# Bicycling in Asia

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*Sustainable Urban Mobility in Asia(SUMA): CAI Asia*

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# Important Questions

(a) Why do some countries have substantial shares of cycling?

*Policy support, manufacturing, expertise*

(b) What are the cycling trends?

Declining in all countries, 5%-20% in all cities, 30%-50% in small cities

(c) What is the potential of rickshaws and cycles?

As para-transit in Bangladesh, feeder in other cities, ~40% trips short trips conducive for bicycles

(d) How is bicycle use associated with poverty, urban development, employment, health, and sustainability(climate change?)

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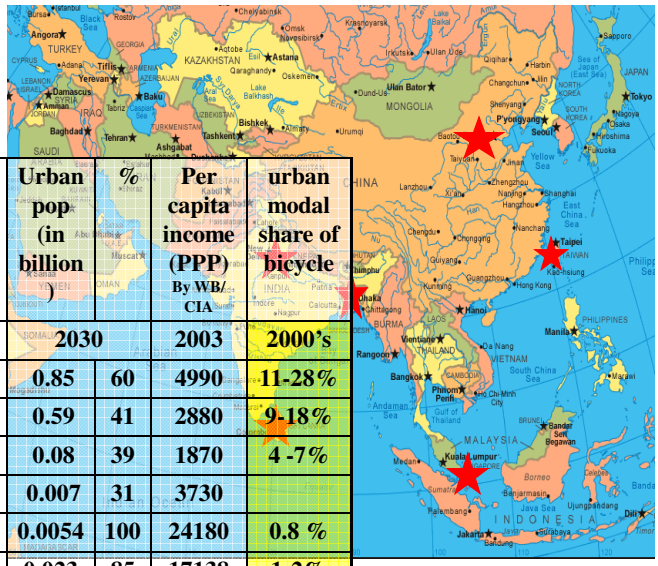
# Focus Countries

6 countries

**Singapore – city state**

**100% urbanized**




| Area | Urban pop (in billion) | % | Urban pop (in billion) | % | Per capita income (PPP) By WB/ CIA | urban modal share of bicycle |
|---|---|---|---|---|---|---|
| | 2000's | | 2030 | | 2003 | 2000's |
| China | 0.6 | 46 | 0.85 | 60 | 4990 | 11-28% |
| India | 0.3 | 28 | 0.59 | 41 | 2880 | 9-18% |
| Bangladesh | 0.035 | 25 | 0.08 | 39 | 1870 | 4 -7% |
| Sri Lanka | 0.0041 | 22 | 0.007 | 31 | 3730 | |
| Singapore | 0.0043 | 100 | 0.0054 | 100 | 24180 | 0.8 % |
| Taiwan | 0.023 | 81 | 0.023 | 85 | 17138 | 1-2% |

# Bicycle Environment in Taiwan

- **The planning of biking network**
  - **Present situation of bicycle lanes in Taiwan**
  - **The promotion of implementing bicycle lanes in Taiwan**

Taoyuan: 11.5km

Taipei: 205.1km

Hsinchu: 29km

Miaoli: 19km

Yilan: 21.7km

Taichung: 37km

Hualien: 40km

Changhua: 32km

Yunlin: 7.1km

Nantou: 17.2km

Chiayi: 4km

Tainan: 45.2km

Taitung: 27.3km

Kaohsiung: 31.2km

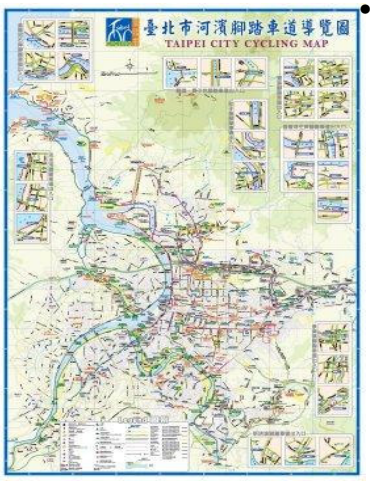
Pingtung: 28km

Total Length in Taiwan 555.3km

**Disadvantages**

- Lack of connection
- Lack of commuting bicycle lanes

# The Planning of Biking Network




- **Development of bicycle lanes: Taipei as example**
  - Plan to implement 50km/year bicycle lanes in urban area
  - Promote bicycle rental system to connect biking network, markets, parks and public transit stations

**From recreation to transportation mode!!**

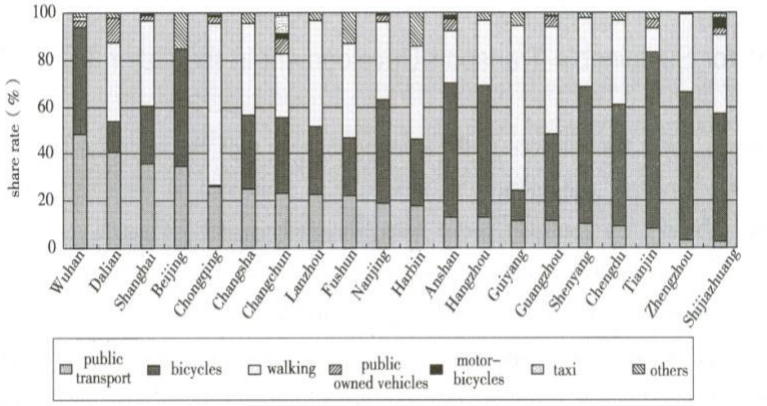
# China (cont)

Population – 1.3 billion

36 central cities – 233 million (17.8%)

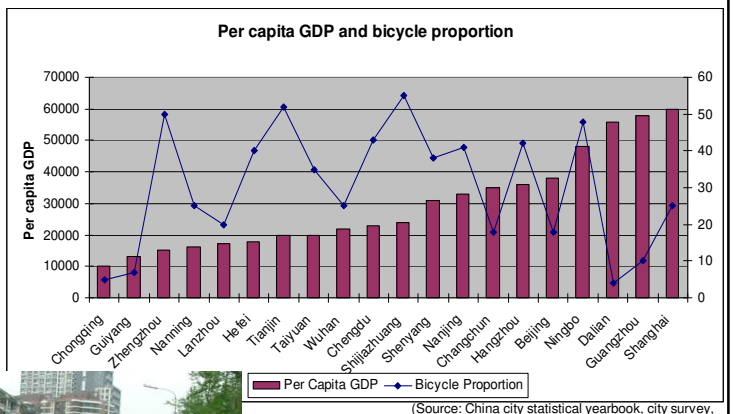
Bicycle modal share – varies between 11- 47%

Average NMT (walk + bicycle) - 65%




# China (cont)

Cities with lower incomes (below 35000 RMB) – avg. 39% Bicycle Mode Share




(Source: China city statistical yearbook, city survey, http://www.chinautc.com)

# China (cont) E-bikes

- **E-bikes** policy (NMT vs MT)
- Some cities restricted the use –
  - interfering with regular transport,
  - weak safety,
  - producing pollution of batteries
- Average distance -22 km
- 80% of electric bicycle users earlier bicycle users
- Problems
  - Lack of industry supervision
  - Speed surpasses the standards (national)
  - Poor in safety.

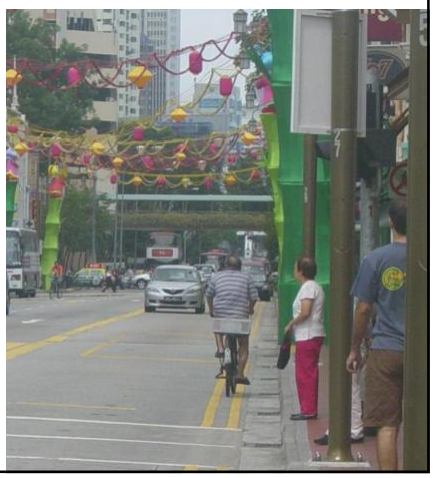
# Singapore

- City state - 4.3 million
- Bicycle only - 1.1% of home-based work trips
  0.6% of home-based school trips

common among non-resident workers

USERS PROFILE

- Workers in low-income (<$1000)
- Mostly males
- Work trip is less than 15 minutes or < 4km
- Workers aged 50 or more
- Low socio-economic status



# Singapore (cont)

INFRASTRUCTURE

- Ø Footpath bicycling is norm (legalization considered)
- Ø Signs warning motorists of bicycles
- Ø Wide-radius slip lanes at most major intersections
- Ø Multiple lanes turning left
- Ø Narrow kerbside lanes
- Ø Extensive system of one-way streets

- ✓ Limited on-street parking
- ✓ Road maintenance, repairs and surface quality -good
- ✓ Bicycles permitted in bus lanes (although not widely known)
- ✓ Off-road paths - NParks builds and plans 300km

Bicycle related fatalities -10.4% (2005)

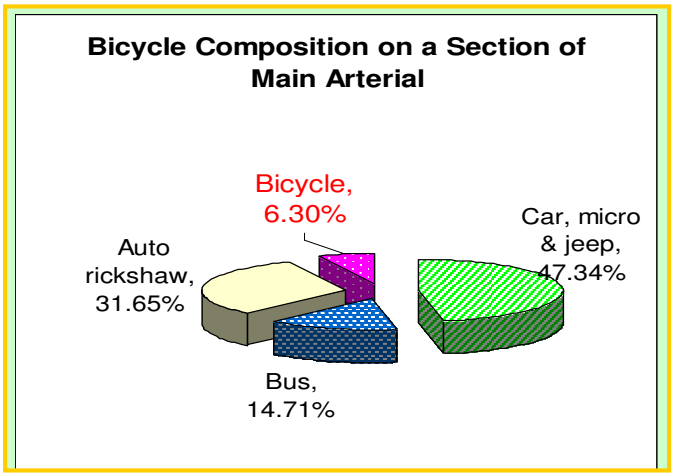
Aged people over-represented in fatalities

# Sri Lanka

- Population - 19.9 million people (2006)
- Total area - 62,705 km2
- Average density - 317 persons per km2
- Poverty - 42% (people under $2 per day)
- 30% urban

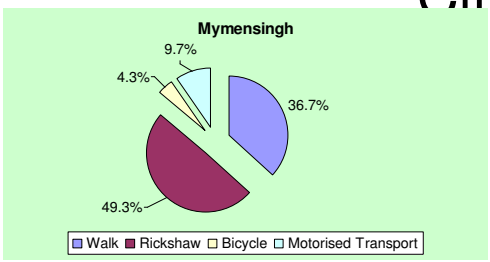
- Bicycle ownership – 46.6%
- Total bicycles – 2.1m
- Employment in bicycle sector -
  - Servicing sector – 10000 people employed
  - Sales and distribution – 3500 people
  - Dispatch riders – 16000 people
  - Manufactures – 600 people

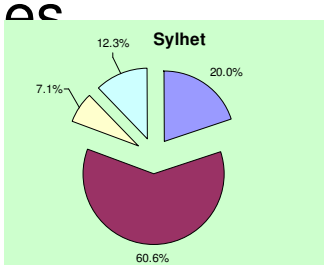
# Cycling on streets (on a section of a main Arterial in Dhaka)

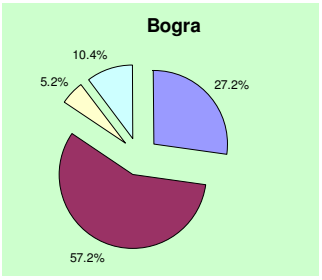




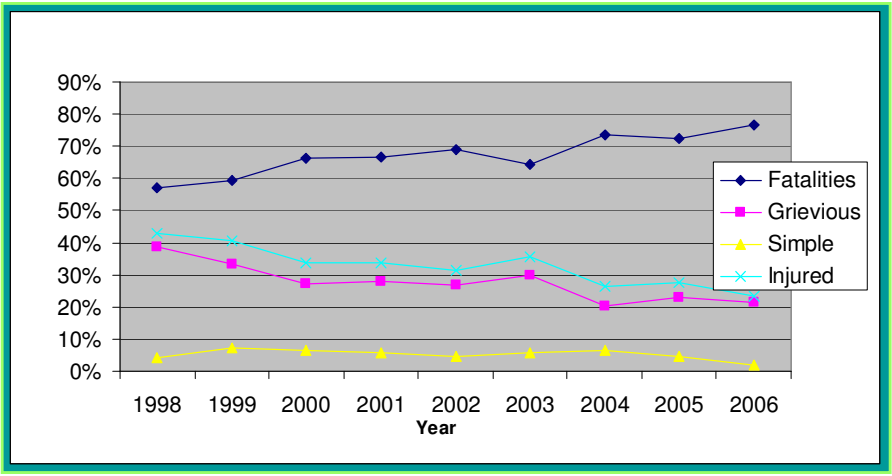

# Modal Split of Medium Sized Cities



# TERNDS OF BICYCLIST CASUALTIES:
# FATALITIES VS INJURIES



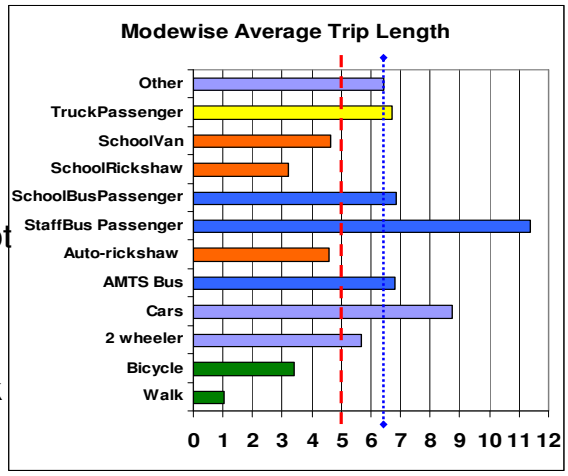

# TRAVEL CHARACTERISTICS

**Vehicle ownership**

Bicycle = 35 - 60 %
2-wheeler = 32 - 55%
4-wheeler = 2 - 8 %
None = 25 - 35 %
Source : Census of India 2001

High ownership does not mean high usage

Huge section does not own any vehicles – walk or use public transport




Source : MOST 2004

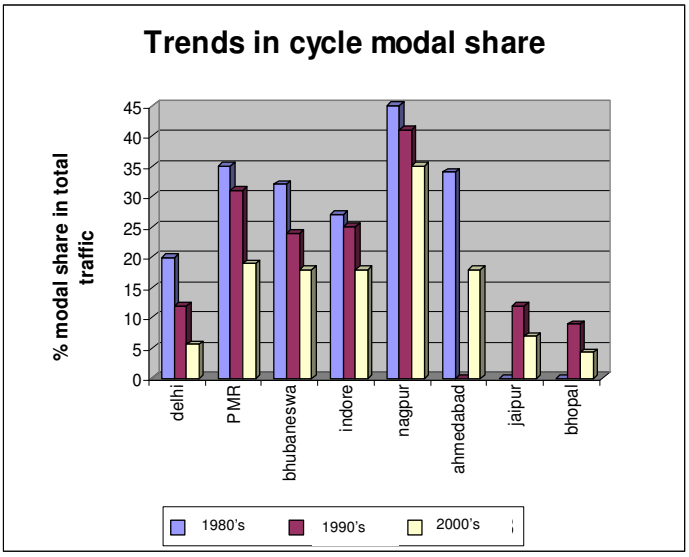
# BICYCLE USE TRENDS 1980-2000

•Sharp decline during 80's-90's due to

–Fast growth of motorized vehicles,

–Road infrastructure improvements

–High cycle fatalities



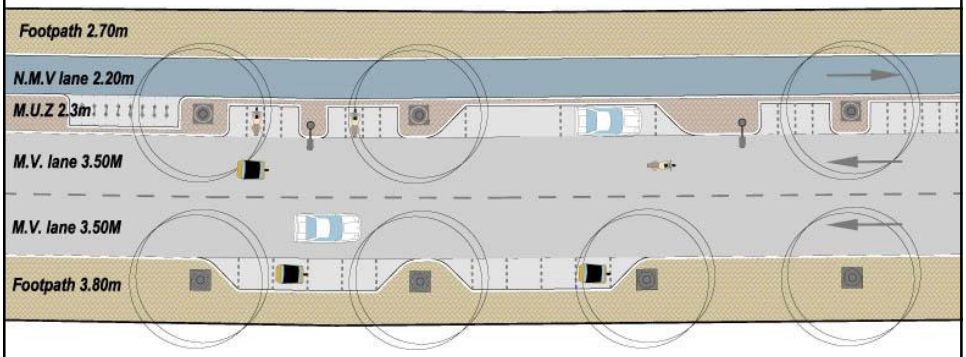

# CAPTIVE RIDERS

- 17 - 30% households - Rs. 5000/month in medium and large cities.
  - Max can spend 15% (750 Rs. / month/ h-h) on transport
- 19% to 30% population - in slums/ JJ colonies
  - 21% h/h owns cycle (4% other NMV and rarely any motorized vehicle)
- Captive rider group with as high as 80% ridership
  - all age groups
  - Cycle ridership decreases with increasing level of literacy and income.
  - 100% people whose work place is on the move
  - above 80% of factory / shop workers are using cycles
- All lengths of distances for work place (up to 50 km) ridership > 70%;

## Design- where is the space?

Proposed section

**18.0m ROW / One way street / Road no. 8**




**Plan**

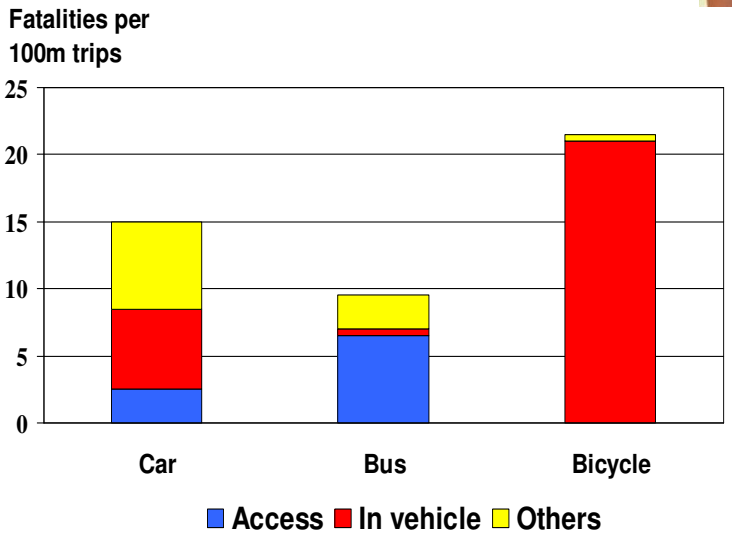
## Proposed details

## BRT NMT integration: Exclusive NMT lane, Delhi BRT

Special lighting for NMV lanes

## Safety Challenge!

### Trip types and fatality rates in central Copenhagen

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## Poverty and bicycle

Urban consumption pattern – per capita exp. 2004-05

| Item | Value (Rs.) (pe capita) | Value per hh. | %age |
|---|---|---|---|
| Food | 447.41 | 2237.05 | 42.51 |
| Non food | 604.95 | 3024.75 | 57.49 |
| - Fuel & light | 104.62 | 523.10 | 9.94 |
| - Clothing & footwear | 49.26 | 246.30 | 4.68 |
| - Education | 52.69 | 263.45 | 5.01 |
| - Medical | 54.59 | 272.95 | 5.19 |
| - Durables | 42.81 | 214.05 | 4.07 |
| - Conveyance | 68.59 | 342.95 | 6.52 |
| - Rent | 59.45 | 297.25 | 5.65 |
| - Taxes & cesses | 8.50 | 42.50 | 0.81 |
| Total | 1052.36 | 5261.80 | 100.00 |

Source: National Sample Survey, 61st Round, Consumption Expenditure data.

## Typology of cycle rickshaws

**Front Bicycle End with Rear Passenger Carriage**

**Front Passenger Carriage with a Rear Bicycle End**

**Bicycle with a Sidecar**

## Why the private sector doesn't innovate on its own

- **Profit margin is too low**
- **Producers are risk-averse small businesses**
- **Consumers are risk-averse low income people**

**But underwriting the risks of new product development, marketing, and dissemination can overcome these barriers to modernization.**

## Important Trends/Issues

- Policy
  - National policy exists in India, Taiwan, China
- Design
  - Outdated guidelines
  - Design and construction compromised
  - Major investments in MV infrastructure

# Important Trends/Issues

- Role of CSO
  - Essential for sustained demand for NMV friendly policy and design
- Safety/Health benefits
  - Well documented not included at policy and investment stage
- Poverty and Gender context
  - Required at policy and design stage

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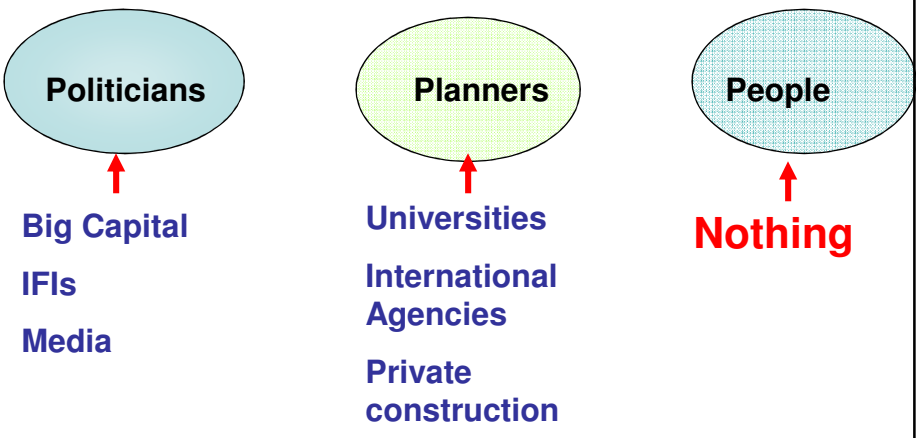
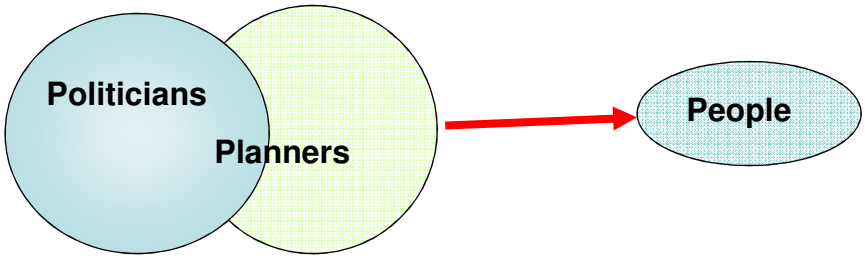
# FUTURE

- PROMOTION OF CONSPICUITY BY LAW AND COMMUNITY PRESSURE
- SPEED CONTROL BY URBAN BLOCK SIZE
- ROUNDABOUT DESIGN
- TRAFFIC CALMING DESIGNS WITH HIGH MOTORCYCLE USE
- SAFER VEHICLE FRONTS

## The PPP Network




## Growing Distance Between PP & P



**The transport infrastructure designs in the spirit the sustainable(21st century) Urban Transport Policy :**

**“equitable space allocation for all road users with a focus on people rather than vehicles.”**