

GROWTH AND FREQUENCY IN INTRA URBAN TRANSPORTATION SYSTEM: A GEOGRAPHICAL STUDY

Dr. S. B. Rathod

Associate Professor & Head, Dept. of Geography,
Shri. Raosaheb Ramrao Patil Mahavidyalaya, Savlaj Ta. Tasgaon Dist. Sangali

E-Mail: suryakantb.rathod@gmail.com

ABSTRACT

Transportation is one of key element for socio-economic development and in emergency situation of a country which can determine the pattern and success of regional development. . A mass communication system should able to develop in countries rather than personal transport system as they are resulted into accidents, congestion, and pollution of vehicle in urban areas. This study focus on providing and providing, strengthening and improving existing mass transportation system in Nanded city. More than 12 busses routes has founded out to perform. The outcome of this study shows economical mass transportation system with less urban pollution, systematic approach to various developed and undeveloped portions in urban areas and feedback given by commuters for safety travel time, easy approach frequency, comfort and economic model of public transportation system.

KEY WORDS: Urban transportation, Frequency of buses, important Bus routes, Peak points.

INTRODUCTION:

The importance of transportation for a city is immense because without it, cities could never have developed. On one hand, it forms a circulatory system connection a city with other cities, as well as, with its country side, and on the other it provides a means for carrying people and good to place within a city "Transportation line serve as the arteries of an organism, which provide links amongst its various parts, inter urban links and regions contact."

It is universally acknowledged fact that transportation plays a vital role in the development of a city. The development of Nanded city owes, greatly to the changing modes of transportation. Nanded Waghala city municipal transportation system is most efficient when compared to other cities of Maharashtra. Presently the urban transportation system in Nanded is mainly dependent on intermediate public transport system including auto and cycle rickshaws, jeeps and private cars operating as public carrier and to a small extent by city bus services.

STUDY AREA:

Nanded city is district of Maharashtra State. It lies between 19.15° North Latitude 77.3° East Latitude and Nanded city covers an area 51.76 Sq. km. The city is divided in two parts one is old Nanded which covers 20.62 Sq. km. and other is new Nanded it covers 31.14 Sq. km., comprising Waghala and six other newly merged villages. As of the 2011 census, it had a population of 550,564; it is small to medium size city. Nanded is one of the ancient and historical place in Maharashtra and it has spiritual significance for Sikh. pilgrimage The city bus service and three wheeler service is provided as public transport system in the city. Study area has seven bus routes carrying bus operation over it and it has few common stops which shares with CBD of the city, it is overlapping route type. This route covers major location of the city as it collect passenger from various area like residential, working and commercial. The selected route also makes easy accessibility to the public facilities like Main bus stand and Railway station to user.

OBJECTIVE OF STUDY:

To study growth of mass transportation system

To study of Traffic routes parameter in city.

To study existing transportation facility in city.

DATABASE AND METHODOLOGY:

The present work is based on primary as well as secondary sources of data. The primary sources include direct observations and interviews with the respondents in the city. The secondary sources of data pertain to the statistics obtained from Official record of Nanded - Waghala Municipal Corporation, Nanded, Socio-Economic Review and District Statistical Abstracts of Nanded, Official record of Town Planning Department, Government of Maharashtra, Nanded. After the collecting data it has been tabulated and represented with the help of various statistical techniques, various maps and diagrams have been prepared to show different types of data and information. The analysis and interpretation of data has been done from the geographical point of view. Finally the personal observation method has been used to study the problems of Nanded city.

RESULT AND DISCUSSION:

City Bus – based urban transport services in Nanded city was started in the year 1957 with buses by MSRTC by converting one Moffusil bus operated between government ayurvedic college and Habib talkies. In 1971, out of 07 buses only 06 buses were operating on 09 routes. At that time frequency of buses was limited. In 1981, routes were increased up to 16 and buses upto 14. In this period 13 buses were in operation. A plan for the development of city bus transportation is prepared by Nanded Municipal Corporation in 1991 – 92. In this year, corporation has increased number of buses upto 35

Table No. I- NANDED CITY - NUMBER OF BUSES AND ROUTES

Sr. No.	Years	Total Buses	No. of Buses in operation	% to total buses	No. of total routes
1	1971 – 72	07	06	85.72	09
2	1981 – 82	14	13	92.85	16
3	1991 – 92	35	31	88.57	28
4	1999 – 2000	40	36	90.00	42
5	2005 – 06	43	39	90.69	49

Source : Nanded Waghala City Municipal Transport Office Record

and in the same year routes and frequencies of buses increased. In this period 28 routes were operated by Nanded Municipal Transport. In 1999 – 2000, the number of buses was increased from 35 to 40, and the number of routes was increased from 28 to 42. In 2005 – 06, routes were increased upto to 59 and buses upto 43. In this period 39 buses were in operation. Table No. I shows the growth of buses in terms of number, routes and operation.

IMPORTANT CITY BUS ROUTES

The frequency of buses is an important aspect of study in intra urban transportation system because the city buses link the neighbor hood area and suburban areas. The movement of passengers through buses have got more importance in traffic system. Here, an attempt has been made to study the main terminal points, number of routs and trips. The city transport of Nanded is controlled by twelve centers. These centers are Etwar Chowk, Gurudwara, Shivaji Chowk, Vazirabad, workshop corner, S.R.T.M. University stop, Sangavi Bk., Wajegaon, M.I.D.C., Waghala Chowk, Bafana Chowk, Nasaratpur and Sugaon Stop per day. It is observed from Table No.II the number of trips are found more from Etwar chowk. It accounts for 17.61 per cent, trips and 12.24 per cent routes are operated from this points in all directions. The Gurudwara terminal is situated in the central part of the city and 50 trips (11.74 per cent) are carried out from this point and 1.16 per cent routes are operated from this points while the Shivaji chowk, Vazirabad, Gurudwara, and Etwar chowk centers contribute for 52.12 per cent (222 trips) and more than average 50 per cent (22 routs) routes operated. Thus, it can be started that these four terminals play an important role in city transportation.

The transportation towards the south part of city is conducted by M.I.D.C. Waghala chowk except Babulgaon. It conducts 26 trips and this terminal accounts for 6.11 percentage of the total trips, while five routes (10.21 per cent). Wajegaon chowk controls the transportation towards the east part of the city. While S.R.T.M. university stop and Nasaratpur chowk controls transport to both ways parts. The percentage of total trips and routes operated by these terminals are 11.50 per cent (49 trips) and 10.21 per cent (05 routes) routes respectively. Sangavi (Bk.) chowk terminal contributes only 2.81 per cent (12 trips) and 2.04 per cent (01) routes operated.

It can be concluded that largest number of city transport trips and roués are operated by Etwar chowk terminal and Sugaon chowk terminal conducts lowest trips and routes. By considering the amount of population, these centers can be arranged in following descending order. 1) Etwar chowk, 2) Vazirabad, 3) Gurudwara, 4) Workshop corner, 5) Shivaji chowk, 6) Wajegaon, 7) S.R.T.U. university stop, 8) M.I.D.C. Waghala chowk, 9) Sangavi (Bk.) stop, 10) Nasaratpur, 11) Bafana chowk, 12) Sugaon chowk. One of the causes of failure bus service were inadequate road infrastructure and traffic management system leading loss of time and inefficient in operations.

Table No. II-NANDED CITY - MAIN TERMINAL POINTS, NUMBER OF ROUTES AND TRIPS

Sr. No.	Terminal Points	No. of Routes *	% of Total **	Total No. of Trips *	% to Total **
1	Etwar chowk	06	12.24	75	17.61
2	Gurudwara	05	10.21	50	11.74
3	Shivaji chowk	06	12.24	45	10.56
4	Vazirabad	05	10.21	52	12.21
5	Workshop corner	04	8.16	48	11.27
6	S.R.T.M.University stop	03	6.13	29	6.81
7	Sangavi (Bk) bus stop	04	8.16	22	5.16
8	Wajegaon	04	8.16	32	7.51
9	MIDC Waghala chowk	05	10.21	26	6.11

10	Bafana chowk	04	8.16	15	3.52
11	Nasaratpur	02	4.08	20	4.69
12	Sugaon	01	2.04	12	2.81
	Total	49	100	426	100

Source : * N.W.C.M.T. office record ** Author

PEAK POINTS

The rapidly growing size and functions of the city have ultimately resulted in creating problems of traffic and transport. The roads of the central area have failed to cope with the increasing congestion in traffic flow of the city. Heavy transportation is the major cause of pollution especially air, noise, and to some extent, mental pollution and the degree of pollution is remarkable in the 12 city bus terminals in Nanded city. The survey has been conducted in order to find out the trip generation schedule and its relation with the different hours of a day. The data has been collected from 12 important bus terminals i.e. Etwar chowk, Vazirabad, Gurudwara, Workshop corner, Shivaji chowk, Wajegaon, S.R.T.M. university stop, M.I.D.C. Waghala chowk, Sangavi, Nasaratpur, Bafana chowk and Sugaon chowk.

The Table No.III and Figure No.I shows the frequency of buses from 6 am to 12 midnight. The table also shows main bus stops, period of trips, number of trips and their percentage. The analysis of the individual bus terminals shows different results. It is observed that Etwar chowk bus terminal has four peak hours period i.e. between 8 am to 10 am, 10 am to 12 noon, 2 pm to 4 pm and 6 pm to 8 pm. During these four peak hour periods 60.00 per cent of the total buses are found running on these routes, while there at the timing of 10 pm to 12 midnight in the frequency of the buses is found comparatively low i.e. 6.67 per cent. The remaining time periods show the moderate frequency of buses. Gurudwara bus stop has highest frequency of buses during two periods i.e. 10 am to 12 noon and 12 noon to 2 pm respectively. In these time periods 38.00 per cent trips are covered. The moderate bus frequency has been observed at the period of 8 am to 10 am, 4 pm to 6 pm and 6 pm to 8 pm respectively which is 34.00 per cent. The remaining time period i.e. 6 am to 8 am, 2 pm to 4 pm, 8 pm to 10 pm and 10 pm to 12 midnight the bus frequency is very low (28.00 per cent).

The Shivaji chowk bus stand has more frequency of buses during three peak hours periods i.e. from 10 am to 12 noon, 4 pm to 6 pm and 6 pm to 8 pm respectively. The percentage of these three peak hours periods is 44.44, while the frequency of buses is very low at 2 pm to 4 pm (6.67 per cent). During the remaining time periods, the frequency is moderate. The Vazirabad bus stop has more frequency of buses during two peak hours periods i.e. from 10 am to 12 noon and 4 pm to 6 pm respectively. The percentage of these two peak hours periods is 36.53, while the frequency of buses is very low at 10 pm to 12 midnight (3.84 per cent). During the remaining time periods, the frequency is moderate.

Workshop corner chowk bus stop shows high frequency during 10 am to 12 noon and 4 pm to 6 pm. And moderate frequency is observed during 6 am to 8 am, 8 am to 10 am, 6 pm to 8 pm and 8 pm to 10 pm respectively. The remaining time period i.e. 10 pm to 12 midnight the bus frequency is very low (4.16 per cent).

The S.R.T.M. University bus stop indicates two peak hour periods. One is the morning at 10 am to 12 noon second is in the 4 pm to 6 pm respectively. Percentage of total buses during these peak hours has observed high (i.e. 41.38). During late hours of the day, the frequency of buses is very low i.e. 3.45 per cent and the moderate frequency of buses is observed in the morning during 6 am to 8 am, 8 am to 10 am, 12 noon to 2 pm, 2 pm to 4 pm, 6 pm to 8 pm and 8 pm to 10 pm i.e. 55.17 per cent. Sangavi bus stand has more frequency of buses during three peak hours periods i.e. 8 am to 10 am, 10 am to 12 noon and 4 pm to 6 pm respectively. The percentage of those three peak hours is 86.35, while the frequency of buses is very low at 2 pm to 4 pm, 8 pm to 10 pm and 10 pm to 12 midnight (13.65 per cent). During the remaining time periods, the frequency is moderate.

The Wajegaon bus terminal has two peak hours periods i.e. between 8 am to 10 am and 10 am to 12 noon. During these two peak hour periods, 40.63 per cent of the total buses are found running on these routes, while there at the timing of 10 pm to 12 midnight in the frequency of the buses is found comparatively low i.e. 3.13 per cent. The remaining time periods show the moderate frequency of buses.

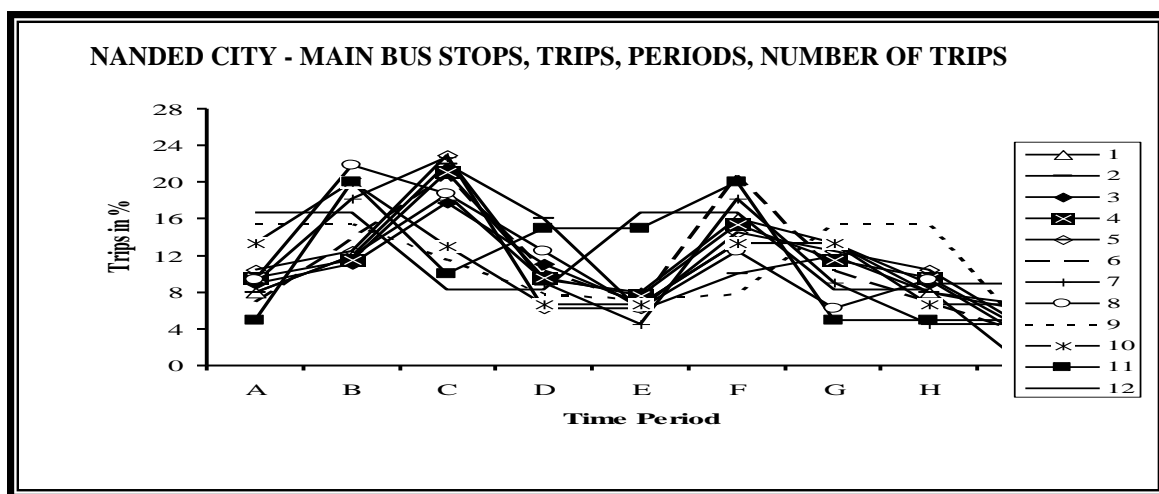
The M.I.D.C. Waghala chowk bus stop has the highest frequency of buses during five time periods i.e. 6 am to 8 am, 8 am to 10 am, 10 am to 12 noon, 6 pm to 8 pm, and 8 pm to 10 pm respectively. In these time periods 73.05 per cent trips are covered. The moderate bus frequency has been observed at the period of 12 noon to 2 pm, 2 pm to 4 pm and 4 pm to 6 pm respectively which is 23.10 per cent. The remaining time period i.e. 10 pm to 12 midnight the bus frequency is very low (3.85 per cent).

The Bafana chowk bus stop has more frequency of buses during only one peak hours period i.e. 8 am to 10 am. The percentage of those only one peak, hours periods is 20.00, while the frequency of buses is very low at 12 noon to 2 pm, 2 pm to 4 pm, 8 pm to 10 pm and 10 pm to 12 midnight. During the remaining time periods, the frequency is moderate. Nasaratpur bus stop has found mainly connected with rural areas. These are found high peak hours in the frequency of buses, i.e. 8 am to 10 am, 12 noon to 2 pm, 2 pm to 4 pm and 4 pm to 6 pm. In this period, 70.00 per cent trips are covered. Remaining only one peak hours are moderate i.e. 10 am to 12 noon. During the remaining time periods, the frequency is very low. Sugaon bus stop indicates four high peak hours during

Table No. III- NANDED CITY

MAIN BUS STOPS, TRIPS, PERIODS, NUMBER OF TRIPS AND THEIR PERCENTAGE

Sr. No.	Main City Bus Point	Time Period									Total No. of Trips
		6 – 8	8 – 10	10 – 12	12 – 2	2 – 4	4 – 6	6 – 8	8 – 10	10 – 12	
1	Etwar Chowk	6 8.00	9 12.00	14 18.67	7 9.33	6 8.00	12 16.00	10 13.33	6 8.00	5 6.67	75 100
2	Gurudwara	4 8.00	6 12.00	11 22.00	8 16.00	3 6.00	5 10.00	6 12.00	4 8.00	3 6.00	50 100
3	Shivaji Chowk	4 8.89	5 11.11	8 17.78	5 11.11	3 6.67	6 13.33	6 13.33	4 8.89	4 8.89	45 100
4	Vazirabad	5 9.62	6 11.54	11 21.15	5 9.62	4 7.69	8 15.38	6 11.54	5 9.62	2 3.84	52 100
5	WorkShop Corner	5 10.42	6 12.50	11 22.92	3 6.25	3 6.25	7 14.58	6 12.50	5 10.42	2 4.16	48 100
6	S.R.T.M. University	2 6.90	4 13.79	6 20.69	3 10.34	2 6.90	6 20.69	3 10.34	2 6.90	1 3.45	29 100
7	Sangavi Bk.	2 9.09	4 18.18	5 22.72	2 9.09	1 4.55	4 18.18	2 9.09	1 4.55	1 4.55	22 100
8	Wajegaon	3 9.37	7 21.88	6 18.75	4 12.50	2 6.25	4 12.50	2 6.25	3 9.37	1 3.13	32 100
9	MIDC Waghala Chowk	4 15.38	4 15.38	3 11.53	2 7.70	2 7.20	2 7.70	4 15.38	4 15.38	1 3.85	26 100
10	Bafana Chowk	2 13.33	3 20.00	2 13.00	1 6.67	1 6.67	2 13.33	2 13.33	1 6.67	1 6.67	15 100
11	Nasaratpur	1 5.00	4 20.00	2 10.00	3 15.00	3 15.00	4 20.00	1 5.00	1 5.00	1 5.00	20 100
12	Sugaon	2 16.66	2 16.66	1 8.34	1 8.34	2 16.66	2 16.66	1 8.34	1 8.34	0 00.00	12 100

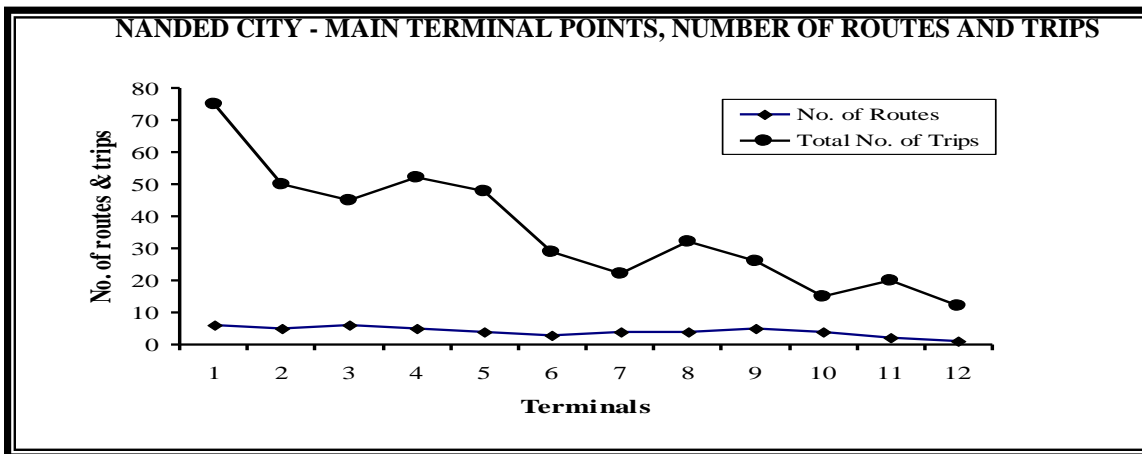
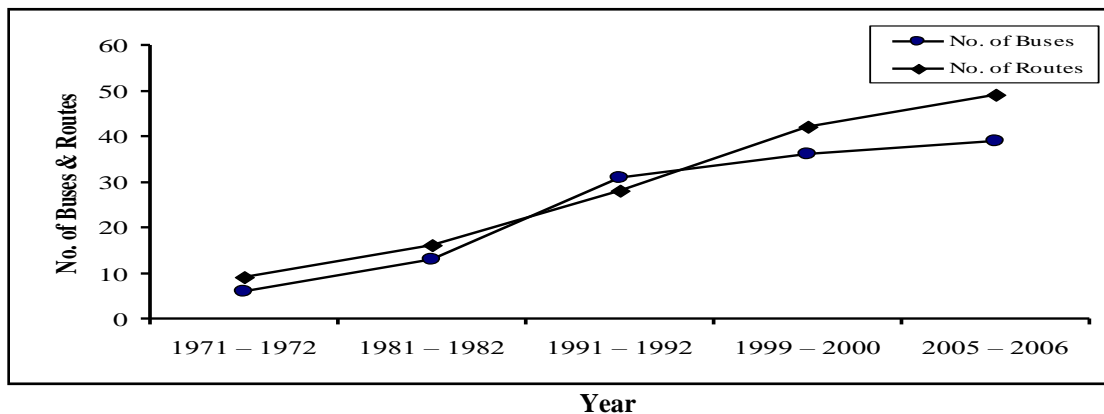


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1	Etwar Chowk	7	Sangavi Bk.	A	6 – 8 am
2	Gurudwara	8	Wajegaon	B	8 – 10 am
3	Shivaji Chowk	9	MIDCWaghala Chowk	C	10– 12 noon
4	Vazirabad	10	Bafana Chowk	D	12 – 2 pm
5	Work Shop Corner	11	Nasaratpur	E	2 – 4 pm
6	S.R.T.M. University	12	Sugaon	F	4 – 6 pm
				G	6 – 8 pm
				H	8 – 10 pm
				I	10 – 12 M.N.

6 am to 8 am, 8 am to 10 am, 2 pm to 4 pm and 4 pm to 6 pm. This bus stop connected to more rural area. Remaining four peak hours are moderate, i.e. 10 am to 12 noon, 12 noon to 2 pm, 6 pm to 8 pm and 8 pm to 10 pm. There is one no bus frequency peak hours i.e. 10 pm to 12 midnight.

NANDED CITY - NUMBER OF BUSES AND ROUTES



Terminals					
1	Etwar chowk	5	Workshop corner	9	MIDC Waghala chowk
2	Gurudwara	6	S.R.T.M. University stop	10	Bafana chowk
3	Shivaji chowk	7	Sangavi (Bk) bus stop	11	Nasaratpur
4	Vazirabad	8	Wajegaon	12	Sugaon

CONCLUSION

Data collection, their analysis and interpretation of data shows city traffic needs mass transportation system. As at present city traffic depends on only private vehicles and autorikshaws, For daily users like students and professionals requirement of mass transportation is necessary and it proves economical of communication to sub urban centers In study it is observed that road users uses their personal vehicle for transportation.

It results that more private vehicles coming on traffic routes hence fuel consumption, traffic congestion and pollution in urban areas increased day by day. Data analysis shows inadequate services, discomfort and delays which needs to improve in urban transportation system . Proper bus stops are required to retain the passengers. It is very necessary for the survival of public sector transit in the times to come. The travel of bus need to improve bus frequency, comfort, ease of transfers and overall quality of buses.

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