

Assessing the level of household Quality of Living (QoL) of Berhampore Town (City) in Murshidabad District, West Bengal, India

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Abstract

Quality of living is a multidimensional concept of an individual or a society. It has been influenced by different factors such as housing conditions, health conditions, education, assets, and other basic amenities. This research deals with assessing the level of household Quality of Living (QoL) of Berhampore Town (city) in Murshidabad district in West Bengal, India. Household Quality of Living is measured based on twenty indicators. These indicators are used as different domains like Human Capital Index, Assets Index, Basic Amenities Index, and Housing Index.

Quality of living conditions is determined based on composite scores. The result shows that living conditions differ in different parts of this town. The living condition of the central part is better than other parts of this city.

Keywords: Quality of Living (QoL); Asset Index; Housing Index; Basic Amenities Index; Domain; Composite Score.

Resumen

La calidad de vida es un concepto multidimensional de un individuo o una sociedad. Ha sido influenciado por diferentes factores, como las condiciones de vivienda, las condiciones de salud, la educación, los bienes y otras comodidades básicas. Esta investigación trata de evaluar el nivel de calidad de vida (QoL) de los hogares de Berhampore Town (ciudad) en el distrito de Murshidabad en Bengala Occidental, India. La Calidad de Vida de los Hogares se mide a partir de veinte indicadores. Estos indicadores se utilizan como diferentes dominios como el índice de capital humano, el índice de activos, el índice de servicios básicos y el índice de vivienda.

La calidad de las condiciones de vida se determina en base a puntuaciones compuestas. El resultado muestra que las condiciones de vida difieren en diferentes partes de esta localidad. La condición de vida de la parte central es mejor que otras partes de esta ciudad.

Palabras clave: Calidad de Vida (CV); índice de activos; índice de vivienda; Índice de Servicios Básicos; Dominio; Puntuación compuesta.

Resum

La qualitat de vida és un concepte multidimensional d'un individu o d'una societat. Ha estat influenciada per diferents factors com ara les condicions de l'habitatge, les condicions de salut, l'educació, els actius i altres serveis bàsics. Aquesta investigació tracta d'avaluar el nivell de qualitat de vida (QoL) de la llar de Berhampore Town (ciutat) al districte de

Murshidabad a Bengala Occidental, Índia. La qualitat de vida de les llars es mesura a partir de vint indicadors. Aquests indicadors s'utilitzen com a dominis diferents com l'índex de capital humà, l'índex d'actius, l'índex de serveis bàsics i l'índex d'habitatge.

La qualitat de les condicions de vida es determina a partir de puntuacions compostes. El resultat demostra que les condicions de vida difereixen en diferents punts d'aquesta població. Les condicions de vida de la part central són millors que les d'altres parts d'aquesta ciutat.

Paraules clau: Qualitat de Vida (QoL); Índex d'actius; Índex d'Habitatge; Índex de serveis bàsics; domini; Puntuació composta.

Introduction

Quality of living (QoL) is a multi-dimensional concept (Mendes 2000; Hirschberg et al. 2001; Fahey et al. 2004; Kironji 2008). Andre et al. (2000) confirmed that there is no universally agreed definition for Quality of Living. A glossary of definitions and explanations is that quality of living is used to mean well-being, satisfactions of life, or happiness of the people. QoL has been defined as the degree of well-being, satisfaction, and standard of living (Campbell et al. 1976). Over time, this field has been largely influenced by different factors, such as accessibility of quality housing, availability of healthy food and access to various basic services (Murray 1988; Kitchen and Muhajarine 2008). One of the major challenges of Indian cities is to improve the livability of urban dwellers. The availability and access to basic urban services and amenities plays a crucial role in determining urban livability. Since 1930s, urban planners give importance to the quality development issue of urban livelihood (Aliakbari and Amini 2010). Researchers from different fields, including geography, sociology, economy, psychology, political science, marketing, and management, have participated in this area of inquiry (Das 2008; Grasso and Canova 2008; Dunning et al. 2008; Johansson 2002; Epley and Menon 2008; Rossouw and Naude 2008; Chen and Davey 2008; Marans and Stimson 2011, Dunning et al. 2008). Urban QoL is usually measured by either subjective indicators using surveys of residents' perceptions, evaluations, and satisfaction with urban living or by objective indicators using secondary data and relative weights for objective indicators of the urban environment (McCrea et al. 2006).

The quality of living of the people in a city depends on the comprehensive development of a city or region. The living quality of people enriches with the availability of basic amenities. According to the Core-periphery model by Friedman, the development of a major region

is of two types; one, development within the region, and the other, development outside the one minor region. This model of regional development focuses on spatially diversified development. The inner-city areas enjoy considerable prosperity and peripheral region shows the sign of urban deprivation and poverty and some regions have the advantage from the surrounding rural areas (Rogers 1962,2003; Klimczuk and Klimczuk-Kochanska 2019).

India is a very highly populated country and among the total population of India, 35.4 percent of people lived in only 4000 cities in India. So, to maintain the quality of living of urban people is very important for urban administrative authority. To maintain this quality of life, it is more important to measure the quality of living in a city. In this study, the quality of living of people in Berhampore city is measured by four essential elements of life, i.e., housing conditions, basic amenities, assets, and the human capital of the household. After that, the comprehensive development of the city is analyzed according to the core-periphery model by Friedman.

The outputs from QoL studies are now being used for purposes such as policy evaluation, rating of places, and formulation of urban planning and management strategies to understand and prioritize the problems that the community faces. The studies also provide information that helps identify the problem areas, causes of dissatisfaction, people's priorities in life, and monitoring and assessing the efficiency of policies and strategies related to QoL (Tesfazghi et al. 2009).

Objectives

The main objectives are

- To measure the availability of basic amenities and services in different wards of Berhampore city.
- To examine the influence of availability and access on quality of life.

Study area

Geographically, Berhampore town (population-305, 609) is an important town (Census 2011) in Murshidabad district in West Bengal. This town is connecting north Bengal and south Bengal. Berhampore town is located just beside Bhagirathi River. The city is covered 22.67 sq. Km area. The geographical extension of Berhampore town is 24° 62'N, 88° 152' E. There are 25 wards in the town (figure-1 and 1A).

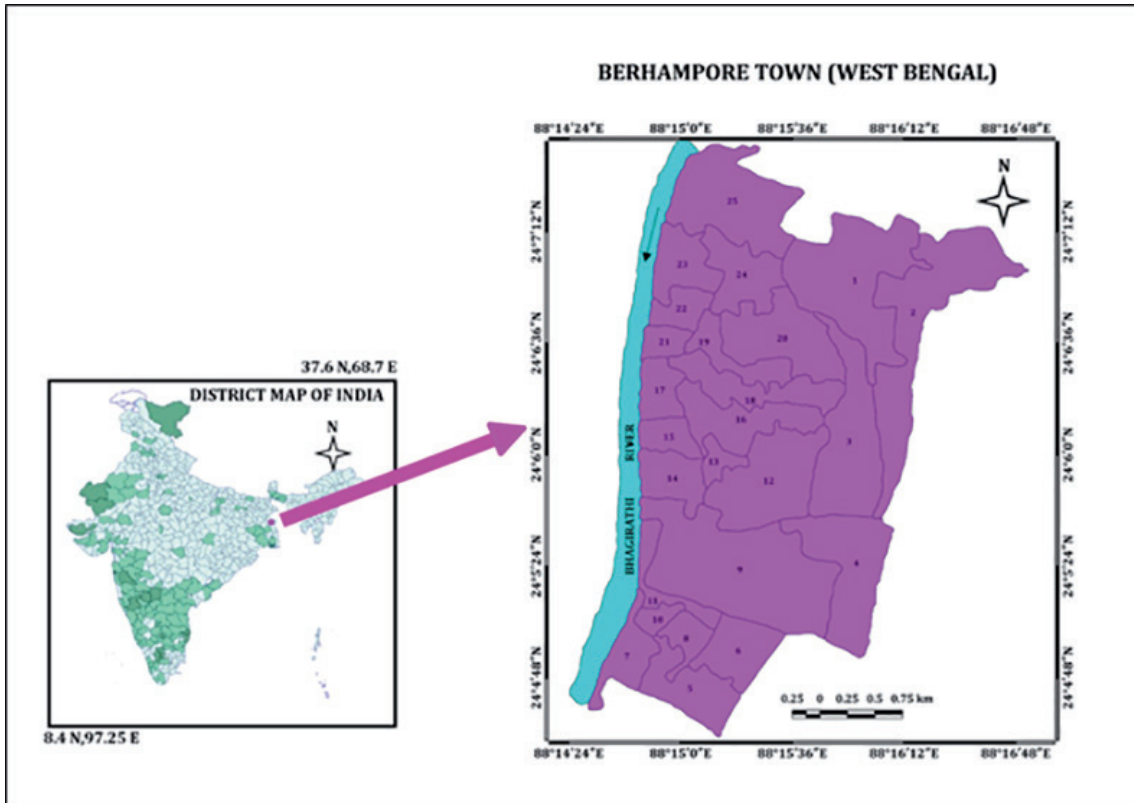


Figure.1. Location map of the study area (Berhampore Town) Figure.1. Location map of the study area (Berhampore Town)



Figure.1A. Satellite image of Berhampore Town, West Bengal, India. Source-earth. google.com. Date-19/3/2022

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Materials and Methods

Data source

This research was conducted based on two major sources of secondary data from the Berhampore municipality office and primary data from the house level primary survey (2018) respectively. These were used to extract different kinds of socio-economic data and basic amenities and basic services.

Selection of domains and Indicators

To assess the living condition of the households of Berhampore town, twenty indicators have been taken into consideration under four major domains. All indicators and domains are demarcated by different variable ID (Table-1).

Domains	Selected Indicators (%)	Variables ID	
Human Capital Index (HCI)	Literate people	LR	
	Female Literate people	FLR	
	Male Literate people	MLR	
Asset Index (AI)	Main Workers	MW	References
	Banking Service	BS	Costanza et al. (2007), Haq et al. (2010) and
	Two-wheeler	TW	Slottje (1991)
	Mobile facility	MF	
	Laptop/Computer	CMP	
Basic Amenities Index (BAI)	Television	TV	References
	Drinking-Water	DW	Haq (2009), Haq and Zia (2008), Kingdon and Knight (2006), Zorondo-Rodriguez et al. (2012),
	Electricity	ELTR	Haq et al. (2010), Pasha and Hasan (1982), Rahman et al. (2011), Siddiqui (2008),
	Latrine	LTR	
	Drainage system	DS	
Housing Index (HI)	Liquid petroleum gas	LPG	References
	Census House	CH	Kingdon and Knight (2006), Li et al. (2010), Ura
	Permanent House	PH	et al. (2012), Das et al. (2019a, b) and Das et al. (2019)
	Kitchen Facility	KF	
	Roof with concrete materials	RCM	
	Wall materials with burn bricks	WMBB	
	Two Dwelling Room	DR	

Table1. Major domains and indicators

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Total	% of Variance	Cumulative %	
1	11.197	55.987	55.987	11.197	55.987	11.005	55.024	55.024	
2	3.879	19.395	75.381	3.879	19.395	3.871	19.353	74.377	
3	2.017	10.087	85.469	2.017	10.087	2.218	11.092	85.469	
4	.983	4.915	90.383						
5	.558	2.790	93.173						
6	.358	1.788	94.962						
7	.286	1.432	96.394						
8	.232	1.161	97.555						
9	.142	.712	98.267						
10	.128	.641	98.909						
11	.062	.312	99.220						
12	.042	.210	99.431						
13	.036	.181	99.611						
14	.031	.155	99.766						
15	.020	.098	99.865						
16	.016	.078	99.943						
17	.008	.041	99.984						
18	.002	.012	99.996						
19	.001	.004	100.000						
20	7.628E-09	3.814E-08	100.000						

Extraction Method: Principal Component Analysis.

Table2. Total Variance

Methods

Standardization of indicators

Scale equivalence or standardization is a statistical technique. This technique is used to transform the data set to a specific range (0-1) because some variables have a large range of variance and some have a small range of variance. This technique is applied to create a strong relationship among the data set (Quackenbush 2002; Miller and Roath 1994; Ketchen and Shook 1996; Das et al 2019; Das et al 2019; Das et al 2020; OECD 2008; Goal and Garg 2018). Normalization is conducted with the help of the following equation-

$$Xid=(OBval-MINval)/(MAXval-MINval) \quad (1)$$

Where Xid is the Range Equalization Method, $OBval$ stands for the actual value of i th Wards; $MINval$ represents the minimum value of i th Wards and $MAXval$ has represented the maximum value of the i th Wards.

For this study, twenty variables have been used under four domains (Table-1). Every variable is normalized through the above formula.

Principal component analysis (PCA)

PCA is a dimensional reduction statistical technique that is used (orthogonal transformation) to convert a large data set into a small data set (interrelated variables into a set of uncorrelated variables)(Horelling 1933; Krishnakumar 2008; Biswas 2002; Lai 2003). This orthogonal transformation conduct in such a way that is PC1, PC2, PC3, PC4 so, on (table-3). The first principle component (pc1) has the largest possible variance and following the constraint each of the next principal components (pc2, pc3, pc4 so, on) has the highest possible variance (Malhotra and Dash 2018; Abdi et al 2010; Uddin et al 2019). For the making of the Living Condition Index, the weightage for each considered variable was computed with the help of PCA. The first principal component score coefficient was used as weight because it explains the maximum percentage of variance (Das et al 2019; Das et al 2020). The weights used in this case are elements of the Eigenvector corresponding to the highest Eigenvector of the correlation matrix (R) are of the selected variables. Eigenvector (table-2) has been used here as it gives relative importance to each variable which is very important for the identification of less development (Sharma 2017).

	Component		
	1	2	3
Percentage of Literacy Rate (LR)	.002	.258	-.032
Percentage of female literacy rate (FLR)	.010	.245	-.047
Percentage of male literacy rate (MLR)	-.005	.257	-.016
Percentage of Main Workers (MW)	-.023	.243	-.011
Percentage of Banking service (BS)	.064	-.022	.160
percentage of Two Wheelers (TW)	.054	-.013	.206
Percentage of Mobile facility (MF)	.089	-.033	-.128
Percentage of Computer (CMP)	.009	.037	.312
Percentage of Television (TV)	.088	-.024	.015
Percentage of Drinking water (DW)	.087	.029	-.074
Percentage of Electricity (ELTR)	.092	-.046	-.068
Percentage of Latrine (LTR)	.097	.011	-.136
Percentage of Drainage System (DW)	.085	.047	-.175
Percentage of Liquid petroleum gas (LPG)	.056	-.029	.208
Percentage of Census House (CH)	.065	.035	.038
Percentage of permanent house (PH)	.097	-.001	-.140
Percentage of Kitchen facility(KF)	.048	-.035	.234
Percentage of Roof Concrete materials(RCM)	.076	-.006	.082
Percentage of wall materials with burn bricks (WMBB)	.095	-.010	-.165
Percentage of two dwelling room (DR)	.080	.015	-.290
Extraction Method: Principal Component Analysis.			
Rotation Method: Quartimax with Kaiser Normalization.			

Correlation analysis

Multivariate analysis was performed of the selected variables in this study using SPSS software (version 22). Pearson correlation coefficient was used to examine the relationships among various indicators applying the following equation (Das et al 2020):

$$(r) = \frac{N\sum xy - (\sum x)(\sum y)}{\sqrt{[N\sum x^2 - (\sum x)^2][N\sum y^2 - (\sum y)^2]}} \quad (2)$$

where r = Pearson correlation; N = number of pairs of scores; $\sum xy$ = sum of the products of paired scores; $\sum x$ = sum of x scores; $\sum y$ = sum of y scores; $\sum x^2$ = sum of squared x scores; $\sum y^2$ = sum of squared y scores respectively. In this study, level of living was considered as a dependent variable and twenty variables were taken into consideration as independent variables.

ANOVA				Sum Squares	df	Mean Square	F	Sig.
Human Capital Index	Between Groups	(Combined)		.092	23	.004		
		Linear Term	Weighted	.060	1	.060		
	Deviation		.032	22	.001			
	Within Groups			0.000	1	0.000		
	Total			.092	24			
Asset Index	Between Groups	(Combined)		.011	23	.000	57.405	.104
		Linear Term	Weighted	.005	1	.005	565.445	.027
	Deviation		.006	22	.000	34.312	.134	
	Within Groups			.000	1	.000		
	Total			.011	24			
Basic amenities index	Between Groups	(Combined)		.010	23	.000	12.995	.216
		Linear Term	Weighted	.004	1	.004	126.067	.057
	Deviation		.006	22	.000	7.855	.275	
	Within Groups			.000	1	.000		
	Total			.010	24			
Housing Index	Between Groups	(Combined)		.008	23	.000	42.033	.121
		Linear Term	Weighted	.003	1	.003	397.958	.032
	Deviation		.005	22	.000	25.855	.154	
	Within Groups			.000	1	.000		
	Total			.008	24			

Table 4. ANOVA

One way ANOVA analysis

One-way analysis of variance (ANOVA) is generally used to assess the significant difference between as well as within variables respectively. On the other hand, one ANOVA analysis is used to test the statistical significance of the variables (Das et al 2019). In this research one-way ANOVA (Table-4) was used to assess whether there is a significant variety of various basic amenities and services across districts exist or not. But through the analysis of the way ANOVA only the significant differences within and between variables can address and it ever tells us where this difference exactly lies (Das et 2020).

One way ANOVA analysis was performed using following equation:

$$F = MST/ MSE \quad (3)$$

$$MST = \sum_{i=1}^k (t_i/n_i) - G_2/n/ (k-1) \quad (4)$$

$$MSE = \sum_{i=1}^k \sum_{j=1}^k Y_{ij}^2 - \sum_{i=1}^k (t_i/n_i) /k-1 \quad (5)$$

There F is the variance ratio for the overall test, MST is the mean square due to treatments/ groups (between groups), MSE is the mean square due to error (within groups, residual mean square), Y_{ij} is an observation, T_i is a group total, G is the total of all observations, n_i is the number in group i and n is the total number of observations. To valid this, the null hypothesis was drawn as $H_0 =$ there is no significant difference in terms of the availability of basic services and amenities in Berhampore town.

Construction of Living Condition Index (LCI)

Living conditions of the households can be accessed from several approaches such as housing condition of the households, availability of assets, Human capital, and availability of basic services (McGillivray 2005; Wong 2012; Haq and Zia 2013; Ferrara and Nistico 2014; Singh et al 2004; Vyas 2006). Assessing the living condition of the households assist the researchers to examine the state of development of any region which largely depends on the selection indicators. The selection of variables should be taken into consideration based on either theoretical construct or availability of data set for constructing a composite index (Hanafin and Brooks 2005 Das et al 2019; Das et al 2020). Based on the above-mentioned circumstances and after consideration of the availability of data from the District Statistical Handbook and Household level primary Survey, 20 indicators have been selected to measure the living condition of the households through a composite index (CI). A composite index is the simple average of all the indices, which is used to measure development. The value of the composite index varies from 0 to 1. For computing the composite index at first making all the indicators scale-independent using scale equivalence method. Then compute the weight with the help of PCA (personal component analysis).

The first PCs (personal component) drive from PCA is used as weight. To construct the living condition index (LCI) of the households, three individual indexes have been developed namely—(1) HI (Housing quality of living), (2) BAI (Basic Amenities Index), (3) AI (Assets index) and Human Capital Index (HCI). The selected 20 indicators come under these four indices. The whole procedure of the composite index is expressed as follows (Haque 2016).

$$HI = Sdi = a, b, c...n \times Wb \quad (6)$$

$$HCI = Sdi = a, b, c...n \times Wb \quad (7)$$

$$AI = Sdi = a, b, c...n \times Wb \quad (8)$$

$$BAI = Sdi = a, b, c...n \times Wb \quad (9)$$

where HI = Housing Index, HCI = Human Capital Index, AI = Assets Index, Sd = Scale free observed value, i = a, b, c...n = indicators of subindices, wb = component score.

$$LCI = (H_{Index} + HC_{Index} + A_{Index} + BA_{Index}) / N_{indices}$$

where LCI = Living Condition Index; H_{Index} = Housing Index, HC_{Index} = Human capital index, A_{Index} = Assets Index, BA_{Index} = Basic Amenities Index respectively. Methodological frame of construction of Living Condition given below (fig-2)

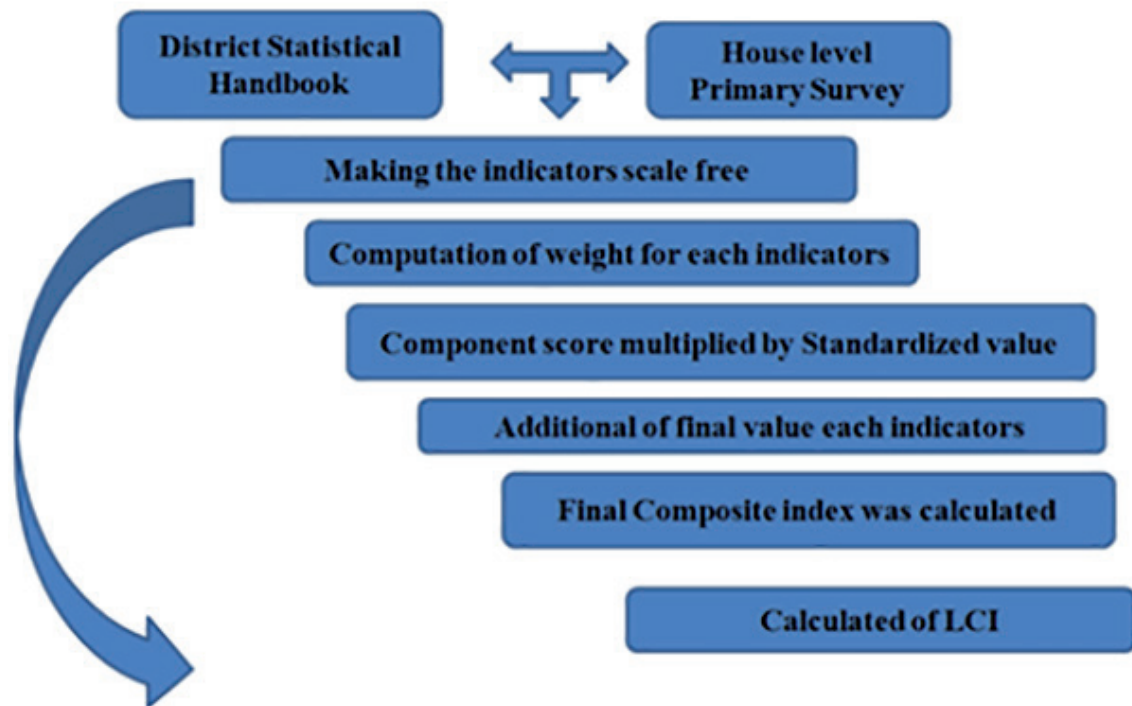


Figure 2- Methodological Frame-Work

Software used

All the statistical analysis was performed in SPSS software (version 22) and spatial mapping was performed in Qgis-3.12 software.

Result and Discussion

Availability of basic amenities to the households

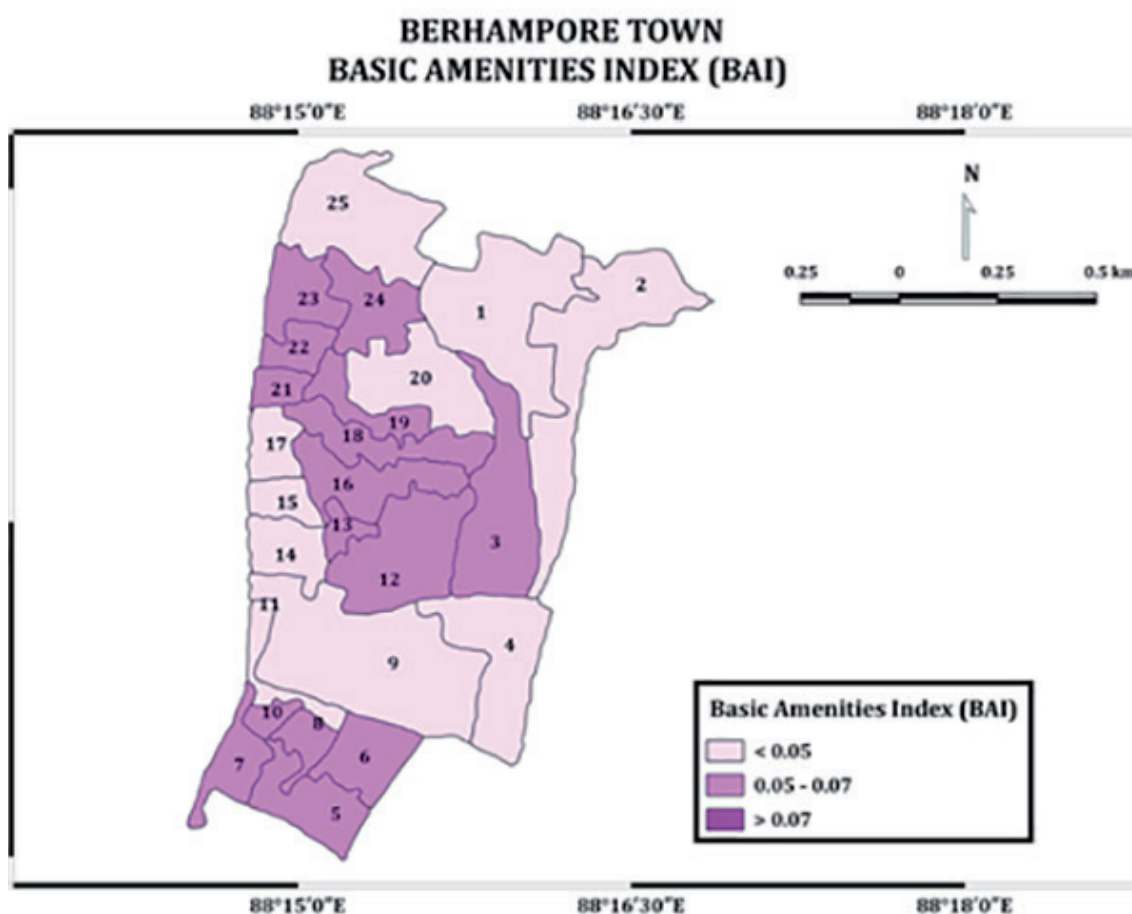


Figure 2- Basic amenities index map

In Berhampore town, 83.4% of people have drinking water facilities within premises (2018, Statistical Hand Book). More than 90 percent of households have drinking water within the premise in Wards no-5, 3, 6, 8, 12, 13, 16, 18, 22, 24. The drinking water sources of this town are hand pumps (71.9%), tube wells (16.6%), tap water from the treated source (9.3%), and tap water from the untreated source (0.8%). Wards no-24, 14, 1, 2 of households are more than 90 percentage hand pump as the main source of drinking water. This town is situated beside the Bhagirathi River in the Gangetic plain. So groundwater is within easy reach.

The availability of electricity in this town is overall good. More than 87 percent of town dwellers have the facility of electricity. Maximum facility of electricity is shown in ward

Domain	Basic amenities	Variable ID	Maximum	Minimum	Average
Asset Index (AI)	Banking Service	BS	96.2 (Ward No-5)	36.0 (Ward No-1)	74.84
	Two-wheelers	TW	41.4 (Ward No-5)	5.6 (Ward No-14)	24.36
	Mobile facility	MF	78.8 (Ward No-7)	42.6 (Ward No-1)	65.88
	Laptop/Computer	CMP	26.5 (Ward No-12)	3 (Ward No-14)	12.62
Basic Amenities Index (BAI)	Television	TV	95.6 (Ward No-5)	55.7 (Ward No-1)	81.07
	Drinking-Water	DW	97.7 (Ward No-5)	43.2 (Ward No-11)	79.04
	Electricity	ELTR	98.5 (Ward No-5)	56.5 (Ward No-1)	87.49
	Latrine	LTR	99.6 (Ward No-19)	59.7 (Ward No-10)	90.78
	Drainage system	DS	91.6 (Ward No-3)	30.6 (Ward No-1)	69.95
Housing Index (HI)	Liquid petroleum gas	LPG	88.3 (Ward No-5)	18.7 (Ward No-1)	59.54
	Census House	CH	89.3 (Ward No-5)	31.9 (ward No-1)	61.41
	Permanent House	PH	99.1 (Ward No-5)	62.4 (Ward No-1)	89.968
	Kitchen Facility	KF	89.4 (Ward No-5)	25.5 (Ward No-14)	67.64
	Roof with concrete materials	RCM	90.5 (Ward No-12)	27.3 (Ward No-14)	68.89
	Wall materials with burn bricks	WM BB	98.8 (Ward No-10)	55.7 (Ward No-1)	88.72
	Two Dwelling Room	DR	40.4 (Ward No-18)	20.6 (Ward No-11)	32.44

Table 5- Availability of basis amenities of households (%)

no – 8 (97.9%), 10 (97.8%), 15(90.6%), 16 (94.7%), 18 (95.5%), 22 (97.5%), 23 (91.6%), 21(95.4%), and 24 (95.3%) and comparatively low is shown in ward no-1(56.5%), 4(68.1%), 2(65.7%). Town dwellers also used kerosene (10.9%) and solar energy (1.2%) as a source of light. In ward no. 11,14,15,17, most of the people have lived in the slum area and wards no. 1, 2, 4 are newly added under the Berhampore municipality. So they cannot afford electricity infrastructure in their house till now.

More than 90.9 % number of households have latrine facilities and 69 % of households used pour-flush latrine connected to the septic tank and 7.2 % of people used pour-flush latrine connected to the piped sewer system. Pit latrine (11.5%) used within different wards in this town. The highest number of latrine facilities are shown in ward no. 5 (99.5%), 22 (98.9%), 19 (99.6%), 24 (98%), and comparatively lowest number of latrine facilities are shown ward no-11 (59.7%), 4 (71.5%). These two wards have still not taken advantage of the Government initiative of ‘Swaccha Bharat Mission’ yet.

The drainage system is one of the basic amenities in a town. In this town, it is shown 71 percent open drainage and closed drainage 14.6 percent. The maximum open drainage system is shown in ward no. 3 (91.6%), 8 (86.9%), 15 (87.6%) and comparatively low in ward no.1 (30.6%), 2 (46.5%), 11 (34.2%), 9 (52.5%). These wards are extended recently by the municipality. So there have weak infrastructures of the drainage system.

In 59 % of households, urban dwellers are used LPG (Liquified petroleum gas), 21.3% of households used coal, lignite, charcoal, 3.9% of people used cow dung cake, and 11.7% of people used firewood for Cooking in this town. Urban dwellers of ward no-12(85.2%), 5 (88.3%), 6 (86.3%) maximumly are used LPG gas and lowest used in ward no. 1 (18.7%), 2 (36.1%), 14 (22%) 25 (27.1%). Ward no-1 and 2 are belonged to the rural panchayat area in past, now it has belonged to the municipality. So there are used fuels for cooking like cow dung cake, wood, coal. Ward no-14 has belonged to the slum area. They can’t get the advantage of ‘Ujjala Gas Yojana’ and are not able to purchase LPG.

Availability of assets to the households

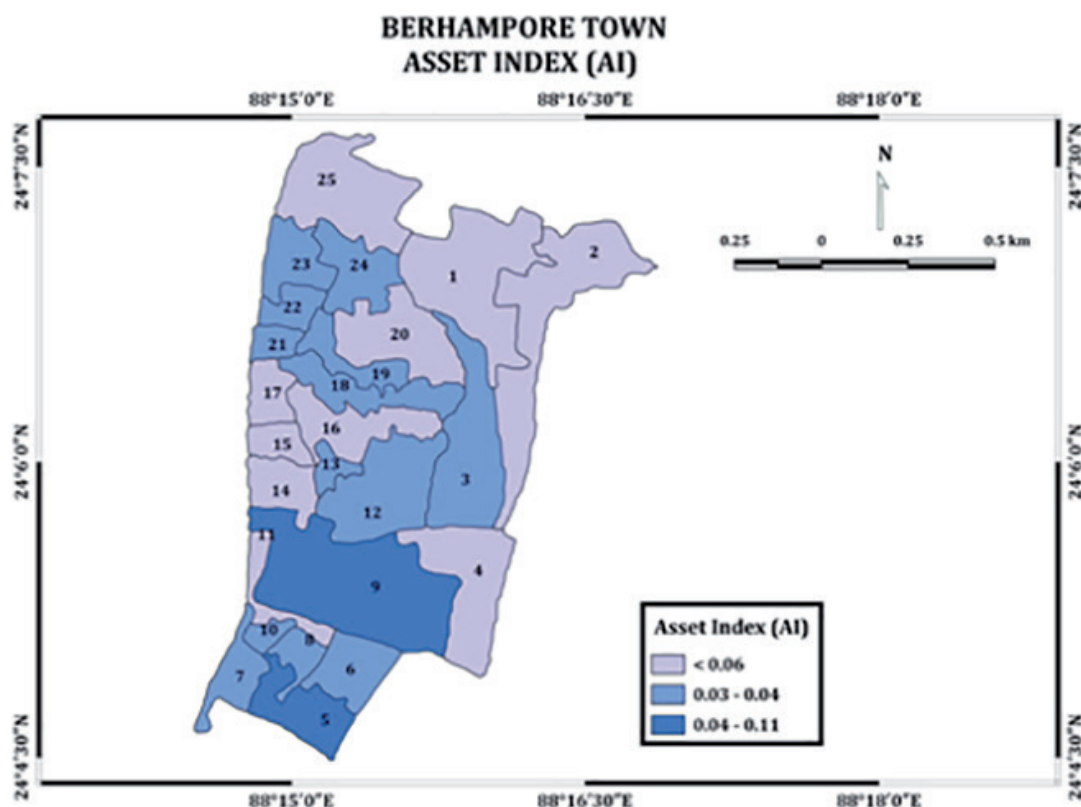


Figure 3- Asset index map

In this study, banking facility, T.V, Computer or laptop, mobiles phone, and two-wheelers are considered as an asset of the households. 74.6 % households have Banking facility in this town, Maximum number of banking facilities are shown ward no-5 (96.2%), 6 (93.4%), 16 (93.3%), 8 (93.3%) and 16 (93.3%) and minimum numbers are shown in ward no-1(36%), 2(58.1%), 4 (66.7%), 14(36.7%), 11(57.2%), and 25(48.9%). In this town, T.V has been used in 84% of households as a social medium. In ward no-5 (95.6%), 6 (91.2%), 8 (93.5%), 16 (91.4%) maximum people brought TV for entertainment purpose and lowest shown in ward no.1 (55.7%), 4 (61.7%), 11 (65.9%). That means the economic condition of people in wards no. 5, 6, 8, 16 are better than others. The uses of mobile phone in wards no-5 (77%), 7(78.8%), 19 (71.4%), 21(74.8%), 18 (70.2%), 10 (75.6%) and lowest percentage are shown in wards no-1(42.6%), 4(43.9%), 25(58.1%), 10(75.6%). Two-wheelers (24.6%) and four-wheelers (3.3%) have been used in this town. According to asset index, map showing (fig-3) ward no- 9 and 5 has the highest asset to the households and lowest is shown ward no- 1,2,14,15,17,25,20,4. From the analysis, the asset index is the high middle zone of the town. This part is influenced by the Central Business District zone. Other hand new wards (1, 2, 4, and 25) which are belonged to the edge of the city have a low asset index. These wards are influenced by the rural area.

Housing condition of the households

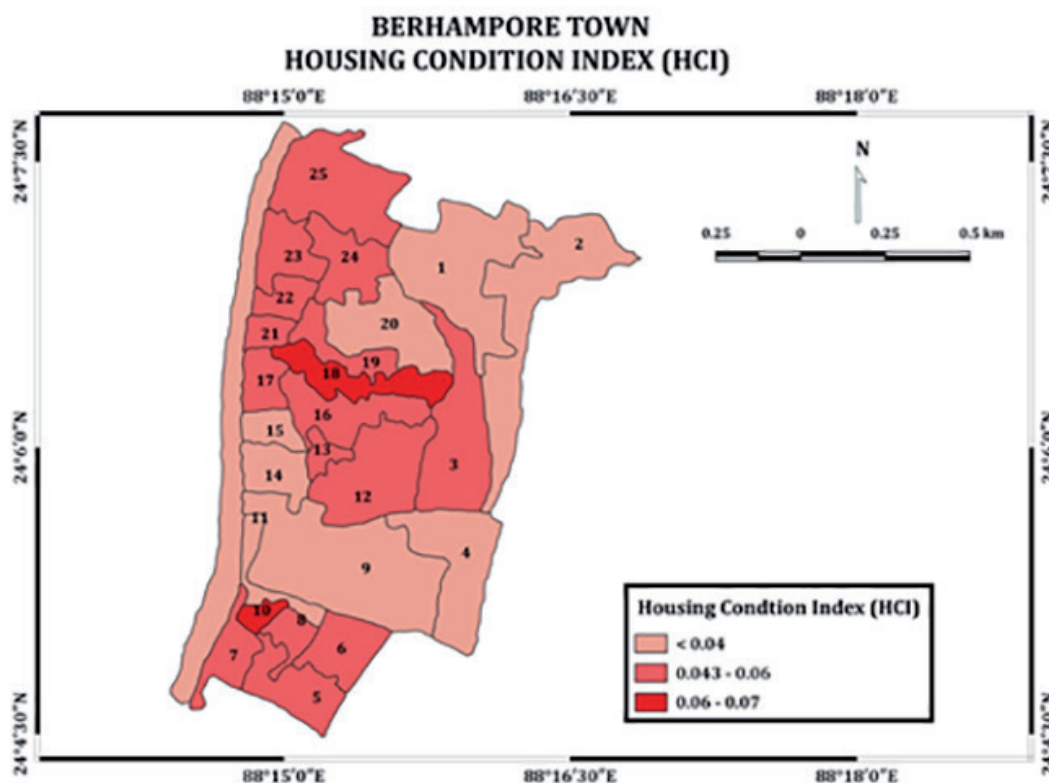


Figure 4- Housing condition index (HCI)

According to data, ninety percent of the house in some wards are good and livable. A relatively high percentage is seen in ward no-5 (89.3%), ward no-16 (84.5%), ward no-24 (81.9%), ward no-10 (77.8%) and ward no-3 (77.1%).

The percentage of ownership and permanent households in this study area is different in different wards. Although the ward level percentage is very close. The highest percentage of own households are seen in ward no-5 (99.1%), ward no-18 (97.8%), wards no-22 (97.6%).

The walls, roof, and floor of the house have been made by the different materials in this area. Different materials are used on the roof of the house like hand-made tiles, asbestos sheets, concretes, etc. Almost every ward has been used with hand-made tiles and concrete as the roof materials for the house. It has a comparatively close percentage as it is lowest in ward no-5 (4.5%, 89.3 %), ward no-21 (5.8%, 65.6 %) and highest in ward no-14 (68.1%, 27.3%), ward no- 1(53.4%, 32.4%), ward no-11 (48.4%, 29.1%). Every house almost here is made of burnt bricks. The percentage is highest in ward no-5 (98.6%) and lowest in ward no-1 (55.7%). If some house walls are made of grass/thatch/bamboo.

The settlements have been used in separate kitchens and bathrooms. The highest percentage has been seen in ward no-5(89.4%, 93.8%), ward no- 16 (89.1%, 91.1%), ward

Domain	Basic amenities	Variable ID	Maximum	Minimum	Average
Asset Index (AI)	Banking Service	BS	96.2 (Ward No-5)	36.0 (Ward No-1)	74.84
	Two-wheelers	TW	41.4 (Ward No-5)	5.6 (Ward No-14)	24.36
	Mobile facility	MF	78.8 (Ward No-7)	42.6 (Ward No-1)	65.88
	Laptop/Computer	CMP	26.5 (Ward No-12)	3 (Ward No-14)	12.62
Basic Amenities Index(BAI)	Television	TV	95.6 (Ward No-5)	55.7 (Ward No-1)	81.07
	Drinking-Water	DW	97.7 (Ward No-5)	43.2 (Ward No-11)	79.04
	Electricity	ELTR	98.5 (Ward No-5)	56.5 (Ward No-1)	87.49
	Latrine	LTR	99.6 (Ward No-19)	59.7 (Ward No-10)	90.78
Housing Index(HI)	Drainage system	DS	91.6 (Ward No-3)	30.6 (Ward No-1)	69.95
	Liquid petroleum gas	LPG	88.3 (Ward No-5)	18.7 (Ward No-1)	59.54
	Census House	CH	89.3 (Ward No-5)	31.9 (ward No -1)	61.41
	Permanent House	PH	99.1 (Ward No-5)	62.4 (Ward No-1)	89.968
	Kitchen Facility	KF	89.4 (Ward No-5)	25.5 (Ward No-14)	67.64
	Roof with concrete materials	RCM	90.5 (Ward No-12)	27.3 (Ward No-14)	68.89
	Wall materials with burn bricks	WM BB	98.8(Ward No-10)	55.7 (Ward No-1)	88.72
Two Dwelling Room	DR	40.4 (Ward No-18)	20.6 (Ward No-11)	32.44	

Table 5- Availability of Basic Amenities of Households (%)

no-12 (86.7%, 91.8%) and the lowest has been seen in ward no-1 (34.4%, 39.6%), ward no-25 (45.8%, 51.5%).

The housing index map (figure-4) is showing, overall housing conditions are comparatively better inwards no-10, 18. Traders and businessmen are living in these wards.

Level of Quality of Living in Berhampore town

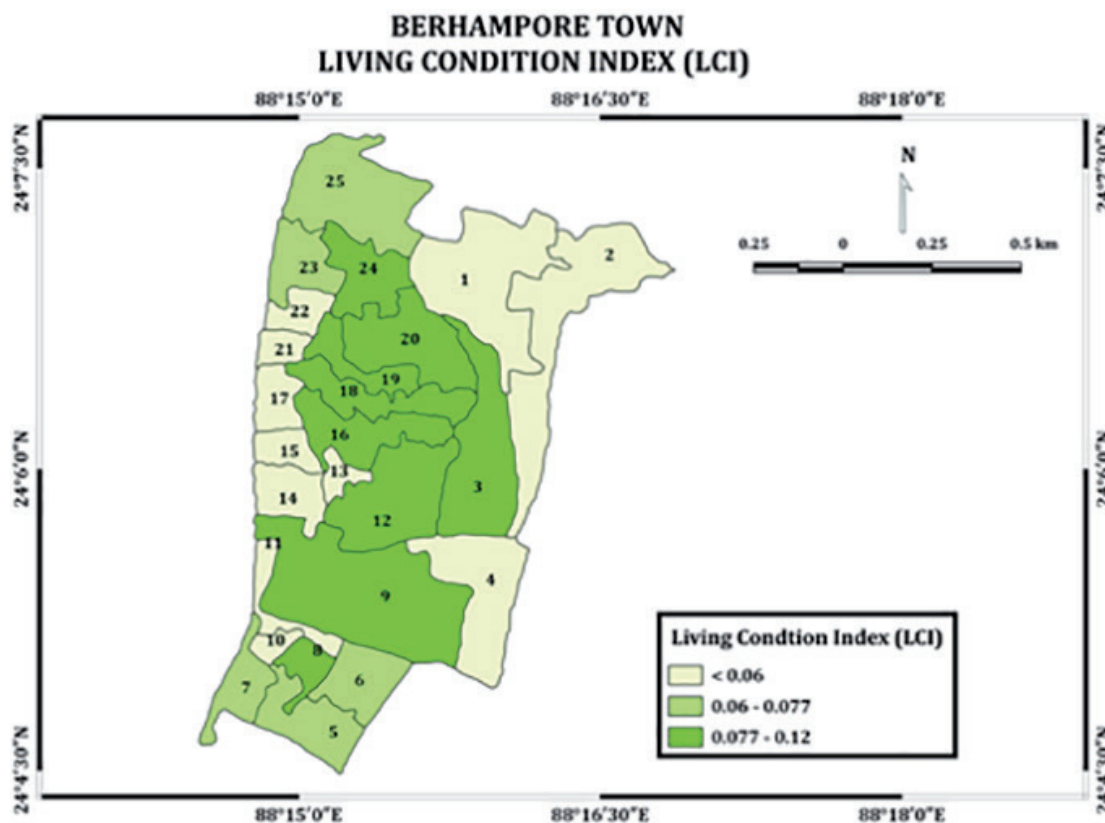


Figure 5- Living Condition Index (LCI)

Based on the composite index (Table-4, Fig-5); Berhampore town has been divided into three categories of level of development shown in the table. A higher value of the composite index shows a higher level of development and vice versa. From Table-6 and, one can easily observe (fig-4) in terms of quality of living. As per as composite score value, it is observed that wards carry the high quality of living namely wards no-3, 8, 9, 12, 16, 18, 19, 20, 24 for the composite score, and other wards quality of living is very poor like wards no-1, 2, 4, 10, 11, 14, 13, 15, 17, 21, 22. There is a high quality of living in the middle part of the city. This area is influenced by the central business district zone. Urban dwellers consume more facilities in this area. Health, police station, school, college, cinema hall, shopping mall, hotel, restaurants are belonged to in this zone. On the other hand, low quality of living belonged to the left and right edge of the city. Slum populations are living in wards no-11, 13, 14, 17, 21, and 22 which are left side of the city. Wards no-1, 2, and 4 are encroached by the municipality recently. So these wards are influenced by rural culture.

Correlation		LR	FUR	MUR	MW	TW	MEF	CMP	TV	DW	ELTR	LTR	DS	UPG	CH	PH	KF	RCM	WMBB	DR	
LR		1.000																			
FLR		.970	1.000																		
MLR		.977	.895	1.000																	
MW		.874	.756	.934	1.000																
BS		.136	.151	.108	-.058	1.000															
TW		.184	.241	.126	-.077	.100	1.000														
MEF		-.031	-.016	-.043	-.137	.508	.100	1.000													
CMP		.340	.340	.322	.200	.780	.129	.100	1.000												
TV		.087	.136	.040	-.126	.839	.788	.518	.100	1.000											
DW		.239	.279	.152	-.032	.761	.740	.367	.650	.100	1.000										
ELTR		-.028	.050	-.103	-.236	.687	.754	.344	.513	.704	.100	1.000									
LTR		.149	.206	.052	-.114	.688	.788	.307	.851	.533	.766	.100	1.000								
DS		.249	.339	.159	-.023	.530	.493	.221	.665	.626	.752	.677	.100	1.000							
UPG		.117	.144	.069	-.057	.941	.591	.735	.875	.726	.724	.675	.515	.100	1.000						
CH		.284	.313	.246	.014	.741	.562	.461	.717	.789	.572	.683	.512	.729	.100	1.000					
PH		.104	.137	.026	-.119	.621	.736	.375	.868	.701	.516	.791	.802	.637	.571	.100	1.000				
KF		.106	.131	.079	-.056	.894	.593	.693	.829	.620	.684	.591	.393	.599	.706	.559	.100	1.000			
RCM		.172	.207	.133	-.050	.893	.652	.617	.512	.605	.609	.511	.653	.593	.781	.755	.872	.100	1.000		
WMBB		.054	.146	-.028	-.148	.548	.713	.265	.830	.637	.529	.750	.779	.564	.479	.595	.497	.665	.100	1.000	
DR		.021	.033	.030	-.123	.179	.532	-.072	.428	.601	.397	.674	.430	.385	.480	.509	.154	.427	.444	.100	1.000
Sig. (1-tailed)																					
LR																					
FLR		.000																			
MLR		.000	.000																		
MW		.000	.000	.000																	
BS		.258	.221	.304	.392																
TW		.189	.123	.274	.357																
MEF		.442	.471	.420	.257	.005															
CMP		.048	.048	.058	.169	.000	.270														
TV		.340	.239	.454	.274	.000	.000	.004													
DW		.125	.089	.179	.439	.000	.000	.028	.000												
ELTR		.447	.389	.312	.128	.000	.000	.046	.000	.000											
LTR		.239	.151	.331	.294	.000	.000	.068	.000	.000	.000										
DS		.115	.049	.223	.456	.008	.006	.144	.000	.000	.000	.000									
UPG		.288	.246	.337	.375	.000	.001	.000	.000	.000	.000	.000	.000								
CH		.084	.054	.118	.473	.000	.002	.007	.000	.000	.000	.000	.004	.000							
PH		.311	.195	.451	.285	.000	.000	.033	.000	.000	.000	.000	.000	.000	.001						
KF		.307	.257	.353	.379	.000	.001	.000	.000	.000	.000	.001	.036	.000	.000	.002					
RCM		.206	.190	.264	.405	.000	.000	.001	.000	.000	.000	.000	.000	.000	.000	.000	.000				
WMBB		.398	.243	.446	.247	.008	.000	.100	.000	.000	.000	.000	.000	.002	.008	.000	.006	.000			
DR		.460	.438	.462	.278	.196	.003	.365	.016	.001	.025	.000	.016	.388	.008	.005	.231	.017	.013		

a. Determinant = 2.40E-027

Table 6- Correlation Matrix

Table-7 Classification of blocks based on the composite score value			
Composite Score (CS)	Level of quality of Living	Wards Numbers	No of Wards
<0.06	Low	1,2,4,11,14,21,13,15,17,10, 22,	9
0.06- 0.077	Medium	5,6,7,23,25,	10
0.077-0.12	High	3, 8, 9,16,12,20, 24, 18, 19.	6

Descriptive Statistics				
		Mean	Std. Deviation	Analysis N
Percentage of Literacy Rate (LR)	39.9956		13.19374	25
Percentage of female literacy rate (FLR)	39.9964		13.32308	25
Percentage of male literacy rate (MLR)	39.9948		13.75633	25
Percentage of Main Workers (MW)	39.9952		15.94871	25
Percentage of Banking service (BS)	74.8480		16.78271	25
percentage of Two Wheelers (TW)	24.3600		9.38017	25
Percentage of the Mobile facility (MF)	65.8880		9.36885	25
Percentage of Computer(CMP)	12.6280		6.64991	25
Percentage of Television (TV)	81.7040		11.38147	25
Percentage of Drinking water(DW)	82.8560		13.98285	25
Percentage of Electricity(ELR)	87.4960		11.70219	25
Percentage of Latrine(LTR)	90.7840		10.54442	25
Percentage of Drainage System(DS)	69.9560		16.89070	25
Percentage of Liquid petroleum gas(LPG)	59.5480		20.63448	25
Percentage of Census House(CH)	61.4160		18.29084	25
Percentage of permanent house(PH)	89.9680		10.25292	25
Percentage of Kitchen facility(KF)	67.6400		16.56077	25
Percentage of Roof Concrete materials(RCM)	68.8960		19.62807	25
Percentage of wall materials with burn bricks(WMBB)	88.7240		12.63976	25
Percentage of two dwelling rooms (DR)	32.4440		4.77581	25

Table 8.- Descriptive Statistics

Conclusion

This study has reflected the living condition of Berhampore town based on a composite score. The level of living condition is assessed by some parameters like Human Capital Index (HCI), Asset Index (AI), Basic Amenities Index (BAI), and Housing Index (HI). Wards are categorized into three classes based on composite scores. As per result, it is shown that the middle part is more developed than other parts of this town. The result shows basic amenities and services are unequally distributed over this town. The left side or western part and periphery region are covered by slum and rural population. So there are living conditions comparatively low than the middle part of this town. There have not yet received the support services from the municipality.

If here the developmental pattern of every ward is discussed according to Friedman's core-periphery model. Then it may be said that the development of a broad region is possible in two ways; one, development within the region, and in other cases development outside the region. The core region is the main center that is rich. In this town, wards no- 8, 9, 12, 16, 18, 19, 20, 24 are core region. According to Friedman, the upward transition region

is a region influenced by the core and the first next region of the core. In this town wards no- 5, 6, 7, 23, 25 are upward transition regions. The development level of this region is moderate. Another outer zone is the periphery zone. In this town wards no-1, 2, 4, 10, 11, 14, 15, 17, 21, 22 are periphery zone. In these wards 10, 11, 14, 15, 17, 21, 22 are the total slum area. The people of these wards served as daily labor in different sectors of this city. The wards of 1, 2, 4 are the newly added areas of this municipality. These periphery regions are now partially involved in agricultural activities. So the people of these wards served the city by providing raw materials like milk, vegetables, etc.

The lower living condition should be identified to achieve potential targeted goals and to enhance the better standard of living conditions. Backward wards are not available basic service and amenities. Therefore different policies and programs should be taken by the municipality or government for this town.

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