7th International Conference on Advances in Civil Engineering (ICACE2024)
12-14 December 2024
CUET, Chattogram, Bangladesh
https://icace2024.cuet.ac.bd

ASSESSMENT OF REGIONAL DISPARITY: A STUDY ON BANGLADESH

Sharmin Rahman*[1], Kaniz Ahmed Kakon[2], Nushrat Nureen[3], Mustari Jahan Monira[4]

[1] *Postgraduate Student, Khulna University of Engineering & Technology (KUET), Bangladesh, e-mail: sharmin.urp.2k17@gmail.com*
[2] *Graduate Student, Khulna University of Engineering & Technology (KUET), Bangladesh, e-mail: kakonkaniz507@gmail.com*
[3] *Postgraduate Student, Khulna University of Engineering & Technology (KUET), Bangladesh, e-mail: nushratnureenzana@gmail.com*
[4] *Graduate Student, Khulna University of Engineering & Technology (KUET), Bangladesh, e-mail: mustarijahan08@gmail.com*

***Corresponding Author**

Abstract

This study assesses the pattern of socio-economic disparities and compares facility distribution among 64 districts of Bangladesh. The regional disparities were measured in terms of indicators like poverty, income, literacy rate, access to utilities, number of industries, etc. as social and economic dimensions for each district. Among various techniques of disparity analysis natural breaks, weighted overlay, and Location Quotient methods have been used for this study. The data were collected from the statistics of World Bank, BBS (Bangladesh Bureau of Statistics), and Global Data Lab and categorized into two categories under some indicators. Several maps have been prepared to show the regional disparity. The findings reveal significant differences in socioeconomic dimension levels within and across districts in Bangladesh. Some regions are always found to be less privileged than others. Highly urbanized regions (Chittagong, Dhaka, Gazipur, Narayanganj, and Khulna) have more facilities than any other region. In the Eastern and Southern regions of Bangladesh, the level of socioeconomic development is not significant. The spatial disparity is very high in Eastern districts (Sunamganj, Gaibandha, Kurigram, Jamalpur, Netrokona). In the Southern region, Satkhira could not have much socio-economic development much because of its remoteness characteristics and the presence of the Sunderban forest area. On the other side, Rangamati and Cox's Bazar have grown as a result of the development of urbanization in the Chittagong area. According to the study, low-developed districts require improvement in the majority of indicators in order to enhance their overall socioeconomic development, allowing for future sustainable development of regions.

Keywords

Region, Disparity, Social, Economic

1. Introduction

Bangladesh is a developing country in South Asia. Most emerging countries in South Asia have regional differences. [1]. The disparity is a generic indicator of inequities or differences. In general, regional disparities mean inequities or differences generated by inherent societal tendencies. It also refers to the disparities in economic performance and social welfare between regions. The degree of diversity in both of these patterns is great in Bangladesh [2]. Growth is expressed as a parameter for analyzing regional disparity. Growth has accelerated highly in developed districts of Bangladesh, including the capital Dhaka, compared to less developed districts. For example, the capital city Dhaka has an average GDP 1035 dollars per person, while hill track district Khagrachari's is 295 dollars per person, which is four times less than Dhaka's [3]. Different types of facilities are disproportionately existing in 64 districts of Bangladesh. Among different types of facilities, some social facilities are housing, sanitation, access to electricity, drinking water, etc. All are prerequisites for living a healthy life and one of the major concerns for the regional disparity [4]. Along with this Road share percentage, literacy, and infant mortality also affect regional disparities. Controlling population density increase and successfully managing this massive mass is consequently vital to the country's development efforts as well as creates disparities among

districts. For industrial development different types of variables like no of industries, the number of industries worker, employment rate, migration rate, and urbanization rate is considered which creates regional disparities [5].

Socio-economic inequality is a multifaceted topic with many overlapping economic and social components. The Gini index, LQ (Location Quotient), AHP (Analytical Hierarchy Process), and other common metrics include [6]. Although socioeconomic inequality has many forms, it fundamentally boils down to individual disparity. Urbanization can be used to create LQs. Statistics on employment, income, value contributed, and so on. LQs are simple to analyze and evaluate data [7]. The Gini coefficient (sometimes spelled Gini index or Gini ratio) is a statistical indicator of a population's economic disparity. The first step in an AHP analysis is to establish a decision hierarchy. This is also known as decision modeling, and it entails creating a hierarchy to examine a choice [8]. One way of modeling appropriateness is weighted overlay. Several factors will almost always need to be examined in order to achieve a certain goal this is why we use weighted overlay. The primary theme layers are developed as an input for determining feasible recharge project sites in this study. To prepare these layers for use as an input in an overlay weighted model, a number of steps were taken[4]. We choose the weighted overlay method over other disparity processes since other processes have some drawbacks as well, such as the coefficient's disadvantage of overlooking population structural changes. When adding or eliminating choices that are part of the data set, there is inconsistency in location. While the weighted overlay is easy to applicable, the model's weights describe the relative relevance of each variable in the study, as well as the relative value of each variable's classes according to a specified aim [8]. There are some bad effect of weighted overlay such as we need to break the model into several sub-model which requires correct prediction of standards.

2. Research Methodology

2.1 Study Area Profile:

Bangladesh situated in northern South Asia, between 20°34' and 26°38' north latitude and 88°01' to 92°41' east longitude [9]. The magnificent Himalayas are to the north, and the Bay of Bengal lies to the south. West Bengal borders the hilly and forested regions of Tripura, Mizoram (India), and Myanmar [10]. The land area of Bangladesh, at present it is 1, 47,610 sq. km (56,990 sq. mi). Dhaka is the capital city of Bangladesh and also the largest city, which has 10.3 million residents [11]. The 2nd most populous city Chattogram, has a respectable population of almost 4 million. However, it has experienced strong economic growth as well as significant advances in human and social development metrics.

Figure 1: Study Area Map

2.3 Methods

2.3.1 Location Quotient:

This technique has been widely used by researchers in economic geography and regional economics since the 1940s [12]. The Location Quotient (LQ) is a useful ratio for determining how specialized economic activity is in a specific location. LQs data on employment, income, or value contributed, for example, can be created using urbanization. Data may be easily analyzed and evaluated using LQs [12].

$$LQ = \frac{\frac{\text{Urban population of specific district}}{\text{Total population of specific district}}}{\frac{\text{Total national urban population}}{\text{Total national population}}}$$

2.3.2 Natural Breaks(Jenks) :

Natural breaks help to determine the "best" approach to divide the ranges. Assume there are 30 counties, 15 with 0-1 values, ten with 16-18 values, and five with 24-29 values. Obviously, the "better" ranges are 0-1, 16-18, and

24–29. Color harmonization among counties with comparable values is advised. Natural breaks are the only method to determine "ideal" ranges. [8].

2.3.3 Weighted overlay method:

The weighted overlay approach is a simple, rapid, and effective way to identify geographical differences [13]. Weights are distributed to each raster layer both outwardly and internally based on their relative value, which is assessed by expert judgment. Class values refer to internal weights or rating values, whereas external weights or weight values refer to the overall weights of all layers, which must equal 100. The weight values and rating values of each event-controlling component were calculated using Jenks. After the model was assigned weights, all raster layers were run through the weighted overlay tool for susceptibility analysis. Finally, a susceptibility map was constructed using ArcGIS software and the weighted overlay technique [8].

3. Result & Discussion:

3.1 Descriptive Analysis:

Descriptive analysis has performed to identify the level of development in different districts in which wide disparity exist in different socio- economic parameter. Social and economic are the two-main factors which is divided into different category along with some sub-category. This has been used to do further analysis.

Table 1: Descriptive Analysis

Indicator	Category	Sub-category	Percentage
Economic	HDI	Minimum (%)	0.24
		Maximum (%)	0.46
	HCR	Minimum (%)	2.60
		Maximum (%)	70.80
	Per capita income	Minimum (%)	1.15
		Maximum (%)	3.95
	employment	Industry	15.02
		Agriculture	47.14
		Services	37.83
	Unemployment rate	Male	50.31
		Female	49.68
	GDP growth rate	Annual	4.50
	Human assets index (HAI)		63.80
	Poverty rate		24.30
Social	Sanitary condition	Sanitary	68.17
		Non-sanitary	31.83
	House with Electricity	Electricity	55.37
		Without electricity	44.63
	Drinking water	Tap	21.59
		Tube well	78.41
	Floating Population	Male	97.59
		Female	2.41
	Household Population	Male	50.28
		Female	49.72
	Literacy rate	Male	52.12
		Female	47.88
	Road	Paved	95.62

		Unpaved	4.38
	Housing Condition	Katcha	37.75
		Pacca	62.25
	education	Class I to V	32.58
		Class VI to IX	18.56
		SSC/HSC	9.23
		Graduate and above	1.29
	No education		33.34
	Mortality rate (per 1000 live birth)	Male	23.00
		Female	21.00

3.2 Inter-Regional Analysis:

Each region has its own cultural and religious heritage. The distribution of natural resources and made resources are not similar and vary across the different regions of the country. Inequalities among the districts and socio-economic development of all 64 districts for utility services, industry and overall socio-economic sectors. The social patterns and economic activities are very uneven across the regions which resulted into regional disparity in the country. This inequality may be for the uneven distribution of economic growth and social development partially dependent on economic growth. The areas having high economic growth, and social conditions must be better there.

3.2.1 Comparison of inter district economic dimension indicators:

shows the economic inequalities among 64 districts of Bangladesh. To see the inequalities the economic factors are income, expenditure, unemployment rate, no of industrial workers, industries, employment rate and the like. Red marked areas Sherpur, Bandarban, Bagerhat, Barguna, Tangail, Khagrachhari etc. are the low economic areas. Barisal, Dinajpur, Rangpur, Pabna, Magura, Jessore, shatkhira etc. are the moderate economic areas and Dhaka, Rajshahi, Chittagong, Sylhet, Comilla etc. the division areas are the high economic areas.

3.2.2 Comparison of inter-district social dimension indicators:

Factors under the socio-economic stratus are poverty, floating population, urban population, literacy rate, access to utility facilities, housing condition, of road share and the like. Khagrachhari, Bandarban, Jhalokati, Patuakhali etc are the low socio-demographic areas. Where Gazipur, Khulna, Chittagong, Gopalganj etc are the high socio demographic areas. Most of the regions have moderate socio-demographic stratus.

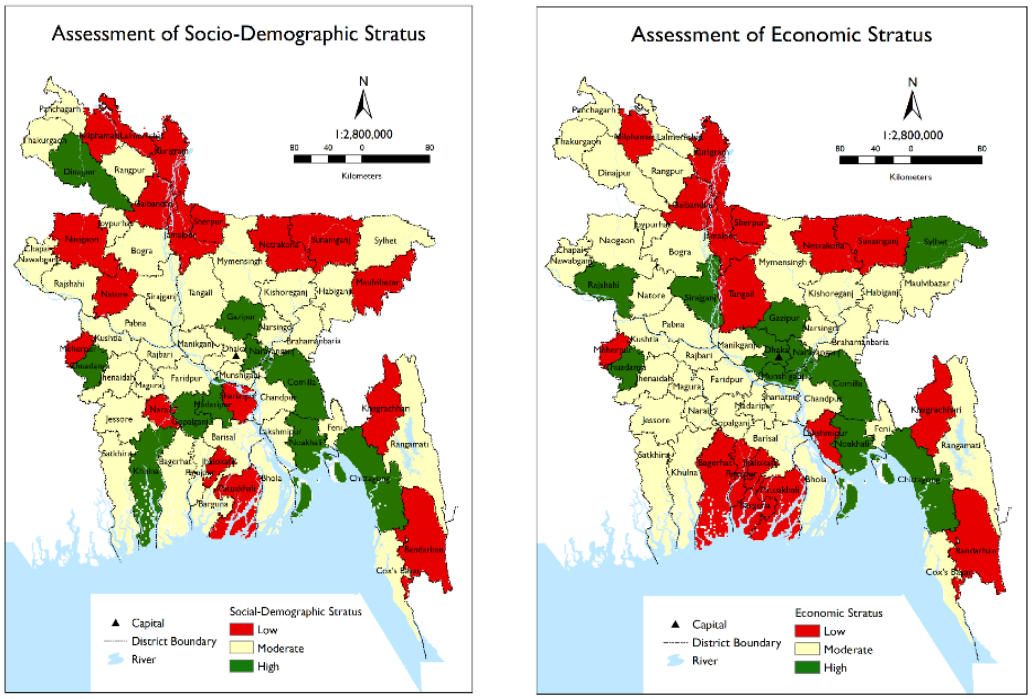

Figure 2: Inter-Regional Socio-Economic Stratus

3.2.3 Analysis of districts in terms of LQ:

To define the development of the region, the LQ of the districts is studied in relation to the level of urbanization and the advancement of the country.Table 2 shows that Dhaka, the capital city of Bangladesh, is fortunate to have an abundance of facilities. It offers exceptionally housing, transportation, communication, health, education, and other facilities. It also provides easy employment opportunities. Dhaka has thus grown to be the nation's center and is expanding daily. Narayanganj and Gazipur have also experienced significant urbanization due to Dhaka's development. Due to its ports, Chittagong has grown to be another significant business district. However, Satkhira's distance obstructed it from becoming a major urban center (Table 3).

Table 2: Top 5 districts based on level of urbanization and LQ

District Name	Level of Urbanization	LQ
Dhaka	93.0%	9.51
Chittagong	54.95%	6.21
Narayanganj	66.37%	5.87
Gazipur	64.64%	5.47
Khulna	50.25%	4.24

Table 3: Bottom 5 districts based on level of urbanization and LQ

District Name	Level of Urbanization	LQ
Gaibandha	8.85%	0.121
Manikganj	9.24%	0.140
Panchagarh	9.86%	0.142
Shatkhira	10.42%	0.153
Naogaon	10.60%	0.161

3.3 Inter Regional Comparison Level of Socio-economic Dimension in Bangladesh:

The regional disparities were measured in terms of indicators like poverty, income, literacy rate, access to utilities etc. for each district (Error! Reference source not found.). The use of socioeconomic indicators to regional differences is a commonly utilized approach [7]. The socio-economic indicators were analyzed and presented as maps. In the maps, the "Low" area was colored in red which represents low level of socio-demographic/economic/socio-economic condition. The "Moderate" and "High" were symbolized as yellow and green.

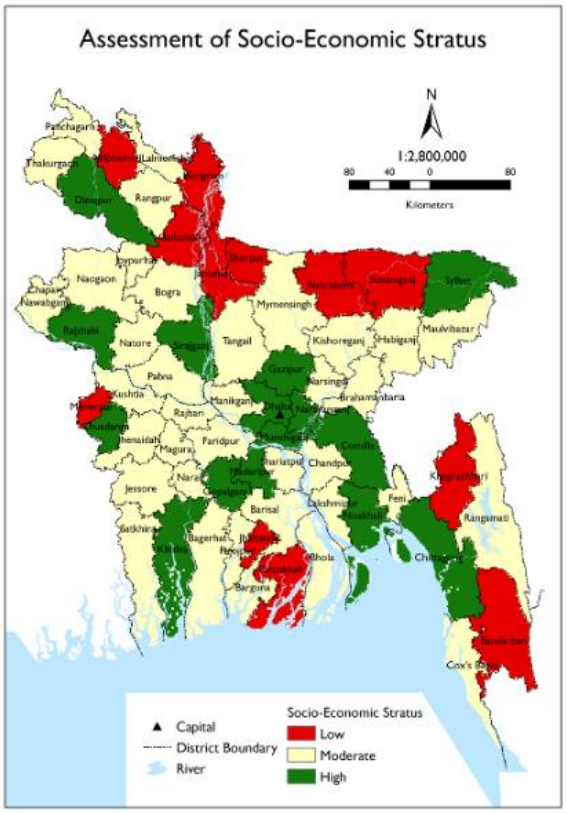

Figure 3: Assessment of socio-Economic Stratus

3.3.1 Number of districts under different dimensions:

The number of districts based on development metrics in terms of sociodemographic and economic dimensions is shown in Table 7. Regarding the sociodemographic component, ten districts are classified as highly developed. The percentage of area for this classification was around 17%. 36 districts are observed to be in middle level developed category. This is the highest considering other aspects and the area was 55.3%. 18 districts were found to be low level of socio-demographic stratus. These low districts were consisting of 27.8% of total land area. The provision of sufficient facilities is essential for raising the overall level of various economic sectors.11 districts are found to have high level of facilities and the area was 17.6 %. And 17 districts were found to be low level of economic stratus. In this level, the area percentage was around 27.4%. The socio-economic status is a combination of both socio-demographic and economic status. From the table, it is observed that 12 districts were found to be low level of socio-economic status which consists of 19.6% of total land area. The low to moderate level of these facilities is present in 37 districts. In terms of overall socioeconomic development, 15 districts outperform other districts, accounting for 24% of total area.

Table 4: Number of districts under different dimensions

Socio-Demographic Status	Number of districts	Area (%)
Low	18	27.8

Moderate	36	55.3
High	10	16.9
Economic Status	**Number of districts**	**Area (%)**
Low	17	27.4
Moderate	36	55.0
High	11	17.6
Socio-Economic Status	**Number of districts**	**Area (%)**
Low	12	19.6
Moderate	37	55.8
High	15	24.6

4. Conclusion:

The purpose of this study was to better understand the widespread differences in socioeconomic development among Bangladesh's 64 districts. Some regions are always found out to be less privileged than the others. The high disparity in Bangladesh is due to regional social and economic reasons. Positive locational advantage zones expand quicker than negative locational advantage regions. Dhaka is Bangladesh's top performing district and serves as the country's focal point, influencing the growth of its neighboring districts through the spread effect. Highly urbanized regions (Chittagong, Dhaka, Gazipur, Narayanganj, Khulna) has more facilities than any other region. The findings suggest that the level of socioeconomic growth in Bangladesh's eastern and southern areas is insignificant. The spatial disparity is very high in Eastern districts (Sunamganj, Gaibandha, Kurigram, Jamalpur, Netrokona) that are highly disadvantaged. The lack of connectivity of these areas with the regional growth centers create adverse effects in development. Many people do not have access to basic services such as power, sanitation, and water since economic growth and infrastructural development are flourishing in many districts parallel with time. Lack of employment is one of the reasons for regional disparity in several areas. People in certain districts are not always able to work, and as a result, they are economically behind than other districts. Satkhira in the Southern region could not have much socioeconomic growth because of its remoteness and the existence of the Sunderban forest area. [12]. On the other side, Rangamati and Cox's Bazar have grown as a result of the development of urbanization in the Chittagong area. However, tourism and agriculture account for the vast majority of their revenue. Sorting out the lagging districts by using the single indicators all together provides us with a clear image of the districts that are completely lagging behind other districts, as well as the ability to suggest specific policies for their development. Job opportunities should be created in backward states for empowering the rural people. That if the government wishes to ensure an equal allocation of development resources, it should focus its efforts on areas where development has fallen substantially behind that of model states [13]. It has been observed that not all dimensions of low-developed districts are low-developed, but some are high or middle-developed. According to the report, low-developed districts need to improve in most metrics in order to achieve higher levels of overall socioeconomic development. Effective government policies can create chances for balanced social and economic development while also guaranteeing equity in development programs throughout all regions. This study might help the decision makers to identify the existing regional disparities and to take necessary steps for developing the under privileged regions accordingly.

References:

1. Salan, S. A., Kafy, A. Al, & Arafat, M. (2018). An analysis of interregional disparity from Lorenz curve to Gini Co-efficient : A study based on district wise facility distribution in Bangladesh June. https://doi.org/10.13140/RG.2.2.24340.81284.
2. Mithun, M. (2021). Regional development planning and disparity in Bangladesh. e3 Journal of Business Management and Economics, 11(1),10-20,https://doi.org/10.18685/ejmr(8)1ejbme 20-013.
3. Moon, M. P. (2020). Youth Development in Bangladesh : Prospects and Challenges Global leader.

4. Islam, M., & Das, A. (2018). Ascertaining Regional Disparities in living Condition through Formal Regionalization : An Instance of Bangladesh. 2018.
5. Tuihedur Rahman, H. M., Hickey, G. M., Ford, J. D., & Egan, M. A. (2018). Climate Change Research in Bangladesh: Research Gaps and Implications for Adaptation-Related Decision-Making. Regional Environmental Change, 18(5), 1535–1553. https://doi.org/10.1007/s10113-017-1271-9.
6. Ferdous, F. (2012). The Spatial Analysis and Morphological Evolution of the "Bazaar Streets" and Urban Structure of Dhaka City. Urban Design International, 17(3), 206–220. https://doi.org/10.1057/udi.2012.10
7. Ramesh Kumar, K., Sivakumar, I., Saravanakumar, N., & Sathishkumar, r. (2020). Regional Disparities and Indian States: A Macro level Study. Journal of Critical Reviews, 7(13), 87–92. https://doi.org/10.31838/jcr.07.13.13.
8. Basharat, M., Shah, H. R., & Hameed, N. (2016). landslide Susceptibility Mapping Using GIS and Weighted Overlay method: A Case Study from NW Himalayas, Pakistan. Arabian Journal of Geosciences, 9(4). https://doi.org/10.1007/s12517-016-2308-y
9. Bangladesh Bureau of Statistics. (2010). Household Income and Expenditure Survey. Dhaka: BBS.
10. Bangladesh Bureau of Statistics . (2012). Yearbook of Agricultural Statistics of Bangladesh. Dhaka: BBS.
11. Bangladesh Bureau of Statistics . (2008). Agricultural Census. Dhaka: BBS.

12. Habibullah, Shah, M., Radam, & Alias. (2009). Industry Concentration in Rich and Poor States in Malaysia: location Quotient and Shift Share Analyses. Icfai Journal of Industrial Economics, 6(1), 56–65.
13. Sheit, P. K., Bhunia, G. S., & Maiti, R. (2016). Potential landslide Susceptibility Mapping Using Weighted Overlay Model (wom). Modeling Earth Systems and Environment, 2(1), 1–10. https://doi.org/10.1007/s40808-016-0078-x