

Spatial Development Trends around Arumbakkam Metro Rail Station in Chennai

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ABSTRACT

The land use and transportation network have a direct link with each other mutually. The Chennai a Metropolitan city which has good connectivity with other parts of the country. The construction of metro rail in the city has boosted the development around the influence area. The Influence area have a greater change in land use, which need to addressed earlier, the concept of transit oriented development has introduced to manage the growth of the development. The Arumbakkam located near the Koyambedu Bus Terminus, which has been well connected to the city by road and Metro rail. The Influence of Metro had a great impact on land use and the opportunity of Transit Oriented Development to regulate and manage the growth in the area is detailed out in this paper.

Keywords – Arumbakkam, Metro Rail, Transit Oriented Development, Land use, Influence Zone.

1. INTRODUCTION

Land use and transport system mutually influence each other and extensive literature on the nature of influence have already been generated. According to Aravantinos[1], between the two systems there is a peculiar but decisive relationship; each one supplements and enhances, while at the same time degenerates, disrupts and disaggregates the other. The exact relationships that characterize this interaction are difficult to define sufficiently. Knight and Trygg [6] examined the impact of a new metro station in Toronto, Canada, on residential density around it. According to their research's results, the first two years after the station's opening there was no particular change in density, whereas within the next five years important density increase was reported in the residential areas nearby in comparison with the areas that were not included in the station's influence zone matching with the principles of Transit Oriented Development (TOD). National Urban Transport Policy (India) has proposed for construction of metro rail system in every city with a population of 20 lakhs and many of the cities have began implementing the metro projects. The concept of TOD has been identified as an innovative strategy to manage burgeoning growth of urban population in India, without proliferation of urban sprawl.

The conventional land use policies and urban planning concepts may have to be redefined and evolved fresh, meeting the demands of the modern day, considering the impact of mass transit system exerts on land use system and mass transit system being introduced in a larger way in Indian cities. Research and empirical studies on land use dynamics in and around mass transit stations would help in this direction. An attempt in this study has been made to study the impact of a new transit station in Chennai City on the land use system of an area using comparative empirical data compiled, before and after the operation of the station. Chennai is one of the fastest growing metropolitan cities in India having a population of over 4.6 million with a density of more than 26,000 persons per sq.km.

2. CHENNAI METRO

Chennai is the fourth city in India, after Kolkata, Delhi and Bengaluru to introduce Metro Rail. The Phase I of the metro initially include two colour coded lines; Chennai Airport – Washermenpet (23.1 km.) and Chennai Central to St. Thomas Mount (22 km.) The Phase I of the Chennai Metro extends for 45.1 km., and began its

operations partially in the Chennai Central to St. Thomas Mount line for a distance of 10 km., covering seven stations from Koyambedu to Alandurin June 2015.

The Koyambedu station is a metro terminal from where the operations began and this station serve the neighborhoods around and those commuting to and from Koyambedu Private Bus Terminal and Wholesale Vegetable Market. The Alandur station serves interchange from one metro line to the other of the Phase I corridors. The station next to Koyambedu is Chennai Mofussil Bus Terminus (CMBT) and the other stations in the sequence are, Arumbakkam, Vadapalani, Ashok Nagar, Ekkattuthangal and Alandur.

3. ARUMBAKKAM – STUDY AREA

As two years is completed since operation of metro services in this line, it was proposed to study the impact of land use changes in the influence area of metro services around a metro station. Arumbakkam metro station influence area was considered for the study, in view of the availability of the land use data for the same area, before the operations of the metro services.

Arumbakkam is a residential neighbourhood came into view, with the implementation of World Bank assisted sites and services housing scheme under Madras Urban Development Project I (1977-82). Under the scheme, more than 2300 housing plots were allotted for different sections of the community. Thus, the neighbourhood includes both planned and unplanned developments. The shifting of wholesale vegetable market and mofussil bus terminal from Broadway to Koyambedu in the years 1996 and 2002 respectively accelerated the growth of the neighbourhood. The land use characteristics of the influence area of the Arumbakkam metro station is studied with reference to physical land use surveys carried out during the years 2011 and 2017.

4. OPPORTUNITY FOR TRANSIT ORIENTED DEVELOPMENT

Chennai Metro Rail project aims at providing people of Chennai with fast, reliable, convenient, efficient, modern and economical mode of public transport, which is properly integrated with other forms of public and private transport including buses, sub-urban trains and MRTS. The project has also opened up a great opportunity for Transit Oriented Development (TOD) in the influence zones of the metro stations. The influence zone is generally up to a radius of nearly 500-800 m., of the transit station, wherein the Transit Oriented Development (TOD) which induces people to use the public transportation is expected to happen. The TOD attempts to maximize the use of residential, commercial and play spaces within the influence zones of the transit stations. This naturally should promote for high density mixed use developments in the influence zone and declining densities moving away from the influence zones. Thus the concept is expected to promote compact development, which is having mixed use in character with high quality transit accessible within 5 – 10 minutes of walking. An attempt has been made in this study, to examine whether the development dynamics since introduction of metro rail is in accordance with the characteristics of TOD.

5. LAND USE CHANGES IN ARUMBAKKAM METRO INFLUENCE ZONE

The metro rail construction work began in the year 2009 and service operation in the stretch under study was introduced in 2015. The physical land use survey in the influence zone of the Arumbakkam Metro Station, drawn circularly with 500 m. radius from the centre of the station, was conducted and mapped for the temporal period 2011 and 2017 and shown in map. The percentages of land falling under different categories of use are also presented in Table 1. The fig.1 below shows the land use change in Arumbakkam due to Influence of Metro Rail.

The major change in land use is observed in the case of residential and commercial uses in the influence zone of the Arumbakkam metro station. The residential use (including both primary & mixed) which accounted for 54 per cent of the total influence area in the year 2011, had come down to 43 per cent while the commercial use which was only around 14 per cent in the year 2011 had increased to 27 per cent in 2017. Apart from this major shift, there is not much of change in other uses excepting in the case of vacant land, which has come down to 3 per cent from 7 per cent during the reference period. The development of vacant land also had been commercial in most cases.

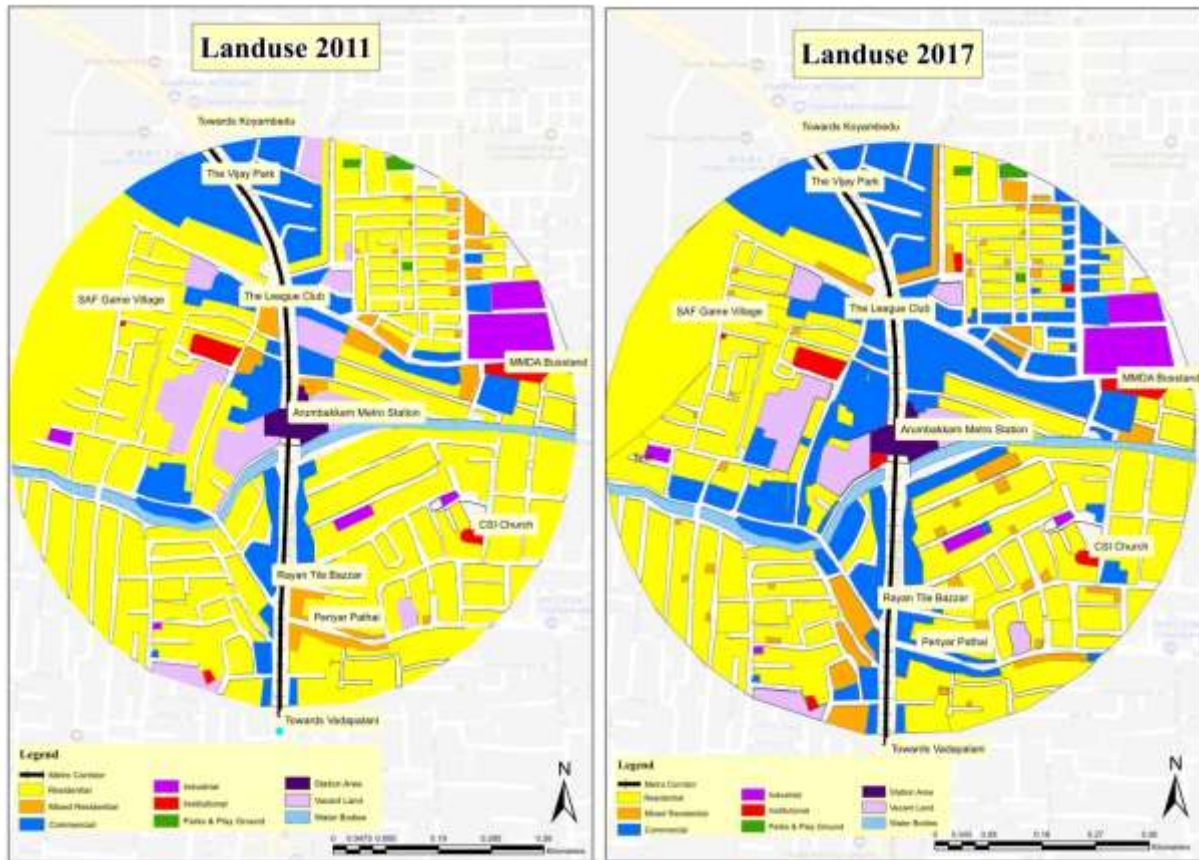


Fig- 1: Land use Change of Arumbakkam

Table –I: Land Use Changes in the Influence Zone of Arumbakkam Metro Station

Sl. No.	Land Use Classification	Percentage of Land Under	
		2011	2017
1	Primary Residential	45.74	37.26
2	Mixed Residential	8.44	6.17
3	Commercial	13.69	27.37
4	Industrial	2.05	2.05
5	Institutional	20.85	21.10
6	Open Space & Recreational	0.23	0.23
7	Vacant	6.59	3.41
8	Others	2.41	2.41
	Total	100.00	100.00

6. CURRENT DEVELOPMENT SCENARIO IN THE INFLUENCE ZONE

The developments in the metro influence zone at Arumbakkam had been more driven by the market mechanism in the absence of any planned intervention, which are required to promote the concept of TOD in the influence zone. Truly, the influence zone of the metro station in this study area is much beyond 500 – 800 m. People residing even 1 -1 ½ km., away from the metro station, access the services. The wider influence area helps to increase ridership and economic viability of the metro services. The Chennai Metro Rail Limited has also proposed to construct four-storey buildings on both sides of Arumbakkam metro station for shopping and office use, which they believe would increase revenue as well as the ridership. However, from the spatial development perspective the current developments do not augur enhancements in quality of life and not aligned towards meeting the objectives of the TOD.

As the influence zone is beyond the walkable distance to the metro station, the people use motorized personal transport to reach the transit, increasing the demand for parking in the vicinity of the station. The culture of shopping at transport modal interchange locations, mainly while interchanging from public to personal mode of transport among the community, create potential for the influence zone to develop as a business district/sub-district which is seen as the reason for the significant increase of commercial land use in the Arumbakkam metro influence zone. In the absence of a strategic plan to increase the residential densities with a balance to other uses, the market mechanism is expected to take over and lead towards a complete transformation of the influence zone into congested, disorderly and unhealthy market place.

It is observed that the current trend of development in the influence zone is not in conformity with the objectives of the TOD (as stated below) though the need for TOD approach in development planning in all Indian cities where mass transit systems have been already put in place, or proposed for implementation has been advocated by the Government of India in the National Transit Oriented Development Policy.

- Reduction in traffic and parking demand
- Developing inclusive habitat in the influence zone
- Integrating EWS and affordable housing in the influence zone
- Providing recreational/open spaces required for good quality of life in influence zone
- Accommodating the growing population in a compact area

7. CHALLENGES IN IMPLEMENTATION OF THE TOD CONCEPT

Three D's namely Density, Diversity (in land use) and Design (encourages NMT) are the guiding principles of developing a transit oriented development in the influence zone of any mass transit station. However, the ground situation makes it difficult to be guided by the principles of TOD.

First, the TOD concept is oriented towards high rise development maximizing densities within the influence zone. The high rise developments require larger plots and sufficient road width for development / redevelopment, which may not be commonly available within the influence zones. The incentive of awarding higher FSI for residential developments for accommodating more population within influence zone, warrant provision of additional services and infrastructure. However, the infrastructures have been found to be inadequate even for the present level of population density.

Secondly, the land economics does not permit to develop a mix of land use which is fundamental for the efficient functioning of the TOD concept. The potential use of land for commercial uses within the influence zone escalates the land cost, and it becomes extremely difficult to provide decent housing which is affordable for EWS or LIG. Livable environments which require leisure and recreations spaces (parks & open spaces) are difficult to create considering the cost of land in the influence zone. Use of land for commercial use only becomes economically viable, hampering the prospects of promoting a mixed use in the influence zone.

Thirdly, the Urban Design principle which is basically aimed at connecting the people with the place through a process of giving form, shape and character to the neighborhoods is difficult to adopt as the public land ownership is very minimal and finding economic viability of design proposals are found hard.

8. CONCLUSION

Notwithstanding the above challenges, improving urban mobility and quality of life through transit oriented development has been attempted as part of the mission by many of the cities covered under Smart Cities Programme. Chennai is one of the metropolitan cities covered under Smart Cities, and the features of the Smart Cities Mission include the characteristics of TOD in the area based development planning.

In order to promote and regulate developments in the influence zone of the metro stations in such a manner the TOD concept works efficient, the influence zone of each metro station need to assessed and delineated first. Further working with the TOD concept in several influence zones (of metro stations), require certain norms/standards to be arrived for planning and also to monitor the implementation of the proposals in such a way that the objectives are achieved.

Further, the assessment of the shortfalls in meeting the requirements of the current population in influence zones of the metro transit stations are to be assessed following which possibilities of augmentation of infrastructure to be studied before deciding on what extent densification could be possible in each of the zones. The additional FSI for densification could be awarded, if possible and it is to be in relation with carrying capacity only, and need not be uniform across all influence zones of the metro transits in the city.

The process of influence zone planning requires to be integrated with Master Planning exercise, so that the city level planning objectives could be well realized.

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