

Spatial Pattern of High Rise Buildings (HRBs) in Urban Areas with Special Reference to Jaipur City



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Abstract

The paper deals with the spatial pattern of high-rise buildings (HRBs) in the Jaipur city examined at the ward level using empirical data gathered through a field survey. The vertical growth of cities in the 21st century is imperative in consequent upon the urban inertia but supposedly to solve housing problem as well as overcome in response to the scarcity of space in fast growing urban areas. The study concludes that intensive high-rise buildings are expected to develop extensively in the future, particularly in the core and inner-ring areas. We examine and summarise the evidence on how government policies, institutions, and public investments have influenced the spatial allocation of apartmentalization within the municipal boundary and how these factors affect welfare, growth, and development i.e. a research agenda for the future. The results support empirical evidence of the spatial dispersal of high-rise buildings, indicating an initial process of gentrification in the Jaipur metropolitan. Research questions concerning the cyclic model of metropolitan region development has been well tested by employing geo spatial technology.

Keywords: High Rise Buildings (HRBs), Geo Spatial Technology, Gentrification, Ward, Apartmentalization.

Introduction

The development of High-rise buildings follows closely the growth of the city. They are a natural response to dense population concentrations, scarcity of land, and high land costs. Unfortunately the land available to keep pace with man's needs in strictly limited and sometimes prohibitively expensive. Many urban areas in India have already reached the limits of horizontal growth and as a result the only alternative left is vertical development. The age and deterioration of structures produce lack of financial profitability. Generally in the central areas of the city the demand is growing and people who can afford high rentals and construction costs try to locate their business and residences in these areas. Residential deterioration does not affect commercial development seriously in these areas but as the result of high demand the commercial redevelopment inculcates the residential development and because of the space problem vertical development takes place slowly.

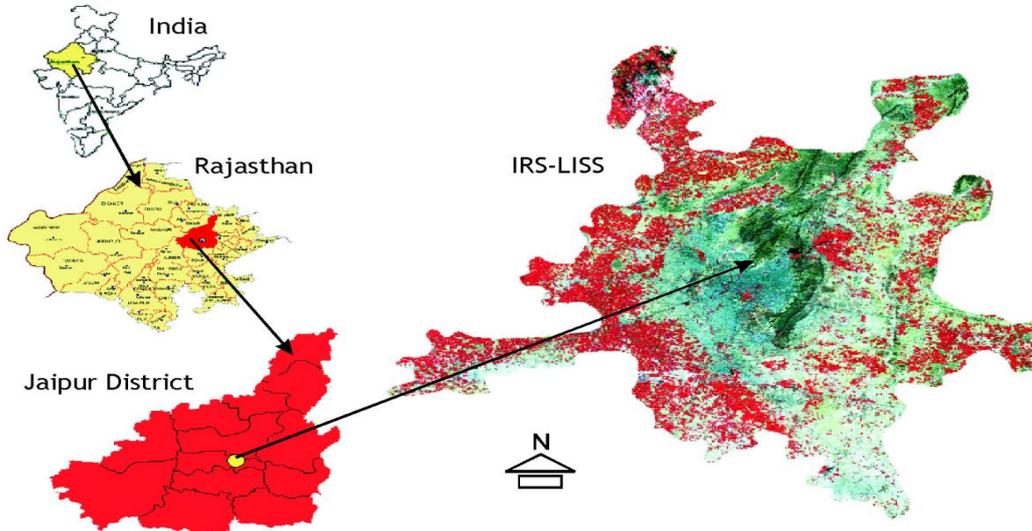
Redevelopment was first attempted in the U.K. and U.S.A. In the form of a federal programme the redevelopment of urban areas as a planning requirement, enacted by the U.S.A. government in Housing Act in the late 1940s. The concepts of urban redevelopment are of a recent origin and in India it is still in the infant stage. The term involves in rejuvenating the urban areas where such areas are in the process of degeneration or decline due to a variety of factors. Rebuilding of the inner parts is essential as the deterioration and decay has set in with obsolescence of the cities.

The concept of urban renewal and redevelopment in India can be traced to the year 1965 when the committee on urban land policy of the Ministry of Health, Government of India mooted urban renewal to tackle the programme of congestions and overcrowded areas. It considered three alternatives, viz., (i) wholesale demolitions and through redevelopment, (ii) selective urban renewal, and (iii) gradual improvement. The process of wholesale demolition and thorough redevelopment was rejected outright and the gradual improvement is approved considering the financial and social implications. The committee also envisaged the role of the local bodies in evolving a systematic policy of long term redevelopment schemes. The recommendations of the committee had been followed by

David R. Godschalk and David C. Rouse (2015) offers planners a detailed guide to creating **Study Area**

comprehensive sustainable plans.

Fig.2: Location Map of Study Area



Source: IRS-LISS-4

Jaipur is situated amidst the Aravali hill ranges at an altitude of about 430 metres above mean sea level and lies on latitude 26°55' north and longitude 75°50'. Koeppen climate classification BSh. The greenery around the city belies the fact that this is the capital of Rajasthan – a desert state. The hill ranges girdle the city from three sides, thus leaving only the southern region for further expansion.

Jaipur is directly linked with several large towns inside and outside Rajasthan by road, rail and air. It is an important railway junction on the Delhi-Ahmedabad railway line. Besides, National Highways Eight and Eleven run through the city of Jaipur, while Highway One links Jaipur with Kota- the industrial city of Rajasthan.

The climate of the city is dry and the temperature fluctuates between 25 °C to 41 °C in summer and between 6.5 °C to 25 °C in winter. The average annual rainfall is 62 cm. While the average humidity in July is 80%. This approximately 240 years old city has been known for its splendid architecture, christened as Pink City.

Objective of the Study

To analyze the spatial distribution and growth of High Rise Buildings within jaipur municipal region between 2011-12 to 2016-17.

Data and Methodology

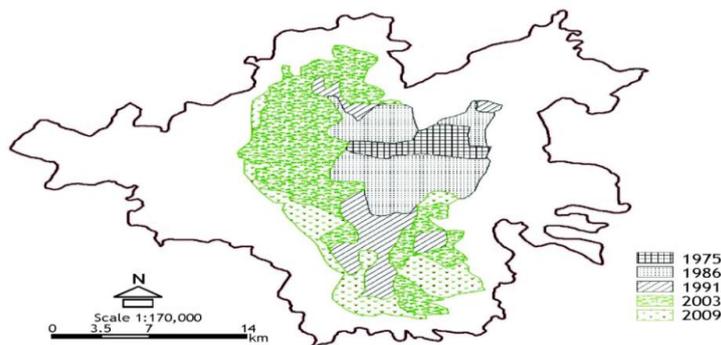
Both secondary and primary data has been used. Classified decadal record of the ward wise residential and commercial buildings constructed between 2012-13to 2016-17 from Jaipur Municipal Corporation and Jaipur Development Authority

Initially Google Earth application followed by LISS-4 /PAN -temporal and multi-resolution satellite data for the interpretation of images pertaining to 2012-13 and 2016-17. Segmental changes were observed with Arc GIS 10.2 and Erdas Imagine 2011 to generate ward boundary and the superimposition of classified buildings there upon.

Results and Discussion

The spatio-temporal expansion of Jaipur city region is depicted in Fig: 3. Initially during 1960s the entire municipal area of Jaipur city covers about 27 sq. miles while the area of the walled city remains 3 sq. miles only. In 2016-17 the municipal area has expanded 200 times.

Fig. 3: Urban Growth 1975-2009



In 1961 Census, Jaipur was physically divided into ten wards, out of which the first eight were within the walled city and the remaining two covered the area outside the walled city. These outlying wards, when compared with the rest, are larger in size and

population. In the 1971 the number of wards increased from ten to thirty-eight. Ward-wise population in Jaipur city during 1961 and 1971 is given in the Table 1.

Table 1: Wardwise Distribution of Population in Jaipur City in 1961 and 1971

Sl. No.	Name of Ward	1961		1971	
		Population	Percentage of the Total Population	Population	Percentage of the Total Population
1.	Purani Basti	53,077	13.2	72,991	12.0
2.	Topkhana Desh	47,293	11.7	59,302	9.7
3.	Visheswarjee	22,812	5.7	27,589	4.2
4.	Modikhana	20,346	5.0	23,375	3.8
5.	Ramchanderji	38,436	9.5	49,424	8.1
6.	Gangapole	20,829	5.2	33,294	5.5
7.	Ghat Gate	43,952	10.9	52,802	8.7
8.	Topkhana Hazuri	27,348	6.8	36,755	6.0
9.	Jawali Shahhar Janubi	48,146	11.9	105,144	17.2
10	Hawali Shahhar Garbi	81,205	20.1	151,696	24.8
	Total	403,444	100.00	610,572	100.0

Source: Compiled on the basis of Census data, 1961 and 1971.

Thus, the population of the eight walled city wards increased from 2, 74,093 in 1961 to 3,53,732 in 1971, recording 29.2 per cent increase over the decade under review. On the other hand, the population in the two outlying wards, Hawali Shahar Janubi and Hawali Shahhar Garbi which was 1, 29,351 in 1961 shot up to 2,56,840 in 1971, thus registering a notable 99.2 per cent increase. The new localities of Jaipur, developed outside the walled city inhabited 32 per cent of city's population in 1961, while in 1971, the figure had gone up to 42 per cent.

Table 2: The Yearly Addition of the new colonies

S.no	Year	Name of colonies
1	1930	Adarsh Nagar, Ashok Nagar, Bani Park, New Colony, Civil Lines
2	1948	Bapu Nagar, Gandhi Nagar
3	1950	Tilak Nagar
4	1970	Jawahar Nagar, Nahar ka Naka

Source: Jaipur, profile of a changing city pp 3-4

Table 2 depicts the further addition of urban habitation in consequent upon the increase in number

of wards further. The subsequent expansion of residential and commercial areas leads to the number of legislative wards to be 77 to 91 in 2011 to 2018 respectively. It is interesting to note that the region out of the walled city that developed during pre and post independence still reveals the fidelity of vertical growth. These new colonies because of their spaciousness, have, a special attraction for the middle income and higher income groups of population.

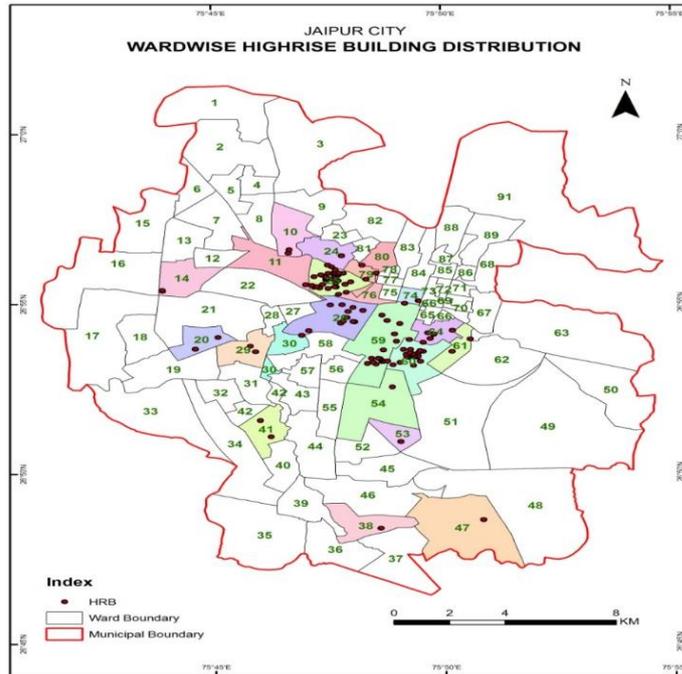
The ward wise segregation and growth of High Rise Buildings (≥15m) is presented in Fig. 4 and Fig. 5 for the time span of 2011-2017 and astonishingly wards no. 25,26,59,60 comes out to be Bani Park, Civil Lines, Bapu Nagar and Tilak Nagar respectively (Graph 2). Moreover, the real estate boom got manifested in Graph 1 showing the maximum construction in the year 2013 followed by 2012. The reasons for deaccelerated growth after 2014 may be ascribed to the change in real estate policies viz, demonetization, Real Estate Regulation and Development Act 2016 (RERA) etc.

Fig. 4: Yearly Distribution of HRBs



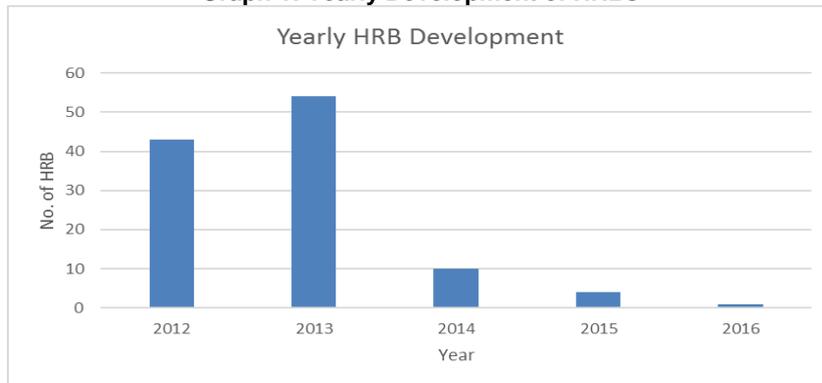
Source: self compilation by the authors

Fig. 5: Wardwise Distribution of HRBs



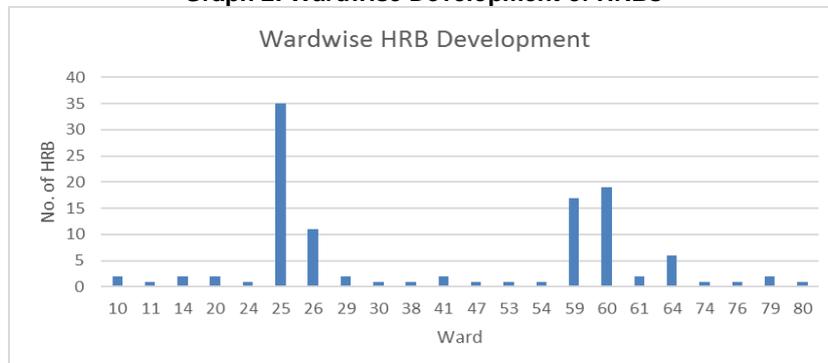
Source: self compilation by the authors

Graph 1: Yearly Development of HRBs



Source : Jaipur Municipal Corporation 2018

Graph 2: Wardwise Development of HRBs



Source: Jaipur Municipal Corporation 2018

Spatio-Temporal Growth and Expansion of Jaipur City

Residential area has higher rate of expansion after 1975, the major expansion is observed in the western, southern and south-eastern

parts and along the national highways 8, 11 and 12. Towards the south it has expanded about 20 km from Ajmeri Gate covering Sanganer town and even along the Tonk road. Towards western direction it has almost reached to Bagru town, which is about 35 km

away from the city. The city has expanded towards southern and western directions engulfing productive cropped area, fallow land, and degraded forest land. The urban area has covered the surrounding towns, which are developing as the satellite towns like Sanganer, Bagru, Chomu, Achrol, Kanota, etc. Jaipur city is putting heavy pressure on the ecologically sensitive areas by way of deforestation and mining in Nahargarh and Jhalana reserve forest areas.

Conclusions and Suggestions

A few proposals relevant for policy making have been suggested to maintain the urban environmental balance. Renowned developers or organized real estate builders should be given priority for high rise projects concerned authority should be strict regarding the implementation of rules and regulations for tall buildings construction act. No compromise should be made due to political or monetary influence. Carrying capacity of the land should be examined meticulously in terms of the infrastructural facilities and municipal civic services before construction of any multi-storied tall residential apartment on a plot of land. Greenery norms, fire safety, structural accuracy, environmental aspects could be given priority during the high rise construction. Above all the viability of the multi-storied construction activity should be studied taken in consideration all the environmental, social and economic factors together with the carrying capacity of the land.

A few norms should be followed carefully by the builders, for example, road alignments and building lines, height of the building in relation to the width of the road on all sides, structural safety and scrutiny of the building plan, minimum open space at ground in relation to the height of the building, parking provision, earthquake resistance, fire services within the building premises etc. In this respect, the developers can introduce a few measures within the

tall building sectors to maintain the quality and serve the dwellers at optimum level. For example, the multi-storied residential buildings can be served by their own water treatment plant, sewerage treatment plant (STP plant) for hygienic disposal of sewerage, gas bank, own power station, provision for re-cycling of waste water, rain water harvesting, development of solar power panel, landscape gardening, imaginative layouts etc. It will not only reduce the pressure on the municipal civic services but also can serve the building dwellers at their satisfactory level and above all can maintain urban environmental quality

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