

The logo for the Transportation Research and Injury Prevention Program (TRIPP) is located on the left side of the slide. It consists of a vertical blue bar with the word "TRIPP" written in white, bold, capital letters. Above the bar, there is a stylized graphic of a road or bridge structure with a white circle above it.

# Pro Poor Transport Strategies

*Geetam Tiwari*

*Department of Civil Engineering*

*Transportation Research and Injury Prevention Program (TRIPP)*

*Indian Institute of Technology (IIT)*

*New Delhi, India*

*Adlerbrestka Guest Professor for Sustainable Transport*

*Chalmers University of Technology(2007-2010)*

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# Urban Poor

- 'poverty must be seen as the deprivation of basic capabilities rather than merely as lowness of income'(Sen 1999).
- Semi skilled and unskilled workers
- Daily wagers or self employed ( street vendors)

# Urban Poor in India

	No. (millions)	%
1987-88	75.17	38.20
1993-94	76.34	32.36
2004-05**	80.80	25.70

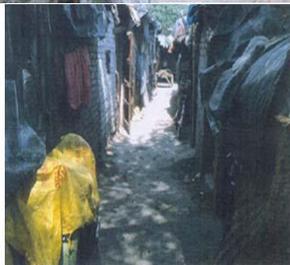
Source: Estimates of the Modified Expert Group (Planning Commission 1997).

\* Planning Commission's estimates, using the consumption data with 30 days recall period.

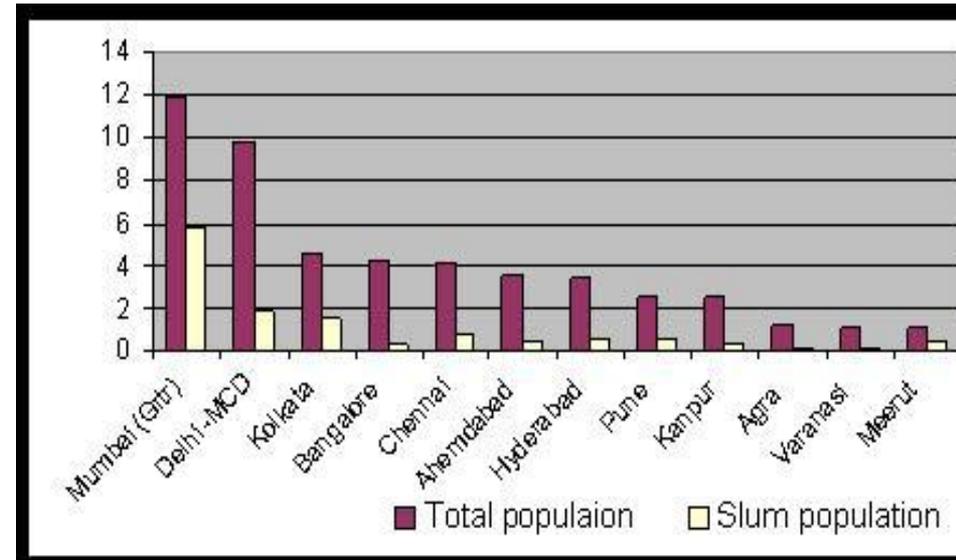
\*\* Planning Commission's estimates, using the consumption data with Uniform Reference Period (30 days recall period)

- **Urban population increased at 2.9 percent p.a. (1981 to 2001), & number of urban poor at 0.6 percent p.a (1983 to 2004/05).**
- **85% of the 80.80 million in non-metros**

- **Informal sector (Urban poor) is an integral part of formal sector**
- **30-50% slum dwellers, 'unauthorized' self constructed dwellings, close to work**
- **Growth of informal sector often faster than formal sector**



## Urbanization in India



**Bicycle ownership 30-50 %**

**Car ownership 3-13%**

**Scooter/Mcycle 40-50%**

# who are the urban poor

## **Urban poor are:**

- the slum dwellers
- the pavement dwellers
- living on the urban periphery, squatting on vacant lands
- those employed as casual labour
- those recent migrants from rural areas, particularly those coming from small and marginal farm and landless labour households
- Seasonal migrants
- those with no or low education and no or low skills

# Where do the Urban Poor Live?

- Slum dwelling population is a good indicator of poverty. But, not all the poor are living in slums and not all the slum dwellers are poor.
- 25.7% of urban population is below the officially defined poverty line in 2004-05. But, on the whole, only 15% of the urban population live in slums (2001).
- 24.1% or 17.70 million population of the million plus municipal corporations lived in slums in 2001. But only 15% here are below poverty line.
- Areas not designated as slums also house the poor. For example, *chawls* in Mumbai, *chawls* and old city areas in Ahmedabad, *katras* in Delhi

# where do they live in metros

- Tend to live near their place of work, squatting
- In industrial segments of the city
- On construction sites – new constructions are on the urban periphery
- In old city areas
- On pavements in the commercial areas
- In marginal lands, such as swamps, riverbeds prone to flooding, no-development zones, etc.

# Pushing out the poor from metros

- New Delhi, in 1977, they were sent to relocation sites 17 kms outside, thrown on unserviced periphery
- Post-2000, 500,000 people evicted in Delhi. Those rehabilitated (thrown out) are at a distance of 33-35 kms,
- Beijing, relocation of central city public housing dwellers beyond 5<sup>th</sup> ring road. Migrants living in sub-divided rural houses (siheyuans) on the urban periphery

# Multiple Deprivations

- Only 37% hhs in the bottom half of the urban population had access to all three basic facilities, w/s, sanitation and electricity
- This figure for top half was 80%
- 69% households in bottom half use community water supply. This figure for top half is 35%
- As high as 46% hhs in top half have access to individual water supply. This figure for bottom half is only 22%

# % Workers in informal sector

	Male	Female	Persons
55 <sup>th</sup> Round	67.5	68.7	67.7
61 <sup>st</sup> Round	73.7	63.5	71.7

**There is increased informalisation of urban employment**

# Urban poor in Delhi

~90% people are employed in unorganised sector( 2002)

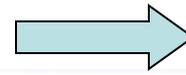
48% unorganised sector is dependent on “own business”- vendors etc.

50% women have daily wage jobs

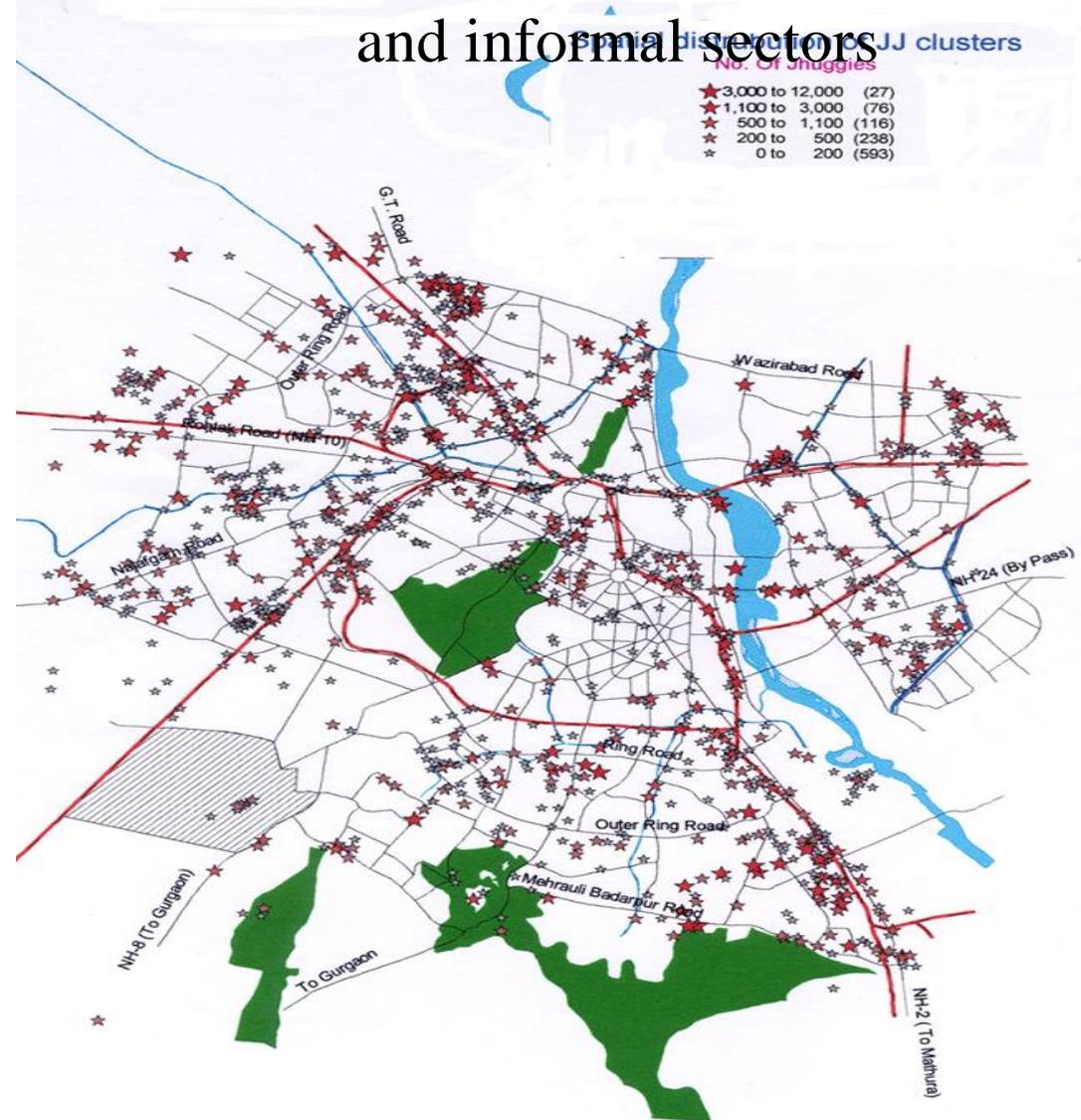
Women are either domestic workers, self employed, or street vendors.

52% women walk to work

Women have longer work days than men



Symbiosis between formal and informal sectors

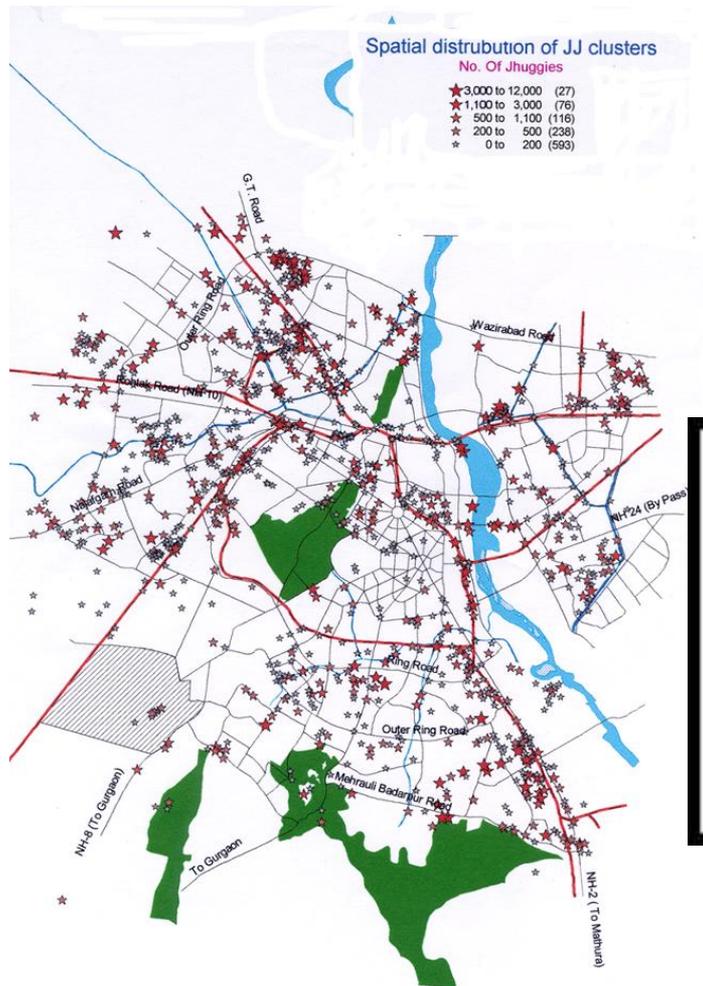


Distribution of Jhuggi Jhopri Clusters in Delhi

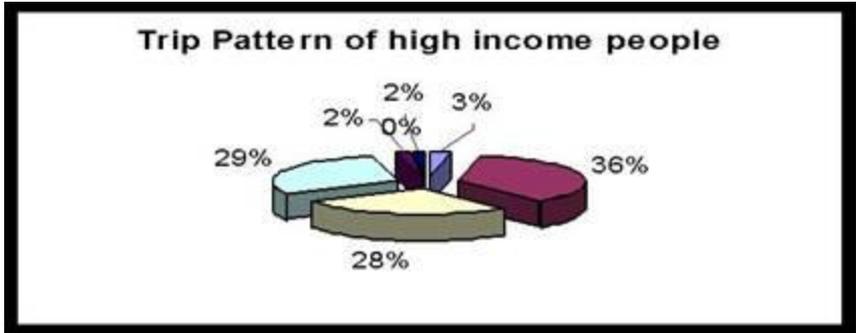
# Characteristics of Informal settlements (Urban Poor)

- Location
  - wrt access to employment(formal and informal)
- Activity Planning
  - Combining production and consumption activities
- Space usage
  - High intensity of space usage through multiple use

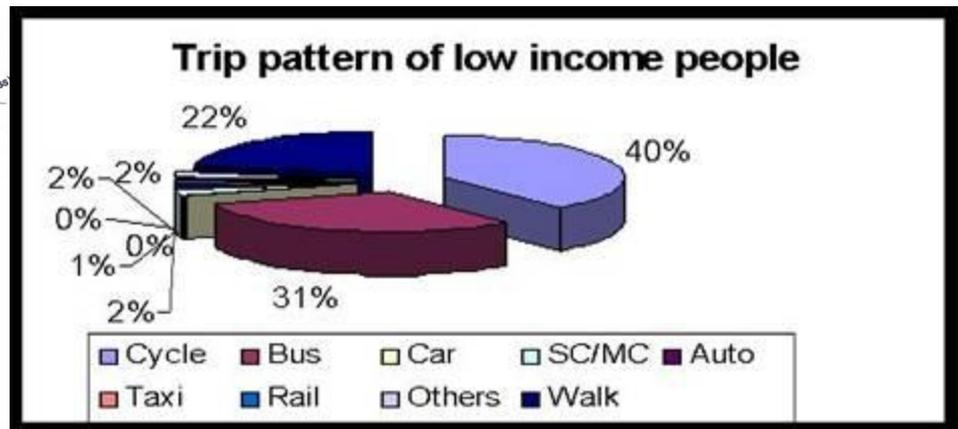
# Travel patterns of Urban poor and others



Distribution of Jhuggi Jhopri Clusters in Delhi



Bus, twheelers and cars



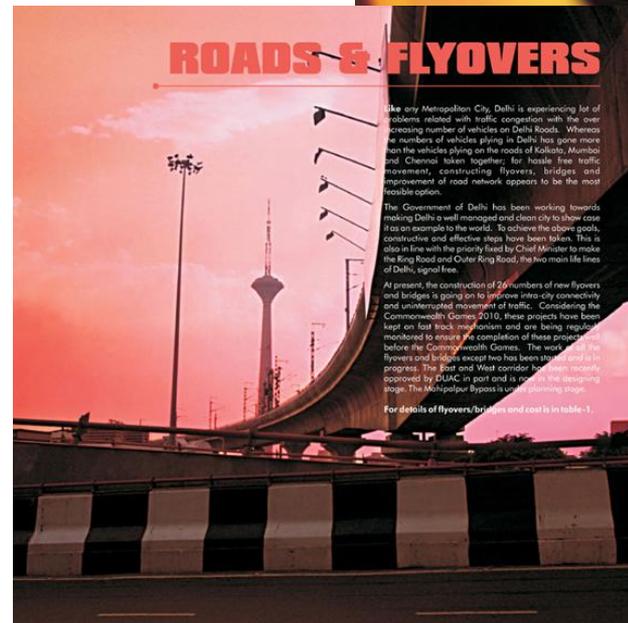
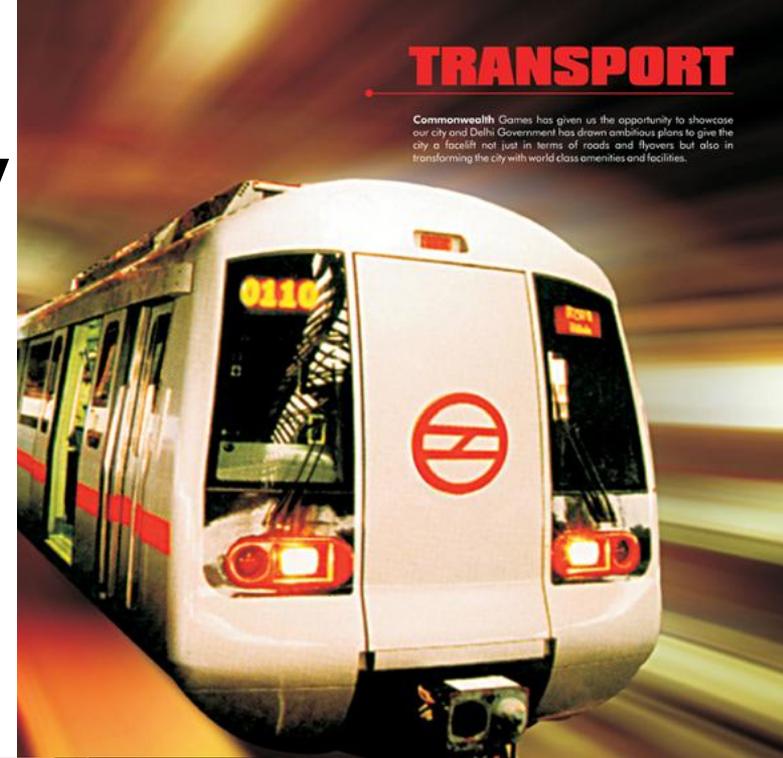
Bicycle, Bus, walk

# Delhi Climate Policy

## projects

- Metro extension
- BUS corporatisation
- AFCS
- Flyovers, ROBs, RUBs
- Street lighting

**Pedestrian and bicycle facilities missing !**



# Current (GREEN)TRANSPORT projects

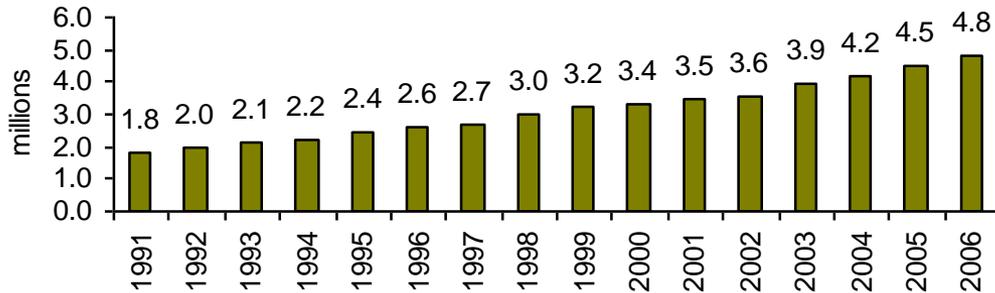
- **CNG in Public Transport:** Initial outcry  
Bus travel becomes expensive and fleet size reduces
- **Metro :** Strong support from media  
PT becomes expensive, poor household relocated
- **BRT(peds, bicycle):** Strong opposition from media  
Bus travels faster than car, car lanes congested

# CNG in PT: 2001

## Uncontrolled vehicle numbers swamp change

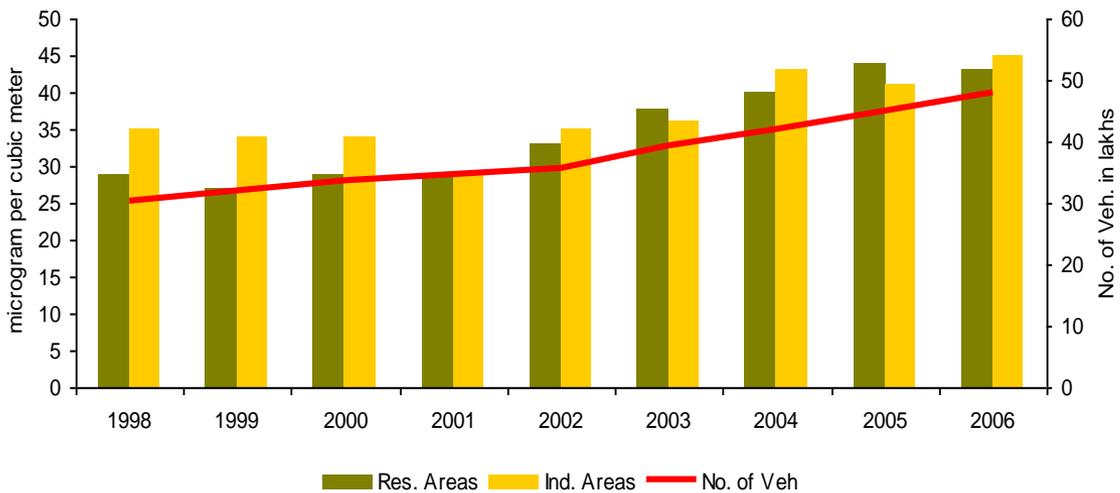
Three fold increase since 1991

Vehicle registrations



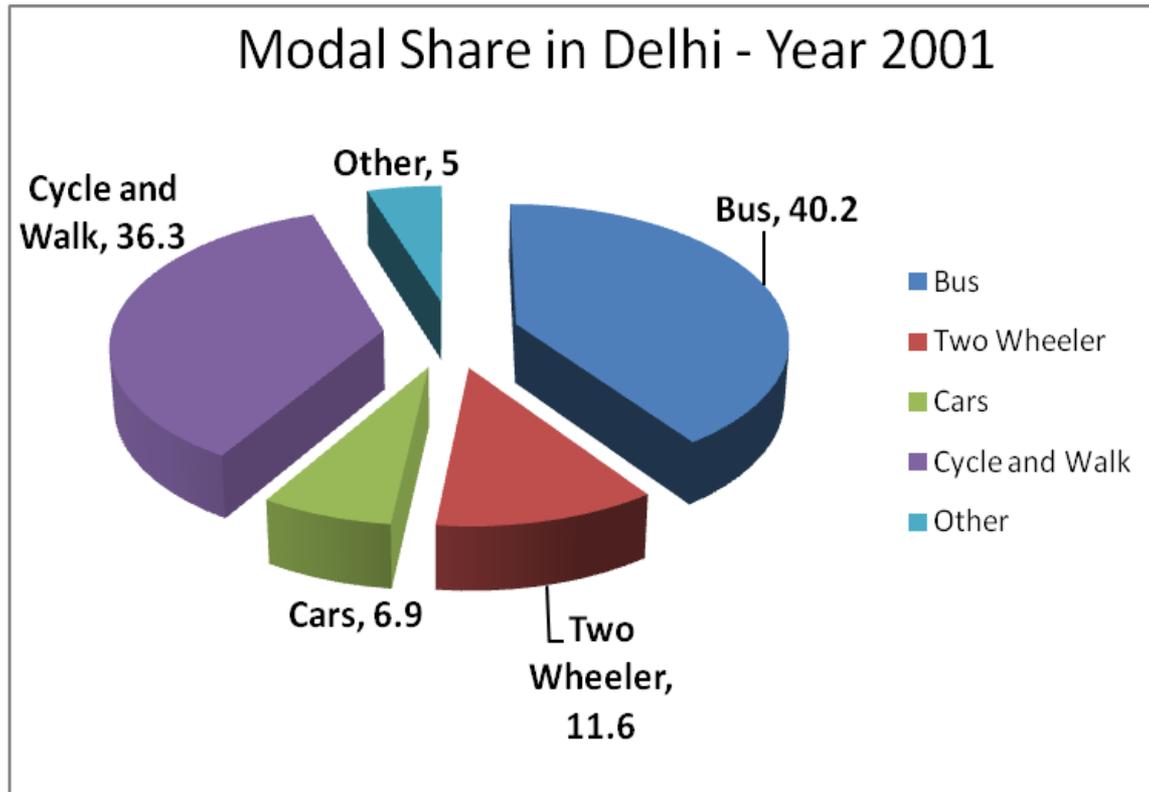
\*fiscal year

Delhi NO2 trend



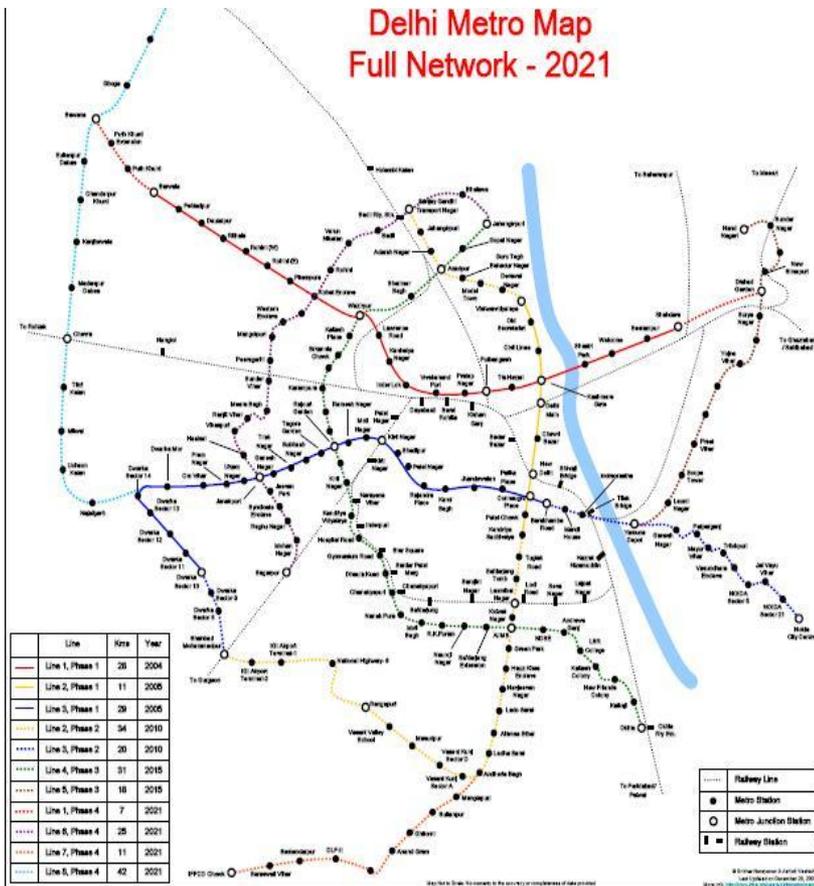
Vehicle growth correlates strongly with rising NOx levels

Assumption: Public transport improves mobility and accessibility, therefore socio economic well being



**Does public transport benefit people who do not have access to personal motorized vehicles?**

2010:~120 Km of metro, 1 million trips/day;  
 planned 300 Km of Metro by 2021



	Line	Kms	Year
	Line 1, Phase 1	28	2004
	Line 2, Phase 1	11	2005
	Line 3, Phase 1	29	2005
	Line 2, Phase 2	34	2010
	Line 3, Phase 2	20	2010
	Line 4, Phase 3	31	2015
	Line 5, Phase 3	18	2015
	Line 1, Phase 4	7	2021
	Line 6, Phase 4	25	2021
	Line 7, Phase 4	11	2021
	Line 8, Phase 4	42	2021

# Large number of people relocated for metro and other development projects

Converting walking trips to motorised trips- buses, RTVs, LCVs

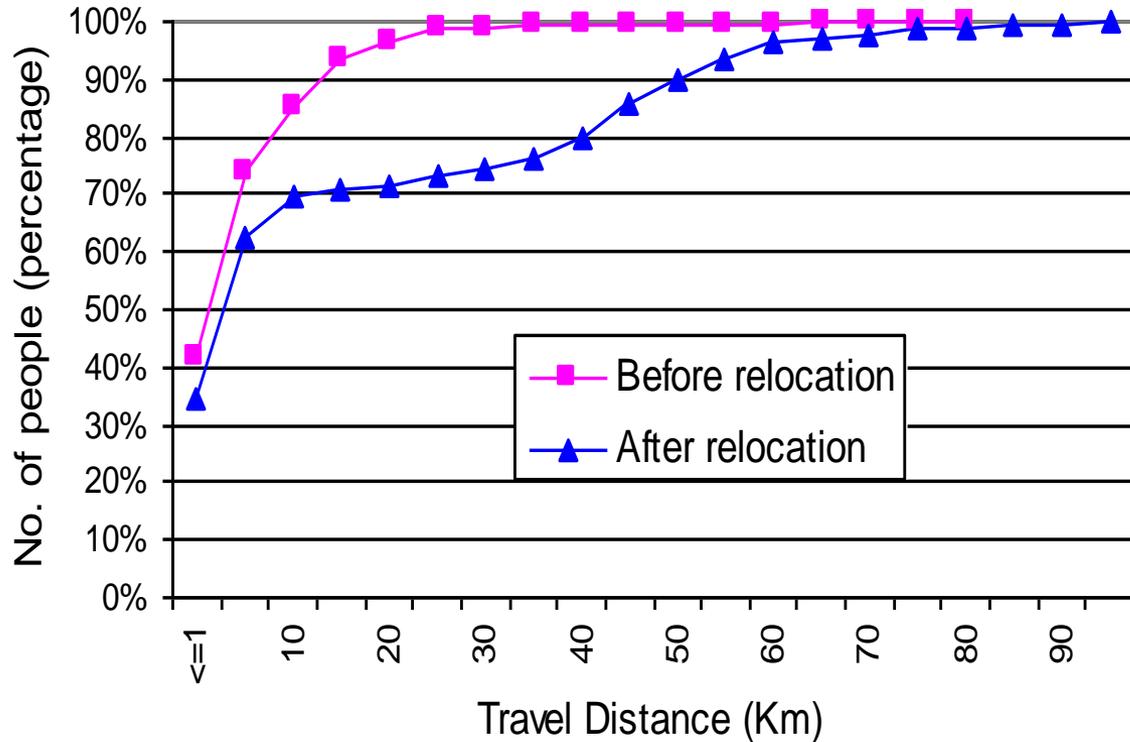
Long cycling trips



Time poverty of women increases

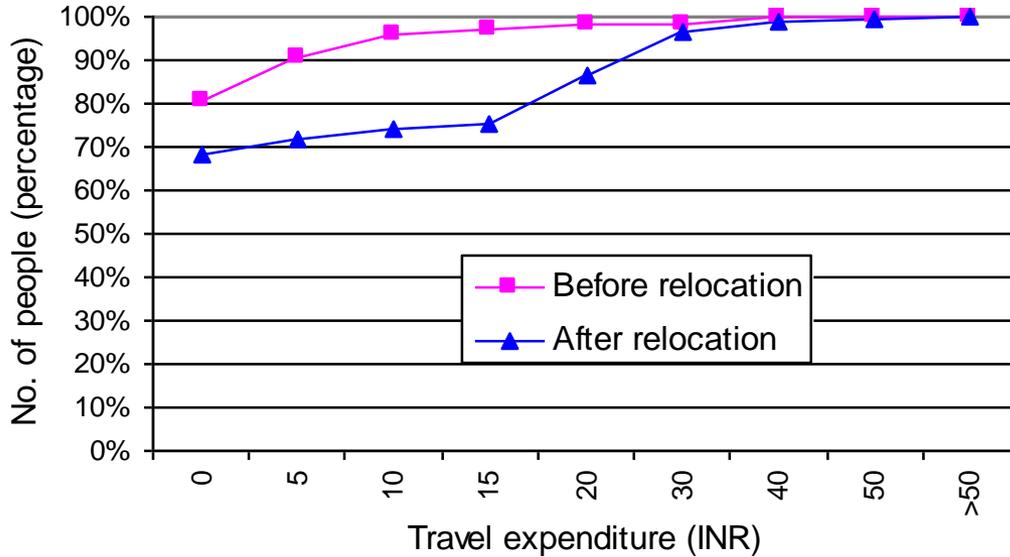
Opportunity for “self employed” business reduces

Daily Travel Distance per person (cumulative)



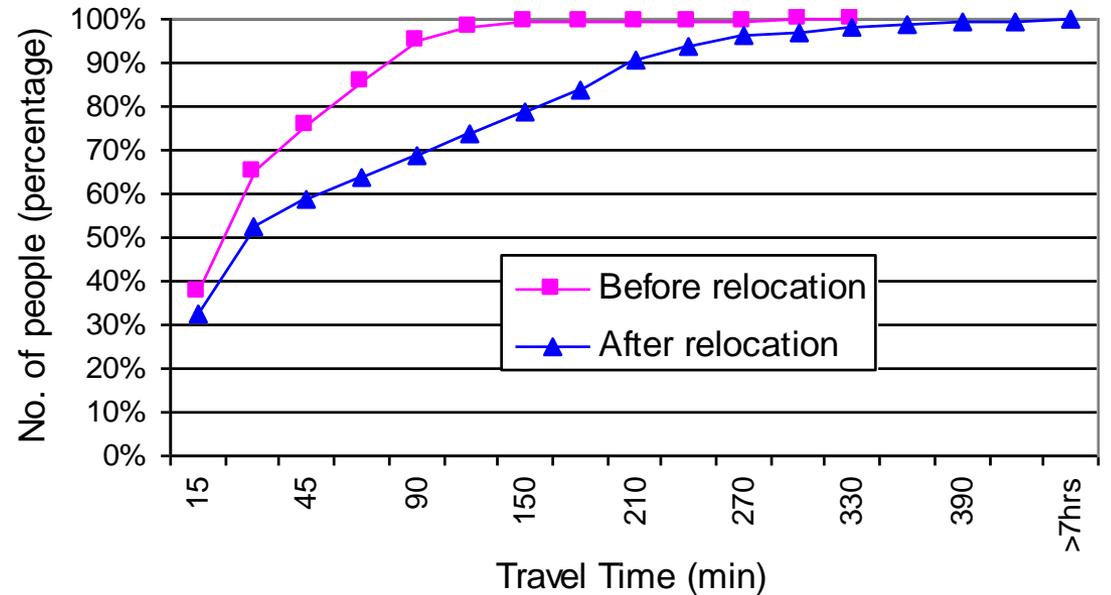
More people travel longer distances in planned settlement

Daily Travel Expenditure per person (cumulative)



Increase in travel cost and travel time

Daily Travel Time per person (cumulative)



# Pro poor transport possible: Bicycle lanes, pedestrian paths

BRT System provides equal road space to all types of commuters and offers safety to cyclist & pedestrians.



Courtesy: ITDP

**Before BRT**



**After BRT**

ITDP has rated Cycling Facilities at BRT as Grade "A". Bicycles flows at peak time are as high as 1,200 per hour, highest in world after China

# Inclusive rd section: Bus, bicycle, three wheelers, street vendors

A.N.Junction , Delhi, 2008

2 bus platforms (near side of junction) capacity: TU of 10 vehicles, at grade crossing



**Line  
capacity:  
9000 prs/h**

**Peak  
demand:  
6000 prs/h**

# Design of street vendors

- Street vendors spaces defined by benches and bollards located outside pedestrian path and





Improving health worldwide

THE LANCET

# Impact on Public Health of Reducing Greenhouse Gas Emissions from Urban Land Transport

Based on :

Public health benefits of strategies to reduce greenhouse-gas emissions: urban land transport. Woodcock J, Edwards P, Tonne C. et al.

The Lancet: Published Online November 25, 2009 DOI:10.1016/S0140-6736(09)61714-1

# Possible Impact on CO2

(woodcock J et al, Lancet, 2009)

London Population 2006 = 7.5m 2030 = 9.0m  Delhi Population 2004 = 14.8m 2030 = 26.0m	London			Delhi		
	Aggregate Transport CO2 Emissions (tonnes)	Transport CO2 Emissions Per Person (tCO2/person)	CO2 Emissions Reduction on 1990 (%)	Aggregate Transport CO2 Emissions	Transport CO2 Emissions Per Person (tCO2/person)	CO2 Emissions Increase on 1990 (%)
2006 London 2004 Delhi	9,647,900	1.3	-2.50%	6,146,651	0.4	97%
2010 BAU	9,935,897	1.3	0%	8,268,298	0.5	165%
2030 Scenario 1 BAU	10,381,318	1.2	4.80%	19,550,693	0.8	526%
2030 Scenario 2 LCD	6,480,565	0.7	-39%	17,069,668	0.7	447%
2030 Scenario 3 AT	6,120,306	0.7	-43%	10,458,736	0.4	235%
2030 Scenario 4 ST	3,608,226	0.4	-65%	9,327,207	0.4	199%

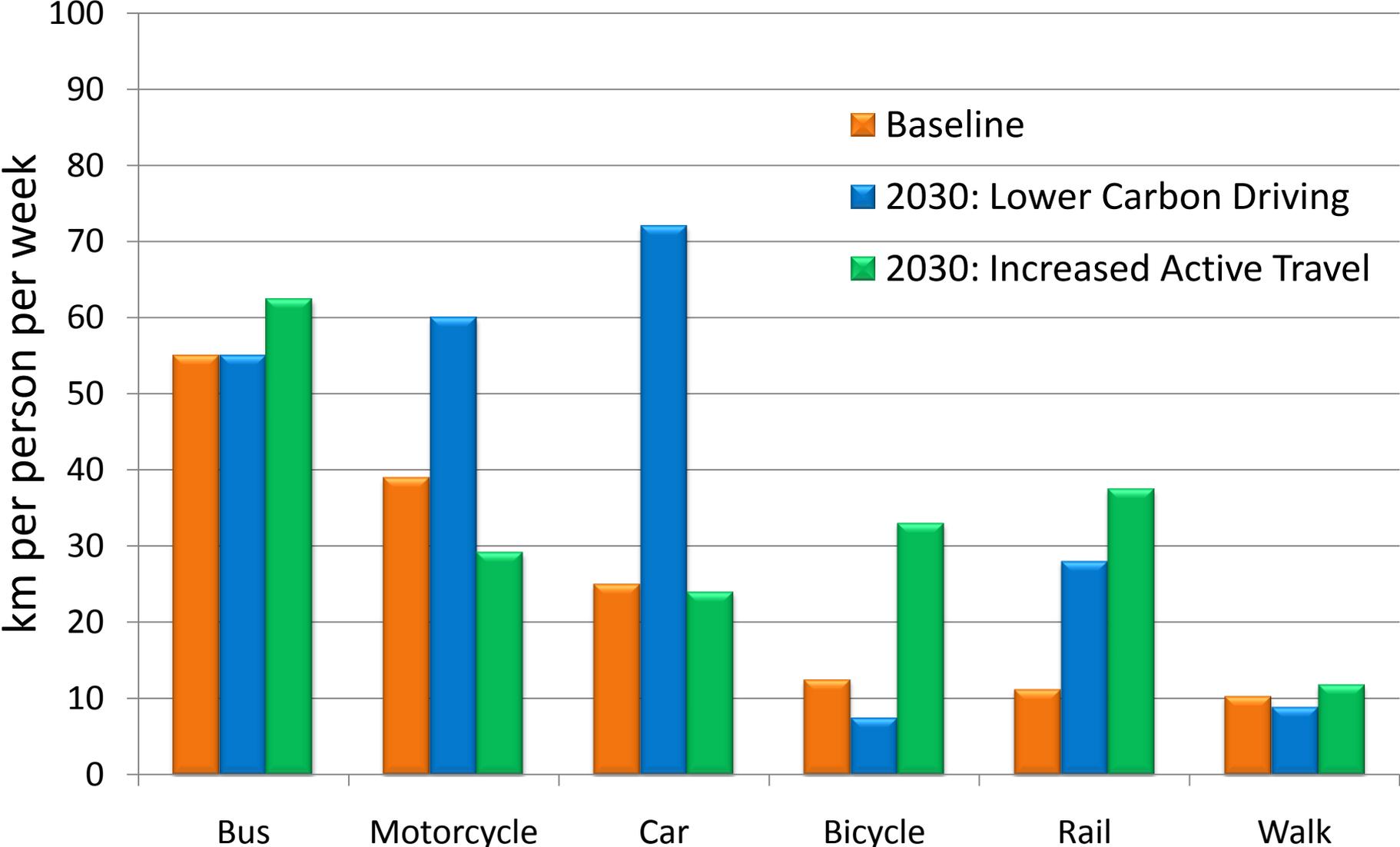
# Possible scenarios for Delhi

- **Business as usual scenario:** Projection of existing trends and no coherent strategy to reduce the increase in the use of cars, but *includes an anticipated increase in rail use.*
- **Lower-carbon-emitting vehicle scenario:** relies on implementation of vehicle technologies along with alternative fuel usage and *an anticipated increase in rail use.*
- **Increased active travel scenario (walk and cycle):** a reversal of present trends is assumed with a small increase in the distance walked and more than double increase in distance cycled, *a large increase in rail use* and small increase in bus use. Policy interventions include substantial investment in infrastructure designed for pedestrians and cyclists rather than for cars, carbon rationing, road pricing, traffic demand management, restrictions for car parking and access, reduced speed limits

# Possible scenario for Delhi cont.

- **Sustainable transport scenario:** lower emissions from motorized vehicle and low car use from active travel scenario. Policy change would require high-intensity implementation and effectiveness of all measures. Further reduction could occur through use of electric vehicles with energy from low-carbon sources; shorter-distance trips; and continued shift from car use to walking or cycling.
- **Short distance active travel scenario:** In this scenario, it is assumed that the same motor vehicle distances are travelled as in the sustainable transport scenario but only half the increase in distances walked and cycled. This scenario represents less travel and shorter travel distances than in the other scenarios.

# Delhi travel patterns



# Delhi: Health impacts by cause

	Change in disease burden	Change in premature deaths
Ischaemic heart disease	11-25%	2490-7140
Cerebrovascular disease	11-25%	1270-3650
Road traffic crashes	27-69%	1170-2990
Diabetes	6-17%	180-460
Depression	2-7%	NA

# Conclusions

- Replacing motor vehicle trips with walking or cycling is a win-win in both developed & developing countries
- Pedestrians and cyclists have the right to direct, pleasant and safe routes
- Restrict motor vehicles:
  - speed, road space and convenience

# Landuse-Transport integration for sustainable cities

- Integrating diverse socio economic households in master plan
- Street designs and transport system to ensure current and potential walking and bicycling trips
- Lessons- indicators and methods from self organising cities.

# ***Urban Transport challenges***

*Development and modernity is associated with technology  
(fuel, automobile, metro rail)*

*External financing favours large construction projects ( metro  
vs buses)*

*Zero emission modes, walking and cycling have no “market  
value” i.e. financing through land development or loans  
not possible, hence no takers!*

*Successful public transport projects are those which do not  
affect the cars adversely not just benefiting the bus  
commuters!*