Measuring Inclusiveness

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Exclusive Transport plans

- Biased towards…
  - Main breadwinner only (male)
  - Motorized modes
  - 'Regular' trips (O-D, frequency/week)
  - 'Long enough' trips
  - Middle class
  - Well-to-do areas (easier to survey!)

- In order to remove these biases, there should be careful data collection and analysis process… being as much inclusive as possible.

Mode usage (%)

Sex	Walking	Cycle	Hand cart/ paddle rickshaw	Public bus	Shared auto rickshaw	BRTS	Multiple modes	M2W	Auto rickshaw	Grand total
Female	**58.9**	**1.8**	0.7	8.7	16.3	0.2	9.9	0.8	2.6	100.0
Male	**29.7**	**19.5**	2.7	11.8	15.6	0.5	11.7	5.0	3.6	100.0
Overall	**40.4**	**13.0**	**2.0**	**10.7**	**15.8**	**0.4**	**11.0**	**3.5**	**3.2**	**100.0**
	Non-motorized modes = 55.4			**Public/ shared modes = 26.9**			**Private modes = 6.7**			100.0

Mode share in earlier studies	Walking	Cycle	Public bus	Shared auto rickshaw	M2W	Auto rickshaw	Car-van	Others	Total
LB-IPTS study 2000 [1]	37.6	17.6	8.4	5.7	25.3	2.5	2.5	0.3	100.0
AMC-CEPT 2006 [2]	13.2	18.8	15.0	-	35.0	8.8*	3.1	5.8	100.0

Notes: * Shared auto rickshaw is assumed to be part of this as it is not mentioned separately.
1 As quoted by AMC et al, 2007 (Detailed Project report for BRTS Phase -1)
2 As quoted by AMC, 2008 (Detailed Project report for BRTS Phase - 2)

Travel distance (%)

Distance Traveled	Less than 1 Km	1.1 to 3 Kms	3.1-5 Kms	5.1-7 Kms	7.1-9 Kms	9.1and above	Grand Total
Female	**42**	30	10	7	3	7	100
Male	**24**	27	15	9	7	18	100
Over all	**31**	**28**	**13**	**8**	**6**	**14**	**100**
(City – level) LB-IPTS study 2000	13.0	43.1	12.9	8.3	7.0	15.5	100.0

Mode/ Avg. Trip distances (%)

All trips	Walking	Cycle	Hand cart/ paddle rickshaw	Public bus	Shared auto rickshaw	BRT	Multiple modes	M2W	Auto rick.	Average trip length
Female	1.36	2.90	3.33	5.24	4.77	1.50	7.98	6.88	3.39	2.88
Male	1.35	4.86	5.08	9.34	6.12	4.75	9.39	7.07	5.96	5.10
Overall	1.36	4.77	4.84	8.14	5.70	4.39	8.99	7.06	5.24	4.35
Mode wise trip lengths in city level studies										
LB-IPTS study 2000	0.9	3.6	-	12	5.3	-	-	6.8	5.1	4.6
AMC-CEPT '06[1]	2	3	-	-	-	-	-	-	-	5.5
[1] – Only trips exceeding 1 Km are considered as a 'trip' for this study.										

Trip expenses

Sex	Expense per trip (in Rs.)						
	Nil	01-05	06-10	11-15	16-20	20+	Grand Total
Female	**63**	17	13	3	1	2	100
Male	**54**	15	17	5	2	6	100
Over all	**58**	16	15	5	2	4	100

Modal split by locations

	Walking	Cycle	Hand Cart/ Paddle Rickshaw	Municipal bus	Shared Auto Rickshaw	BRT	M2W	Auto Rick.	Total
Core City Slums									
Female	66	3	1	10	16	0	1	3	100
Male	40	26	6	8	12	0	6	2	100
Over all	**50**	**17**	**4**	**9**	**14**	**0**	**4**	**2**	**100**
Peripheral Slums									
Female	77	1	0	6	12	1	1	2	100
Male	33	21	1	15	17	2	4	7	100
Over all	**48**	**14**	**0**	**12**	**16**	**1**	**3**	**5**	**100**
Resettlement Sites									
Female	52	2	1	13	27	0	1	4	100
Male	22	17	1	20	27	0	8	4	100
Over all	**34**	**11**	**1**	**17**	**27**	**0**	**5**	**4**	**100**

Mode wise trip distance/locations

Trips <4 days/ week	Walking	Cycle	Hand Cart/ Paddle Rickshaw	Municipal Bus	Shared Auto Rickshaw	BRTS	M2W	Auto Rick.
All settlements								
Female	1.4	2.9	3.3	5.2	4.8	1.5	6.9	3.4
Male	1.4	4.9	5.1	9.3	6.1	4.8	7.1	6.0
Overall	**1.4**	**4.8**	**4.8**	**8.1**	**5.7**	**4.4**	**7.1**	**5.2**
Rehabilitation Sites								
Female	1.1	2.8	2.0	6.6	6.5	0.0	10.0	4.3
Male	1.5	8.0	5.5	10.8	7.5	0.0	10.3	4.9
Overall	**1.3**	**7.6**	**4.3**	**9.5**	**7.2**	**0.0**	**10.3**	**4.7**

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

- 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

Data Collection Concerns

- Need for fresh data collection (and not depend on available OD surveys alone. These would not be inclusive sampling)

- Household based transport demand survey - to include details of all members – to capture gender and age dimensions

- Representative spatial distribution

- Representation of different income and social groups in the sample for survey

- Two stage sampling, city level and neighbourhood/ settlement level

Sample Design

City level

- By geography – Identify city segments, e.g. industrial regions, residential regions, minority enclaves, SC enclaves, etc. and estimate total households (could use ward level census data for estimation)

- Identify neighbourhoods/ settlements representing different population segments mentioned above. (There is a tendency that birds of same feather flock together)

- This can be done by using Enumeration Blocks data

- Select neighbourhoods/ settlements from each segment by their proportion based on scientifically derived sampling pool.

Neighbourhood level

- Stratified sampling by housing typologies and spatial location
- Identifying different housing typologies / conditions as proxy of income
- Identifying female-headed households in each selected settlement or any other vulnerable social groups relevant in that context
- Take a representative sample covering housing types, social groups and spatial distribution in the given neighbourhood.

Household Survey Data Requirements

Data required	Description	LCMP
	Caste	Y
	Religion	Y
Personal information (for all household members)	Age	Y
	Gender	Y
	Occupation	Y
	Monthly income	Y
	Vehicle ownership and age of vehicle	Y
	Total Monthly expenditure	Y
	Monthly expenditure on transport	Y
Transport infrastructure rating for different modes	Perception about Safety	Y
	Perception about security	Y
	Perception about comfort	Y

Data required	Description	LCMP
Trip making information	Trip purpose	Y
	Trip frequency per week	Y
	Trip origin and destination	Y
	Travel distance	Y
	Mode used	Y
	Access and egress mode	Y
	Access and egress public transport stop	Y
	Distance to access and egress public transport stop	Y
	Travel time to access and egress	Y

Data required	Description	LCMP
Trip making information	Average waiting time to board Public transport	Y
	Total travel time	Y
	Total travel cost	Y
	Average mileage if PMV used (km travelled per month)	Y
	Fuel used and qty per month	Y
	Reason for using the mode used	Y
	Previous mode used	Y
	Reasons for change in mode	Y

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 should be decided based on 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

Inclusive road design

- Streets are spaces for various activities, including accessing opportunities, balancing the non-motorised and the motorised modes

- Street space distribution for various activities including shopping and vending, (paid) parking, street furniture, amenities etc.

Thank You