Inter-ward Disparities in Urban Facility-utility Services: A Study on Purulia Municipality, West Bengal, India

Krishna Mallick1 & Dr. Shovan Ghosh2
1Assistant Professor, Department of Geography, Balarampur College, Rangadih, Purulia, West Bengal, India
2Associate Professor, Department of Geography, Diamond Harbour Women’s University, Sarisha, South 24 Paraganas, West Bengal, India
Corresponding Author: Dr. Shovan Ghosh, E-mail: ghoshshovan80@rediffmail.com

ARTICLE INFO

ABSTRACT

Received: December 24, 2019
Accepted: January 27, 2020
Published: January 30, 2020
Volume: 2
Issue: 2

In the present context of rapid urbanization, the regional disparity is a challenging issue towards the urban planners and policy makers in the developing countries. In India, socio-economic disparities in large scale are a regular occurrence in cities and towns. Such an unpleasant phenomenon creates a wide range of variation in Quality of life, well-being and welfare of the city dwellers. Based on empirical observation the present paper tries to analyze ward-wise variation of available facilities and accessibility of utility services with reference to Purulia municipality of West Bengal. With the help of statistical treatment like composite Z score and correlation matrix, the study found that inter-ward disparities are too much prominent in terms of demography, available facilities and land-use pattern in this small urban town which in turn affect the urban social well-being and quality of life.

KEYWORDS

disparity, utility services, well-being, quality of life

Introduction

The development of socio-economic infrastructure and urban utility-facility services (Paul S., 2012) may indicate the development of Quality of Life (Bardhan et al. 2011) of the inhabitants of a particular place. Improving the Quality of Life in cities is no longer a simple matter of bricks and mortars, but the human satisfaction with different urban attributes such as transportation, land-use pattern (Azeez, T. et al. 2016), population and building densities and ease of access for all to basic goods, services and public amenities, as well as social attributes such as protecting public health, safety and security, education and social integration. But adverse physiographic characteristics and unfair socio-cultural belief resulted into the unequal and irrational distribution of resource in the region leading to the emergence of regional inequalities (Malik T.A. et al., 2015). An unchecked and unplanned nature of growth leads to problems (Mondal B. et al., 2015). This regional disparity may result in economic, social and cultural problems (Hangaragi, 2008). Regional inequalities with regard to quality of urban life exist in both developed and developing countries. In developing countries like India, the basic problem is to provide a minimum level of subsistence to a large proportion of the population (Ray Chaudhury, 2001). Inequalities by means of development have been an integral feature of the history of India’s economic development. After independence in the 3rd five year plan (1961-66) a separate chapter was devoted to balance regional development (Chapter- IX). Several studies in several times have been made to analyze the regional inequalities exist in India and aboard as well. Different scholars like Mathur (1983), Dadibhavi (1998) had tried to access the regional disparities in terms of per capita income as a measure of development. Banerjee R. (2012) had tried to bring an appraisal on spatial variation based on land-use dynamics. A group of scholars like Mallikarjun (2000), Hassan (2007) and Paul (2012) tried to focus on the factors that lead to regional disparities. Principal Component Analysis and Composite Index techniques were adopted as methodology.
Literature Review

Researchers like Parry, J.A. et.al (2013), Rastegari, M., et.al. (2016), Borana, S.L. et.al (2017), have been tried to establish the fact that in a small urban town, when the influx of population is increased, the utility-facility services among the all wards in a municipality is not maintained. This is due to lack of proper planning and formulating models in order to regulate urban network to minimize emerging problems. Three facilities like police station, school, and hospitals in Jodhpur city, Rajasthan (Borana, S.L. et.al (2017) has taken into account, which reveals that disparity leads to various problems like separation of people towards interpersonal disparities in standards of life and declining of city surroundings. The use of RS and GIS has been used to demarcate the problems. In Yazd province, (Rastegari, M., et.al (2016), the relationship between urban facilities and population distribution in urban network was studied. Numerical taxonomy model and its numerical analysis stages used as methodology. Srinagar city contains sixty eight wards (Parry, J.A. et.al (2013), also showed significant unevenness in the provision of urban amenities. Health care institution and ration depots were taken into account and these facilities decrease from the core of the city to its periphery. Location quotient, Lorenz curve, Aggregate weighted scores were taken into account.

Against these backdrops, the present paper is a submission to assess the Quality of Urban Life with reference to Purulia municipality of West Bengal, India.

Objectives

The paper has the following objectives, viz;

- To highlight the availability of facility-utility services among the wards in Purulia Municipality.
- To scrutinize the spatial disparities among the wards and a reasoned account for the variation.

Study Area

Purulia municipality, situated in the westernmost district of West Bengal, extends between $23^\circ18'30''N$ to $23^\circ21'0''N$ latitude and $86^\circ21'0''E$ to $86^\circ23'30''E$ longitude, covering a total geographical area of 14 square kilometers. Purulia municipality was formed on 26th July, 1876, 143 years ago from today. It is bordered on the north by Raghabpur gram panchayet & Bongabari gram panchayet; Lagda gram panchayet and Sonajhuri gram panchayet on the west; Surutia gram panchayet and Palanja gram panchayet on the east and Simulia gram panchayet on south (Figure-1).
Purulia municipality has population of 121,067 of which 62,351 are males while 58,716 are females (Census of India, 2011) with an average population density of 5867.70 persons /sq. Kilometers. Population of Children with age of 0-6 is 12653 which are 10.45 % of total population of Purulia municipality. Female Sex Ratio is of 942 against state average of 950. Moreover Child Sex Ratio in Purulia is around 945 compared to West Bengal state average of 956. Out of total population the district has 19.38% scheduled caste and 18.45% of scheduled tribe population. Literacy rate of Purulia town is 82.09 % higher than state average of 76.26 %, male literacy is around 88.40 % while female literacy rate is 75.39 %. Purulia municipality has total administration over 23,754 houses to which it supplies basic amenities like water and sewerage.

Out of total population, 40,560 are engaged in work or business activity. Of this 31,902 are males while 8,658 are females. In census survey, worker is defined as person who does business, job, service, and cultivator and labour activity. Of total 40560 working population, 81.81 % are engaged in Main Work while 18.19 % of total workers are engaged in Marginal Work (Census of India, 2011). In the state of West Bengal, Purulia is ranked 16th out of 17 districts under calculation with a poor value of HDI.

Methodology and Database
The present paper is entirely based on secondary sources of data, collected from Census of India; 2011, District Statistical Handbook (2011-2015) published by bureau of applied Economics and Statistics, 2011, the present study incorporates 28 variables concerning three indicators as mentioned below:
1. Demographic Variation
2. Variation in Available facilities
3. Variation in Land-use

<table>
<thead>
<tr>
<th>Demographic Variation</th>
<th>X1- Population Density/Ward</th>
</tr>
</thead>
<tbody>
<tr>
<td>X2- Sex-ratio/ward</td>
<td></td>
</tr>
<tr>
<td>X3- Family size/ward</td>
<td></td>
</tr>
<tr>
<td>X4- Population Growth rate/ward</td>
<td></td>
</tr>
<tr>
<td>X5- Population &lt;6 years / ward</td>
<td></td>
</tr>
<tr>
<td>X6- percent of Population growth/ward</td>
<td></td>
</tr>
<tr>
<td>X7- percent of ST Population/ ward</td>
<td></td>
</tr>
<tr>
<td>X8- percent of slum Population/ Ward</td>
<td></td>
</tr>
<tr>
<td>X9- percent of female literate population/ward</td>
<td></td>
</tr>
<tr>
<td>X10- percent of total working female population/ ward</td>
<td></td>
</tr>
<tr>
<td>X11- percent of female main worker/ ward</td>
<td></td>
</tr>
<tr>
<td>X12- percent of female marginal worker/ward</td>
<td></td>
</tr>
<tr>
<td>X13- percentage of female non-worker /ward</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Available Facilities</th>
<th>X14- number of primary schools/1000 population</th>
</tr>
</thead>
<tbody>
<tr>
<td>X15 number of secondary &amp; higher secondary schools/ 1000 population</td>
<td></td>
</tr>
<tr>
<td>X16- Number of bus service / ward</td>
<td></td>
</tr>
<tr>
<td>X17- Number of bus stoppage/ward</td>
<td></td>
</tr>
<tr>
<td>X18- Number of commercial bank/ 1000 population</td>
<td></td>
</tr>
<tr>
<td>X19- Number of ATM services / ward</td>
<td></td>
</tr>
<tr>
<td>X20- Number. of tap water sources/ ward</td>
<td></td>
</tr>
<tr>
<td>X21- Number of health care facility/1000 population</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variation in Land-use</th>
<th>X22- Household Density/ward</th>
</tr>
</thead>
<tbody>
<tr>
<td>X23- Average Land-price near CBD (Central Business District)</td>
<td></td>
</tr>
<tr>
<td>X24- Average Land- Price I periphery</td>
<td></td>
</tr>
<tr>
<td>X25- percentage of built-up area/ ward</td>
<td></td>
</tr>
<tr>
<td>X26- percentage of household area/ ward</td>
<td></td>
</tr>
<tr>
<td>X27- Compactness (percentage of Household - percentage of built-up area per ward)</td>
<td></td>
</tr>
<tr>
<td>X28- Crowding (percentage of population- percentage of built-up area per ward)</td>
<td></td>
</tr>
</tbody>
</table>

*Table: 1: Selected variables
Source: computed by authors, 2019.*
Computation of Z score is used as methodology because it allows an easy and accurate comparison of the selected variables (Table-1) from the normal distribution. The equation is as follows-

\[ Z_i = \frac{(X_i - \bar{X})}{\alpha} \]

Where

- \( Z_i \) = is the standard score of ith variable,
- \( X_i \) = is the original value of the individual observation;
- \( \bar{X} \) = is the mean of variables, and
- \( \alpha \) denotes the standard deviation.

Values of Z-score are added up and averaged to compute the composite mean Z-score, that will indicate an index of development. This can be expressed as:

\[ CS = \frac{\sum Z_{ij}}{N} \]

Where

- \( CS \) = is the composite mean Z-score
- \( Z_{ij} \) = is the sum of Z-score of variables
- \( J \) = is the in observation I
- \( N \) denotes the number of variables.

**Results and Discussion**

Availability of Life supporting facilities in proportion to its population size determines the indices of development in that area. In India the disparities of the available facilities is a common syndrome. Amidst this known fact, analysis of availability and accessibility to urban facilities, studies are being carried out to decipher certain inference to draw the attention of the authority for proper planning and resource management. In view of this importance a micro-level study of regional disparity among all of the wards in a municipality area is aimed at considering analysis of three important parameters such as demographic variation, facility-utility and land-use pattern.

**Section-i: Demographic Variation:**

Demographic structure is one of the important determinants of socio well-being as well as for human development. Population density followed by sex-ratio, family size, population growth and percent of growth per ward, and slum population per ward as well as child population (<6 years), female literacy and working pattern depicts the demographic and socio-economic variation among the wards.

![Demographic Variation Among the Municipal Wards of Purulia, 2019](image)

*Figure: 2: Demographic variation*
From the computed composite-Z score value, it has been found that Ward number 5 and 8 fall under the high category. It has been revealed that the demographic variation (Figure - 2) might have affected the economic and educational facilities. The nature of working population is found to be influential in the construction of socio-economic status. Ward number 5 and 8, register high population and household density (1134 persons/sq km and 2050 persons/sq km and 245 houses/sq km and 329 houses/sq km respectively) and slum population (20 percent-25 percent), but the population growth rate is lower (3.8 percent in ward number 8 and -10.6 percent in ward number 5 in last 10 years).

<table>
<thead>
<tr>
<th>Level of variation</th>
<th>Composite Z-score values</th>
<th>Number of wards</th>
<th>Identity of Wards</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>&gt;0.22</td>
<td>2 (9 percent)</td>
<td>Ward number 5,8</td>
</tr>
<tr>
<td>Moderate</td>
<td>0.10-0.22</td>
<td>4 (18 percent)</td>
<td>Ward number 7,9,10,14</td>
</tr>
<tr>
<td>Low</td>
<td>&lt;0.10</td>
<td>16 (73 percent)</td>
<td>Ward number 1,2,3,4,6,11,12,13,15,16,17,18,19,20,21,22</td>
</tr>
</tbody>
</table>

Table: 2: Level of demographic variation based on composite Z score.

The analysis of data set testimonies less-migration and presence of indigenous people or permanent settled people in these two wards. In the arena of economic status, it has been found that working population chiefly female main worker is in high percentage in these two wards. Ward number 5 tops the list in terms of literacy percentage (89 percent) (Table-2). This situation is different in ward number 7, 9 10 and 14. Here population growth rate is very high in last 10 years, with the highest in ward number 9 (23 persons/year). In so far as percentage of population is concerned, ward number 14 is in leading position. Slum population is also high in ward number 14, but working population and literacy rate is not so remarkable. The high growth rate of population is attributed to large scale in-migration from surrounding areas as because it is the central part of the town where working facilities is more flexible than other parts of the town.

All remaining wards are socio-economically lagging behind due to high non-worker population, higher rate of illiteracy among women, higher slum population and higher child population (Figure- 2).

Section-ii: Variation in available facilities:

Unequal distribution of facilities over a region gives birth to regional disparity which is a common phenomenon in India. In Purulia municipality area these variation is too prominent (Figure-3).
Educational facilities, transportation, financial accessibility, water availability and health care facility have been taken into account (Table-3).

**Educational Facility:** Educational facilities are very important indicator of development of any area. Provision of good schools and colleges are very much needed for proper development. It has been found that ward number 5, 14, 16, and 20 have highest number of primary schools (6 to 7 primary school), whereas secondary and higher secondary schools are almost equally distributed among the wards. Ward number 12, 13, 14 and 20 have higher number of primary school per thousand populations. On the other hand ward number 3, 7, 10, 11, 14, 15, 16, 17, 19, and 21- these 10 wards have no secondary and higher secondary schools per thousand population. Two reputed colleges of Purulia district, i.e., Jagannath Kishore College and Nistarini College are situated in Ward number 9 and ward number 1 respectively. Although Sidho- Kanho-Birsha University is not situated in municipality area but its distance is only 5 kilometers from the town. Proper planning in education system and accessibility of educational facility may help the growth of percentage of female literacy as well as male among the slum areas. It helps to bring about changes among total working population in the municipal area.

<table>
<thead>
<tr>
<th>Level of variation</th>
<th>Composite Z-score values</th>
<th>Number of wards</th>
<th>Identity of Wards</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>&gt;0.55</td>
<td>3 (14 percent)</td>
<td>Ward number 1, 3, 4</td>
</tr>
<tr>
<td>Moderate</td>
<td>0.10-0.55</td>
<td>3 (14 percent)</td>
<td>Ward number 5, 12, 13</td>
</tr>
<tr>
<td>Low</td>
<td>&lt;0.10</td>
<td>16 (72 percent)</td>
<td>Ward 2, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22</td>
</tr>
</tbody>
</table>

**Table: 3: Level of variation in available facilities based on composit Z score.**

**Transportation facility:** Road density per ward, total number of buses running through the wards and number of bus stoppage per ward is taken into account to identify available transportation facilities. Six wards i.e, 3, 4, 5, 6, 7, and 8 are enjoying maximum bus services at present. Ward number 5, 6 and 7 are well connected with bus services, where 100 to 150 buses run per day. These wards are traversed by Purulia- Tata road. Ward number 3 and 4 also get well road connection, traversed by Purulia- Bankura road and Purulia- Ranchi road, where 150 buses run per day. Whereas other wards are poorly facilitated with bus services although surface roads are there. Auto, toto, rickshaw, personal modes of communication etc. are used to communicate with the rail and bus service. Purulia Jn. Railway station is situated in ward number 11. Apart from ward number 11, ward number 21, 16 and 22 also have the rail service facility.

**Financial accessibility:** Number of commercial bank per thousand population and number of ATM center per ward has considered for understanding the availability and accessibility of finance.

In this field it has been seen that ward number 1, 3 and 4 have higher number of commercial bank per thousand population and number of ATM also high in these wards. The ward number 7, 11, 16, 17, 18, 20 and 22 has no established ATM center yet.

**Water availability:** Problems related to water is very prominent in Purulia, where Municipality provides tap water to every ward, but the number of Tap water sources is unequally distributed among the wards. Ward number 1, 3 and 4 get 10, 11 and 15 tap water source per 100 meter respectively, where some wards like 6, 7, 8, 12, 13 get only 4 to 5 tap water source in each ward. The densest ward is ward number 8 (2050 population per square kilometer), but the number of tap water sources is only 5 here. Therefore, the analysis clearly depicts the disparity among the wards in water resources which could have been better by proper planning and execution.
Health care facility: The health care facility is very poorly developed in the total municipality area. Most of the nursing homes, hospital are situated in the CBD area. Though irregular, ward number 3 has relatively high health care facility (0.3 percent per thousand populations). There is only one Government Hospital (Deben Mahato Sadar Hospital). Many wards do not have a single health-care centre even, comprising of ward no 4, 8, 20 and 21. They have to depend on the other centers where rush of peoples are maximum. Total health care facility is needed to develop in Purulia municipality area.

Section- iii: Variation in landuse pattern:

In any region the land use pattern is always changed due to the development of socio-economic and other infrastructural facilities. In modern times, the development of flats and shopping malls bring about changes in the distribution of percentage of build-up areas, percentage of household and bring disparity in household density, allover compactness and crowding of the town.

![Variation in land-use pattern among the wards in Purulia Municipality, 2019](image)

Fig: 4: variation in land-use pattern

From this viewpoint, Purulia Municipality Area land-use pattern (Fig.-4) is well and good in ward number 6, 8, 15, and 17. High land price value is found near the central part of the town (7lakh to 8 lakh per Katha), comprising highest in ward number 15 (9 lakh/ Katha). Household density is highest in ward number 8 (329 houses per sq km) and lowest in ward number 3 (61 houses per sq km). This is due to the increase of percentage of slum population and migrated people. Although ward number 13, 14 is situated near CBD, household density is low here. Ward number 1, 3 and 4 are basically used for aesthetic sense, for well-developed and planned commercial purpose and well-planned flat, office etc. Ward number 10, 11, 21 and 22 are basically having high province of rail connectivity, high percentage of slum population and migrated population. So, in the sense of proper land utilization these wards are not up to the mark. Ward number 8, 13, 14 and 15 has high percentage of built-up area (80 percent to 90 percent) because of better available facilities although land price is high here (Table-4).
Table- 4: level of variation in land-use pattern based on composite Z score values.

Correlation among the variables:

Pearson’s product moment co-relation has computed among all the variables and it has been revealed as per follows-

- Population density and Household density among the wards are strongly and positively related \((r=0.977)\) means that as population density increases, household density also increases and vice versa.
- There is a moderately positive relation in between slum population and crowding \((r= 0.657)\) means that increase in slum population is added more load to the town.
- Relation in between female main worker and bus stoppage is positively correlated \((0.580)\). Increase in the number and percentage of female main worker might be affect the number of buses running through the wards and crowding \((r= 0.580 \text{ and } r=0.543 \text{ respectively})\). The relationship among these four variables is positive.
- Commercial bank and bus stoppage \((r=0.601)\); commercial bank and ATM centers \((r=0.788)\) are positively and moderately related. This means that the availability and accessibility of bank, ATM and bus stoppage is correlated with each other for better connectivity facility.
- Near CBD, the land price is very high and these places are mainly used for administrative purpose; so crowding \((r= -0.446)\) and compactness \((r= -0.324)\) is negatively related with the land price in CBD.
- The relation in between built-up area and health care facility is unfortunately moderately negative \((r= -0.760)\), reveals that although more and more health care facilities is needed but not provided in the town.

Population density and household density is significant at 0.01 levels. So as for bus stoppage and main worker; total number of bus and bus stoppage per ward; bus stoppage per ward and percentage of female main workers; commercial banks and ATM services all are correlated at 0.01 significant levels.

Whereas slum population and percentage of female literacy rate is significant at 0.05 level. Same picture is found in the case of household density and percentage of female main worker; percentage of female literacy rate and commercial bank and ATM services; built-up area and primary school; household density and crowding. These variables are also correlated at 0.05 significant levels. Health care facility and primary school are negatively correlated by 0.05 significant level.
Findings and Conclusion
The study provides an analytical discussion on utility-facility services provided among the wards in Purulia Municipality, West Bengal. It has been found from the study that lacunae do exist among the wards in terms of available facility, and demography as well. Not all the wards are getting equal facilities among which water facility and health care facility is more important. Influx of Population gives birth to higher population density, household density but no proper planning is found to eradicate disparities among the wards. Some wards are more developed in terms of all available facilities but others are lagging behind. A reasoned and proper planning is needed to develop the municipality area as well as to create a quality-life among the inhabitants of the town/city dweller.

References