

# **Socio Economic Cost of Road Crashes**

**by**

**Dr. S.Gangopadhyay**


**Director,**

**CSIR - Central Road Research Institute**



**8<sup>th</sup> IRF Regional Conference on “Road Infrastructure for Safe Mobility**

# India's Road Network



	(Km)
<b>National Highways</b>	<b>78,651</b>
<b>Expressways</b>	<b>365</b>
<b>State Highways</b>	<b>1,56,181</b>
<b>Other Roads</b>	<b>44,55,510</b>
<b>Total</b>	<b>46,90,707</b>

**National Highways and State Highways constitute only 5.4 % of length, but carry more than 70% of the traffic on Indian Roads.**

# NHDP

➤ **National Highways Development Program is world's largest road development program based on Public Private Partnership (PPP) Model.**

➤ **Under NHDP, the NHAI has**

- **Completed Length : 18,760 Kms**
- **Presently Under Implementation : 14,130 Kms**
- **Balance for award : 22868 Kms**

➤ **All seven phases of NHDP cover 55,000 Kms + approximately. (including 5700 Km approx. of 6-Laning of Phase – I [GQ])**

➤ **Other than NHDP, Government is also implementing major road development programmes in North East (SARDP-NE) for 6418 Kms (NH-3513 Kms and SH-2905 Kms) and in Left Wing Extremism (LWE) affected areas for 5477 Kms (NH-1126 Kms and SH-4351 Kms).**

# *Background on Road Crashes: An epidemic*

- 1.4 million people are killed and 50 million are injured worldwide per annum due to road crashes*
- Developing countries account for 90% of the casualties*
- It's the leading cause of death of young people worldwide*
- If unabated, the number of deaths will increase to 1.9 million per annum (worldwide) by 2020*
- The economic cost to developing countries amounts to around \$100 billion a year*

## Background: Road Crashes in India (Contd...)

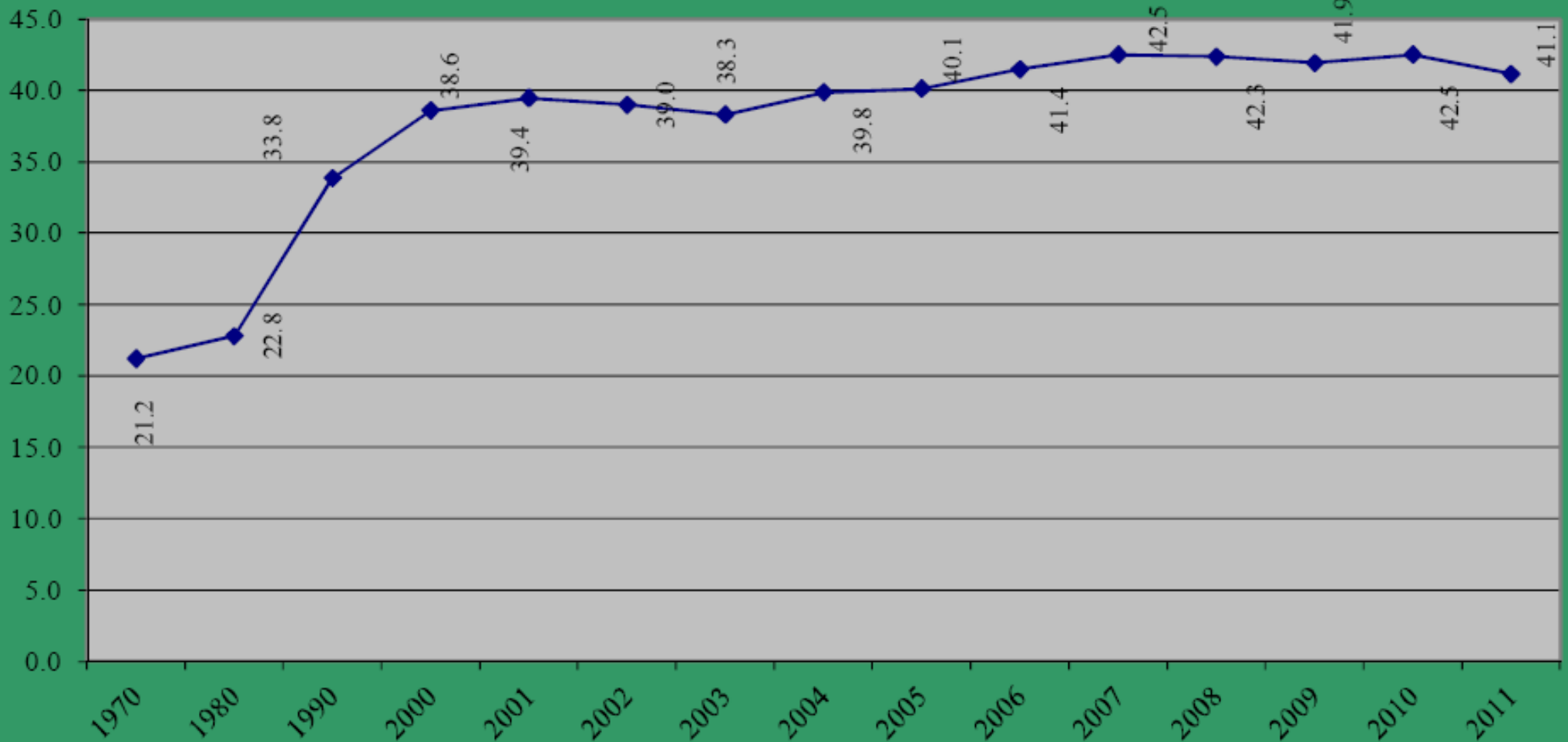
- *India has some unfortunate distinctions:*
  - **Country with highest number of road crashes;**  
*Statistics of road crashes in 2011 is a whopping*  
**4,97,686**
- **Road crash-related fatalities; 1,42,485, in 2011 i.e.**  
*an average of one fatality per 3.5 road crashes*
- *The road crash-related cost amounts to 3% of our*  
**Gross Domestic Product (GDP)**

# Total Number of Road Crashes, Fatalities and Person Injured during 2002 - 2011



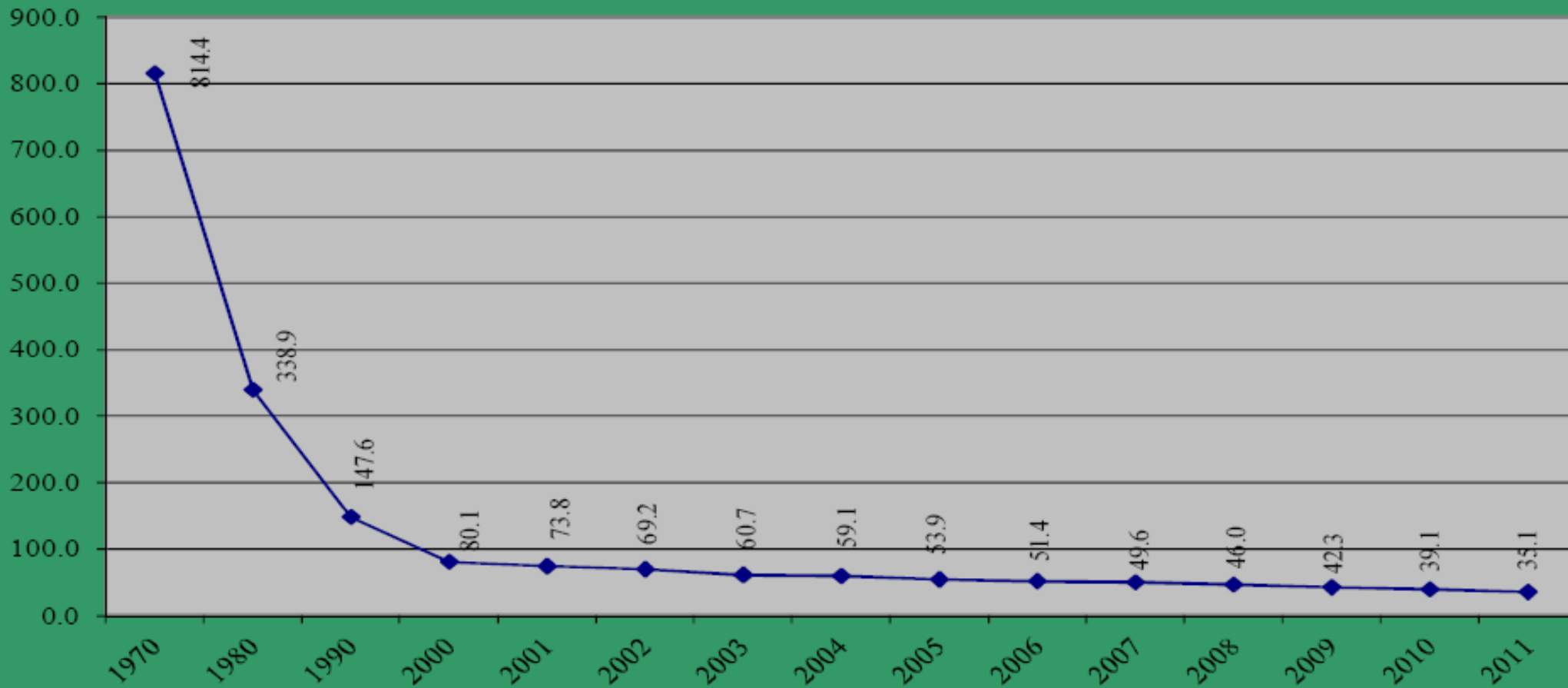
Source : Road Accidents in India (2011). New Delhi, Transport Research Wing, Ministry of Road Transport and Highways, Government of India.

# Number of Road Crashes per Lakh Population (1970-2011)



Source : Road Accidents in India (2011). New Delhi, Transport Research Wing, Ministry of Road Transport and Highways, Government of India.

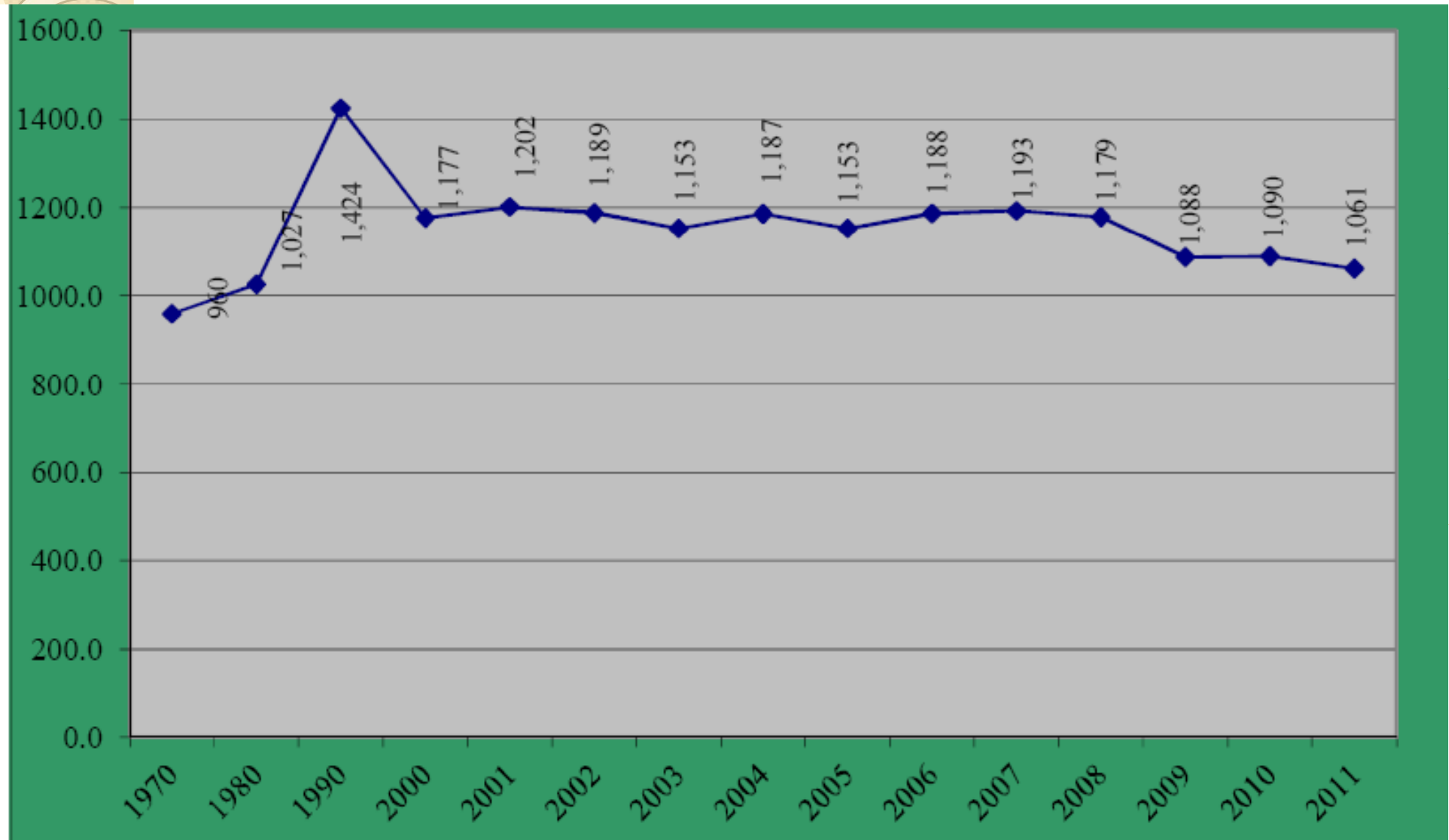
# Number of Road Crashes per Ten Thousand Vehicles (1970-2011)



Source : Road Accidents in India (2011). New Delhi, Transport Research Wing, Ministry of Road Transport and Highways, Government of India.



# Number of Road Crashes per Ten Thousand Kms. of Road Length (1970-2011)



Source : Road Accidents in India (2011). New Delhi, Transport Research Wing, Ministry of Road Transport and Highways, Government of India.

# Number of Road Crashes, Number of Persons Killed and Injured as per Type of Road (2002-2011)

Year	National Highways			State Highways		
	Percentage Share in			Percentage Share in		
	Total Number of Road Accidents	Number of Persons Killed	Number of Persons Injured	Total Number of Road Accidents	Number of Persons Killed	Number of Persons Injured
2002	32.3	39.7	32.4	23.5	27.2	25.4
2003	31.4	38.6	30.1	22.4	28.2	26.7
2004	30.3	37.5	30.8	23.5	26.9	24.9
2005	29.6	37.3	31.3	23.6	27.2	25.7
2006	30.4	37.7	30.8	18.5	26.8	24.9
2007	29.0	35.5	30.2	24.4	27.7	26.2
2008	28.5	35.6	28.6	25.6	28.4	27.5
2009	29.3	36.0	29.6	23.8	27.1	25.5
2010	30.0	36.1	31.3	24.5	27.3	26.0
2011(P)	30.1	37.1	30.5	24.6	27.4	26.1

As per 2011 figures, the share of total road crashes on NHs and SHs is **30.1 %** and **24.6 %** respectively. Similarly, the share of road fatalities on NHs is **37.1 %** whereas SHs account for **27.4 %**

# Road Crash Scenario on National / State Highways

- *National Highways (NHs) and State Highways (SHs)*

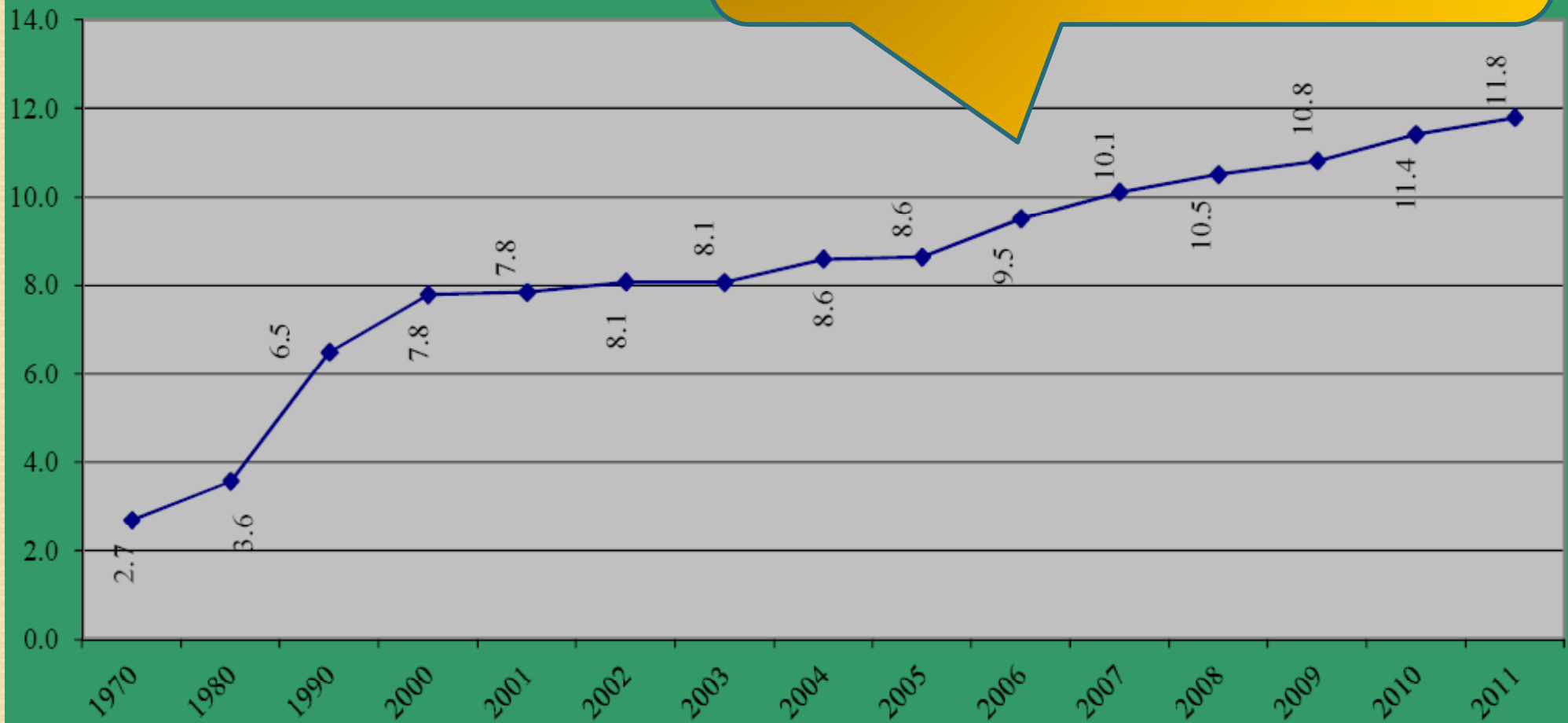
*constitute merely **5.4 %** of the total Indian road network.*

- *Though the capacity of NHs being augmented by National Highway Development Program (NHDP); But sometimes, safety aspect is grossly overlooked in design and implementation.*

Source : *Road Accidents in India (2011)*. New Delhi, Transport Research Wing, Ministry of Road Transport and Highways, Government of India.

# Number of Persons Killed per Lakh of Population

Persons killed per lakh of population jumped four-fold from 2.7 in 1970 to 11.8 in 2011



Source : Road Accidents in India (2011). New Delhi, Transport Research Wing, Ministry of Road Transport and Highways, Government of India.

## *Background (Contd...)*

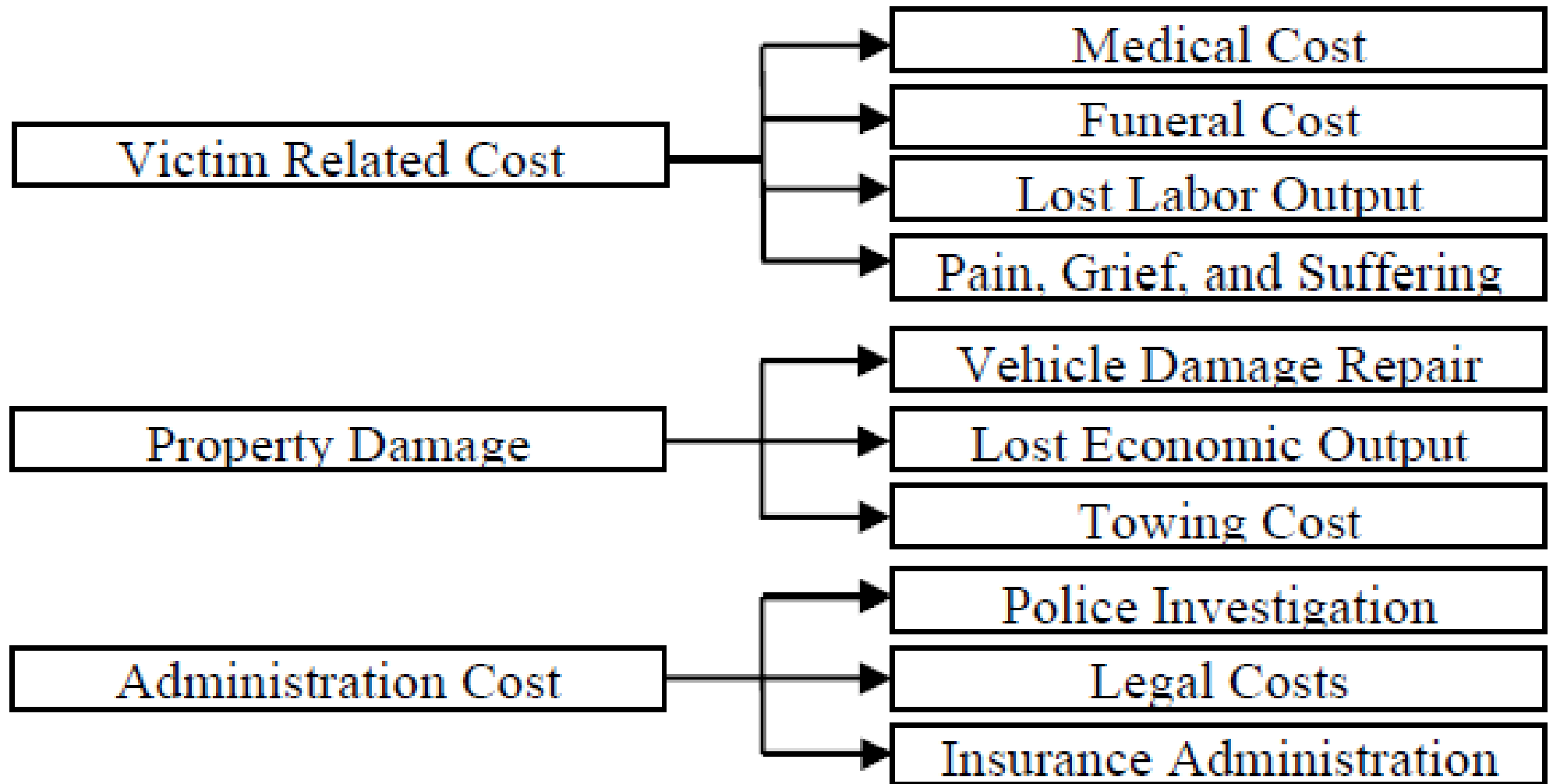
- World Health Organization (WHO) has declared 2011-2020 to be the Decade of Action for Road Safety with the following goal:*

***Prevent five million road traffic deaths globally by 2020; India has rightly joined this endeavour***

# *Social cost of Accidents*

- *Why a cost?*
- *How to calculate this*
  - *Human capital approach*
  - *Willingness to pay*

# Accident Cost Components- Classification



# Estimation Method of Cost Components

## □ Estimation Method of Cost Components

Cost Component	Estimation
Lost labor output	Calculated as the average daily wage rate of each person involved in the crash, multiplied by the number of days off work, then added up for all the people involved in the crash. For fatalities and permanent disabilities the calculation is performed over the rest of their expected productive working life and discounted to an equivalent present value
Pain, grief and suffering	Calculated as a percentage of lost output cost
Vehicle damage	Calculated as the average cost of vehicle repairs multiplied by the average number of vehicles involved in the crash.
Administration cost	Calculated as a percentage of resource costs in line with ADB recommendations (0.2% for fatal accidents, 4% for serious injury accidents, 14% for minor injury accidents and 10% for property damage-only accidents)



# Accident Cost Components-*Medical, Funeral & Lost Labour Output*

- **Medical Cost** –*Actual Cost incurred*
- **Funeral Cost** –*Actual Cost incurred*
- **Lost Labor Output** - Potentially productive years of life lost as a result of an accident are also considered.
- Without data on patient's economic profile, it is reasonable to assume that all the victims are working with capabilities to earn this wage. Lost labor output of fatalities was computed using the cumulative present values of the assumed wages. Lost output is typically the largest casualty related cost incurred.

# Accident Cost Components- Pain, Grief and Suffering (Contd..)

- ❑ **Pain, Grief and Suffering-** In order to quantify the social cost and emotional burden accidents bring about to the victim and their families, a notional amount to reflect 'pain, grief and suffering' is added to the total costs for each accident severity when using the Human Capital method.
- ❑ The amount to be added in the human capital method could be considered as part of a social objective of poverty alleviation, as accidents are known to have a greater adverse effect upon the poor. The amount to be added is often a political and subjective decision, and an element of judgment is unavoidable. As recommended by the ADB, experience from previous international studies is used. These values are:
  - 20% of total lost income for fatal accident.
  - 50% of total lost income for serious injury accident.
  - 30% of total lost income for minor injury accident.

# Accident Cost Components- Property Damage (Contd..)

- ❑ **Vehicle Repair** - The largest portion of property damage is that which stems from damage to vehicles due to mishaps and lost economic productivity of wrecked public transport vehicles.
  
- ❑ According to the TRL's Costing Road Accidents in Developing Countries (1995), an adjustment factor is needed to compensate for lack of information on vehicle repairs according to accident injury severities. These are as follows:
  - Fatal Accident- 1.55 times average repair cost
  - Serious Injury Accident- 1.40 times average repair cost
  - Minor Injury Accident- 1.25 times average repair cost
  - PDO Accident- 0.85 times average repair cost

# **Accident Cost Components- Property Damage** **(Contd..)**

- **Lost Economic Output of Vehicles – Based on vehicle records data or the data from the service centres.**
- **Towing Services Cost –Actual Cost to be added**

# Accident Cost Components- Administration Cost

- ❑ It is usual in previous international studies that police and administration costs are low compared to other cost components. The reason being is these costs are not direct costs that can be associated to accidents. It is advised not to spend much time and effort in producing detailed estimates of these costs because of the sector's complexity. Alternatively, TRL advises developing countries to use the following values for administration costing after their analysis from previous international case studies wherein:
- ❑ **Total resource cost = (lost output + medical cost + property damage).**
  - Fatal Accident----- 0.2% of total resource cost
  - Serious Injury Accident----- 4.0% of total resource cost
  - Minor Injury Accident----- 14 % of total resource cost
  - PDO Accident----- 10 % of total resource cost



***Thank You.***  
***Any Queries Please!***