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Factors and Dimensions of Inter-Ward Disparities in Urban Facility-Utility Services in Burdwan City, India

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ABSTRACT

The regional disparity is a challenging issue towards the urban planners, policy makers, academicians, bureaucrats and technocrats in the developing countries. In India, a wide range of socio-economic disparities are commonly evident even in Class-I cities. Such an undesirable phenomena reflect on the spatial variation of quality of life, level of living as well as well-being and welfare of the inhabitants. Moreover, it is against the constitutional law of equity and social justice. The present study is based on the empirical observation focused on ward-wise variation of availability and accessibility of socio-economic and utility services in Burdwan city of West Bengal. On the basis of 'Principal Component Analysis', entire set of data have been arranged into seven factors of which first three factors have been considered to examine the dimension of socio-economic disparities in the city.

Key words: *Disparity, Utility Services, Principal Component Analysis.*

INTRODUCTION

The development of socio-economic infrastructure and urban facility-utility facilities indicates the quality of life of the people of a particular area. The availability of all socio-economic infrastructure solely does not mean for the development unless and until adequately available corresponding to the population size and extent of area. Such an adequacy should ensure the accessibility to socio-economic infrastructure for the people. But, unfair political practices, physiographic characteristics and socio-cultural dogma resulted into the unequal and irrational distribution of infrastructure in the region leading to the emergence of regional disparities. Regional disparity comes into being when any state fails to the extent of the distribution of developmental fruits equitably to all corners of the region. An unchecked and uncontrolled process of growth leading the regional disparities may result in economic, social and cultural problems (Hungaragi, 2008). The coexistence of developed and underdeveloped regions in a country or state leads to misallocation and underutilization of resources with untapped potential of some areas. Such disparities are not conductive to regional development [5]. It is a characteristics phenomenon of developing economy. The poor countries of the world are characterized by large and growing regional disparities while rich countries are generally characterized by small and diminishing gaps in development [14].

Inequalities at the level of development have been an integral feature of the history of India's economic development. The magnitude of regional disparity became wide during the British colonial period, which for their own business interest developed few port areas leaving other parts of India most backward. After independence in 1947, a considerable emphasis was given to eliminate this problem. In the Third Five Year Plan (1961-'66) a separate chapter was devoted to balance regional development (Chapter IX). Policies for the development of backward areas, at the

centre and state levels, identification of backward areas and indicators of development for different sector etc. all the efforts were made based on Pandey Committee, Chakraborty Committee and National Council for Development of Backward Areas (NCDBA) recommendation right from the Third Five Year Plan (Kumar, 2009). Despite different efforts being undertaken, India still has been experiencing a wide inter as well as intra regional both at macro and micro level disparities in socio-economic and cultural development

Several studies on the examination of magnitude of regional inequality have been made in abroad and India as well. Different scholars like Mathur [7] and Dadibhavi [2] tried to access the regional disparities in socio-economic development using per capita income as a measure of development. Rao [12] analysed the extent of inter-state disparities in development measured on the basis of per capita state domestic product. A group of scholars like Rao [11], Rao and Babu [12], Mallikarjun [6] and Hassan [4] attempted to the focus on the leading factors of regional disparities of different socio-economic development by adopting Principal Component Analysis and Composite Index techniques. Sao Suman [13], Paul and Dasgupta [8], Rahaman and Salauddin [10] try to find out the nature of and determinants of disparities of urban utility-facility services in intra ward variation of urban centres.

A review of the studies on the issue of regional disparities reveals that most of the studies are based on broad area and restrained from the study at smallest unit like ward level in the city. Hence, the paper is an attempt to examine the spatial distribution of facility-utility services and inter-ward disparities in levels of socio-economic development of Burdwan city.

Study Area

Burdwan city of West Bengal, India has been chosen for conducting this empirical study to identify the system of resource distribution and its effect on socio-economic disparities within the city boundary. As per census of India, 2001, Burdwan with total population nearly 0.3 million has been identified as one of the Class – I cities in India. It is located at 87^0 51' East longitudes and 23^0 13' North latitudes [1] in West Bengal state. The city covers nearly 32.5 sq. km. lies along the Eastern Railway (headed to New Delhi) line about 90 km. away from Kolkata and being accessed to NH-2 (G.T. Road). The city is divided into 35 wards. Burdwan city as district headquarters and an important township in West Bengal, thousands of people commute this place (as source of origin and destination both) everyday for different purposes. Considering this fact, the city has achieved sufficiency in providing urban facilities in order to cope with varied demand and expectations of increasing urban population. To serve this purpose, there is a need to know about the present condition and coverage the urban facility-utility services with relation to population of each ward of this municipality. The overall picture also gives the deficit areas and services which can be taken care in planning process. If the city wants to established superiority over other urban centres, such type of study is very necessary. The main objectives of this study are follows –

- To analyse the spatial distribution of socio-economic facilities for the people at micro level,
- To identify the leading factors of socio-economic disparities and

To examine the magnitude of inter-ward disparities of the levels of socio-economic development in Burdwan city.

MATERIALS AND METHODS

The study is based on the primary data collected through the intensive field survey in the sampled wards of Burdwan municipality. The primary information is supplemented with secondary data whenever is needed. To estimate a quantitative weight of a variable (i.e. number of primary school per 1000 population) total population of each ward as per Census of India, 2001 has been projected to 2010 when field investigation has been carried out.

Sample Design and Data Collection

In order to access the unequal resource distribution leading to the variation in development among core area, intermediate area and peripheral part of the city. The municipal wards have been selected from each part of the city (see figure 1.a). Twenty wards out of thirty five wards have been selected for purposive sampling. The information regarding number of selected socio-economic and facility-utility services has been collected non-partially, i.e. total number of concerned facility was ensured through field investigation. The entire field survey was conducted during January-March, 2010 and collected data have been analysed.

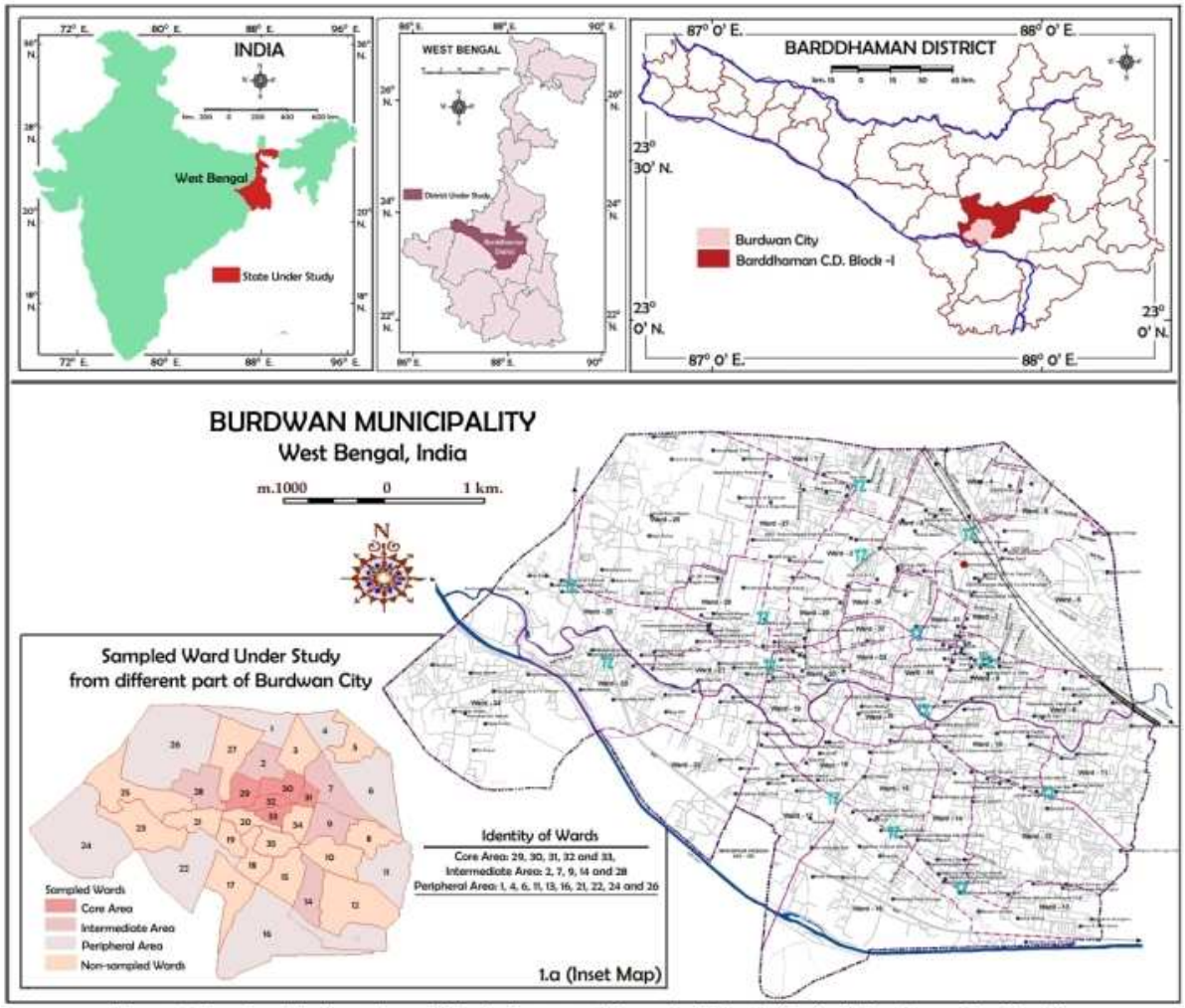

Figure 1 showing the Location of Study Area and Sampled Wards (1. a) of Burdwan City (inset).

Adoption of Statistical Techniques

For the purpose of the present study both qualitative and quantitative methods have been adopted. However, in quantitative analysis both simple and standard statistical techniques have been used to infer the facts.

- Availability of infrastructure facility per unit population has been estimated in terms of actual number of facility per 1000 of projected population in 2010.
- Population for 2010 has been projected using simple arithmetic progression techniques.
- Accessibility of each facility in terms of nature of distribution per unit area has been measured using Mathur's method of Mean Spacing which is as follows:

$$\mathbf{D = 1.0746\ \sqrt{A/N}}$$

Where, D denotes theoretical distance between the facilities in a hexagonal pattern of area, A denotes area of the ward and N denotes the number of facility at that ward.

- Levels of development have been estimated after constructing a composite index based on selected physical indicators. Certain weights have been assigned to each indicator based on their value judgment to arrive at a meaningful and comparable composite index of development. For this purpose, 'Factor Analysis' has been used to derive the factor loading or coefficient of each variable.

The factor loading of each variable has been multiplied by the corresponding standardized value to obtain their factor score. Finally, the factor score of each variable has been added together to estimate the index of development of each unit of study or sampled ward of the city.

The statistical model which has been used can be expressed as:

$$\mathbf{P_1 = \sum a_{j1} X Z_j} \text{ or } \mathbf{P_1 = a_{11}. Z_1 + a_{21}.Z_2\ a_{11}.+ \cdots\cdots\cdots\ a_{n1}. Z_n}$$

where, P_1 denotes composite index of development of a unit study as first factor denotes the factor loading of the j^{th} variable and 1 indicate the factor number, i.e. first factor – vector of factor loadings.

Z_j denotes standardized value of the j^{th} variable, which is expressed as:

$$\mathbf{Z_j = \frac{X_j - X_m}{\delta_j}}$$

where, X_j denotes original value of j^{th} variable, X_m denotes the mean of of j^{th} variable and δ_j denotes the standard deviation of of j^{th} variable.

FINDINGS AND ANALYSIS

Availability and Accessibility to Urban Facilities in Burdwan City

The problem of unequal distribution of facilities across the region is a common phenomenon in India. Such a problem leads to emergence of regional disparities in socio-economic development. The present study is an attempt to highlight the unequal distribution of socio-economic facilities through the analysis of availability per unit of population and per unit of areal extension (mean spacing) of the sample wards of the study area.

Education Facility

Education facility is one of the significant determinants of social well-being and welfare as well as human development. Among all the educational facilities, highest coefficient of variability of 198.56 has been accounted for college and university in Burdwan city (Annexure-Table 1a). However, among the education facilities, least coefficient of variation, i.e. C.V. = 52.94 has been computed in the distribution of primary school.

Highest availability of primary school (X_1) i.e. 0.75 followed by secondary and higher secondary school (X_2), i.e.0.57 per 1000 of population have been found in ward no. 31 and 14 respectively (Table no. 1.1). While lowest availability of 0.09 (X_1) followed by 0 (X_2) in ward no. 26 and 13, 22, 30, 31, 33 respectively. However, in area perspective analysis also, a similar figure is depicted in the distribution of primary school. Highest and lowest mean spacing of 1.86 km. and 0.27 km. has been recorded in ward no. 26 and 31 respectively (Annexure-Table 2a). It reveals that in ward no. 31, primary schools are much closely spaced ensuring its better accessibility to the inhabitants than in other wards, while the inverse figure is found in ward no. 26 (Annexure- Table 2a). The secondary and higher secondary schools are located as highest as 0.42 km. apart from each other in ward no. 29 while as lowest as 1.80 in ward no. 24 (Annexure-Table 2a). Further, table no. 1.1 reveals that highest availability of college and university facility per 1000 population has been recorded in ward no. 28 (0.24) while fifteen wards are not having this facility.

It comes out from the above assessment that better availability and accessibility of education facilities has been recorded in ward no. 24 (peripheral part) followed by ward no. 16 (peripheral part).

Health Facility

The provision of availability and accessibility to health services can ensure better health condition of the inhabitants. It is another important indicator of human development. Among three selected health facilities, i.e. hospital (X_4), nursing home (X_5) and primary health centre (X_6), the availability of nursing homes (X_5) per unit of population is much consistent (C.V. = 213.25). Of 20 sampled wards, two (10 %) are having hospital facility, ten (50 %) are having nursing home facility. Ward no. 32 and 30 has been identified as better in availability of first two (X_4 and X_5) health facilities. However the analysis of mean spacing reveals better accessibility of health facility found in ward no. 29 (0.73 km.) for X_4 and ward no. 32 (0.14 km.) for X_5. It is evident from the analysis that, health facility are having better accessible and better in number in the core area of Burdwan city.

Financial Facility
This is an important indicator of economic development. The analysis reveals disparity in the availability and accessibility to banking facility to the people of Burdwan city. Among the sampled wards, banking facility (X_7) is available to 11 wards (55 %). In case of availability per 1000 of population, ward no. 32 (2.62) is in better position followed by ward no. 30 (2.15), while in case of accessibility same position are found in ward no. 32 (0.14 km.) and 30 (0.22 km.) since banks are located centrally. In case of availability of ATM counters (X_8) and co-operatives (X_{10}), it has been found the central position of Burdwan city having highest concentration of facilities. This is evident from the above analysis that, central portion of city having good financial facility than other wards.

Another financial indicator for socio-economic development is market (X_9). Besides the place of selling and purchasing of goods, it is the meeting place of people who exchange their social, cultural and political ideas leading to socio-cultural transformation of the society. Table 1a of annexure reveals high degree of variability (C.V.=191.55) in its availability among the sampled wards. Among the wards, ward no. 7 has been recorded better position of market availability of 0.3 per 1000 population. However, Table no.4 reveals that accessibility of market is much better in ward no.31, where markets are located at an average spacing as lowest as 0.47 km. as against 0.87 km. mean spacing in ward no. 14.

Communication and Transport Facility
Road density and post office are another important facility of the urbanites. Basically, this communication facility pulls the people to achieve different facilities located in the city. Highest level of road density found in ward no. 33 (27.21 km. / km^2) which is located in central position. Highest level of road density is found in the core portion of the city (ward no. 29, 30, 31, 32 and 33). Post office also determines the level of human life. It is available only in 2 wards (10 %) out of sampled wards. Ward no. 22 has the highest number of 0.12 post offices per 1000 population. In ward no. 11 (1.13 km.), post office facility has better accessibility as people can avail it within a short distance.

Other Facility
Public urinal, cinema hall, play ground, hotel and lodge, petrol pump and burning ghat etc. are the very important facilities for the urban people. Public urinal (C.V. =142.64) followed by hotels (C.V. =165.76) having least amount of variability among other facilities (Annexure-Table 1b). Also in case of accessibility ward no. 31 (0.27 km.) and ward no. 7 (0.16 km.) having the least mean spacing in public urinals (X_{13}) and hotels (X_{16}) respectively.

Levels of Socio-economic Development
An unequal and irrational distribution of facilities in urban centres without considering the size of the population and extent of area causes regional disparities of socio-economic development. It is the characteristics of developing economy. Development is a multi-faceted phenomenon which a society or a region achieves. As a spatial phenomenon, development of a region is explained in two ways, firstly as the state of change in the distribution of parameters between given points of time, and secondly, the state of their existing distribution. The state of imbalance of development inspires regional planners for formulating the diagnostic plan to achieve balanced regional development.

In the analysis of the development index of each ward has been estimated as a composite of factor score of each variable with factor coefficient more than 0.50. Using the Principal Component Analysis, the factor coefficients have got arranged into seven factors (i.e. Factor I, Factor II, Factor III, Factor IV, Factor V, Factor VI and Factor VII in which first factor reveals 23.12 per cent variance, while second, third, fourth, fifth, sixth and seventh reveal 16.49 per cent, 12.71 per cent, 10.45 per cent, 8.57 per cent, 7.06 per cent and 5.34 per cent respectively. Therefore, all the seven factors cumulatively reveal 83.74 per cent of variance (Table 1). Among them, the first three have been taken into consideration for estimation of development, as these four factors combination reveal 52.32 per cent variance. More than 0.5 value of factor coefficient have taken into consideration for determining the development index. Since variables X_1, X_2, X_7, X_8, and X_9 showing factor coefficient more than 0.50 in Factor I have been multiplied by standardized value of the respective variable to derive their factor score and finally to estimate the composite index of development (Table 1). Likewise, variables X_5, X_6 and X_{14} with their factor coefficient more than 0.50 have been identified in Factor II. Again, for Factor III, X_{10}, X_{11}, X_{13} and X_{16} are considered as they have coefficient value of more than 0.50. But no single variable shows factor coefficient more than 0.50 in Factor IV, though variables X_3 and X_{12} show factor coefficient more than 0.50 in Factor IV which reveals only 8.57 per cent variance, have not been included in the estimation of development index. Subsequently out of 20 variables, 14

variables are observed as significantly responsible and 12 variables have been taken to examine the spatial variation of socio-economic development in Burdwan city.

Table 1: Factor Loading of Variables, Burdwan City, 2010

Variables and Definitions		Component		
		Factor I	Factor II	Factor III
X_1	**no. of Primary Schools / ' 000 Population**	**0.776**	0.464	0.273
X_2	**no. of Secondary and H.S. Schools / ' 000 Population**	**0.616**	-0.142	-0.058
X_3	**no. of Colleges and University / ' 000 Pop.**	-0.043	-0.124	-0.169
X_4	**no. of Hospitals / ' 000 Population**	-0.15	0.031	-0.083
X_5	**no. of Nursing Home / ' 000 Population**	-0.324	**0.538**	0.629
X_6	**no. of Primary Health Centres / ' 000 Pop.**	0.147	**0.851**	0.14
X_7	**no. of Commercial Banks / ' 000 Population**	**0.795**	0.427	0.675
X_8	**no. of ATM Counters / ' 000 Population**	**0.636**	0.395	-0.105
X_9	**no. of Markets / ' 000 Population**	**0.9**	0.087	0.173
X_{10}	**no. of Co-operatives / ' 000 Population**	0.453	-0.081	**0.794**
X_{11}	**Road density**	0.07	-0.086	**0.831**
X_{12}	**no. of Post Office / ' 000 Population**	0.801	-0.148	-0.404
X_{13}	**no. of Public Urinal / ' 000 Population**	0.557	0.083	**0.65**
X_{14}	**no. of Cinema Halls / ' 000 Population**	-0.191	**0.791**	-0.105
X_{15}	**no. of Play Grounds / ' 000 Population**	0.42	0.018	-0.239
X_{16}	**no. of Hotel, Lodges / ' 000 Population**	0.287	0.161	**0.839**
X_{17}	**no. of Petrol Pump / ' 000 Population**	0.711	-0.05	-0.153
X_{18}	**no. of Burning Ghat / '000 Population**	-0.085	-0.064	-0.167
% of Variance		**23.12 %**	**16.49 %**	**12.71 %**

Note. Extraction Method – Principal Component Analysis, Rotation Method.

Source: Computed by Authors.

Levels of Development – Factor I (Education and Financial Facility)

On the basis of composite development index of factor I, the sample wards have been arranged into three levels in order to study the inter-ward disparities of development in socio-economic amenities ((Annexure-Table 3a)). Out of 20 sampled wards, 4 wards (20 %) with development index more than 1.00 fall in high level of development. These wards are located almost at the core area of the city. Due to the old built up area, these wards are having essential amenities like, education, health, communication, drinking water, marketing and easy transport facility.

Table 2: Levels of Development – Factor I (Education and Finance), Burdwan City, 2010

Level of Development	Indices	Number of Wards	Identity of Wards
High	Above 1.00	04 (20 %)	**Ward no. 7, 30, 31 and 32**
Medium	1.00 to – 1.00	07 (35 %)	**Ward no. 14, 29, 1, 2, 24, 16 and 28**
Low	Below - 1.00	09 (45 %)	**Ward no. 26, 9, 4, 21, 22, 11, 6, 33 and 13**

Source: Computed by Author from Annexure – Table 3a.

Seven wards (i.e. ward no. 14, 29, 1, 2, 24, 16 and 28) with development index ranging 1.00 to – 1.00 come under medium level of development. Further, table 5 reveals that with development index less than – 1.00 nine wards (45 %) are comprised under low level of development in the city. All these wards are located in buffer and peripheral part of Burdwan city. Peoples are living in these wards with difficulty of education and financial facilities. As a result, the quality of life and level of living of people of these areas are deteriorating gradually.

Levels of Development – Factor II (Health Facility)

Variables X_5, X_6 and X_{14} in factor II altogether explain the levels of development of health (nursing home and primary health centre) in the city **(**(Annexure-Table 3b). Only 4 wards (20 %) i.e. ward no. 30, 9, 32 and 31 with development index more than 0.75 have been categorized under high level of development. Out of four wards in this category, three are located in the core while ward no 9 is located in the intermediate part.

Six wards i.e. ward no 1, 7, 33, 28, 22 and 2 have been found in the medium level of health development in the city. The wards under medium development have scored index ranging from 0.75 to – 0.75.

Further, a majority of sample wards (i.e. no of wards 10) have been found with development index of less than – 0.75 which have been considered under the low level of health infrastructure facility in the city. These wards are located in the city in scattered form.

Table 3: Levels of Development – Factor II (Health), Burdwan City, 2010

Level of Development	Indices	Number of Wards	Identity of Wards
High	Above 0.75	04 (20 %)	**Ward no. 30, 9, 32 and 31**
Medium	0.75 to – 0.75	06 (30 %)	**Ward no. 1, 7, 33, 28, 22 and 2**
Low	Below -0.75	10 (50 %)	**Ward no. 29, 26, 4, 6, 11, 13, 14, 16, 21, 24**

Source: Computed by Author from Annexure – Table 3b.

Levels of Development – Factor III (Market, Transport and Communication and Other)

On the basis of factor III, variables X_{10}, X_{11}, X_{13} and X_{16} have marked as important factor for the development in socio-economic condition of Burdwan city. Six wards with development index more than 1.00 ((Annexure-Table 3c) falls under higher degree of development. These are ward no. 31, 7, 33, 32, 9 and 2. Basically these area lies in the administrative part of the city. Due to location of C.B.D. of Burdwan city this area provides some good market, high transport facility and facilities of hotel and lodging.

Four wards (i.e. ward no. 1, 29, 4 and 16) with development index ranging 1.00 to – 1.00 come under the medium level of development. Again a majority (50 %) of the wards have been found in the low level of development index having value less than – 1.00. These wards are located basically in the outer and intermediate part of the city. It has been found that market, road and hotel are not good in number in those areas.

Table 4: Levels of Development – Factor III (Markets, Transport & Communication and Lodging), Burdwan City, 2010

Level of Development	Indices	Number of Wards	Identity of Wards
High	Above 1.00	06 (30 %)	**Ward no. 31, 7, 33, 32, 9 and 2**
Medium	1.00 to – 1.00	04 (20 %)	**Ward no. 1, 29, 4 and 16**
Low	Below - 1.00	10 (50 %)	**Ward No. 26, 6, 13, 10, 30, 14, 11, 28, 22 and 24**

Source: Computed by Author from Annexure – Table 3c.

CONCLUSION

The foregoing analysis based on the field survey infers to the inter-ward disparities in socio-economic development consequent upon the irrational as well as unequal distribution of amenities and facilities. It has come out from the study that, the peripheral area of the city are lacking behind in socio-economic amenities resulting into low level of development. The low level of development in the wards is mainly due to the allocation of facilities without corresponding the population size, poor condition of roads and finally negligence from the city government side to allocate resources. Another important finding from the empirical observation is that, government medical facility is very poorly available to people of Burdwan city. To wipe out this problem of existing inter-ward disparities in the level of socio-economic development from Class I Indian cities like Burdwan city, a diagnostic plan should be formulated to provide and locate resources in according to population size. Subsequently, the balanced development would be achieved and social justice to the people would be ensured, consequently, human well-being and welfare would be result of relentless and selfless efforts made by the people, the government and the NGOs.

REFERENCES

[1] Annual Administrative Report of Burdwan Municipality, Bureau of Urban Affairs, Govt. of West Bengal, India, **2008-2009**.
[2] Dadibhavi, R. V.; *Indian Journal of Regional Science*, **30 (1998) 2**, 84-97.
[3] Hangaragi, S. S.; *Indian Journal of Regional Science*, **40 (2008) 2**, 41-53.
[4] Hassan, M.I.; *Indian Journal of Regional Science*, **39 (2007) 1**, 40-49.
[5] Kumar, S; *Indian Journal of Regional Science*, **41 (2009) 1**, 22-36.
[6] Mallikarjun, M.; *Indian Journal of Regional Science*, **32 (2000) 2**, 01-10.
[7] Mathur, A.; Regional development and Income Disparities in India – A Sectoral Analysis. Economic Development and Cultural Change, **31 (1983) 2**, 475-505.

[8] Paul, S. and Dasgupta, A.; Urban Facility-Utility Mapping of Krishnagar Municipality – An Appraisal of Ward-wise Infrastructure Development. Indian Journal of Landscape Systems and Ecological Studies, **31(2008) 2**, 91-98.
[9] Rahman, K. N.; Planning of urban community facilities: Islambagh Area, Unpublished MURP Thesis, Department of Urban and Regional planning, Bangladesh University of Engineering and Technology, Dhaka, **1991.**
[10] Rahaman K.R. and Salauddin Md.; A Spatial Analysis of Urban Public Services and their Deficiencies: A Study of Some Selected Blocks in Khulna City, Bangladesh. TERUM, Spl. No. **[2009]**, 120-132.
[11] Rao, Hemlata; Regional Disparities and Development in India, Ashish Publishing House, New Delhi **(1984)**.
[12] Rao, Hemlata; Inter-State Disparities in Development in India", in Mishra, G. P. (ed.), Regional Structure of Development and Growth in India, New Delhi, **1 (1985),** 68-101.
[13] Sao, S; Identification of Levels of Facilities: A Case Study of Deheradun City. GIS Development, http://www.geospatialworld.net; accessed on dated. **April 10th, 2012**.
[14] Williamson, J. G.; Regional Inequalities and the Process of National Development: A Description of Patterns. Economic Development and Cultural Change, **12 (1965) 4**, 121-129.

Annexure

Table 1a: Availability of Facility-Utility (Per Unit Population) Services, Burdwan City, 2010.

Ward No.	Educational Infrastructure			Health Infrastructure			Financial Infrastructure			
	No. of Primary School / '000 Pop.	No. of Secondary & H.S. School / '000 Pop.	No. of Colleges & University/ '000 Pop.	No. of Hospital / '000 Pop.	No. of Nursing Homes / '000 Pop.	No. of P. H. C. / '000 Pop.	No. of Commercial Bank / '000 Pop.	No. of ATM Counter / '000 Pop.	No. of Credit Institutions / '000 Pop.	No. of Market / '000 Pop.
	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}
Ward 1	0.50	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.08
Ward 2	0.35	0.12	0.12	0.00	0.24	0.00	0.24	0.12	0.12	0.12
Ward 4	0.28	0.09	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.00
Ward 6	0.28	0.07	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ward 7	0.49	0.20	0.00	0.00	0.10	0.10	0.20	0.79	**0.30**	0.10
Ward 9	0.29	0.15	0.00	0.147	0.15	0.00	0.29	0.00	0.00	0.00
Ward 11	0.21	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ward 13	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ward 14	0.14	**0.57**	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00
Ward 16	0.50	0.20	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.10
Ward 21	0.30	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ward 22	0.37	0.00	0.00	0.00	0.25	0.00	0.25	0.00	0.00	0.00
Ward 24	0.74	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ward 26	0.09	0.28	0.19	0.00	0.09	0.00	0.09	0.28	0.00	0.00
Ward 28	0.24	0.24	**0.24**	0.00	0.47	0.00	0.47	0.00	0.00	0.00
Ward 29	0.30	0.46	0.00	**0.152**	0.15	0.00	0.15	0.30	0.00	0.00
Ward 30	0.65	0.00	0.00	0.00	1.72	**0.43**	2.15	**0.86**	0.00	0.00
Ward 31	**0.75**	0.00	0.00	0.00	0.00	0.25	1.00	0.00	0.25	**0.25**
Ward 32	0.56	0.19	0.00	0.00	**2.62**	0.00	**2.62**	0.00	0.00	0.19
Ward 33	0.16	0.00	0.00	0.00	0.48	0.00	0.48	0.00	0.00	0.16
C.V.	**52.64**	**97.65**	**198.21**	**307.84**	**213.37**	**280.76**	**183.27**	**202.80**	**191.36**	**155.35**

Source: Computed by Author.

Table 1b: Availability of Facility-Utility (Per Unit Population) Services, Burdwan City, 2010.

Ward No.	Transport, Communication Infrastructure		Other Infrastructure					
	Road Density	No. of Post Offices / '000 Pop.	No. of Public Urinals / '000 Pop.	No. of Cinema Halls / '000 Pop.	No. of Play Ground / '000 Pop.	No. of Hotel and Lodge / '000 Pop.	No. of Petrol Pump / '000 Pop.	No. of LPG Dist. Centres / '000 Pop.
	X_{11}	X_{12}	X_{13}	X_{14}	X_{15}	X_{16}	X_{17}	X_{18}
Ward 1	15.06	0.00	0.08	0.08	0.00	0.67	0.08	0.08
Ward 2	13.90	0.00	0.24	0.00	0.00	0.71	**0.24**	0.00
Ward 4	19.37	0.00	0.00	0.00	0.00	0.47	0.09	0.00
Ward 6	9.28	0.00	0.14	0.00	0.00	0.28	0.00	0.00
Ward 7	11.44	0.00	0.59	0.00	0.10	**3.74**	0.20	0.00
Ward 9	10.66	0.00	0.59	0.15	0.00	2.06	0.00	0.00
Ward 11	8.62	0.11	0.00	0.00	0.00	0.00	0.00	0.00
Ward 13	12.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ward 14	10.85	0.00	0.00	0.00	**0.14**	0.00	0.00	0.00
Ward 16	5.88	0.00	0.20	0.00	0.00	0.20	0.10	0.00
Ward 21	11.58	0.00	0.00	0.00	0.00	0.00	0.00	**0.15**
Ward 22	4.60	**0.12**	0.00	0.00	0.12	0.00	0.12	0.00
Ward 24	3.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ward 26	3.59	0.00	0.47	0.00	0.00	0.37	0.00	0.09
Ward 28	5.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ward 29	14.33	0.00	0.61	0.00	0.00	0.00	0.00	0.00
Ward 30	11.09	0.00	0.00	**0.22**	0.00	0.00	0.00	0.00
Ward 31	21.11	0.00	**0.75**	0.00	0.00	1.50	0.00	0.00
Ward 32	23.28	0.00	0.00	0.00	0.00	0.56	0.00	0.00
Ward 33	**27.21**	0.00	0.00	0.00	0.00	0.64	0.00	0.00
C.V.	**53.40**	**308.85**	**142.64**	**262.50**	**247.33**	**165.76**	**174.70**	**254.96**

Source: Computed by Author.

Table 2a: Accessibility – Mean Spacing (Per Unit Area) of Facilities, Burdwan City, 2010.

Ward No.	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{12}	X_{13}	X_{14}	X_{15}	X_{16}
Ward 1	0.39	0.96	0.00	0.00	0.00	0.00	0.00	0.00	0.68	0.96	0.00	**0.96**	**0.96**	0.00	0.34
Ward 2	0.48	0.84	**0.84**	0.00	0.59	0.00	**0.59**	0.84	0.84	0.84	0.00	0.59	0.00	0.00	0.34
Ward 4	0.46	0.80	0.00	0.00	0.00	0.00	0.00	0.56	0.00	0.00	0.00	0.00	0.00	0.00	0.36
Ward 6	0.67	1.34	1.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.95	0.00	0.00	0.67
Ward 7	0.45	0.72	0.00	0.00	1.01	**1.01**	0.72	0.36	0.59	1.01	0.00	0.41	0.00	1.01	**0.16**
Ward 9	0.61	0.86	0.00	**0.86**	0.86	0.00	0.61	0.00	0.00	0.00	0.00	0.43	0.86	0.00	0.23
Ward 11	0.80	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.13**	0.00	0.00	0.00	0.00
Ward 13	0.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ward 14	0.87	0.43	0.00	0.00	0.00	0.00	0.00	0.00	**0.87**	0.00	0.00	0.00	0.00	**0.87**	0.00
Ward 16	0.63	0.99	**1.40**	0.00	0.00	0.00	0.00	0.00	0.00	**1.40**	0.00	0.99	0.00	0.00	0.99
Ward 21	0.57	0.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ward 22	0.82	0.00	0.00	0.00	1.01	0.00	1.01	0.00	0.00	0.00	**1.43**	0.00	0.00	**1.43**	0.00
Ward 24	0.64	**1.80**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ward 26	**1.86**	1.07	1.31	0.00	**1.86**	0.00	**1.86**	**1.07**	0.00	0.00	0.00	0.83	0.00	0.00	**0.93**
Ward 28	0.92	0.92	0.92	0.00	0.65	0.00	0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ward 29	0.52	**0.42**	0.00	**0.73**	0.73	0.00	0.73	0.52	0.00	0.00	0.00	0.36	0.00	0.00	0.00
Ward 30	0.40	0.00	0.00	0.00	0.25	0.49	0.22	**0.35**	0.00	0.00	0.00	0.00	**0.70**	0.00	0.00
Ward 31	**0.27**	0.00	0.00	0.00	0.00	**0.47**	0.23	0.00	**0.47**	**0.47**	0.00	**0.27**	0.00	0.00	0.19
Ward 32	0.30	0.52	0.00	0.00	**0.14**	0.00	0.14	0.00	0.00	0.52	0.00	0.00	0.00	0.00	0.30
Ward 33	0.52	0.00	0.00	0.00	0.30	0.00	0.30	0.00	0.00	0.52	0.00	0.00	0.00	0.00	0.26

Source: Computed by Author.

Table 2b: Accessibility – Mean Spacing (Per Unit Area) of Facilities, Burdwan City, 2010.

Ward No.	X_{17}	X_{18}	Ward No.	X_{17}	X_{18}	Ward No.	X_{17}	X_{18}	Ward No.	X_{10}	X_{12}
Ward 1	0.96	0.96	Ward 9	0.00	0.00	Ward 21	0.00	**0.81**	Ward 29	0.00	0.00
Ward 2	**0.59**	0.00	Ward 11	0.00	0.00	Ward 22	**1.43**	0.00	Ward 30	0.00	0.00
Ward 4	0.80	0.00	Ward 13	0.00	0.00	Ward 24	0.00	0.00	Ward 31	0.00	0.00
Ward 6	0.00	0.00	Ward 14	0.00	0.00	Ward 26	0.00	**1.86**	Ward 32	0.00	0.00
Ward 7	0.72	0.00	Ward 16	1.40	0.00	Ward 28	0.00	0.00	Ward 33	0.00	0.00

Source: Computed by Author.

Table 3a: Factor Scoring Variables (Factor Loading > 0.50) and Index of Development, Burdwan City, 2010.

Ward	Factor I					Index of Development	Ward	Factor I					Index of Development
	X_1	X_2	X_7	X_8	X_9			X_1	X_2	X_7	X_8	X_9	
Ward 1	0.52	-0.3	-0.43	-0.31	1.16	**0.63**	**Ward 21**	-0.27	-0.02	-0.43	-0.31	-0.47	**-1.51**
Ward 2	-0.08	-0.14	-0.17	-0.02	0.68	**0.27**	**Ward 22**	0	-0.63	-0.16	-0.31	-0.47	**-1.57**
Ward 4	-0.35	-0.26	-0.43	0.16	-0.47	**-1.37**	**Ward 24**	1.48	-0.26	-0.43	-0.31	-0.47	**0**
Ward 6	-0.35	-0.34	-0.43	-0.31	-0.47	**-1.92**	**Ward 26**	-1.11	0.51	-0.34	0.38	-0.47	**-1.03**
Ward 7	0.48	0.18	-0.22	1.64	2.41	**4.49**	**Ward 28**	-0.51	0.34	0.08	-0.31	-0.47	**-0.87**
Ward 9	-0.31	-0.02	-0.12	-0.31	-0.47	**-1.24**	**Ward 29**	-0.27	1.24	-0.27	0.43	-0.47	**0.65**
Ward 11	-0.63	0.22	-0.43	-0.31	-0.47	**-1.63**	**Ward 30**	1.12	-0.63	1.92	1.81	-0.47	**3.75**
Ward 13	-0.71	-0.63	-0.43	-0.31	-0.47	**-2.56**	**Ward 31**	1.52	-0.63	0.66	-0.31	1.93	**3.16**
Ward 14	-0.91	1.68	-0.43	-0.31	0.87	**0.9**	**Ward 32**	0.76	0.14	2.43	-0.31	-0.47	**2.55**
Ward 16	0.52	0.18	-0.43	-0.31	-0.47	**-0.51**	**Ward 33**	-0.83	-0.63	0.09	-0.31	-0.47	**-2.15**

Source: Computed by Authors.

Table 3b: Factor Scoring Variables (Factor Loading > 0.50) and Index of Development, Burdwan City, 2010.

Ward No.	Factor – II			Index of Development	Ward No.	Factor – II			Index of Development	Ward No.	Factor – II			Index of Development
	X_5	X_6	X_{14}			X_5	X_6	X_{14}			X_5	X_6	X_{14}	
Ward 1	-0.25	-0.30	0.76	**0.21**	**Ward 13**	-0.25	-0.30	-0.30	**-0.86**	**Ward 28**	0.13	-0.30	-0.30	**-0.48**
Ward 2	-0.06	-0.30	-0.30	**-0.66**	**Ward 14**	-0.25	-0.30	-0.30	**-0.86**	**Ward 29**	-0.13	-0.30	-0.30	**-0.73**
Ward 4	-0.25	-0.30	-0.30	**-0.86**	**Ward 16**	-0.25	-0.30	-0.30	**-0.86**	**Ward 30**	1.13	3.04	2.63	**6.80**
Ward 6	-0.25	-0.30	-0.30	**-0.86**	**Ward 21**	-0.25	-0.30	-0.30	**-0.86**	**Ward 31**	-0.25	1.64	-0.30	**1.09**
Ward 7	-0.17	0.47	-0.30	**0.00**	**Ward 22**	-0.05	-0.30	-0.30	**-0.65**	**Ward 32**	1.86	-0.30	-0.30	**1.25**
Ward 9	-0.13	-0.30	1.70	**1.26**	**Ward 24**	-0.25	-0.30	-0.30	**-0.86**	**Ward 33**	0.13	-0.30	-0.30	**-0.47**
Ward 11	-0.25	-0.30	-0.30	**-0.86**	**Ward 26**	-0.18	-0.30	-0.30	**-0.78**					

Source: Computed by Authors.

Table 3c: Factor Scoring Variables (Factor Loading > 0.50) and Index of Development, Burdwan City, 2010.

Ward No.	Factor – III				Index of Development	Ward No.	Factor - III				Index of Development
	X_{10}	X_{11}	X_{13}	X_{16}			X_{10}	X_{11}	X_{13}	X_{16}	
Ward 1	0.31	0.37	-0.26	0.10	**0.51**	**Ward 21**	-0.51	-0.08	-0.46	-0.51	**-1.55**
Ward 2	0.71	0.22	0.14	0.14	**1.21**	**Ward 22**	-0.51	-0.97	-0.46	-0.51	**-2.44**
Ward 4	-0.51	0.92	-0.46	-0.08	**-0.13**	**Ward 24**	-0.51	-1.06	-0.46	-0.51	**-2.54**
Ward 6	-0.51	-0.37	-0.11	-0.25	**-1.24**	**Ward 26**	-0.51	-1.10	0.71	-0.17	**-1.07**
Ward 7	0.51	-0.10	1.01	2.88	**4.30**	**Ward 28**	-0.51	-0.82	-0.46	-0.51	**-2.30**
Ward 9	-0.51	-0.20	1.01	1.36	**1.66**	**Ward 29**	-0.51	0.27	1.06	-0.51	**0.32**
Ward 11	-0.51	-0.46	-0.46	-0.51	**-1.93**	**Ward 30**	-0.51	-0.14	-0.46	-0.51	**-1.61**
Ward 13	-0.51	0.03	-0.46	-0.51	**-1.44**	**Ward 31**	2.04	1.14	1.41	0.85	**5.44**
Ward 14	-0.51	-0.17	-0.46	-0.51	**-1.64**	**Ward 32**	1.43	1.42	-0.46	0.00	**2.39**
Ward 16	0.51	-0.81	0.04	-0.33	**-0.58**	**Ward 33**	1.12	1.92	-0.46	0.07	**2.66**

Source: Computed by Authors.