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A Geographical Analysis of Household Amenities in NCT of Delhi

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Abstract
The term "basic amenities" refers to those facilities that are "basic for everybody" at the same time. All humans need these facilities, and these are both directly and indirectly connected to human growth in many ways. The percentage of tap water from treated sources has been found more in urban areas (75.8%) than rural areas (49.6%). Use of electricity as main source of lighting has increased by 67%. There are found bathroom facility 87% in total, 74.8% in rural areas and 87.3% in urban areas in NCT of Delhi. The present paper examines an intra city household amenities in NCT of Delhi. For this purpose, the census data at ward level has been collected from the Table HH-14: House listing & housing census, 2011. Statistical techniques such as Composite index, Z score and Standard Deviation have been used for analysis of this data. The results show a lot of differences in the levels of household amenities. Municipal wards exist in middle, middle-eastern and middle southern parts i.e. NDMC 0001, NDMC 0002, NDMC 0004, NDMC 0006, 12, 13, 21, 41, 45, 50, 51, 52, 56, 61, 63, 64, 67, 73, 82, 83, 86, 88, 89, 92, 95, 96, 99, 101, 104, 105, 107, 109, 110, 112-115, 117, 119, 120, 126, 127, 129, 131, 132, 145, 146, 156-164, 169, 182-184, 189-191, 194, 222, 223, 225, 231, 232, 235, 237, 241, 260 have better household amenities and middle and south eastern wards i.e. Cantt.0002, Cantt.0004, Cantt.0005, Cantt.0008, NDMC 0008, 2, 5, 15-20, 26, 28, 30, 33-36, 42, 59, 68, 71, 74, 80, 81, 90, 97, 98, 100, 111, 122, 150, 154, 171, 175, 176, 178, 188, 192, 193, 195, 197-200, 207, 213, 224, 242, 244, 250 have lack of household amenities.

Key Words – Household Amenities, Drinking Water, Bathroom Facility, Electricity, Drainage System, Cooking Facility

1.1 Introduction:

Every community, every country, and every culture have a different definition of an amenity. The term "basic amenities" refers to those facilities that are "basic for everybody" at the same time. All humans need them, and they are both directly and indirectly connected to human growth in many ways. The former United Nation General Secretary Kofi Annan had indicated that access to safe drinking water and sanitation facility are essential to human need and a basic human right. Polluted water endangers both physical and social health of all people. It is an abuse to human dignity.

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India is a vast country. It is the world's largest democracy and also has a large number of people without basic amenities like drinking water, sanitation and electricity. In 2015, nearly 50 per cent of India's population of around 568 million people suffered the shame of defecating in open area due to a lack of access to toilets. Inadequate water, sanitation and hygiene (WASH) services in India's health facilities contributes to the high neonatal mortality rate, which is currently 24 deaths per 1000 live births. Chemical contamination of water, mainly through fluoride and arsenic, is present in 1.96 million dwellings. Meanwhile, less than 50 per cent of the population has access to safely managed drinking water (located on-premises, available when needed and free of contamination). Moreover, two-thirds of India's 718 districts are affected by extreme water depletion, and the current lack of water safety and security planning is a significant concern.

It should be observed that the supply of water in large cities of India is going to be a serious challenge in the future. The average access to drinking water is the highest in Class-I towns/ cities where 73 percent of the household have access to drinking water. This is followed by 63 percent in Class-II, 61 percent in Class-Ill, and 58 percent in other towns of IV, V and VI class category. The slum and squatter settlement are almost deprived of such facility and the people just depend on public standpoints and other tube well and hand pump for water. The problem of drinking water should be viewed not in terms of quantity alone. In case of 'quality' nearly 66 million people across major 17 states in the country are estimated to be at the risk with fluoride contents, while yet another 13.8 million people are affected by arsenic water.

2.1 Study Area

Delhi, the capital city of India has 9 districts as North, North West, North East, South, New Delhi, Central, West, South West and East. There are three ULBs i.e. Municipal Corporation of Delhi, New Delhi Municipal Council and Delhi Cantonment Board (DB). There are total 272 wards of MCD, 9 wards of NDMC and 8 wards of Cantonment board in the NCT of Delhi.

Delhi, Mumbai and Kolkata have recorded a significant decline in the population growth rate during the period 2001-2011. However, Delhi's urban population growth is fastest at 26.8 per cent, with Mumbai and Kolkata being way behind, at 12 per cent and 6.9 per cent, respectively.

3.1 Data

Data relating to household amenities have been taken from Table HH-14: House listing & housing census, 2011. Spatial data like topographical maps have been taken from survey of India. Topographical maps bearing numbers H43W13, H43W14, H43X1, H43X2, H43X3, H43X5, H43X6 and H43X7 have been used for spatial information. The municipal wards boundary map has been taken from Directorate of Census Operations, New Delhi and ORGI- Data Dissemination Unit (DDU) New Delhi. Administrative Atlas of NCT of Delhi (2011) and District Census Handbook, Series-08, Part XII-A have been taken from ORGI- Data Dissemination Unit (DDU) New Delhi.

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3.2 Methodology

Census of India provides information relating to household amenities at ward level. In this study the municipal ward has been taken as a unit of analysis for comparison. Ward map has been scanned, geo-referenced and digitized in Arc GIS software. In this study, a set of seven indicators have been taken for the spatial analyses of household amenities at wards level in NCT of Delhi (Table: 1): -

Table: 1. Indicators and Variables of Household Amenities: -

Sr. No.	Household Amenities	Categories
1.	Main source of drinking water	Tap water from treated source
2.	Location of drinking water source	Within premises
3.	Main source of lighting	Electricity
4.	Number of households having latrine facility	Within the premises
5.	Number of households having bathing facility within the premises	Yes (Bathroom)
6.	Waste water outlet connected to	Closed drainage
7.	Type of fuel used for cooking	LPG/PNG
8.	Kitchen Facility	Cooking inside house (has kitchen)
9.	Households by type of structure of Census houses	Permanent

In order to get spatial variations in the levels of development of household amenities as Main source of drinking water, Location of drinking water source, Main source of lighting, Number of households having latrine facility, Number of households having bathing facility within the premises, Waste water outlet connected to drainage, Type of fuel used for cooking, Kitchen Facility, Households by type of structure of Census houses. Z-score and composite index techniques have been used there.

Formula of Z score $= Z = \frac{x - \mu}{\sigma}$

Z = Standard score
x = Observed value
μ = Mean
σ = Standard Deviation

A composite index has been made to know the differences in the level of development of household amenities in NCT of Delhi. The higher value of composite index indicates higher development of household amenities and lower value shows low development. Levels of development have been categorized into five categories i.e. very low, low, medium, high and very high. ARC GIS software

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has been used to show the spatial pattern of availability of household amenities at the municipal ward level in NCT of Delhi through maps.

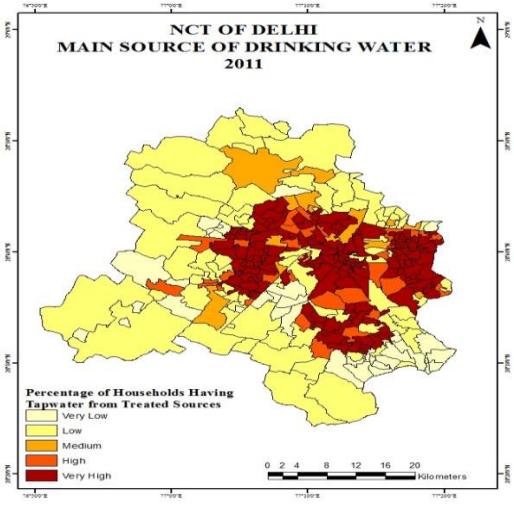
4.1 Result and Discussions

3.4.1 Main source of Drinking Water

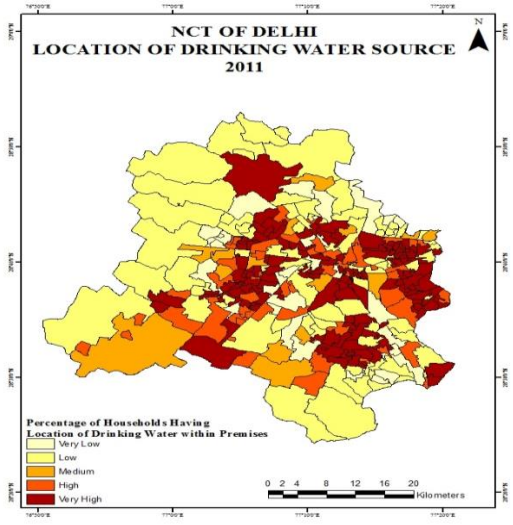
NCT of Delhi has the highest percentage of households in the category tap water from treated source rather than others. The category of very high level of main source of drinking water is represented by households in 144 wards. These wards exist in the middle-eastern parts in the NCT of Delhi. Ward No. 222 has the highest z-score value 1.81 which shows that this ward has very high level of main source of drinking water. High level wards exist in the middle-eastern parts and medium level wards found in middle-northern part of NCT of Delhi. Northern, western and southern wards of the NCT of Delhi have low level of main source of drinking water. Very low level of main source of drinking water among the households are found in 29 wards. In these wards very low-income group resides. These are Cantt.0002-Cantt.0005, Cantt.0007, Cantt.0008, 18, 33-36, 134, 139, 142, 173, 177-179, 186-188, 197, 199, 200-202, 204, 207, 264. These wards exist in the middle-western and south eastern parts in the NCT of Delhi. Ward no Cantonment – 02 has lowest Z-score value (-3.22) (Map 1.1).

4.2 Location of Drinking Water Source

It also plays an important role in the household development of any area. NCT of Delhi has the highest percentage of households in the category within the premises rather than others. So, in the present study only within the premises category has been taken.



Map 1.1



Map 1.2

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The category of very high level of location of drinking water source is represented by households in 124 wards. Mostly wards are existed in middle parts of the city, while some wards are found in northern and middle southern parts also. High level wards exist in the middle southern and middle-eastern parts and medium level wards found in middle northern and south western parts. Northern, western and middle southern wards of the NCT of Delhi exist in the low-level category. Very low level of location of drinking water source are seen in 30 wards i.e. Cantt.2, Cantt.4, Cantt.8, 5, 6, 26, 33-36, 68, 71, 74, 90, 97, 98, 121, 147, 154, 171, 178, 187, 188, 193, 195, 199, 200, 265, 271, 272. Ward no Cantonment – 04 has lowest Z-score value (-3.65) (Map 1.2).

4.3 Main Source of Lighting

It is a very important indicator of household development. There is total six categories of main source of lighting as electricity, kerosene, solar energy, other oil, any other and no lighting. There is found a lot of differences at ward level. NCT of Delhi has the highest percentage of households in the category electricity than others. So, in the present study electricity as a source of lighting has been taken.

The category of very high level of main source of lighting is represented by households in 93 wards. These wards exists in the northern part in the NCT of Delhi. Ward no. Cantt.0003 and Cantt.0004 have the highest z-score value 0.25 which shows that these wards have the highest lighting facility in middle-eastern wards of NCT of Delhi. High level wards exist in the middle-eastern and southern parts of the NCT of Delhi. Medium level wards from northern, western and some wards in the southern parts of NCT of Delhi. North western and south eastern wards of the NCT of Delhi have low level of electricity facility. Very low level of main source of lighting among the households are seen in 5 wards, most of them from middle parts of the city. In these wards very low-income group resides. These are Cantt.0002, Cantt.0008, NDMC 0008, 80, 90. Ward no Cantonment – 0002 has lowest Z-score value (-11.40).

4.4 Latrine Facility

There is found a lot of differences at ward level. NCT of Delhi has the highest percentage of households having latrine facility within the premises than others. So, in this study only number of households having latrine facility within the premises category has been taken.

The category of very high level of latrine facility is represented by households in 125 wards. Ward no. Cantt.0003, 0222, 0260 have the highest z-score value 0.77 which shows that these wards have good latrine facility. These wards exist in the middle-western, eastern and southern parts in the NCT of Delhi. The category of high level of latrine facility is represented by households in 60 wards. Some wards exist in the south eastern and some wards exist in middle-western parts of the NCT of Delhi. Medium level of main source of latrine facility is represented by households in 21 wards. Some wards exist in the north eastern, middle and some wards exist in south western parts of the NCT of Delhi. Middle northern and middle southern wards of the NCT of Delhi show the

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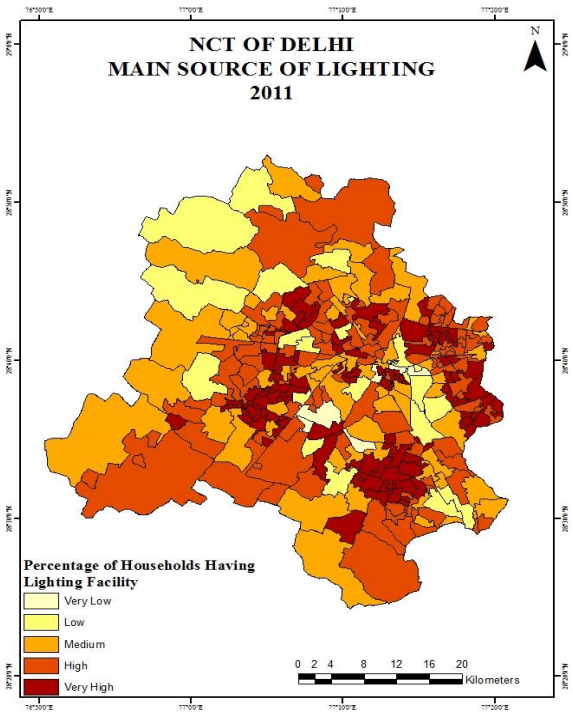
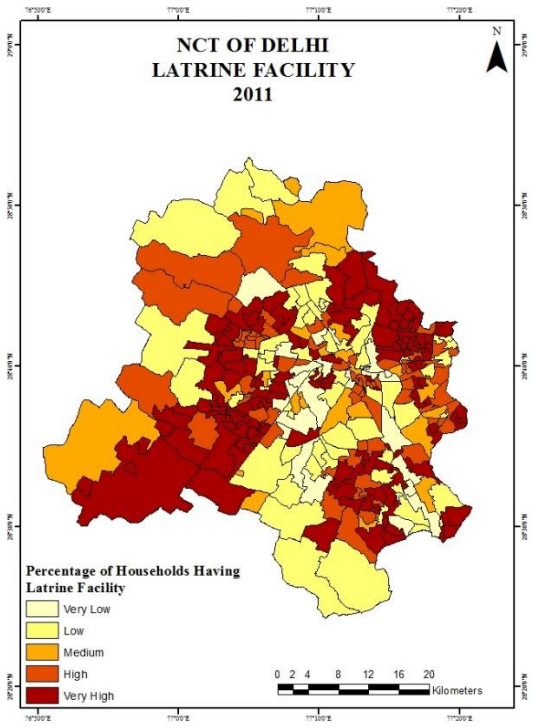
low level of households having latrine facility within the premises. Very low level of latrine facility among the households are seen in 23 wards, most of them from middle parts of the city. Ward no Cantonment – 04 has lowest Z-score value (-4.80).



Map 1.3



Map 1.4

4.5 Bathroom Facility

It is a very important indicator of quality of life. There are many categories of bathroom facility as number of households having bathing facility within the premises and number of households having not bathing facility within the premises. In the category number of households having bathing facility within the premises further two categories are there- bathroom and enclosure without roof. There are a lot of differences at ward level. NCT of Delhi has the highest percentage of households having bathroom facility within the premises than others. The category of very high level of bathroom facility is represented by households in 117 wards. Ward no. 50 and 222 have the highest z-score value 0.94 which shows that these wards have the best bathroom facility. These wards exist in the middle northern, eastern and middle-western parts in the NCT of Delhi. High level wards exist in the middle, western and south eastern parts and medium level wards are existed in the middle north and eastern parts. Middle northern and middle southern wards have low level

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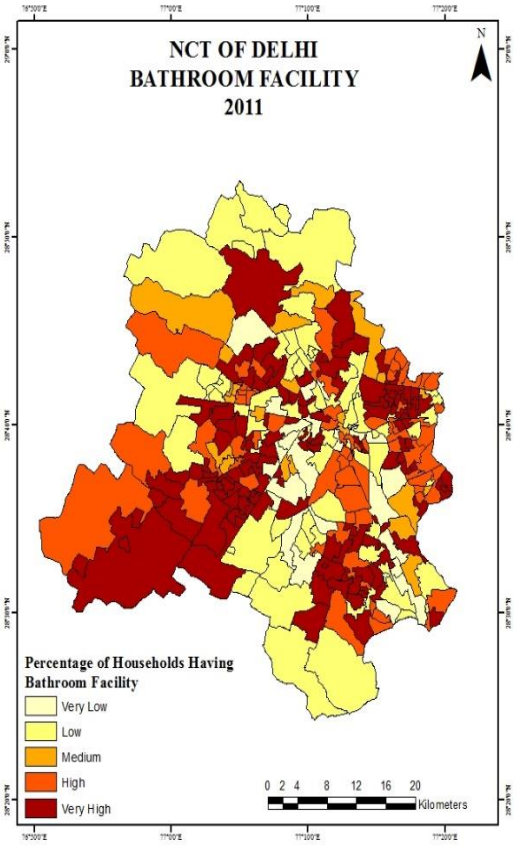
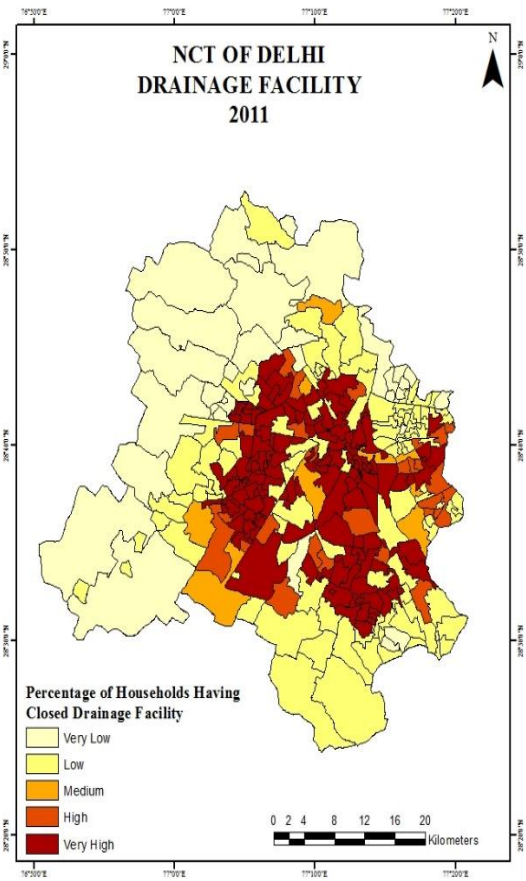
of bathroom facility. Very low level of bathroom facility among the households are seen in 24 wards, most of them exist in the middle parts of the city. Ward no 0199 has lowest Z-score value (-4.05) which shows that this ward has very low level of bathroom facility.



Map 1.5



Map 1.6

4.6 Drainage Facility

It is a very important indicator of household development. There are three categories of drainage facility as waste water outlet connected to- closed drainage, open drainage and no drainage. There is found a big variance at ward level. NCT of Delhi has the highest percentage of households having waste water outlet connected to- closed drainage. The category of very high level of drainage facility is represented by households in 126 wards. Ward no. 73, 104, 117, and 189 have the highest Z- score value among all wards which is 1.22. The wards of very high-level drainage

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facility exist in middle parts in the NCT of Delhi. High level wards exist in the middle parts and medium level wards from middle, east and southern parts of NCT of Delhi. Middle-eastern and south eastern wards of the NCT of Delhi have low level of drainage facility. These are Cantt.0004, 2-4, 17-18, 23, 26-30, 33-36, 133, 139, 140, 187, 188, 264-267, 269-272. Ward no Cantonment – 0004 has lowest Z-score value (-1.98). These wards exist in the northern and western parts in the NCT of Delhi (Map 1.6).

4.7 Fuel Used for Cooking Facility

It is a very important indicator of household development. There are many categories of type of fuel used for cooking as- fire-wood, crop residue, cow dung cake, coal, lignite, charcoal, kerosene, LPG/PNG, electricity, biogas, any other and no cooking. NCT of Delhi has the highest percentage of households having LPG/PNG. The category of very high level of cooking facility is represented by households in 107 wards. Ward no. cantt.0003 has the highest z-score value 0.99 which shows that this ward has the best cooking facility. These wards exist in the middle, eastern and south eastern parts in the NCT of Delhi. High level wards exist in the middle, eastern, north western, south western and south eastern parts and medium level wards are from middle-eastern and middle northern parts of NCT of Delhi. Low level wards exist in the middle, western, northern and southern wards of the NCT of Delhi. Ward no Cantonment – 0002 has lowest Z-score value (-5.34). The wards exist in the middle and south eastern parts in the NCT of Delhi have very low level of cooking facility.

4.8 Households having Kitchen Facility

It is a very important indicator of quality of life. There are four main categories of kitchen facility as- total, cooking inside house: has kitchen and does not have kitchen, cooking outside house: has kitchen and does not have kitchen, no cooking. There is found a lot of differences at ward level. NCT of Delhi has the highest percentage of households having kitchen in cooking inside house category. The category of very high level of kitchen facility is represented by households in 106 wards. These wards exist in the south western and middle parts in the NCT of Delhi. Ward no. 0260 and 0105 both have the same highest z-score value 1.35 which shows that these wards have the best kitchen facility. The category of high level of kitchen facility is represented by households in 59 wards. High level wards exist in the middle north, eastern, south western and south eastern parts and medium level wards from middle eastern and middle western and some wards in the northern and south eastern parts of NCT of Delhi. Northern, middle and southern wards of the NCT of Delhi have low level of kitchen facility. Very low level of kitchen facility among the households are seen in 28 wards. Ward no 0199 has lowest Z-score value (-3.93) and ward no. Cantonment – 0002 also have the low z-score value -3.33. These wards exist in the middle and southern eastern parts in the NCT of Delhi.

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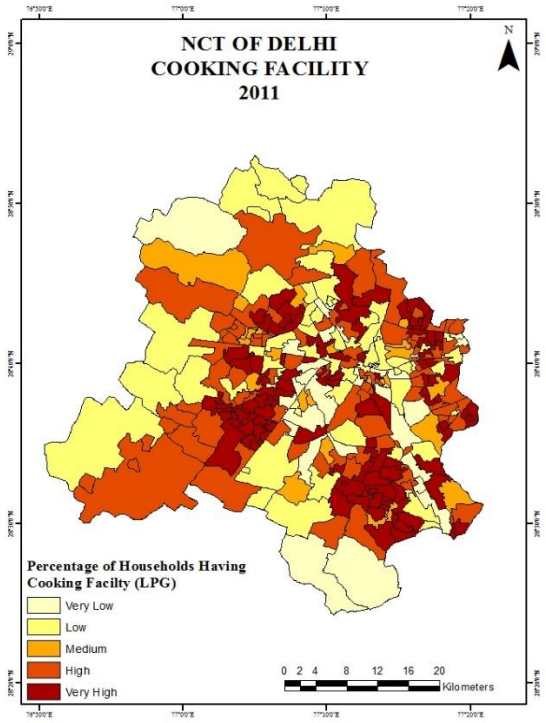
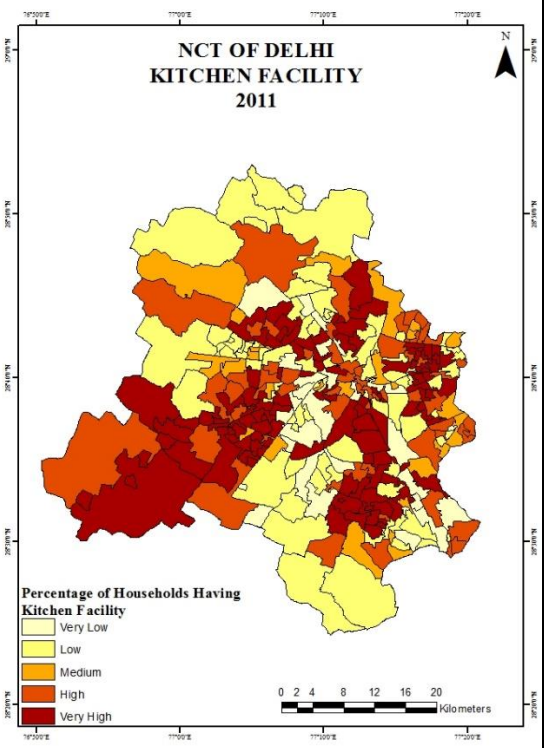


Map 1.7



Map 1.8

4.9 Census House

It is a very important indicator of household development. There are total six categories of households by type of structure of census houses- permanent, semi-permanent, total temporary, serviceable, non-serviceable and unclassifiable. NCT of Delhi has the highest percentage of permanent households by type of structure of census houses. So, in the present study only permanent households by type of structure of census houses has been taken. The category of very high level of census house is represented by households in 75 wards. Ward no. cant. 0004 has the highest z-score value 0.72 which shows that this ward has the highest percentage of permanent census houses. These wards exist in the south western, north eastern, eastern and middle parts in the NCT of Delhi. Average 50% wards exist in this category. Mostly wards exist in the middle and south eastern parts and some wards in the western parts also. Some wards exist in middle, western and some wards in the northern and southern parts of NCT of Delhi. Mostly wards exist in middle and southern parts and some wards of northern and western parts of the NCT of Delhi. These are Cantt.0002, Cantt.0005, Cantt.0008, NDMC 0009, 26, 59, 80, 81, 91, 98, 100, 111, 149, 150, 154,

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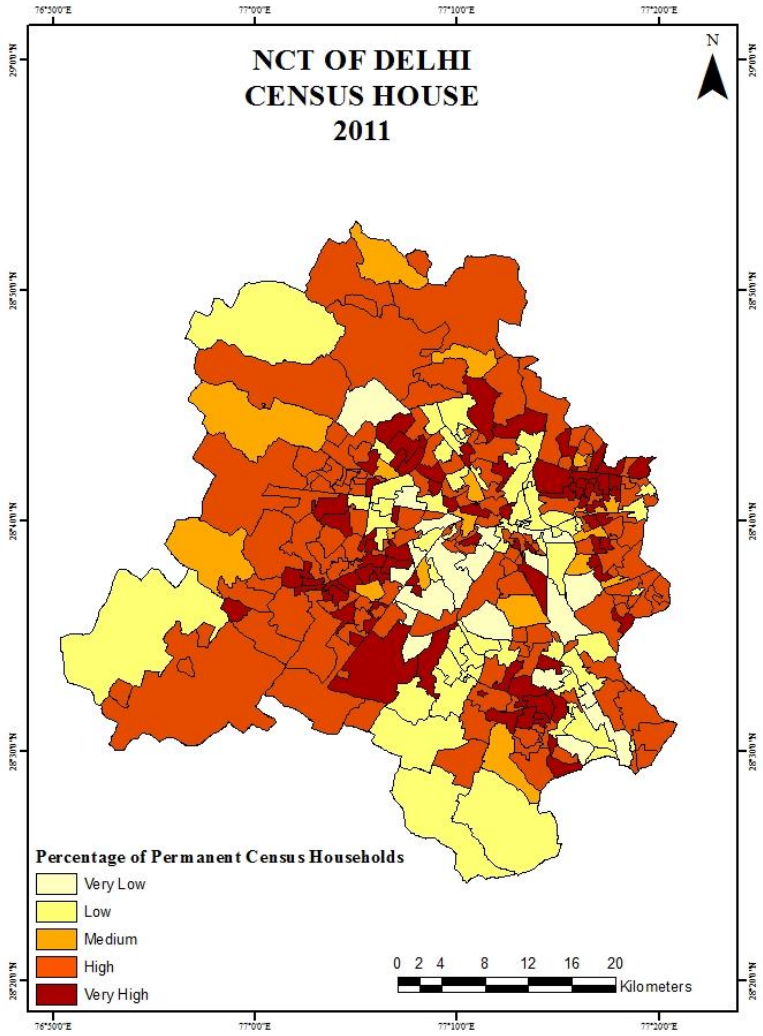
188, 192, 199, 200 and 224. Ward no Cantonment – 02 has lowest Z-score value (-9.03). These wards exist in the middle and south eastern parts in the NCT of Delhi



Spatial Variations in Household Amenities in NCT of Delhi

It is a very important indicator of quality of life. There are many indicators of household amenities according to census of India, 2011 as- main source of drinking water, location of drinking water source, main source of lighting, number of households having latrine facility, number of households having bathing facility within the premises, waste water outlet connected

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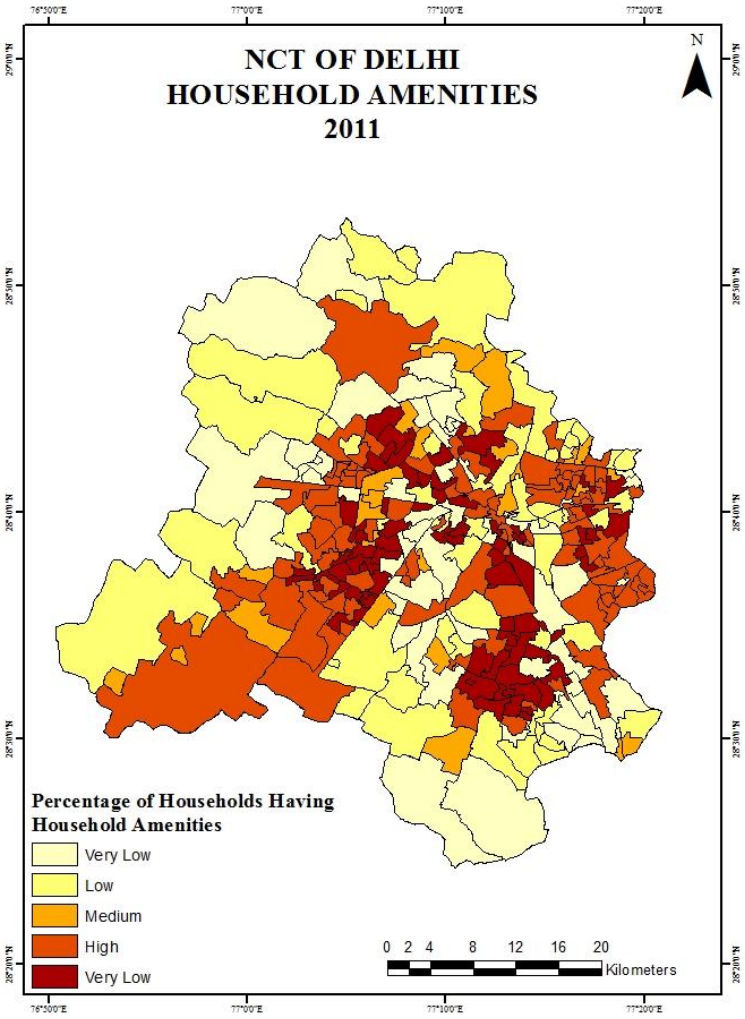
to drainage, type of fuel used for cooking, kitchen facility, households by type of structure of census houses.



Map 1.8

A composite index has been made to know the spatial variations in household amenities in NCT of Delhi. The higher value of composite index indicates higher development of household amenities and lower value shows low development. Levels of development have been categorized into five categories i.e. very low, low, medium, high and very high.

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The category of very high level of household amenities is represented by households in 72 wards. These wards exist in middle, middle-eastern and middle southern parts in the NCT of Delhi. Ward no. 105 has the highest z-score value 0.90. High level wards exist in the middle, eastern and south western parts of the NCT of Delhi. Medium level wards exist in the north eastern part of NCT of Delhi. Western, northern, middle and southern wards of the NCT of Delhi show the low level of household amenities. Ward no Cantonment – 0002 has lowest Z-score value (-39.55) and ward no. Cantt. 0008 also has the second lowest value (-4.85). This show that these wards have very low level of availability of household amenities. These wards exist in the middle and south eastern parts in the NCT of Delhi.

6.1 Conclusion

This paper shows the ward wise differences in the household amenities in the NCT of Delhi. Variables of household amenities as- main source of drinking water, location of drinking water source, main source of lighting, number of households having latrine facility, number of households having bathing facility within the premises, waste water outlet connected to drainage, type of fuel used for cooking, kitchen facility, households by type of structure of census houses have been used to find out the spatial differences in the NCT of Delhi. Wards existing in middle, middle-eastern and middle southern parts in the NCT of Delhi i.e. 105, 222, 21 have better household amenities because it covers a large areas of planned area, while wards Cantonment - 0002 and Cantonment- 0008 have very low level of availability of household amenities because these are the unplanned area and old region of NCT of Delhi. These wards exist in the middle and south eastern parts in the NCT of Delhi. Hence these wards need improvement in the housing development.

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