

PROCESS OF PERI URBAN FORMATION IN CHENNAI METROPOLITAN AREA

Anna University, Chennai

1 INTRODUCTION

The WP2 study exhaustively covered 135 settlements in Chennai Metropolitan Area in all directions. Peri Urban indicators were established and the 135 settlements were classified under three categories namely, Rural – Peri - Urban and Urban. The indicators were all formulated in ranges as it was found that Peri Urban formation is a process and the transformation is always in a dynamic state. For the purpose of study and analysis the need for identifying settlements with physical boundary to understand the process was inevitable. The factors influencing the formation of Peri Urban settlements, the impact of Peri Urban formation on the Socio-economic characteristics of the settlements, the resulting transformation, the extent to which natural resources are depleted and the transport system that is responsible for inducing developments were established in WP2. Major findings of the WP2 study indicated that Peri Urban development is greatly influenced along transport corridors whether it is road transport or rail transport corridor. If the corridor is served by road and rail transport the development is found to be faster. Several case studies along the major corridors with a few settlements classified as Peri Urban were selected to understand the process of transformation along the corridor and away from the corridor and at distances from the center of the city. The case studies established the fact that though the rate of Peri - Urban formation is more along the corridor, the interiors settlements also under go transformation depending upon the type of road connectivity, linkage with the nearest urban centers, availability of good water source, cheap land and availability of public and semi-public transport facilities. Similarly, though the transformation were visible in these settlements in the area of socio-economic characteristics (Agriculture, non-agriculture workers ratio, workers participation, dependents ratio, income levels vehicle ownership, type of employment, distance traveled for work, education etc) land use changes and travel pattern the extent to which the transformation takes place in the process of Peri - Urban formation was

difficult to establish as the rate of transformation was varying depending upon the location of the settlements.

There were several pertinent issues raised and discussed in workshops that followed WP2 workshop at Chennai, for appropriate clarification and knowledge;

- Does the transport corridor induce developments or developments force the corridors to develop from a small access road to a major road ?
- During the process of transformation what is the role different forms transport play ?
- How is the level of infrastructure facilities available in a settlement responsible for the transformation or development of transport network.?
- What kind of developments induce not only land use changes but also invite creation of transportation infrastructure ?
- Is the Peri Urban settlement a location for exclusive farm houses with palatial houses for the rich or is it a location for speculative purposes with huge housing or commercial layouts?
- The level of dependency prevailing in Peri Urban settlements for jobs, education and business with different types of Urban settlements situated at different distances from the city center.
- The cumulative impact of transport demand induced on all the major corridors leading to the city.

In order to find clarification / answer to these issues, four case studies were instituted covering 33 settlements served by a major rail and road corridor on the west and an East coast express way in the east and two major links namely IT corridor and Tambaram Velachery road in the middle. The fig 1 shows the study area delineated at the periphery of the Chennai Metropolitan Area at the south eastern portion of the CMA.

2 STUDY AREA CHARACTERISTICS

In the CMA, settlements are growing rapidly due to urban sprawl. But the development of these settlements is not of the same order and at different levels. Some settlements are growing rapidly compared to other and the road network does not cope up with these tremendous development resulting in various problem like improper accessibility, absence of hierarchical road etc.

The secondary data such as population, literacy, agricultural workers, non-agricultural workers are collected from the Census of India Hand Books for three Census years i.e. 1981, 1991 and 2001 respectively. Then the percentage change in these parameters from 1981 to 2001 is calculated.

The settlements having more than 100 % increase in population and non - agricultural workers are identified as fast growing settlements. Hence this guideline is taken as criteria for identifying the study area. The Query Analysis in GIS is used to identify the fast growing settlements in peripheries of CMA. Hence the above criteria is given as query in suitable Arc View format. From the analysis it is inferred that there are 51 settlements having more than 100 % increase in Population and 80 settlements having more than 100 % increase in Non agricultural workers.

The concentration of these fast growing settlements is comparatively more in the southern part of CMA. Moreover the developments are highly pronounced more in the southern part of CMA. For the purpose of this study, the cluster of 33 fast growing settlements in the southern part is selected as study area. The list of settlements in the study area is given in Table 1 In this area, there is a Municipal Town, 7 Town Panchayat and 15 Village Panchayat.

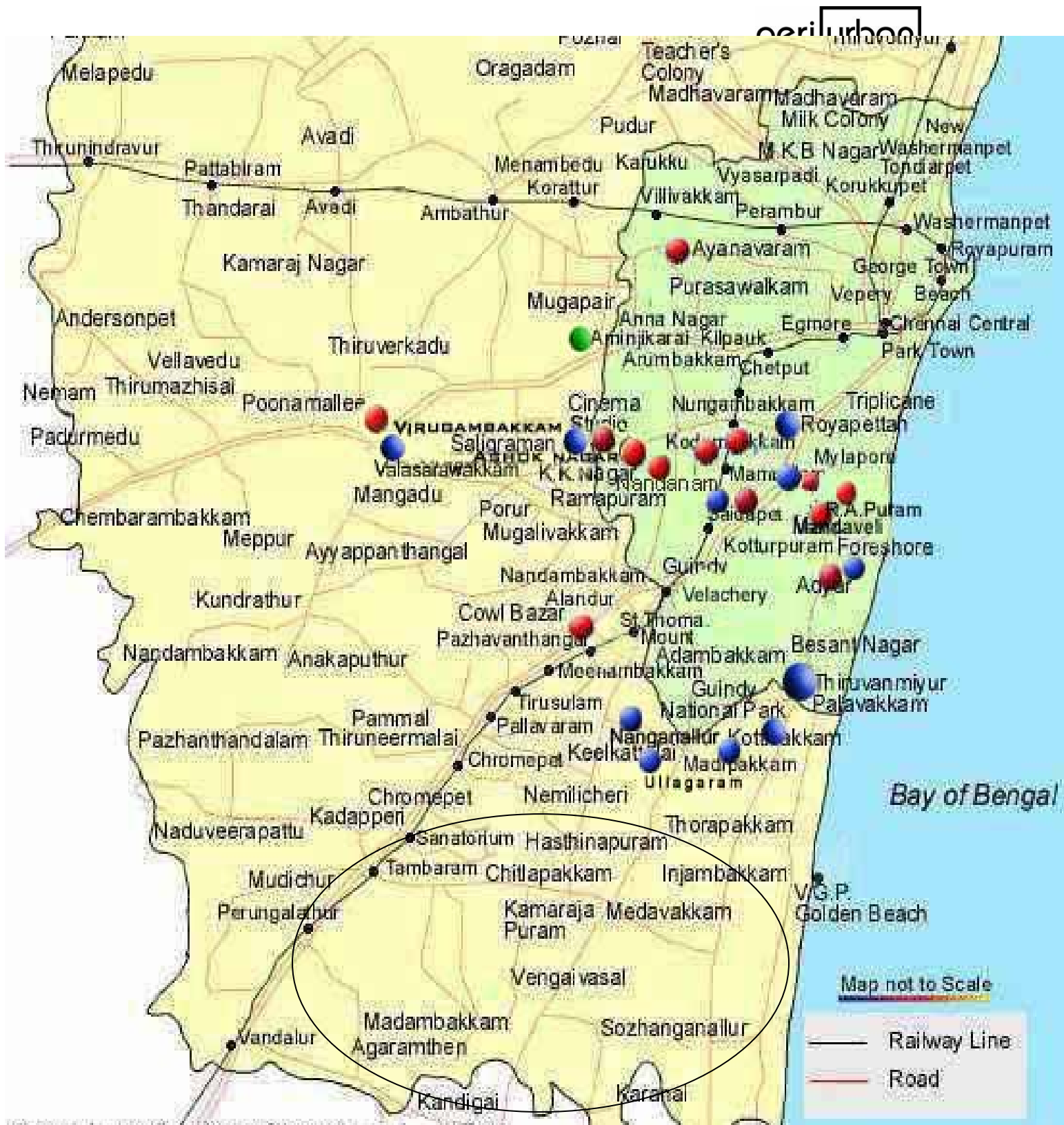


Fig 2.1 Delineation of Study Area

TABLE: 2.1 LIST OF SETTLEMENTS IN THE STUDY AREA

1	Medavakkam
2	Sembakkam
3	Rajakilpakkam
4	Gowrivakkam
5	Jaladiampet
6	Vengavasal
7	Madampakkam
8	Thiruvanjeri
9	Chittalapakkam
10	Agaramthen
11	Maduraipakkam
12	Kovilancheri
13	Ottiyambakkam
14	Arasankalani
15	Tambaram
16	Selaiyur
17	Kadaperi
18	Irumbuliyur
19	Pulikoradu
20	Peerkankaranai
21	Kilampakkam
22	Vandalur
23	Chitlapakkam
24	Perungalathur
25	Mudichur
26	Mannivakkam
27	Nedunkundram
28	Kulapakkam
29	Mepped
30	Semancheri
31	Sholinganalur
32	Uthandi
33	Perumbakkam

2.1 Classification Of Settlements Based On Peri Urban Indicators

Based on the criteria listed by the census department of India and the WP2 study, the settlements in the study settlements are classified as rural, peri urban and urban. The classification of settlements are shown in the table 2 below.

TABLE 2.0 SETTLEMENT CLASSIFICATION

	SETTLEMENT NAME	STATUS
1	AGARAMTHEN	RURAL
2	JALLIDIAMPET	PERI URBAN
3	KILAMPAKKAM	PERI URBAN
4	KOLAPAKKAM	PERI URBAN
5	MADAMBAKKAM	PERI URBAN
6	MADURAIPAKKAM	PERI URBAN
7	MANNIVAKKAM	PERI URBAN
8	MEDAVAKKAM	PERI URBAN
9	MUDICHUR	PERI URBAN
10	NEDUNGUNDRAM	PERI URBAN
11	OTTIYAMBAKKAM	PERI URBAN
12	PERUMBAKKAM	PERI URBAN
13	SEMANJERI	PERI URBAN
14	SHOLINGANNALUR	PERI URBAN
15	SITTLAMPAKKAM	PERI URBAN
16	THIRUVANJERI	PERI URBAN
17	UTHANDI	PERI URBAN
18	VENGAVASAL	PERI URBAN
19	PEERRKANKARANAI	URBAN
20	PERUNGALTHUR	URBAN
21	SEMBAKKAM	URBAN
23	TAMBARAM	URBAN
24	VANDALUR	URBAN

2.2 Characteristics Of The Settlements

General Characteristics

The general characteristics of the settlements located in the study area are outlined below. The general characteristics such as distance from the corridor, socio economic and nearest urban center to the settlement the travel characteristics are described below

❖ Peerkankaranai

It is a town Panchayat located at a distance of 0.25 km from the major corridor NH-45. The major occupations are; 78% of the workforce is private and the rest is government service. From the analysis of the past trend it is observed that it is one of the fast growing settlements and the major attracting forces are easy accessibility to both

road rail corridors, infrastructure facilities such as good roads, sufficient water supply, and availability of shopping facilities.

❖ **Vandalur**

It is located at a distance of 0.3 km from the NH – 45. About 80% of the people are employed in private and government sector. The Vandalur Panchayat includes well known colleges and institutions like Shankara Vidyalaya and crescent college of engineering. The manufacturing industries like team minerals, garment and steel industries are located here.

From the opinion survey it is observed that the attracting forces for this settlement are accessibility to road and rail corridors.

❖ **Tambaram**

The civic status of the settlement is Municipal Corporation. It is one of the major urban center of Chennai metropolitan area and it is located at a distance of 1 km from the NH-45. It includes five administrative areas as Selaiyur, Tambaram Irumbuliyur, Kadaperi and Pulikorode.

The major occupation is found to be in private sector. The trend analysis of this settlement has shown increased growth rate in population. The reasons for the fast growth has been observed as accessibility, good infrastructure facilities and about one third of the area is commercial which yields major revenue to the local bodies.

Kadaperi which is located nearer to the MEPZ (Madras Export Processing Zone), is a major employment center. About 86%, is employed in private sector and the rest in government sector. A vast majority is employed in MEPZ.

Selaiyur and Irumbuliyur are residential areas and the potential for development in these settlements are water availability and easy accessibility to work and education.

Pulikorode is an interior settlement and most of the workforce is employed in quarry as daily laborers. The income range of this people vary between 3000 – 5000 Rs/month.

❖ Perungalathur

It is a town Panchayat located at a distance of 0.75 km from the NH-45. In recent years this settlement has witnessed tremendous change in terms of housing plots, apartments shopping facilities etc. The reason for development is identified to be accessibility to both bus rail corridors and water availability. From the analysis it is found that a major share of residents are migrants from city of Chennai.

The reason expressed by the residents for choosing this location is accessibility, water availability, environment and low living cost.

❖ Chitlapakkam

The civic status of the settlement is town Panchayat, located at a distance of 1.5 km from the NH_45, The nearest urban enter is sanitorium and Tambaram. The factors influencing the migration to this settlement are water availability and low living cost.

❖ Mannivakkam

It is a village Panchayat located at a distance of 1.8 km from the major corridor NH-45. The nearest urban center is Tambaram. People depend on Tambaram for shopping and bus facilities. The attracting forces of this settlement are water availability and low living cost. Majority of the work force is employed in public and private sector.

❖ Mudichur

The civic status of this settlement is village Panchayat, located at distance of 2.1 km from the NH-45, the in migration rate in this settlement is increased in the past five years. The main reason for the development is housing plots, water availability and environmental factors.

❖ Nedunkudrum

The civic status of this settlement is a village Panchayat, which is constituted by five settlements as Mepped, Kulapakkam, Sadhanandapuram, Alapakkam and Nedunkudrum.

- ❖ Mepped is located at a distance of 1.9 km from the NH-45, the attracting forces of this settlement are water availability and environment. It lacks in basic facilities relating to education, health facilities, and infrastructure facilities like good roads, drainage facilities and solid waste collection.
- ❖ Sadhanandapuram, Alapakkam and Nedunkudrum are residential areas. The main attracting potential of this settlement are water availability, environment and low land value. Ground water is also drawn from these settlements to supply to Chennai City.
- ❖ Kulapakkam which is one of the better-developed settlements when compared to other areas in this village Panchayat. Though the private sector employment is prevalent in this settlement about 5% agricultural occupation is still prevailing in this settlement. An educational institution named Balaji polytechnic is located in this settlement.

❖ **Semmancheri**

It is located at a distance of 0.2 km from the IT corridor; the civic status of this settlement is village Panchayat. It is an institutional area accommodating more than 4 Engineering colleges. The major attracting force for institutions to select this area is mainly because of availability land at low cost and water. About 5% of the workforce is employed in these institution as daily laborer.

❖ **Sholinganallur.**

It is a town Panchayat located at a distance of about 0.64 km from the IT corridor. About 52% of the workforce is employed in private sector. Sholinganallur is known for IT companies.

The major attracting force of this settlement is Transport accessibility and availability of water.

❖ Sembakkam

It is a town Panchayat that includes Rajakilpaukam, Gowrivakkam, Sembakkam and Kamrajapuram. It is located at a distance of 0.5 km from the Velachery to east tambaram high road. Recently these settlements have witnessed fast growth because of increased in migration to this settlement. From the analysis it is found that the majority of migrants are from city .The major reason for migration are accessibility to Transport, health and education facilities and good living environment.

The major occupation of the workforce in these settlement is in private sector. About 50% are employed in Private sector, and about 40% in Gowrivakkam

❖ Jallidiampet

It is located at a distance of 0.64 km from Velachery to east tambaram high road. The civic status of this settlement is village Panchayat. The attracting forces of this settlement are accessibility, water availability and low living cost. The nearest urban center is Medavakkam.

❖ Medavakkam

It is one of the major urban centers along the Velachery-Tambaram highway. The civic status of this settlement is town Panchayat. The developments in this settlement in recent years is tremendous because of the accessibility and water availability. It is also one of commercial center for the nearby settlements like Jallidiampet, Vengavasal, Thiruvanjeri etc.

❖ Vengavasal

It is located at a distance of 1.28 km from the Velachery - Tambaram high road. It is a village Panchayat. It is predominantly an agricultural area in which 46 % of occupation is agriculture. The income range is less than 3000 Rs/month.

❖ Perumbakkam

It is located at a distance of 2.56 km from the Velachery to east Tambaram high road. Though the settlement is located at a far off distance from the main road the development is significant when compared to Vengaiwasal. About 70 % of the workforce is employed in private and public sector and about 14 % are employed in agriculture.

The main attracting forces of this settlement are accessibility, water availability and environmental factors.

❖ Thiruvanjeri

It is a village Panchayat located at a distance of 2.8 km from the Velachery to east Tambaram high road. Major share of occupation is in private sector and about 13% are employed in agriculture and daily laborer work. The attracting force of this settlement is water availability and environment.

❖ Madampakkam

It is a town Panchayat, located at a distance of 2.6 km from the Velachery - Tambaram high road. About 72% of the workforce is private and government service. It is a commercial area. The main attracting forces of this settlement are accessibility, water availability, environment and low living cost.

❖ Sitalapakkam

It is a village Panchayat, majority of the people are employed in private service and about 10% are employed in agriculture. The main attracting forces of this settlement are water availability, environment and low land value.

❖ Maduraipakkam

It is a village Panchayat that includes Kovilancheri, Mulacheri and Maduraipakkam. These settlements lack in basic facilities like education, hospital and

infrastructure facilities. The attracting forces of these settlements are water availability and environment. Major occupation is predominantly in private sector.

❖ **Ottiyambakkam**

It is a village Panchayat located at distance of 6.8 km from the Velachery - Tambaram high road. The ottiyambakkam Panchayat also includes Arasankalani. The attracting force of this settlement is water availability and low land value. About 48% of the workforce is employed as daily laborer. These settlements lack in basic facilities like education and hospital facilities.

❖ **Agaramthen**

It is a village Panchayat located at a distance of 7.68 km from the NH-45, which also includes Vengampakkam, Kaspapuram and Agaramthen. The level of infrastructure facilities and transport services are very poor. The main attracting force of this settlement are water availability and environment factors. About 52 % occupation is agriculture.

❖ **Vengampakkam** is an interior settlement located at 2 km from NH-45. Though the road is provided to this settlement there is no transport service to this settlement.

2.3 Socio – Economic and Travel Characteristics

Income Level:

The table 2..3 shows the income level prevailing in the settlements of the study area.

TABLE 2.3 INCOME LEVEL PREVAILING IN THE SETTLEMENTS

Sl.no	Settlement name / Rs. month	<3000	3000-5000	5000-10000	>10000
	NH 45 - CORRIDOR				
1	PEERKANKARANAI	13.11%	16.39%	42.62%	27.87%
2	VANDALUR / OTTERI	10.71%	11.90%	47.62%	29.76%
3	KILAMPAKKAM	4.00%	8.00%	64.00%	24.00%
4	KADAPERI	7.69%	23.08%	20.51%	48.72%
5	IRUMBULIYUR	10.34%	27.59%	44.83%	17.24%
6	PERUNGALATHUR	5.60%	19.20%	33.60%	41.60%
7	WEST TAMBARAM	1.69%	10.17%	38.98%	49.15%
8	CHITLAPAKKAM	21.43%	46.43%	21.43%	10.71%
9	MANNIVAKKAM	7.14%	17.86%	75.00%	0.00%
10	SELAIYUR	4.08%	12.24%	20.41%	63.27%
11	MUDICHUR	17.95%	10.26%	38.46%	33.33%
12	ALAPAKKAM	18.18%	36.36%	40.91%	4.55%
13	SADHANANDAPURAM	18.92%	24.32%	43.24%	13.51%
14	MEPPED	20.00%	35.00%	45.00%	0.00%
15	NEDUNKUNDRUM	31.82%	9.09%	45.45%	13.64%
16	KULAPAKKAM	14.29%	42.86%	17.86%	25.00%
	IT - CORRIDOR				
17	SEMMANCHERI	28.57%	14.29%	28.57%	28.57%
18	SHOLINGANALLUR	25.00%	38.89%	13.89%	22.22%
19	UTHANDI	66.67%	26.67%	6.67%	0.00%
	VELACHERY - TAMBARAM				
20	GOWRIVAKKAM	11.54%	15.38%	34.62%	38.46%
21	RAJAKILPAUKAM	6.25%	18.75%	56.25%	18.75%
22	SEMBAKKAM	7.69%	17.31%	40.38%	34.62%
23	JALLIDIAMPET	27.66%	59.57%	8.51%	4.26%
24	MEDAVAKKAM	20.00%	45.71%	20.00%	14.29%
25	VENGAVASAL	43.59%	35.90%	17.95%	2.56%
26	PERUMBAKKAM	20.00%	13.33%	46.67%	20.00%
27	THIRUVANJERI	41.03%	33.33%	20.51%	5.13%
28	MADAMPAKKAM	18.75%	37.50%	33.33%	10.42%
29	CHITALAPAKKAM	56.00%	32.00%	12.00%	0.00%
30	KOVILANCHERI	89.47%	10.53%	0.00%	0.00%
31	ARASANKALANI	9.09%	21.21%	57.58%	12.12%
32	MADURAIPAKKAM	44.44%	44.44%	11.11%	0.00%
33	OTTIYAMBAKKAM	83.33%	16.67%	0.00%	0.00%

In all the settlements where there is higher percentage share of private sector employment, the income level is higher. The settlements which are closer to the major road accommodates more of people employed in non – agriculture sector and the income level is also higher. The settlements, which are interior and far off from the main road have agriculture activity more and correspondingly less income.

2.4 Occupational Characteristics:

The table 2.4 shows the occupational characteristics in all the settlements of the study area. It is seen that in all the settlements, which are closer to the NH45 corridor, private, and government sector employment is predominant, labor and agriculture workers form very less percentage in most of the settlements. Whereas in more of the settlements along the Tambaram Velachery – road and IT corridor the agricultural labor force is significance. This clearly indicates that which most of the settlements along the NH45 corridor have already reached the status of urban area, most of the settlements along the Tambaram-Velachery road and IT corridor are peri-urban in character. Thus the level of accessibility is an important factor in the process of conversion of rural settlement into peri urban settlement.

TABLE 2.4 OCCUPATIONAL CHARACTERISTICS IN THE SETTLEMENTS

Sl.no	Settlement Name / occupation	Pvt ser	Govt ser	Own business	Pensioner	Daily laborer	Cultivator
1	Peerkankaranai	52.94%	25.00%	20.59%	0.00%	1.47%	0.00%
2	Vandalur / otteri	54.76%	26.19%	10.71%	5.95%	2.38%	0.00%
3	Kilampakkam	46.67%	43.33%	10.00%	0.00%	0.00%	0.00%
4	Kadaperi	69.23%	17.95%	7.69%	2.56%	2.56%	0.00%
5	Irumbuliyur	68.97%	10.34%	17.24%	0.00%	3.45%	0.00%
6	Perungalathur	56.80%	18.40%	16.00%	6.40%	2.40%	0.00%
7	West tambaram	40.68%	18.64%	37.29%	3.39%	0.00%	0.00%
8	Chitlapakkam	50.00%	32.14%	10.71%	0.00%	7.14%	0.00%
9	Mannivakkam	51.72%	20.69%	17.24%	0.00%	3.45%	6.90%
10	Selaiyur	42.86%	38.78%	12.24%	6.12%	0.00%	0.00%
11	Mudichur	61.54%	20.51%	12.82%	0.00%	5.13%	0.00%
12	Alapakkam	54.55%	9.09%	13.64%	0.00%	9.09%	13.64%
13	Sadhanandapuram	51.35%	16.22%	18.92%	5.41%	8.11%	0.00%
14	Mepped	36.00%	16.00%	28.00%	0.00%	16.00%	4.00%
15	Nedunkudrum	56.52%	17.39%	8.70%	0.00%	8.70%	8.70%
16	Kulapakkam	42.86%	25.00%	25.00%	0.00%	3.57%	3.57%
	IT - corridor						
17	Semmancheri	35.71%	7.14%	21.43%	0.00%	35.71%	0.00%
18	Sholinganallur	52.27%	28.41%	13.64%	2.27%	3.41%	0.00%
19	Uthandi	0.00%	0.00%	2.50%	0.00%	15.00%	82.50%
	Velachery - Tambaram						
20	Gowrivakkam	50.94%	32.08%	13.21%	3.77%	0.00%	0.00%
21	Rajakilpaukam	37.50%	31.25%	31.25%	0.00%	0.00%	0.00%
22	Sembakkam	63.46%	13.46%	17.31%	0.00%	5.77%	0.00%
23	Jallidiampet	45.90%	16.39%	8.20%	3.28%	16.39%	9.84%
24	Medvakkam	37.63%	21.51%	16.13%	3.23%	12.90%	8.60%
25	Vengavasal	23.08%	7.69%	7.69%	0.00%	26.92%	34.62%
26	Perumbakkam	40.00%	30.00%	6.67%	0.00%	10.00%	13.33%
27	Thiruvanjeri	35.90%	23.08%	15.38%	0.00%	12.82%	12.82%
28	Madampakkam	43.75%	25.00%	15.63%	0.00%	10.42%	5.21%
29	Chitalapakkam	24.00%	8.00%	20.00%	0.00%	40.00%	8.00%
30	Kovilancheri	20.00%	5.00%	20.00%	0.00%	10.00%	45.00%
31	Arasankalani	60.61%	24.24%	9.09%	0.00%	6.06%	0.00%
32	Maduraipakkam	22.22%	11.11%	11.11%	0.00%	33.33%	22.22%
33	Ottiyambakkam	0.00%	0.00%	38.46%	0.00%	46.15%	15.38%

2.5 Monthly Expenditure For Transport

The table 2.5 shows the monthly expenditure on transport in the settlements. The monthly expenditure is highly pronounced in the range of Rs 300- Rs600 and Rs600 – Rs1000. The expenditure pattern towards transport clearly emphasizes the fact that there is large-scale movement taking place from settlements for various purposes due to the process of peri-urban formation. The higher the expenditure the farther the distance of travel for work and other purposes.

TABLE 2.5 MONTHLY EXPENDITURE ON TRANSPORT (%)

Sl.no	Settlement Name/ Rs month	0-300	300-600	600-1000	1000-1500	1500-2000
	NH 45 - CORRIDOR					
1	Peerkankaranai	19.05	38.10	38.10	4.76	0.00
2	Vandalur / Otteri	6.56	45.90	42.62	4.92	0.00
3	Kilampakkam	4.76	57.14	38.10	0.00	0.00
4	Kadaperi	7.69	23.08	20.51	48.72	0.00
5	Irumbuliyur	17.39	43.48	39.13	0.00	0.00
6	Perungalathur	19.79	41.67	30.21	4.17	4.17
7	Tambaram	6.98	25.58	58.14	4.65	4.65
8	Chitlapakkam	8.00	68.00	24.00	0.00	0.00
9	Mannivakkam	7.69	76.92	11.54	3.85	0.00
10	Selaiyur	18.18	47.73	25.00	4.55	4.55
11	Mudichur	13.89	50.00	36.11	0.00	0.00
12	Alapakkam	21.43	57.14	21.43	0.00	0.00
13	Sadhanandapuram	14.81	70.37	11.11	3.70	0.00
14	Mepped	15.00	80.00	5.00	0.00	0.00
15	Nedunkudrum	23.53	52.94	23.53	0.00	0.00
16	Kulapakkam	15.38	38.46	42.31	0.00	3.85
	IT - CORRIDOR					
17	Semmancheri	46.15	0.00	53.85	0.00	0.00
18	Sholinganallur	28.17	21.13	19.72	14.08	16.90
19	Uthandi	50.00	33.33	10.00	6.67	0.00
	Velachery - Tambaram					
20	Gowrivakkam	4.17	37.50	35.42	2.08	20.83
21	Rajakilpaukam	0.00	43.75	50.00	0.00	6.25
22	Sembakkam	13.64	45.45	27.27	4.55	9.09
23	Jallidiampet	28.00	38.00	12.00	16.00	6.00
24	Medavakkam	17.14	38.57	17.14	14.29	12.86
25	Vengavasal	34.15	26.83	21.95	9.76	7.32
26	Perumbakkam	26.67	46.67	20.00	6.67	0.00
27	Thiruvanjeri	30.77	53.85	15.38	0.00	0.00
28	Madampakkam	15.19	20.25	40.51	11.39	12.66
29	Chitalapakkam	52.00	24.00	16.00	8.00	0.00
30	Kovilancheri	82.35	11.76	5.88	0.00	0.00
31	Arasankalani	12.90	32.26	48.39	3.23	3.23
32	Maduraipakkam	0.00	100.00	0.00	0.00	0.00
33	Ottiyambakkam	33.33	50.00	16.67	0.00	0.00

2.6 Purpose Wise Trips Generated

The table 2.6 shows the share of trips for each purpose. While work trips are predominant, the education trips, shopping trips and health trips also find significant share in all the settlements, which are closer to the major corridor. The share of work trips and education trips is more in the interior settlements also, where there are more of agriculture activities.

The analysis of the origin and destination of trips generated in a settlement classified as work trips and education trips are as shown in Table 2.6 and Table2.7. The trips generated in a settlement have the same origin but different destinations i.e. local (origin & destination within the settlement itself) destination in the city or destination within CMA, which means movement is between settlements. The Table2.6 Shows the share of work trips based on origin and destination. It is seen that the share of work trips is more in rural settlement, less in periurban settlement and significant reduction is seen in urban area. Share of work towards the city is the least in the case of rural settlement, significant in the case of periurban and urban area. The share of work trips finding destinations within CMA is prominent in all categories, indicating the fact that majority of the work force in the settlements find job opportunities in the nearby settlements which are more urbanized. Similar trends are shown in the case of education trips originating from the settlements (Table2.7). The OD study clearly establishes the fact that there is greater interdependence among the settlements, depending upon the degree of urbanization. Similarly the education trips are more towards urban areas as facilities for higher studies are more in urban areas.

TABLE :2.6 WORK TRIPS – OD CHARACTERISTICS

sl.no	Settlement/ trips in %	Local trips	Trips towards city	Trips within CMA
1	Rural	44.83	3.45	51.72
2	Periurban	26.55	31.88	37.4
3	Urban	23.2	32.23	44.58

TABLE : 2.7 EDUCATION TRIPS – OD CHARACTERISTICS

Sl.no	Settlement/ trips in %	Local trips	Trips towards city	Trips within CMA
1	Rural	0	19.05	80.95
2	Periurban	7.31	29.83	58.69
3	Urban	12.62	37.07	50.32

2.7 Mode Wise Trip Purpose:

Settlements along NH45 which are accessible to both road (bus) and rail transport, predominantly use public transport for work and education purposes (Table 2.8) where as interior settlements and settlements along IT corridor and Tambaram Velachery corridor depend on Bus, Intermediate Public Transport, Two Wheelers and Bicycles. Though all the settlements are connected by Bus service, the accessibility and service level is poor. The inadequacy is catered to by intermediate public transport (Vans) and Two Wheelers. Van services operated by private agencies often cater to the travel demand arising in the interior settlements.

TABLE 2.8 MODE WISE WORK TRIPS

2.8 Bus Route operation in the study area:

SL.NO	SETTLEMENT NAME	BUS	T/W	CAR	WALK	CYCLE	TRAIN
1	Peerkankaranai	36.51	28.57	1.59	4.76	0.00	28.57
2	Vandalur	39.71	35.29	1.47	8.82	1.47	13.24
3	Kilampakkam	13.00	16.00	1.00	10.00	0.00	59.00
4	Kadaperi	38.24	41.18	0.00	5.88	2.94	11.76
5	Irumbuliyur	29.17	33.33	0.00	4.17	12.50	20.83
6	Perungalathur	45.71	23.81	4.76	4.76	0.95	20.00
7	Tambaram	20.93	39.53	0.00	20.93	6.98	11.63
8	Chitlapakkam	32.00	32.00	0.00	4.00	8.00	24.00
9	Mannivakkam	46.15	19.23	0.00	23.08	11.54	0.00
10	Selaiyur	25.58	37.21	2.33	4.65	2.33	27.91
12	Mudichur	34.29	28.57	2.86	5.71	8.57	20.00
13	Alapakkam	40.91	4.55	0.00	22.73	9.09	22.73
14	Sadhanandapuram	62.50	12.50	6.25	0.00	3.13	15.63
15	Mepped	28.57	33.33	0.00	19.05	0.00	19.05
16	Nedunkudrum	10.53	57.89	0.00	10.53	5.26	15.79
17	Kulapakkam	41.67	45.83	0.00	8.33	0.00	4.17
18	Agaramthen	10.34	27.59	0.00	41.38	20.69	0.00
19	Semmancheri	21.74	34.78	4.35	39.13	0.00	0.00
20	Sholinganallur	44.23	44.23	0.00	0.00	11.54	0.00
21	Uthandi	10.71	25.00	0.00	57.14	7.14	0.00
22	Gowrivakkam	45.83	33.33	8.33	4.17	0.00	8.33
23	Rajakilpaukam	21.05	42.11	0.00	21.05	0.00	15.79
24	Sembakkam	58.33	25.00	8.33	0.00	8.33	0.00
25	Jallidiampet	55.00	24.00	0.00	10.00	10.00	0.00
26	Medavakkam	12.50	53.13	3.13	18.75	12.50	0.00
27	Vengavasal	40.48	16.67	0.00	26.19	16.67	0.00
28	Perumbakkam'	20.37	40.74	1.85	14.81	22.22	0.00
29	Madampakkam	28.41	46.59	5.68	5.68	9.09	4.55
30	Thiruvanjari	51.16	23.26	2.33	9.30	4.65	9.30
31	Chitalapakkam	50.00	33.33	0.00	8.33	8.33	0.00
32	Kovilancheri	36.36	9.09	0.00	36.36	18.18	0.00
33	Arasankalani	43.90	39.02	0.00	9.76	4.88	2.44
34	Maduraipakkam	30.00	50.00	0.00	10.00	0.00	10.00
35	Ottiyambakkam	50.00	14.29	0.00	28.57	0.00	7.14

In the study area buses are operated under the Metropolitan Transport Corporation (MTC). About 40 bus routes are operated from the city center, and 5 bus routes are operated within the study settlements. All the buses are operated in the form of ordinary

service, limited stop service and point-to-point service. In the all bus routes totally 1885 trips are operating daily. The following Table 2.9 gives the existing bus route details and their frequencies.

TABLE 2.9 DETAILS OF BUS ROUTES AND THEIR FREQUENCIES IN THE STUDY AREA

S.L NO	BUS ROUTE	ORIGIN	DESTINATION	NO. OF BUS	TOTAL NUMBER OF TRIPS
1	21 H LSS	Broadway	Kelambakkam	10	120
2	21 L EXTN	Broadway	Keelkattalai	2	28
3	51 C	Broadway	Tambaram	1	8
4	51 D	Broadway	Tambaram	1	14
5	51 F	Broadway	S Kolathur	1	16
6	D 51	Broadway	Medavakkam	5	80
7	H 51 CUT	Broadway	Tambaram	1	12
8	H 51 EXP	Broadway	Tambaram	1	8
9	H 51 LSS	Broadway	Tambaram	3	36
10	H 51	Broadway	Sittlabakkam	1	8
11	51 B	Broadway	Tambaram	5	80
12	A 51	Broadway	Tambaram	1	9
13	19 G LSS	Broadway	Kovalam	6	56
14	19 PP EXP	Broadway	Enjambakkam	5	46
15	19 G EXP	Broadway	Kovalam	4	40
16	PP 51	Broadway	Tambaram	7	62
17	19 E LSS	Parrys	Kovalam	1	8
18	19 PP LSS	Parrys	Enjambakkam	8	128
19	51 P	Parrys	Puzhithivakkam	2	28
20	19 CUT	Adyar b.s	Enjambakkam	1	20
21	19 K CUT LSS	Adyar b.s	Siruseri	2	32
22	19 EXTN	Kazhangar Nagar	Kovalam	4	36
23	19 B	Saidapet	Kelambakkam	8	78
24	19 B CUT	Saidapet	PTC Colony	4	64
25	19 G CUT	Saidapet	Kovalam	2	28
26	51	Saidapet	Kolathur	2	20
27	51 B	Saidapet	Karanai	4	48
28	51 C CUT	Saidapet	Tambaram	2	24
29	51 E EXTN	Saidapet	Madibakkam	2	20
30	51 H	Saidapet	Tambaram	6	72
31	51 S	Saidapet	Meps	3	36

32	51 S CUT	Saidapet	Tambaram	1	20
33	51 C	Saidapet	Tambaram	1	12
34	51 E	Saidapet	Madibakkam	7	120
35	51 B EXTN	T.Nagar	Kelambakkam	2	28
36	5 A LSS CUT	T.Nagar	Balaji Nagar	3	32
37	19	T.Nagar	Kanathur	3	36
38	51 LSS CUT	T.Nagar	Kolathur	2	20
39	51 M	T.Nagar	Madibakkam	2	32
40	51 N	T.Nagar	Moovarasampet	1	16
41	G 51 LSS	Tambaram	Vengavasal	4	64
42	51 A	Tambaram	Agaram	3	60
43	51 K	Tambaram	Karanai	2	32
44	51 T	Tambaram	Ponmar	1	20
45	51 T CUT	Tambaram	Madurabakkam	1	20
46	51 C LSS	Tambaram	Adyar B.S	9	108

2.9 Maxi Cab Routes And Their Frequencies

In the study settlements most of the commuters depend on the public bus transport and intermediate public transport services/ maxi cab. Maxi cab is the term applied to small passenger transport, which operate informally on a fare-paying basis. They have become very popular because they fill the gap where growing demand has not been satisfied by organized public transport services.

From the study area, the informal van services are operated along the parallel routes of public bus transport. The major reasons is the inadequacies of bus transport in catering to the hid demand.

In the Velachery – Tambaram main road there are 40 maxi cabs (420 singles per day) operated and in the IT-Corridor there are 75 maxi cabs (750 singles per day) operated. The following table 2.10 gives the details of maxi cab operation in the study area.

TABLE 2.10 NUMBERS OF MAXI CAB AND THEIR FREQUENCIES

I. VELACHERY-TAMBARAM MAIN ROAD	NUMBER OF SERVICE	TRIPS/VAN /DAY	TOTAL SINGLE
Saidapet to Madavakkam	10	6	120
T.nagar to Medavakkam	5	6	60
Medavakkam to Tambaram	15	5	150
Medavakkam to Sithalabakkam	3	4	24
Madavakkam to Ottiyambakkam	2	3	12
Sholinganallur to Tambaram	5	6	60
II. IT Corridor			
Adyar depot to Sholinganallur	40	5	400
Sholinganallur to Kelambakkam	30	5	300
Adyar depot to Kelambakkam	5	4	40

2.10 Bus Users Opinion Survey

The questionnaire for opinion survey has been framed to study the opinion of the people who travel by bus from the study area. It is aimed at collection of data regarding trip purpose, employment status, monthly income, ticket status, intermediate transfer point etc.

2.11 Travel And Socio-Economic Characteristics Of The Bus Passengers.

The people involved in the opinion survey have various purposes for their trips. The fig2.2 shows the composition of trip purpose as Work trip is 59%, Education is 15% and others are 26%. From the fig 2.2, it is given that the major share of the trips is for work and education. This shows that 74% of the people are the permanent users of bus service.

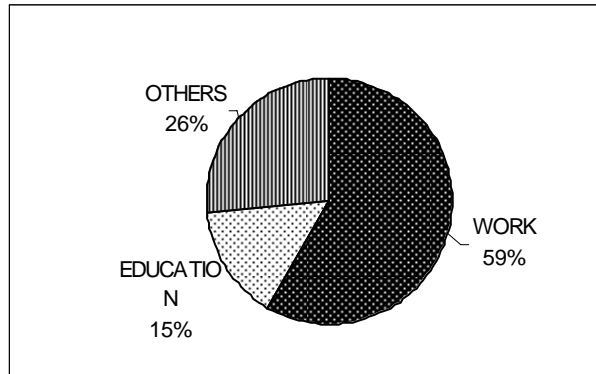


Fig.2.2 Trip Purpose of Bus Users in the Study Settlements

The people involved in the survey have various purposes for their trips. The fig.2.3 shows the composition of bus users. About 59% of bus passengers are observed to be regular and another 41% are occasional.

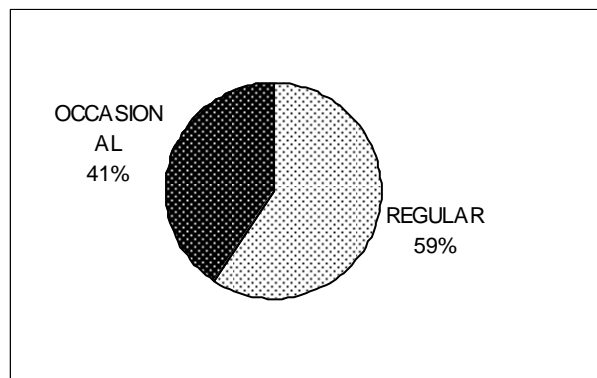


Fig.2.3 Type of Bus Users in the Study Settlements

62% of the bus passengers fall under LIG category, whose salary is less than Rs 5,000/-. In the LIG category a majority of them (44%) have their salary in the range Rs 3,000/- to Rs 5,000/-. About 32% of the passengers have their salary in the Range of Rs 5,000/- to Rs 10,000/- and 6% earn more than Rs 10,000/-. It is clear that more than one half of the bus users fall under LIG category and a minimum of 6% belong to HIG category. About 75% of the bus users have their average expenditure on

transport less than Rs 5,00/- per month and the remaining have their expenditure on transport less than Rs 1,000/-.

The fig.2.4 shows the composition of ticket status. It is shown that 33% of passengers are holding season tickets and other 67% are traveling by paying ticket fare daily. But from the above Fig.2.4. it is seen that 59% of bus users are regular. This variation between type of use (regular/occasional) and ticket status, because the commuters from study settlements mostly daily wagers and more dependent on city centers for their work (work trips is 59%). So most of the bus users (67%) not having the season ticket.

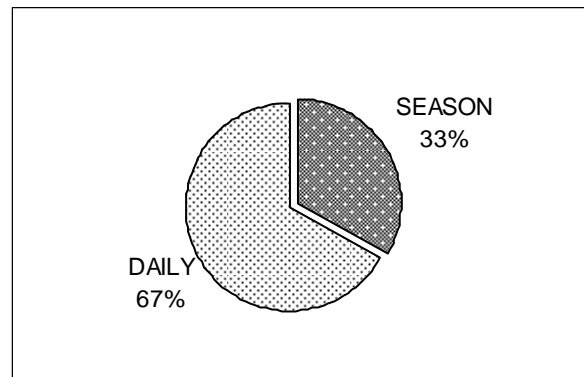


Fig.2.4 Ticket Status of Bus Users in the Study Settlements

The survey was conducted covering all categories of people. The fig.2.5 Shows sample involved as government (18%), private (46%), self employed (11%) and others (25%).

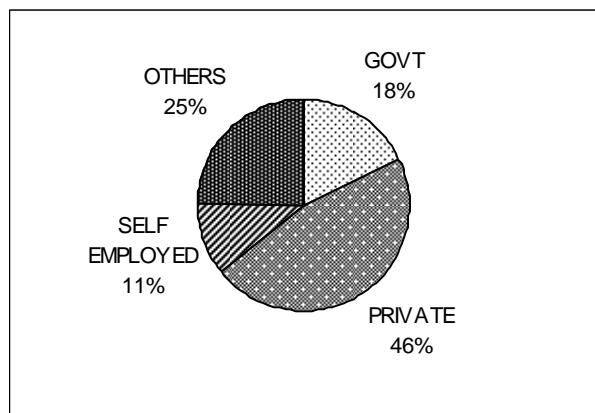


Fig 2.5 Employment Status of Bus Users in the Study Settlements

From the fig.2.6 shows that majority of passengers enjoy the network of bus service and they are satisfied with the same. Only 26% of passengers have to take more than one service.

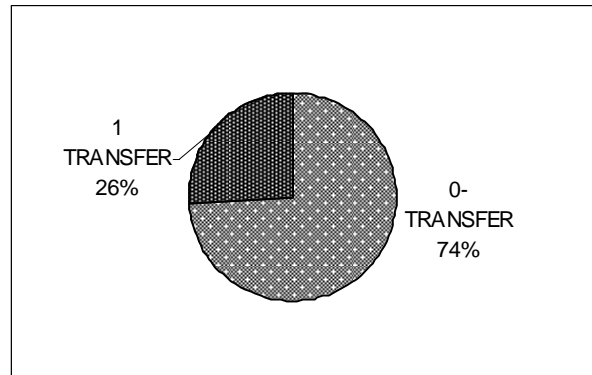


Fig.2.6 Number of Transfer point between the Trips

2.12 Van Commuter’s Opinion Survey

The public transport in this area is operated by Metropolitan Transport Corporation (MTC), often the public transport is over loaded and the overloading in some areas is as high as 180%. This is due to the increased demand for services and inadequate supply of MTC Bus Services. Bus transport services operate on a schedule along the specified routes. Due to the lack of scheduled operations and frequency of buses the public tend to shift towards intermediate public transport (IPT).

Presently IPT (Maxi cab) provides a viable supplementary to the bus service. The parallel maxi cab operation not only impinges on the economic loss to bus transport, but create more congestion on the road network, environment pollution and increase the accidents

The opinion survey has been framed to study the opinion of the people who use the maxi cab (van) from the study area and to collect the data regarding trip purpose, employment status, monthly income, reason for using van service and criteria for not

using the bus service available between the trips. About 20 van passengers in each settlement were interviewed and the following observations are made.

2.13 Employment Status

The opinion survey was conducted covering all categories of people. The fig.2.10 shows that 21% is employed in Govt. Offices, 46% in private firms, 10% self employed. 23% are in employed in other sectors.

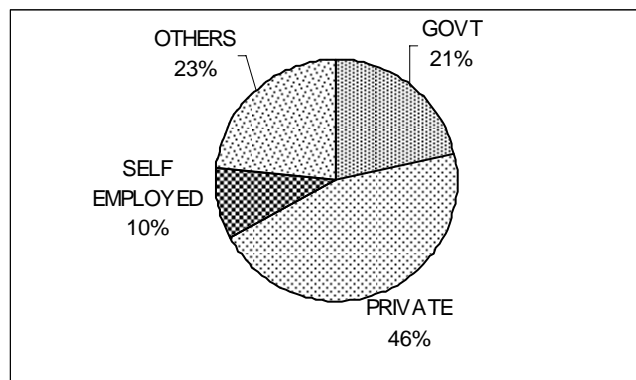


Fig.2.7 Employment Status of Van Users in the Study Settlements

2.14 Purpose Of Trip

The people involved in the opinion survey have various purposes for their trips. The fig.2.8 show the composition of Trip purpose, Work trip constitutes 56%, Education 9%, Shopping 19 % and others are 16%. From the fig 2.8 it is given that the main of the trips is for work.

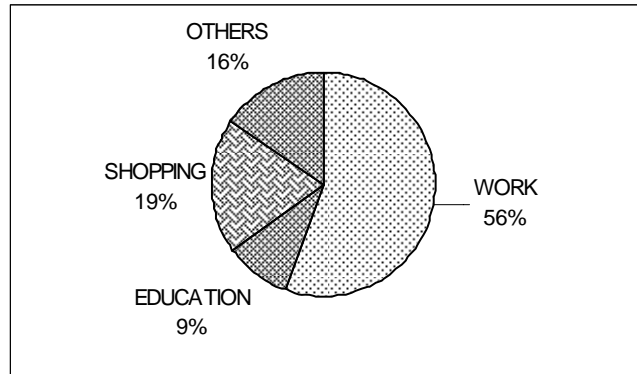


Fig2.8 Trip Purpose of Van Users in the Study Settlements

2.15 Reason For Using Van Service

Fig.2.9 Shows the reasons expressed by the users for using van service. Higher frequency (63%), due to less travel time (4%), and more comfort (33%). The public bus transport in this area most of the times are over loaded and the overloading in some areas is as high as 180%. This is due to the increased demand for services and inadequate supply of MTC Bus Services. Due to lack of scheduled operations and frequency of buses the public bus tend to use (96%) maxi cab. Presently Maxi cab provides a viable supplementary to the bus service.

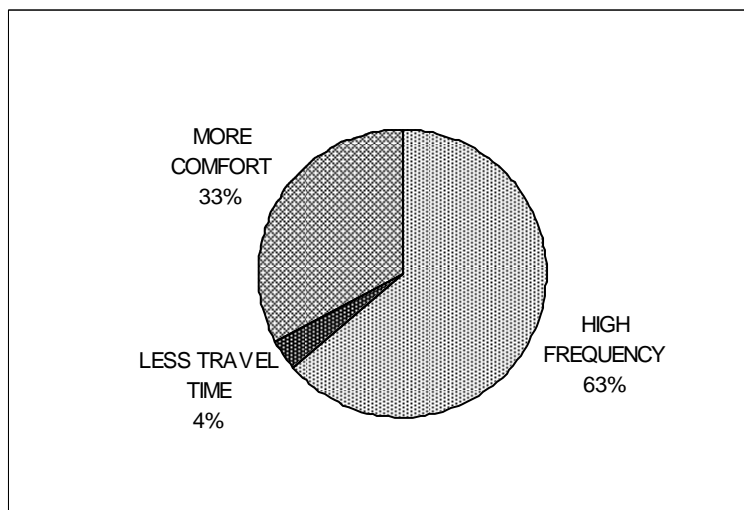


Fig 2.9 Reason for using Van services

2.16 Reason For Not Using Bus Service

The reason for not using the bus was ascertained from van commuters. About 40% of van commuters expressed as infrequent bus services, 41% of van commuters expressed over crowding in the bus during peak hour and increased travel time, less safety, and high cost factor. From fig.2.10 most of the (81%) van users use the van service due to the lack of scheduled operations and lack of frequency of buses.

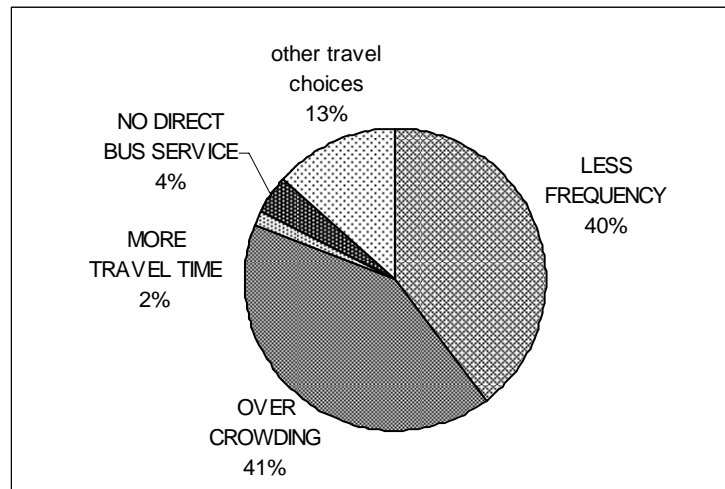


Fig.2.10 Reason for not using the bus service

2.17 Interdependency among the settlements

The people from the settlements, which are under various stages of transformation from rural to periurban to urban, depend on the facilities available in the adjacent higher order settlements. All these settlements do interact with the city for its higher order needs. Quantification of the available facilities in each settlements, based on the guidelines given by the World Bank, is used to calculate a score for each settlement. Using the score the settlement interaction matrix is developed. The settlement with maximum force of interaction with all surrounding settlement is identified and it is considered as center place. In the study area three such settlement are identified as center place. They are Tambaram, Medavakkam and Sholinganallur. The force of interaction

among these major settlements and the settlement surrounding it are calculated using the following expression

$$\text{Force of interaction} = P_i * P_j * (S_i - S_j) / d_{ij}P^2$$

Where P_i and P_j = Population of settlement i and j respectively

S_i and S_j = Score of the settlement i and j respectively

d_{ij} = Distance between the settlements i and j

The value of interaction gives the interdependency among the settlements. The higher the value the higher is the interaction. The settlement interaction matrix is as shown in the table 2.11

2.18 Origin-Destination Study

A study on travel characteristics to understand the travel behavior of the commuters in the study settlements an origin – Destination study was conducted in those settlements that are abutting the corridor. Based on the survey results an Origin – Destination matrix was developed and plotted as show in the figure 2.11 From the study analysis it is found that around 17% of passengers come from western and north western regions along the suburban rail corridor. 50% of trips generated from Velachery and regions beyond Velachery up to CMA are local trips: 20% of these trips are attracted to South East Zones and towards East Coast Road. Thus this corridor attracts the trips from all directions and the pressure for further improvement of this corridor is increasingly becoming more and more.

3.0 Study Conclusion

- Metropolitan Transport Corporation operates 46 bus services, in the study area, which makes 1885 singles trips per day, Which is in sufficient because there is 115 informal maxi cab operate parallel service with 1100 trips per day.

- Most of the bus routes (12 Bus routes) from southern settlements, beyond Velachery up to CMA boundary going parallel to the MRTS alignment touch Vijaya Nagar bus terminus at Velachery and 7 Bus routes are going parallel to the MRTS alignment touch Thiruvanmiyur bus terminus.
- Around 75 % are long distance passengers (passengers traveling for more than 15 km) from the southern settlements.
- The public bus transport in this area most of the times are over loaded and the overloading in some areas is as high as 180%. This is due to the increased demand for services and inadequate supply of Metropolitan Transport Corporation Bus Services. Due to the lack of scheduled operations and frequency of buses the public bus users (96%) tend to shift towards maxi cab. Presently Maxi cab provides a viable supplementary to the bus service. The reason for using van service is due to higher frequency (63%), due to less travel time (4%), and due to more comfort is 33%.
- The developments that have taken place over the last 8 years along a two lane narrow road connecting several village created a huge demand for improvement of the road to four lane roads. The four lane road (after completion) has been responsible for attracting more industries and institutions creating further demand for widening the road to a 6 lane divided expressway. Thus investments made in rural settlements in the urban fringe because of availability of land at cheaper cost has not only induced rural transformation but also forced the authorities to provide for better transportation access. Thus it is found that while higher accessibility provided by transportation corridors induce Periurban formation, large scale private investments in rural settlements also induce periurban formation
- Established corridors and the transport services provided by bus and trains along the corridors attract developments and Periurban transformation takes place. But where the access to conventional transport services is constrained, intermediate public transport (IPT) fulfills the gap. The IPT vehicles in the form of vans, share auto and autorickshaws provide transport service to the nearest towns or major

transport services. The role of IPT is twofold, it fulfills the gap in demand not serviced by the conventional bus / train and serves till the demand grows up to the level of conventional public transport services.

- The level of infrastructure available in a settlement is responsible for the rate of growth of a rural settlement to get transformed in to a Periurban area. Particularly, higher education facilities, health facilities, banking and shopping facility attract more developments and the Periurban transformation is quicker. This is further evidenced in the literacy level and the general income level prevailing in the settlement.
- Among all the developments, IT industries and educational institutions when located in a rural settlement attract service industries and commercial activities. The scale of activity is the primary factor in the growth of the settlement.
- Establishment of farm houses in large pieces of land was the trend a few years back. However with the increasing pressure on land for development, many farm houses have vanished in the Periurban settlements
- The interdependence among the rural Periurban and urban settlements is highly pronounced. Rural settlements depend on the immediate Periurban settlements and the Periurban settlements depend on major urban settlements for work, education and health facilities. For higher levels of activity involving specialized jobs, higher education, specialized health services and shopping of valuable items. The city continues to attract work trips, education trips and shopping trips.
- Periurban settlements are often not self contained development. They continue to depend on the main city for jobs and specialized purposes. The traffic generated towards the city form a telescoping pattern along the available few major transportation corridors. The flow increased from the periphery of the city where Periurban settlements are predominant towards the city. As the city roads are already clogged, the traffic from the Periurban and urban settlements further aggravate the situation. The primary reason is while the transportation corridors were instrumental for development, the same corridors are stressed beyond the handling capacity at reasonable speed. This means that Periurban transformation

has increased the distance of travel and not the change in the direction of travel.
This has become a major challenge for the transportation planners.