The Bicycle in Delhi: its use and barriers to use

paper by:
Rajendra Ravi, IDS, India

Introduction

The extent of mobility and the access to opportunities are the prime enabling or disabling factor in the struggle for survival of the urban poor in the city, i.e. there is a positive correlation between accessibility, job employment and income security. With increasing urbanization in the third world countries, there is an increase in the number of service providers in the city to support the changing lifestyles. These service providers belong to both the organized and the unorganized sector, the latter being more in number but less visible in our cities. Many of these people either walk to work or use bicycles to commute to work. But the transport infrastructure, on which investments are taking place, does not provide for pedestrians or bicyclists. In fact, the high speed, uniform flow concept inhibits use by pedestrians and cyclists, effectively disabling their access to work. Bicycles are unrecognized and uncounted, and thus do not feature anywhere in official statistics. Obviously the policies framed on those statistics, ignore their presence and needs completely. The urban planners do not accord them equal right of using road space, by ensuring that the roads are only designed for the needs of motorized vehicles. Over the last few years, however, efforts are being made by organizations such as TRIPP to redesign road spaces to include the non-motorized. They have done a lot of work in sensitizing the planners and the policy makers toward the need and importance of the non-motorised modes of transport. However, what is difficult to combat is the low image of the bicycle. Bicycles are the mode of the poor and bicyclists are captive riders in India – that is, they have no choice. So issues of equity and dignity are closely linked to the bicycle use on our roads.

At the same time, there is an increasing realization around the world, that non-motorized transport is the sustainable transport of the future. In this era of high energy consumption, high pollution and environmental degradation, encouraging the use of non-motorized modes of transport is a step towards achieving environmental sustainability while promoting gender equity and social justice.

In 2004-2005, the Institute for Democracy and Sustainability (IDS), Delhi in collaboration with TRIPP, IIT, Delhi, conducted a study titled "*The Bicycle in Delhi – its use and barriers to use*". This study was an effort to understand the role of the bicycle in the urban life, its usage on the urban streets and socio-economic and infrastructural constraints which make the bicycle an undesirable mode of transport for its users. The target groups were the urban working class, school/college students and the parents of the students. The paper presents the results of this study with the objective of understanding the perception of the urban communities about bicycle, both from the perspective of the users and the non-users, so that the bicycle can be re-integrated into the urban life in a sustainable manner.

Objective

The objective of the study is two-fold

1. To study the socio-economic profile of bicycle users and non users in Delhi, to understand their life, problems and barriers to the use of the bicycle

2. To understand the perception of the community about bicycle, both from the perspective of the users and the non-users, to understand how the bicycle can be re-integrated into the urban life

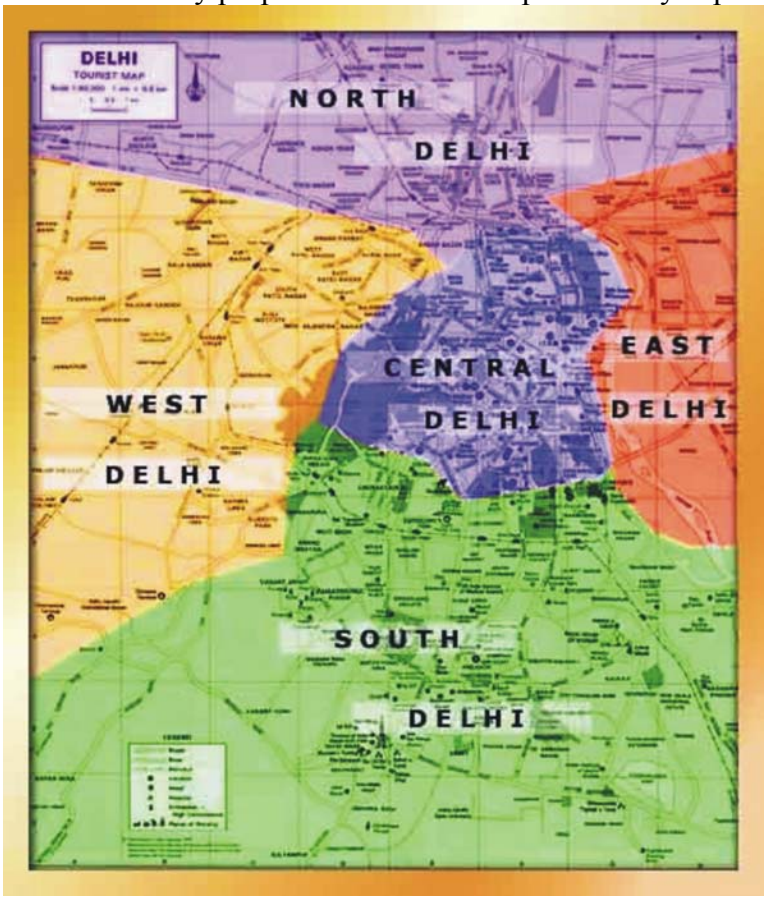
Methodology

1. The target group for the survey was decided upon after discussion.
2. The total sample size was decided upon based on resources, time and the logistics of survey.
3. Secondary data was collected to obtain geographic zones in the city which may be used for analysis and lists of the target groups from government and non-government sources
4. A group meeting of the study team with social scientists was organized to discuss questionnaire design and sample distribution
5. The distribution of the sample amongst the different target groups was decided based upon the geographic area and actual numbers
6. Separate questionnaires were designed for the identified target groups
7. A pilot survey of all the target groups was conducted to understand efficacy of the questionnaire and problems likely to be faced by the survey team in the interview process
8. The questionnaires were updated and streamlined based on the feedback from the pilot survey
9. A workshop was conducted at IIT with the TRIP faculty and experts from other CBOs to discuss the questionnaire
10. Based on the expert group meeting, the questionnaire was finalized
11. The questionnaire was then converted to a codable format for the ease in the interview and subsequent data entry process with the help of experts in social statistics
12. The interviews were then conducted across the city based on the survey methodology finalized earlier

Research Area

A perusal of the government listings showed that the most common way of dividing the National Capital Territory (NCT) of Delhi into geographic zones was the 5 zone definition of North, South, East, West and Central zones. The lists of schools, colleges,

industries etc were also based on this division. Hence this has been taken as the geographic divide for our study purposes. The zonal map of the city is presented below.



Target Groups

1. Students of educational institutions and their parents
2. Working class in the city, both in the organized and unorganized sectors.

Pilot survey

A pilot survey was conducted amongst all the target groups identified. During this process the survey team realized not only the complicated logistics of conducting a survey in the entire city but it also brought to fore the diversity of the different types of cycle users and the extent of invisibility of these service providers in our city. This enabled us to expand out sample over a more diverse group.

Sample size (2000 persons)

1. School/ college going children = 500 persons
2. Parents of school/college going children = 500 persons
3. Urban working class =1000 persons

Also some detailed interviews are being conducted amongst persons who depend on the bicycle for their livelihood to understand their life and problems faced. These are being recorded as narratives rather than data to ensure that the qualitative aspects of our study are not disregarded.

Sampling Methodology

Sample Distribution for 500 students of educational institutions

Educational Institutions Existing (Source Government data)

Type	Central		North		South		East		West		Total	%
	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.		
Schools	60	84	279	85	173	136	213	48	230	173	1481	94
Colleges											89	6
Total institutions											1570	100

Sample Distribution of Educational Institutions

Assuming 10 students/institution to be surveyed in interest of logistics= 50 institutions

Type	Total	%	Sample (indicative)	Sample * (rounded off)
Schools	1481	94	47	45
Colleges	89	6	3	5
Total institutions	1570	100	50	50

*Assuming minimum of 5 colleges to be taken, i.e. 1 from each zone, then 45 schools to be taken

Sample for Schools

Distribution of number of schools for each zone

Type	Central		North		South		East		West		Total
	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	
Total Schools	60	84	279	85	173	136	213	48	230	173	1481
Sample size	2	3	8	3	5	4	6	2	7	5	45

Sampling method 1481/45 = 33 hence chose every 34th institution in the lists
Based on this calculation, a list of target schools (distributed zone-wise) was made.

Sample for Colleges

Zone	College

Central	Matreyi College, Chanakyapuri
North	Indraprastha College, Shamnath Marg
South	Sri Venkateswara College, Benito Juarez Road
East	Shyamlal College, Shahadra
West	Rajdhani College, Raja Garden

Sample Distribution for 500 parents of students

In accordance with the number of students interviewed in each zone, the same sample size was used to interview parents. They were however, selected at random in areas in the vicinity of the targeted educational institutions.

Sample Distribution for 1000 working class persons

A large section of the cycle users are industrial workers in Delhi and the rest are employed or self employed all over the city. Since the industrial areas in the city are known and defined, a sampling method was worked out for interviewing the industrial workers. The industrial areas either conform to the planned industrial use or are labeled as non-conforming industries. The sample is again distributed over the 5 geographic zones in Delhi.

Distribution of total sample of 1000 persons over Zones identified
Assuming 20 workers/zone to be surveyed in interest of logistics= 50 areas

	Central		North		South		East		West		Total	Sample
Type	**Conf**	**Non**	**Conf**	**Non**	**Conf**	**Non**	**Conf**	**Non**	**Conf**	**Non**		
Industrial	0	3	13	10	6	5	4	3	7	15	66	25
Other												25
Total areas												50

Industrial workers

Distribution of sample in proportion to number of industrial areas for each zone

	Central		North		South		East		West		
Type	**Conf**	**Non**	**Conf**	**Non**	**Conf**	**Non**	**Conf**	**Non**	**Conf**	**Non**	**Total**
Total Industrial areas	0	3	13	10	6	5	4	3	7	15	66
Sample size		1	5	4	2	2	2	1	3	5	25

Sampling method
66/25 = 3 hence chose every 4th area in the lists

Sample for industrial workers
Sampling method: 66/25 = 3 hence chose every 4th area in the lists.

Non-industrial workers

The types of non-industrial workers in the city were listed. The sample of 500 was distributed over the 5 zones, i.e. 100, in each zone and an effort was made to capture the diversity of the non-industrial, primarily service sector, occupations that support the city today. The different types of service sector occupations using the bicycle are listed below:

1. **Government Services** like Postman, Telegraph, Telephone repair man, Malaria department representative, Electric and Water department, Sweeper, Sanitary worker
2. **Home-based service providers** like Gardner (park / residences), Rag Picker, Sweeper, Mat maker, Stove-Cooker Repairing, Key maker, Barber
3. **Delivery men** of Stationary, Newspaper, General store item, Gas Cylinder, Milk, Courier, Medicines supplier, Surgery cotton supplier, Bidi / Cigarette supplier
4. **Workers** like Factory labor, Mason, Electrician, Carpenter, Shop helper, Cycle rickshaw mechanic, Domestic workers, General workers
5. **Vendors** of Cloth, cooked food, fruits, Condiments vendor, Manihari items

Survey Results

The analysis of survey data for each target group, namely, students, parents and urban working class depicts the socio-economic profile and the basic travel characteristics of users and non users, and also the perception of the community about the bicycles and problems and barriers to the use of bicycles.

Students – bicycle users and non-users

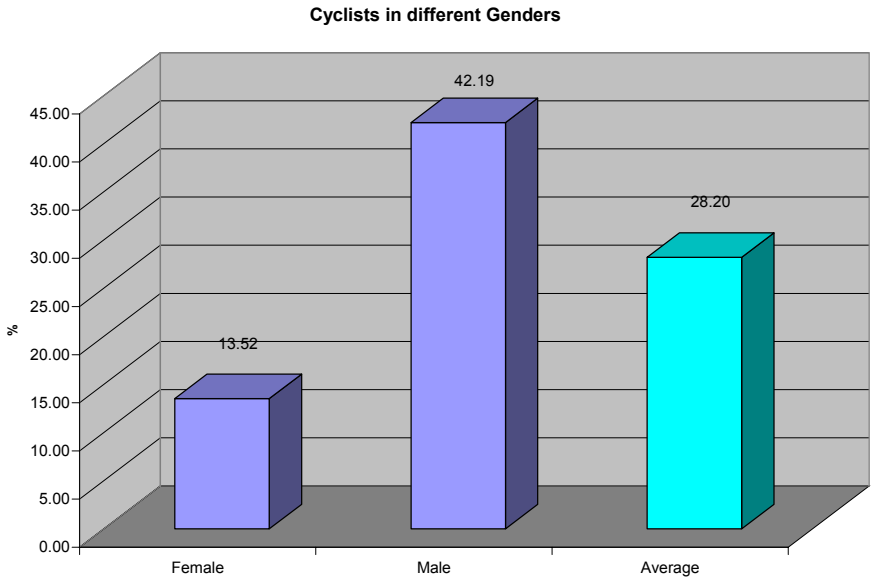
Socio-economic profile:

For all interviewed:

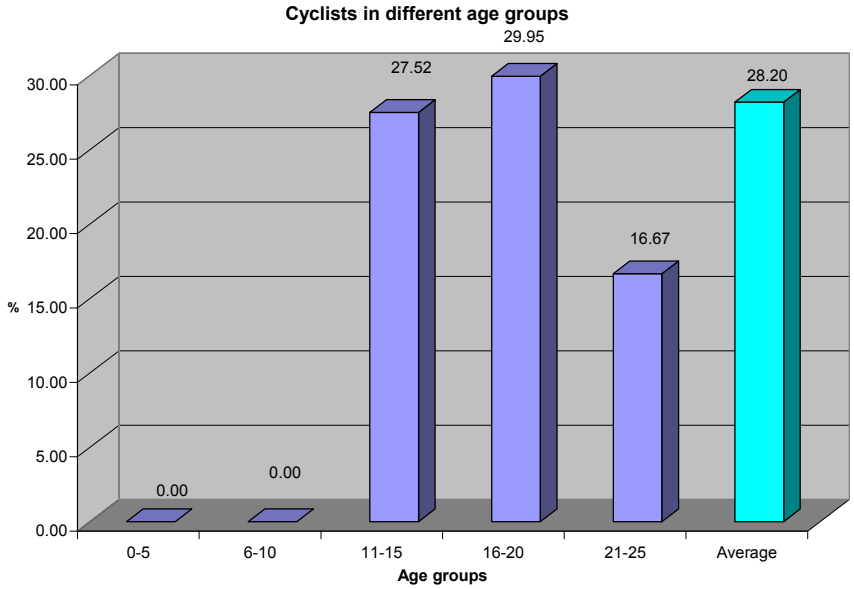
- In all 500 students were interviewed across 5 zones covering the city.
- 97% of all students interviewed were between 11 and 20 years of age.
- Interviewees were well distributed between genders as 49% students interviewed were females and 51% were males. Only in zone 1, there was large difference in numbers (42% females and 58% males).
- 91% of the students interviewed were studying at middle level (30%) and secondary/ higher secondary level (61%).

For bicycle users:

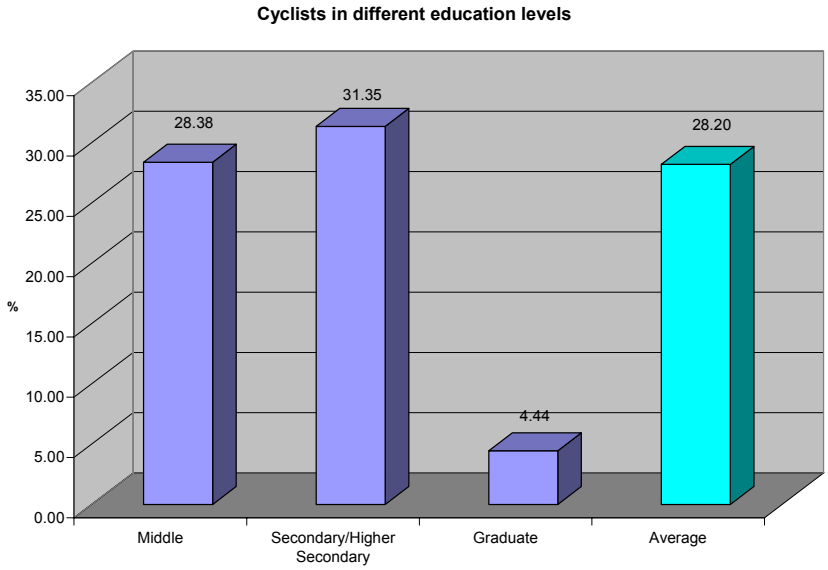
- Among cycle using students, only 23% are female, whereas 77% are male.
- Only 13.5% female students use bicycle for traveling to school whereas proportion of such male students is 42%.



- The percentage of students cycling is highest in the age groups of 11-20 years and declines after that.



- Graduate level students use bicycle to reach their academic places very rarely, only in 4.4% cases (against 28% overall).



Zonal variations:

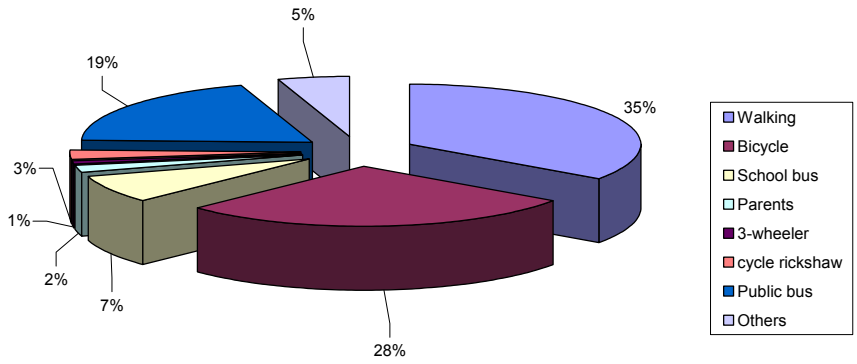
- Zone wise, zone 1 and zone 2 have higher proportion of bicycle using students (more than 36%) where as in zone 5 only 15% of students interviewed use bicycles.
- In zone 1 and 2, proportion of bicycle using students is higher among 16-20 years age group. On the other hand, in zone 4 and 5, students from age group 11-15 have higher proportion of cycle users.
- Only in Zone 3, students above the age of 20 were found using bicycles.
- In zone 3 and zone 5, only 3% female students use bicycles, where as in zone 2 26% female students use bicycles.
- In zone 1, 44% students of secondary/higher secondary level use bicycle where as the figure for zone 4 is only 11%.

Travel characteristics:

For all

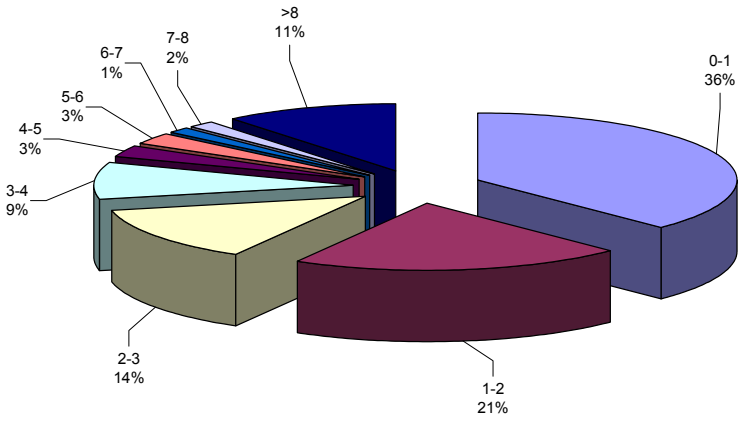
- 35% of all students walk to school, 28% use bicycle and 27% use buses (school bus or public bus).

Modes of travel for all students

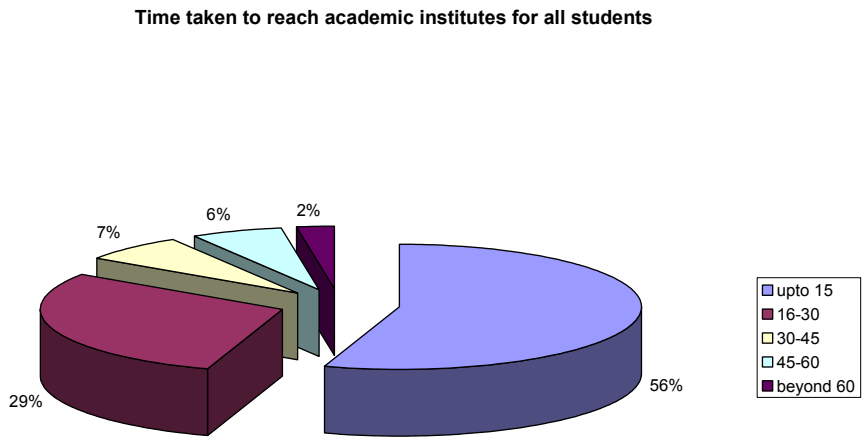


- 81% of the students have to travel less than 4 km to reach school, for 37% less than 1 km. 11% students have to travel more than 8 km. In zone 5, more than 18% students have to travel more than 8 km whereas 73% have their schools within 4 km from their residence.

Distance (in KM) from academic institutes for all students

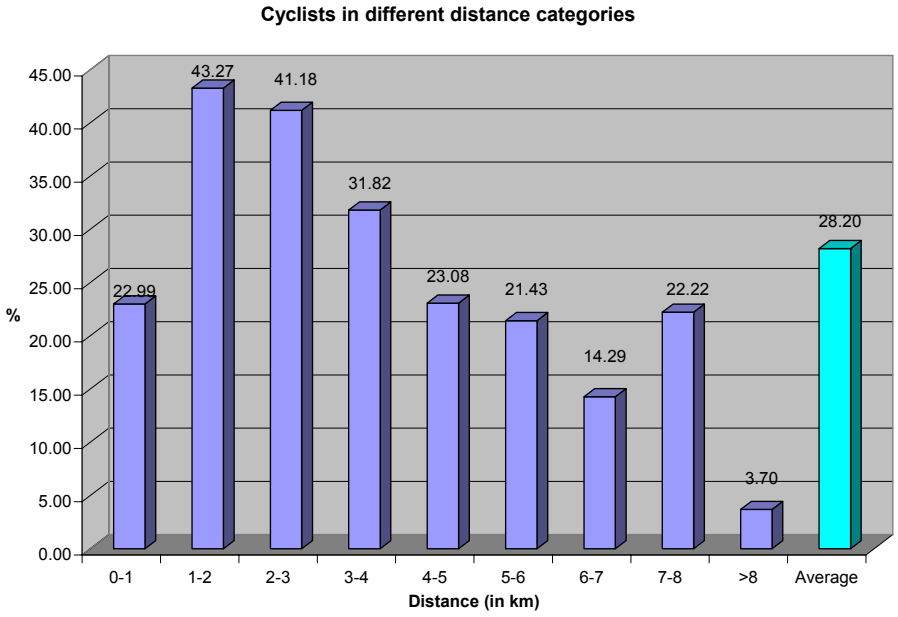


- 55% students take 15 minutes or less to reach school, 29% take 16 to 30 minutes. Only 2.4% students take more than 60 minutes to reach school.

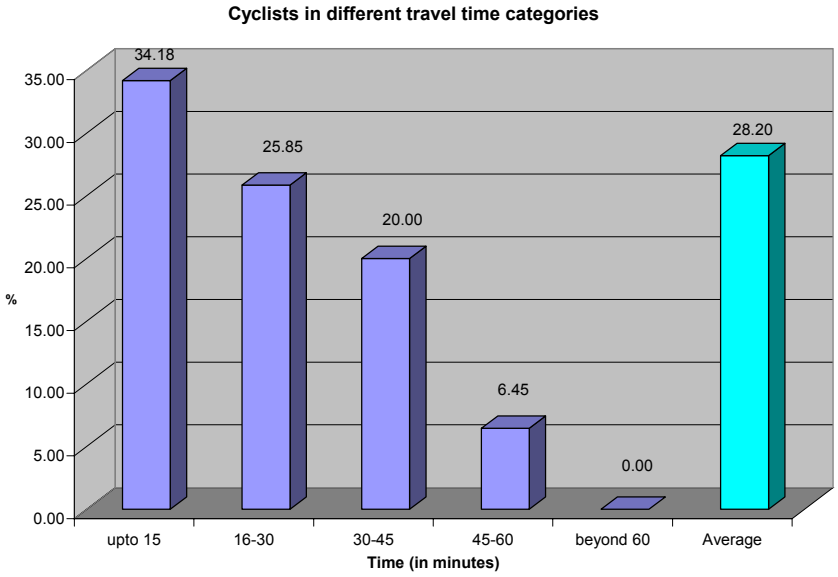


For bicycle users

- Proportion of cyclists is highest (43%) among those students who have to travel between 1 and 2 km to reach their schools. For distance between 2-3 km, 41% students are cyclists. Only 23% of students traveling 1 km or less are cyclists against 28% overall. Proportion for cyclists is only 3.7% for students going more than 8 km.



- 67% of the cyclists take less than 15 minutes to reach school, which is 34% of all students in this category. Very few cyclists travel for more than 30 minutes (only 6%).



Zonal variations

- In every zone, with the exception of zone 1, students traveling between 1 and 2 km have the highest proportion of cycle users. In zone 1, highest proportion is for students traveling 2-3 km.

Perception of problems and barriers to use

- In all, 500 students were interviewed across 5 zones, comprising the whole city of Delhi.
- 396 out of these 500 students were using bicycle for some purpose or the other.
- Out of these 396 students, 252 were not using bicycles to travel to their academic institutions.
- 104 out of 500 students interviewed were using modes other than bicycle for their travel.
- Of these 104 students, 68 used to ride bicycles earlier but had left it now.

Perception pertaining to use/non use of bicycles:

- Among those who were using bicycles but not for the purpose of going to their school/college/university, 29% cited command of parents as one of the reasons. For 21% students, institute was very far and 16% didn't like cycling. For 18% heavy traffic was the deterrent factor and 24% cited other reasons. Fear of being made fun of by the peers was the reason for less than 1% students.
- Among those students whose parents wouldn't allow, given the choice 50% would still not prefer to use bicycle to reach their institutes.
- 66% of 396 students using bicycles for some purpose didn't feel safe on roads.

- Fear of accidents by other vehicles was the chief reason (for 96% students) for not feeling safe on roads. Other important reasons being – problems in crossing at intersections (42%), difficulty in crossing roads (18%) and rough roads (15%).
- 37% cycle using students would wish to buy a motor cycle, given the facility, and 11% would prefer to purchase a car. Interestingly, 17% students would like to stick to bicycle only. 22% students were not decisive about the vehicle of choice.
- 26% students left cycling because they didn't like it. 21% left because their bicycles were stolen. 15% left it due to fear of accidents. For 7% students, parents' wishes went against the use of bicycle and 6% felt that using cycling was not socially acceptable.

Benefits:

- 86% cycle users identified physical exercise as one of the advantages of cycling. Time saving was the advantage for 78%, money saving for 38% and expression of freedom for 25.5% cycle users. Avoiding crowds was seen as advantage by only 5% cycle using students.
- 73% of Students who were not using bicycles identified physical exercise as one of the advantages of cycling. Time saving was advantage for 62.5% students and money saving for 61%. Less pollution, safe environment and saving of petroleum were other advantages identified by quite a few. Significantly, easy ride and avoiding crowds were seen as advantages of cycling by only 6 and 2% students respectively.
- Only 22 out of 500 students (4.4%) answered in affirmative when questioned about the knowledge of bicycle and bicyclists insurance and out of those only 2 students had got themselves such insurance.
- Even lesser number of students (only 7 i.e. 1.4%) had information about the bicycle clubs – an idea of Delhi government to encourage bicycles.

Problems:

- 94% of cycle users never experienced any physical problems while cycling. Physical fatigue was felt by 3% students and mental fatigue by only 0.5% cycle users.
- 18% cycle using students met with an accident some time or the other while cycling. 52% of these accidents were caused by motor cycles and 21% by cars. 63% cyclists sustained minor injuries, 32% somewhat deep and 4% suffered with serious injury. But none of the victims went to lodge an FIR for the mishap.
- 91% cycle users used locks to keep their bicycles secure. Despite that, bicycles of 18% students had been stolen some time. In 79% instances bicycle was stolen from home, followed by 14% from market and 8% from school. Only 7% students went to lodge an FIR but not even in single case any recovery/compensation was provided. In one case, no FIR was lodged.

Improvements:

In order to improve the roads of Delhi and make them more bicycle friendly, 89% of all 500 students felt that it was necessary that bicycles be provided separate lane. 78% felt that good roads should be made. 53% students demanded that bicycle lanes be made

exclusive. Water and toilet facility on the way and greenery were the other improvements on Delhi roads which got the vote of students.

Parents of students

Socio-economic profile:

For all

- 93% of all the parents interviewed were between 31 and 50 years of age.
- 42% of parents interviewed were female and 58% were male. Only in zone 4 more female parents were interviewed (62%).
- Of all parents, 12% had received primary education, 13% up to middle level, 36% up to the secondary/ higher secondary level and 24% had received education up to graduate level. 8% parents were illiterate.
- 79% of parents interviewed had monthly income less than 8000 Rs and 94% had income less than 12000 Rs per month. 4% parents didn't reveal their incomes.
- 95% parents were having 4 children or less, maximum proportion being of 2 children (45%). 2% parents had more than 5 children.

For bicycle users

- Age of parents does not seem to have much of an effect on their tendency to let their children ride bicycles. But age groups less than 40 have higher proportion of cases of bicycle using children (83%) than the age groups 40-60 years (76%).
- Effect of education of parents on letting their children use bicycle is also not very prominent. Tendency is higher among post graduate/diploma holder parents (87%), graduate (83%), primary educated (83%) and illiterate parents (82%), and lower among middle level (79%) and secondary/higher secondary educated parents (78%).
- Income of parents does not seem to have any effect at all as in all widely interviewed income groups in 79-80% cases children use bicycles. In the income group 12000-16000 Rs, in 87% cases children found to be using bicycles but this result can be questioned on the point that very small number of parents belong to this category (only 1.6%). Among those who didn't reveal their incomes, in 95% cases children were using bicycles.
- Among parents having number of children 3 or less, in 81% cases children were using bicycles. For parents having 4 and 5 children, cases of bicycle using parents were only 74%. Noticeably in all cases of parents having more than 5 children, children were using bicycles.

Zonal variations

- Trends are not much varied across the zones and spatial pattern seems to be uniform.

Travel characteristics:

For all

- 61% of the parents had ridden bicycles some time in their lives, out of which 44% still ride bicycles.

For bicycle users

- Bicycle riding history of parents has no impact, whatsoever, on their decision to let their children ride it.
- Strikingly, among the parents who have ridden bicycles some time in their lives and whose children don't use bicycles, only 25% still ride them.

The Urban Working Class – bicycle users and non-users

Socio-economic profile:

For all:

- In all, 1000 people were interviewed from across the city, dividing it into 5 zones.
- Interviewees were well distributed among all working age groups, with maximum being of 20-40 yrs (about 30%).
- Most of the people interviewed were males (more than 99%).
- Education wise, secondary/ higher secondary pass people form the biggest category (36%), followed by middle level educated (24%) and primary educated (14%). 6% people were graduate.
- Most of the people interviewed were among low income groups, with people having monthly income below 3000 Rs comprising 60% and between 3000 and 6000 Rs, 26% of all. Only 1 person interviewed had monthly income more than 15000 Rs.
- 39% people had offices as there workplace, where as 20% people were employed in factories. Shops were the workplace for 17% people and 12% people remained on the move while working. 6% people were working on daily wages.

For bicycle users

- People above the age of 60 years had the highest proportion of bicycle users (91%), followed by the age groups below 20 years (86%) and between 20 and 30 years (83%).
- Just literate and middle level educated people have higher proportion of bicycle users (87 and 84% respectively), whereas only 48% graduate use bicycles.
- Income shows a very definite effect on the use of bicycles as it was found that higher the income in a group lesser was the proportion of bicycle users in that group, being highest for the income group below 3000 Rs per month (86%) and lowest for the income group 12000-15000 Rs pm (44%).

- Almost all the people who work on the move used bicycles for their movement. Office going people have the least proportion of bicycle users (69%).

Zonal variations

- Trends are more or less same across all zones.

Travel characteristics:

For all

- 26% people travel 10 km or less during a day, whereas 25% people travel between 10 and 20 km. 38% people travel between 20 and 50 km, and 11% people travel more than 50 km in a day for their work.
- In all, 79% working class people use bicycle.

For cycle users

- Proportion of cycle users is by and large same for all the distance ranges. Even for distance more than 50 km, proportion of bicycle users is 70%. Many times, for large distance trips, bicycles play a part in the whole trip.

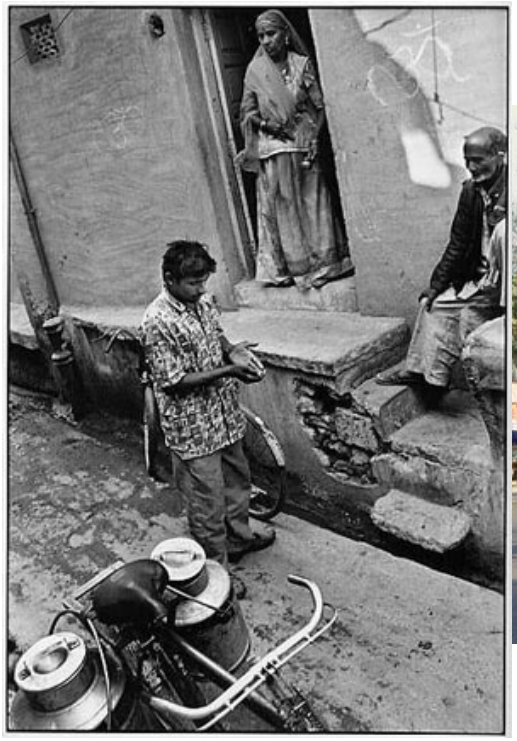
Zonal variations

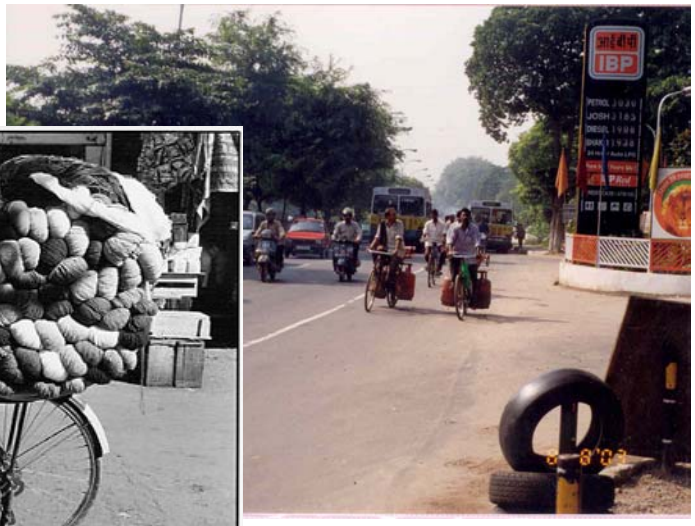
- Trends are more or less same across all zones.

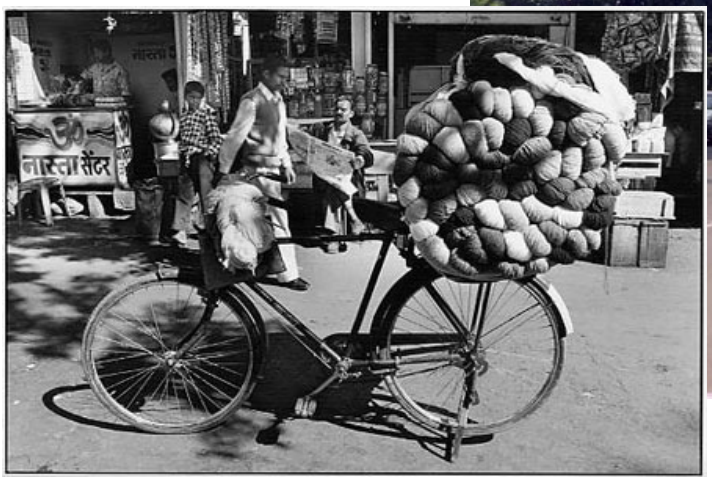
Narrative Case Studies

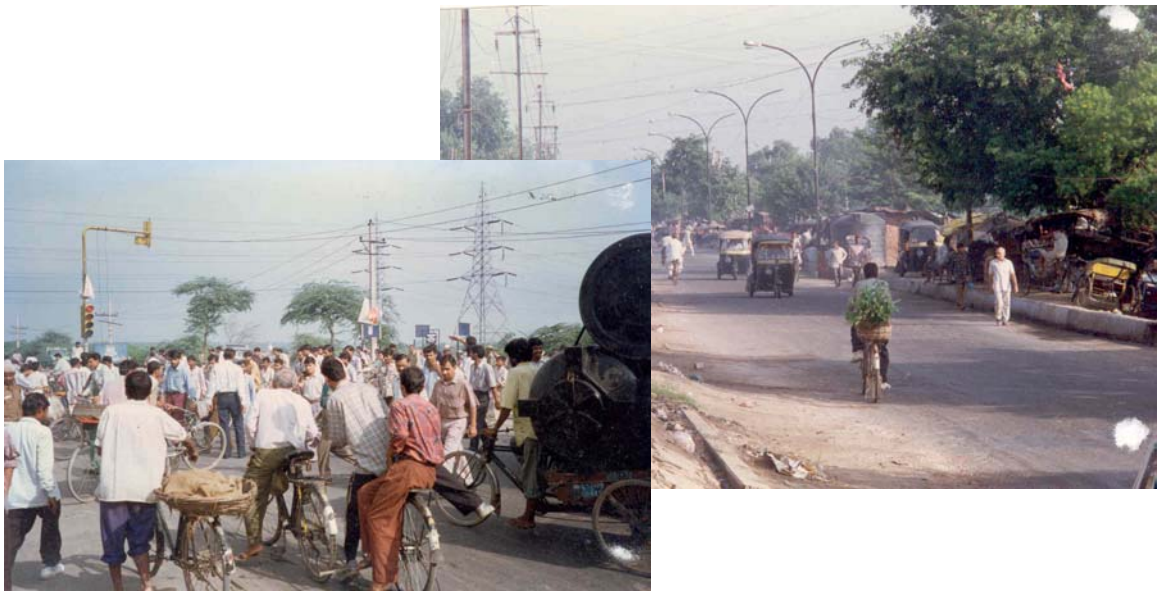
Qualitative surveys were conducted to collect narratives of the lives of some people whole livelihood are integrally dependent on the bicycles. They selected people were interviewed over the day to understand their daily activity profile.
The representative occupations selected for this are listed below

Barber
Milkman
Newspaper Delivery man
Gardner
Factory worker
Rag-picker
Postman
Telephone repairman
Domestic Worker




IBP

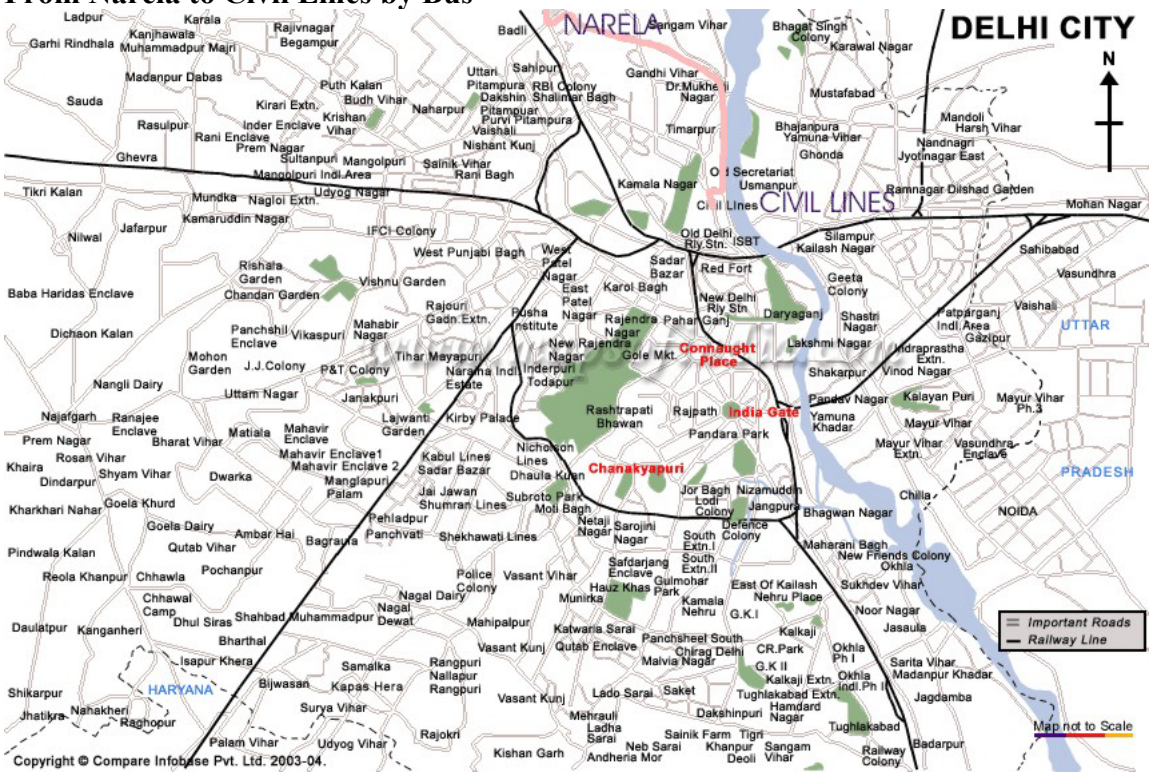

नास्ता सेंटर



Kartar Singh - the barber

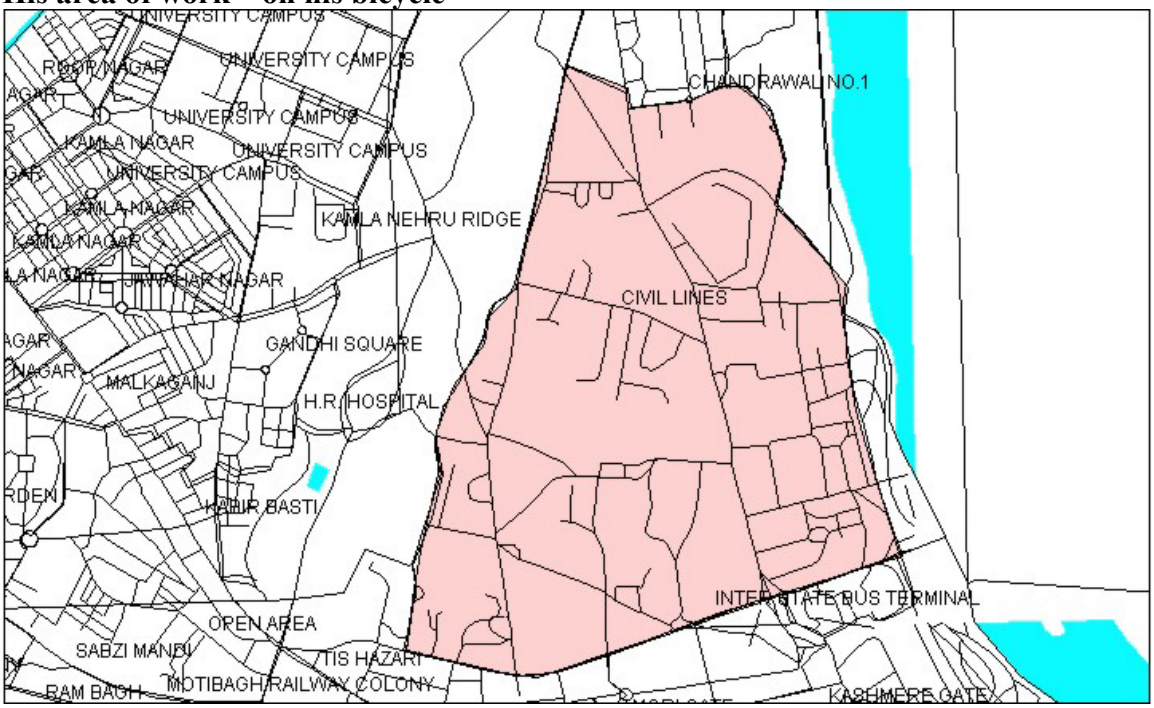
Kartar Singh is a 82 yr old barber plying his trade on his bicycle since 1944. He comes from his home in Narela to his place of work in Civil lines by bus – traveling a distance of 25 km. In Civil Lines, he picks his bicycle up from his friend's place and rides to his various destinations from 6 AM to 9 AM. His area of work is spread over 5 square Km and his customers are fixed for every day of the week

From Narela to Civil Lines by Bus



He has a fixed clientele and fixed routes according to the days of the week. He was employed in a saloon run by an Englishwoman before independence of India from the colonial rule in this area. After independence he has been serving the same clients, going door to door on his bicycle.

His area of work – on his bicycle



Discussion

The results of the survey of students indicate that the cycle is predominantly used by school going children who can travel independently, but does not find preference amonst the college goers. The bicycle is primarily used for travel distance upto 4 Km and travel time upto 30 min. However, amongst the students who do cycle, 64% of them do not use it to travel to their academic institutions. 50% of the students not using he bicycle now, used it earlier but have left it. The major reason for non-use of the bicycle was seen as lack of safety on road in the perception of students and their parents. The roads were also perceived as inconvenient for bicycling. The perceived advantages of cycling were physical exercise and savings in time and money. Approximately 20% of the cyclists had met with accidents and the same numbers had had their bicycle stolen at some time. The major improvements suggested by the students were separate bicycle lanes and good road surfaces.

The survey of parents indicates that the education level and income class of parents had little effect on their decisions to let their children cycle or not; neither did their own history of bicycling. Most of them perceived the roads as unsafe for cycling and would prefer their children not cycle to school/college.

Amongst the working class of people interviewed, the bicycle was used more by people upto 30 years of age or more than 60 years indicating non-usage amongst the middle-age group. Lower education and lower income levels showed higher usage of the bicycle. The proportion of people traveling indifferent distance ranges is similar upto 50 Km after which it starts declining. This indicates that distance time or convenience has little to do with bicycle usage – the bicycle users are captive users, having little choice.

Acknowledgements
The author would like to acknowledge the contribution of Prasoon Saurabh of TRIPP, IITD for in data analysis for his paper.