

Full Length Research Paper

Population growth, urban expansion and housing scenario in Srinagar City, J&K, India

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Burgeoning population growth and wild urban sprawl has constituted serious problems especially in developing countries with a huge demand in housing stock. This phenomenon is more aggressive in historical cities like Srinagar. In such cities, there exists large scale variations in housing scenario due to differential growth and expansion patterns from core to periphery of these cities. This paper attempts to analyze the spatio-temporal dimensions of population growth, urban sprawl and housing quality in Srinagar City. The city has an urban history of more than six hundred years and is experiencing the fastest growth rates amongst all the Himalayan urban centers. This has resulted in heavy demand for various facilities including quality housing. The analysis has revealed that apart from increasing demand for new housing facility there exist marked spatial variations in housing quality among different wards of the city. On the one hand, lower and lower-middle income group people live in decayed old houses in the historical part of the city. These houses are closely packed and mostly shared by more than three households. On the other hand, qualitative and spacious housing structures have emerged in newly developing sub-urban areas. These houses mostly belong to higher level civil servants and elite business class with one household per house. The analysis brings to light the behavior of population growth, urban expansion and associated housing problems in the historical mountainous urban centre and calls for an immediate attention of planners to devise comprehensive urban renewal, land use regulations and building design policies for the sustainable management of housing in Srinagar city.

Key words: Urban sprawl, population growth, housing quality, Himalayan, Urban renewal.

INTRODUCTION

Historically, urban settlements have been the cradles of civilization and culture, environments in which a multitude of intellectual, economic and social activities have flourished. For these many pursuits to thrive in the India

of the 21st century, we need settlements that work efficiently, are sustainable and provide access to work, services and security to all its citizens along with the social and cultural space needed for full human

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development and expression (ihs, 2012). Although Thomas Malthus' ideas have been criticized because the industrial revolution has made possible an increase in productivity, the problem of the disagreement between population size and the means of livelihood has in recent years taken a new dimension. However, the factors associated with rapid population growth are varied. While different factors have been identified in developing and developed countries of the world, housing problem in its different forms seems to be a common feature (Ejaet al., 2011).

Population growth is the major contributory factor for housing expansion. According to UN-Habitat (2010), between 1950 and 2010, humankind endured its most rapid expansion, from 2.5 to 6.9 billion people. Most of that growth has taken place in developing countries where the urban population has increased nearly seven times in only 60 years (UN-Habitat 2010). Inadequate housing has exerted pressure on the urban environment of most developing countries and consequently threatens the health and wellbeing of urban residents (Boadiet al., 2005).

More worrying is the spatial pattern of housing problem in the cities with long urban history where the growing population and spatial expansion has not only resulted in increasing demand for new housing but also a widening gap between the old down town areas and newly sprawling parts of the city in terms of quality housing. In Srinagar City, on the one hand large proportion of population is living in old housings structures in a decayed condition and on the other hand sprawling outskirts of the city are occupied by modern architectural housing. It is pertinent to mention here that during the past six hundred years, Srinagar City has survived all odds and has become the largest urban centre in the whole Himalayan Region (City Master Plan, 2001-21). In this backdrop present study has been undertaken with the main objective to assess the housing scenario in response to historical urban growth (population growth and urban sprawl) of Srinagar City.

DATABASE AND METHODOLOGY

The City of Srinagar lies 74°43'–74°52'E longitude and 34° 0'–34°14'N latitude (Figure 1). It is about 5200 feet above mean sea level. The city has a unique physiographic setup with steep hills in the East and North east. In the South and West Low lying paddy fields along the flood plain of Jhelum are located. There are *karewas* of Budgam in the extreme South and towards the North are located the uplands with moderate slopes. The famous *Dal* Lake is situated in the heart of the city. The City of Srinagar experiences a Mediterranean type of climate with most of the precipitation in winter season in the form of rain and snow. The city has been growing at an alarming pace and the changes in its demographic dimension have been very fast (Bhat, 2008). The city is among the 100 fastest growing (92nd to be exact) Urban Centers of the world (City Mayor, 2013). The natural vegetation in the area has been considerably altered by urbanization and cultivation over the period

of last fifty years (Kuchay and Bhat, 2011).

The study was confined to the municipal/city limits of Srinagar City. Therefore data pertaining to population and demographic variables were collected from decadal Census of India from 1901 to 2011. Reports and publications from various state agencies such as Srinagar Municipal Corporation, Srinagar Development Authority, Town Planning Organization, etc. were utilized to obtain information regarding other required variables such as housing and crowding. Historical maps of the city and satellite images were analyzed in GIS for mapping the spatial expansion of the city. Data regarding housing quality and other amenities were obtained through primary survey carried out in different wards of the city, taking the following variables into consideration.

- a. Spacing (Distance between different housing units)
- b. Size of housing unit (Ground area, number of stories and rooms)
- c. Building material (Type of material used for construction of housing units)
- d. Housing unit sharing (Number of households per housing unit)
- e. Crowding (Persons per household and persons per housing unit)
- f. Hygiene and civic amenities (Type of toilet, bathing facility, method of waste disposal, etc.)
- g. Housing ownership (Single ownership, multiple ownership)
- h. Household owner's occupation.

RESULTS AND DISCUSSION

Population growth

It is evident from Table 1 that the population growth of Srinagar city during the last century (1901-2011) has been phenomenal. The population of the city increased from 0.122 million persons in 1901 to 1.225 million persons in 2011 indicating nearly tenfold increase amounting to 900 percent growth with a net increase of 1.103 million persons. The pattern of decadal growth however, has not been uniform. In the early decades from 1901 to 1961 the growth was slow and declined from 22.46 percent in 1931 to 15.71 percent in 1961. This decline in the growth rate could be attributed to the political unrest and partition of the subcontinent in 1947 which led to the large scale migration of people (Bhat, 2008).

It was after 1961 that a new phase of growth of population commenced. The population of the city increased from 0.285 million persons in 1961 to 0.606 million persons in 1981 recording a net addition of 0.320 million persons with alarming decadal growth rates of 34.31 and 40.13 percent respectively. The main factors responsible for this accelerated population growth during this period have been in-migration, increase in birth rates and fall in death rates. Besides this, the merger of 62 villages in city limits in 1971 and the introduction of urban agglomeration concept which brought a number of rural areas under the jurisdiction of Srinagar city are indeed the other factors contributing to the rapid growth of the city population.

Subsequently, the population increased to 0.971 million persons in 2001, registering a net growth of 0.365 million persons in two decades with a decadal growth rate of

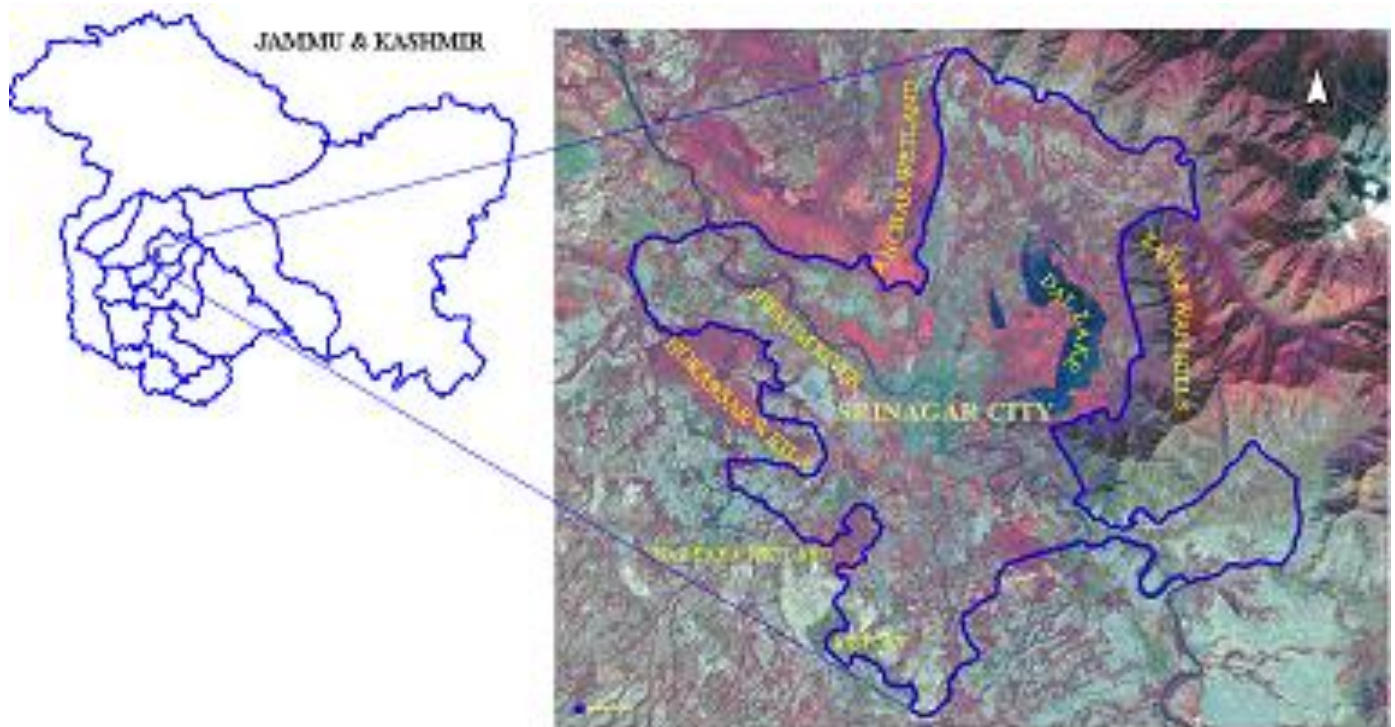


Figure 1.Location map of study area.

Table 1.Srinagar City: population growth and areal expansion (1901-2011).

Year	Area (Km ²)	Population	Absolute variation	Decadal growth rate	Density/Km ²
1901	12.8	122618	---	---	9579
1911	12.85	126344	3726	3.04	9832
1921	14.48	141735	15391	12.18	9788
1931	17.6	173573	31831	22.46	9862
1941	17.6	207787	34212	19.71	11806
1951	29.52	246522	38735	18.64	8351
1961	41.44	285257	38735	15.71	6884
1971	82.88	403413	118156	34.31	4867
1981	208.9	606002	202589	40.13	2912
1991	N.A	N.A	N.A	N.A	N.A
2001	278.1	995806	389804	64.32	3581
2011	278.1	1225837	230031	23.13	4407

Source: Census of India, 1901-2001 Srinagar Municipal Corporation. NA (Not Available) No Census was conducted in 1991.

30.14 percent. As per the recent Census (2011), the population of the city has reached 1.225 million persons recording a net addition of 0.254 persons during the last ten years. It is pertinent to mention here that no census was conducted in Jammu and Kashmir states in 1991 because of political turmoil. The dynamic trend in the population growth of Srinagar city suggests an

accelerated rate of growth in city's population in future which is revealed from the fact that the city achieved the metropolitan status in the year 2008. This anticipated rapid change in the demographic dimension of the city is bound to have an impact on the socio-economic structure of the city and may accentuate the problems of housing scarcity, land speculations and urban blight and slums

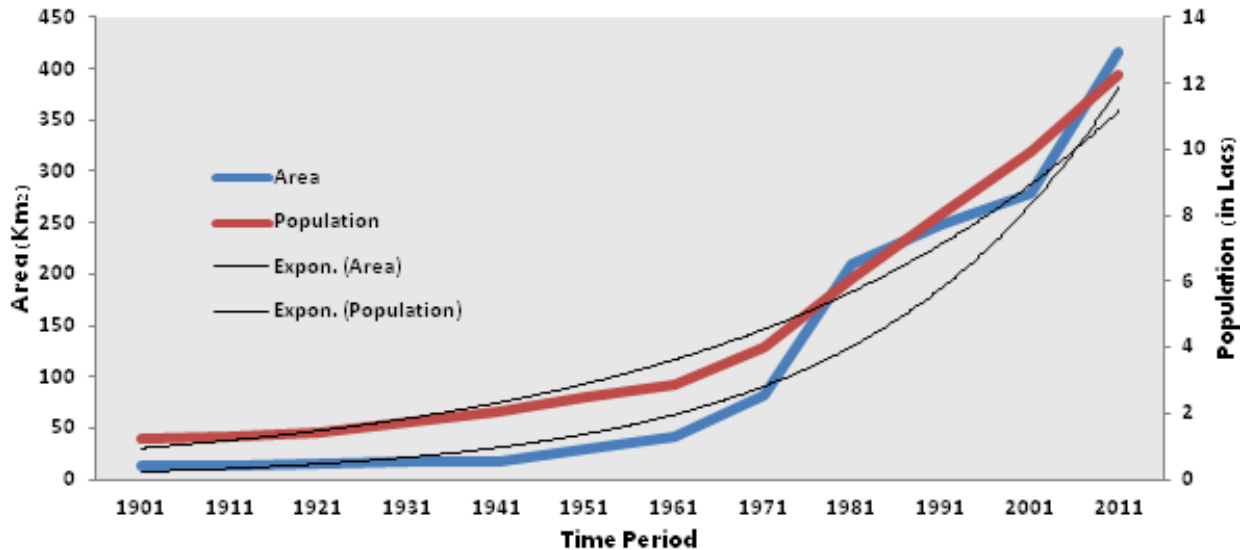


Figure 2. Population growth and areal expansion of Srinagar City (1901-2011).

(Kuchay and Bhat, 2011).

Population density

Density of population is an index to measure the degree of concentration of population in a given area and therefore indicates the intensity of population pressure on the land. A study of the changing density of population of Srinagar City reveals that there have been large scale fluctuations during the inter censal periods from 1901 to 2011 (Table 1). The population density of the city increased from 9,579 persons per Km² in 1901 to 11,806 persons per Km² in 1941. The main factors responsible for such an increase in the density during this period could be in-migration and centralized trend of population growth.

During the decades 1941 to 1981, the population density of the city decreased persistently owing to the process of expansion of city limits to large tracts of sparsely populated land during these decades, particularly during the period 1961-81 in which the population of the city increased by 0.231 million persons while the area of the city increased from 41.44 Km² to 208.09 Km². The large increase in the area as compared to the population resulted in a sharp decline in the density of population from 6,884 persons per Km² in 1961 to 2,912 persons per Km² in 1981.

The city again witnessed an increase in population density in 2001 (3492 persons per Km²) and 2011 (4407 persons per Km²) respectively. This increase in the density could be attributed to population growth on account of natural accrual and increased migration from rural areas together with a moderate expansion in the city limits as compared to earlier decades.

Srinagar City: Population growth and areal expansion (1901-2011)

Gross density is an effective yardstick to measure the degree of concentration among different cities or towns (Figure 2). The gross population density of Srinagar city is 4407 persons per Km² (Census of India, 2011). Developed area density indicates the extent of pressure and concentration of urban population on the land which is available for urban use. The developed area density of Srinagar city is 9820 persons per Km² of developed area. Residential density refers to the total population and the urban land area defined as residential land. The total residential density of the city of Srinagar is 10763 persons per Km² of residential area. Strictly, this represents a rational measure of population concentration on residential land.

Spatial distribution of population density (Ward Wise Analysis)

Though the preceding discussion brings out the pattern of overall change in the various types of population density at the city scale during the period 1901 to 2011, an attempt has been made to analyze the spatial variations in the distribution of population density among the different wards of the city. Wardwise density facilitates to examine the spatial pattern of intra-city distribution of population. An analysis of the population density of Srinagar city (Figure 3) reveals that there is a close relation between the age of the ward and population density. The core wards of the city are very densely populated and the density decreases as one moves from the centre towards the periphery of the city (Table 2).

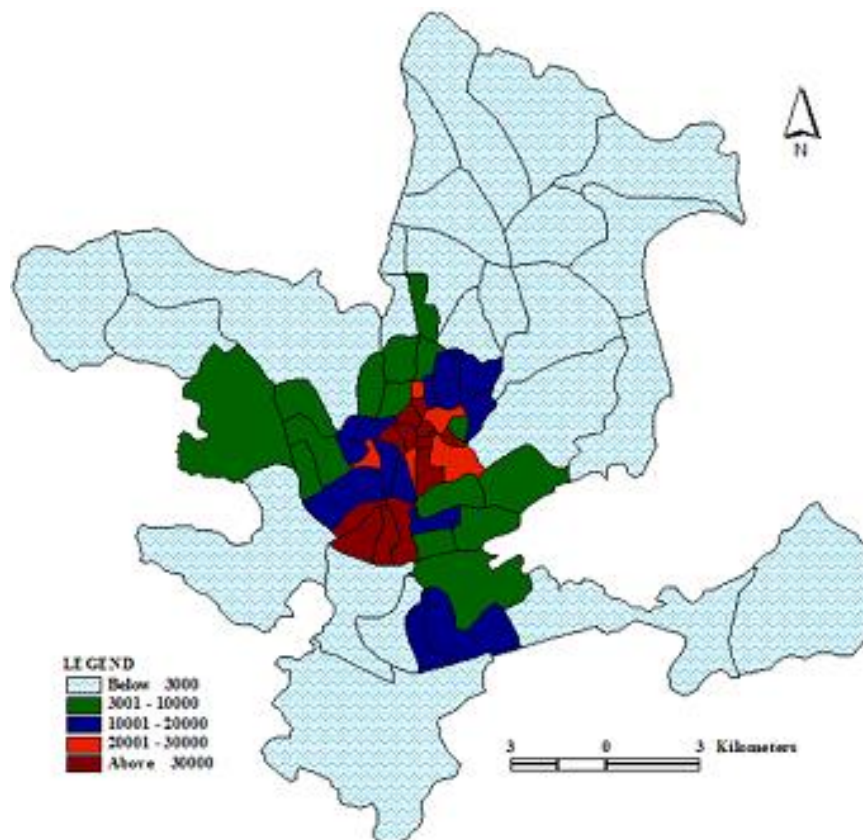


Figure 3. Srinagar City population density (2011). Source: Census of India, 2011; Srinagar Municipal Corporation.

Urban expansion

Srinagar- the primate city of the region has enjoyed its primacy throughout the ages. Limited vertical expansion due to unfavorable geophysical setup of the region has paved way for rapid horizontal expansion of this urban centre (Kuchay et al., 2014). It is clear from Table 1 that there has been a slow expansion of the city during 1901-61 and a fast expansion after 1970's as the total area of the city has increased from 12 Km² in 1901 to 82 Km² in 1971 and 278 Km² in 2011. The area of the city is projected to touch 416 Km² mark by 2021 (City Master Plan, 2001-21). A detailed analysis of the spatial expansion of the city reveals that growth of the city has been an exponential one as has been shown in Figure 2.

Housing density

The overall gross housing density of the city as a whole is 610 households per Km². However, the households are not uniformly distributed across the different wards of the city. The developed areas are having higher density with

1571 households per Km² and 1664 households per Km² of residential area of the city. The existing spatial distributional pattern of housing density could be explained/generalized by dividing the wards into various density classes given in Table 3 and Figure 4.

An analysis of the existing housing density reveals that very high density (above 7,000 households per Km²) prevails in the old downtown localities such as in the wards of *Islam yarbal* 11,780, *Malik Aangan* 11,000, and *SR Gunj* 10,293 households per Km² respectively. Here the houses are packed brick to brick and roof to roof. Contrary to this a high (between 5000-7000 households per Km²) housing density prevails in the wards of *Aalikadal*, *Sheikh Davood Colony*, *Nawab Bazaar*, *Ganpatyar*, *Batamaloo* and *Aqilmir*

Khanyar. However in most of the peripheral, newly added wards of the city the housing density is fairly moderate to low (below 5000 households per Km²).

During last four decades a large number of fringe villages and their hinterlands have been added to the city limits. These are predominantly low housing density areas. The wards like *Harwan*, *Nishat*, *Soura*, *Tailbal* with less than 400 households per Km² fall in this group.

Table 2. Srinagar City-population density.

Class	Area (Km ²)	%age Area	Population	%age Population	Population Density
V. V. High	1.6	0.58	98369	9.88	Above 40,000
Very High	8.0	2.88	235665	23.66	40,000-20,000
High	15.9	5.72	218053	21.89	20,000-10,000
Medium	44.8	16.11	241276	24.22	10,000-3,000
Low	82.3	29.59	144054	14.46	3,000-1,000
Very Low	125.5	45.13	58362	5.86	Below 1,000

Source: Compiled from Census of India, 2011; Srinagar Municipal Corporation.

Table 3. Srinagar City- housing density.

Class	Area (Km ²)	Percentage Area	Households/Km ²
Very high density	1.6	0.57	Above 7500
High density	3.5	1.25	5000 - 7500
Moderate density	10.5	3.77	2500 - 5000
Low density	262.5	94.39	Below 2500

Source: Compiled from Census of India, 2011; Srinagar Municipal Corporation.

Ahmad Nagar Ward has the lowest housing density (28 households per Km²) in Srinagar city. The spatial pattern of this marked variation in the distribution of the housing density in Srinagar city across the different wards is visualized in Figure 4.

Crowding index

The very high density residential areas have also high crowding index (more than 5.76 persons per household). The wards of *Dalgate, Lal Chowk, Batamaloo, Aloochoi Bagh, Magarmal Bagh, Shaheed Gunj, Karan Nagar, Chattabal* fall in this category and are densely populated and highly congested areas. These wards are very close to the central business district (CBD) and account for 15.46 percent of the total area of the city.

The wards of *Raj Bagh, Wazir Bagh, Mehjoor Nagar, Bemina East, Bemina West, Laweypora and Humhama* have medium crowding index ranging from 5.56 to 5.76 persons per household and account for 76.5 percent of the total area of the city. The wards with moderate crowding index represent the other (besides CBD) leading business centers with large scale administrative and commercial activities.

The outer wards of *Harwan, Rawal Pora, Bagi Mehtab, Alesteng, Tailbal* and *Daraha* have comparatively low crowding index (below 5.56 persons per Km²). The main reason of the low crowding index in these wards is their recent origin. Most of these wards form the outskirts of the city where a significant proportion of land is still vacant or devoted to agriculture and horticultural

activities. These wards are inhabited by rural communities who were already living there before the expansion of city limits. Also occupying the wards are the newly migrated business class people and high ranking civil servants. These people have migrated from either the highly congested city core areas in search of better environmental conditions or from the rural areas to assess various urban facilities. The existing distributional pattern of crowding index (Table 4) could be explained by dividing the city into different crowding index zones as reflected in Figure 5.

The spatial pattern of crowding index as emerged from Figure 5 reflects a broad pattern of housing occupancy in Srinagar City. The surveys conducted by Town Planning Organization have shown that there exist certain pockets of alarming housing density and crowding index. In 11 mohallas (*Zarab Khana, Banday Koacha, Budhgir, Chopan Mohalla, Khan Mohalla Shabri, Khar Mohalla, Dug Mohalla, Baghi-Misken, Nowhatta, Mala Shah and Leper Hospital*) the crowding index ranges between 15.1 and 24 persons per household. In other 37 mohallas (*Malateng, Court Road, Abi Guzar, Haft Chinar Beeruni, Beminallqbal Abad (Old Cluster) Tengpora, Charamgari Mohalla, Dabtal Tashwan, Urdu Bazar, Shahilteng, KralKhud, Doompora, Basant Bagh, Tenga Bagh, Nowpora Bridge, Beron Anderwari, Gadayar, Bacha Mohalla, Nawa Kadal, Doom Kadal, Haftyarbal, Waniyar, Hathi Khan, Khaliefpora, Shampora, Malapora, Kadikadal, Chundapora, Tilwandoori, Kamagarpora, Makarpora, Sazgaripora, Khushalsar, Zadibal, Anchaar Mohalla*) the crowding index ranges between 12.1 to 15 persons per household (City Master Plan, 2001-21).

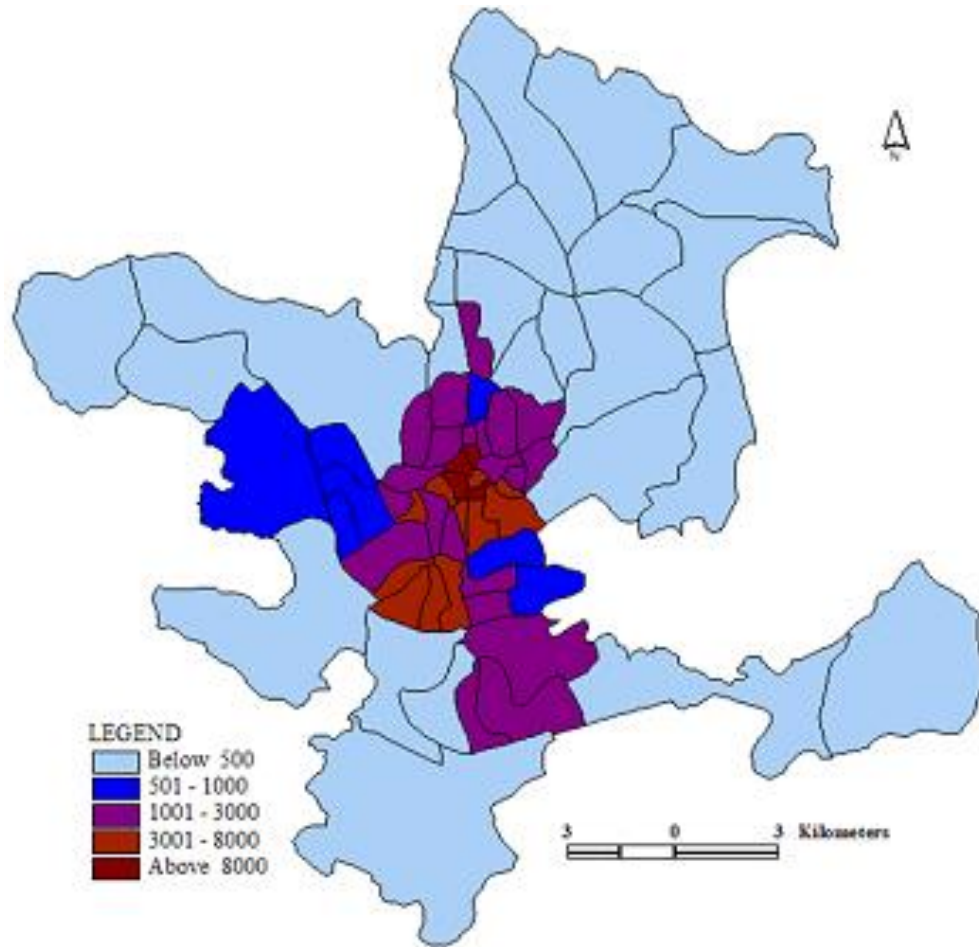


Figure 4. Srinagar City housing density (2011). Source: Census of India, 2011; Srinagar Municipal Corporation.

Table 4. Srinagar City- crowding index.

Class	Area (Km ²)	Percentage Area	Persons/Household
High Index	43	15.46	Above 5.76
Medium Index	76.5	27.5	5.56 - 5.76
Low Index	158.6	57.02	Below 5.56

Source: Compiled from Census of India, 2011; Srinagar Municipal Corporation.

Slum formation

Due to rising population especially in urban areas, the number of slum dwellers is rising. One billion people worldwide live in slums and the figure will likely grow to 2 billion by 2030 (UN-Habitat Report, 2010).

In the City of Srinagar slums have emerged in two forms. The city has a long history of growth and the housing in Downtown area of the city, that was once relatively affluent, has deteriorated over the period of time

as the original dwellers moved on to newer and better parts of the city. Secondly vast informal settlements have come up within the last fifty years especially after the 1990s. These settlements have mainly encroached the easily accessible wetlands and margins of major transport corridors of the city (Figure 6). Apart from this, large slums are also found around the historical monuments and religious shrines of the city. The largest slum area of the city has emerged around the hillock of Kohi-Maraan in the form of a ring along the historical wall 'Kalay' of the

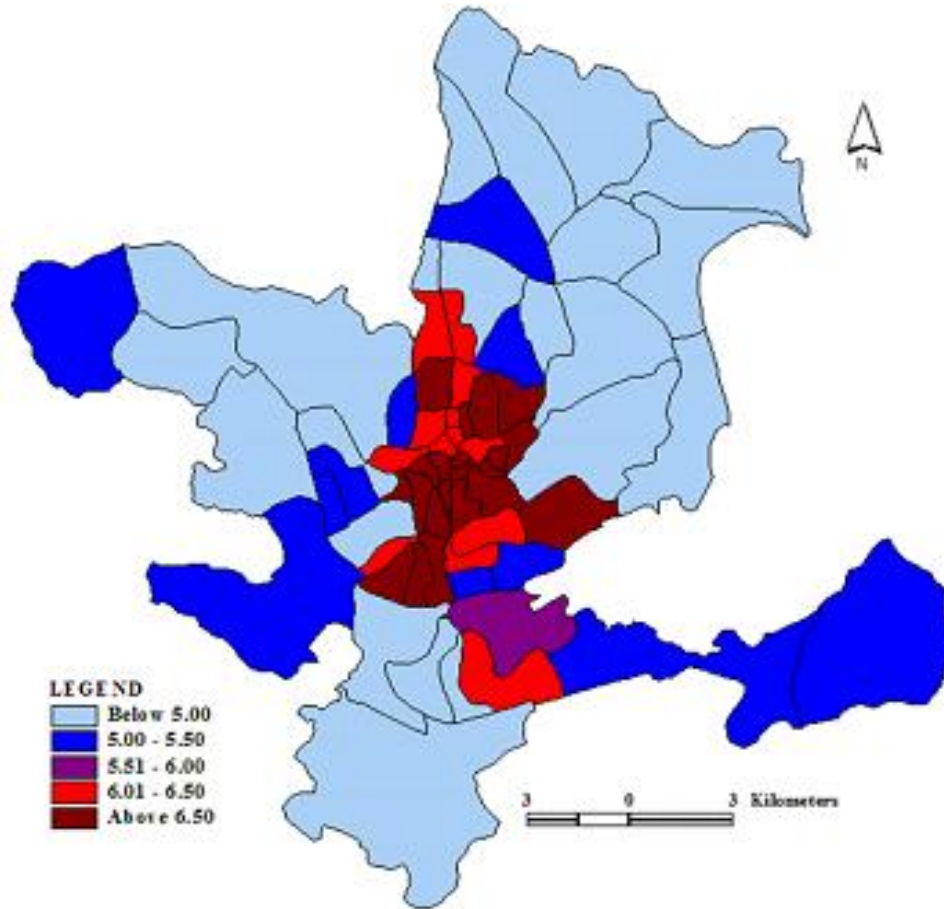


Figure 5. Srinagar City crowding index (2011). Source: Census of India, 2011; Srinagar Municipal Corporation.

famous *Hari Parbat* fort in the city.

Distribution of Houses

The age wise (period of construction) spatial distribution of housing as reflected in Figure 7 shows that about 33.9 percent of the total houses in Srinagar city were between 0-15 years old. They were built between 1997 and 2012. About 44.7 percent of the houses are between 16-30 years old meaning that they were built between 1982 and 1997. The number of old buildings is low constituting 21.4 percent. They mainly comprise houses which are more than 30 years old. These houses are mostly constructed of traditional mud bricks, wood and stone.

Housing types

The analysis of Figure 8 shows that the housing types ranged from mud and wood housing (3%), brick and wood housing (26%), concrete brick housing (54%) and

concrete decorated houses (17%). Old age housing structures (Brick and wood; Mud and wood) together constituting 26 percent are concentrated mainly in the Downtown Area of the city. Concrete brick structures are spread throughout the city and are occupied by middle income group citizens. Concrete decorated houses are confined to the newly developing “colonies” occupied by elite business class and high level officials

Housing conditions

A housing that lacks basic amenities such as quality drinking water, toilet, bathing and waste disposal facilities constitutes life and health threats of the occupants and may have unhealthy environmental impacts for an entire neighborhood. Occupants of housing units without toilet and proper waste disposal mechanisms may engage in open defecation and indiscriminate waste disposal (Bomah, 2013). It was observed during the field survey that 27 percent of the households have inadequate bathing and toilet facility. About 32 percent of the



Figure 6.Srinagar City location of slums (2011). Source: Cartosat-1 satellite data and primary survey; City Master Plan (2001-21).

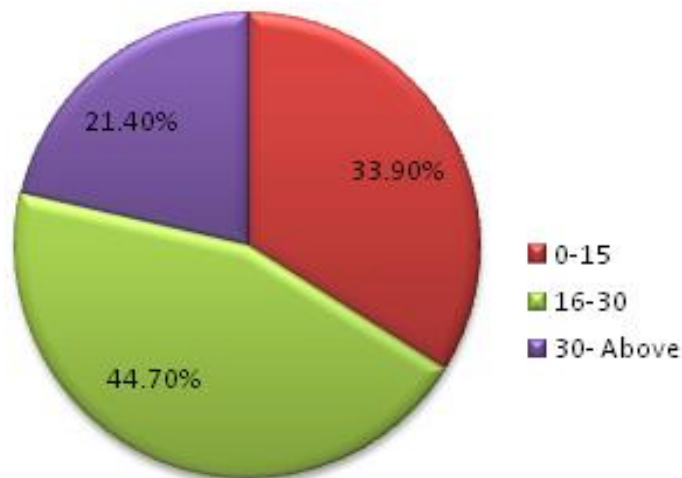


Figure 7.Age (yrs) of different housing structures in Srinagar City.

households lack proper waste collection and disposal practice. These households mostly dump the waste in open spaces and along the road sides. Most of the old

age houses located along the banks of river Jhelum lack modern toilet facilities. The sewage is disposed directly into the river through a network of drains which in turn

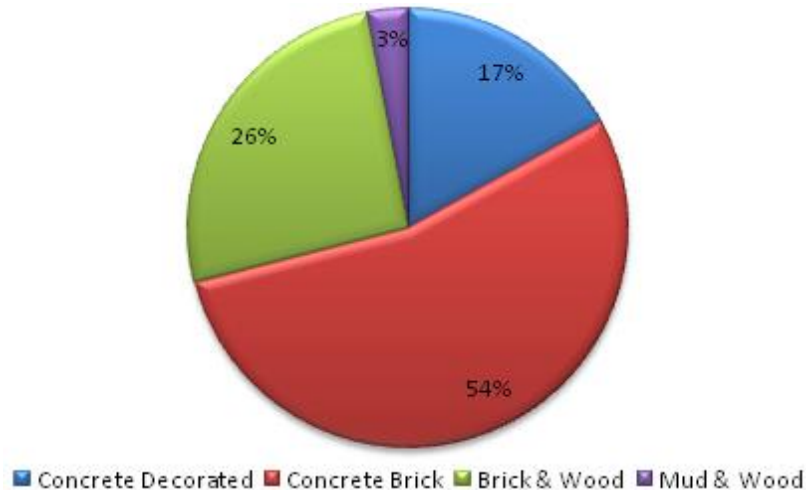


Figure 8. Distribution of housing in Srinagar City based on construction materials.

has resulted in increasing levels of water pollution and waterborne diseases in the area (Rather et al., 2010).

DISCUSSION AND CONCLUSION

Srinagar City is the largest urban centre in the whole Himalayan Region. The city has been growing at an alarming pace both in terms of its population size and areal extent. This in turn has resulted in alarming variation in housing availability across the space, while moving from core to the periphery of the city. A considerable number of people live in decayed, overcrowded houses in the Downtown area of the city. These houses are densely packed with a space of less than a meter apart, characterized by inadequate civic and hygiene facilities. Most of the houses are constructed of locally available traditional material (mud bricks, wood, etc.) and are occupied by 2 to 3 households per house. The level of vulnerability to various natural and human induced hazards is very high in this area. Contrary to this, the newly sprawling areas of the city in the sub-urban areas are occupied by concrete housing structures equipped with most of the modern civic and hygiene facilities. In these areas the buildings are spaced more than few meters apart inhabited mostly by single families. The multiple house ownership has also been observed in the peripheral areas of the city. The residential expansion in the sub-urban areas of the city has mostly encroached upon the productive agricultural land and wetlands thereby posing a considerable threat to the ecological setup of the city. Based on the inferences drawn from the present study there is an urgent need to regulate the residential growth of the city in a planned manner. In this connection, some important measures are suggested. Firstly the initiation of Urban Renewal Programme could

be useful in enhancing the housing quality in the old Downtown area of the city. Secondly, the land use regulations and building codes as laid down in the existing Master Plan of the city need to be adhered in order to ensure the safe housing environment in the sub-urban areas of the city. Thirdly an affordable housing for urban poor be made available through a Government Housing Agency to avoid slum formation and preserve historical, religious places and other common property resource lands from further encroachment.

Conflict of Interests

The authors have not declared any conflict of interests.

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