

ASSESSMENT OF IMPACTS OF URBAN SPRAWL ON EXTENT OF OWN VEHICLES USE IN MYSORE URBAN AGGLOMERATE

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ABSTRACT

Urban sprawl refers to dispersed group of houses at the city's outskirts where residential land-use is dominant. In sprawl areas, essential services like milk parlor, vegetable and grocery shops etc. required to lead daily-life are not within walkable reach. This will cause frequent travel using own vehicles leading to traffic congestion, traffic delays, energy wastage, global warming, climate change etc. Thus, sprawl poses serious threats to sustainable urbanisation. The study aims to investigate the intensity and magnitude of the extent of own vehicles use in the emerging Mysore urban agglomerate. The questionnaire survey method has been adopted wherein a structured questionnaire was served to randomly selected dwellers of residential layouts at the outskirts of Mysore city to obtain answers. The study reveals that there is extreme dependency on own vehicles and very less on public vehicles for their daily commute, location of daily essential services beyond walkable reach, more number of trips, travelling more distance, spending of more money and time on daily commuting and this is causing traffic congestion and delays in the Mysore city. Understand the intensity and magnitude of the issue will help to develop a strategy to counter and mitigate its possible threats to sustainable urbanisation in the Mysore urban agglomerate.

Keywords: Urban sprawl, Homogeneous land-use, Questionnaire survey method, Urban agglomerate,

1. Introduction

Urban sprawl refers to dispersed group of houses at the city's outskirts (Dario, 2014). Thus, sprawl areas are characterized as homogeneous land-use, inadequate road network, lack of public transportation, over dependence on own vehicles, more travel, high energy consumption etc.

(Sierra club, 1998;Doytsher et al., 2010).The essential services required to lead a daily life such as milk parlors, schools, offices, grocery and medical shops etc.,are not within walkable reach in sprawls(Burchell et al., 1998).Hence, people in sprawls have to frequently travel to cities for daily activities. The provision of public transportation is limited; hence, use of private vehicles is inevitable (Downs, 1999; Brueckner, 2000; Burchfield et al., 2006; Ewing et al., 2008).Increased use of private transport leads to several problems like traffic congestion, traffic delays, accidents, noise and air pollution and energy wastage (Glaeser and Kahn, 2003). This in turncauses increasedemission ofgreenhouse gases leading to climate change. Elevated air and noise pollution beyond agreed human safety limits lead to adverse impact on the quality of life. Thus, sprawl poses serious threats to global efforts of reducing greenhouse gas emission.

In this background, the study aims to examining the extent of using public or own vehicles for daily commute, daily number of trips,commuting distance, daily time and money spendingon travel etc. in the emerging Mysore urban agglomerate.

Mysore city is the second largest and second fastest growing city in the state of Karnataka. It is now emerging as urban agglomerate and has become a new hotspot for long-term investors in land and home seekers. In recent years, more than 2500 private residential layouts adjacent to MUDA layouts have cropped up. People from both semi-urban and rural hinter land of Mysore city are migrating to the city which intensifies the demand for housing and infrastructure. Mysore city serves as a growth center with an intention to release the stress on the Bangalore metropolitan city. In this context, the study will help to understand the intensity and magnitude of the issue in the Mysore city to counter and mitigate its possible threats sustainable urbanisation.

2. Objectives

To assess the impacts of urban sprawl on extent of own vehicles use in Mysore urban agglomerate.

3. Study Area: Mysore Local Planning District

The study area of the present research work is Local Planning District of Mysore city, headquarter of the Mysore District of Karnataka state, India.

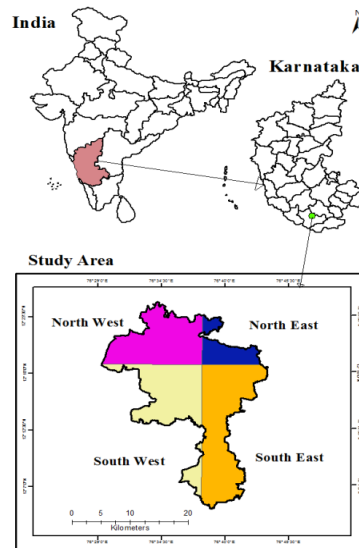


Figure – 1: Study Area: Local Planning District of Mysore

It spreads over an area of 507.72 sqkm. It lies between 12° 14' 41" to 12° 22' 25" N latitudes and 76° 34' 20" to 76° 43' 23" E longitudes. The Mysore district shares boundary with Tamil Nadu state to its southeast, the Kodagu district to its west, Mandya district to its north, Hassan district to its northwest and Bangalore district to its northeast. The northern part of the city is drained by river Cauvery and the south is drained by the river Kabini. The Mysore city blessed with several tanks and lakes across the city and in its outskirts.

In the last two decades, Mysore city has seen massive increase of built-up (from 80.71 sqkm in 2000 to 226.72 sqkm in 2016 with 146.01 sqkm addition) which triggered a drastic land use land cover change especially at the outskirts of the city. The landscape metrics analysis of urban growth reveals that urbanisation in the Mysore city became more diverse, complex and fragmented especially towards the south direction of the city. The study of degree of urban sprawl using Shannon entropy reveals that dispersed growth or sprawling is shifting from inner zones to outer zones of the Mysore city (Manjunatha and Chandrashekhara, 2021).

4. Methodology

To assess the impact of urban sprawl on the extent of own vehicle use in the Mysore LPD, "questionnaire survey method" has been adopted wherein, a structured questionnaire is provided

to randomly selected residents of newly developed layouts at the outskirts of the city to obtain answers.

The study area has been divided into four directions/zones such as a) North-East b) North-West c) South-East and d) South-West to analyse the sprawl impact towards different directions of the city. The primary survey has been conducted and answers are obtained from residents of newly developed layouts of all four zones separately. Overall 200 residents with 50 from each zone have been met and collected data regarding extent of own vehicles use for their daily activities.

The questionnaire includes various dimensions of own vehicles use by urban residents for their routine works/commute such as households using public, own or both kinds of vehicles, number of trips commuted using public or own vehicles, distance needs to commute to visit schools, grocery and medical shops etc., distance travelling using public or own vehicles, time spending on daily commute, spending on fuel by households for commute and vehicle traffic and traffic delays in the city.

The collected data has been analyzed using Microsoft excel and SPSS software.

4. Impacts of urban sprawl on extent of own vehicles use

Table 1:Households using public, own or both kinds of vehicles for daily commute

Directions	Public vehicle users	Own vehicle users	Both kinds of vehicles users	Total number of respondents
North-East	1	38	11	50
North-West	0	43	7	50
South-East	0	40	10	50
South-West	0	45	5	50
Total	1	166	33	200
% of total	0.5%	83%	16.5%	100%

Source: Field survey conducted in 2019

There is an extensive use of own vehicles (i.e. 83% of surveyed residents) for their daily commute in the Mysore LPD. Residents of sprawl areas extremely depend on their own vehicles

and very less on public vehicles for their daily commute. There is an extensive use of own vehicles in all the four directions/zones of LPD with highest reported in South-West direction followed by North-West direction.

Table 2: Number of trips commuted using public or own vehicles for daily routine works

Direction/Number of trips	Public vehicle				Own vehicle			
	1 to 2	3 to 4	5 to 6	> 7	1 to 2	3 to 4	5 to 6	> 7
North-East	10	1	0	0	7	16	12	3
North-West	7	0	0	0	8	20	14	2
South-East	8	2	0	0	0	30	10	0
South-West	5	0	0	0	4	28	13	0
Total	30	3	0	0	19	94	49	5
% of total	90.9	9.1	0	0	11.4%	56.3%	29.3%	3.0%

Source: Field survey conducted in 2019

Table 3:Distance needs to commute to visit schools, grocery and medical shops etc.

Direction/Distance	< 1 km	1 to 2 km	2 to 3 km	>3 km
North East	20	24	6	0
North West	10	32	8	0
South East	11	27	12	0
South West	8	33	9	0
Total	49	116	35	0
% of total	24.5%	58%	17.5%	0%

Source: Field survey conducted in 2019

Table4: Distance of travel (kilometers) using public or own vehicles for daily commute

Direction/distance	Public vehicle				Own vehicle			
	< 4	4 to 8	9 to 12	> 12	< 4	4 to 8	9 to 12	> 12
North-East	0	10	1	0	0	8	6	24
North-West	2	5	0	0	0	3	7	33
South-East	0	7	1	2	2	5	3	30
South-West	0	2	3	0	0	1	8	36
Total	2	24	5	2	2	17	24	123
% of total	6.1%	72.7%	15.2%	6.1%	1.2%	10.2%	14.5%	74.1%

Source: Field survey conducted in 2019

Table 5: Time spent to daily commute using public or own vehicles

Direction/Distance	< 30 m	30 to 60 m	1 h to 2 h	> 2 h	Total
North East	5	9	20	16	50
North West	2	10	20	18	50
South East	3	8	26	13	50
South West	6	11	24	9	50
Total	16	38	90	56	200
% of total	8.0%	19.0%	45.0%	28.0%	100%

Source: Field survey conducted in 2019

Table 6, Spending on fuel by households for commute

Direction/Distance	<Rs. 2000	Rs. 2000 to 4000	Rs. 4000 to 6000	>Rs. 6000	Total

North East	2	35	6	7	50
North West	4	22	20	4	50
South East	2	23	21	4	50
South West	4	12	20	14	50
Total	12	92	67	29	200
% of total	6%	46%	33.5%	14.5%	100%

Source: Field survey conducted in 2019

Residents of surveyed layouts (about 76.5%) have to travel more than 1 km from their home to visit nearby schools, grocery and medical shops etc. The same trend is followed in all the four directions with highest number reported in South-West followed by the North-West direction. Therefore, about 88.6% residents have to make more than 3 trips per day using their own vehicle for daily routine works. Similar trend of making more trips is seen in all the directions with highest reported in South-West followed by the South-East direction. Further, about 86.6% of own vehicles users travel more than 9 km per day to avail themselves to their daily routine activities. It is also observed that own vehicle users travel more distance than public vehicle users per day. Same trend is seen in all the four directions with highest reported in South-West followed by the North-West direction. About 73% residents spent more than 1 hour per day in daily commute using public or own vehicles. Same trend is seen in all the four directions with in South-East followed by North-West direction. About 94% residents spending more than Rs. 2000 on fuel their vehicles per month. Most of the residents of all the four directions spend the same amount to fuel their vehicles with highest in the South-West followed by South-East direction.

Table 7: Vehicle traffic and traffic delays in the city

Direction/ response	Vehicle Traffic Rise	If yes, what are the reasons for rise and delays				
		Increase of own vehicles	Narrow roads	Unscientific traffic management	Extensive outgrowth of city	Any other
North-East	50	50	21	10	33	-

North-West	50	46	-	18	38	-
South-East	34	32	-	-	14	-
South-West	43	43	-	-	18	-
Total	177	171	21	28	103	-

Source: Field survey conducted in 2019

About 88.5% residents opined that in recent daystraffic rise and delays are common in the city. Increase of own vehicles use and extensive outgrowth of city are main reasons for this. It is important to note that all the residents of North-East and North-West directions opined that traffic rise and delays are common in the city in recent days.

5. Discussion

Surveyed layouts are basically isolated, scattered, located away from villages or main city and have homogeneous land-use. These layouts are just a group of houses and have no basic amenities/services such as milk parlors, vegetable shops, grocery shops, medical shops, schools, offices etc., in the vicinity. One of the chief characteristics of such layouts is the lack of mix land-use. These layouts having only homes and devoid of other amenities required to lead daily life. Besides, these layouts have inadequate public transportation system including far away location of bus stands, less frequent visits of busses etc., due to scattered and isolated location of these layouts which makes the public transportation non-economical. Hence, residents have to depend on their own vehicles to visit and avail the daily essential services that are located away from their homes.

Different parameters considered to assess the impacts of urban sprawl on extent of own vehicles use have shown different intensity in different directions. The highest dependency on own vehicles, making more trips, traveling more distance, spending more than Rs. 2000 per month on fuel is reported in South-West direction where, sprawl is relatively high.

All the surveyed residents of North-West and North-East direction of Mysore LPD agreed that traffic is rising and hence traffic delay become common in the city. The North-West zone is a junction connecting K. R. Nagara, Madikeri and Bangalore roads and it includes industrial area, tourism spots like KRS, Balamuri and GRS Park etc. The North-East direction is relatively close to city. Hence, there is huge traffic congestion in these directions.

Extensive use of own vehicles, making more trips, traveling more distance, spending more time and money for travel to get daily essential services leads to traffic congestion, traffic delays, accidents etc. in the city. Besides, it causes air and noise pollution beyond agreed human safety limits and increased greenhouse gas emissions leading to global climate change.

6. Conclusion

The study relating to urban sprawl impacts in the Mysore LPD on extent of own vehicles use reveals that there is excessive dependency on their own vehicles for their daily routine commute. Daily essential services like schools, grocery and medical shops etc., are located relatively away from the surveyed layouts. Therefore, residents of such layouts have to make more number of trips, commuting more distance and spending more time and money using their own vehicle. This has led to traffic congestion and delays in the Mysore city in recent days due to mainly excessive use of own vehicles and extensive outgrowth of city in recent days. Understand the intensity and magnitude of the urban sprawl in the Mysore city will help to develop a strategy to counter and mitigate its possible threats to sustainable urbanisation as a case to apply for tier-2 cities of developing countries.

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