Indicators and benchmarks for inclusive mobility & accessibility

Darshini Mahadevia

(Centre for Urban Equity and Faculty of Planning, CEPT University)

Rutul Joshi

(Centre for Urban Equity and Faculty of Planning, CEPT University)

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Inclusive
Low-carbon Mobility Plans

- LCMP should not only measure/model ‘mobility’ but also analyze ‘mobility constraints’ (or lack of accessibility) in order to plan for them.

- Mobility constraints can be defined by…
  - Affordability
  - Location
  - Social groups (gender, caste etc.)
  - Occupation (i.e. on-foot street vendors etc.)
  - Modes (walking, cycling)

Dimensions of Inclusiveness for the poor and vulnerable groups

- Affordability Dimension – Share of transport expenditure in total household expenditure
- Social Dimension – Gender, marginal social groups (caste, religious minorities), Urban Poor
- Occupational Dimension
- Locational Dimension – Work-residence link and residence-social facilities link
- Modal Dimension – NMT should not be pushed out

Measuring Inclusiveness

1. To measure mobility constraints - Accessibility analysis at neighbourhood level
   - Availability, frequency , cost of modes viz. use of modes by especially low income and marginal groups
   - Transport deprivation index

2. Benchmarks for personal trips and public transport efficiency.

Benchmarks for inclusiveness

- **Personal trips**
  - Time
  - Generalised costs in combination of time and money costs
  - Comfort and Risk
  - Affordability as a % of income, which is 2% now for bottom half
  - Ease with which they can reach what they want – measuring ease?
  - Option of modal choice
  - Congestion
  - Safety/ security

- **Public transport efficiencies**
  - frequency, waiting time, costs – all encompassing and all-inclusive

Landuse-transport indicators (Input indicators)

- Index of heterogeneity – of land use and of income
- Index of accessibility
- Index of Density/ Sprawl
- Pavements per km of road length

Mode usage and share

Indicator Name	Relevance	Rajkot	Udaipur
Modal shares*	Modal shares by trip purpose i.e. work, education, health and others	- Average trip per day is 1.3 - 38% walk (55% women walk & 30% men walk) - 10% use cycles (11% men and 7% females) - only 3% use bus - 35% use 2Ws (42% male and 20% female) - 11% use autos (12% female and 9% male) - Average trip length is 3.45 km, including walking trips	- Av. Trip rate per day is 1.1 (inclusive of walking) - Walking is 48%, cycle is 2%, 2W is 34%, car is 3%, IPT is 11% and bus is 2%
	Modal shares by social groups i.e. by income, women headed household	- Average trips per day by income groups required - 50% walk in Rs 0-2500 income group and 52% walk in Rs 2500-5000 income group - 6% cycle in income > Rs 80,000 - 4Ws used by only hhs with income more than Rs. 30,000	- Av. Trip rate for HIG men is 1.6 and HIG women is 0.8 - Av. Trip rate for LIG men is 1.3 and LIG female is 0.6 - In LIG group, 46% walk, 8% cycle, 3% use bus & 12% shared autos, 16% use 2Ws and 15% IPT - In HIG, 21% walk, 39% 2Ws, 27% cars, 4% bus & 4% shared autos

Trip length

Indicator Name	Description	Rajkot	Udaipur
Trip length*	Average trip length frequency distribution		- 5.09 km
	Mode wise average trip length disaggregated by social groups1	- Income group < Rs. 5000 pm, av. Trip length is 3 km - Trip length by car is 11.7 km, bus is 8.5 km, cycle is 3.4 km, walk is 1.7 km	- Av. Trip length for walking is 2.5 km, by cycle is 5.1 km, by 2W is 5.2 km, by Car is 6 km, by bus is 8.5 km
	Trip purpose wise average trip length disaggregated by social groups		

Travel time

Indicator Name	Description	Rajkot	Udaipur
Travel time*	Average travel time by trip purpose i.e. work, education, health and others using different modes1	- No data	Travel time by mode – by walking 27.7 min; cycling is 18.7 min, 2Ws is 9.2 mins, car is 9.5 min, IPT is 14.3 mins, bus is 13.7 min
	Trip purpose wise average travel time disaggregated by social groups	- No data	

Infrastructure Quality

Indicator Name	Description	Rajkot	Udaipur
Infrastructure Quality	Average speed on roads of different modes	- Average speeds of motorized vehicles - on arterial roads 18 kmph and sub-arterial 14 kmph	- Average speed is 35 kmph, which is high & 62% roads have speed higher than 35 kmph
	Percentage of Household within 10 min walking distance of PT and para-transit stop	- Use of para transit, particular autorickshaws, available everywhere - Wide use of shared auto rickshaws (Chhakadas)	69%
	Average number of interchanges per PT trip	- No public transport system except 10.7 km corridor of BRTS completed - Para transit	- Limited city bus service - IPT on fixed routes
	Accessibility for disadvantaged by different modes	- No infrastructure for differently abled - No cycling tracks except along the BRT corridor	- No cycling infrastructure

Indicator – Affordability and Landuse

Indicator Name	Description	Rajkot	Udaipur
Affordability*	Affordability of PT and para-transit fare by social group	- Not available	- Not available
	Cost of commuting		
Landuse paramaters	Land use mix intensity Income level heterogeneity Kernel density of roads, junctions and PT stop	- Maps given of kernel density	- Mixed landuse
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Safety

Indicator Name	Description	Rajkot	Udaipur
Safety	Risk exposure mode wise1	- 15% of the road accidents are fatal - 68% of fatal accidents are on highways and arterial roads	
	Risk imposed by modes		
	Overall safety		
	Speed limit restrictions		
	Quality of footpath infrastructure	- Present on all arterial and sub-arterial roads but discontinuous, encroached or narrow reducing walkability - 27%footpaths wider than 2 m - Low (?) footpath density	- 96% roads are without footpaths - 33% roads have on-street parking

Infrastructure and other activities

Indicator Name	Description	Rajkot	Udaipur
Security	Percentage of road lighted		
	Percentage of footpaths lighted	- Poorly lit and discontinuous footpaths	- 63% of roads do not have street lighting - No separate lighting available for footpaths
	Percentage of people feeling safe to walk/cycle and use PT in city by gender*	- No bicycle track	
Other	Space Design for vendors	- No plans of their inclusion in design - Roads and footpaths encroached upon by 2Ws and 4Ws - No parking policy and spaces	

*"Participatory democracy demands **low-energy technology**, and free people must travel the road to productive social relations **at the speed of a bicycle**."*

- Ivan Illich, 'Energy and Equity', 1973.

Thank You