

Distribution of High-Rise Building and Its Relationship with Increase in Population of Burdwan Municipality, West Bengal

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ABSTRACT: High-Rise Buildings are one of the major aspects of modern urban society. In the modern urban land use where there is a continuous pressure of population and human activities, the demand for vertical expansion or multiple utilization of land has become necessary. High-Rise Buildings can fully utilize the potentiality of land. On one hand, they are very useful in terms of multiple uses of land and on the other hand it plays a significant role in the changing facets of urban people. In the wave of globalization at present, these modern aspects are coming into small cities and playing a significant role in the daily life of the urban dwellers. The specific objectives of the study are to examine the distribution of High-Rise Buildings in the study area, the impact of High-Rise Buildings over the town and various problems related to the development of High-Rise Buildings and their future trends of development. This paper tries to illustrate the significant rise in the number of High-Rise Building ward wise in order to cope up with the high rising population and shows the demand for flat culture has led to urbanization within the area. It reviews the past and current High-Rise Building scenario in Burdwan Municipality. The methodology adopted for the study includes interviews of the related officers in the Burdwan Municipality and analyses of data collected during the field investigations. The correlation between increase in High-Rise Building and increase of population within the wards of Burdwan Municipality has been calculated by the use of IBM SPSS 20 version Software. This work is mainly based on personal observation and analysis of the secondary database.

KEYWORDS: High-Rise Building, Urbanization, Globalization, Peripheral Area, Vertical Expansion, Housing Complex, Migration.

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I. INTRODUCTION

Society is facing a rapid change through time with the advent of modern technology and innovation. The land is being utilized at a rapid rate and is becoming scarce. "One's assessment of a place will depend on how it is perceived, the attributes of the place, and the standard of comparison against which it is judged which may be personal needs, expectations, aspirations, etc."^[1] Joint families are breaking down into nucleated families with the change of social structure and relationships. In many of the developed countries where land is scarce, vertical risen buildings are a solution to the problem of excess population. According to Elsinga and Hockstra (2005), the higher quality a dwelling is, the higher the resident's satisfaction is towards it^[2]. The tall building in Japan provides the best solution for land scarcity. In Egypt tall buildings is used as a tool for high-density development as the entire population has chosen to live in 4% available terrain. Thus tall buildings in today's world have become a popular event occurring in each and every developed and developing the nation. "From developed to developing countries, we should admit that high rise building is a phenomenon encroaching all over the world"^[3]. A 'High-Rise Building' or 'blocks of flat' refers to a tall structure or building used for the purpose of living and even for official use. "Very often, High-Rise Buildings are proposed as a means of achieving high urban density"^[4]. There we will highlight on the residential purposes. Oxford English directory defines a High-Rise Building as a 'building having many stores'. Massachusetts united states general law says 70 feet as higher as High-Rise Building. Any building with a height of 30 meters is regarded as a high rise by Mumbai Municipal Corporation. A High-Rise Building, apartment tower, office tower, apartment block, or block of flats, is a tall building or structure used as a residential and or office use. In some areas they may be referred to as "Multi-Dwelling Unit" or "Vertical cities"^[3].

India has been observing a high rise in population over the years as a result demographic changes are also taking place at a rapid scale. High-Rise and non-high rise dwellers have differed significantly with regard to the majority of the general information characteristics like education, occupation, monthly family income, number of living rooms, per capita living space.^[5]

Migration of people in search of job opportunities from rural to urban areas is occurring at a rapid rate. People are moving not only for jobs but also for education, trade, commerce etc. thus resulting in expansion of cities or urban sprawl. The cities are expanding due to the increase in the huge amount of population and in order to provide space to the inflow of population High-Rise Buildings are growing at a rapid rate to accommodate the increasing population. Under current urbanization trends, it would appear that high-rise housing is an inevitable consideration in many cities search for answers to the quest of providing enough living spaces for the growing urban population.^[6]

Even the nucleated families that come detached from their rural joint families to urban areas in search of a job or better education doubt opt for building a new house rather they want to live in these High-Rise Buildings which in future they might sell to others or continue leaving. If the minimal definition of a high-rise is a building taller than three storeys, then the history of high-rises may be traced back to the pyramids of Egypt (about 48 storeys in height) and the Tower of Babel.^[7]

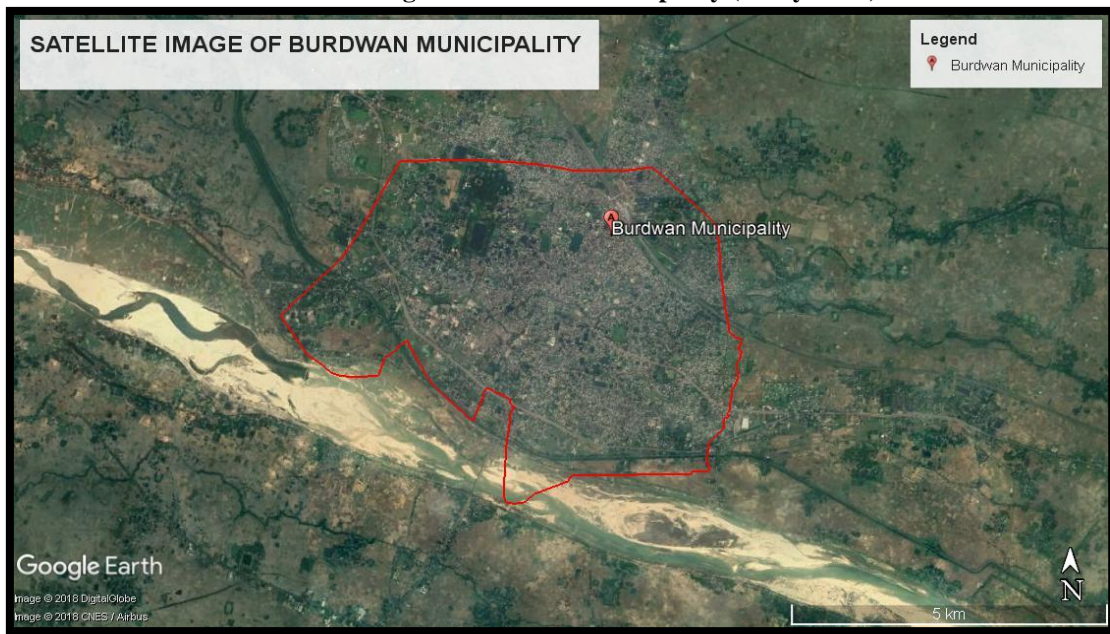
In India buildings greater than 75 feet (28 meter) which is generally 7 to 10 stories is considered as high rise. Building code of India defines a tall buildings are the one with four floors as more and 15 meters or over in height. Huge concentration of a High-Rise Building with increase construction is seen in Mumbai and Delhi. About 1500 constructed High-Rise Building are already seen in Delhi. Ilesanmi (2010) has remarked that since the process of urbanization also involves the improvement of urban quality including renewing the city, optimizing urban spatial organization and improving urban functions, achieving sustainability in housing provision therefore requires consideration of socio-cultural diversity in the structuring of institutions and management approaches towards low-income housing provision.^[8]

Rapid urban development has brought dynamic changes to large and medium-size cities in the developing countries.^[9] Burdwan Municipality located in Purba Bardhaman District, West Bengal; has a population of 314265 as per census report 2011. The city has 35 wards in which elections are held every year. In Burdwan modern urban land use has resulted in a lack of space within the city and an increase in population. As such continuous pressure of population and activities has led to the demand in a vertical expansion of the city. In the name of globalization multiple use of land has led to development of modern aspects into the small cities thus playing significant role in the daily life of the urban dwellers. "There is a relationship between income strata of buyers and their area of residence. In addition to this, in the consumer end, age has a relationship with family size."^[10] Thus at present a recent scenario of increasing development and livelihood within the High-Rise Building has increased within this area from past to present. This enquiry is an attempt to highlight the positive and negative impact of such High-Rise Building within the study area as well its future trends of development.

II. THE STUDY AREA

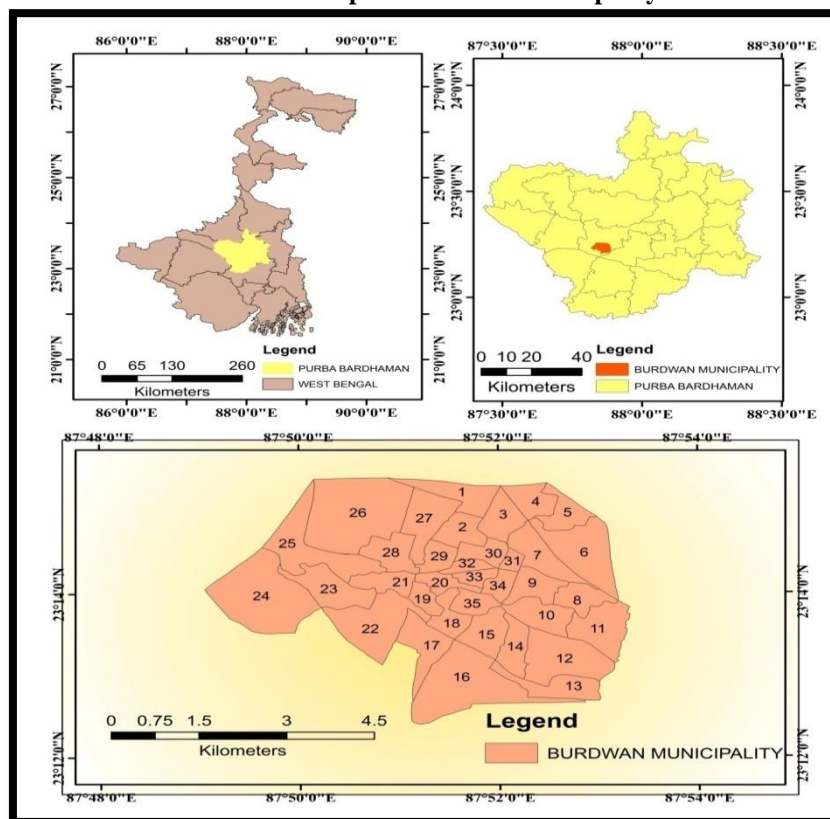
Burdwan is one of the major towns of West Bengal and is very important in terms of population concentration as well as modern liberalization. The study area includes parts of Purba Bardhaman District that is Burdwan Municipality area located at 23° 12' N to 23° 15' N latitude and 87° 49' E to 87° 53' E longitude. According to 2011 census, Purba Bardhaman District has an area of 5432.69 Sq. Km. and a total population of 4835532. The Burdwan Municipality has a population of 314265 of which 159936 are males while 154329 are females as per the report released by the census of India 2011. The municipality is divided into 35 wards. The area is dominated by a large number of housing complexes, building structures, flats, homes etc. thus providing shelter to its residents. Burdwan town is located in the midst of a rich alluvial plain as the left bank of river Damodar and is the administrative headquarter of Purba Bardhaman District. It is surrounded by the rural mouzas like Bongpur, Kanchannagore, and Tejganj etc. in the east, west, and north and by river Damodar on the south.

Satellite image of Burdwan Municipality (Study Area)



Source: Prepared by the authors on Google Earth

Location map of Burdwan Municipality



Source: Prepared by the authors

III. REVIEW OF LITERATURE

At present, Indian cities are witnessing immense demographic expansion due to migration from surrounding villages, which leads to urban sprawl, housing demand, the rise in the cost of land in the main town. Many citizens all over India migrate to the cities for better jobs and education and Burdwan town is not an exception; Industries, trade and commerce activities and many educational centres in Burdwan town attract floating

population from all its surrounding villages and districts. This has expanded the city in all directions particularly in the north and south-east direction. With this urban sprawl, the town recently faces the problems of congestion, pollution, every day commuting to the workplace, competition, deforestation etc. Although there is no precise definition that is universally accepted, there are various bodies have tried to define what 'High-Rise' means:

- In India, a building greater than 75ft (23 m), generally 7 to 10 stories, is considered a High-Rise Building.
- The New Shorter Oxford English Dictionary defines a High-Rise as "a building having many stories".
- Massachusetts, United States General Laws define a High-Rise as being higher than 70 feet (21 m).
- The Mumbai Municipal Corporation (BMC) proposed that any building with a height of 30m (nine floors) be categorized as a high rise.

Awotona and Ogunshakin (1994) depict that "Globally and traditionally, the house was always evolved both economic and socio-cultural consideration."^[11] Thus, every civilization produces its own house form which is highly reflective of the historically prevalent cultural values and objectively conditioned by the structural system of social organization. Amad (2003) said that "The other important factors relating to ethnic groups are that people from different ethnic backgrounds live together peacefully and harmoniously in public estates. Living together brings a greater opportunity for inter-ethnic contacts and living together in the same residential area harmoniously".^[12] Olusola Oladapo Makinde (2014) in his research paper "Influences of socio-cultural experiences on residents' satisfaction in Ikorodu low-cost housing estate, Lagos state"^[13] ascertains about the relation of socio-cultural factors of residents with their housing in such a manner that "It is quintessential that the socio-cultural factors that could influence residents' satisfaction are worthy of study at this particular point in time. Hence, this study is intended to assess the effects of socio-cultural background on residents' satisfaction. In doing so, it has examined the socio-cultural characteristics of the residents; their level of satisfaction with various housing elements based on quality performance criteria and the elements includes physical, environmental, economic, behavioural, functional and timing elements and the relationship between the residents' socio-cultural characteristics and their dwelling. Rojek et al. 1975; Galster 1987; Marans and Rodgers (1975) in their work show that "People make decisions based on subjective assessment of a place".^[13] Rupali Kavilkar and Shweta Patil (2014) in their research paper "Study of High Rise Residential Buildings in Indian Cities (A Case Study – Pune City)"^[14] shows that type of Indian high-rise structure, materials used in the construction of High-Rise Buildings and various problems related to it. They have shown that the High-Rise Buildings have the potential to decongest the urban sprawl on the ground and increase the urban density, housing a higher number of families in lesser space. Benefits include they act as landmarks; create unique skyline and efficient land use. They conclude their research as high rise residential structures are not popular due to user perception that they are expensive and the associated fear of safety during the fire. Thaman (2002) in his study addresses that "Culture is a comprehensive notion, and its meaning should be drawn from the collected studies which cover three major areas which influence residents' satisfaction and socio-cultural experiences of people in housing".^[15]

IV. STATEMENT OF PROBLEM

High-Rise Buildings are arbitrarily located over the Burdwan municipal area. As there is no hard and fast rule of local governing bodies hence all the High-Rise Buildings are located haphazardly in the town causing several problems. With the development of modern High-Rise Building culture and shopping malls, the traditional mentality of the people living in the town has changed. Also, urban people who are very much aware of modern culture are bound to adopt and accept these modern changes which lead to nuclear family system, changing interaction pattern, changing shopping as well as dressing pattern etc. and ultimately changes the traditional way of living of people to modern cosmopolitan culture. This High-Rise Building separates people from the outdoors, the city and from other people. "What high-rise does is separate large numbers of people from the street, so we end up with a city that is detached from street life, we end up with a city that is based on enclaves and gated communities," says urban planning expert Michael Buxton.

V. AIMS AND OBJECTIVES OF THE STUDY

The present study is aimed at the following objectives:

- To understand the growth, distribution and development of High-Rise Buildings in the study area.
- To examine the correlation between growth of High-Rise Building with the increase in population of the town.
- To find out the reasons behind the increase in number of High-Rise Building.

VI. HYPOTHESIS

The study considers a well hypothesis which regards

H₀: There is no significant difference between increase in population and demand for High-Rise Building in the year 2011.

H₁: There is significant difference between increase in population and demand for High-Rise Building in the year 2011.

VII. METHODOLOGY AND DATABASE

This paper is mainly based on secondary data and field observation. After field investigation and observation the area of Burdwan Municipality has been selected for the study. Various demographic data are collected from census then compiled, computed and presented through different statistical tools by using IBM SPSS 20 version software and MS Excel 2007. Different Maps are prepared by the ARC GIS 10.5 version software to show the concentration of High-Rise Building, location map and road map of Burdwan Municipality. Google maps related to study has been downloaded from Google Earth Pro 7.3.0.3832 version software. With the help of secondary data collected from yearly building plan sanction registration office of Burdwan Municipality, different types of maps, charts, and diagrams were prepared. The data about population growth rate and the number of High-Rise Building over the years has been collected from the Burdwan Municipality. Data regarding decadal growth of urban centre and total urban population in the town has been taken from the census of India.

VIII. FINDINGS AND ANALYSIS

High-Rise Buildings play a significant role in determining the modernity of an area. Hence it can be said that modern trends like flat culture changes the socio-economic structure of the population. It has led to urbanization within the area with the increase in the number of flats. It has also shown evidence of inflow of migrants within the city in search of better occupation and livelihood. We see that after 1971 decadal growth of urban centres in Burdwan town had been grown significantly. The population had been rapidly grown from 1951 and as a result, the residential buildings, complexes, and structure of the town are getting complex day by day. The year wise increase in the number of High-Rise Building is shown in the table which depicts a high rising trend from 2005 to 2013. As such we can say with the passing of each year the demand for flats have increased every year and the future prospect of more increase in the number of flats can be clearly witnessed from the data.

Table 1. Decadal growth of population in Burdwan Municipality

Year	Total population in Burdwan town	Decadal growth rate of population
1901	30522	0
1911	35921	17.69
1921	34616	-3.63
1931	39618	14.45
1941	62910	58.79
1951	75376	19.82
1961	107881	43.12
1971	143318	32.85
1981	167364	16.78
1991	245079	46.44
2001	285602	16.53
2011	314265	3.99

Source: Thesis of Sandip Tah, 2016

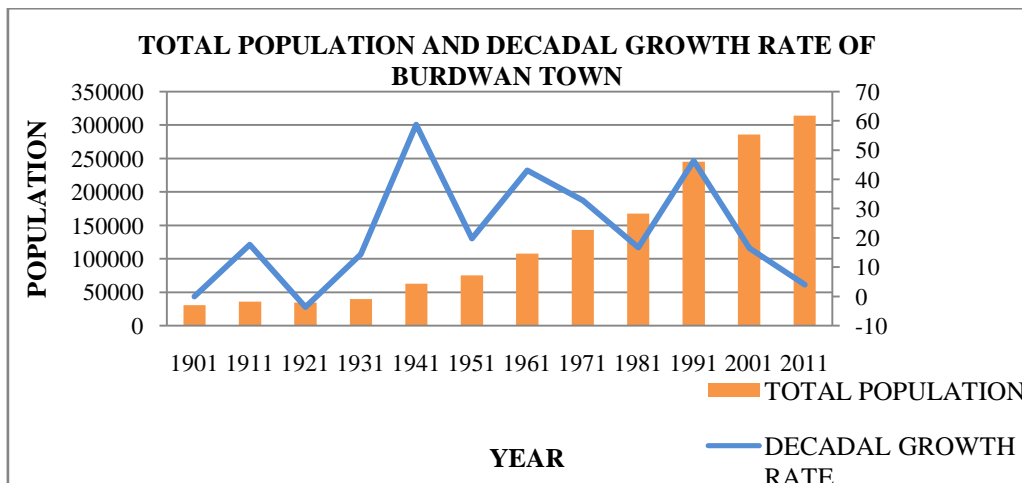


Figure 1: Year wise population and decadal growth rate of Burdwan town

This figure shows the total population and decadal growth rate of population in Burdwan Municipality from 1901 to 2011. The total population of Burdwan town has shown a significant increase from 1901 to 2011. The population of Burdwan Municipality increased from 30522 persons in 1901 to 314265 persons in 2011. However a negative growth rate of -3.63% was found in the decade of 1911 – 1921 due to a large number of deaths caused by several fatal diseases such as influenza, cholera, plague, smallpox etc. As such the year 1921 is called the demographic divide in the demographic history of India because in place of the population there was a sudden decline in it. The year 1941 witnessed a sharp growth rate of 58.79% increase in population. This may be due to various economic activities of the town.

Table 2. Year wise increase in the number of High-Rise Building in Burdwan Municipality

Year	Number of High-Rise Buildings built
2005	1
2006	0
2007	1
2008	5
2009	7
2010	16
2011	18
2012	27
2013	28
2014	38
2015	39

Source: Burdwan Municipality, 2018

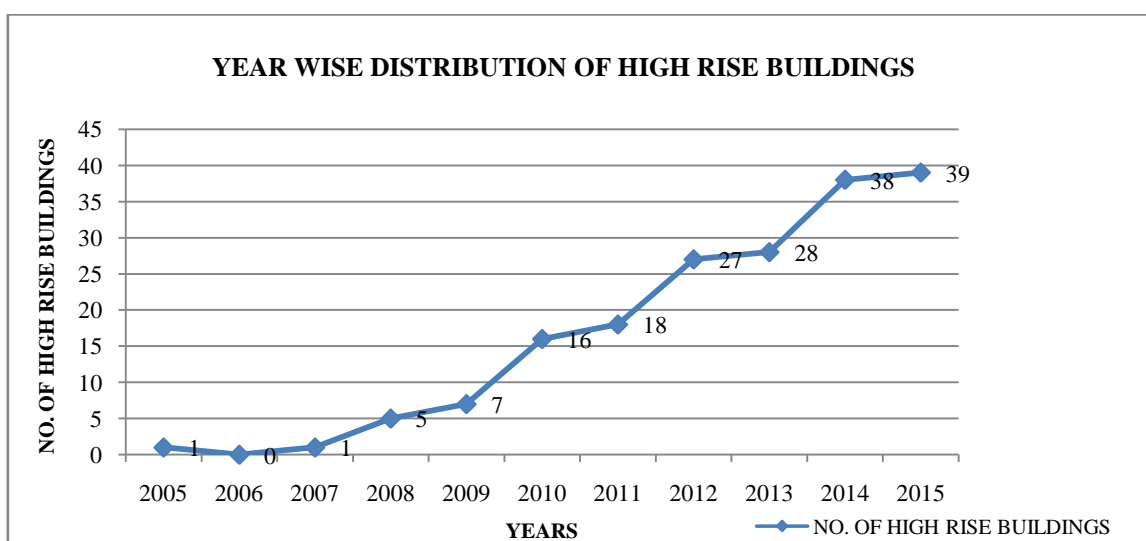


Figure 2: Year wise distribution of High-Rise Buildings

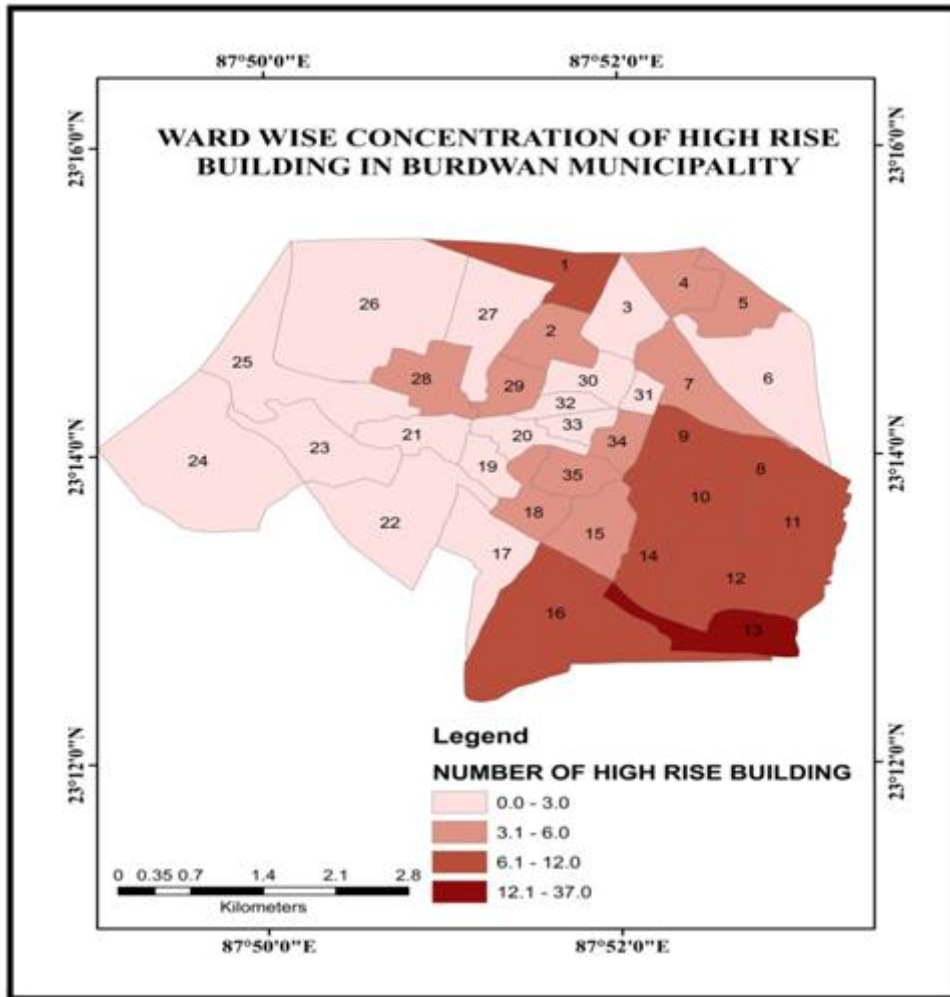
Ward No.	YEAR											Total
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
1						1	1	2	1	1	2	8
2								2		3		5
3							1	2			1	4
4								2				2
5												0
6						1	1	1	1		1	5
7						1		1	1	2	1	6
8					1		1	1	1	3	1	8
9				1			1	2		3	1	8
10						1	1			1	5	8
11				1		3		2		1		7
12				1	1	3	5	4	7	10	6	37
13						1	2		2	5	2	12
14			1		1	1	1		1	1	3	9
15				1	1			1	2	1	2	8
16								1	3	1	1	6
17							1	2				3
18									2	1	2	5
19	1											1
20							1		1			2
21							1	1				2
22												0
23												0
24												0
25						1					2	3
26												0
27					1	1			2	1	1	6
28								1			1	2
29					1						2	3
30				1		1				2		4
31											1	1
32									1	1	1	3
33					1			1				2

34							1	1			2	4
35						1			3	1	1	6
TOTAL	1	0	1	5	7	16	18	27	28	38	39	180

Table 3. Year and ward wise distribution of High-Rise Buildings in Burdwan Town

Source: Burdwan Municipality, 2018

The year wise growth and ward wise concentration of flats have been taken for analysis to show the ward wise increase in the number of flats on a yearly basis. The following figure shows the ward wise concentration of High-Rise Building.



Source: Prepared by the authors

If we observe the map of the ward wise total number of flats established and sanctioned, ward number 13 located at the southern periphery of Burdwan town shows the maximum concentration of High-Rise Building. The biggest housing colony i.e. Ullhas Nandini Complex is located near this area. The main reasons for such high concentration are it is located very close to National Highway (NH-2); hence people commuting for services to other cities like Kolkata will always opt for this type of area. Another reason is this place is highly accessible by transport network and low land value and land is easily available for construction of flats. The ward is located away from the city center and now urban elites like to live in these peripheral zones to avoid congestion of city center.

Location of major townships along the peripheral areas of Burdwan Municipality

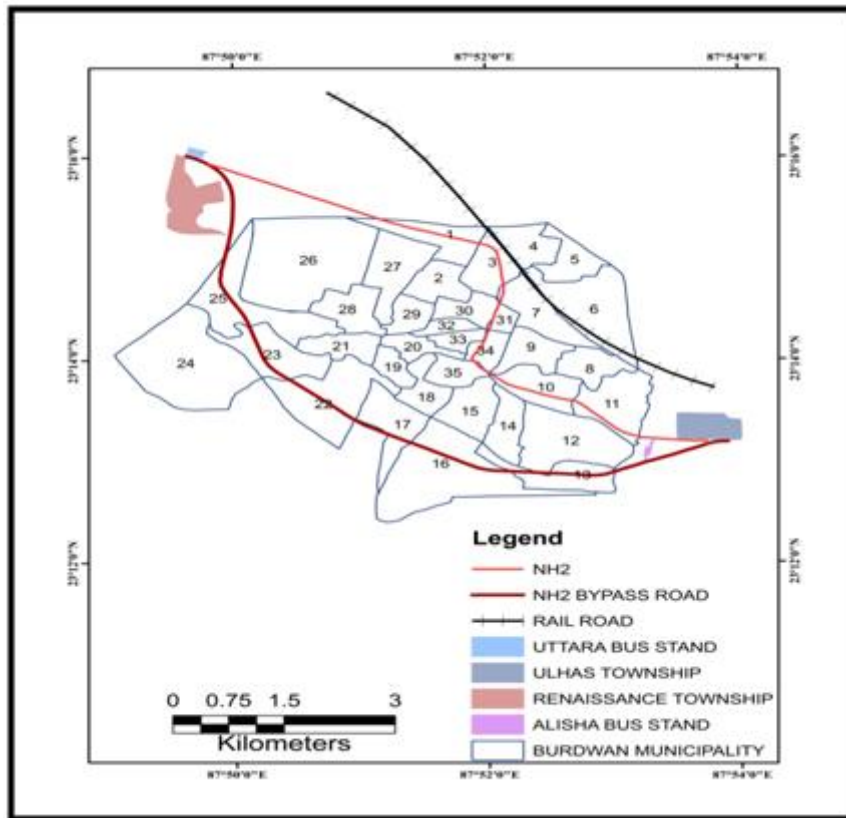


Figure 3. Location of major roads, Rail line and Township, and Bus stand

Source: Prepared by the authors



Satellite Image of Renaissance Township



Satellite Image of Ulhas Nandini Complex

Factors for development of High-Rise Buildings:

The table and figures reveals that although Flat culture started in 2005 but it is increasing after 2008 to this modern culture is only 11 years of history in Burdwan but interesting to find that within this 11 years all total 180 flats has been sanctioned and build in Burdwan town and it increased from 5 in the year 2008 to 39 in the year of 2015 and most recently many more High-Rise Building already have been sanctioned which indicates the potentiality and demand for flat culture is increase rapidly. It is easy to predict that in near future this vertical expansion of the town will increase more and more.

Pull factors: The main pull factors are-

- The increasing population of the town due to rapid migration from its surrounding area,
- Various urban facilities are given by Burdwan Municipality to its residents,
- Increasing demand for High-Rise Building culture among the people,
- Transportation facilities provided by Bardhaman Railway junction since 1855,

- e. Ample vacant lands are available in the peripheral parts of the town and
- f. Cost of land is cheaper over here compared to other areas of the town.

Push factors: The main push factors are-

- a. No vacant land is available in the big cities for future expansion,
- b. Ample land is available along the NH-2 for development of High-Rise Building,
- c. Improved transportation system makes the region very accessible with other important towns and places that makes commuting very easy,
- d. Impact of Globalization over the people and
- e. Shifting of the population from neighboring rural areas to this town to fulfill their livelihood.

Table 4. Ward wise Population and number of High-Rise Building in 2011:

Ward Number	Ward wise number of Population (2011)	Ward wise number of High-Rise Building (2011)
1	14476	1
2	9527	0
3	14645	1
4	10105	0
5	7243	0
6	15350	1
7	12372	0
8	6675	1
9	5916	1
10	8183	1
11	11535	0
12	16050	5
13	11343	2
14	7537	1
15	10708	0
16	11353	0
17	10194	1
18	6697	0
19	7050	0
20	5185	1
21	7005	1
22	8880	0
23	13270	0
24	9883	0
25	13381	0
26	9361	0
27	4436	0
28	6062	0
29	4527	0
30	4235	0
31	4446	0
32	6374	0
33	5162	0
34	6721	1
35	6651	0

Source: Thesis of Sandip Tah, 2016 and Burdwan Municipality, 2018

Descriptive Statistics

	Mean	Std. Deviation	N
Population 2011	8929.66	3423.204	35
Number of flats 2011	.51	.951	35

Correlations

		Population 2011	Number of flats 2011
Population 2011	Pearson Correlation	1	.398*
	Sig. (2-tailed)		.018
	N	35	35
Number of flats 2011	Pearson Correlation	.398*	1
	Sig. (2-tailed)	.018	
	N	35	35

*. Correlation is significant at the 0.05 level (2-tailed).

Here we correlate the ward wise population of Burdwan town and ward wise number of High-Rise Buildings in the year of 2011. Form the result we see that the null hypothesis assumed is rejected and the correlation value of

0.398 is significant at the 95 % level. The mean value of the population in 2011 is 8929.66 and the standard deviation is 3423. 20. As the correlation value is positive, it means that with the increase in a number of the population there has been an increase in the number of High-Rise Building in the year 2011.

Images of different High-Rise Building structure within Burdwan Municipality



Near Golapbag Bus Stand



Near Khoshbagan



Near Khosbagan



Beside Big Bazaar

IX. CONCLUSION

With the passage of time the population is increasing rapidly in the town, as a result, there has been increasing demand for land causing land scarcity. Most of the individual in the present generation wants to have their own dwellings. That's why vertical utilization of remain urban space is essential in the present context of urbanization. The recent years have also shown a break in the stereotype living in a joint family which leads to numerous developments of nucleus families. This study tries to show year wise and ward wise distribution of High-Rise Building along with its increasing population. It is found that with the increase in population, the number of High-Rise Building has also increased over the years. The reasons behind such growth of High-Rise Building are population migration from its surrounding rural areas in search of employment, better livelihood, education and so on. The case study of 2011 shows a positive correlation between the increase in population and increase in the number of High-Rise Building and the housing complexes getting popular as these are not very expensive which makes both economically and functionally to the customers. It is important to note that this housing culture changes the social life and economic structure of the town. The maximum concentration of High-Rise Building is in the southeast part of the municipality and its peripheral area due to well-connected transport network through NH-2 and Alisha bus stand to the major cities such as Kolkata, Howrah, Bishnupur, Durgapur, Katwa, Asansol etc. Thus in this present day of rapid urbanization and rise in population vertical expansion of building structure are becoming popular as it not only saves space but also provides various facilities within the complex itself apart from the other advantages.

REFERENCES

- [1]. Makinde O. O., Influences of socio-cultural experiences on residents' satisfaction in Ikorodu low-cost housing estate, Lagos state. Springer, 2015. 17: p. 173-198.
- [2]. Elsinga, H.a., Homeownership and housing satisfaction. Springer, 2005. 20: p. 401-424.
- [3]. Ibrahim E., High-Rise Building- Needs and Impacts. CIB World Building Congress, 2007: p. 1998-2007.
- [4]. Shaviv, Y.a.C., The Influence of High-Rise Buildings on their Energy Consumption and Urban Shading. 1999, HELIOS Ltd.
- [5]. Chatterjee M., Perception of Housing Environment among High Rise Dwellers. Journal of the Indian Academy of Applied Psychology, 2009. 35(Special Issue): p. 85-92.
- [6]. B., Y., Romancing the high-rise in Singapore. Elsevier, 2005. 22(1): p. 3-13.
- [7]. Gifford R., The Consequences of Living in High-Rise Buildings. Architectural Science Review, 2007. 50(1): p. 1-13.
- [8]. Ilesanmi O. A., Post-occupancy evaluation and residents' satisfaction with public housing in Lagos, Nigeria. Journal of Building Appraisal, 2010. 6(2): p. 153-169.
- [9]. B., O.M., Analysis of the socio-economic characteristics and housing condition in the core neighbourhood of Akure, Nigeria. Journal of Geography and Regional Planning, 2013. 6(6): p. 229-236.
- [10]. Chowdhury F., The Impact of Socio-Economic Factors on the Investment Prospect of Real Estate Developers: Case Study of Dhaka City. Journal of Business and Management, 2015. 17(2): p. 30-37.
- [11]. Awotona, A., & Ogunshakin, L., Multi-habitation and cultural structures; experiences from Nigeria 1994, Ile-Ife and CARDO Newcastle UK.: Book of Readings; Dept. of Architecture O.A.U, .
- [12]. Amad, H., Residential satisfaction and social integration in public low cost housing in Malaysia. . Pertanika Journal of Social Sciences & Humanities,, 2003. 11(1): p. 1-10.
- [13]. Rojek, D.A., Clemente, F. R., & Summers, G. A. , Community satisfaction: A study of contentment with local services. . Rural Sociology, 1975. 40(2): p. 177-192.
- [14]. Kavilkar, R., and Patil, S., Study of High Rise Residential Buildings in Indian Cities (A Case Study -Pune City). IACSIT International Journal of Engineering and Technology, 2014. 6(1): p. 86-90.
- [15]. Thaman, K.H., Shifting sights: The cultural challenge of sustainability. Higher Education Policy, 2002.

D Goulias" Assessing Specification Pay Schedules through Monte Carlo Simulation"
International Journal of Computational Engineering Research (IJCER), vol. 08, no. 12, 2018,
pp 17-28