

# Mixed Land Use in an Urban Context: A Case of Ahmedabad

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**Abstract**—Mixed land use is one of the most common characteristic of urban development and planning. In India and abroad there are many cities have the pattern of mixed land use. Mixed land use require special attention with reference to planning and development of that particular city. Because increased mixed land used can create may kind of difficulties for both the residential and commercial users, if there is a lack of proper urban planning. Hence the present study has been carried out with the aim to understand the mixed land use pattern in Ahmedabad, India, and to identify day to day and long term required planning for its development.

**Keywords**— Ahmedabad, Bapunagar, Mixed land use, Planning, Urban,

## I. INTRODUCTION

Urban development is characterised by two types of mixed land use i.e., mixed land use area of separate building for each land use and mixed use buildings [1]. In the Indian context, mixed land use (MLU) traditionally has been accepted, the old city residential fabric being a testimony of it [2], [3]. Contemporary urban planning, which has promoted zoning concept and segregates zones of residential and commercial activities, is in contrast to the mixed and multiple use of space in traditional settlement [3], [4].

Increased unplanned activities lead to degradation in environmental quality, especially with reference to infrastructure, safe living environment, pollution, traffic congestion, lake of parking spaces, changes in usage and character of open space [5],[6].

Indian cities have a strong tradition of MLU patterns. The workplace in the next room, the shop next door and the community square around the corner have all been a way of life, well-articulated in the morphology of traditional settlements [3],[7]. In the last fifty five decades of India's town planning history, however master plans of nearly small and large towns have adopted a system of zoning in preference to the traditional system of MLU. Yet mixing of non-residential uses, particularly shops persist in nearly all kind of housing areas [2] - [4].

The reasons for happening such things are, (i) quantitative inadequacy of provided shopping; (ii) qualitative inadequacy in terms of inconvenient location of provided shopping; and (iii) the emergence of non-permissible uses (such as shops) in residential areas (due to slack enforcement of regulations) [3], [7], [8]. Regardless of the existence of few inefficient and even dangerous "single-use" districts in Indian cities – such as the educational zone of Ahmedabad or the more recent Bandra-Kurla office complex in Mumbai – India has a very strong benefit with respect to mixed-use zoning when compared with Western European and North American countries. Further, it is not because of the large segment of informal activities that co-exist with formal ones in Indian cities. This co-existence indicates the fruitful association between various different uses, be they formal or informal. Therefore, when deliberating any improvement of present zoning guidelines in India, the requirements and urgencies of the informal economy and its workforce must be addressed. Otherwise, a large share of the population would unnecessarily (continue to) be excluded and economic growth would (continue to) be constrained. Now, the question is no longer whether or not mixed-use zoning is good but how the increasing effect of mixed-use zoning can be reinforced and how the informal economy can be included [9].

Hence, the presented research work was designed with the aim to study the existing development control regulations, recommend policy on MLU and suggest necessary policy guidelines for MLU residential development. During this project, we studied structure of commercial activities in residential premises in terms of their ingress patterns w.r.t. socio-income categories and housing typologies, identified commercial activity types, their characteristics, locational attributes and catchment area and studied the impact of mixed use activities with reference to physical, social and economic factors, adequacy of infrastructure, good living environment, pollution, traffic congestion, parking problems, change in usage and character of open spaces.

## II. RESEARCH METHODOLOGY

The research methodology adopted for the study aimed to find and analyse the structure of commercial activities in residential premises as well as formal commercial centres. This included the study of physical as well as socio-economic attributes, their correlation and interrelationships [3]. To study the structure of formal commercial centres and MLU commercial activities, a detailed land use survey of the selected residential areas was done. This included preparation of maps leading to information on commercial activities, their intensity and their locational attributes existing within each socio-economic residential settings, co-relation between road hierarchies and commercial ingress and preferred locations for various commercial establishments.

The study looked at the socio-economic and behavioural traits of all the stakeholders involved i.e. households, shopkeepers and customers to understand their perceptions, motives and problems [5]. This was accomplished by conducting surveys and interviews.

Ahmedabad is an historical city founded by Sultan Ahmed Shah in 1411 AD on an open plain to the east of river Sabarmati, renowned as a great textile and commercial center and as the 'Manchester of India'. It is today a prosperous, thriving city, the second largest in western India with the second largest textile industry in the country [10]. The borough municipality functioned from 1926 and 1950. Urban areas developing very fast lie beyond the corporation limits. These areas come under the Ahmedabad Urban Development Authority (AUDA) which started its functioning from February 1978 under the provision of Gujarat Town Planning and Urban Development Act of 1976 [11]. The area under AUDA is 1294.66 km<sup>2</sup>, which is covered out from four districts, namely Ahmedabad, Mehsana, Kheda and Gandhinagar. The major functioning of the authority is planning and control of development in the area under its jurisdiction and to provide adequate services in the area. In the past three decades population growth was increasing, but in 80's it started to decline. This is due to the decline of the textile industry, which was backbone of the city economy [12]. Majority of the household belong to lower middle class category. The income distribution is less skewed which shows higher proportion in low middle and upper middle groups. Population below poverty line is 20-25% and has come down over years.

At macro level selection of study areas was based on intensity of commercial ingress and as per socio-economic stratification.

At micro level selection was based on development typologies. Based on the above criteria Bapunagar area was studied in Ahmedabad. Sample size of interviews was one hundred each for the residents/shopkeepers and customers, leading to collective sample of one hundred respondents. Identification of impact of commercial uses in residential areas was done with reference to physical, and socio-economic effects like, impact on infrastructure, safe living environment, pollution, traffic/parking problems, change in usage/character of residential open spaces, impact on property values, variation in property prices among residential and commercial establishments. Among physical effects both tangible and intangible effects were identified. The tangible effects such as effect on built form or development, and effect on activity patterns in public spaces were identified through observations and visual surveys. The intangible effects were those perceived by the residents, such as an intrusion on privacy. These were identified through interviews.

## III. RESULT AND DISCUSSION

Covered over area of 280 hectares, with a population of 93,834, Bapunagar has 20% industrial land use [13]. The Socio-economic profile shows that older settlements have extended and that joint families are still prevalent. They are mainly predominantly mill workers who come under low-income group or middle-income group. The average dwelling unit size is 37.85 m<sup>2</sup>, which characterises low rise and high-density development. The market profile reveals a very irregular growth pattern or conversion from residential to commercial use. The existing commercial area is higher than the proposed or under development along the main road. The Market is a mix of small shops and showrooms. Since, Bapunagar enjoys a very close proximity to the city the value of land is high. An overall study of the traffic reveals major problems of congestion along major commercial roads, due to excess of informal activities and lack of road network.

### *A. Socio-economic profile of the stake holders:*

The economic profile of the stake holders was found through the questionnaire directed towards residents/shopkeepers and customers. The income groups were classified as LIG (low income group), MIG (middle income group) and HIG (high income group) based on income [14] as mentioned below in TABLE I (A). The economic profile of stake holders is mentioned in TABLE I (B).

**TABLE I (A)**  
INCOME GROUPS OF THE SELECTED POPULATION

Income groups	Income per month (Rs.)
Low income group (LIG)	3,301-7,300
Middle income group (MIG)	7,301-14,500
High income group (HIG)	> 14,500

**TABLE I (B)**  
ECONOMIC PROFILE OF THE POPULATION

Income group	1	2	3	4	5	6*	7*	Ownership status *	
								Rented	Self-run
LIG	45	50	60:40	3	60	1	99	1	99
MIG	39	41	45:55	38	31	15	85	30	70
HIG	16	9	30:70	59	9	30	70	33	67

\* All values are mentioned as percentage value (%)

The details mentioned in the table 1 as 1, 2, 3, 4, 5, 6 and 7 are:

1. Residents/ Shopkeepers,
2. Customers,
3. Shopkeepers to Customer ratio,
4. Distribution of shopkeepers within formal commercial areas,
5. Distribution of shopkeepers within mixed commercial areas,
6. Shopkeepers having outlet in formal commercial areas,
7. Shopkeepers having outlet in mixed commercial areas

In the selected area, Ownership status within across formal and MLU was found as total rented property 32% in formal commercial centres while rest 68% are in MLU commercial areas. Within mixed commercial areas against 86% self-run properties only 14% are rented, while in case of formal commercial units self-run properties are 80% and rented are 20%.

The commercial activities within each income groups showed that shops, offices and other commercial activities are distributed evenly amongst all income group area except offices, which were slightly higher in HIG are.

#### B. Distribution of commercial activities within various floors

Percentage distribution of commercial activities within various floors is mentioned in table 2. In addition to that, the floor space under different commercial categories was also assessed. It was found that on an average shops were found to have a floor space of 25-28 m<sup>2</sup>. Offices have a floor space of 20-25 m<sup>2</sup> and other categories of commercial developments have an average floor space of 30-35 m<sup>2</sup>. Further it was found that with increase in average commercial floor space per unit, the catchment area of commercial development also increases [TABLE II]. However it should not be taken as a standard pattern because catchment area is dependent on other parameters also [15].

#### C. Relation between commercial floor space and road hierarchies

Relation between commercial floor space and road hierarchy has been mentioned in TABLE III. It was found that higher is the hierarchy, higher is the per unit commercial floor space of adjoining establishment. The overall average commercial floor space per employee was found to be 13.45 m<sup>2</sup>.

Most of the respondents have paid to government officials for changing the land-use. Although 36% respondents said to have paid conversion charges, they were unwilling to disclose the amount, while 64% residents have not paid any conversion charges at all. Most of the respondents who said to have paid conversion charges belonged to higher income group category having commercial outlets in fully converted commercial centres.

**TABLE II**  
PERCENTAGE DISTRIBUTION OF COMMERCIAL ACTIVITIES WITHIN VARIOUS FLOORS

	Floor wise usage					Floor wise Activity				
	-1	0	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	-1	0	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>
<b>Shop</b>	22	60	7	8	3	6	85	8	1	0
<b>Office</b>	3	10	13	20	61	0	26	50	22	2
<b>Other</b>	74	5	10	0	0	78	18	4	0	0
<b>Residential</b>	1	25	70	72	36	0	25	55	17	3

**TABLE III**  
**RELATION BETWEEN COMMERCIAL FLOOR SPACE AND ROAD HIERARCHIES**

Road Hierarchy	6-9 m	10-15 m	16-24 m	25-30 m
Average commercial floor space per establishment (m <sup>2</sup> )	9	33	32	48
Customers/unit floor space	2.3	2.0	1.4	1.7
Employees/ unit floor space	0.02	0.08	0.04	0.10
Average commercial floor space per employee (m <sup>2</sup> )	8.3	17.0	18.2	10.3
No. of customers/day per employee	21	20	17	13

#### D. Travelling pattern of stockholders

Travelling pattern of employees and customers has been mentioned in TABLE IV. Further it was found that majority of the customers (48.5%) come from within 500 m distance. 3.5 % from 500 to 1 km, 9% from 1 km to 2 km, and the rest (39%) from ranges of 2 to 10 km.

**TABLE IV**  
**TRAVELLING PATTERN OF EMPLOYEES AND CUSTOMERS**

Mode of commuting	% Employees	% Customers	Average distance travelled (km)	
			Employee	Customer
Paddle	30	58.1	1.2	0.6
Bicycle	19	18.9	3.6	3.2
Two wheelers	18	1.0	5.5	2.6
Four wheelers	2	6.5	4.0	5.0
Bus	31	15.5	6.5	6.0

#### E. Contributory factors promoting residents to convert land use (residential space into commercial use)

The underlying fact behind putting residence into commercial use is economic benefit along with convenience. It is felt that rather than economic compulsions, mixed land-use is an outcome of economic opportunities that residents foresee by putting residential space to commercial use. Residents who self-run the commercial establishments especially offices see MLU as a source of additional income to the family when females and elderly people establish commercial outlet in the residence. (TABLE V)

#### F. Reasons for selecting residential premises for commercial use by shopkeepers

As in case of residents, the reason for selecting residential premises for commercial use by shopkeepers is predominantly the economic benefit it offers. Along with other factors such as nearness to residence, economic compulsion due to high cost of space in formal commercial centres, etc., (TABLE VI)

**TABLE V**  
**CONTRIBUTORY FACTORS PROMOTING RESIDENTS TO CONVERT LAND USE**

Reasons/Contributor factors	Weightage
Economic opportunity due to locational advantage of main road, proximity to established shopping centres and public gathering places like cinema halls etc.,	40%
Convenience in business, low operating cost, source of additional income	31%
Economic compulsion due to high cost of space in formal commercial centres	20%
Other reasons	9%
Total	100%

**TABLE VI**  
**REASONS FOR SELECTION OF RESIDENTIAL PREMISES FOR COMMERCIAL USE**

Reasons/Contributor factors	Weightage
Economic opportunity due to locational advantage of main road, proximity to established shopping centres, and public gathering places like cinema hall, etc.,	56%
Nearness to residence	20%
Economic compulsion due to high cost of space in formal commercial centres	19%
Better physical environment than other congested/crowded commercial areas	5%
Total	100%

#### G. Customers' purpose of visit

Visit to the shopping centres is not meant for shopping or business activity only. It is sometime combined with leisure or just window-shopping. And in some cases it is also true that residents regularly visit the shopping streets only for stroll (TABLE VII). Out total customers 19% visit every day. 21% visit once a week. 30% twice a week and an equal percentage i.e., 30% come occasionally but not regularly.

**TABLE VII**  
**CUSTOMERS' INCOME GROUP AND THEIR PURPOSE OF VISIT**

Income group	Purpose of visit (as %)				Total (%)
	Shopping or business	Shopping and stroll	Stroll	Other	
LIG	16	55	29	-	100
MIG	72	18	8	2	100
HIG	98	-	2	-	100

#### H. Utilisation pattern of various shopping centres

To study utilization pattern of regular markets MLU areas, respondents were asked their preferences for their daily, weekly, monthly and yearly needs. Findings revealed that for daily and monthly needs people prefer MLU areas. But for monthly and yearly needs regular shopping markets carry more weightage.

#### I. Negative aspects of formal shopping centre and MLU commercial area

Findings suggests that customers have feeling of congested inconvenience to shop in MLU area, however they found locational disadvantage for formal commercial centre.

Although the presence and phenomenon of commercial ingress in residential premises is akin to most of the Indian cities. The present study indicates MLU is more pronounced in Ahmedabad because of socio-economic character of the majority of population, stress to maintain economic balance due to high cost of property, living and very high variation in the value of residential an commercial properties. MLU is the best pattern to cater the need of LIG and MIG group of people [16]. A major feature of the lower income group households of the urban centres in India is the home based work, the so called "informal sector" manufacturing and services. i.e. laundry, small repair shops for stove, cycle, furniture, electrical appliances, etc., Hence in the case of design of dwelling for lower income group, the home based work merits serious consideration in determining the size of a dwelling. Most often though, the additional area requirements are not in terms of a built up space, but in terms of semi-covered spaces or small open land under a shady tree. In MLU area commercial activity should be allowed on any floor. It should not be mandatory that establishment shall be run by the resident only. It is necessary that boundary walls and front margins do not hinder the shop frontage and the pedestrian paths. A continuous flow of public space is very essential [17].

#### IV. CONCLUSION

As the study findings suggest MLU phenomenon is related with many parameters and phenomena-taking place simultaneously. It is necessary that the pattern of MLU activities be identified from city level down to a single dwelling unit. Based on the identified criteria and time limitations the scope of the study was limited to residential development namely, Bapunagar T.P. Scheme. Although the study clearly identifies the important issues in the context of commercial and residential mixed land-use in Ahmedabad, a sample survey of three hundred respondents is still small in relation to large population of Ahmedabad. It is suggested that rather than uniformly applying the study findings to all the zones, a further detailed study of each zone should be carried out, and zone specific guidelines should be formulated for commercial development in Ahmedabad.

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