

Functional Establishments in Madurai City, Tamil Nadu, India

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ABSTRACT

Madurai City is one of the ancient cities of South India. It is the second largest city in Tamil Nadu regarding population. The City occupies a position in the south central part of Tamil Nadu. The City has grown on the banks of River Vaigai. National Highways such as N° 7, 49 and 4513 passes through the City. The broad gauge lines connect Madurai City with Chennai, Coimbatore, Tuticorin, Tirunelveli, and Bodinayikannur. One Airport is in the outer core of Madurai City. The functional establishments along road like from Fenner to Viratipattu. The NH-49 extension road connecting Madurai-Theni passes through this ward between the points of Fenner to Viratipattu. The field observation survey conducted by the investigator on either side of the road listed out 18 different functional establishments. These functional establishments are grouped under 5 categories. They are Residential, Commercial, Educational, Industrial, Public and semi-public. Apart from this, another type of observation also made, that is, single functional establishments and Multifunctional establishments. Keeping this in mind the paper aims to study the pattern of road side functional establishments in order to identify the trend of urban requirement and landuse in development.

1. Introduction

In the process of urban expansion, the major roadways are the prime attractions for the establishments of urban functions. The commercial, residential, industrial, educational and public and semi-public functional units sprang up on either side of the roads as the beads on the string due to greater connectivity and accessibility. Later, mainly residential units and multifunctional uses to support the requirement of the residential population fill up the area between the roads. In this study area an attempt has been made to study the urban functional establishments along the major roads in the study area unit. The City Corporation Area is divided into 72 Wards, spread over four zones, namely, North Zone (21 Wards), South Zone (19 Wards), West Zone (16 Wards) and East Zone (16 Wards). The area of North Zone, South Zone, West Zone and East Zone is 19.50 sq.km, 6.12 sq.km, 7.40 sq. km and 18.78 sq.km respectively. The West Zone of the City Area includes 6 Wards lying to the west of bye-pass road of the City. The Ward of 72, including the area of Ampalayam, lies between the NH 49 road and NH 7 bye-pass road and it has been selected for the in-depth study of land use change.

In recent times, urbanization has been associated with industrialization and economic development and thus urbanization is essentially an economic process. In the early period, the geographical study of towns was essentially descriptive and mainly focused on the land use function and morphology. Burgess (1925), Christaller (1966), Hoyt (1939), Harris and Ullman (1945) elaborately discussed the functional land use under the urban landscape and they evolved various types of urban land use models.

Gowri (1984) studied the structure, growth and land use functions of Madurai City. She also focused on the consumer travel preference of shopping centers. Rajamanikam (1988) analyzed the structure, growth and land use functions of

Tiruchirappalli. Podhumani (1989) analyzed household characteristics in housing conditions and residential quality in Madurai City. Lakshmi (1997), analyzed the land use changes in relation to transport characters. Gopi (2004) analyzed the housing environment in the DD plan of Madurai City.

Sudhira and Ramachandra (2003) focus on the urban sprawl pattern recognition and explore the causal factors for urban sprawl of Udipi and Mangalore area. Survey of India Toposheets, IRS satellite data and GIS are used for developing a model of sprawl in urban environment.

In the early part of the 20th century, academics described the spatial structure of cities as a function of the relationship between land use and distance from the central business district (Burgess, 1925; Hoyt, 1939). In this model, the demand for better, high-quality housing by higher-income households pushed them away from both expensive central business and industrial districts and neighbourhoods with aging, multi-family housing stock in favour of newer neighbourhoods with larger housing units on the urban periphery. This classical urban location theory predicts that people make residential location decisions based on the relative costs of land and travel to central-city jobs (Alonso, 1964). Suburbanization, therefore, can be explained by the preference of higher-income households for more land, the relative costs of which are cheaper in the urban periphery (Abler, Adams, Gould, 1971).

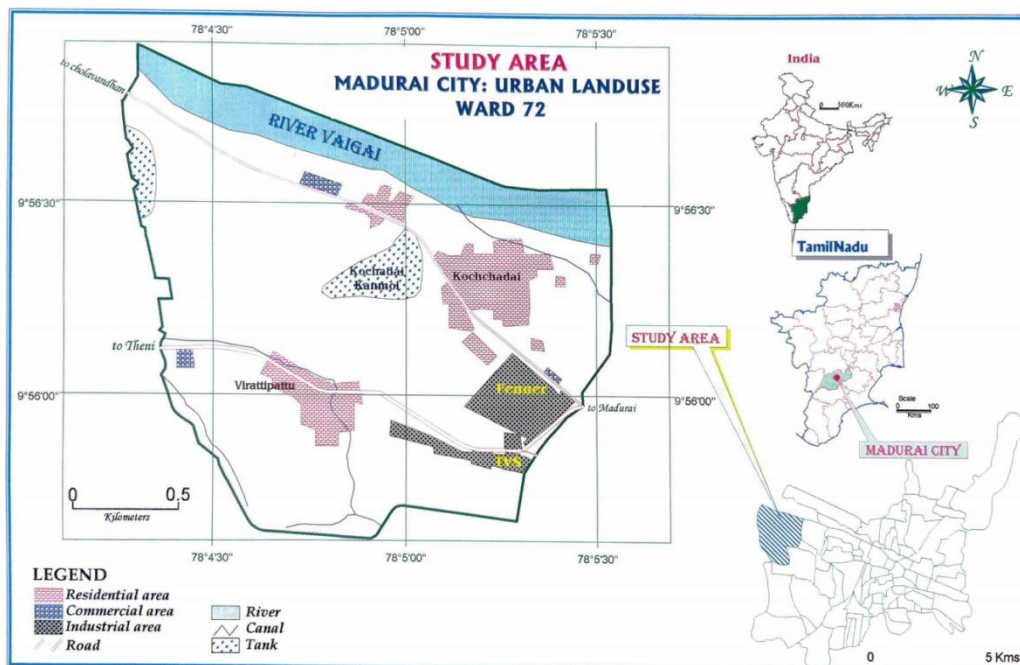
Most of the research cited here relies on simple, crude characterizations of urban and suburban neighbourhoods, typically relying on United States Census data on urban and suburban counties, downtowns and downtown adjacent neighbourhoods only, or analyses of residential population densities without regard to land use mix or transportation system characteristics. Sustainable urban development requires efficient transport of people and goods, reliable water

supply, effective land-use and management, green spaces and soil protection, well-functioning sewage systems, high quality waste management, effective energy management, and many other things.

2. Study Area

Madurai City is one of the ancient cities of South India. It is the second largest city in Tamil Nadu regarding population. The City occupies a position in the south central part of Tamil Nadu. The City has grown on the banks of River Vaigai. The broad gauge lines connect Madurai City with Chennai,

Coimbatore, Tuticorin, Tirunelveli, and Bodinayikannur. One Airport is in the the outer core of Madurai City. Madurai city ranks second next to Chennai according to the size of population. Madurai city is located on 78°07'02" E longitude and 9°55' N latitude and occupies a position in the south central part of Tamil Nadu. The city emerged as a town ship with an aerial extent of 2.59 sq.km with population of about 41,600 in 1886, has now grows in its aerial extent to 52.5 sq. km and with a population of more the 1.4 million population in 2001.



(Fig. 1)

3. Data base and Methodology

Reference materials related to the present study were collected from various sources. The study depended on both primary and secondary data relating to the impact of roads on the development of Survey of functional establishments of ward no 72,

Land use map for Madurai city was prepared data collected from the District Corporation Office, Madurai. Period of study was 2005, with reference to Ward number 72, (Fenner to Melakkal).

The following methodology is used in the study:

- Primary and Secondary sources of information relevant to the study area.
- Madurai and Ward Maps from Corporation Office formed the major secondary source of information.
- Field Study was carried out to cross validate the different land use types in Ward No. 72 of Madurai City.

4. Results and Discussion

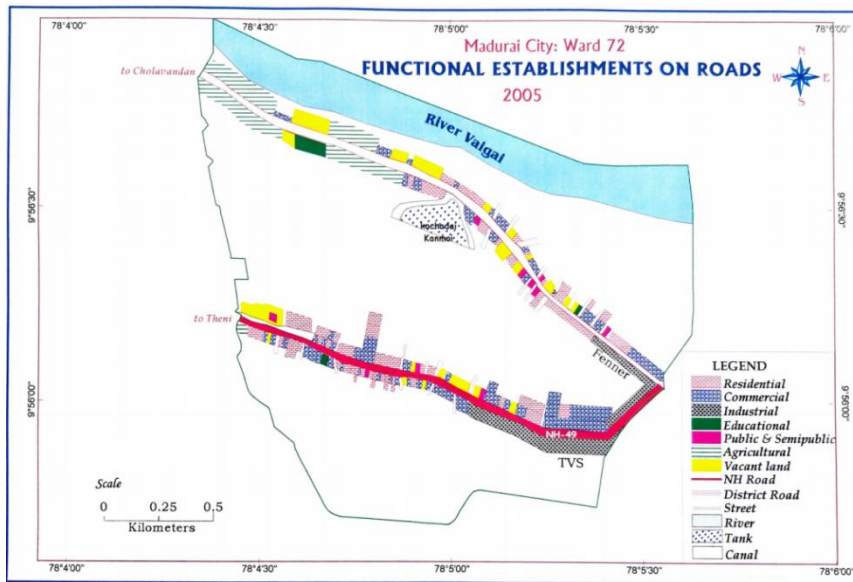
Functional Establishments Along Road Side

Fenner to Virattipattu Road : The NH-49 extension road connecting Madurai-Theni passes through this ward between the points of Fenner to Virattipattu. The field observation survey conducted by the investigator on either side of the road listed out 18 different functional establishments. These functional establishments are grouped under 5 categories. They are:

Residential, 2. Commercial, 3. Educational, 4.Industrial and 5. Public and semi-public.

Apart from this, another type of observation also made, that is, 1.Single functional establishments and 2.Multifunctional establishments.

Multi-functions are the sharing of the front side of the residential units to other uses and the combination of commercial, public and semi-public uses. In many cases the shops are in front side and household activities are in back side. In some cases ground floor is used for commercial banking and other multifunctional activities, whereas first and second floor are used for residential purposes. The urban land use developments are listed out on both sides of the roads (see figure 2)

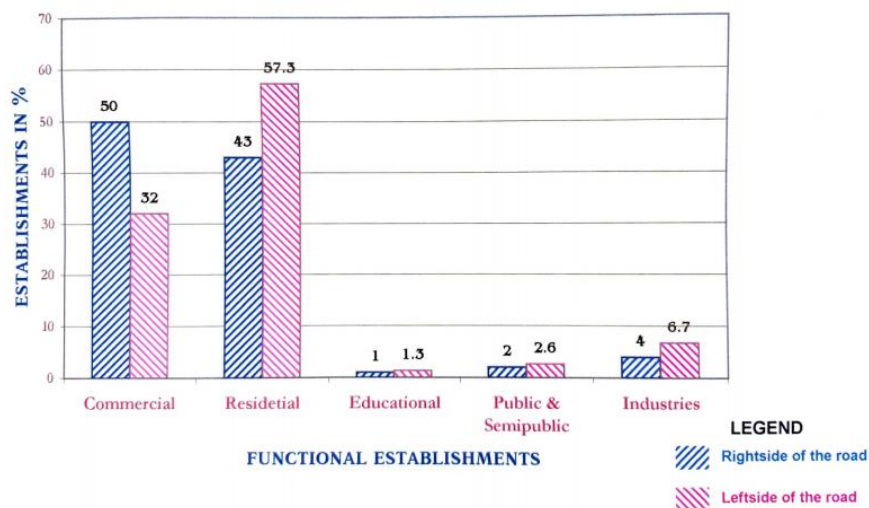


(Fig. 2)

Table: 1 Functional Establishments Fenner to Viratipattu Right-side of the road (2005)

Category	Observed Functional Establishment	Number of Establishment		Percentage
		No	Total	
I	Commercial			
	Grocery shops:	29	50	50
	Automobile spare parts & repairing	8		
	Telephone booth	7		
	Tea shop	5		
Tailor shop	10			
II	Residential:			
	Single floor	28	43	43
One floor	15			
III	Educational	1	1	1
IV	Industrial	2	2	2
V	Public & Semi-public:			
	Pump house	1	4	4
	Petrol bunk	1		
	Temple	1		
Check post	1			
	Total	103	100	100

Madurai City: Ward 72
FUNCTIONAL ESTABLISHMENT ON ROADS
(Fenner to Virattipattu)

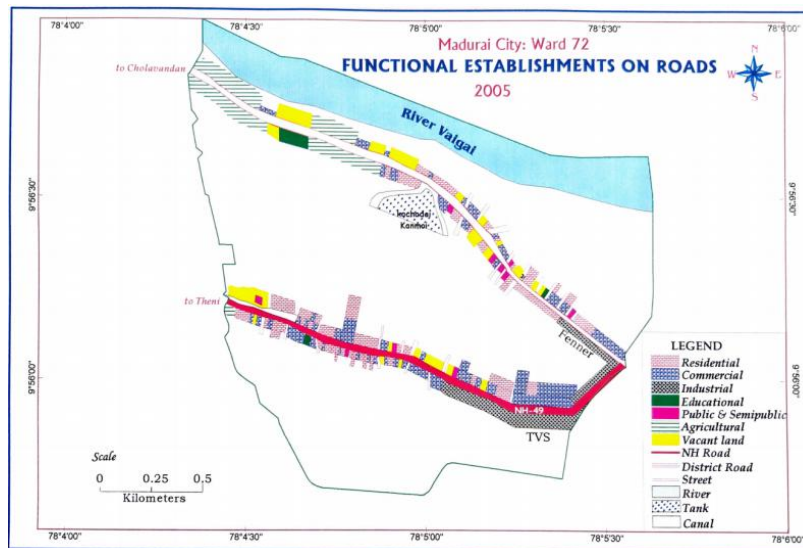


Establishments on the right side of road: In total there are 100 functional establishments on the right side of the road. All these establishments are grouped under five major classifications and listed in the following table.

Commercial: On the right side of the road from Fenner to Viratipattu commercial establishments more in number constituting 50% share to total. Grocery shops are more in number in commercial establishments. Grocery shops are more in number to support the daily requirements of residences. The tailor shops ranks second in numbers.

Automobile spare parts and repairing ranks third in the total number commercial establishments.

Residential: Residential establishment constitute 43% of the total functional establishment along the right side of this road. Among the residential units with single floored buildings are more in number than the Multi-storeyed. Single floored residential buildings are mostly with tiled roof and multi-storeyed are terraced ones. The filed type residences are more near Virattipattu, which is a part of the village now it is included in the city limit.



Educational: There is only one primary school located in the right side of the road.

Industrial: There are 2 industrial establishments. One is Fenner producing rubber by products and belt and another one

is a saw mill. The Fenner is a large-scale industrial units and a predominant establishment in the sector.

Public and semi-public: Public and Semi-Public establishments constitute 4% of total functional units. This includes one pump house, one temple, one petrol bunk and a check post.

Table: 2 Functional Establishments on Fenner to Viratipattu left side of the road (2005)

Category	Observed Functional Establishment	Number of Establishment		Percentage
		No	Total	
I	Commercial			
	Grocery shops	10	24	32
	Automobile spare parts & repairing	5		
	Telephone booth	4		
	Tea shop	3		
Tailor shop	2			
II	Residential:			
	Single floor One floor	43	43	57.3
III	Educational College	1	1	1.3
IV	Industrial	2	2	2.6
V	Public & Semi-public:			
	Temple Marriage Hall	1 4	5	6.7
	Total	75	100	100

Residential: Residential establishments are more in number along the left side of the road from Fenner to Viratipattu. The residential establishment constitutes 57.3%.

Most of the units are having only ground floor. Only 14 buildings are having more than one floor.

Commercial: Commercial establishments constitute 32%. The commercial units include grocery shops, teashops, and telephone booth and tailor shops. Since residential use is more in number along this side grocery shops are also more to meet the daily requirements of the residence population among the commercial units.

Educational: Pandean College of Pharmaceuticals is the only residential educational institute located on the left side of this road.

Industrial: The TVS Rayon Thread and Rubber Industries and Southern Roadways are the major 2 large-scale industrial units located along the left side of the road. His industrial units are the good landmarks of this road. Once, this unit was in the outside of the city limit, due to the urban expansion in the later period this comes under the city limit.

Public and semi-public: Public and Semi-Public establishment includes one temple and four marriage halls. Combine together it constitutes 6.7% of total functional establishments. These marriage halls facilitate the social requirement of the residential communities living around this area. Besides this, single functional units are more than multifunctional establishments along this side. Single functional building accounts for 88.7% and multi-functions are only 11.3% of total functional establishments. The village setup of social conditions in the Virattipattu village, availability of cheap land and less competition for urban function, relatively less accessibility to the establishment of core discover age the multi-functional types of land use.

Comparison: When comparing both sides of NH 49 road from Fenner to Viratipattu, the arrangement of the functional establishments are of almost same on both side. But commercial utilities are more on the right side, whereas the residential establishments are more on the left. The reason for the concentration of commercial buildings on the right side is industries. TVS industry occupies a large area along the left side of this road. Other establishments like educational-institutions; public and semi-public establishments are distributed uniformly on both the sides.

Functional Establishments along Road

Fenner to Mellakkal: The Mellakkal road, which connects Madurai to Vadipattipathu via Cholavanthan passing parallel to NH 49 through this ward. Field Observation Survey conducted by the investigators on either side of functional establishments. These establishments are grouped under five major categories. There are Residential, Commercial, Educational, Industrial and Public & Semi-Public.

Apart from these types of observation the investigators made observation on single and multi-functional buildings along both sides of the major road. Multifunctional building includes residential and commercial functions in the same buildings. In some cases household units comes on the backside, in some cases ground floor is used for commercial and first and second floors for residential purpose. Let us see the development along this road taking right side and left side and right side separately:

Table: 3 Functional Establishments from Fenner to Mellakkal left side of the road (2005)

Category	Observed Functional Establishment	Number of Establishment		Percentage
		No	Total	
I	Commercial			
	Grocery shops:	18	26	39
	Automobile spare parts & repairing	6		
Tea shop	12			
II	Residential:			
	Single floor	27	32	48
One floor	5			
III	Educational	1	1	1
IV	Industrial	2	2	3
V	Public & Semi-public	6	6	9
	Total	67	100	100

Commercial: Commercial establishments along the left side of Mellakkal road constitute 40% of the total function. Major Commercial establishments along this side are automobile spare parts and repairing, grocery shops and teashops. Grocery shops are more among the commercial establishments.

Residential: Residential establishments are more along this side of the road constituting 49%. Thatched huts and tiled houses are common indicate the rural atmosphere here. Off 32 residential units, one-floored residential buildings only 5 in number.

Educational: Educational institution includes only one school namely Seventh Day Adventist Matriculation School.

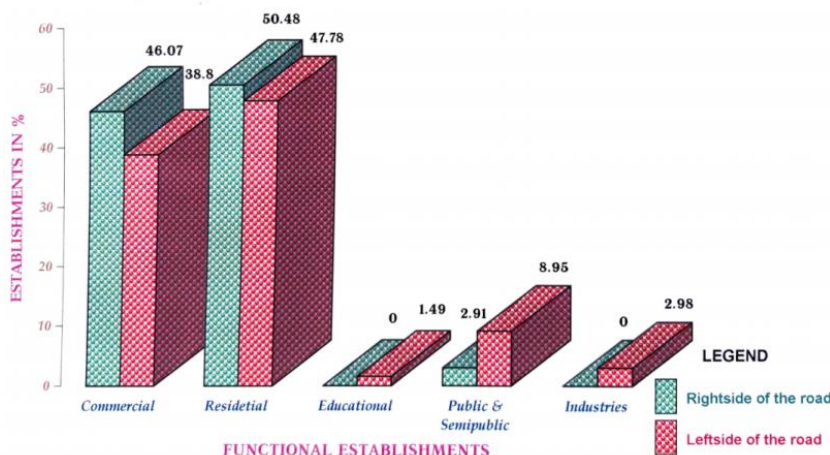
Industrial: Fenner is the only one industry on this side of the road. This is a large Rubber Industry. This industrial function constitutes only 1.53% of the total functional establishments.

Public and semi-public: Public and Semi-public utilities include two accounts 9.23% of the total units. Other than this, among the total 63 buildings multifunctional buildings are only 2 in number. Commercial and residential functions combine together.

Table: 4 Functional Establishments from Fenner to Mellakkal right side of the road in the year - 2005

Category	Observed functional establishment	Number of establishment		Percentage
		No	Total	
I	Commercial			
	Grocery shops:	39	48	46.07
	Automobile spare parts & repairing	4		
	Telephone booth	2		
Tea shop	3			
II	Residential:			
	Single floor	48	52	50.48
One floor	4			
III	Educational			-
IV	Industrial			-
V	Public & Semi-public:			
	Pump house		3	2.91
	Petrol bunk	1		
	Temple	1		
Check post	1			
	Total	103	103	100

Madurai City: Ward 72
FUNCTIONAL ESTABLISHMENTS ON ROADS
(Fenner to Melakkal)



Commercial: Commercial functions include grocery shop and automobile spare parts and repairing centres. Grocery shops ranks first as these arc more in number whereas, automobile repairing and spare parts centres comes second. Other minor shop includes telephone booth and medical shops. Commercial establishment constitute 46.07% of the total functions.

Residential: Residential units alone constitute half of the total functional utilities. Among this huts with thatched roof are more in number. Tiled and concreted residential buildings are very small in number along this side residential unit with first floor are only 4 in number among the total residential units.

Public semi-public: Along the right side of this road, public and semi-public buildings include one marriage hall, one hospital and a water pumping station. All these constitute only 2.9%.

Education: Educations institutions are absent in this side of the road.

Industry: Industrial establishment were not yet developed along this side of the road. Totally 103 buildings are there along this side of the road. Among this single functional buildings are 98 in number. Only 5 buildings single functional buildings constitute thatched houses.

Comparison: Major functional establishment like commercial and number units are more in number along the right side of these Mellakkal roads. Development residential establishments are more along the riverside. Agricultural field are mainly concentrated on interior part of left side of the road. Industrial and educational establishments are developed side. The over both sides of the road show that residential function are more. Among the buildings on the both side, single functional apartment are more in number than the multi-functional

5. Summary and Conclusion

The urban land use is the land on which an urban settlement and functions are built. The structure of the city involves building up urban land uses within the city and the territorial expansion to areas that have become urbanised

beyond the city limits. New buildings replace old ones. The land use changes initiate the new functions to move from one location to another to match with requirements. The urban expansion has changed the outlook of the western zone of the ward 72 located on the edge of the urban boundary area. Residential, public, and semi-public land uses have been well developed in the period of 2005. Most of the open spaces and agricultural lands were converted into residential and commercial purposes. Major changes are occurred in the field of residential and commercial land uses. The land use under roads and streets are also increased. There is an overall decrease in the land under agriculture and land under open space.

area under residential purpose has increased from 7.9% in 1978 to 31.01% in 2005. New colonies of this ward like HMS colony, Muthu Dever Colony, Doak Nagar and Fenner Colony etc. the land area under residential use is mainly developed by swallowing the agricultural land and open space. When comparing both sides of NH 49 road from Fenner to Virattipattu, the arrangements of the functional establishments are of almost same on both sides. But commercial utilities are more on the right side, whereas the residential establishments are more on the left. The reason for the concentration of commercial buildings on the right side is industrial and residential concentration on the left. Single functional units more than multi-functional establishments along the left side of this buildings accounts for 88.7% and multi-functions are only 11.3% of total functional

establishments. The village set up and social conditions of availability of cheap land and less competition for urban accessibility to the establishments have discouraged the multi-functional type of land use.

The micro level study of land use and the functional establishment reveals the characteristics of urban use of Madurai city in the fringe area. This detailed land use study of ward-72 and the findings in the form of maps, diagrams and tables prepared us will be helpful for the urban planner for the better urban land use management. Major functional establishments like commercial and number along the right side of Melakkal road. Development is more along the riverside. Agricultural fields are mainly concentrated on the interior part of the left side of the road. Industrial and educational establishments are developed only along the left side. The overall development along both sides of the road shows that residential functions are more. Among the buildings on both sides, apartments are more in number than the multi-functional.

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