

State of the Transport Infrastructure in India and Recent Policy Changes

Dr. Sanjay K. Singh

Indian Institute of Management Lucknow

- The mobility of people and goods in India heavily relies on its rail and road network.

Trends in rail and road share in passenger movement

	BPKm Rail	BPKm Road	Rail Share (%)	Road Share (%)
1950-51	67	36	65	35
1970-71	118	240	33	67
1990-91	296	1487	16.6	83.4
2000-01	457	3078	12.9	87.1
2020-21	1078	11909	8.3	91.7

Trends in rail and road share in freight movement

	BTKm Rail	BTKm Road	Rail Share (%)	Road Share (%)
1950-51	44	12	78.6	21.4
1970-71	127	82	60.8	39.2
1990-91	243	567	30.0	70.0
2000-01	312	899	25.8	74.2
2020-21	750	4250	15.0	85.0

Existing transport infrastructure

- Road length is inadequate and its growth is significantly less than the growth in vehicular population
 - Over the past 50 years, from 1956 to 2006
 - Road capacity increased 8 times whereas **vehicular traffic increased 210 times** (from 0.43 to 90 million vehicles)
- Road network: 3.314 million Km
- However, less than half (47.5%) of the total are paved roads.
- National Highways: 70,548 Km (includes 200 Kms of Expressways)
 - Less than 20% of the national highways 4-Laned
- State Highways: 1,28,000 Km
- Major District Roads: 4,70,000 Km
- Village Roads: 26,50,000 Km

Existing transport infrastructure ...

- In general, India's roads are congested and of poor quality.
- Trucking goods from Delhi to the port in Mumbai (1500 Km) can take up to 10 days.
- Although national highways constitute only 2% of the road network, it carries 40% of the total road traffic.
- But, ...

• **Width of National Highways:**

- Single Lane (width of 3.75 m): 20,849 Km (30%)
- Double Lane (width of 3.5 m per lane): 37,646 Km (53%)
- Four Lane / Six Lane / Eight Lane (width of 3.5 m per lane): 12,053 Km (17%)
- *Moreover, between 31st March 2004 and 2009, national highways length increased only by 5000 Km (from 65,569 to 70,548 Km; 7.6% increase in five years)*

Existing transport infrastructure ...

- Indian Railways could add only 10,000 Kms of route in last 60 years.
 - Route-Km in 1950-51: 53,596 Km
 - Route-Km in 1990-91: 62,367 Km
 - Route-Km in 2008-09: 63,465 Km
 - total length of track in 2008-09: 111,599 Km
 - Only about 28% of the route-km and 40% of the total track-km is electrified
 - Average speed of goods train: 19 to 30 Km per hour
 - Average speed of passenger train: 30 to 80 Km per hour (train that runs at 55 km per hour or more is called super-fast train)

Existing transport infrastructure ...

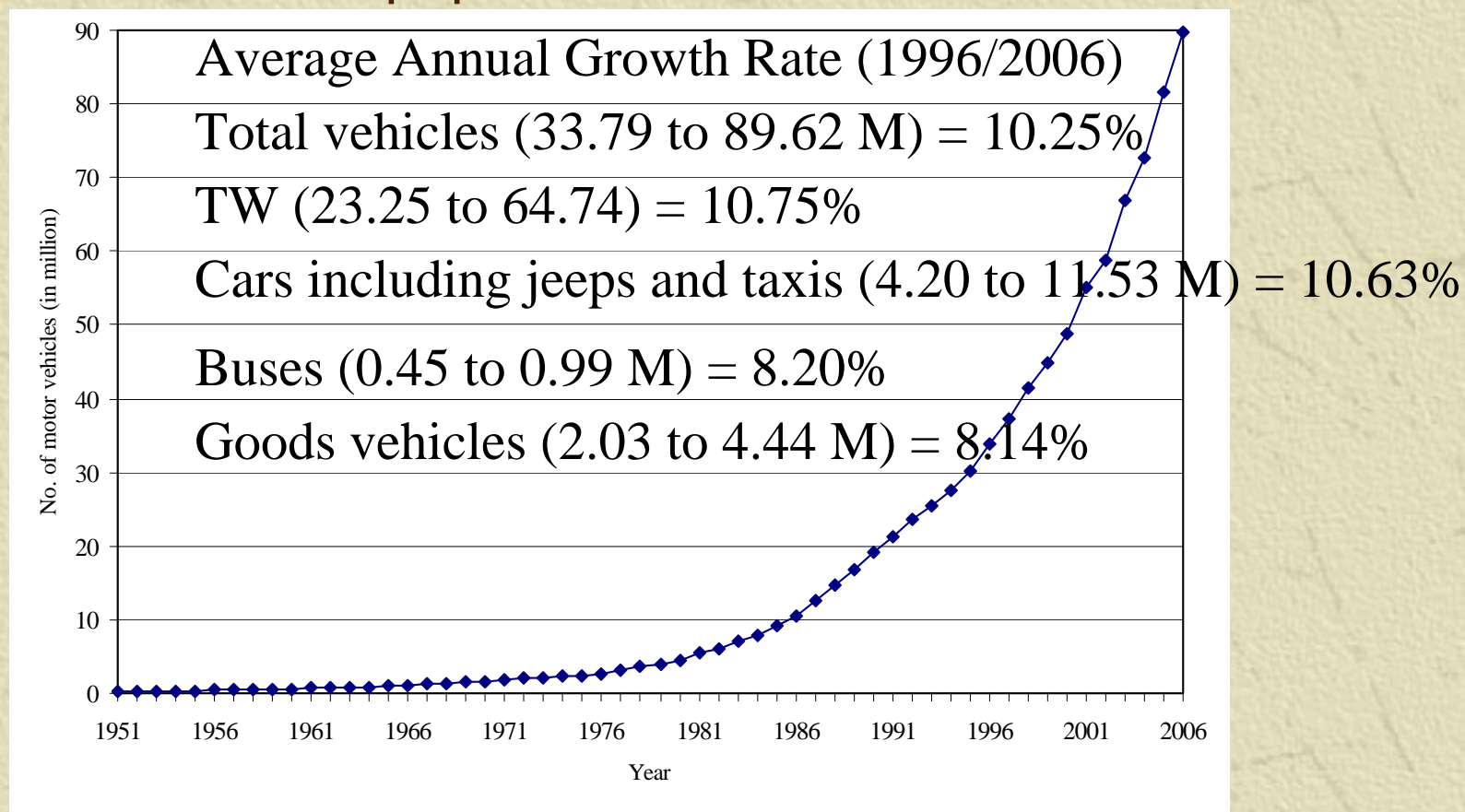
- Inadequate availability of public and private transport.

Vehicle profile in selected countries (in 2006)

	Buses per 1000 person	Cars per 1000 person	Two-wheelers per 1000 person
Australia	2.85	487	21
Germany	1.10	565	48
France	1.41	496	41
Malaysia	3.10	225	236
China	6.00	18	62
India	0.90	10	58

- There is a mismatch between demand and supply of public transport (leading to rapid growth in private transport).

Motor vehicle population in India: 1951 to 2006



- Expected veh. pop. in India in 2010: 132 million.
- Expected car pop. in 2010: 17 million
- Expected two-wheeler pop. in 2010: 97 million
- Expected bus pop. in 2010: 1.35 million
- Expected goods veh. Pop. in 2010: 6 million

Sale of motor vehicles in India (including exports) in '000

	Commercial Vehicles	Three- wheelers	Cars	Two- wheelers	Total Vehicles
2000-01	150	198	591	3746	4812
2001-02	159	216	558	4308	5411
2002-03	203	275	612	4992	6249
2003-04	278	352	822	5629	7291
2004-05	348	375	981	6576	8527
2005-06	392	437	1052	7566	9713
2006-07	517	548	1270	8492	11136
2007-08	546	506	1415	8068	10887
CAGR (2000-01/2007-08)	20.3	14.3	13.3	11.6	12.4

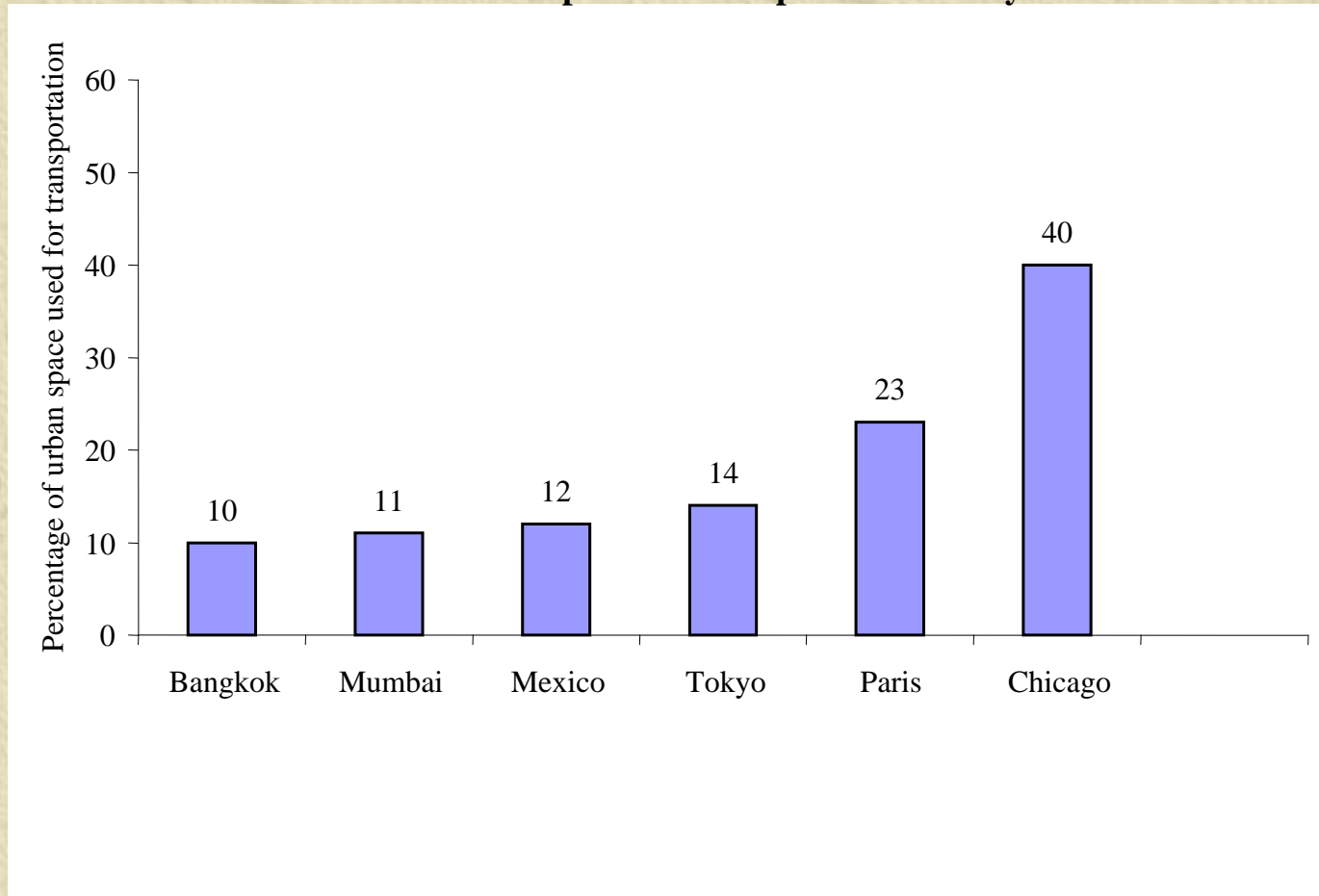
Motor vehicles in cities

- Excess concentration of vehicles in metropolitan cities.
- 32% of vehicles are plying in metropolitan cities alone, which constitute just 11% of the total human population.
- Around 13% of all motor vehicles in the country are plying in mega cities (Mumbai, Delhi, Kolkata and Chennai) alone.
- Delhi, which contains around 1.4% of Indian population, accounts for nearly 7% of all motor vehicles in the country.

Road infrastructure in cities

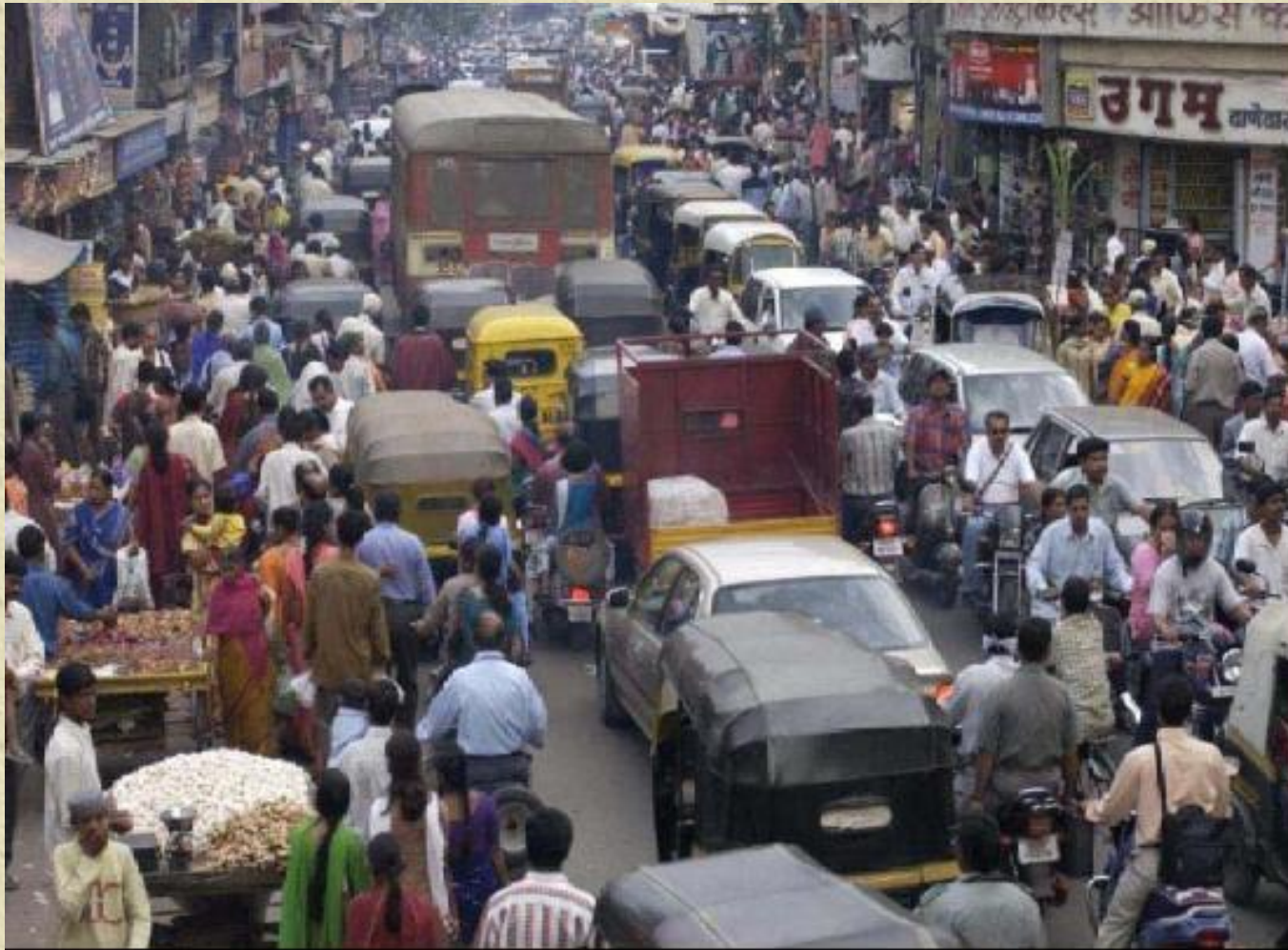
- Only 16.1% of the total developed area in Class – I cities is allocated for roads and streets.

Allocation of urban space for transportation in city centres



Road infrastructure in cities ...

- Heavy encroachment at major roads and junctions.



Existing transport infrastructure in cities

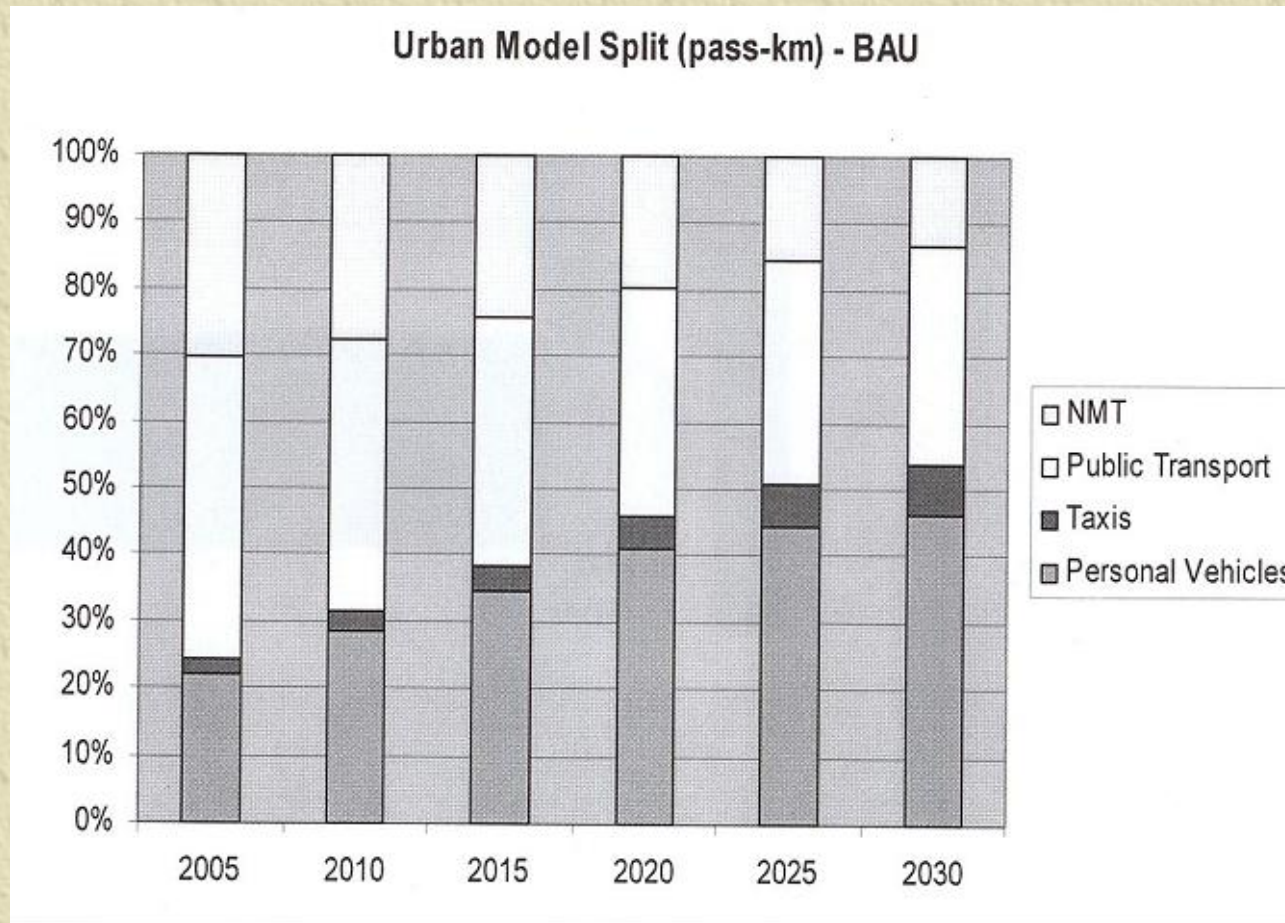
- Extremely limited rail services (only to Mumbai, Delhi, Kolkata, and Chennai).
- Well-organized bus services are mainly run by MTUs/STUs and confined only to few metropolitan cities.
- The share of buses is negligible in most Indian cities as compared to personalized vehicles. For example, two-wheelers and cars together constitute more than 95% in Kanpur and 90% in both Hyderabad and Nagpur whereas in these cities buses constitute 0.1, 0.3, and 0.8 percent respectively.

Existing transport infrastructure in cities ...

- Overall, quality of public transport services is poor.



More worrisome trends



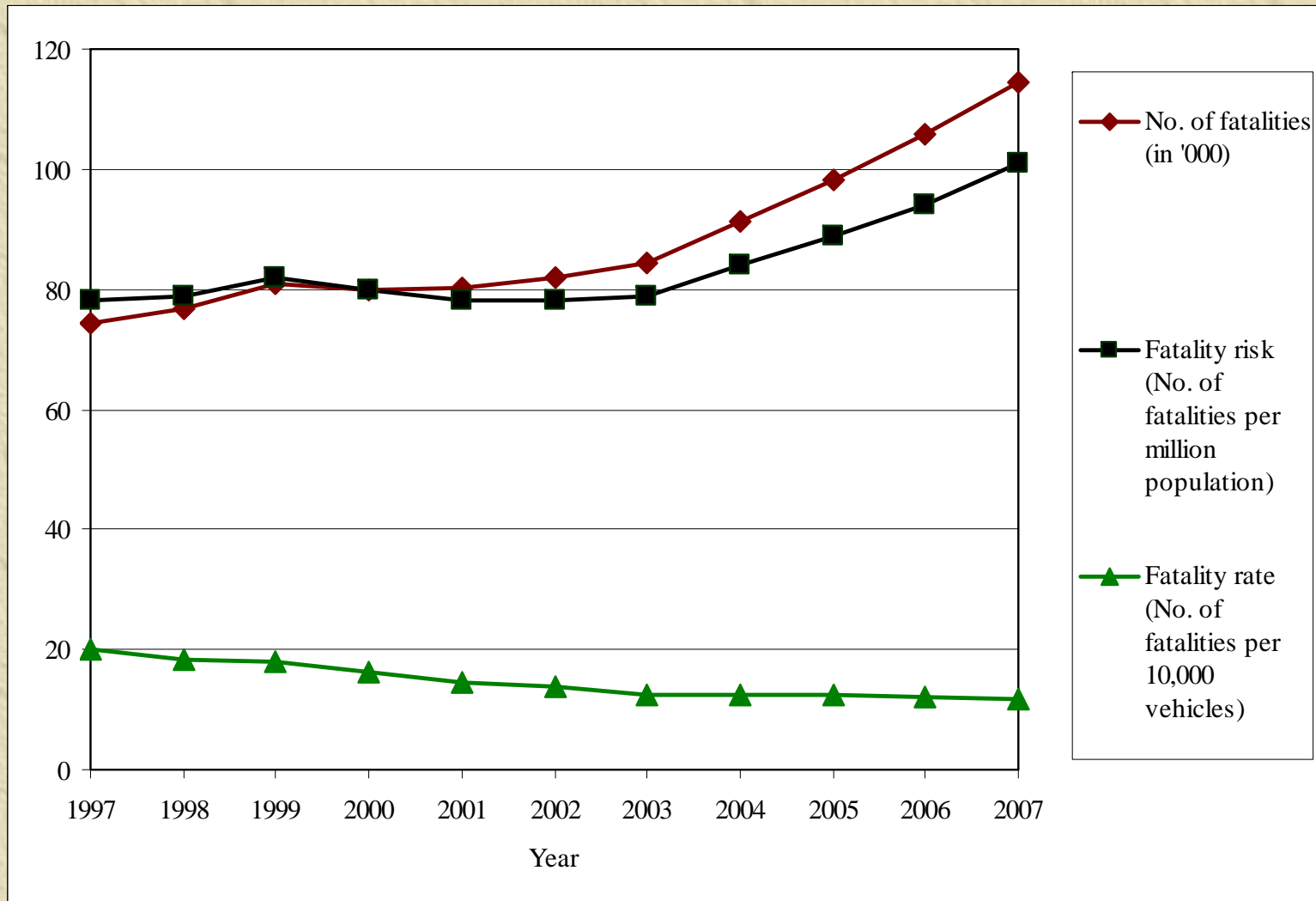
Source: Ke Fang, India: Sustainable Urban Transport Program, March 2007
(South Asia Transport Unit, World Bank)

Relatively, there is a greater reliance on roads and within roads there is far greater reliance on private and para-transit modes. Reliance on public transport and NMT modes is declining.

What are the consequences?

- Acute traffic congestion resulting in inordinate delays
- High-energy consumption
- Intense pollution of the environment and
- High rate of road accident
 - For example, in India, from 1990 to 2007, average annual growth rate of
 - Total road accidents: 3.1%
 - Fatality: 4.3%
 - Injury: 4.5%
 - Registered vehicles: 10.1%
 - Road length: 4.4%
- *Economic loss due to road accidents in India is of the order of at least one percent of its GDP*

Fatality risk in India



Road accidental deaths in Indian cities

There are more than 35 deaths per week due to road accidents in Delhi alone (in 2007).

Fatality risk in selected metropolitan cities in 2007

	Mid-year population (M)	Fatality	Fatality risk (fatality/100,000 people)
Agra	1.32	510	38.64
Allahabad	1.05	104	9.90
Bengaluru	5.69	961	16.89
Bhopal	1.46	248	16.99
Chennai	6.43	1146	17.82
Delhi	12.79	1789	13.99
Hyderabad	5.53	506	9.15
Indore	1.64	233	14.21
Jaipur	2.32	595	25.65
Kanpur	2.69	544	20.22
Kolkata	13.22	462	3.49
Lucknow	2.27	517	22.78
Meerut	1.17	354	30.26
Mumbai	16.37	891	5.44
Pune	3.76	552	14.68
Varanasi	1.21	218	18.02
Total (city)	107.88	12664	11.74
Total (India)	1136.55	114590	10.08

Some observations

- The most productive age group (31-45 years) is the most prone to road accident fatality.
- The adult working age group (18 to 60 years) accounts for more than 80 percent of all casualties in many cities.
- Pedestrians, cyclists, and motor cyclists death as a percentage of all road fatalities are extremely high (over 50% of all traffic fatalities).
- Road infrastructure does not allow segregation of slow moving vehicles from the fast moving vehicles.
- Roads are neither self-explaining nor forgiving.

Government response (at all India level)
National Highway Development Project (NHDP)
started in 1999

implemented by the **National Highways Authority of India**

NHDP began with Phase I & II

Project	Length in Km	Cost
NHDP Phase I & II includes (upgradation of 14,279 Km of national highways to 4 or 6 lane)	14279	Rs. 64,639 crore at 2004 prices
Golden Quadrilateral (GQ) connecting Delhi, Mumbai, Chennai, and Kolkatta	5846	
North-South Corridor connecting Srinagar in the North to Kanyakumari in the South and East West Corridor	7300	
Port Connectivity (improvement of roads connecting 12 major ports) and Others	1133	

National Highways Network



Status of NHDP Phase I & II as on July 31, 2009

(though these projects should have been completed by December 2007; likely to be completed by Dec. 2009)

	GQ	NS-EW Corridor	Port Connectivity	Others
Total length (Km)	5846	7300	380	962
Already 4-Laned (Km)	5729	4014	236	828
Under Implementation (Km)	117	2396	139	121
Contracts Under Implementation (No.)	15	122	6	12
Balance length for award (Km)	-	732	6	20

National Highway Development Project (NHDP): 2005-15 Phase III

✦ **Phase III:** 4/6-Laning of 12,109 Km of National Highways on Built, Operate and Transfer (BOT) basis

- ✦ Connectivity to state capitals, places of tourists, and places of economic importance with NHDP Phase I & II
- ✦ Estimated cost: Rs. 80,626 crore
- ✦ To be completed by December 2013
- ✦ Already 4-Laned: 937 Km
- ✦ Under implementation: 2,155 Km
- ✦ Balance length for award: 9,017 Km (BOT bids would be invited soon)

National Highway Development Project (NHDP): 2005-15 Phase IV and V

✦ Phase IV: 2-Laning of 20,000 Km of National Highways

- ◆ To be completed by December 2015
- ◆ Work is likely to start from 2011
- ◆ Estimated cost: Rs. 30,000 crore

✦ Phase V: 6-Laning of 6,500 Km of National Highways including 5,700 Km of GQ

- ◆ Estimated cost: Rs. 41,210 crore
- ◆ As on March 2009, 103 Km has been completed
- ◆ 1030 Km is under implementation
- ◆ The proposal for 6-Laning of 1410 Km has been sent to Public Private Partnership Appraisal Committee (PPPAC)
- ◆ The feasibility reports of 1405 Km have already been prepared
- ◆ For balance length, feasibility reports are getting prepared
- ◆ Project to be completed by December 2012

National Highway Development Project (NHDP): 2005-15 Phase VI and VII

✦ Phase VI: Construction of 1000 Km of expressways under Public Private Partnership (PPP) model

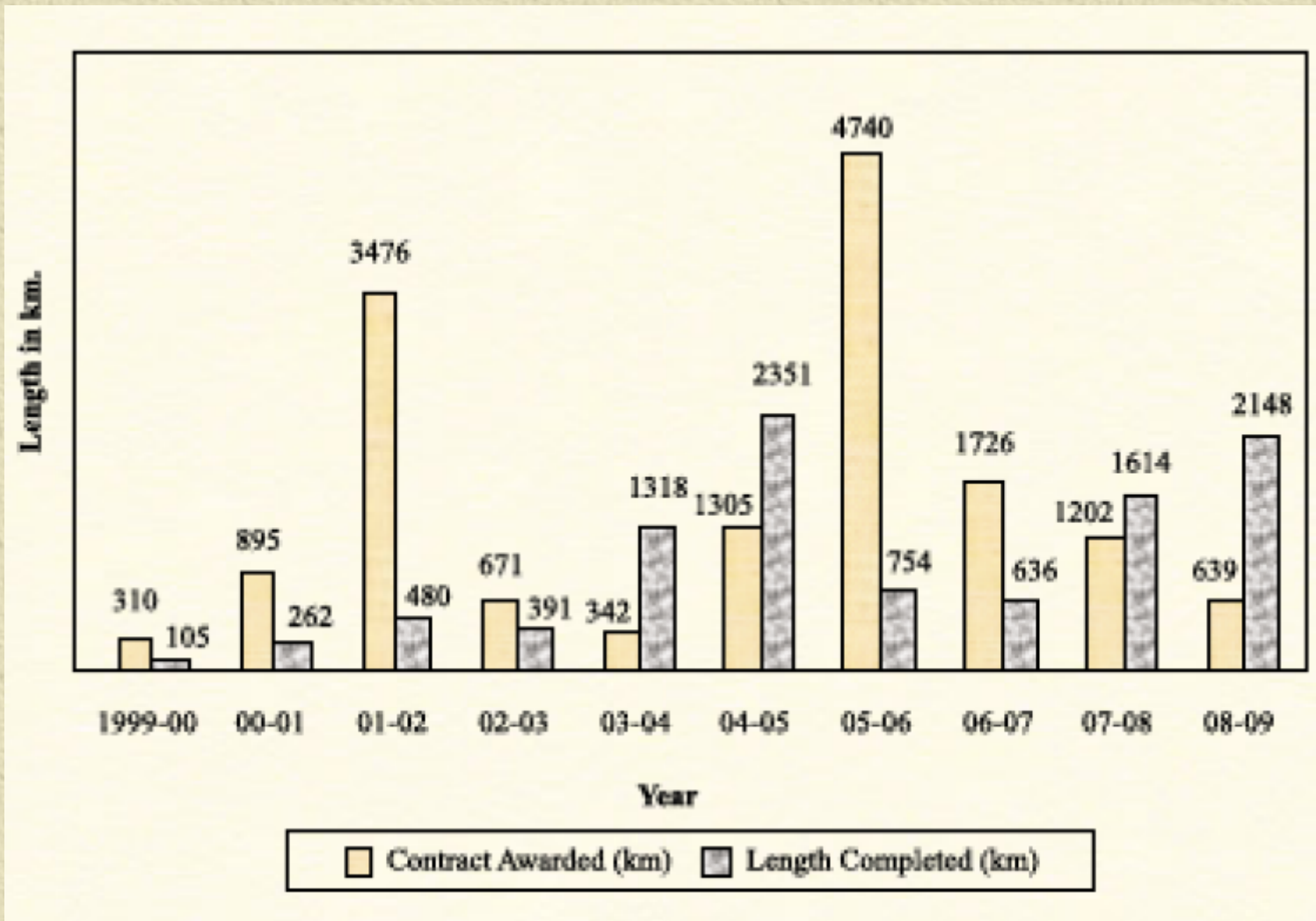
- This includes expressways connecting Vadodara-Mumbai, Delhi-Meerut, Bangaluru-Chennai and Kolkata-Dhanbad stretches.
- Estimate cost: Rs. 16,680 crore (at 2006 prices)
- Rs. 9,000 crore will come from the private sector and the balance Rs 7,680 crore will be Government funding for bridging the viability gap as well as meeting the cost of land acquisition, utility shifting, consultancy, etc.
- Project is targeted to be completed by December 2015
- Work is yet to start


National Highway Development Project (NHDP): 2005-15 Phase VII

✦ **Phase VII:** Construction of 700 Km of ring roads, bypasses, flyovers, underpasses, etc. including improvements of NH links in cities

- ◆ Estimate cost: Rs. 16,680 crore
- ◆ 19 Km under implementation
- ◆ Feasibility study is being undertaken for 10 ring roads/ bypasses (Aligarh, Meerut, Kanpur, Varanasi, Lucknow, Dhanbad, Patna, Vishakhapatnam, Madurai and Thiruvananthapuram)
- ◆ Project to be completed by December 2014

NHDP: progress of contracts awarded and length completed





Rural roads: physical targets during the eleventh plan (2007-12)

o Constructing 1,29,707 km of new rural roads, and renewing and upgrading existing 1,77,726 km covering 60,638 rural habitations

Public Private Participation in NHDP

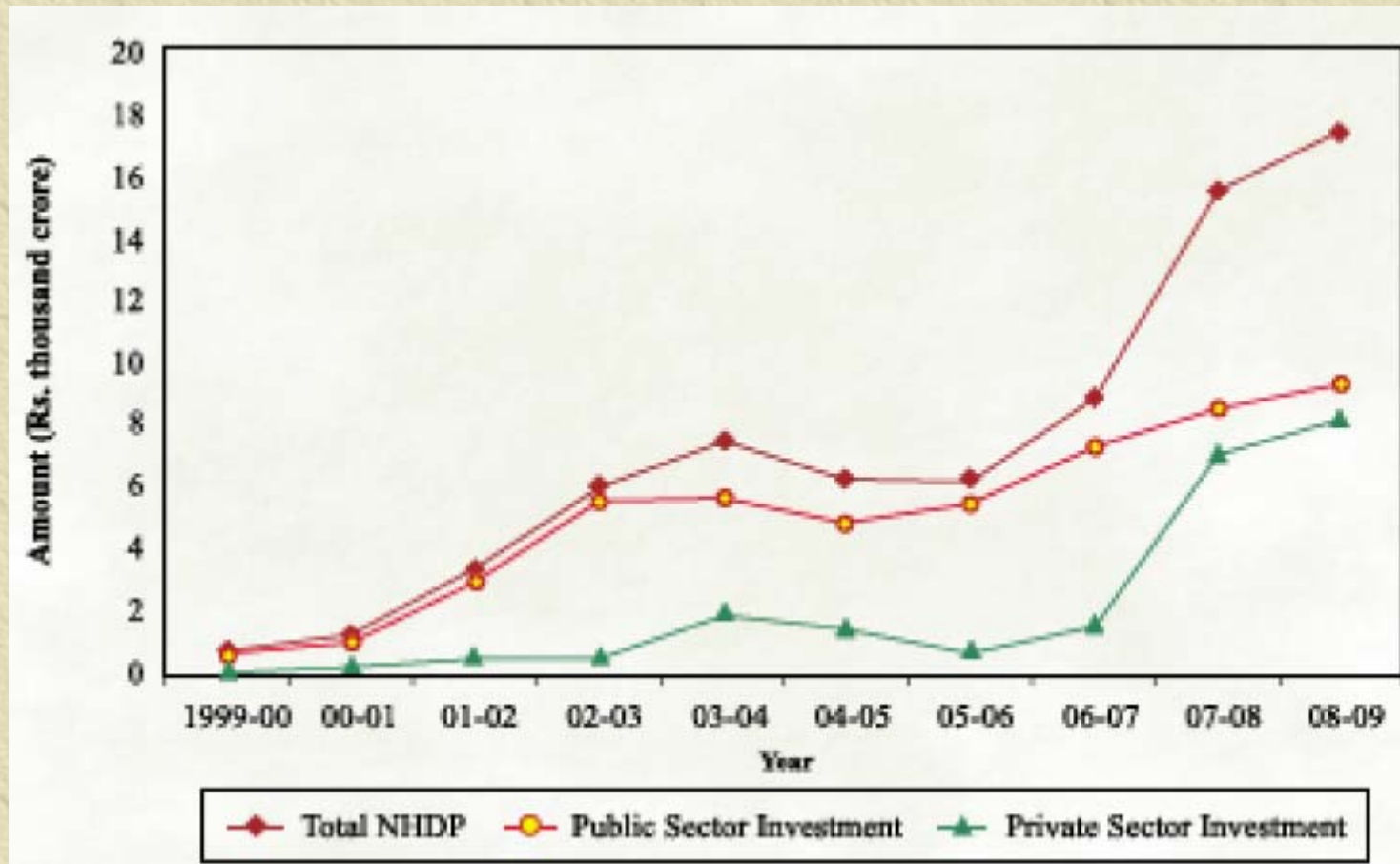
- ✦ Projects in NHDP from Phase-III to Phase-VII would be taken up mainly on Public Private Participation (PPP) route following either Build Operate and Transfer (BOT) toll mode or BOT (Annuity) mode
 - BOT-toll: Developer bids for a BOT-toll road contract and after winning it, raises funds, operates it for a specified period (maximum up to 30 years), earns revenues through toll and transfers it back to the government.
 - Capital grant (viability gap funding) up to a maximum of 40% of capital cost provided by the NHAI
 - BOT-annuity: Developer bids for a BOT-annuity road contract and after winning it, raises funds to meet the entire upfront cost (no grant is paid by the NHAI) and the expenditure on annual maintenance for a specified period (2.5+15 years), earns (from the government) annuity every six months over the concession period.


Public Private Participation ...

✦ To encourage participation of private sector, the government has also allowed ...

- ✦ Foreign Direct Investment (FDI) up to 100% in the road sector
- ✦ Viability gap funding up to 40% of project cost
- ✦ 100% tax exemption in any consecutive 10 years out of the first 20 years of a project
- ✦ Duty free import of high capacity and modern road construction equipments
- ✦ Government shall meet all expenses relating to land and other pre-construction activities


NHDP: expenditure incurred





Railways: physical targets during the eleventh plan (2007-12)

- o Constructing Dedicated Freight Corridors between Mumbai-Delhi and Ludhiana-Kolkata*
- o 8,132 km of new railway lines; gauge conversion of 7,148 km*
- o Modernization and redevelopment of 22 railway stations*
- o Introduction of private entities in container trains for rapid addition of rolling stock and capacity*



Railways: investment requirement during eleventh plan (2007-12)

- More than \$50 billion required for expansion and modernization of the railway infrastructure
- Around \$15 bn (30%) is expected to be raised from non-budgetary resources through PPP
- Possible areas of PPP
 - World Class Railway Stations (22 Stations in major cities)
 - Operation of Container Trains (14 contracts allowed already)
 - Commercial Utilization of Surplus Land
 - Dedicated Freight Corridor Projects



Urban transport: investment through *Jawaharlal Nehru National Urban Renewal Mission* (JNNURM) (2005/06-2012/13)

- o 63 cities (7 with more than 4M population, 28 with 1-4M population, and 28 with less than 1 M population) are covered under JNNURM
- o total investment of Rs. 1,20,536 crore (Rs. 17,219 crore per year) is planned through Urban Local Bodies
- o 9.59% of the total investment would be for Mass Rapid Transport System, 6.87% for roads and flyovers, and 1.38% for other urban transport projects.
 - o In January 2009, the central government sanctioned Rs. 4,581 crore to procure 14,240 buses for urban transportation.



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