PATTERNS OF COMMUTING FOR WORK: A CASE STUDY OF KOCHI CITY*

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1. Introduction

The literature on urbanization in India identifies an emerging trend of more and more people staying outside the cities and commuting everyday for work and work related purposes (Mohanan 2008; Chandrasekhar 2011; Bhagat 2011; Kundu 2011; Sharma 2013). The trend is likely to accelerate over time due to increase in employment opportunities in urban areas particularly cities and the limited scope of the rural areas to employ its residents. Such a development demands policy initiatives by the local and state governments as well as the employers. But, it has not received adequate attention from policy makers, planners, employers and researchers in India. The present study is a modest attempt to understand the patterns of commuting for work to the city of Kochi from other parts of the state of Kerala.

The time spent on commuting can be seen as a continuation of the time on the job. Earlier studies on commuting patterns have pointed out that there is an inverse relationship between commuting time and factors such as health status (Everett 2013) , productivity (Evans and Wener 2007; Cox et al., 2006; Bhat and Sardesai 2006) and work-readiness (Everett 2013). Travel by both public and private modes of transport can cause considerable stress (Tse et al. 2000; Wener et al. 2005; Bhat and Sardesai 2006) as well as poor quality of life (Costa et al. 1988). The negative impacts of commuting on psycho-physiological wellbeing are more pronounced among females compared to their male counterparts (Roberts et al. 2011). Stressors like traffic congestion, lack of reliable and punctual services of public transport can cause motivational deficiency, increasing absenteeism and low productivity among tired workers.

2. The Setting

Kerala is one of the fastest urbanising states in India. According to Census 2011, nearly half of its population (48 per cent) live in urban areas as against 31 per cent at the national level. Kochi is considered to be the commercial and industrial capital of Kerala. The total area under the Corporation of Kochi is only 94.88 square kilometres but it is the nerve centre of a much larger urban

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agglomeration of about 200 sq. kilometres. Apart from the Kochi Municipal Corporation, the Kochi Urban Agglomeration (KUA) includes nine municipalities, 14 Grama Panchayats and four Census Towns. KUA has a population of 2,117,990 in 2011 making it the largest urban agglomeration in the state. Decadal growth rate of population in KUA during 2001-11 is 37.9 percent. But the area covered by the Kochi Municipal Corporation did not show any significant growth in population. The growth during the period was just 0.01 per cent i.e. from 596,473 in 2001 to 601574 in 2011. The population growth of the city was much higher during the earlier decades (10.0 per cent during 1981-1991 and 5.7 per cent during 1991-2001). It appears that the city area has almost reached its residential development capacity.

Steady expansion of economic activities within the city as well as in the hinterlands and extensive regional network of communication and transportation facilities enabled the city of Kochi to exert strong economic influence beyond its administrative boundaries. Its influence on other parts of the state is evident from the fact that the size of the floating population to the city is as high as 46% of the resident population. More than one-third of the floating population (37 per cent) is from other districts (NATPAC 2007). Two-thirds (65 percent) of the commuters visited Kochi for work and work related purposes (*ibid*). Nearly 2.5 lakh persons commute to the core city from a radius of about 100 kilometres daily and more than 40 percent of the city jobs are availed by commuters from outside the city (CII-Kerala, CPPR and Kumar Group 2012). With near stagnation in population growth in Kochi Municipal Corporation area, the dependence on workers from outside the city limits is bound to increase in the future.

Kochi is one of the few cities in India which has all major modes of transport connecting the city with the rest of the state. The city serves its daily commuters by three dominant modes of transport: firstly, road based transportation; secondly, rail based transportation; thirdly, a limited network of water transport services mainly from the islands to the mainland. A major development taking place which facilitates commuting within the urban agglomeration is the construction of Metro rail. It is interesting to note that Keralites, on an average, commutes longer distance for work than people in most other states. According to the 69th round (2012) of the National Sample Survey, among major states, urban Kerala is second only to urban Maharashtra in the proportion of households for which the maximum distance travelled by any earner to reach the place of work was more than five kilometers.

Rural Kerala was in the third position among the major states (behind Jammu & Kashmir and Tamil Nadu) in this regard. In 36 per cent of the rural households and 44 per cent of the urban households, at least one earner was travelling more than five kilometers to reach the workplace. The corresponding proportions at the national level were 23 per cent and 37 per cent respectively.

3. Objectives of the Study

The specific objectives of the study are:

- To understand commuting mode, commuting distance and travel time of different categories of workers.
- To assess the use of urban infrastructure and facilities by the commuting workers and to understand their perceptions about available facilities in the place of work and place of origin.
- To identify major issues related to commuting faced by the workers.
- To assess the implications of the commuting behaviour and issues related to commuting on urban governance and urban infrastructure and facilities.

4. Methodology

The main component of the study is a survey among workers commuting to Kochi on a daily basis from outside. The aggregate analysis of the workers may not reveal important influences that characterise the commuting behaviour specific to different groups of workers. Therefore, taking into account the differences in the commuting behaviour, five different categories of workers viz., workers in the construction sector, retail sector, IT sector, office staff and domestic workers have been covered by the study. Workers belonging to the five sectors mentioned above who are commuting from outside the city for work on a daily basis form the target group of the study. Obviously those residing within the city limits and commuting to their work place has not been included in the sample. While office staff, retail workers, construction workers and domestic workers working within the city corporation area is included, the IT professionals employed in Kakkanad in the adjacent Thrikkakara municipality is included. This is because Kakkanad is the IT hub of Kochi city region and there are no major IT establishments within the city corporation limits. Commuters from outside the Thrikkakara municipal area, i.e., from Kochi city as well as from the neighbouring panchayats, municipalities and districts to Kakkanad were the respondents for the IT sector. The sample size for quantitative survey

was 500 (100 from each sector). Besides the survey, depth-interviews with employers/HR Managers and Focus Group Discussions with workers in each sector were also undertaken. Respondents were identified using snowball sampling, using personal contacts and contacts of the respondents. The workers were interviewed at the work sites, transit points or their homes using pre-tested questionnaires. For depth interviews, semi-structured interview schedules were used. FGDs among workers were conducted using check-lists.

5. Profile of the Commuting Workers

The five categories of workers were selected taking into account the differences in their profile and commuting patterns. The workers in the construction sector do not have a fixed place of work as the worksites are changed frequently. Respondents in the construction sector are male workers[1]. They usually depend on public transport. Women domestic workers and workers in the retail sector also largely depend on public transport. The domestic workers form a group which usually starts journey-to-work early in the morning. The workers in the retail sector usually commute to their home from workplace during night. Office staff and IT professionals are better off socially and economically than the above three categories. Office staff includes those working in private and government establishments and a good section of them commute in their own vehicles. The commuting behaviour of IT professionals is different from other categories of workers. They earn more and are more likely to use private transport. In many IT firms, the employers provide transport facility to the staff. Car pooling is also practiced to some extent by this group. Moreover, the work timings are different from other sectors and include night shifts. There is also flexi-timing in some of the IT firms.

The profile of the workers in the sample is presented in Table 1. The IT professionals are the youngest with 90 per cent of them aged between 21 and 30 years. Their educational profile is also better than others with more than half having professional degrees. Domestic workers are on the other end with three-fourths of them aged above 40 years. Their educational status is far below that of other categories. The workers in the retail sector have longest working hours and the office staff have the shortest.

[1] The sector used to have women employed in large numbers as unskilled labourers. But of late, they have been replaced by the male migrant workers from other states who are usually provided accommodation facilities by the employer.

Table 1: Profile of the Commuting Workers in the Sample (%)

Category	Construction Worker	Domestic Worker	Retail Worker	Office Staff	IT Professional	Overall
Sex						
Male	100	0	62	50	76	57.6
Female	0	100	38	50	24	42.4
Age Group						
21-30	23	0	45	49	90	41.4
31-40	25	24	33	27	10	23.8
41-50	26	54	13	12	0	21.0
51-60	20	20	6	10	0	11.2
61 and above	6	2	3	2	0	2.6
Education						
Illiterate	1	3	0	0	0	0.8
Primary (1-7 years)	16	52	3	2	0	14.6
Secondary /SSLC	63	44	43	11	0	32.2
Higher Secondary	9	1	18	6	4	7.6
Diploma	5	0	11	10	3	5.8
Graduate/Postgraduate-General	2	0	22	60	37	24.2
Graduate/Postgraduate-Professional	4	0	3	11	56	14.8
Ownership of current Residence						
Own House	97	84	90	96	70	87.4
Rented House	3	15	10	3	28	11.8
Rent free	0	1	0	1	2	0.8
Working Hours						
Up to 8 Hours	12	88	32	70	36	47.6
8.1-10 Hours	87	9	52	30	64	48.4
Above 10 Hours	1	3	16	0	0	4
Average Working Hours	**8.8**	**6.9**	**9**	**7.9**	**8.6**	**8.2**
Average Monthly Income (Rs.)	**13546**	**5860**	**8645**	**13980**	**17290**	**11864**

6. Determinants of Commuting for Work

The commuting pattern of a city is dependent on several factors. Availability of regular work in the city is the most important factor that pulls workers to Kochi. Better wages in the city is another important pull factor. Non-availability of jobs in the place of residence pushes the workers to seek work in the

city. The workers engaged in domestic work also reported that they are not willing to do the so called low profile work in their home village. The most cited reason for not shifting the residence rather than commuting from outside to the city is the closer proximity to family and friends network which have been developed over a period of time in the place they reside now. The probability of shifting residence to the city is also dependent on the ownership of their present residence. It may be noted that large majority of workers in the sample live in houses owned by them[2].

High cost of living and lack of affordable living space in Kochi are other reasons mentioned by the commuting workers for not shifting their residence to Kochi. It is difficult for majority of the workers in the sample except perhaps the IT professionals to buy or take on rental a modest house in the city. The worker households can be pulled to the city because of the quality-of-life incentives, including access to better public services (such as schools, hospitals, shopping places etc). But the difference between rural and urban areas is much lower in this respect in Kerala than in most other states of India[3]. So the pull of better access to public services in the city may not be as strong as in other parts of India. Pollution and poor waste management in the city have been mentioned by a small proportion of the relatively better off groups viz., office staff and IT professionals, as a reason for not shifting their residence to a locality near the workplace. The relatively better road network and transport connectivity are other facilitating factors. Improved transport infrastructure might have also led to greater tolerance for long-distance travel among workers. Because of the above reasons, workers tend to stay in the rural areas and commute to the city for work rather than shifting their residence to the job location.

7. Commuting Time and Distance

The commuting time of a worker is largely non-productive and reduces the free time available with the workers. The inverse relationship between commuting time and health status and productivity of the worker has been brought out by earlier studies. Among the five categories of workers covered by the study, the longest commute was for the office staff. On an average, they spend 161 minutes for a

[2]Kerala is a state which has relatively high proportion of families owning a house (91 percent as against 87 per cent at the national level). The contrast is much more evident in the case of rural areas. While 88 per cent of the rural families in Kerala own a house, the corresponding proportion is only 69 per cent at the national level (Census 2011). Census 2011 also indicates that the rural households in Kerala have better facilities compared to many other states.

[3] It is often pointed out that the state has a rural-urban continuum. Majority of the villages have schools, hospitals and other infrastructure usually found in urban areas.

round trip. On the other end are the IT workers, who spend 92 minutes on an average a day for commuting for work. The workers in the sample, on an average, spend 133 minutes for commuting (to and fro). This is equivalent to spending a quarter of their working time for commuting. The average worker in the sample working for 280 days a year spends 26 full days getting to work and returning home. It may be noted that a reduction of five minutes in commuting one way saves time equivalent to six working days a year. Thus, any improvement in road and public transport infrastructure has major implications on the well being of the workers.

Table 2: Percentage Distribution of Respondents by Commuting Time (One Way)

Commuting Time	Construction Worker	Domestic Worker	Retail Sector Worker	Office Staff	IT Professional	Overall
Up to 1 Hour	44.0	42.0	55.0	33.0	77.0	50.2
1.01-2.00 Hour	49.0	58.0	36.0	54.0	22.0	43.8
2.01- 3.00 Hour	6.0	0.0	4.0	12.0	1.0	4.6
More than 3 Hours	1.0	0.0	5.0	1.0	0.0	1.4
Total	100.0	100.0	100.0	100.0	100.0	100.0
Average Time (one way in minutes)	**71.7**	**71.3**	**64.3**	**80.5**	**45.9**	**66.7**

On an average, the commuting workers travel around 25 kilometres to reach their workplace. Average distance travelled by workers in the sample is highest for office staff (37 kilometres) and lowest for IT professionals (19 kilometres). In other words, the area from which the city draws its commuting workers for office jobs is much wider compared to that of other categories of work.

Table 3: Percentage Distribution of Respondents by Commuting Distance (One way in Kms)

Commuting Distance	Construction Worker	Domestic Worker	Retail Sector Worker	Office Staff	IT Professional	Overall
Up to 10 kms.	10.0	6.0	24.0	5.0	29.0	14.8
10.01-25 kms.	50.0	68.0	41.0	30.0	45.0	46.8
25.01- 50 kms.	32.0	25.0	22.0	47.0	26.0	30.4
More than 50 kms.	8.0	1.0	13.0	18.0	0.0	8.0
Total	100.0	100.0	100.0	100.0	100.0	100.0
Average Distance	**26.1**	**20.1**	**24.9**	**36.6**	**19.2**	**25.4**

8. Mode of Commuting

Many of the commuters use more than one mode for their journey to work. Therefore, main mode, defined as the one which covers more distance in the journey to work and back home, has been used for the analysis. Majority of the workers in all sectors except IT sector depend on public transport (Table 4). Half of the IT professionals depend on the transportation facility arranged by the employer. Among the public transport services, bus is the most prominent service.

Table 4: Main Mode of Commuting by Respondents (%)

Mode	Construction Worker	Domestic Worker	Retail Sector Worker	Office Staff	IT Profe-ssional	Overall
Bus	70.0	96.0	66.0	55.0	9.0	59.2
Train	9.0	0.0	11.0	23.0	0.0	8.6
Boat	8.0	4.0	0.0	1.0	0.0	2.6
Office cab	0.0	0.0	0.0	0.0	52.0	10.4
Motorcycle/ Scooter	12.0	0.0	20.0	17.0	27.0	15.2
Own Car	0.0	0.0	0.0	3.0	12.0	3.0
Others*	1.0	0.0	3.0	1.0	0.0	1.0
Total	100.0	100.0	100.0	100.0	100.0	100.0

* - Others include those coming by cycle or auto rickshaw

9. Public Transport

One-fourth of the bus commuters, 40 per cent of the train commuters and four-fifths of the boat commuters opined that there are not sufficient public transport facilities to come to the city at proper time (Table 5). Hence, inadequate water transport facility is an issue which needs to be addressed in the near future. The provision for funding support for this purpose in the urban development programmes such as Jawaharlal Nehru National Urban Renewal Mission (JNNURM) needs to be effectively made use of. There is also a need for increasing the availability of trains which reaches the city before the usual working hours, particularly of the office staff. Even though Kochi Metro will start operating soon, it may not be sufficient to cater to the needs of a large section of the workers commuting to the city from outside. As per the present plan, it facilitates only north-south transit. But workers are coming from all sides. The relatively higher fares of the metro trains compared to other modes of public transport may discourage the low income earners such as domestic workers, retail workers and construction workers from using it.

Some quality related aspects of commuting by public transport have been explored by the study. While most of the boat commuters get seats while commuting, majority of the bus and train commuters usually have to stand in the crowded buses and trains. Though there has been wide media attention, large majority of the commuting workers who regularly travel in trains are feeling safe about night commuting by train. However, one-fifth of the boat commuters feel that the safety measures in boats are inadequate.

Table 5: Some Quality Aspects of Commuting by Public Transport

Indicators	Percentage
Percentage of commuters usually getting seats in the public transport service:	
: Bus	42.8
: Train	35.3
: Boat	95.2
Percentage feeling safe while commuting by train at night	88.2
Percentage feeling that adequate safety measures are available in boats	81.0

10. Commuting By Private Vehicle

Nearly one-fifth of the workers in the sample use private vehicles- four wheelers or two wheelers - for their journey to work. In two-thirds of such cases, the worker travels alone (Table 6).

Table 6: Number of Persons accompanying while Commuting for Work in a Private Vehicle

Number of Persons Travelling together in Private Vehicles	Two wheeler (%)	Four wheeler (%)
Worker alone	69.7	66.7
Together with one or more persons	30.3	33.3
Base	76	15

Increased use of private cars is the result of factors such as increase in disposable income, inefficient urban and transport planning, absence of effective implementation of regulations to curb the use of motorized vehicles in the city etc. Apart from the pressure it creates on the city roads, regular work trips by private vehicles especially car, create some hazards like degradation of air quality,

congestion and increased demand for parking space. Any movement of people using vehicles has not only monetary cost, but also ecological cost. The carbon footprint is more when the movement is by private vehicle as it is often under-utilised. Hence the number of cars entering the city needs to be regulated effectively. Reducing the number of cars through vehicle quota system, as has been done in Singapore may not be possible here. However, measures like congestion charges during peak hours, differential parking fees and strict penalty for unauthorised parking may be helpful to curb the dependence on private cars for commuting in the city. The employers should be made responsible for providing parking facilities for the employees. A strong commitment from the local government, beyond the legislative measures, is required to implement these measures effectively. Better initiatives in terms of car pooling or introduction of more rapid mass transits are required to motivate the daily commuters to use public transits. Private vehicle users also have pointed out that punctual and more reliable service and increased frequency of the public transport will motivate them to shift from private to public modes of transport.

11. Early Morning and Night Commuting

Commuting workers differ from each other in terms of their work timing, time at which they reach or leave the city, selection of mode etc. Majority of the domestic workers in the sample need to travel early in the morning at around 6 AM. The low frequency of bus service in the early hours and consequent overcrowding are major problems faced by these workers. Some of the workers, particularly those in the retail sector who have longer working time and IT professionals who have night shifts, need to travel after 7PM. Three-fifths of those who travel at night depend on public transport for their night commuting. About one-third of them faced some problem in getting public transport during late hours. About 15 per cent of the night commuters reported that they have to walk through streets in the city where lights are not lit. The proportion is much higher in the places of residence (outside the city). Half of the night commuters reported absence of street light in their area of residence. This makes the commuting back home unsafe particularly to the women workers. Hence availability of street lights demands immediate attention of the local governments particularly those in the place of origin of the commuting workers.

12. Gender Dimensions of Commuting for Work

In all sectors, female workers are travelling less compared to their male counterparts (Table 7). This implies that the city attracts women workforce from a smaller region than the male workforce. These findings are in line with the findings of studies conducted elsewhere that females are having relatively shorter work trips (Madden 1981; Johnston-Anumonwo 1992; Blumen 1994; Blumen and Kellerman 1990; Anumonwo 1992; Camstra 1996; Crane 2007). Research comparing women's and men's work trips generally indicates that labour market differences are critical in explaining the shorter work trips for women. Hanson & Johnston (1985) found that the most important factors explaining shorter travel times for women were their lower incomes, concentration in female-dominated occupations, and greater reliance on public transport. A number of researchers suggest that greater household responsibilities lead to shorter travel time for women (Madden 1981; Johnston-Anumonwo 1992).

Table 7: Average Commuting Distance and Time (One way) by Gender (%)

Worker category	Average Distance commuted (in kilometres)		Average Time for Commuting One way (in minutes)	
	Male	Female	Male	Female
Construction worker	26.2	--	71.7	-
Domestic Worker	--	20.1	-	71.3
Retail Sector Worker	30.8	15.3	69.9	55.2
Office Staff	41.1	32.1	84.5	76.4
IT Professional	20.2	16.0	48.4	37.9
Overall	28.2	21.6	67.4	65.8

The study finds that among the commuting workers, women have lesser access to family-owned vehicles than men (Table 8). Therefore, any improvement in the public transport system will be more beneficial to women than men. Even though the average distance travelled by the female commuters is significantly lower than that of their male counterparts, the average time taken to reach the workplace does not differ much. The reason can be the higher reliance of female commuters on relatively slower public transport.

Table 8: Main Mode of Transport by Gender (%)

Category of Workers	Gender	Private Vehicle	Public Transport	Others*	Base
Retail Sector Worker	Male	25.8	72.6	1.6	62
	Female	10.5	86.8	2.6	38
Office Staff	Male	30.0	68.0	2.0	50
	Female	10.0	90.0	0.0	50
IT Professional	Male	46.1	6.6	47.4	76
	Female	16.7	16.7	66.7	24
Construction Worker**	Male	12.0	87.0	1.0	100
Domestic Worker***	Female	0.0	100.0	0.0	100

* Others include office cab and shared travel. ** Only male respondents; ***- Only female respondents.

Nearly one-fifth (21 per cent) of the female commuters who need to travel at night are feeling unsafe in the city as against 8 per cent in the case of male commuters. It is also observed that much lower proportion (11 per cent) of women commuters are feeling unsafe in their place of residence than in the city where they work (not shown in the Table).

13. Pressure on Urban Infrastructure and Facilities

Commuting of workers to the city exerts pressure on urban infrastructure and facilities. Apart from roads, the facilities in the city which daily commuters use include pedestrian facilities, parking facilities, sanitation facilities and eateries.

Nearly half of the commuting workers in our sample reported that there are no pavements on the city roads they use to reach the workplace (Table 9). Even if there is footpath, walking on them is often a safety hazard due to uneven/broken surfaces, encroachment by shopkeepers and vendors, disposal of waste on the pavement etc. Open drains and encroachment of pavements are reported by two-fifths of the respondents. More than one-fourth of the respondents also reported roadside disposal of garbage as one of the serious issues affecting the pedestrians. The pavements are also encroached with hoardings and streets are lined with haphazardly parked vehicles. On top of this, there is hardly any zebra crossing and even if it is available, drivers seldom respect it. Traffic signals in city are also not pedestrian friendly as there is no signal for pedestrians. As a result, the pedestrians take heavy

risk in crossing roads in the city[4]. Many of the roads in the city are managed by Municipal Corporation and some others by the Greater Cochin Development Authority (GCDA) and Public Works Department (PWD) of the State government.

Table 9: Problems Faced by Pedestrians While Walking Inside the City

Problems	Percentage
No Pavements	46.6
Open drains	42.4
Encroachment of Pavements	38.4
Roadside Disposal of Garbage	27.2
Base	500

Note: Total may not add up to 100 due to multiple responses

Ensuring pavements in all roads is one intervention that the Municipal Corporation, GCDA and the PWD can take up to improve the experience of pedestrians. Elevated walkways in crowded junctions is another intervention that can lead to a pedestrian-friendly environment in the city. The needs of motorists have been given priority at the expense of pedestrians. Programmes to increase the awareness about the rights of the pedestrians are necessary not only among drivers but also among urban planners, elected representatives, traffic police and other officials. Making the city roads more pedestrian friendly should be an objective of city governance.

Even though the demand for parking is high, many of the firms are not able to provide parking facilities to the staff resulting in roadside parking of vehicles. Nearly one-fifth of the workers commuting for work in their own vehicles park vehicle on the roadside (Table 10).

[4] According to a study conducted in 2008 by Wilbur Smith Associates for the Ministry of Urban Development, Government of India, Kochi is ranked 15th on walkability index among the 30 major cities in India covered by the study. **Walkability index is c**alculated as the weighted average of availability of footpath (footpath length as a ratio of length of major roads)and score based on opinions on available pedestrian facilities (Wilbur Smith Associates and Ministry of Urban Development 2008).

Table 10: Place where the vehicle is parked while at Work

Parking Space	Percentage
Parking Space Provided by the Employer	81.3
Paid Parking Places	1.1
Roadside	17.6
Base	91

Commuters use the sanitation facilities in the workplace and in transit points such as bus stands, railway stations and other public places. About one-fourth of the commuting workers use the public sanitation facilities in the city. However, majority of them (89 percent) use these facilities only once in a while (not reported in Table).

Table 11: Sanitation Facilities

Sanitation Facilities	Percentage	Base
Proportion using Public sanitation facilities in the city	23.0	500
Opinion on Cleanliness of Public Toilets		
Good	21.0	500
Average	24.0	
Bad	55.0	

Commuters, irrespective of whether they use the public sanitation facilities or not, were asked to give their opinion on the cleanliness of the public toilets. More than half of the daily commuters rated cleanliness of the public toilets as bad demanding immediate attention by the Kochi Municipal Corporation.

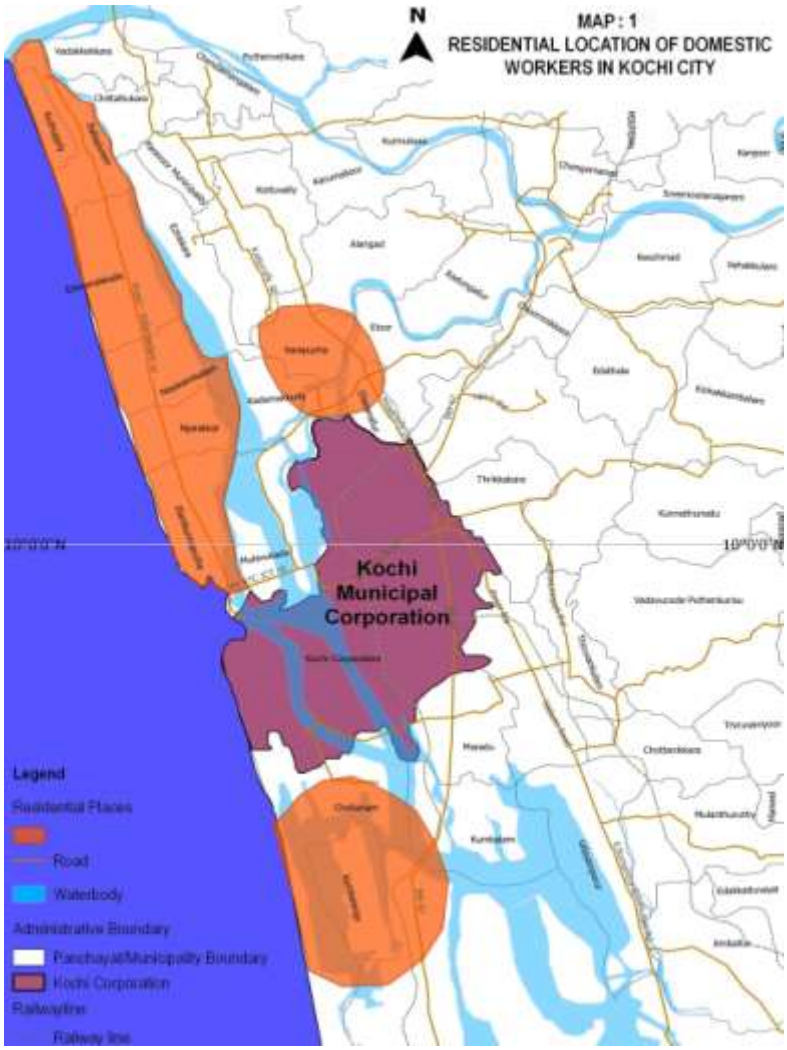
14. Spatial Aspects of commuting for Work

Commuting is an economic activity which acts as a link between residential and job location of workers in a spatial framework. It is closely related to the urban land development patterns of a particular area. The relation between decentralized nature of development and its impact on commuting for work patterns has been studied both cross-sectionally (Cervero 1989, 1996; Crane 2000; Shen 2000) and longitudinally (Gordon et al. 1991; Crane and Chatman 2004). The basic question examined in this body of research is how commuting length is affected by the spatially

decentralized development of metropolitan areas. Studies in this area conclude that spatial decentralization brings jobs and workers closer to each other by reducing the commuting distance (Gordon et al. 1991; Cervero and Wu 1997; Crane and Chatman 2004). Cervero and Wu. (1997) observed that suburban employment, vis-a-vis central city employment, generate shorter commute times in polycentric cities. Yang (2005), however, in his comparative study of Atlanta and Boston, concluded that different spatial decentralization pathways may lead to entirely different commuting outcomes. Trade-off between cost of housing and that of commuting is one of the major factors in deciding the housing locations (Kain 1962). Choice of residence is governed by many factors, accessibility to work being one among several others. Escalating land prices, high cost of living and poor living conditions are discouraging the choice of residence within the city area whereas better schooling facilities, better healthcare facilities and other infrastructural facilities may encourage a movement towards the city. Moreover, the choice of workplace and residence is dynamic in nature which is influenced by future employment opportunities and residential aspirations (Crane 1996). Besides these, changes in household structure with two workers having two separate commutes, has also added to this changing nature of commuting for work by altering the choice of residential locations (Clark et al. 2003).

With the limited information we could gather through the survey of workers, depth interviews with employers and FGDs with the workers, we examine the link between home and place of work in the five sectors covered by the study. Since only 100 workers were interviewed in each sector, the information collected was not sufficient to provide any conclusive evidence on the distribution of localities from where workers in these sectors commute to the city for work. Among the five sectors covered by the study, the domestic workers were relatively socially and economically backward. As noted earlier, they commute to Kochi city because of the high wages received for their work in the city than what they could get in their place of residence. The domestic workers in Kochi city come mainly from Vypin, Edakochi, Chellanam and Varapuzha. All these are relatively backward suburbs on the western side of the city (Map 1). However, the land prices are shooting up in these localities because of the proximity to the city. The situation is that even though their earnings are low, their asset base has strengthened due to rapid urbanization taking place in areas where they live. As is evident, they are unlikely to move into the city but are likely to be pushed off further from the city. The FGD conducted among domestic workers indicated the low esteem attached to the job. It was pointed out that younger ones in the households of these workers are not entering this occupation. This is likely

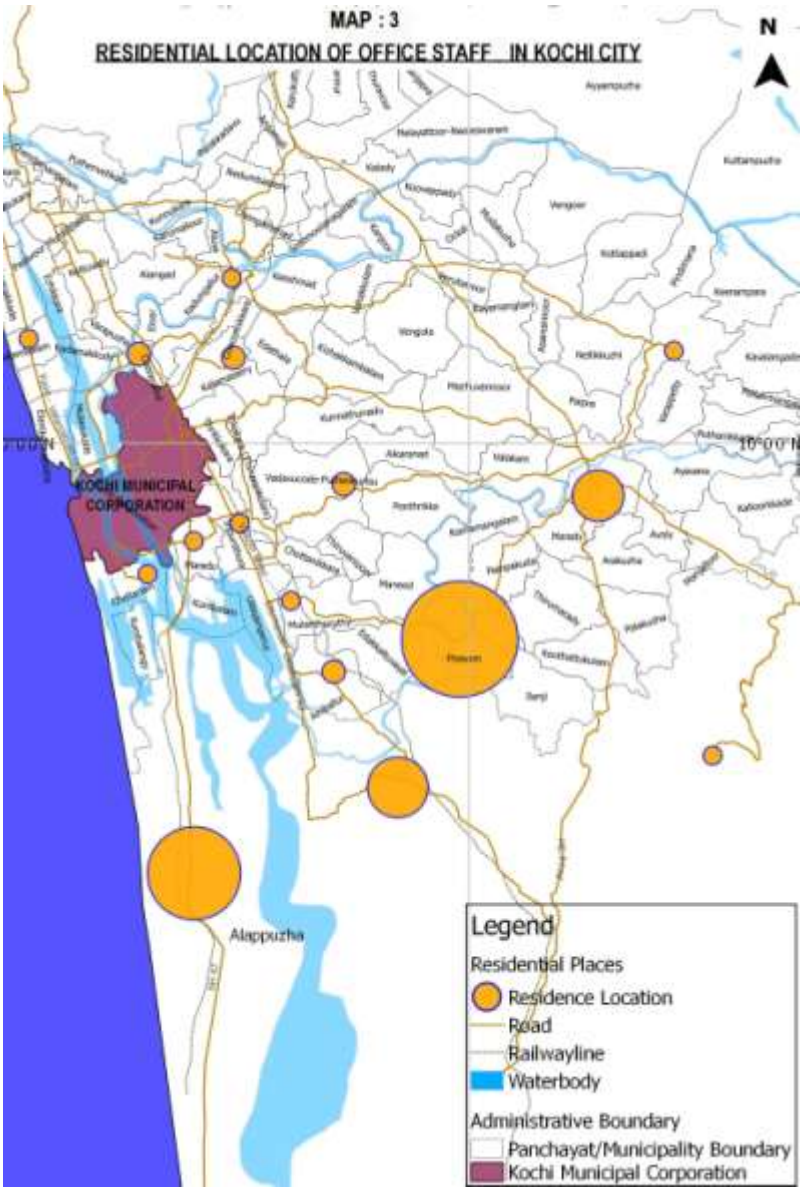
to reduce the supply of domestic labour in the city in the coming years. On the other hand, increased availability of disposable income, increasing number of dual-earner households and the ageing of the population are likely to increase the demand for domestic labour in the city. In such a scenario, the city will have to depend on workforce from farther areas.



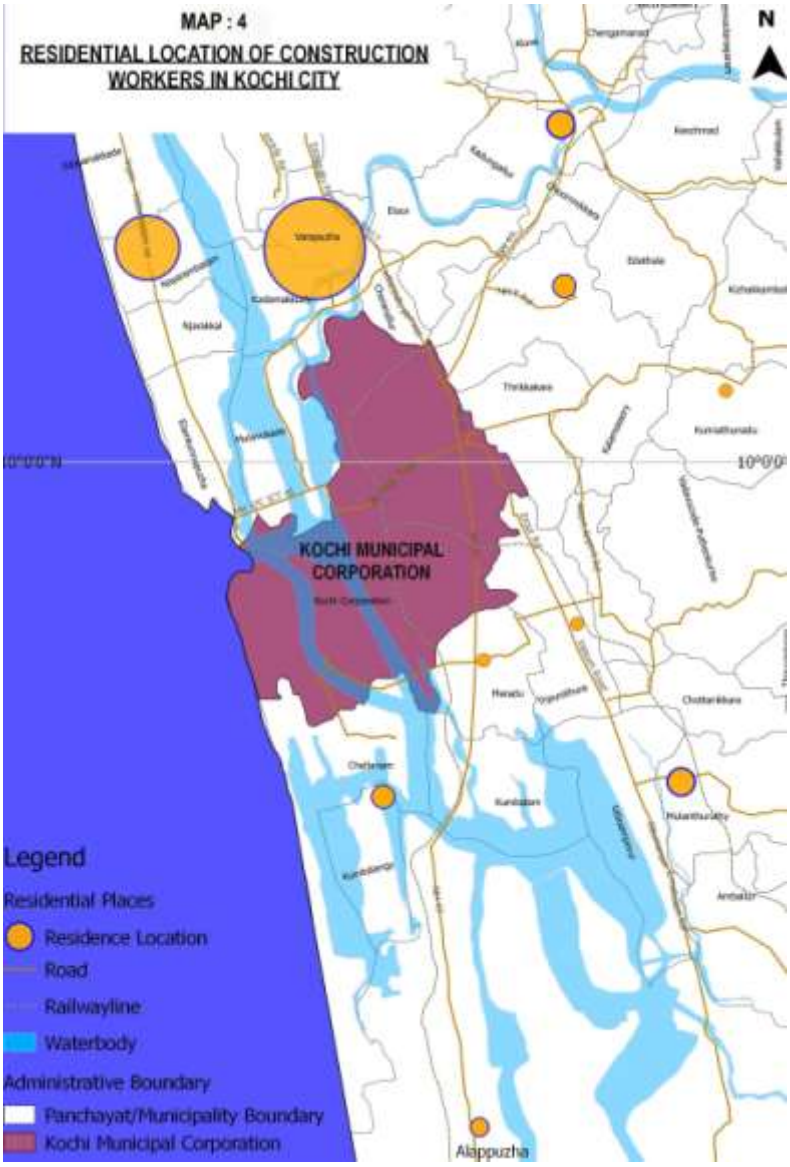
On the other extreme are the workers in the IT sector. Our interactions with HR personnel in some of the IT firms and the FGD conducted among IT professionals revealed that the workers are getting located near the work place or inside the city area. Kakkanad region, which is part of the Thrikkakara municipality, is fast becoming an extension of Kochi city primarily because most of the IT firms are located here. As noted earlier, the average commuting distance is the lowest for workers in this category. Late working hours in the IT sector is a factor that necessitates locating residences closer

to the workplace. The facility for office cabs in select routes covering mainly the city area and the Kakkanad area also facilitates such a settlement pattern. The high earnings of the IT workers and the resultant disposable income has made it possible for the IT workers to buy land either in Kakkanad or within the city limits or to take rented premises in these localities. Therefore, this section of the workers is likely to move closer to the place they work.

There is no definite pattern in the place of residence of office staff. They come from all over Ernakulam district and the neighbouring districts of Alappuzha and Thrissur. Relatively lower availability of office jobs in the neighbouring districts, particularly in the private sector, leads to such a situation.



The construction sector has been witnessing significant growth for over a decade. The workers in this sector did not show any pattern but majority of them are living at a radius of 50 kilometres from the city and are commuting to the city for work (Map 4). There is no fixed place of work in this sector as construction sites are changed frequently.



The residences of retail workers, who are commuting on a daily basis to the city, are located largely within a radius of about 25 kilometres (Map 5). The city has been experiencing shortage of workers in this sector. To address the labour shortage, large retail outlets particularly the textile shops, have been sourcing workers from rural areas of other districts. A large number of such workers have their permanent residence in Idukki, which is a relatively backward district in the state with lesser opportunities for work other than that in the plantation sector. Many of the employers are providing accommodation to these workers near the work place in the city.

Owning a house within Kochi is increasingly becoming a task that appears to be getting more and more out of reach of the middle and lower classes. As noted earlier, among the five sectors, only workers belonging to the IT sector are able to gravitate towards their workplace, in terms of their residences.

There are two types of establishments viz., the ones that can only be located within the city limits and others which can be located outside the city also. New institutions/commercial establishments which attract large number of workers and other commuters should be located outside the city area unless it is absolutely essential to be located within the city limits. This can help in developing new townships. The development of Kakkanad Township is worth mentioning. The township was developed initially as the location of the district headquarters. Later on, the area was developed as

the IT hub of central Kerala. Kakkanad is very near to the city and all the city facilities are accessible easily. Thus the city could avoid a heavy flow of IT professionals everyday in to the city area.

Globally, malls are usually built not in the heart of the city but in the outskirts. An urban area will be developed around malls. Malls can become an attraction to move in to the locality. In Kochi, malls are now built up even in the busiest junctions. The strategy should be to encourage the malls, large textiles show rooms, jewellery show rooms and other big commercial establishments which attract large number of workers and other commuting population to move out. Another instance of lost opportunity is with regard to the High Court Complex. It is an institution which caters to the whole state of Kerala. Apart from the large number of workers and lawyers, the High Court and the offices of the lawyers attract thousands of people who often come in private vehicles to the city every day. The High Court was rebuilt a decade back in the core business district. Locating it outside the city would have provided an opportunity for the development of a new employment centre. New institutions, whether in the private sector or the government sector, which attracts large number of workers and other commuters as well as vehicles, may be allowed to locate in the core business district only if it is absolutely essential. Development of satellite towns and counter magnets are necessary. Left to the market forces, it is likely to happen. But such a development will be unplanned and can lead to further chaos. It can also take a much longer time. Therefore, there is a need for planned development of townships outside the city. This kind of polycentric development will also increase two-way traffic thereby reducing the cost of providing public transport facilities. Polycentric development, however, cannot be planned at the municipal corporation level. On a large scale, the GCDA, with the support of all the local governments in its limits, has to take the initiative. On a much larger plane, it is the job of the state government.

To overcome the issues related to long distance commuting by workers, two strategies are often discussed: 1) improving connectivity and public transport services and 2) making available affordable housing options within the city for poor worker households. For the first option, there is a need to map the public transport network in Kochi and the surrounding areas to identify the gaps in the availability of the service. Increasing access to public vehicles in the existing routes should also be a part of the strategy. The importance of promoting public transit services has to be viewed not only for its affordability but also for other costs such as traffic congestion, air pollution and higher oil dependence caused by private vehicles. The second strategy of making provisions for affordable

housing[5] is possible only to a limited extent. Such an initiative was undertaken by the state government few years back. A housing project was started in Kakkanad for poor worker households. The government initiatives for providing affordable housing is possible only to a limited extent due to the present fiscal position of the state government. Improvement in the commuting system and better provision of public services to the commuting workers can be much more useful in increasing worker satisfaction.

15. Commuting Worker and Right to City

Commuting for work or any other kind of circulatory movement creates a group of "rurban" (Zérah et al. 2011) population who are completely overlooked in the local level planning process. This group of workers comes everyday to work in the city and thus contributes in its development. They are, however, not part of the city planning though their circulatory movement provided the substitute of permanent residence in the city. On the other hand, their involvement in participatory planning and decentralized governance of the locality where they reside is also low as they leave early morning and reach late in the evening. Therefore, it is possible that the presence of the productive workforce in decentralised governance can be low. There should be efforts by the local governments to facilitate their involvement. Such efforts may include organizing some of the meetings at a time convenient to the workers or by trying to solve some of the problems the workers face while commuting. In the city, there is a need for institutionalizing some mechanism for consultation between municipal authorities and representatives of the commuting workers so that their voices are heard. The rights of the commuting workers to the city in which they work should be recognised.

16. Conclusion

The city of Kochi is characterised by almost zero population growth making it more and more dependent on workers from other parts of the state and outside to fill the gap in demand and supply of labour. The discussion in the previous sections indicates that the nature and patterns of

[5] Families who pay more than 30 percent of their income for housing are considered cost burdened and may have difficulty in affording necessities such as food, clothing, transportation and medical care. This means that a worker having an income of Rs 10000 per month can afford to spend a maximum of Rs 3000 as rent/EMI. Task Force headed by Deepak Parekh (2008) on "Affordable Housing for All" constituted by the Government of India (2008) suggests a housing unit for low income households as one with a carpet area between 300 and 600 sq ft, with (i) the cost not exceeding four times the household gross annual income (ii) EMI/rent not exceeding 30 percent of the household's gross monthly income.

commuting differ widely from sector to sector. We have also noticed that the patterns differ between male and female workers. Even within a sector, the patterns are likely to be different for unskilled/ low skill workers compared to skilled or white collar workers. Improving the commuting experience needs a comprehensive plan encompassing urban and transport planning, keeping the environmental issues at the backdrop. It may not be possible always for the local governments to take all the decisions on the issues related to area planning, building norms, parking infrastructure or on the components of transport planning. It may come under the purview of state or central government. But local governments and GCDA should be aware and concerned enough to influence these decisions. IT also requires strong commitment from the local people as well.

The presence of commuting workers is often not considered in city population statistics. There is no estimate of the number of workers commuting to Kochi city and or urban agglomeration and their nature of work. Though they form a part of the floating population, the commuting workers are different from the other categories of floating population because they are coming to the city on a daily basis and therefore the pressure exerted by them on urban services and facilities is of higher magnitude. This category of the day population is often not considered in urban planning. There is a need to make an estimate of the number of workers commuting from other parts of the state to the city. There is also a need to understand in which localities and which sectors they are employed. This call for a larger study covering different categories of workers and examining different social and economic dimensions of the work related commuting and its influence on urban planning and development.

Before we conclude, let us recognise that though everyday commuting for work has many negative consequences, it also has some positive dimensions. It provides opportunities for information sharing and building relationships. The public transport facility and the waiting areas are acting as ‘public space’ which is gradually declining in Kerala. Such sociological aspects of commuting for work may be studied to make the ‘public space’ more attractive. Given the limited sample of workers the survey covered, that too only in five sectors, the findings of the study are difficult to be generalised. But it is hoped that the study will contribute to improving our understanding of the commuting for work patterns in the city.

References

Bhagat, R. B. 2011 Emerging Pattern of Urbanisation in India, Economic and Political Weekly Vol. 46(34):10-12.

Bhat, C.R., and R. Sardesai. 2006. The impact of stop-making and travel time reliability on commute mode choice. Transportation Research Part B: Methodological 40(9): 709-730.

Blumen. O and A. Kellerman. 1990. Gender Differences in Distance, Residence, and Employment Location: Metropolitan Haifa 1972 and 1983, *Professional Geographer*, 54-71, DOI:10.1111/j.0033-0124.1990.00054.x accessed on 12/11/2013

Blumen. O. 1994. Gender Differences in the Journey to Work. *Urban Geography*, 15: 223-245

Camstra, R. 1996. Commuting and Gender in a Lifestyle Perspective, *Urban Studies*, 33 (2): 283-300 doi: 10.1080/00420989650012013

Cervero, R 1989, 'Jobs-Housing Balancing and Regional Mobility', Journal of the American Planning Association, vol. 55, no. 2, pp. 136-150.
Cervero, R. 1996. Job-housing Balance Revisited: Trends and Impacts in the San Francisco Bay Area. *Journal of the American Planning Association* 62: 492-511.
Cervero, R., Wu, K.L., 1997. Polycentrism, commuting, and residential location in the San Francisco Bay Area. *Environment and Planning* A 29, 865–886.

Chandrasekhar, S. 2011. Workers Commuting between the Rural and Urban: Estimates from NSSO data, Economic and Political Weekly Vol. 46(46):22-25.

CII- Kerala, CPPR and Kumar Group. 2012. *Vytilla Mobility Hub: A Gateway to Kerala*. Available at: http://www.cppr.in/wp-content/uploads/2012/10/Vyttila-Mobility-Hub-Report-1.pdf accessed on 10-2-2014.

Clark, W. A. V., Y. Huang, S. Withers. 2003. Does Commuting Distance Matter? Commuting Tolerance and Residential Change, *Regional Science and Urban Economics*, 33:199-221.

Costa, G., L. Pickup, and V. DiMartino. 1988. Commuting – a further stress factor for working people: Evidence from the European Community. *International Archives of Occupational and Environmental Health 60(5):371-376*

Cox, T., J. Houdmont, and A. Griffths. 2006. Rail passenger crowding, stress, health and safety in Britain. Transportation Research Part A: Policy & Practice 40(3): 244-258.

Crane, R., 1996. The influence of uncertain job location on urban form and the journey to work. *Journal of Urban Economics* 39, 342–356.

Crane, R. 2000. The Influence of Urban Form on Travel: An Interpretive Review, Journal of Planning Literature, 15(1):3-23.

Crane, R. 2007. Is There a Quiet Revolution in Women's Travel? Revisiting the Gender Gap in Commuting, *Journal of the American Planning Association,* 73 (3):298-316

Crane, R. and D. Chatman. 2004. Traffic and Sprawl: Evidence from U.S. Commuting (1985 to 1997). *Planning and Markets* 6: 14-22.

Evans, G.W., and R.E. Wener. 2007. Crowding and personal space invasion on the train: Please don't make me sit in the middle. *Journal of Environmental Psychology 27(1): 90-94.*

Everett, B. What a long trip to work is doing to your health, Friday, 16 August 2013 Retrieved at http://www.smartcompany.com.au/transport-and-logistics/057034-what-a-long-trip-to-work-is-doing-to-your-health.html

Gordon, P, Richardson, HW & Jun, M-J 1991, 'The Commuting Paradox Evidence from the Top Twenty ', Journal of the American Planning Association, vol. 57, no. 4, pp. 416-420.

Hanson, S. and Johnston, I. 1985. Gender differences in work-trip lengths: Explanations and implications. Urban Geography 6:193-219

Johnston-Anumonwo, I. 1992. The influence of household type on gender differences in work trip distance. Professional Geographer 44: 161-169;

Kain, J.F., 1962. The journey to work as a determinant of residential location. Papers and Proceedings, Regional Science Association 9, 137–161.

Kundu, A. (2011): Method in Madness: Urban Data from Census 2011, Economic and Political Weekly, vol. 46(40).

Madden, J. F. 1981. Why Women Work close to Home? *Urban Studies, 18:181-194*.

Mohanan, P. C. (2008): "Differentials in the Rural-Urban Movement of Workers", The Journal of Income and Wealth, 30(1), 59-67.

Parekh Deepak. 2008. "Report of the High level Task Force on Affordable Housing for All", Government of India, Ministry of Housing and urban Poverty Alleviation.

Roberts, J., R. Hodgson, P. Dolan. 2011. "It's driving her mad": Gender differences in the effects of commuting on psychological health, *Journal of Health Economics, vol. 30(5): 1064–1076*.

Shane, Q. 2000. Spatial and Social Dimensions of Commuting, Journal of American Planning Association, 66: 68-82.

Sharma, A. 2013. Exclusionary Urbanization and Changing Migration Pattern in India: Is commuting by workers a feasible alternative? Paper presented at IUSSP Conference. Busan, Korea. Available at: http://www.iussp.org/sites/default/files/event_call_for_papers/Draft_Ajay.pdf

Tse, J.L.M., R. Flin, and K. Mearns. 2000. Bus driver well being review: 50 years of research. Transportation Research Part F: Traffic Psychology and Behaviour 9(2): 89-114.

Wener, R., G.W. Evans, and P. Boately. 2005. Commuting stress: Psychological effects of a trip and spill over into the workplace. Transportation Research Board 1924/2005: 112-117.

White, M. J. 1986. Sex Differences in Urban Commuting Pattern, *American Economic Review, 76(2): 368-372.*

Yang, J. 2005. Commuting Impacts of Spatial Decentralization: A Comparison of Atlanta and Boston. *The Journal of Regional Analysis and Policy*, 35 (1): 69-78

Zérah, M.–H., Tawa Lama-Rewal, S., Dupont, V., Chaudhuri, B. 2011. Introduction: Right to the City and Urban Citizenship in the Indian Context, *Urban Policies and the Right to the City in India*: *Rights, Responsibilities and Citizenship*, UNESCO, India.