Changing Dynamics of Land Use in Residential Neighbourhood of Vani Vilasa Mohalla¸ Mysore

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Abstract: *Large cities have experienced rapid spatial growth because of higher growth rates of urban population. Land is an important resource for spatial expansion and accommodating various activities within the residential areas of the city. Therefore, there is an increase in land use change in residential areas by the local and planning authorities and they are allowing changes in making streets as commercial streets for socio-economic benefits. Many streets in residential areas have altered into commercial, public and semi public activities and apartments. Thus, the residential areas are affected greatly in terms of increasing density and overloading the existing infrastructure facilities by changing dynamics of land use. With a result of this, the residential areas are transforming into mixed land use. The City of Mysore is a large city and an emerging metropolitan city in the State of Karnataka. Vani Vilasa Mohalla, is a residential neighbourhood it is one among many residential areas which was developed before Independence. The neighbourhood is experiencing rapid land use transformation. The paper presents the changing dynamics of land use for emerging mixed land use in a residential neighbourhood of Vani Vilasa Puram, Mysore and proposes planning strategies for mixed land use.*

Keywords: *Changing Dynamics, Land Use, Diversity, Neighbourhood, Mixed Land Use.*

I. Introduction

In recent years, large cities have experienced rapid growth and majority of these cities are facing uncontrolled developments at the densely populated areas and changing of residential land use into mixed land use. Land use changes are increasingly known as the consequence of actors and factors' interactions (Bakker and van Doorn 2009). These conversions and their consequences are obvious and it has been becoming a disaster around the city areas. The relationships between population increase, economic developments and land use change have generated much of the research interests. In the 1960s and 70s mixed use re-emerged, as a tool for urban revitalization, in large-scale projects referred to among the development community as mixed-use developments. It is presumed that mixed land uses yields socio-economic benefits and therefore has a positive effect on housing and commercial values.

Land use is an important tool for Master Plan and land, which is allotted for residential area and is designed as per zoning and subdivision regulations for satisfying the concept of neighbourhood designs. Over a period of time City Corporations and Urban Development Authorities allow change in making street as Commercial Street due to increase pressure for commercial activities. With a result of this, many streets in the residential areas altered to commercial, public and semi public activity and also apartments and there is increase in land use changes over the years. Thus, the residential areas are affected by the changing dynamics of land use by increasing the density of the area. It looks like a mixed land use driven in the residential area which is violation to zoning regulation. It has also mounted pressure on existing infrastructure like water supply, traffic and transportation, sewerage etc. Very recently, these changes have been recognised by introducing the concept of mixed land use in residential areas in many of Indian Master Plans namely Delhi¸ Mumbai, Bangalore etc. The City of Mysore is experiencing changing dynamics in residential areas which need to be recognized and addressed properly by the Planning Authority in its development control regulations.

II. Background of Mysore

Mysore is the second largest city in the State of Karnataka and it had a population of 887,446 as per 2011 provisional census figures and it increased from 7, 85, 800 in 2001. The name of Mysore was derived from mahisha (a demon). Formerly, the city was the state capital and head quarters of the Princely State of Mysore. It is situated at a distance 140kms from Bangalore, on the southern part of Karnataka State at 12° 18' North latitude and 76° 12' East longitude, and at an altitude of 770 mts above mean sea level. The city lies in a saucer shaped basin flanked by Chamundi hills on the south-east and a raised platform near Hinakal village on the west. The city has a salubrious climate and the temperature varies from 12° C to 35° C. It has an average annual rainfall of about 798mm. The city spreads across an area of 128.42sq.kms. The literacy rate is 82.8 percent.

III. Land Use Of Mysore

The general land use pattern of Mysore city owes its origin to its past. The old city is predominantly the central business district, which scattered around the palace and it is also the heart of the city. The land use for different periods from 1966 to 2009 is given in table 1.

Table 1 Land Use for the Period from 1966 to2009

Land Use	1966		1997		2009	
	Area in Hectares	% age	Area in Hectares	% age	Area in Hectares	% age
Residential	2997.57	40.40	3057.30	42.60	6747.52	47.75
Commercial	211.25	2.41	182.23	3.00	467.04	3.30
Industrial	614.32	13.49	1021.01	8.73	1281.63	9.07
Parks and Open Spaces	625.25	5.49	415.77	8.9	765.36	5.42
Public and Semi-Public	1230.67	11.32	856.45	17.49	1517.34	10.74
Traffic and Transportation	911.77	20.22	1530.73	12.95	3238.01	22.91
Public utility	23.87	0.49	37.26	0.34	-	-
Water sheet	37.23	2.41	182.68	0.53	-	-
Agricultural	384.45	3.77	285.34	5.46	6747.52	47.75
Total	7036.38	100	7568.77	100	14131.97	100

Source: Mysore Urban Development Authority, Mysore

IV. Spatial Growth of Mysore City

The spatial expansion in four different periods is given in the following fig.1
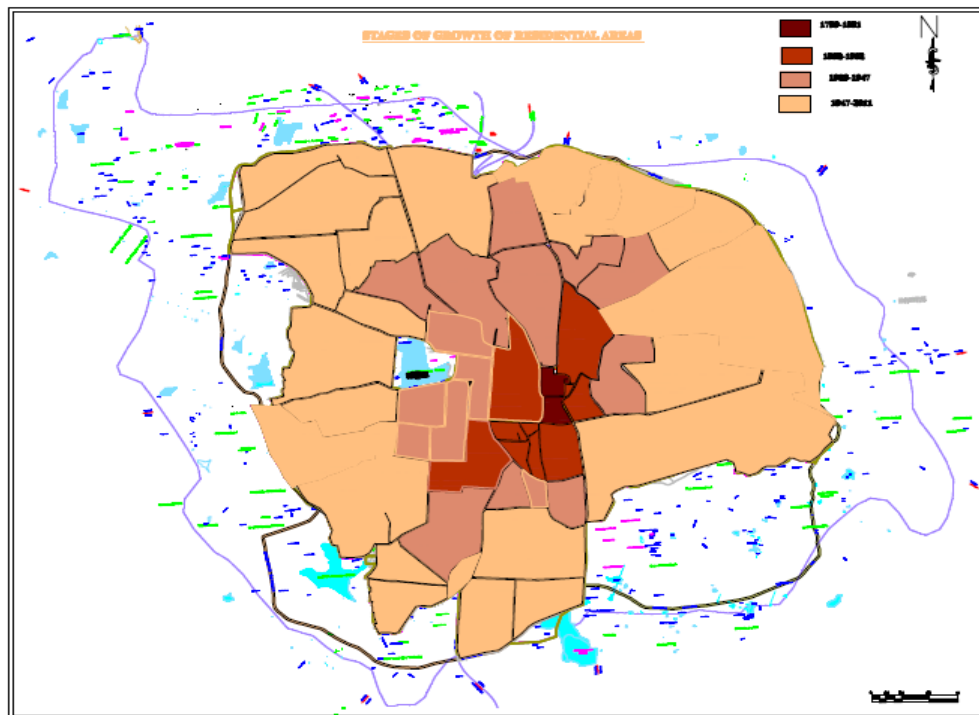

Fig. 1 Residential Growth in Different Periods

The residential areas which were developed in different periods are as as follows:

Growth of Residential Areas	Period
Nazarbad, old and new Agrahara, Santhepet, Sivarampet, Mandi, Lashkasr, Devaraj, Chama raja, Fort, Irangere Mohallas	1799-1890
Lakshmi Puram, ,jalpuri,Ediga,K.R Mohalla, Chamundipuram, Ashokapuram, Agraharas, Chatanahalli, DoddaHolegeri, Bannimantap,	1900-1915
Krishnamurthy puram, Jayanagar, Vanivilas puram, Gokulam and Padavarahalli, Yadavagiri, Narasimhraja Mohalla, Saraswathipuram	1915-1935
Jayalakshipuram, Brindavan extension, Mahadevapura, Kesare, Kuvempunagar, Kurubarahalli, Gayathripuram, Bannimantap	1947 to date

V.   Background of Vani Vilasa Mohalla

Vani Vilasa Mohalla is one of the oldest residential neighbourhoods developed during Maharaja's period before the Independence India. The neighbourhood was developed in the name of Maharani Kempa Nanjammani Vani Vilasa Sannidhana, was the wife of Chamaraja Wodeyar IX. During 19th century, the city continued to grow, congestion and haphazard growth began. By the end of this century, the town had become old fashioned with narrow and crooked lanes, devoid of ventilation, drainage and lung space and having congested blocks of pot tilled and dingy houses.

In the year 1930, the Maharja and Yuvaraja gave some donation to the City Improvement Trust Board to construct houses for poor and middle class families. By 1934, the Board acquired and demolished about 5,000 houses in highly congested areas at a cost of Rs. 3.5 million. As many as 37 neighbourhoods, of which prominent ones are Vanivilas Mohalla, Gokulam, Lakshmipuram, and many more residential neighbourhood layouts, were laid out.   Vani Vilasa Mohalla had 3874 population in 1991 increased to 5116 in 2001 and 6787 in 2011. Number of houses also increased from 1003 in 1997 to 1357 and 2011.

Table 2. Demographic and Housing Details of Vani Vilasa Mohalla

	1991	2001	2011
Population	3874	5116	6787
Male	1930	2550	3380
Female	1944	2566	3407
No of Houses	1003	1137	1357
Road length	21.5	21.5	24.4

Sources: 1.Mysore Urban Development Authority and 2. Mysore City Corporation

VI.   Neighborhood Concept Vanivilasa Mohalla

The neighbourhood was designed for minimum population of 5,000 to 6,000 populations. The focal point was the elementary school which is centrally located on a common or green space, along with other institutions that have service areas coincident with the neighbourhood boundaries. The radius of the neighbourhood was maximum of one quarter mile thus precluding a walk of more than that distance for any elementary school child. Major collector streets and sub-arterial road are located at the edge residential neighbourhoods. Interior street patterns was designed on grid-iron pattern and constructed with light duty surfacing so as to encourage a quiet, safe and low volume traffic movement and preservation of the residential atmosphere and shopping districts was sited at the edge of neighbourhoods preferably at major street intersections.
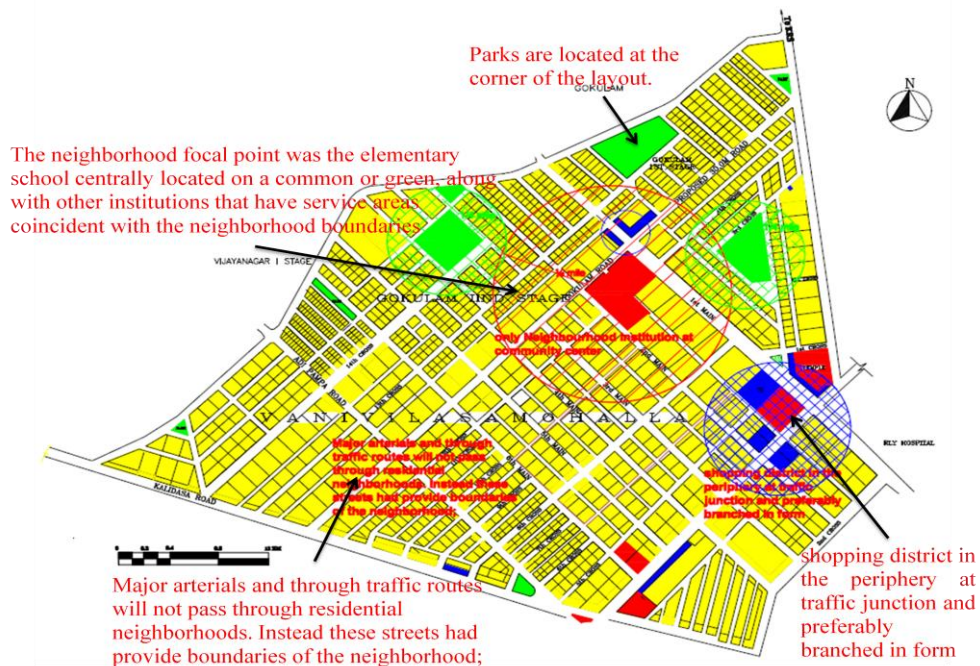

Fig.2 Neighbourhood Concept of VV Mohalla

Residential Neighbourhood layout plan was prepared during 1934 as per the City Improvement Trust Board norms. Terrain conditions were flat with gentle slope towards north east direction and south east is most elevated. The dimension of site areas were 60'x40', 100'x120', 120'x180' and these plots were designed to meet the requirements of high income group people. Now, these bigger plots have great land values for promotion of real estate rates in this neighbourhood. A separate conservancy lane has been provided for disposal of night soil and these spaces are being misused and abused by neighbouring residents in many instances. Parks are provided at the corner of layout many of the waste part of the land is being used for parks. Many institutions, specialized hospital, hotels are being located in this area.

VII.   Land Use Pattern Of Vani Vilasa Mohalla

The residential neighbourhood has an extent of 134 hectares. The prominent uses in this area are residential (55.75 %) followed by traffic and transportation (29.12%), parks and open spaces (5.41%), public and semi-public (5.2%) and commercial (4.2%).

Table 3: Land Use of VV Mohalla in Different Periods

| Use	1960		2009		2012	
	Area in hectares	% of land use	Area in hectares	% of land use	Area in hectares	% of land use
Residential	74.70	55.75	64.7	48.3	63.4	47.3
Commercial	6.05	4.52	11.2	8.33	11.4	8.54
Public and semi public	7.0	5.20	9.55	7.13	10.6	7.94
Park and open space	7.25	5.41	8.32	6.21	8.33	6.20
Traffic and transportation	39.02	29.12	40.2	30.0	40.2	30.0
Total	134	100	134.	100	134.	100

VIII.   Land Use Analysis

The total area covered under residential use is 63.40 hectares. This works out to 47.32**%** of the total built up area. The net residential density of population, works out to be 5711 persons per sq kms as per 2001 census. The residential use has decreased from 64.73 hectares to 63.40 hectares from 2009 to 2012 and from 74.40 to 64.73 from 1960 to 2009 respectively. The area under commercial use is 11.44 hectares. The areas allowed for commercial activities are retail business, whole-sale business, ware-houses, shopping mall, cinema theatres, hotels etc., commercial use has increased from 6.05 hectares to 11.44 hectares from 1960 to 2012. The area under public and semi-public uses accounts for 5.20%. This includes the land utilized for public offices, educational institutions and hospitals. Many educational institutions are located in this area, from primary school to post graduation level. An area of 8.33 hectares is under parks and open spaces use, forming 6.20 per cent of the total developed area which is less than planning standards of 12-15%. The area under traffic and transportation is 40.22 hectares, which accounts for 30 percent of the total built-up area.

IX.   Housing Typologies

By 1934, the City Improvement Trust Board developed about 570 sites and 100 model houses around which the development was encouraged at a cost of Rs. 350,000. The model houses were built with country tiled roof with brick and mud wall during 1931-37. The sites formed in Vani Vilasa Mohalla by the Board and provided at reduced rates of 15 or 7 paise per square meter instead of 30 paise. By 1950, the housing typology changed to Mangalore tiled and 1970 to terraced house.

Table.4 Housing Typology in Vanivilasa Mohalla

year	1934	1950	1970	2011
Country Tiled brick and mud wall	150	184	102	72
Mangalore tiled with brick walls	57	190	248	310
Terraced with brick	----	57	235	851
Vacant sites	413	219	185	47

HOUSING TYPOLOGIES
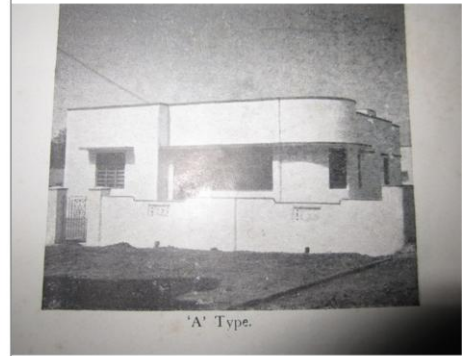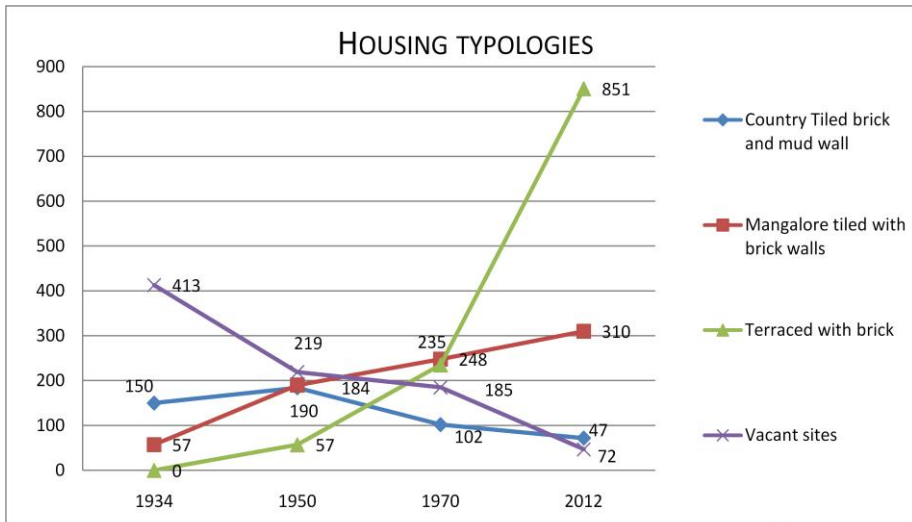
Model house constructed in 1934

Mangalore tiled with brick walls

X. Hirschmann- Herfindahl Model

Hirschmann-Herfindahl model is employed to identify the diversity of change in land use. In this model, it is assumed that households will be living in a mixed urban environment. In this situation employment is an indicator for land use, which suggests that not just the number of jobs, but also the composition of total employment in terms of different economic activities matters for mixed land use. Therefore, it has been defined a diversity index so as to be able to examine the impact of a mixture of employment and housing on property values. Let $_{Hh}$ denote the number of households in a neighbourhood of house h and E_{gh} the number of employees in sector g. The diversity index for house is the inverse of the Hirschmann- Herfindahl index. In other words P_{gh} and P_{Hh} represent respectively employment and household shares of the sum of employment and households. If activities in the neighbourhood of the house under consideration are fully concentrated in one sector, or when only households occupy in this neighbourhood of house, we find and this index increases as activities in this neighbourhood become more diverse.

$$D_h = 1/\left(\sum_{\forall g}\left(P_{gh}^2\right) + P_{Hh}^2\right),$$ where $P_{gh} = E_{gh}/\left(H_h + \sum_{\forall g}\left(E_{gh}\right)\right)$ and $P_{Hh} = H_h/\left(H_h + \sum_{\forall g}\left(E_{gh}\right)\right).$

Data sets of Vani Vilas Mohalla

P_{gh} = 1117/ (6787+$\sum_{\forall g}$ (1117))

    = 1117/ (6787+3351)

P_{gh} =0.110

Type	No of shops	Average no of employees	Total no of employees
Hotels	18	10	180
Retail shops	162	3	486
Super market	2	15	30
Service station	8	5	40
Banks	7	15	105
others	92	3	276
		Total	1117

$$P_{Hh} = H_h / \left(H_h + \sum_{\forall g} (E_{gh}) \right).$$

P_{Hh} = 6787/(6787+ $\sum$¥g(1117))

$=6787/(6787+3351)$

P_{Hh} =0.64

The diversity index for house is the inverse of the Hirschmann Herfindahl index:

$$D_h = 1 / \left(\sum_{\forall g} (P_{gh}^2) + P_{Hh}^2 \right),$$

D_h = $1/(\sum_{¥g}(0.110$)+ 0.640   )

= $1/(\sum_{¥g}(0.012)$+ 0.47)

= $1/(0.0459+0.40)$

$=1/0.435$

D_h = 2.50

If activities in the neighbourhood are fully concentrated in one area, or when only households occupy in the neighbourhood of house h, then the value of D_h=1 and this index increases as activities in this neighbourhood become more diverse. Vani Vilasa Mohalla neighbourhood has the value of DH = 2.50 and this indicates that the activities are diverse in this neighbourhood.

XI. Issues

The major phenomenon of developed residential area is mixed land use pattern and it is difficult to get alter. The commercial activities have intruded into residential areas especially all along major roads. In case of Jaipur, the city was planned to introduce mixed residential and non residential activities. The zonal-development plans identified the various use zones/activities to be permitted in various parts of the proposed mixed land use area. The mixed use in the same building like residential cum commercial or residential cum institutional or residential cum services industry could be permitted as per the Land use Zoning Code. Whereas in case of Bangalore, Mixed land used was proposed in Master Plan and the honourable High Court of Karnataka directed the authorities to disallow fresh construction of non-residential nature in areas classified as residential in the Revised Master plan 2015. Hence, there is a potential scope to address the diverse neighbourhood of mixed land use due to changing dynamics of land uses in residential areas in the Karnataka Town and Country Planning Act through suitably amendments.

XII. Planning Strategies

The mixed use has positive and negative socio-economic and environmental impacts. Therefore, formulation of a balanced policy of mixed use considering its environmental impact and the socio-economic is need of an hour. Non-residential activity on residential premises should be permitted selectively and carefully, taking into consideration community needs, environmental impact and provision for safe and easy traffic circulation and adequate parking. Mixed Use streets to be identified based on traffic/parking studies. For identification of mixed use streets in zonal regulations, mixed use may be permitted on ground floor, in residential plots facing streets/road of minimum 15.0 or 18.0 meters. Only selective commercial/ non-residential activity should be allowed in the residential premises by considering the needs of the residents, environmental concerns, secure and painless traffic movement and ample of parking space. Permissible use of land includes the retail shops, convenience stores and any other specific use or professional activity not considered harmful for the society. The front setback should be used only for parking purpose. The premises to be entered only from the service lane, but, the direct entry from the main road to be avoided. The planned nature of the residential area to be preserved

XIII. Conclusion

The City of Mysore is experiencing changing dynamics in residential areas. Vani Vilasa Mohalla is the one of the oldest residential layout developed during Maharaja's period, before the Independence India. The diversity index for house is

the inverse of the Hirschmann- Herfindahl index and in this neighbourhood D_h =2.50 this indicates activities are diverse in this neighbourhood, Vani Vilasa Mohalla has been developing into mixed land use pattern and is difficult to get alter. A well developed policy would set the tone for harmonised development of existing residential areas in to mixed land area.

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BIOGRAPHIES

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