

**Planning Commission
(Transport Division)**

1. Subject: Study proposal on Determination and Evaluation of Traffic Congestion Costs by Road Transportation in India

I. Background: The current estimation of time loss and costs of traffic congestion is lacking a scientifically valid empirical database concerning the queue speed and time loss, as well as a methodological soundness of the value-of-time of commuting and leisure, and may hence lead to serious errors. In fact, the low willingness-to-pay of commuters for using a toll road indicates that the benefit of traffic time gains is estimated to be much lower than a significant part of the wages. The time loss of road vehicles because of traffic congestion, in general, is determined on the basis of roughly estimated queue lengths, time periods of congestion and mean queue speed. The registration of queue length and duration is mostly done manually by means of observations of highway policemen / general traffic policemen and might lead to considerable estimation errors. The queue speed varies a lot by time and location and the use of an average value for a whole network can make the estimation of time loss very hazardous.

In order to address the freight delay and prioritize freight projects, public-sector researchers and planners need to know the impact of delay on stakeholders. This input information is important for understanding the benefit of transportation improvement projects and for justifying infrastructure investments. However, to date, freight planning decisions are made in the absence of defensible cost / benefit analyses. While the cost of improvements can be confidently estimated, the benefits of investment are much more difficult to identify, especially for users such as shippers. Therefore, a question is typically asked: what is the value of delay in freight transportation?

The value of delay study is essentially a special value of time study, which has been studied for carriers for decades. Estimates typically consider the direct costs to carriers because of delay in traffic (Wynter, 1995), which include fuel cost, truck operation cost such as truck / tempo / trailer lease and maintenance, and driver wage and benefit. However, this direct assessment method does not consider indirect impacts in terms of lost productivity to the carrier fleet. For example, the time spent in congestion affects

carriers' ability to schedule freight shipments and reduces their fleet capacity for serving more clients.

The purpose of this research is to study the value of delay to shippers by examining additional cost to them. This study has been planned to focus on three aspects which were considered the most relevant to the investments in highway infrastructure — the trucking industry, inter-city buses, and in view of its very important but largely unfulfilled role in enhancing road safety, the motor insurance industry.

2. Terms of Reference:

- Identify the weaknesses of the actual methods of registration and determination of the congestion time loss.
- Assess the application remote sensing and aerial method in measuring the traffic congestion.
- Evaluate the traffic congestion costs and / or value of delay by road transportation.
- Study how freight delay incurs costs to shippers and how the cost varies with the shipper's operational characteristics.
- Propose study methodologies to quantify the shipper's value on delay.
- Conduct a pilot survey among a limited number of shippers for model testing.
- Apply inventory management models and analyze the impact of highway delay.
- Assess the value on delay on the inventory management and supply chain management.
- Work-out the effectiveness of countermeasures to fight against traffic congestion.
- Suggest mechanism for effective road traffic management.

3. Objectives:

- How can the time loss of road users be determined consistently?
- Which external effects are involved by road transport and what is their importance?
- How can the costs of traffic congestion be evaluated methodologically and quantitatively?
- Which are the costs and benefits of different strategies?

2. Research Proposal

Subject – 'Inter-state Regional Transport Planning and Medium-term Planning for Development of Maharashtra State; having transport linkages with other States/UTs in India- using Input-Output (I-O) Analysis Study,'

1. Background:

Planning Commission undertook in earlier decades of 1970s and 1980s and sponsored a few studies on transport planning and policy requisites, in socially and economically backward hilly and forest regions, like North-Eastern region, Himalayan region, and Vindhya region, where the inhabitants were geographically segregated from the main stream plan areas, due to lack of transport facilities even for movement of persons and of daily needed goods and services; and handicapped by the most inadequate transport modes.

National Council of Applied economic Research (NCAER), New Delhi undertook the Regional Transport Survey of North-Eastern Region, sponsored and funded by North-Eastern Council (NEC), Shillong; another study of Meghalaya Techno-economic survey; (and a Perspective Plan for Telangana rural electrification) were completed during 1975-1979. These studies reported projections of all commodities movements between States/UTs/Regions/Districts; of North-Eastern region (NER) and from and to outside NER, taking into account, projections of production/supplies of all those commodities from and to NER; and then projections for different modes of transport and relevant & requisite number of vehicles for movements of men and goods within (State & UTs) NER and from and to NER (States & UTs). As part of the study, Origin and Destination (O-D) survey were undertaken; so that those results of O-D surveys were benefitting to bridge the secondary data gaps and supplementing to span and spread the results over all spatial dimensions of regions, enveloping NER or of Meghalaya. Since the, 1978-1979, no major studies of the kind were undertaken by major sponsoring/funding bodies.

Beyond 1980s, research studies on inter-regional and intra-regional transport and regional development planning studies at National and States levels are scarcely done, even for the earlier said hilly and forest areas; and no study on desert areas of Thar etc. and no study on mainstream plains of States/UTs in India.

2. Objectives :

The objectives of the study are:

- (i) To spell out what and how Maharashtra State should, can and will have inter-modal transport for Inter-state linkages, that are essential for medium term inter-regional perspective development planning and growth;
- (ii) to what extent that could be due to both direct and indirect backward and forward linkages by distinct transport modes operated and implemented to facilitate inter-regional transport and development planning for growth and balanced regional development in Maharashtra State.

Terms of Reference of the Study:

- i. To conduct origin and destination (O-D) survey in each season of the year, thrice, in (1) Summer Season i.e. February, March, April and May; (2) Rainy Season i.e. June, July, August and September and (3) Winter Season i.e. October, November, December and January, at each check post continuously for 48 hours, dates to be chosen appropriately for each season so that traffic flows of commodities and stocks, by different modes of transport will become fully available.
- ii. To prepare a commodity-wise input-output table, the list of commodities being given from OD survey and commodities inputs and outputs details to be culled out from Annual Survey of Industries (ASI), Census Report and

unregistered sector data from NSS reports. All these data should enable to enlist the names of the sectors in a number of rows of producing commodities sectors to be the same as number of columns of commodity using sectors, with one to one correspondence for the number and names of commodity traded through border check posts, The flows in the rows are the outputs of the sectors(n) and the flows in the columns are inputs of the sector (n), both drawn from secondary data and from the results of OD survey for 2014-2015; so that commodity X commodity flow input-output table will correspond to the latest 12-months period; supplementing and filling-up the gaps and cross-checking the flows of the I-O table prepared for the year concerned.

- iii. This process of combining OD survey primary data with IO table requirement (Based on secondary data) will provide a third dimension of space points of origins and destinations of outputs and inputs of n sectors. This provides not only inter-sectoral consistency but also inter-regional consistency of flows of I-O table, with regional dimensions to each input and outputs of n sectors (three dimensional I-O table for the same year). The flow are in physical quantity units of I-O table; another in producers prices and if needed yet another in purchasers prices, whichever is needed for the relevant price structure of n sectors.
- iv. To prepare levels of n sectoral final demands (final uses) and the relevant components of final demands vectors, to be estimated by the use of secondary data of Annual Reports of the sectors' units of production and of use; NSS reports, and reports of government expenditure, investments (capital formation of fixed capital & working capital & replacement capital), exports and imports of commodities' Foreign trade reports, Transport modes-wise report of Maharashtra State.
- v. The components of the value added for the sectors should be estimated for I-O table of commodity by commodity sector, using many estimation methods to arrive at each components of value added.
- vi. Given commodity by commodity I-O Table, final demands and value added components vectors, use of Input-Output model estimates the direct and

indirect total output requirements of commodities production and relative price structures (shadow prices) in Maharashtra State, using primal and dual of input output analysis respectively.

- vii. To sustain the final demands and value-added (State domestic product), total outputs projections should be done. Based on the results, transport requirements by modes of transport, has to be worked out, for transport planning and inter-regional planning, corresponding to development planning.

3. Identification of data gaps in the transport sector and suggesting remedial actions

1. Background

Integrated transport planning has the potentials to unravel greater efficiencies in movement of goods and people in an already resource scarce environment. Accurate, robust and regularly updated data in respect of all modes of transport is essential for developing an integrated transport plan and for taking appropriate decisions on investments across different modes. Unfortunately such data is not available in India in respect to all modes and even where it is available it may not be regularly updated and analyzed for use in decision making. This issue is further magnified given the long list of agencies involved with the transport sector in India.

The demand for mobility has been growing at a very rapid rate hand in hand with India's continued economic growth. There is therefore an urgent need to understand the present data availability across the multiple sources while suggesting ways to consolidate this information to help in more strategic planning of transport networks. It is critical to have a complete view of the transport sector, both from the supply side, including information about the infrastructure, energy and other resources used, and from the demand side, about the demand for mobility for individuals, industries and other demand sectors such as agriculture.

It is expected that this kind of information would help in making better strategic planning across different modes and improved logistics choices for both goods and people. This study is therefore expected to be a first of many to determine the present availability, issues and gaps in the availability of transport data in India across various modes of transport.

2. Objectives

The results from this study will be used to develop an understanding of the present availability, issues and gaps in data across different modes of transport. It will also

devise a plan of action that would improve the transport related data systems in the country to help in development of an integrated view of transport in India.

3. Terms of Reference:

1. Conduct literature reviews and summarize the findings of various national level studies on transport data undertaken in the recent years in India
2. Summarize the availability of data across various modes of transport in the country for both long distance and urban mobility including road, rail, air, water and pipelines
3. Undertake survey of agencies responsible for collecting data across different modes of transport to understand the issues and present shortcomings of the presently available data
4. Identify various stakeholders involved in both the compilation of and end use of the data that is generated across different transport modes
5. Outline the issues with integrating the information across different modes in India
6. Review of the international best practices of collation of national level transport data
7. Draw up a basic framework of a national transport data platform
8. Develop an action plan for creation of such a national transport data platform.