C4 Contracts should include maintenance, and there should be stiff punitive measures for traffic interruptions and fall in service quality. Accidents and other safety indicators should be linked to payments made to road operators.

C5 The role and scope of private sector involvement in road construction and operations in cities should be extended, by extending the annuity model to cities, and by including substantial parts of city networks in contracts. Ownership of assets in city networks may not be possible, but maintenance and repair can be part of the contract. A possible mode of operation is to set aside a share of the road taxes, proportional to the load carried and to the service quality.

C6 Inter-firm sale of road assets in part or full would also work towards optimality and should be made feasible.

C7 Inter-modal synergies (e.g. road networks feeding into rail services) are not easily achievable without common ownership of network assets. Using interconnect charges is an option that is currently viable.

d) Viability of inland water transport in India [Rangaraj and Raghuram, 2005]

This paper addresses the issue of 1) prima facie viability of Inland Water Transport (IWT) in India, 2) the operating and market characteristics in the main National Waterways and the important operation in Goa – which is the only commercially viable sector in the country today.

The important conclusions of the study are as below.

D1 Given a sector turnover of about Rs 110 crores annually, the sector investment by the government in the 9th plan: Rs 308 crores (as against proposals of Rs 1701 crores) and proposed investments of Rs 5665 crores in the 10th plan, does not appear to commercially or economically viable, with the projections of the growth of traffic, barring in a few sectors.

D2 Existence of a driving cargo stream of sufficient volume to justify large investments where natural depth of water and navigability are not adequate, per se. Natural draft of at least two metres should be available for operations of craft of viable size.

D3 Government investment possibilities for each waterway and port interface have been outlined.

D4 River linking projects, if pursued by Government, should explicitly provide for IWT

D5 The protocol with Bangladesh on usage of Bangladesh waters by Indian vessels and vice versa and the consequent commercial conditions of operation need to be uniform and liberalized.

D6 A redefined role for IWAI has been suggested, including accountability in the provision of draft, certification and a possible move to a revenue-based model (including explicit subsidies).

D7 Possible driving cargo has been identified in specific waterway segments, like coal and fly ash, agri-exports and construction material. In addition, the possibilities for passenger traffic, tourism potential in this sector and the other stakeholders affected by the IWT sector have been identified.

D8 The locations where IWT for freight is successful in India are because of the interface with ports and the larger marine supply chain. A further opportunity exists if there are vessels capable of inland as well as coastal operations or there is a good interface between vessels on these two sectors. The differential regulations that specify licensing and maintenance requirements need to be made uniform.

D9 Tidal river systems are attractive for IWT because their draft availability is generally good and there is no competing demand for their saline water for use in drinking, irrigation or construction.

e) Infrastructure and institutional bottlenecks in the development of coastal shipping [Sundar and Jaswal, 2005]

This paper addresses the bottlenecks coming in the way of the development of coastal shipping in the country and addresses the issues of 1) cabotage, 2) capital investment in the sector and 3) operating costs. Some of the major conclusions are as follows.

E1 There is a case for relaxing cabotage laws, to allow for increased capacity, and competition, which would be required for a larger share of traffic in this sector.

E2 The tonnage of fleet for coastal carriage has been stagnant. Since one of the reasons is the difficulty in getting finance at low interest rates, there is a case for specialized wings in development financial institutions for funding coastal shipping.

E3 Coastal ships, unlike ocean going vessels, have to pay duties on bunker oil. This duty increases the cost of operation of coastal vessels significantly. Given that coastal shipping is much more environment friendly and fuel efficient than any other mode of transport, there is a case for providing tax concessions both for fuels and spares.

E4 The manning scales for the coastal shipping industry continue to be stringent. Now coastal ships have to comply with the scales that are applicable for Near Coastal Vessels that ply between India, Bangladesh, Sri Lanka, and Maldives. Although this is a relaxation from the earlier position where the manning scales of ocean going vessels applied, there is still a case for reviewing both the manning scales and qualifications. Because of the manning scales, taxes and other benefits, the staff costs on Indian ocean-going vessels are higher than on foreign vessels.

f) *Rationalization of allocation of landing rights for civil aviation [Kesharwani, 2005]*

The paper addresses the issues of 1) civil aviation and airport policies to do with landing rights of airlines and 2) a framework for the allocation of landing rights under a bilateral negotiation. The major recommendations are as follows:

F1 Pending an early finalization of a civil aviation policy (in tune with an overall transport policy in the country), the current liberalization process of international air transport operations, including the policy for passenger charters and open skies policy for international cargo should be continued.

F2 The capacity of Air India and Indian Airlines should be increased to enable them to expand their services and utilize their landing rights effectively. Gradually, all the privileges of Air India and Indian Airlines should be curtailed. Simultaneously, they should be absolved of social obligations, both written and unwritten. In the long-term, they should be treated at par with other Indian carriers.

F3 Private Indian carriers should be freely permitted to operate on routes not served or partially served by Air India and Indian Airlines. For domestic operators, the requirements in regard to number of aircraft and minimum subscribed capital are not necessary and should be removed or at least diluted.

F4 The existing open skies policy for the winter peak season should be extended at least for two years so that foreign operators could plan and provide the necessary capacity in time. In the long run, landing rights to foreign carriers should be based on reciprocity only.

F5 All bilateral agreements should provide for multiple destinations.

F6 The participation of foreign airlines in the equity of domestic airlines should not be permitted at the moment.

F7 The problem of shortage of slots can be tackled by better management in the short term and adequate capacity at airports in the long term.

F8 An independent economic regulatory authority should be established for the entire civil aviation sector and not only for the airports. Safety and security should be handled by the Government.

g) Improvement of railway finances – hiving off non-core activities [Malik, 2005]

The paper addresses 1) the rationale for hiving off non-core activities, 2) the nature of non-core activities to be hived off and 3) the process for hiving off.

The paper has an analysis of railway systems world over, which indicates that railway organisations are hiving off non-core elements of their operations, leaving them to perform the core task of moving passengers and freight effectively and efficiently. In this context, the issues faced by Indian Railways are assessed by the author, including the successes of CONCOR, which is running as a separate corporation.

The major recommendations of the paper are as follows

G1 Production units, schools and hospitals, catering and other on-board services, uneconomic branch lines and suburban services need to be hived off at different levels of disinvestment.

G2 The production units have to be hived off, with corporatisation as a possible intermediate option. This would have multiple benefits in terms of technology upgradation, costing of equipment and capital budgeting, procurement practices and labour productivity. Redeployment of excess manpower in these units should be possible, within or outside the railway system.

G3 The schools and colleges run by the railways can be handed over to an organization like the Kendriya Vidyalaya system, with financial support for the purpose.

G4 With regard to running of services on branch lines that are not viable, the paper suggests an appropriate concessioning arrangement.

G5 Suburban systems should also be managed by a joint venture, supported by the state government, with a commercial orientation to exploit land and air space. Such a structure would also provide a separation from the railway tariffs, and enable higher pricing, more in line with other forms of urban transportation.

G6 The use of concessions and other forms of disinvestment (management contracts, public stock offering and joint venture with strategic partner) can be explored for getting private parties to participate commercially in many areas. Analysis of risk and mechanisms for sharing this risk are important for successful operation of concessions and other forms of hiving off of activities.

h) A framework for modelling the optimal modal mix for urban passenger transport, given considerations of congestion, pollution and lack of safety [Tiwari, 2005]

This paper addresses 1) the modeling of the optimal modal mix of transport supply that an urban area should have, considering the various drivers of transport demand and the various options of transport supply, and 2) a set of strategies for different types of cities to plan for their transport. The study points out that apart from traffic demand patterns, income levels and land use patterns play a big role in determining the type of transport that can be offered, used and sustained. Quoting from experiences world-over and in several cities in India, the study assesses the suitability of different mode mix of transport offerings and offers some directions to this selection. Non motorized vehicles and pedestrians are also considered in the study.

The major conclusions and policy recommendations are as below.

H1 Irrespective of city size and other characteristics of the population, a large part (50%) of trips are less than 5 km long. Together with the fact that there is a large segment of the population that cannot afford any kind of motorized transport, it is worthwhile for any urban transport system to provide for pedestrian and bicycle traffic.

H2 Viable rail based corridors are those where high density travel needs can be combined with the ability to pay. Even here, the viability depends on the complementary modes for feeder movements.

H3 A graded scheme of investment priorities, actions and strategies is provided for city populations ranging from 0.1 million to above 5 million. The options include non-motorized vehicles, intermediate public transport, bus systems including high- capacity bus systems, and rail corridors, to be deployed selectively.

The conclusions of the research present a counterpoint to the current trend in the major metros in India, where metro and light rail systems are being judged to be the best option.

5. Intended policy directions

The research papers have recommended policy interventions in a number of ways. Before we examine the way forward, a brief look is taken at the present efforts of the government, as embodied by the policies, draft policies and sector study reports that reflect the current priorities of the government. We present some of the major recommendations and action points of the following publicly available documents:

1. Draft National Road Transport Policy (2005) – Ministry of Road Transport, Highways and Shipping – Annexure 1
2. Draft National Road Safety Policy (2005) – Ministry of Road Transport, Highways and Shipping – Annexure 2
3. Draft National Maritime Policy (2005) – Ministry of Road Transport, Highways and Shipping - Annexure 3
4. Report of the Committee on “A Road Map for the Civil Aviation Sector” (2003) – Ministry of Civil Aviation – Annexure 4
5. Draft Policy on Airports and Domestic Air Travel (2005) – Ministry of Civil Aviation - Annexure 5
6. Policy on Airport Infrastructure – Ministry of Civil Aviation – Annexure 6
7. The Indian Railways Report (2001) – NCAER for Ministry of Railways – Annexure 7
8. Draft National Urban Transport Policy (2005)–Ministry of Urban Development – Annexure 8

On examining the policy guidelines and documents that the different government departments/ministries are following, we note that the major rationale of study in each of the research areas has indeed been explicitly recognised in each of the policy guidelines. This provides hope that the specific recommendations in each sector would find scope for meaningful implementation. This also raises the question as to why policy statements based on well-intended premises have not always seen the attendant implementation.

Our view is that the policy statements may not always have recognised the social context or have the right focus for the context for which the policy is being stated. We believe that some of this research adds value either in clarifying the context or in sharpening the focus. For example;

- Clarification of the context is done with regard to the phenomenon of overloading of trucks, the issue of cabotage in coastal shipping, the specific bilateral arrangements possible in landing rights for international carriers and the framework for deployment of different modes of urban transport.
- Some of the research findings call for sharper institutional roles or in some cases, new institutions. Examples are the suggestion of a redefined role for the IWAI and the suggestion of a Road Regulatory Authority.

- Some of the research identifies specifics of certain policy guidelines and provides a sharper rationale and methodology for actions already identified. Examples are the hiving off procedures for railway workshops, and the possible outsourcing of road collection data.

We present a more comprehensive categorisation of the policy recommendations arising from the research, in the context of the different roles that the government today plays in the sector.

6. The way forward

The research described in this synthesis paper was intended to provide explicit inputs for government policy making and also provide some primary background analysis on each of the identified themes. In terms of government interventions, we examine the recommendations in terms of their specific policy implications and also discuss some of the broader issues involved in policy, such as the pros and cons of setting up new institutions, strengthening existing ones, the role of regulation and so on.

Implications for policy

In any sector, the implications for policy on the part of the government can be broadly categorised under the headings of (i) institutions that the government manages (ii) instruments of regulation of the sector and (iii) development issues that the government can facilitate. The various roles that the government may have to take on are as vision holder, licensor, financier, infrastructure builder and infrastructure operator.

Institutions: The institutions that the government would manage include regulatory institutions, development institutions in the public domain, and public private partnerships. Government institutions are at various levels in the country: central, state and local.

Instruments of regulation: The role of the government as a regulator is primarily in the areas of licensing (including international regulation/protocol), pricing, safety, environment, service levels (including Universal Service Obligation) and in dispute resolution. The means of regulation could be through direct acts or indirect acts such as location policy for industry, taxes and the freight equalization policy. A number of direct acts are relevant to the transport sector, such as:

Motor Vehicles Act	National Highways Authority of India Act
Motor Transport Workers Act	Inland Water Transport Act
Indian Railways Act	Inland Waterways Authority of India Act
Tramways Act	Carriage of Goods Act
Major Ports Act	Airports Authority of India Act
Indian Ports Act	Air Carrier Act
Merchant Shipping Act	Multi-Modal Transport of Goods Act
National Highways Act	

Development issues: The government has a role to play in facilitating development issues of technology, including aspects of automation, capital intensity, IT and multi-modalism and in the area of human resources, such as training and awareness.

A categorisation of policy reforms: A useful categorisation of the recommendations arising from the research in each paper is as follows. For each of the various actors (Ministries and Departments) in the government sector, the recommendations are classified as per the action required, under the headings (1) better implementation of existing policies, (2) changes to policy in an existing framework – including strengthening of existing instruments, (3) strengthening existing institutions, (4) new instruments and (5) new institutions.

	Dept of Road Transport & Highways	Dept of Shipping	Min of Civil Aviation	Min of Railways	Min of Urban Development
Better implementation of existing policies	A4, B6, C1				
Strengthening of existing instruments (in existing policy framework)	A2, A3, A5, A6, A7, B5, C4, C5	D5, E1, E3, E4	F3, F4, F5	G1	
Strengthening existing institutions	A2, A5	E2	F2	G3	H1, H3
New policy instruments	A4, C2, C3, C6			G6	
New institutions	A7, A8, B2			G2, G4, G5	H3

We also examine the regulatory functions of the government in more detail and map the recommendations to various aspects of regulation, where relevant. This framework has been excerpted and modified from [Raghuram, 2001].

Regulatory role ↓	Dept of Road Transport & Highways	Dept of Shipping	Min of Civil Aviation	Min of Railways	Min of Urban Development
Licensing	C6	D8, E1, E4	F3, F4, F5	G1, G6	
Pricing	A3, A4, C2, C3, C4	E3			
Service Level	A2, A6, C4	D8, E4			
Safety	A5, A7, C4		F8		
Environment					
Dispute resolution					

Discussion

The government has a large presence in the transport sector in India. Apart from certain natural roles, such as safety related regulation, it has played many other roles over the years. It is tempting to propose new institutional arrangements (such as Regulatory Authorities for different sectors) as the solution to many questions of concern. However, there are already a number of institutions with well-defined roles, which could in principle act. Some of the areas that policy researchers raise are cause for concern because of a natural limitation in the implementability of certain regulations and incentives and because of breakdown of some institutional structures. New institutions and initiatives are unlikely to address these fundamental barriers. For example, an effective Road Regulatory Authority would be difficult to envisage unless the limitations of the existing authority (at the local level, the Regional Transport Officer's office) are recognized at a significant level.

It has often been stated that a National Transport Policy with an integrated perspective would solve a lot of the problems. Transport and mobility, being fundamental economic needs, have many dimensions of supply, demand, service, regulation and overall impact on the economy and environment. It is difficult to comprehensively lay out a meaningful, unified policy with sufficient specificity for the nation in such a large setting. While it is clear that there are many decisions that need to be made across sectors and that there is a need for co-ordinated decision making, it is not clear exactly what role an over-arching National Transport Policy would achieve. The last such attempt was the policy document of 1980. Since then, although there have been perspective studies of the transport sector as a whole for many purposes (e.g. [WB, 2002] and [Raghuram 2001]), there has not been the consensus required to articulate a national level policy.

The role of the government then was primarily that of a doer. Now it has changed in the direction of being a facilitator. Lack of such a policy need not be a great hurdle in progress in decision making in these areas. There are examples of co-ordinated decision-making and holistic planning, where it has come up naturally, especially governed by commercial principles.

Example: In BOT projects for road, the toll collection is directly tied up with the maintenance contract. This would mean that overloading of trucks (which damages the road surface) would be monitored and addressed by the toll authority, with appropriate arrangements for dealing with overloaded trucks. It may well turn out that toll operators would charge less per axle load in multi axle trucks because of this.

Example: The Delhi metro rail project as of now does not plan to touch Delhi airport. For urban airports, rail connectivity from the main city is considered a good infrastructural element in an overall airport plan. It may (and should) happen as a bilateral negotiation between the airport authority and the metro corporation, if judged to be desirable and viable, rather than as a policy directive.

Example: With petroleum companies considering pipeline options, the utilization of tank wagons on the railways is going down and there is excess capacity in this sector. While the railways would like a directive policy to petroleum organisations to “utilize” this capacity, the petroleum industry would instead be seeking price discounts to make rail economical vis-à-vis pipeline. There is scope for a more market-oriented resolution of this issue.

Conclusion

What should government do?

- Review laws and regulations that are “non-implementable”, with an appropriate perspective on social realities
- Strengthen existing institutions where possible by using appropriate structures, autonomy and leadership
- Facilitate private sector participation by evolving appropriate financial and contracting frameworks
- Be pro-active, with the goal of energising transport development. Drive from a commercial perspective rather than a bureaucratic perspective.

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Annexure 1: National Road Transport Policy

The objectives of the National Road Transport Policy complement the efforts towards augmentation and strengthening of the road network in the country through the initiatives of the States and Centre.

1. There is a need for initiation of studies by the Planning Commission for an adequate database comprising of information on number of vehicles and freight moved. These would be useful to railways and road transport and would provide suitable inputs to policies concerning the sector.
2. Ensuring road infrastructure development for sustained economic development in all regions of the country, with a special attention to integrating backward regions and the North-East into the economic mainstream. Subsidizing transport operations in backward and remote areas. State could involve private operators and award routes on the basis of least subsidy.
3. Maintenance of roads to be given priority with increased emphasis on maintenance standards, so as to reduce need for frequent reconstruction.
4. There is an urgent need for the introduction of new technology in the designs, engineering and construction methods, as also carrying out surveys through remote sensing techniques.
5. Encourage the adoption of low tare weight multi-axle commercial goods vehicles to minimize damage to roads.
6. Rationalize the motor vehicle tax regime across States.
7. Implementation of those recommendations of Auto-Fuel Policy Committee (Mashelkar Committee) as accepted by the Govt, which pertain to road transport.
8. Reduction of barriers including check posts, octroi, sales tax posts, hoardings/advertisement boards, etc to allow freer movement of road transport.
9. Curb overloading of trucks. It has been established that the amount of damage caused due to overloading to the road infrastructure and the life expectancy of the road far outweighs any short term gain.
10. Adopt a multi-disciplinary approach covering engineering, education and enforcement of regulatory provision to reduce the increasing number of road accidents.
11. Promote sustainable transport system with increased emphasis on safety, energy efficiency, environment conservation and positive social impact.

Adapted from: [MOSRTH, 2005a]

Annexure 2: National Road Safety Policy

The Draft National Policy on Road Safety covers both preventive and post-accident aspects of road safety encompassing initiatives of public policy as well as implementation aspects, as also the responsibilities of various stakeholders.

1. Awareness needs to be raised among key decision makers, stakeholders and NGOs to facilitate them for planning and promoting road safety.
2. Legal, institutional, and financial environment for road safety at various levels would be provided.
3. Reporting of important details at the scene of accident shortly after the occurrence of the accident needs to be improved. Storage and accessibility of all data relevant to an accident needs to be improved. A comprehensive road safety information database needs to be developed.
4. All proposed new and rehabilitation road schemes need to be checked from a safety perspective during planning and designing stages. Best global practices for road safety need to be ensured.
5. Safety conscious design of vehicles would be promoted. Statutory periodic inspection as an essential check on the road worthiness of vehicles would be promoted. The impact of vehicle operation on roads needs to be minimized.
6. The development of systems which ensure that trained and competent new drivers are permitted to come on the roads would be facilitated.
7. Vulnerable Road Users (VRUs) need to be recognized as being equally important as the motorized vehicle in the planning, designing, construction and operation of roads and to provide for their special needs and requirements.
8. There needs to be road traffic safety education and training.
9. The capacity of concerned state agencies would be improved, to affect improvement in their driver testing and vehicle testing to the required standards.
10. Emergency medical services for road accidents would be provided.
11. A system for identifying new areas for research for road safety and for extension to ongoing research projects would be set up.

Adapted from: [MOSRTH, 2005b]

Annexure 3: Draft Maritime Policy**Port Sector:**

1. The policy proposes to adopt a holistic approach for the port sector for improving the existing infrastructure through modernisation of the systems with latest technology, assure capital dredging towards providing draft at ports, ensure coordinated development of major and non-major ports to exploit the potential of the hinterland, promote training of personnel for improving employment and efficiency of the human resource and provide the necessary institutional framework.
2. Integrated development of facilities at the existing major ports would be planned in accordance with master plans. Port specific measures will be initiated for planning future growth. Major and minor ports would develop in complementary manner to derive benefits of synergies. Criteria will be prescribed for declaration of minor ports as major ports.
3. National Sea-Waterways (on the lines of the National Highways) along the coast would be developed and funded by the Central Government. To start with, the channel depths at major ports would be addressed and the scheme would be extended at a later date.
4. Special Purpose Vehicles formed for operating terminals at ports would not be allowed to develop into captive facilities or monopolies. The policy would provide for bringing in additional investments, investors and competition as may be warranted.
5. Measures will be taken to promote Indian dredging industry including the private sector.
6. The Land Policy for major ports would ensure allotment on transparent manner and at reasonable prices.
7. Infrastructure facilities at major ports for handling crude oil would be strengthened through a facilitative policy on single point moorings.
8. Private sector participation would be encouraged as also private public partnerships; suitable safeguards would be positioned to ensure that the facilities are operated as public utility.
9. Reforms in the organizational structure of ports through corporatisation would be attempted; as maritime ports are service providers, representation of user interests as trustees in major ports would be reviewed to enhance the levels of their participation. For overall coordination and policy implementation, a Directorate General of Ports would be set up.
10. The Ports would proactively address issues of coordination with other transport modes, electronic data interchange, supply chain management and interface with users and trade interests as well as International Maritime Organisations.
11. The policy would pay attention to manpower/industrial relations and training through productivity linked reward for workers, pension, incentives, training and in matters of recruitment and promotion; a transparent policy on stevedoring would be put in place liberalizing the system by which workers are engaged by stevedores.

Shipping and Maritime Training:

1. India is presently ranked 17th among maritime nations in the world; however, the total tonnage has remained around the same level in recent years. In view of the trend in international shipping, replacement of old ships and modernizing the fleet would be accorded priority. BBCD route would also be encouraged for ship acquisition.
2. Efforts would be made towards increasing the share of Indian bottoms in the carriage of overseas cargo. Institutional arrangements and the infrastructure for the shipping sector will be strengthened. Policy towards offshore shipping and LNG carriage would be announced to facilitate increase in cargo handling by Indian ships.
3. Attention would be paid towards standardization of the passenger ships for voyages to Andaman & Nicobar and Lakshadweep Islands to ensure that the ship acquisition is cost effective and entails minimum delay.
4. Coastal shipping will be encouraged through a package of measures covering acquisition of fleet, provision of dedicated berths at ports, reduction in dues to be paid, as well as through fiscal concessions. A Coastal Shipping Development Fund with a corpus of Rs.500 crores will be set up to provide finance on soft terms for acquisition of coastal vessels.
5. Navigational aids would be modernized for facilitating increased ship movement in Indian waters and VTS would be operationalised in the eastern and southern regions of the country, as also in the Gulf of Khambhat.
6. Regional Merchant Marine Deptt. Offices would be set up in 8 Maritime States; district level MMDs would be reorganized. The strength of Ship Surveyors would be increased.
7. As the emerging global shortage of qualified shipping personnel would provide scope for Indian seafarers, two Maritime Universities would be set up on the east and west coast of India; marine related courses would be popularized by strengthening the infrastructure. The policy aims at aggressive marketing for Indian seafarers on foreign flag ships.
8. The interface with trade interests, shippers' councils and with international institutions would be strengthened. Attention would be paid also towards operationalising a policy package for sailing vessels, fishing vessels besides continuing cargo support to Indian ships through TRANSCHART of the Ministry of Shipping

Shipbuilding and Ship Repair:

1. Shipbuilding is a highly competitive business and the world over the industry is generally supported by national policies and subsidies. A package of measures including fiscal concessions and subsidies would be considered to make Indian shipbuilding industry globally competitive and to emerge as a leading player by 2025. In the interim, two international size shipbuilding yards would be set up in the country, in addition to measures for modernizing the existing public and private sector shipyards. Foreign direct investment would also be encouraged for the sector.

Inland Water Transport:

1. Despite being an eco-friendly, cost effective and fuel efficient mode, IWT carries only 0.15% of the total inland cargo throughput. The number of vessels for IWT movement and the trained manpower engaged in IWT is also limited.
2. The policy aims to increase the share of inland cargo movement by IWT mode from the present level of 0.15% to 2% by the year 2025 through schemes for fairway and infrastructure development, manpower training, institutional strengthening and through financial fiscal concessions.
3. Specific projects of infrastructure development will be identified for implementation through Joint Venture/BOT route.
4. Inland Water Transport Development Council will be strengthened and empowered to play a more active role in the development of IWT.
5. IWT Development Fund with a corpus of Rs.500 crores at National level will be created. The subsidy scheme will be re-examined and amended for development of infrastructure and acquisition of vessels but not for operations.
6. Apart from promoting IWT mode for inland cargo movement, the policy also emphasizes the possibility of co-operation with neighbouring countries through protocols and bilateral arrangements.

Adapted from: [MOSRTH, 2004]

Annexure 4: Report of the Committee on “A Road Map for the Civil Aviation Sector”

The Committee provides a strategy aimed at making air transport affordable and enhancing air connectivity across the various regions of the country.

1. Liberal Fiscal Regime: The government should substantially lower excise duty and sales tax on ATF and abolish import duty and sales tax on AVGAS.
2. Lowering of Airport Charges: The airport charges should be brought down substantially to levels comparable with neighbouring South East Asian and Gulf countries.
3. Freedom to Source ATF: Airlines should be allowed to source ATF from suppliers of their choice.
4. Ensuring a Level Playing Field: With a view to ensuring a level playing field between Indian Airlines and domestic private airlines, the Committee recommends the removal of restrictions on travel of government and PSU employees on private airlines.
5. Ministry of Home Affairs: At international airports, operators must ensure availability of more space so as to enable the Ministry of Home Affairs to locate additional counters and deploy more immigration officers.
6. Ministry of Defence: In order to optimize the use of air space, the Committee recommends that the government may consider the model wherein air space is permanently made available for civil aviation and segments of air space are re-vested and made available to defence on request.
7. Air Transport Services: In the domestic air transport segment, route dispersal guidelines should be abolished and airlines should be allowed to service the routes of their choice based upon commercial considerations.

The Government should provide explicit subsidy support for providing essential but uneconomical services and award it through a system of minimum subsidy bidding.

The Committee recommends that regional air services should be encouraged by reducing route navigation and landing charges for helicopters and aircraft having a maximum certified capacity of less than 80 seats.

8. Airports: The Government may focus its efforts on early privatization of all airports.
9. Air Traffic Control: The Committee recommends separation of ATC services from the AAI and vesting them with a government owned ATC Corporation. Safety regulation of ATC Corporation should be under the purview of the DGCA.
10. Institutional Framework: There should be a specialized regulator overseeing safety issues, separate from an economic regulator. DGCA should be tasked with safety regulation.

BCAS should continue to remain the nodal agency for aviation security.

Segments of airports and ATC services, which have natural monopoly or “common user/carrier” characteristics, should be subjected to independent economic regulation by the proposed AERA.

An Essential Air Services Fund (EASF) should be established to provide explicit subsidy support to essential but uneconomical services including commercially unviable airports.

Given that complete liberalization of international air transport services is quite a way off, the Government will have to remain involved in negotiating bilaterals.

Adapted from: [MOCA, 2003]

Annexure 5: Domestic Air Transport Policy

1. Barriers to entry and exit from this sector should be removed. There should only be a pre-entry scrutiny of applications to verify the financial soundness, maintenance, security, and safety aspects of operations and human resources development proposed to be undertaken by the applicant.
2. Choice of the airport type and size should be left to the operator.
3. To eliminate non-serious entrepreneurs and to achieve economies of scale, the minimum fleet size for a scheduled operator should be raised from the existing three to five aircraft and the minimum amount of the shareholders funds should be enhanced from existing Rs 5 crore to Rs 10 crore for aircraft of all up weight below 40,000 kgs and from Rs 10 crore to Rs 30 crore for aircraft of all up weight exceeding 40,000 kgs.
4. Induction of total capacity in the air transport sector should be predetermined on the basis of trend growth of traffic and projections made for atleast five years on annual basis. This information should be widely publicized to enable the entrepreneur to take investment decisions.
5. In the distribution of this predetermined capacity for induction, while preference will be given to Indian Airlines according to its fleet augmentation plan subject to its ability to do so, to meet a share of additional capacity that would emerge each year, there would not be any predetermined restriction on the induction of capacity by private operators.
6. The present policy of route dispersal guidelines be retained and strictly enforced. According to these guidelines, all scheduled operators are required to deploy in the North East, Jammu & Kashmir, Andaman Nicobar Islands and Lakshadweep 10% of their capacity deployed on the specified trunk routes.
7. Foreign equity up to 49% and NRI investment up to 100% is permissible in the domestic air transport services through the automatic route. Equity from foreign airlines is not allowed, directly or indirectly, in domestic air transport services.

Adapted from: [MOCA, 1997]

Annexure 6: Policy on Airport Infrastructure

This policy relates to use and development of airport infrastructure.

1. **Proposed Classification of Airports:** To develop the capacity of airports in accordance with the future projections, it is proposed to reclassify the airports as International Hubs, Regional Hubs, and Other Operational Airports.
2. **Modernization and Upgradation:** Detailed master plans for the development of all selected airports will be prepared or revised by the operating agency. Priority will be accorded to safety, passenger facilities, aircraft and cargo handling, while deciding the allotment of funds among different upgradation and modernization schemes. The surface access to airports should be efficient.
3. **Greenfield Airports:** Greenfield airports will normally not be taken up either in the public or private sector without the prior approval of the Government. A Greenfield airport may be permitted where an existing airport is unable to meet the projected requirements of traffic or a new focal point of traffic emerges with sufficient viability.
4. **Air Traffic Services:** The AAI will provide the Air Traffic Services over the Indian airspace and adjoining oceanic areas. There will be greater civil-military liaison for joint surveillance of Indian airspace. A Central Control Unit will be established in order to monitor all flights in the country from the security point of view.
5. **Ground Facilities:** The AAI will set standards of performance in various areas of passenger and cargo handling. Procedures will be simplified, regulations which delay or restrict movement of traffic reviewed and efforts made to reduce ground delays to a minimum. Dwell time of passengers and cargo will be drastically reduced, thus enhancing capacity at existing airports. Technological and other improvements will be made by introduction of automation and computerization. Efforts will be made to upgrade the facilities, manpower, equipment, etc by concerned departments and institutions like customs, immigration, etc so that these keep pace with the upgradation of airports. Private agencies will also be encouraged for providing ground handling services.
6. **Cargo Facilities:** Special attention needs to be given to the speedy handling of cargo and reducing its dwell time.
7. **Commercial Activities:** There will be a major thrust towards increasing the share of commercial revenue emerging from non-aeronautical sources.
8. **Airport Security:** The objective of airport security will be to safeguard the passengers, crew, ground personnel, the general public and the airport infrastructure against unlawful acts. Airport security will be looked after by specialized police agencies, state police and airport security organizations. There will be constant training of security personnel posted at airports in order to improve their effectiveness and passenger-friendliness.
9. **Ownership and Management:** A strategy is needed that permits utmost latitude in the patterns of ownership and management of airports in the country. Foreign equity participation may be permitted upto 74% with automatic approvals, and upto 100% with special permission.

10. Private Sector Participation: The Government will take all possible steps to encourage private participation. An Airport Restructuring Committee in the Ministry of Civil Aviation will identify existing airports, in respect of which private sector involvement for development and upgradation of infrastructure is desired.
11. Role of Central and State Governments: The role of the Central Government include investment in airport infrastructure, clearance of Greenfield airport projects, airspace management, safety and security of airports, bilateral air services agreements, licensing of airports and ATC personnel, environmental aspects and removal of obstructions around airports, and approval of aeronautical charges.

The Ministry of Civil Aviation will try to facilitate the speedy clearance of projects from different Ministries.

The State Governments will deal with aspects of acquisition of private land and allotment of government land, supply of water and power, and provision of sanitation and sewage services, provision of surface access through multi-modal linkages, prevention of environmental pollution, maintenance of law and order, and protection of airports from encroachments and vandalism.

12. Regulatory Mechanism: The Government will create a fair and independent Airport Regulatory Board, comprising representatives of the Ministry of Civil Aviation, DGCA, airport and airline operators etc. This grievance redressal mechanism would help in speedy and effective resolution of disputes among the various stakeholders. There will also be legislation for conversion of the DGCA into a Civil Aviation Authority with full powers of regulation of overall aspects of the aviation industry.

Adapted from: [MOCA, 2005]

Appendix 7: The Indian Railways Report 2001

If Indian Railways is to survive as an ongoing transportation organization it has to modernize and expand its capacity to serve the emerging needs of a growing economy. This will require substantial investment on a regular basis for the foreseeable future.

1. IR will have to compete even harder with other modes in order to sustain its traffic volumes, let alone accelerate growth. Thus a significant change is needed in IR's strategy towards its freight services.
2. IR should take steps to recover its market share through a combination of tariff re-balancing and quality enhancement measures, and to increase its share of the transportation of "other commodities".
3. The Committee has constructed three possible investment strategies for IR over the next fifteen years. The first two scenarios, "Low Growth" and "Medium Growth" are constructed in a "Business as Usual" framework, whereas the third scenario, "Strategic High Growth" will require substantial focused remunerative investment and corresponding organizational restructuring of IR internally and in its relationship with government, including corporatisation.
4. For IR to survive over the next 20 years and beyond, it has to adopt a "strategic perspective" where it rekindles high growth in both the passenger and freight segments.
5. IR will have to explore every avenue of cost reduction. Among the cost reductions to be implemented staff cost reduction will be crucial.
6. From the point of view of investment strategy, the most undesirable feature of the annual budget exercise is the very short-term focus it imparts to all investment initiatives. The priority for Indian Railways is to invest in debottlenecking points of congestion in the network (particularly on the saturated arterial networks of the Golden Quadrilateral linking Delhi, Kolkata, Chennai and Mumbai).
7. The Expert Group's focus on root causes has highlighted three priority areas: institutional separation of roles; clear differentiation between social obligations and performance imperatives; and the need to create a leadership team committed to and capable of redefining the status quo.
8. The current system has two flaws that the Expert Group believes must be corrected: tenure and skills. A system which effectively rewards those on the basis of seniority and age with a position on the Board for a few months prior to retirement is not the mechanism to breed leaders. Skills in the leadership team need to be broadened and deepened. IR urgently requires an injection of fresh ideas and fresh skills to accelerate its development into a commercially savvy market oriented set of businesses.
9. The Expert Group has carefully examined the experience of European and other railways in their restructuring efforts. The focus should be on commercialization rather than privatization. This involves reorganizing the rail system into its component parts, spinning off non-core activities, restructuring what remains along business lines and adopting commercial accounting performance management systems. IR's management needs to be allowed a degree of autonomy that is comparable to any other commercial organization.
10. Indian Railways must eventually be corporatised into the Indian Railways Corporation (IRC). The Government of India should be in charge of setting policy direction. It would also need to set up an Indian Rail Regulatory Authority (IRRA), which would be necessary to regulate IRC's activities as a monopoly supplier of rail services, particularly related to tariff setting. The Indian Railways Corporation (IRC) would be governed by a reconstituted Indian Railways Executive Board (IREB).

Adapted from: [MOR, 2001]

Annexure 8: National Urban Transport Policy

The prime objective of the urban transport policy is to ensure easily accessible, safe, affordable, quick, comfortable, reliable, and sustainable mobility for all.

It adopts a four pronged approach

- Reduce the existing levels of congestion
 - Reduce the impact of motor vehicles on urban air pollution
 - Improve road safety, and
 - Foster the use of sustainable technologies that minimize the consumption of imported fuels in urban transport and thus preserve the country's energy security.
1. **Public vs Personal Transport:** Encourage and support investments in facilities that would wean people away from the use of personal vehicles rather than build facilities or adding to road capacity through building fly-overs or widening roads that would encourage greater use of personal motor vehicles.
 2. **Ownership vs Usage:** Recommend the adoption of measures that restrain the use of motor vehicles through market mechanisms such as higher fuel taxes, higher parking fees, reduced availability of parking space, longer time taken in travelling by personal vehicles vis-à-vis public transport.
 3. **Pricing of Public Transport:** Recommend provision of differentially priced services, with cheap fares for those who cannot afford higher prices and premium services for those who would shift from personal vehicles if they get quality services.
 4. **Public vs Private Provision of Transport Services:** Central Government would recommend greater involvement of the private sector in public bus transport. Urban rail based systems, being high cost investments, would need to continue under public management.
 5. **Technologies for Public Transport:** The choices are between high capacity but high cost technologies like metro systems or lower cost but lower capacity alternatives like bus systems. Both alternatives have their respective applications and should form part of any large mass rapid transit network.
 6. **Choice of Auto Fuels:** The Central Government would encourage the research, development, and commercialization of cleaner technologies.
 7. **Non-motorized Transport:** Non-motorized modes are environmentally friendly and have to be given their due share in the transport system of a city.
 8. **Local planning:** Support city specific traffic and transportation studies that would help identify city specific problems and remedial measures.
 9. **Financing:** Encourage the levy of dedicated taxes that would be credited to an urban transport fund and used exclusively to meet urban transport needs. Encourage greater use of private capital in areas where the private sector can competitively deliver urban transport services.
 10. **Coordination:** The Central Government would recommend the setting up of Unified Metropolitan Transport Authorities (UMTAs) in all million plus cities, to facilitate more coordinated planning and implementation of urban transport programs and projects and an integrated management of urban transport systems.

11. Databases: Recommend the development of an organized system of regular data collection, compilation, maintenance, and updating using computerized systems.
12. Regular Research and Manpower Development: The Central Government would set up a national level institute for coordinating research, information dissemination, and manpower development in the area of urban transport.
13. Need for Public Awareness and Cooperation: It is necessary to launch intensive awareness campaigns that educate people on the ill effects of the growing transport problems in urban areas.

Adapted from: [MUDPA, 2005]