

Research Article

# Equity in Public Facilities Provision in an Urban Area: A Spatial Analysis of Rajshahi City Corporation

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## Abstract

In the Rajshahi City Corporation (RCC) area, spatial size is not proportionate to the placement of public facilities due to rapid urbanization and population growth. This raises the question of what is the level of equity present in the provision of public facilities in the city corporation area. For this research, primary schools, high schools, colleges, health facilities, and markets were selected from the available types of public facilities. Location Quotient (LQ) method and Gini Coefficient were used to analyze locational concentration and spatial disparity in the provision of public facilities in 30 wards of Rajshahi City Corporation (RCC). Service area analysis was done to show how much of the city corporation area falls under a favorable distance from the public facilities. The number of the wards having LQ value > 1 range from 9 – 15 based on different public facilities; showing locational concentration is present for all public facilities. The Gini coefficient (GC) values range from 0.41 to 0.67, showing a high level of spatial inequity. The service area analysis also shows the service area of the public facilities fail to cover all of the wards. In the future, inequity in provision of public facilities can compound with the increase in population and urban sprawl if not met with regulatory and inclusive planning policies.

## Keywords

Spatial Analysis, Population, Public Facility, Service Area, Spatial Disparity, Planning Standard

## 1. Introduction

In recent years, urbanization has been a global phenomenon. The growth of the urban population in various regions of the world has shifted the ratio of the rural-urban population around the world. In the case of the Asia region, the urban population has risen from 33 million in 1950 to 548 million in 2018 [1]. Bangladesh has also seen a rapid urbanization rate, the urban population growing from 8.2% of the total population in 1972 to a projected 39% of the total population in 2021 [2]. The ever-increasing urban population has resulted in unplanned development in the urban areas, which has put a strain

on the available public facilities [3]. Urbanization and population migration are internally connected [4, 5]. In the case of Bangladesh, 50% of the population of the secondary towns consists of migrated people and the biggest reason behind migration is economic opportunities [6]. The rapid rise in urban population growth has an adverse impact on public services, higher population density lowers the service level, exceeding the capacity of service provision [7-10]. Urban sprawl created due to also lowers environment quality and creates problems like urban heat island [11], loss of ecosystem and biodiversity [12-17]. It is shown by

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Md. J. Alam & Ahmad, 2013 [18] that the provision of public facilities in public and private housing projects is poor and missing in some cases, due to corruption, lack of good governance [19, 20], and other reasons.

In the last several decades, scholars have taken an increasing interest in the issue of public facility accessibility [21-23]. Poor accessibility, on the other hand, may have negative socioeconomic effects [24] and promote inequality by limiting citizens' access to essential public facilities like schools and hospitals, as well as services and social contact [25-28]. Equality in sustainable urban development and excellent quality of life necessitates an examination of the accessibility of urban public amenities. Nonetheless, the majority of prior research has concentrated on a single establishment [29-31]. The main benefit of focusing down on a single facility is that it may assist establish a fair public facility allocation plan by highlighting locations that are underserved and in need of improvement in facility distribution.

Urbanization has also occurred in the Rajshahi Division. According to a study done by K. T. Alam & Islam, 2010 [32], the Rajshahi division hosts 15.5% of the total urban population of Bangladesh. Rajshahi City Corporation (RCC) is the prominent urban growth center in this region, showing high urban growth from 1990 to 2015, averaging 7.9% per annum, converting 25 sq. km. of non-urban land to urban land [33]. Rajshahi City Corporation (RCC) is not only a city corporation area but also a divisional city. It is one of many economic centers where rural to urban immigration occurs because it provides economic opportunities to nearby rural areas. The city management authority, Rajshahi Development Authority (RDA) controls development through building codes and standards of land and facility development. Although, many facilities are developed before the standards came into implementation. There are not many studies done on the spatial distribution of public facilities in a City Corporation area. The scope of the available studies limits itself to a single specific public facility. Literature on the equity and efficiency of public facilities is available, but literature based on the perspective of Bangladesh is sparse. This study was inspired by a need to address a gap in knowledge by analyzing the spatial variance and accessibility of public services throughout the city's wards. Also finding out how many people are in the region that these public amenities serve.

## 2. Public Facilities, Equity and Evolution of Planning Standards

In our research first, the definition of a public facility has been determined. There are several definitions offered. Public facilities, as simply put by Cremer et al., 1985 [34], are locations where customers get public services. A more in-depth explanation is given by DeVerteuil, 2000 [35]; Teitz & Bart, 1968 [36], according to them urban facilities are parts of the city whose first and foremost function is the provision of

public goods and services which are partly if not wholly by the government. Again, City of Irvine, 2012 [37] describes public facilities as the institutional provision of health, education, safety, recreation, and worship, which are basic human needs and also some facilities are helpful even in earthquake [38]. They are also explained as those basic services which cannot be provided door to door [39].

### 2.1. Equity in Public Facility Provision

The scope of spatial equity varies from person to person, from ambitious goal of encompassing access to multiple alternatives to jobs, facilities, cultural events to access to basic public facilities for everyone [40]. Similarly, Robinson, 2007 [41] considers equity as affordable, accessible and appropriate services provided to all classes of the population. In a simpler way, Andrews et al., 2019 [42], considers equity as equal access to services for both wealthy and poor. In equal provision of facilities exacerbate the existing problems in the socio-economic and health drawbacks in the urban area [26]. From the understanding of equity as a concept, definition of spatial equity is derived by Rahman et al., 2015 [43] and simply explains spatial equity as public facilities provided equally in the context of space [44]. Public facilities need to be distributed on the basis of equity to elevate the lives of people living in every corner of a city. According to Ashik et al., 2020 [45], there are two types of spatial equity:

- 1) Horizontal Spatial Equity: Horizontal spatial equity refers to the distribution of facilities disregarding the location and socio-economic condition of the residents. This focuses on the access of people to public facilities.
- 2) Vertical Spatial Equity: Vertical spatial equity is the provision of public facilities based on the socio-economic condition of the served population so that people at the lower end of socio-economic spectrum get compensation for public facilities to lower the overall inequality they face.

Some researchers prefer vertical equity over horizontal equity (De Bartolome and Ross 2004 [46]; Martins et al. 2013 [47]; Yuan et al. 2017 [48], as cited in Cepiku & Mastrodascio, 2021 [49], referring horizontal equity as equality.

### 2.2. Equity and Planning Regulations

The history of planning regulations shows the evolution of planning regulations. The regulation changed over time to accommodate equity. Alterman, 2013 [50] divided the evolution of planning regulations into five generations. The first generation introduced building regulation and construction related rules. The second generation expanded on this and introduced land use control elements immediately surrounding the building structure. The third generation included landscaping standards and design review process. The fourth generation counted for environment, introducing protection rules, growth management, land conservation etc. Finally, the

fifth-generation regulations focus on community needs, they include Dedication of land for public services, fees for public services usage etc. The present generation of regulations is

based on planning principles that help to increase equity and inclusivity. The planning for public facilities also enforces these qualities, as shown by Mohd Ibrahim et al., 2016 [51].

**Table 1.** Planning Principles.

Planning Principles	Descriptions
Equal distribution of facilities	Properly distributed in accordance to location and population.
Accessibility	Provisioned within walking distance from residential areas and provided safety from traffic.
Comfort and safety	Not established in places of natural hazard, steep slopes, etc.
Interaction	Social interaction is to be promoted.
Design	Should value local aesthetics and culture, also in line with universal design principles.

### 2.3. Planning Standard for Public Facilities

There are several planning authorities in Bangladesh, which implement different planning standards for their respective jurisdiction area. In the case of Rajshahi City Corporation (RCC), the Rajshahi Development Authority (RDA) has set the planning standards for public facility development, some of the standards related to this research are shown below:

**Table 2.** Standard for Public Facilities in Rajshahi City Corporation (RCC) Area.

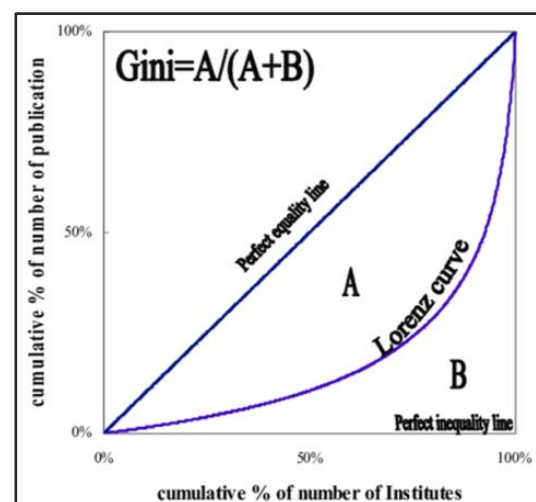
Facilities	Rajshahi Metropolitan Development Plan, 2004 (RMDP 2004)
Primary School	1 school per 4000 popn
High School	1 school per 6,000 popn.
Intermediate College	1 college per 6,000 popn.
Degree College	1 college per 30,000 popn
Market	1 in each ward
Health Center	354 person per bed

Some of the given standards do not mention the suitable spatial distance from one public facility to another. It is sometimes hard to designate distance to standards, but some studies show the maximum distance which the public facility users are willing to go to receive the service. According to Rodríguez-López et al., 2016 [52], children are willing to walk up to 875 meters to go to educational facilities and in the case of adolescents, the distance is 1350 meters. For the distance of health facilities, Mansour, 2016 [53] considered 1 km as the preferred distance. So, the ideal spatial distances for the selected public facilities are:

**Table 3.** Preferred Distance of Public Facilities.

Facilities	Distance
Primary School	875 meters
High School	1350 meters
College	1350 meters
Clinic	1 kilometer
Hospital	1 kilometer
Market	1 in each ward

### 2.4. Measuring Spatial Disparity of the Public Facilities



**Figure 1.** Lorenz Curve and Gini Coefficient (GC) (Source: Zheng et al., 2021 [54]).

The measurement of spatial disparity is done through the analysis of Gini co-efficient (GC). This method is used by Jahan & Oda, 2000 [55], and Rahaman & Salauddin, 2009 [56], Azmoodeh et al., 2021 [57], Jang et al., 2017 [58] to analyze spatial equity. According to Pan American Health Organization, 2001 [59] “The Gini coefficient (GC) is based on the Lorenz curve, a cumulative frequency curve that compares the distribution of a specific variable with the uniform distribution that represents equality. This equality distribution is represented by a diagonal line, and the greater the deviation of the Lorenz curve from this line, the greater the inequality.”

The perfect diagonal line shows the perfect equality. The more the Lorenz curve deviates from the equality line, the more inequality is in the system.

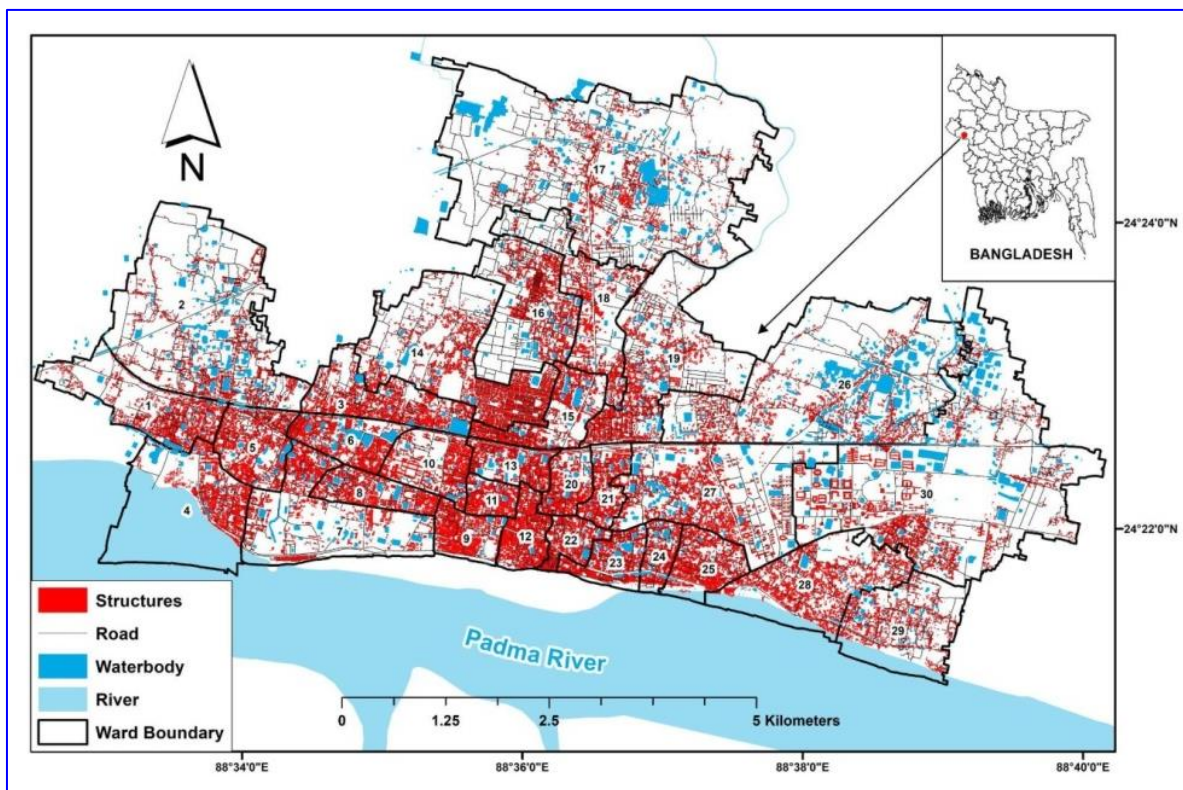
### 2.5. Measuring Spatial Concentration of the Public Facilities

Analysis of spatial concentration of the public facilities

provide the answer to the question of spatial disparity of public facilities. One method of measuring concentration is through a method named L. Q or Location Quotient method, used to measure spatial concentration by Jahan & Oda, 2000 [55] and Rahaman & Salauddin, 2009 [56] In the Location Quotient Method, the relative distribution/concentration of one area with the whole area is measured.

### 3. Study Area

Rajshahi City Corporation (RCC) has a long history of development. More than 150 years ago, Rajshahi city was known as Boalia Rampur municipality. Later, it became Rajshahi Paurashava. In 1887, the municipality was upgraded to a municipal corporation. In 1990, the municipal corporation was updated to Rajshahi City Corporation (RCC). This city corporation consists of 30 wards. According to the Bangladesh Bureau of Statistics and Rajshahi City Corporation (RCC) has an area of 97.17 sq km with a population of 449756.



**Figure 2.** Rajshahi City Corporation (RCC) Area.

There are 7 types of structure use in Rajshahi City Corporation (RCC). The highest percentage of structures are used as residential buildings. 87% of the total structures are residential buildings. The 2nd highest percentage of structure use

type is the business and mercantile buildings. The detail structure type with their percentage and frequency are described in [table 4](#).

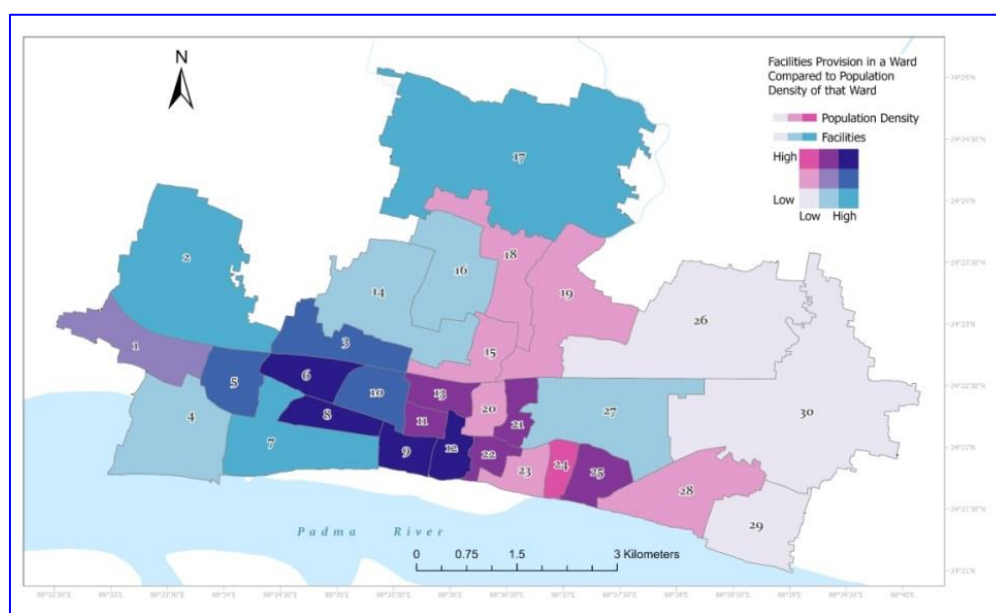


**Table 4.** Structure Use Type in Rajshahi City Corporation (RCC) Area.

Structure Use Type	Count	Percentage
Business and Mercantile Building	5955	6
Educational Building	735	0.78
Health Care Building	166	0.18
Industrial Building	436	0.46
Miscellaneous Building	3845	4
Mixed Use	1024	1
Residential Building	81649	87
Total	93810	100

They add up to 6% of the total structure use types. The Miscellaneous Buildings are the 3rd largest percentage of total structure use types, which is 4%. These 3 structure use

types make up 97% of the total structure use type. The rest of the use types are only 3% of the total structure use type.

**Figure 3.** Facility Provision Compared to Population Density.

The figure shows the density of public facilities at each ward compared to population density of these wards. It is evident from the map that there is a concentration of public facilities in a few wards which also have a high density of population. Some wards also have a high population density but they lack public facilities.

## 4. Method

For this research, quantitative data is required to fulfill the research objectives. The variables including demography of

the study area, service area of the public facilities, and location variation of the public facilities require quantitative data for analysis. Demographic data, ward area, structures in the selected wards, and other structure-related data have been collected from the Bangladesh Bureau of Statistics and Rajshahi City Corporation (RCC).

### 4.1. Data Analysis

The data were processed and analyzed in Microsoft Excel and maps were produced in ArcMap 10.6.

**Analysis of Spatial Concentration of the Public Facilities:**

In the case of measuring the spatial concentration of public facilities in this research, the Location Quotient Method is used. The formula for this research will be:

$$LQ = (x_i / n_i) / (x / n)$$

Where,

$x_i$  = Number of facilities in a selected ward

$n_i$  = Population of that selected ward

$x$  = Number of facilities in Rajshahi City Corporation (RCC)

Area

$n$  = Total population of Rajshahi City Corporation (RCC)

The values derived from the formula will range from 0 to greater than 1. The interpretation of the values is given below:

If  $LQ < 1$ :

The  $LQ$  value  $< 1$  means that the concentration of the facilities in the ward is lesser than the total wards in the city corporation area

If  $LQ = 1$ :

The  $LQ$  value  $= 1$  means that the facilities present in the ward are sufficient enough for the population of that particular ward.

If  $LQ > 1$ :

The  $LQ$  value  $> 1$  indicates that there is a concentration of the facilities in the ward.

**Analysis of Spatial Disparity of the Public Facilities:**

Gini Coefficient (GC) derived from the Lorenz Curve is used to derive the level of spatial disparity of the public facilities in the study area. The formula for Gini Coefficient (GC) is given below:

$$G = 2 \frac{\sum_{i=1}^n (x_i - \bar{x})}{n^2 \bar{x}}$$

Here,

$x$  = observed value (Number of facilities per population)

$n$  = number of values observed (Number of wards)

$\bar{x}$  = mean value of  $x$

$G$  = Gini Coefficient

The range of Gini coefficient (GC) is 0 to 1. 0 shows total inequality and 1 shows total equality.

## 4.2. Service Area Calculation

The service areas of the public facilities were analyzed with the Network Analyst tool in ArcGIS. The required distances were derived through literature review.

Rajshahi City Corporation (RCC) has a total population of 449756. The following table shows the breakdown of the population based on education and gender.

**Table 5.** Demographic Information of the Rajshahi City Corporation (RCC).

Wards	Population (Primary School going)	Population (High School going)	Population (College going)	Male	Female	Ward Population
Ward 1	1475	1892	1635	7945	8087	16032
Ward 2	1836	2139	1854	8860	8963	17823
Ward 3	1711	2033	2255	10098	10034	20132
Ward 4	1165	1416	1324	6660	6578	13238
Ward 5	1201	1554	1370	6796	7332	14128
Ward 6	1343	1587	2105	7775	7481	15256
Ward 7	919	1100	1152	7851	5091	12942
Ward 8	804	914	1630	5806	5205	11011
Ward 9	939	1195	1864	7321	6911	14232
Ward 10	708	829	1504	5692	5365	11057
Ward 11	701	873	2410	5960	6334	12294
Ward 12	624	1078	1873	6518	4831	11349
Ward 13	679	797	1467	5059	4786	9845
Ward 14	1975	2502	2480	11369	10580	21949
Ward 15	1110	1260	1904	7203	6497	13700
Ward 16	1495	1844	2076	8829	7781	16610

Wards	Population (Primary School going)	Population (High School going)	Population (College going)	Male	Female	Ward Population
Ward 17	1816	2314	2474	9999	9952	19951
Ward 18	1295	1469	1557	7490	7057	14547
Ward 19	2064	2545	2729	11622	11307	22929
Ward 20	589	872	896	4015	3842	7857
Ward 21	804	1042	1022	5130	4797	9927
Ward 22	589	732	900	4250	4164	8414
Ward 23	718	848	857	4346	4308	8654
Ward 24	1277	1437	1495	7358	7155	14513
Ward 25	969	1250	1454	6659	6093	12752
Ward 26	1561	1877	2119	9754	8832	18586
Ward 27	1428	1696	1911	9163	8693	17856
Ward 28	1844	2278	2712	11622	10075	21697
Ward 29	1595	1851	1623	7244	6995	14239
Ward 30	1522	1863	3175	14580	11656	26236

### 4.3. Number of Public Facilities at Each Ward

The following table shows the distribution of public facilities at each ward of Rajshahi City Corporation (RCC).

**Table 6.** Number of Public Facilities in Each Ward of Rajshahi City Corporation (RCC).

Wards	Primary Schools	High Schools	Colleges	Markets	Health Facilities
Ward 01	3	1	0	2	1
Ward 02	6	3	1	4	0
Ward 03	4	1	0	2	3
Ward 04	3	0	0	3	2
Ward 05	5	3	1	1	1
Ward 06	2	0	0	4	8
Ward 07	2	2	1	2	5
Ward 08	1	4	2	0	11
Ward 09	4	2	2	0	7
Ward 10	2	2	0	0	9
Ward 11	3	2	1	0	3
Ward 12	1	2	0	6	1
Ward 13	1	2	1	1	4
Ward 14	3	2	1	0	2
Ward 15	0	0	0	0	0
Ward 16	3	1	0	2	0
Ward 17	4	3	2	2	2

Wards	Primary Schools	High Schools	Colleges	Markets	Health Facilities
Ward 18	1	0	1	1	1
Ward 19	1	1	0	0	1
Ward 20	2	1	0	0	0
Ward 21	3	2	1	0	1
Ward 22	0	1	3	1	0
Ward 23	1	0	1	1	1
Ward 24	4	0	0	0	0
Ward 25	5	1	1	0	1
Ward 26	0	0	0	0	0
Ward 27	1	4	2	0	2
Ward 28	2	0	0	1	1
Ward 29	0	0	0	0	0
Ward 30	0	0	0	0	0

## 5. Results and Discussion

### 5.1. Spatial Concentration of Public Facilities

Through the LQ method, spatial concentration of public facilities is determined. The following table shows the LQ values of public facilities in each ward.

*Table 7. LQ Values of Public Facilities.*

Wards	Primary	Secondary	College	Health Facilities	Market
Ward 1	1.116	0.596	0	0.419	1.7
Ward 2	1.793	1.581	1.383	0	3.059
Ward 3	1.282	0.554	0	1	1.354
Ward 4	1.413	0	0	1.014	3.089
Ward 5	2.284	2.176	1.87	0.475	0.965
Ward 6	0.817	0	0	3.52	3.573
Ward 7	1.194	2.049	2.225	2.593	2.106
Ward 8	0.682	4.934	3.146	6.706	0
Ward 9	2.336	1.886	2.75	3.302	0
Ward 10	1.55	2.719	0	5.464	0
Ward 11	2.349	2.583	1.064	1.638	0
Ward 12	0.879	2.091	0	0.591	7.205
Ward 13	0.808	2.827	1.747	2.727	1.384
Ward 14	0.833	0.901	1.033	0.612	0
Ward 15	0	0	0	0	0
Ward 16	1.101	0.611	0	0	1.641



Wards	Primary	Secondary	College	Health Facilities	Market
Ward 17	1.209	1.461	2.072	0.673	1.366
Ward 18	0.424	0	1.647	0.461	0.937
Ward 19	0.266	0.443	0	0.293	0
Ward 20	1.862	1.293	0	0	0
Ward 21	2.047	2.163	2.507	0.676	0
Ward 22	0	1.54	8.541	0	1.62
Ward 23	0.764	0	2.992	0.776	1.575
Ward 24	1.718	0	0	0	0
Ward 25	2.83	0.902	1.763	0.526	0
Ward 26	0	0	0	0	0
Ward 27	0.384	2.658	2.683	0.752	0
Ward 28	0.595	0	0	0.309	0.628
Ward 29	0	0	0	0	0
Ward 30	0	0	0	0	0

The facility wise LQ values show concentration of different public facilities in various wards:

For Primary Schools - 15 out of 30 wards have scored LQ value higher than 1, showing that concentration of primary school is present in those wards. 10 other wards show LQ value lower than 1, showing a lack of self-sufficiency. The wards having a concentration of primary schools are located in the north, east and southern parts of the city corporation.

For High Schools – 14 out of 30 wards have scored LQ value higher than 1, showing that concentration of high schools is present in those wards. 6 wards have LQ value lower than 1, showing a lack of self-sufficiency. 10 wards do not have high schools in them.

For Colleges – 15 out of 30 wards have scored LQ value higher than 1, showing that concentration of colleges is present in those wards. Interestingly, the other 15 wards have no colleges in them, so there is no lack of self-sufficiency in those wards, but rather an absence of facilities.

For Health Facilities – 9 out of 30 wards have scored LQ value higher than 1, showing that a concentration of health facilities is present in those wards. 12 wards have scored LQ values lower than 1, showing that there is a lack of self-sufficiency in those wards. 9 wards do not have health facilities in them.

For Markets – 12 out of 30 wards have scored LQ value higher than 1, showing that the concentration of markets is present in those wards. 3 wards have scored LQ values lower

than 1, showing that there is a lack of self-sufficiency in those wards. 15 wards do not have markets in them.

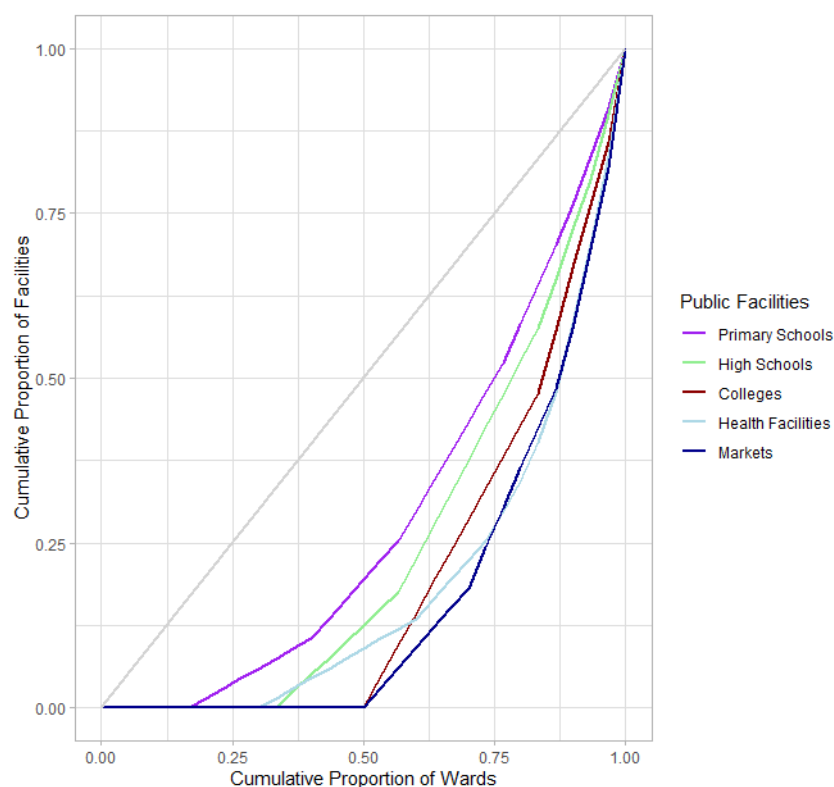
Spatial Disparity of Public Facilities:

The spatial disparity of public facilities is analyzed through the Gini coefficient (GC). The following table shows the Gini Coefficient (GC) of each public facility.

**Table 8.** Gini Coefficient (GC) of Each Public Facility.

Public Facility	Gini Coefficient (GC)
Primary School	0.41
High School	0.51
College	0.64
Health Facility	0.65
Market	0.67

The Gini coefficient (GC) table shows that there is a high level of disparity present in the distribution of public facilities in the Rajshahi City Corporation (RCC) area. The level of disparity is similar for colleges, Health facilities, and Markets. Relatively lower disparity can be seen in the case of high school and relatively the lowest disparity is in the availability of primary facilities.

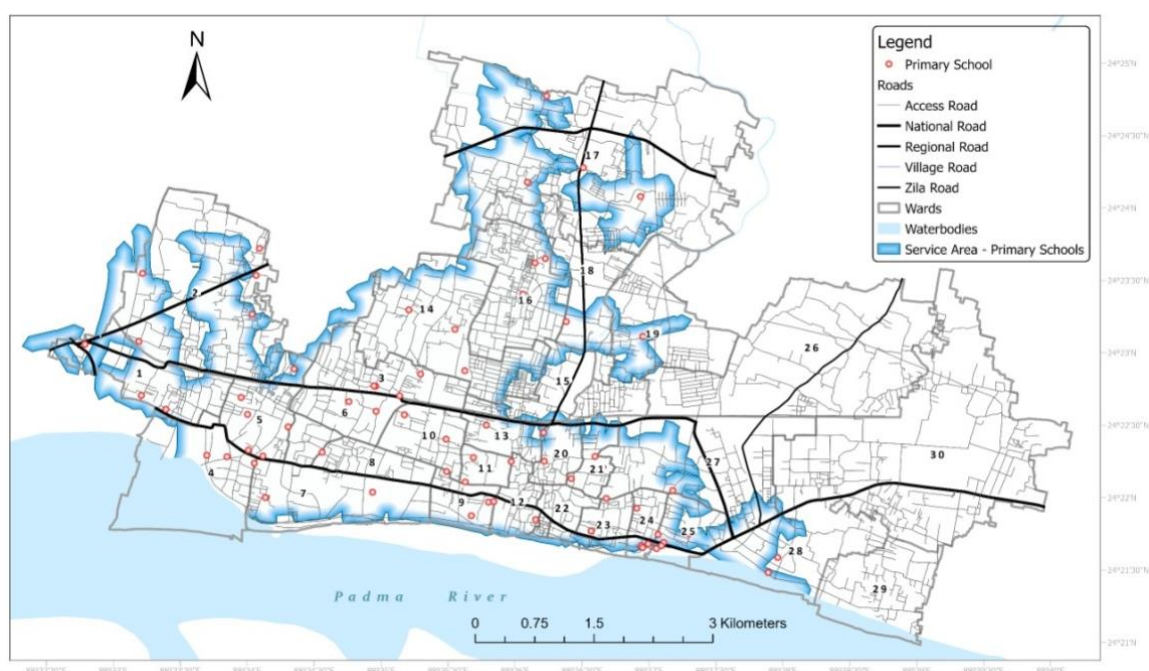


**Figure 4.** Lorenz Curve of the Public Facilities in Study Area.

## 5.2. Service Area of the Primary Schools

There are 67 primary schools in Rajshahi City Corporation (RCC). The service area of the primary schools covers most of

the wards of the city corporation although does not cover the eastern part of it. Ward no 26, 29, and 30 do not have any coverage of primary schools available in the city corporation area. The 3 wards out of the service area of the primary schools have a total primary school eligible population of 4678.

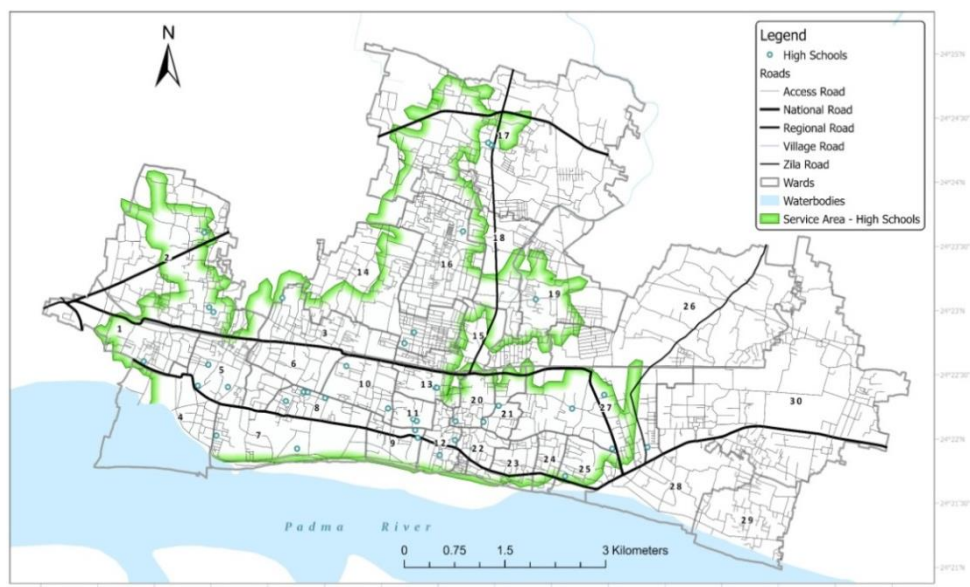


**Figure 5.** Service Area of the Primary Schools.

### 5.3. Service Area of the High Schools

There are 40 high schools in the Rajshahi City Corporation (RCC). These high schools are spread over 20 wards out of 30 wards of the city corporation area. The wards which do not have any high school in them are Ward 4, 6, 15, 18, 23, 24, 26,

28, 29, and 30. Although these wards do not have high schools, the service area of the high schools covers most of the wards. Only ward no 26, 28, 29, and 30 fall outside the service area of the high schools. These wards that do not fall under the service area of high schools have a total high school eligible population of 7869.

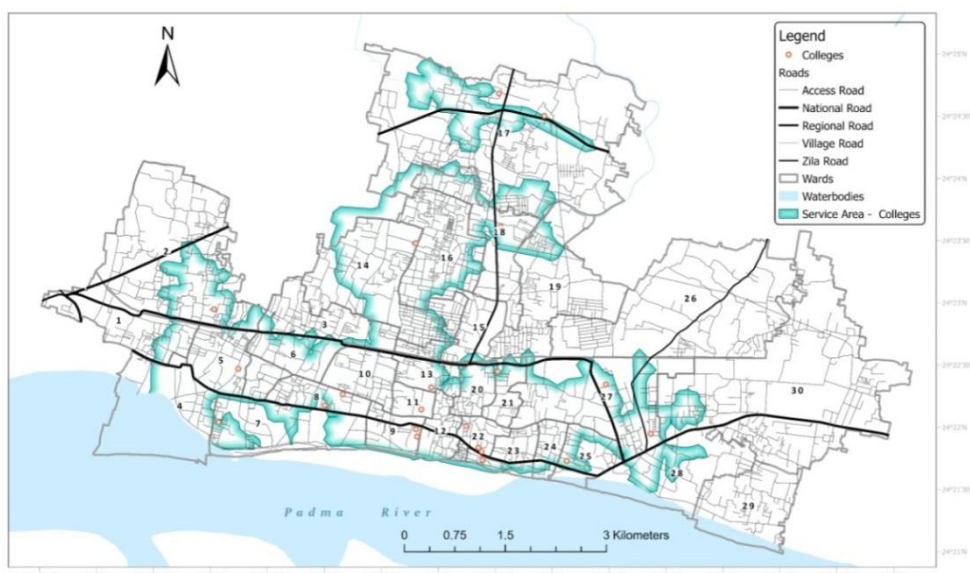


**Figure 6.** Service Area of the High Schools.

### 5.4. Service Area of the Colleges

There are 21 colleges in the Rajshahi City Corporation (RCC) area. Only 15 out of 30 wards have colleges in them. There is a concentration of colleges in the southern part of the

city corporation area. Their service area covers most of the wards. Although the service area does not reach wards 26, 29 and 30. These three wards have a total high school eligible population of 2306.

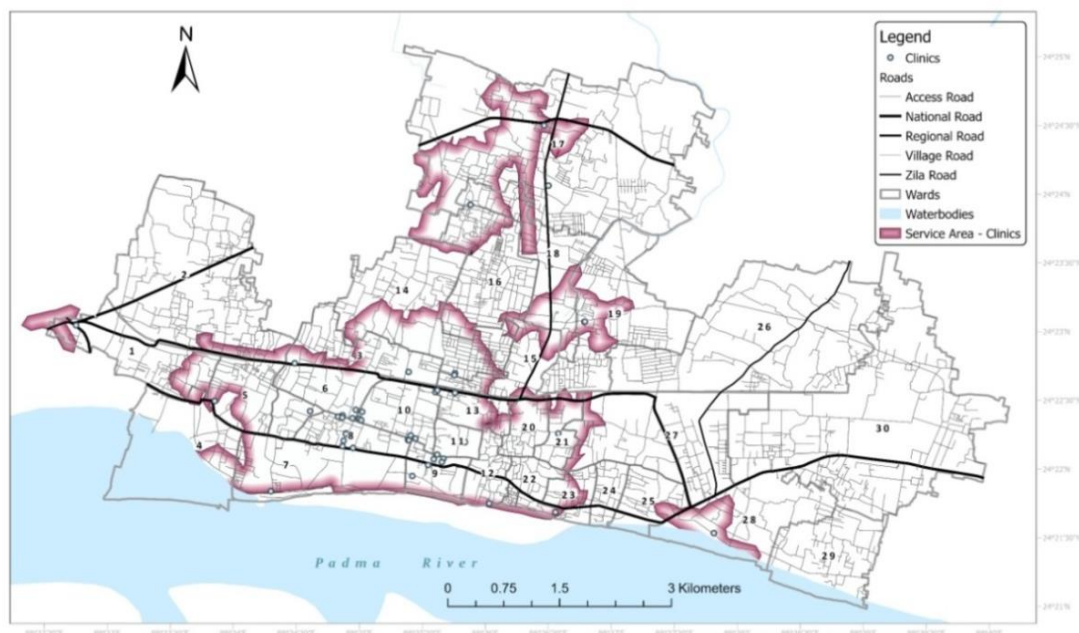


**Figure 7.** Service Area of the Colleges.

### 5.5. Service Area of the Clinics

There are 47 clinics in the Rajshahi City Corporation (RCC) area. Most of the clinics are located in the southern part of the

city corporation. Their concentration in that part of the area leaves some of the wards out of their service area. These wards are: Ward 2, 4, 24, 25, 26, 27, 29, and 30.



*Figure 8. Service Area of the Clinics.*

### 5.6. Service Area of the Hospitals

There are 19 hospitals in the Rajshahi City Corporation (RCC) area. All of the hospitals are located in the southern part of the city corporation. The service area of the hospitals covers 10 wards out of 30 wards.



*Figure 9. Service Area of Hospitals.*



## 5.7. Service Area of Markets

There are 35 markets in the Rajshahi City Corporation (RCC) area. Most of the markets are spread in the southern and western parts of the city corporation. The RMDP 2004 insists to have at least one market in each ward. Currently, the

35 markets are located in 15 wards out of the 30 wards. Ward 8, 9, 10, 11, 14, 15, 19, 20, 21, 24, 25, 26, 27, 29 and 30 do not have market in their area. Out of the total population of 449756 in Rajshahi City Corporation (RCC), 223891 people live in the wards where there is no market.



**Figure 10.** Market Locations in the Rajshahi City Corporation (RCC).

## 6. Recommendations and Conclusion

The concentration of public facilities in some wards means that many wards do not have public facilities in them. Identifying those wards and providing public facilities in them will be helpful to reduce concentration.

The planning standard in many cases does not require spatial conformity of provision, rather it sets the number of people to be served. Following this planning standard will reduce the disparity of public facility provision, although spatial disparity may still exist.

Improvement of the transportation system and safe pedestrian-friendly environment development can help reduce the distance-related problems of using public facilities to a great extent, thus reducing the spatial disparity of using the facilities.

The population of the wards in Rajshahi City Corporation (RCC) will increase over time, and with that, the demand for public facilities will rise as well. Balanced urban planning will be required to manage the demand; the current situation already has seen disparity and concentration.

The current provision of public facilities has already con-

centrated in some of the wards of the city corporation. Land use management, zoning and other policy instruments can be helpful to incentivize the development of new/mixed land use which can be beneficial for the provision of new public facilities in the currently under-equipped wards.

The Rajshahi City Corporation (RCC) will face many challenges in the next decades to provide public facilities due to already existing spatial disparity. The population growth will be significant, so balanced and effective supply-demand based planning is required.

## Abbreviations

ERP	Emergency Response Program
GC	Gini Coefficient
LQ	Location Quotient
RCC	Rajshahi City Corporation
RMDP	Rajshahi Metropolitan Development Plan
RDA	Rajshahi Development Authority

## Conflicts of Interest

The authors declare no conflicts of interest.

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