# Spatial Analysis of Socio-Economic Development in Ghaziabad District

## Asra Khatoon[1], Afsha[2]

[1,2]Research Scholar, Department of Geography, AMU, Aligarh, India

**Abstract**

Socio-economic development, encompassing diverse dimensions such as economic growth, education, health services, and more, constitutes a multifaceted phenomenon. This research paper explores the spatial analysis of socio-economic development in Ghaziabad District for 2020. The study employs a composite index approach, incorporating indicators from education, health, transportation and communication, electricity and drinking water, financial development, and agriculture sectors. By standardizing and categorizing various indicators, the research examines the distribution of development across different blocks within the district. The findings indicate varying levels of development across sectors and blocks, shedding light on the interconnectedness of agriculture and overall socio-economic progress.

## 1. Introduction

Socio-economic development is a multi-dimensional phenomenon. Its major dimensions include economic growth, education, health services, nutrition, degree of modernization, the status of women, quality of housing, distribution of goods and services, and access to communication (Das, 1999). Development can be defined in different ways; however, it is a process in which things improve positively. In the socio-economic context, development means the improvement of people's lifestyles through improved education, incomes, skills development, and employment. It is the economic and social transformation process based on cultural and environmental factors. Various studies have been made at governmental and quasi-governmental levels regarding the assessment and evaluation of socio-economic and cultural facilities at the macro and micro levels in India to examine the levels of socio-economic development. However, very few studies have been conducted at the micro level to reduce the existing regional imbalances.

The government has laid stress on balanced regional growth through different programs such as the Backward Region Grant Fund (BRG), the Border Area Development Programme (BADP), the Hill Area Development Programme (HADP), the Integrated Action Plan (IAP), Bharat Nirman, Serva Shiksha Abhiyan, and National Rural Health Mission right since independence. An in-depth study at the district level on the socio-economic dimension has been done by the Indian Society of Agricultural statistics on Orissa (1992), Orissa (1993), Andhra Pradesh (1994), Kerala (1994), Uttar Pradesh (1995), Maharashtra (1996), Karnataka (1997), Tamil Nadu (2000) and Madhya Pradesh (2002). Some of the researchers have also carried out intensive research on levels of socio-economic development in different parts of India at meso and micro level like (Chattopadhyaya & Pal, 1972), (Rao, 1973), (Datt &Ravallion, 1993), (Das, 1999), (Rajarshi, 2003), (Dholakia, 2005), (Kundu & Varghese, 2010) and (Singh et al., 2014).

Despite all the efforts made by governments to reduce the existing regional disparities at different levels these disparities are still lying and continue to increase due to our faulty planning, non-participation of the local people as well as the planning is devoid of existing ecological setting and resource base.

## 2. Research Methodology

This study assesses the level of socio-economic development in Ghaziabad District for the year 2020. The indicators of socio-economic development are represented using various relevant variables selected after an extensive literature review and considering their relevance for the present study. This is calculated by the method of equalizing the contribution of each indicator through an average-weighted approach. Standardizing each indicator was adopted from the method used in calculating Human Development Indices (UNDP, 2015). As the indicators selected for measuring socio-economic development differ in nature and scale, Formula has standardized each indicator.

$$\textbf{Index Ai} = \frac{A_i - A_{min}}{A_{max} - A_{min}}$$

where Ai is the actual value of the variable and Amax and Amin are the maximum and minimum values of the variable from the entire dataset which have been pre-determined. After standardization, the value of indices for selected indicators of socio-economic development ranges from 0 to 1 to represent extremely low to higher scores, respectively, and these indices of are free from any measurement units.

The spatial analysis of levels of socio-economic development has been discussed through tabulations and illustrations of the numerical values of selected variables sequentially.

## 3. Objectives

The primary objectives of this research are as follows:

➢ To assess the spatial distribution of socio-economic development indicators within Ghaziabad District.
➢ To analyze the interplay between agriculture and overall socio-economic development.
➢ To categorize development levels using composite indices for different sectors and blocks.

**Table 1 Ghaziabad District: Indicators of Socio-Economic Development**

| Level of Educational Development | |
|---|---|
| X1 | Number of Primary Schools per 10,000 of Population |
| X2 | Number of Middle Schools per 10,000 of Population |
| X3 | Number of Secondary Schools per 10,000 of Population |
| X4 | Number of Other Educational Institutions per 10,000 Population |
| X5 | Number of Anganwadi Centres per 10,000 Population |
| Level of Health Development | |
| X6 | Number of Public Health Centres per 10,000 Population |
| X7 | Number of Primary Health Centres per 10,000 of Population |
| X8 | Number of total Beds Available per 10,000 of Population |
| X9 | Number of Doctors Available per 10,000 of Population |

| X10 | Number of Para-medics Available per 10,000 of Population |
|---|---|
| X11 | Family and Mother-Child Welfare centres/ Sub-centres per 10,000 of Population |
| **Level of Transportation and Communication Development** | |
| X12 | Number of Post offices per 10,000 of Population |
| X13 | Number of P.C.O. per 10,000 of Population |
| X14 | Number of Telephones per 10,000 of Population |
| X15 | Number of Railway Stations per 100 Sq. km. |
| X16 | Number of Bus Stops per 100 Sq. km. |
| X17 | Length of Pucca Roads per 10,000 of Population |
| **Level of Electricity and Drinking Water Development** | |
| X18 | Percentage of Villages Electrified to the total Villages |
| X19 | No. of Pump Sets per 10,000 of Population |
| **Level of Financial Development** | |
| X20 | Number of Nationalized Commercial Banks per 10,000 of Population |
| X21 | Number of Rural Banks per 10,000 of Population |
| **Level of Agricultural Development** | |
| X22 | Number of Seeds Sale Centres per 10,000 of Population |
| X23 | Number of Fertilizer Sale Centres per 10,000 of Population |
| X24 | Number of Literate Population |
| X25 | Number of Cold Storages per 1,000 hectares of Net Sown Area |
| X26 | Number of Agriculture Cooperative Societies per 10,000 of Population |
| X27 | Fertilizers Consumption per hectare of Gross Area Sown (Kg) |
| X28 | Length of Canal per 1,000 hectares of Net Sown Area |
| X29 | Number of Government Tube wells per 1000 hectare of Net Sown Area |
| X30 | Number of Pump sets per 1000 hectare of Net Sown Area |
| X31 | Percent of Net Sown Area to the Total Area |
| X32 | Percent of Net Irrigated Area to Net Sown Area |
| X33 | Productivity |
| X34 | Percent of Cultivator to the Total Worker |
| X35 | Percent of Agricultural Labourer to the Total Worker |
| X36 | Cropping Intensity |
| X37 | Road Length |
| X38 | No of Iron Plough per 100 hectares of Net Sown Area |
| X39 | Electricity in the Households |
| X40 | Number of Rural Markets per Hundred Sq. Km. |
| X41 | Number of Advance Harrower and Cultivators per 100 hectares of Net Sown Area |
| X42 | Number of Advanced Thresher Machines per 100 Hectare of Net Sown Area |

| | |
|---|---|
| **X43** | Number of Sprayers Per 100 hectares of Net Sown Area |
| **X44** | Number of Advance Sowing Instruments Per 1000 hectare of Net Sown Area |
| **X45** | Number of Tractors per 100 hectares of Net Sown Area |

*Source:* District Statistical Handbook, Ghaziabad2020

**Table 2 (a) Ghaziabad District: Sector Wise Index of Development of each Indicator (2020)**

| Blocks | Education | | | | | Health | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | X1 | X2 | X3 | X4 | X5 | X6 | X7 | X8 | X9 | X10 | X11 |
| Bhojpur | 0.00 | 0.00 | 0.26 | 0.00 | 0.83 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| Murad Nagar | 1.00 | 1.00 | 0.25 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.92 | 0.94 |
| Razapur | 0.04 | 0.66 | 0.00 | 0.00 | 0.62 | 1.00 | 1.00 | 0.50 | 0.00 | 0.62 | 0.44 |
| Loni | 0.40 | 0.86 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 0.33 | 0.50 | 1.00 | 0.00 |

*Source:* District Statistical Handbook, Ghaziabad 2020

**Table 2 (b) Ghaziabad District: Sector Wise Index of Development of each Indicator (2020)**

| Blocks | Transport & Communication | | | | | | Electricity & Drinking Water | | Financial Development | |
|---|---|---|---|---|---|---|---|---|---|---|
| | X12 | X13 | X14 | X15 | X16 | X17 | X18 | X19 | X20 | X21 |
| Bhojpur | 0.00 | 0.00 | 0.00 | 0.00 | 0.29 | 0.00 | 0.58 | 1.00 | 1 | 0.75 |
| Muradnagar | 0.78 | 0.09 | 1.21 | 0.00 | 0.71 | 0.56 | 1.00 | 0.00 | 0 | 0.5 |
| Razapur | 1.00 | 0.00 | 0.01 | 0.50 | 0.00 | 0.01 | 0.05 | 0.41 | 0.5 | 1 |
| Loni | 0.56 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.26 | 0 | 0 |

*Source:* District Statistical Handbook, Ghaziabad 2020

**Table 2 (c) Ghaziabad District: Sector Wise Index of Development of each Indicator (2020)**

| Blocks | Agricultural Development | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | X22 | X23 | X24 | X25 | X26 | X27 | X28 | X29 | X30 | X31 | X32 | X33 | X34 | X35 | X36 | X37 | X38 | X39 | X40 | X41 | X42 | X43 | X44 | X45 |
| Bhojpur | 0.5 | 0.00 | 0.06 | 0.13 | 0 | 0.00 | 0.30 | 0.50 | 1.00 | 0.83 | 0.00 | 0.00 | 0.80 | 0.83 | 0.14 | 0.17 | 0.23 | 0.00 | 1.02 | 0.30 | 0.00 | 0.00 | 0.60 | 0.00 |
| Muradnagar | 1 | 0.20 | 1.00 | 0.00 | 1 | 0.00 | 1.00 | 0.54 | 0.00 | 1.00 | 0.73 | 0.52 | 0.98 | 1.00 | 0.07 | 0.77 | 0.40 | 0.00 | 1.37 | 0.40 | 0.10 | 0.00 | 0.00 | 0.18 |
| Razapur | 0 | 0.50 | 0.00 | 0.51 | 0.25 | 0.30 | 0.00 | 0.96 | 0.21 | 0.46 | 1.00 | 0.89 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 0.47 | 0.83 | 0.75 | 0.40 | 0.39 |
| Loni | 0 | 1.00 | 0.38 | 0.93 | 1 | 1.00 | 0.57 | 0.00 | 0.58 | 0.00 | 0.82 | 1.00 | 0.32 | 0.18 | 0.00 | 1.00 | 1.00 | 1.00 | 0.63 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

*Source:* District Statistical Handbook, Ghaziabad 2020

**Table 3 Ghaziabad District: Limits of Composite Indices for Different Stages of Development**

| Sector | Composite Indices | | Limits of Composite Index | | |
|---|---|---|---|---|---|
| | Mean | SD | High | Medium | Low |
| **Education** | 0.45 | 0.29 | **0.45 - 1** | **0.25 – 0.45** | **0 – 0.25** |
| **Health** | 0.68 | 0.09 | **0.7 - 1** | **0.55 – 0.7** | **0 – 0.55** |
| **Transport & Communication** | 0.45 | 0.38 | **0.55 – 1** | **0.25 – 0.55** | **0 -0.25** |
| **Electricity & Drinking Water** | 0.41 | 0.29 | **0.50 - 1** | **0.25 – 0.50** | **0 – 0.25** |
| **Finance** | 0.47 | 0.41 | **0.35 - 1** | **0.1 – 0.35** | **0 -0.1** |
| **Agriculture** | 0.49 | 0.15 | **0.5 - 1** | **0.30 – 0.5** | **0 - 0.30** |
| **Overall Development** | 0.49 | 0.07 | **0.5 - 1** | **0.35 – 0.5** | **0 – 0.35** |

*Source:* District Statistical Handbook, Ghaziabad 2020, Computed by researcher

## 4. Results and Discussion

### 4.1. Educational Facilities

The spatial analysis of educational facilities considering primary schools, middle schools, secondary schools, other educational institutions, and Anganwadi centers per 10,000 population is indicated by X1, X2, X3, and X4, respectively. Table 2a clearly depicts that the facilities are not uniformly distributed. the value of indices for selected indicators of socio-economic development ranges from 0 to 1 to represent extremely low to higher scores, respectively, and these indices are free from any measurement units. A

high level of educational development has been observed in Murad Nagar. Medium educational facilities are found in the Loniblock while two blocks come under the low category, Bhojpur, and Razapur.

**Fig. 1 Educational Facilities Development in Ghaziabad District, 2020**
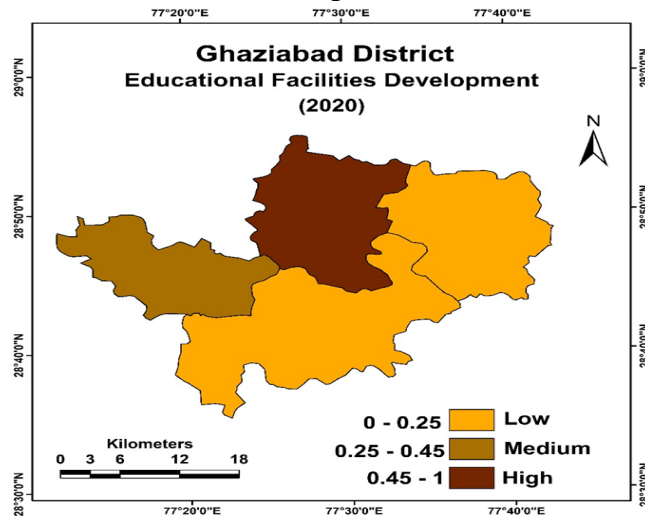


*Source:* Computed by researcher

## 4.2. Health Facilities

The spatial analysis of health facilities taking into account public health centers, primary health centers, total beds available, doctors available, para-medical facilities available, and mother-child welfare centers per 10,000 of the population, which is indicated by $X6, X7, X8, X9, X10$, and $X11$ respectively. The values are categorized into high medium and low which shows the levels of health development. Murad Nagar block falls under the category of high development while two blocks come under the category of medium development namely Loni and Bhojpur. Razapur block falls under a low level of health development.

Health facilities analysis indicates that Murad Nagar demonstrates high levels of health development, while Loni and Bhojpur display medium levels. Razapur falls within the low health development category.

**Fig. 2 Health Facilities Development in Ghaziabad District, 2020**
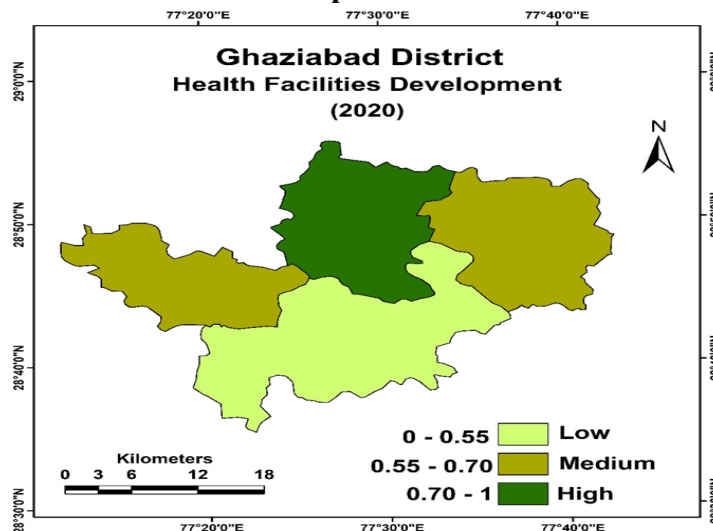


*Source:* Computed by researcher

## 4.3. Transportation and Communication

Any area that witnesses accessible transportation and communication enjoys the fruits of development. Six variables of transport and communication are considered for the analysis of development they are the number of post offices (X12), number of P.C.O (X13), number of telephones (X14) per 10,000 of population, number of railway stations per 100sq km (X15), number of bus stops per 100 sq. km (X16) and length of pucca roads per 10,000 0f population. The values of transport and communication development levels are high, medium, and low. It clearly reveals that the facilities are not uniform. Block Loni comes under the high development category while block Murad Nagar is in medium development. The two blocks namely Bhojpur and Razapur fall under the category of low development. It is shown in the figure the uneven spatial distribution of transportation and communication facilities.

**Fig. 3 Transport and Communication Facilities Development in Ghaziabad District, 2020**
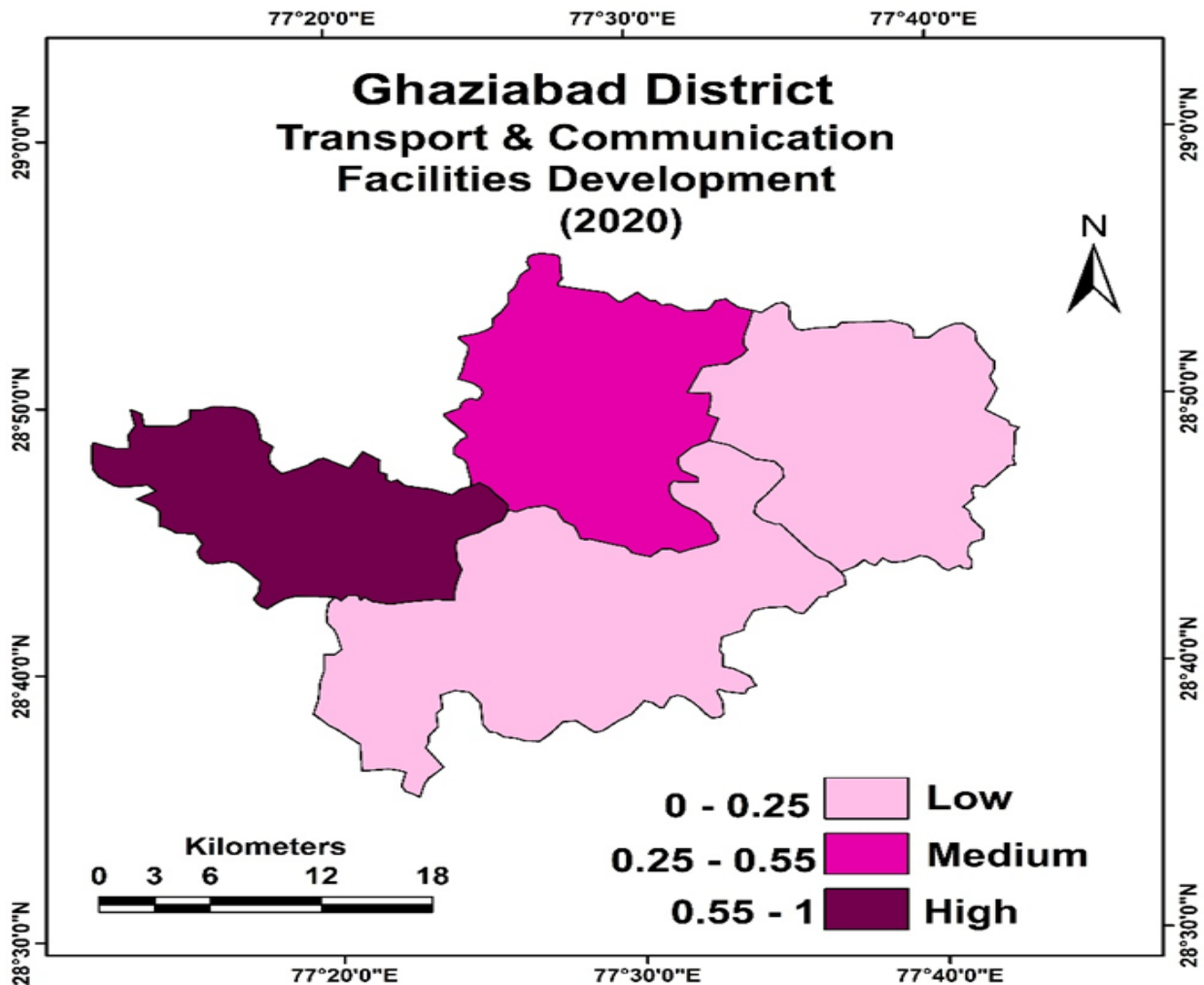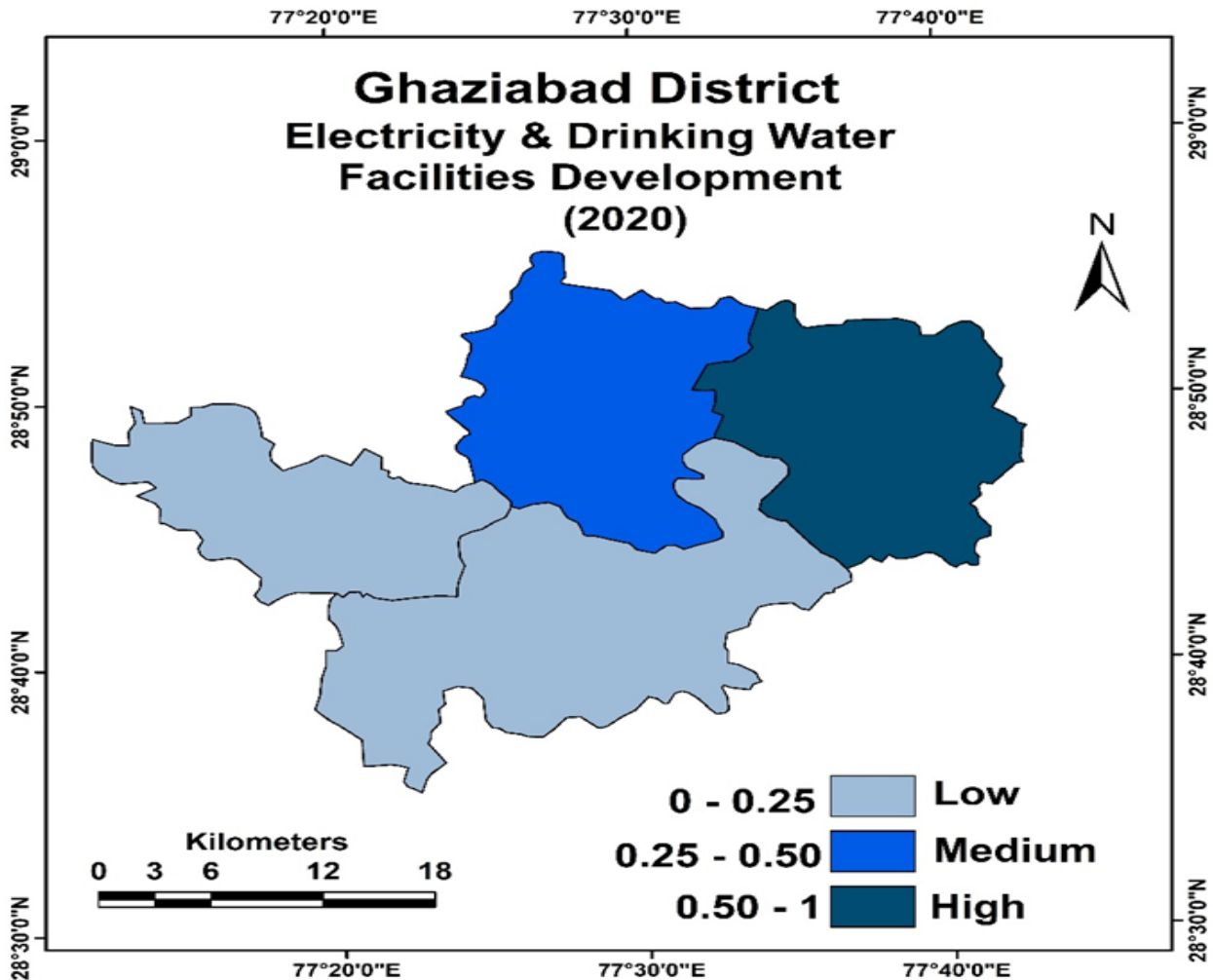


*Source:* Computedby researcher

## 4.4. Electricity and Drinking Water Facilities

Uninterrupted supply of electricity and accessible potable drinking water are essential components of understanding socio-economic development. It has been observed that wherever these variables are found in an accessible manner, the level of the socio-economic index is better than that of the area devoid of these facilities. The present analysis focuses on the spatial variations of these two facilities at

the block level. The index has been categorized into three parts, high, medium, and low categories, taking into consideration the percentage of villages electrified to the total villages (X18) and the number of privately electrified pumps per 10,000 population (X19).

Table2b and figure.3, reveal that the high level of electricity and drinking water development has been recorded in block Bhojpur. Medium level of development covers Murad Nagar block and two blocks come under the category of low level of development they are Loni and Razapur.

**Fig. 3 Electricity & Drinking Water Facilities Development in Ghaziabad District, 2020**
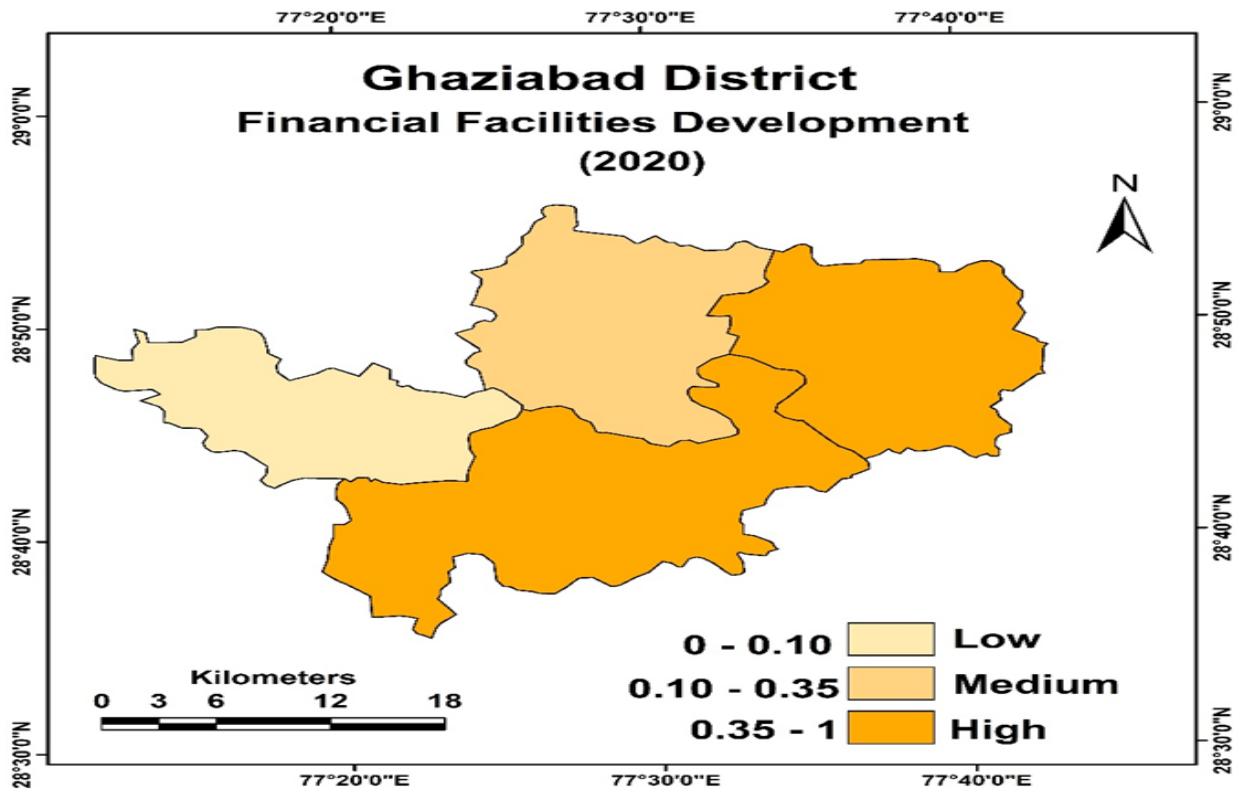


*Source:* Computed by researcher

## 4.5. Financial Facilities

Providing accessible financial assistance to the villagers through different banking and cooperative systems and financial institutions at minimum interest isthe most critical stimulating factor to improve their socio-economic lives by using innovations for diversification of agriculture to sustain their livelihood.

The spatial analysis of financial institutions has been examined taking into considerationof number of nationalized commercial banks (X20) and the number of rural banks (X21) per 10,000 population respectively (Table). The index has been categorized into three categories: high, medium, and low.

Thehigh level of development has been found in the blocks of Bhojpur and Razapur. Medium level of development found in the block Murad Nagar. Low level of financial facilities found in block Loni.

**Fig. 4 Financial Facilities Development in Ghaziabad District, 2020**



*Source:* Computed by researcher

### 4.6. Agricultural Facilities Development

The development of agriculture depends upon several variables that influence directly and indirectly their productivity. If all the variables are found in an accessible manner in any region its index of development in agriculture is likely to be high. In order to examine the levels of agricultural development at the block level, 26 variables have been considered to develop a composite index for the analysis of the levels of development.

These variables are Number of Seeds Sale Centres (X22), Number of Fertilizer Sale Centres(X23), Number of Literate Population (X24), Number of Cold Storages per 1,000 hectares of Net Sown Area(X25), Number of Agriculture Cooperative Societies (X26), Fertilizers Consumption per hectare of Gross Area Sown(X27),Length of Canal per 1,000 hectares of Net Sown Area(X28),  Number of Government Tube wells per 1000 hectare of Net Sown Area (X29), Number of Pump sets per 1000 hectare of Net Sown Area(X30),    Net Sown Area to the Total Area(X31), Net Irrigated Area to Net Sown Area(X32), Productivity(X33), Cultivator to the Total Worker( X34),  Agricultural Labourers to the Total Worker(X35), Cropping Intensity(X36), Road Length(X37), No of Iron Plough per 100 hectares of Net Sown Area(X38), Electricity in the household (X39), Number of Rural Markets per Hundred Sq. Km (X40), Number of Advance Harrower and Cultivators per 100 hectares of Net Sown Area(X41), Number of Advance Thresher Machines per 100 Hectare of Net Sown Area(X42), Number

of Sprayers Per 100 hectares of Net Sown Area(X44), Number of Advance Sowing Instruments Per 1000 hectare of Net Sown Area(X45), Number of Tractors per 100 hectares of Net Sown Area(X46).

The index has been categorized into high, medium, and low. A high level of agricultural development has been found in Loni block. A medium level of agricultural development has been revealed in Murad Nagar and Razapur while a low level of development was recorded in Bhojpur block.

### Fig. 5 Agricultural Facilities Development in Ghaziabad District, 2020
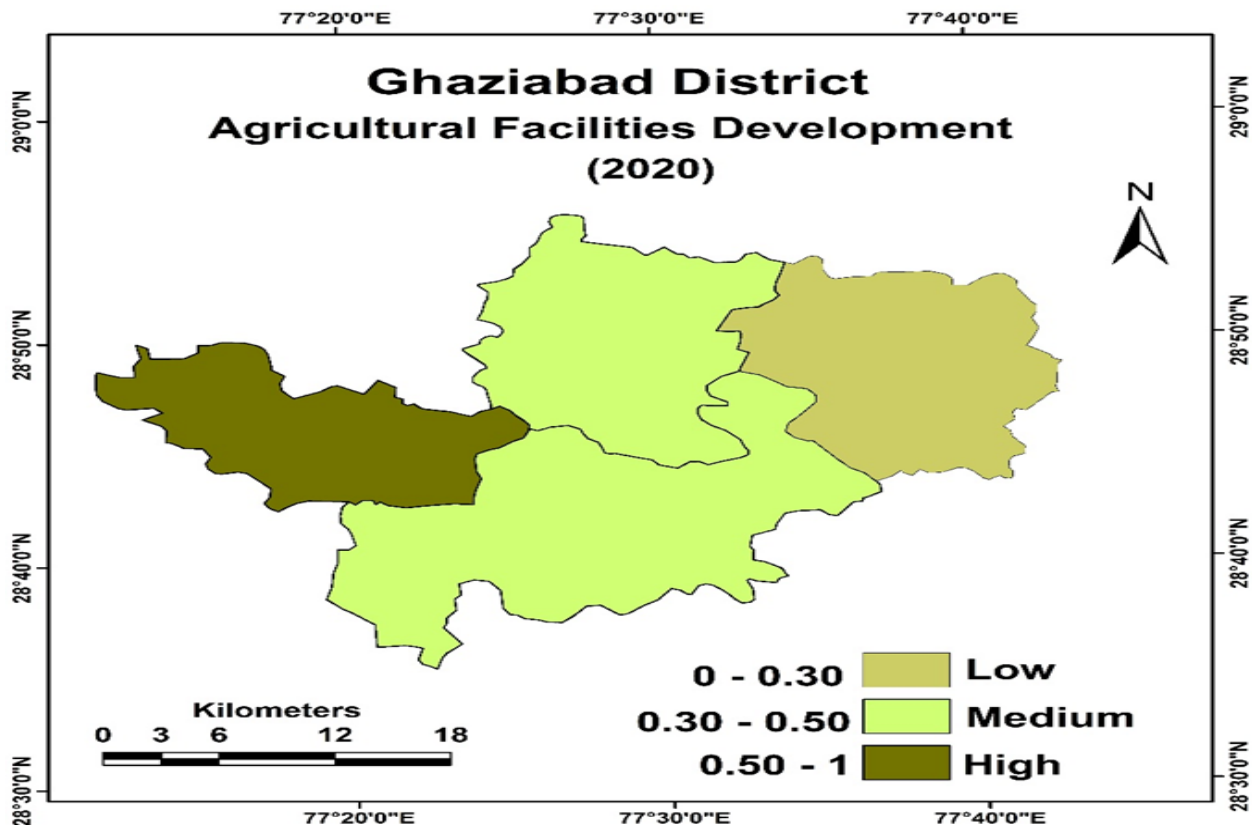


*Source:* Computed by researcher

### 4.7. Overall Socio-Economic Development

After foregoing analysis regarding the level of socio-economic development considering 45 variables of different categories like education, health, electricity and drinking water, financial institutions, and agricultural development indicators.

### Table 4 Ghaziabad District: Overall Socio-Economic Development Index of each Sector (2020)

| Blocks | Composite Index of Development | | | | | | |
|---|---|---|---|---|---|---|---|
| | Education | Health | Transportation & Communication | Electricity | Finance | Agriculture | Overall Development |
| **Bhojpur** | 0.22 | 0.67 | 0.05 | 0.79 | 0.88 | 0.31 | 0.48 |

| Murad Nagar | 0.85 | 0.81 | 0.56 | 0.50 | 0.25 | 0.51 | 0.58 |
|---|---|---|---|---|---|---|---|
| Razapur | 0.26 | 0.59 | 0.25 | 0.23 | 0.75 | 0.46 | 0.42 |
| Loni | 0.45 | 0.64 | 0.93 | 0.13 | 0.00 | 0.68 | 0.47 |

*Source: Computed by researcher*

**Fig. 6 Overall Socio-Economic Development in Ghaziabad District, 2020**
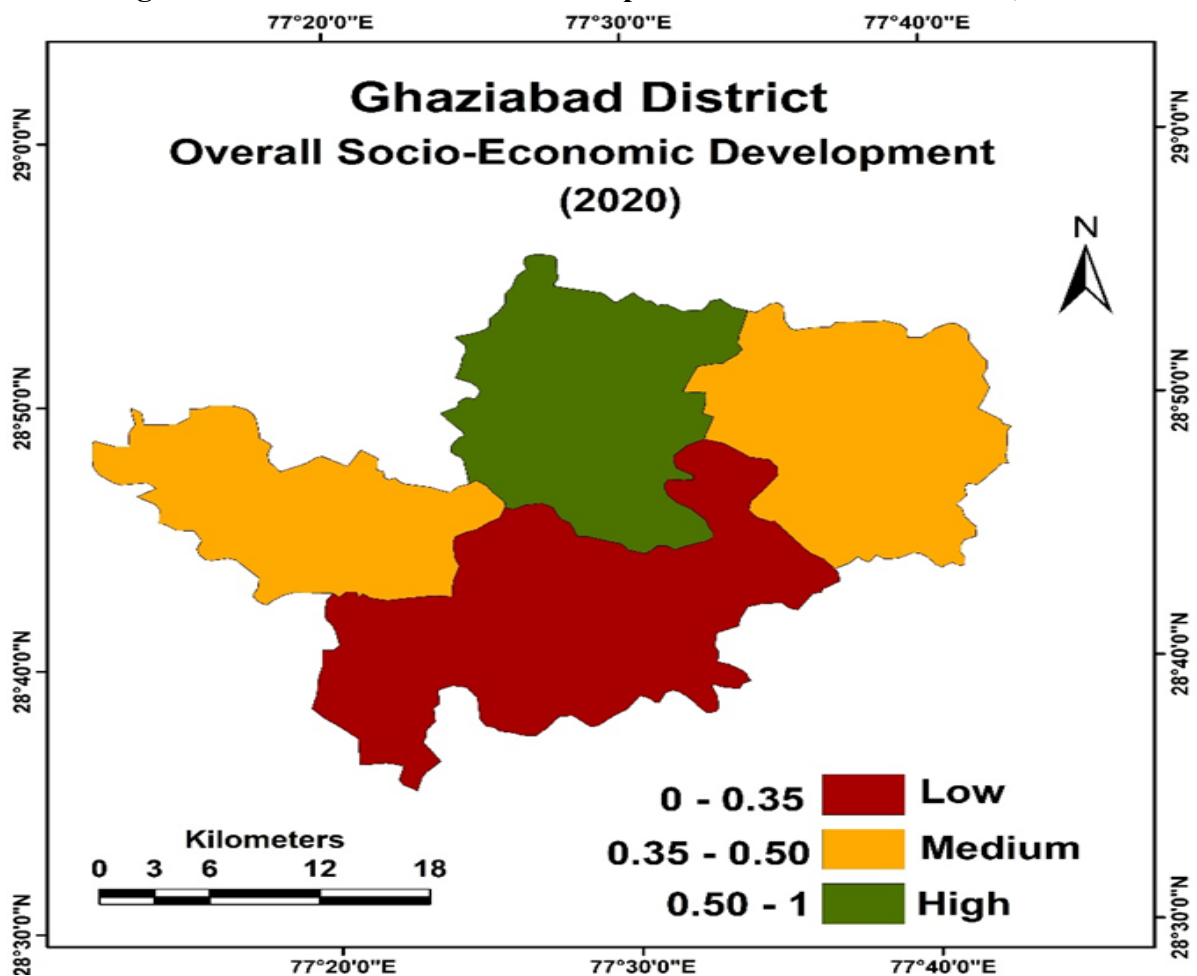


*Source:* Computed by researcher

## 5. Conclusion

It is concluded that these facilities are found in non-uniform distribution, which exhibits irregular socio-economic development. In order to understand the holistic view of socio-economic development, all the indicators are examined in a composite manner by computing a composite index. Its indices have been categorized into high, medium, and low. The analysis reveals that high socio-economic development is found in the blocks of Murad Nagar. The blocks of Loni and Bhojpur lie in the medium category of development. The block exhibitsa low level of development, i.e., Razapur. Agricultural practices have

been of great importance in the rural areas of the district. It is clear from the study that those blocks that are agriculturally developed, they are also socioeconomically developed and vice versa. It means there is an integrated development where agriculture plays a very important role in the socio-economic development in the district.