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ORIGINAL PAPER

Spatial variation in literacy among the Muslim population: a block level scenario of Uttar Dinajpur District, West Bengal, India

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Abstract

Literacy is one of the most essential qualitative criteria for an individual's development and the socio-economic advancement of human society. Through social mobility, literacy aids in achieving a higher social rank. Studying the gender differences in literacy patterns and their impact on socio-economic change is significant since it is one of the most crucial driving forces behind socio-economic transformation. The Indian Census defines a person over six in India who is literate as being able to read and write in any language with good comprehension. In the Uttar Dinajpur District of West Bengal, this research tries to illustrate the spatial variation and gender gap in literacy among Muslim-religious residents of rural and urban areas. Muslims are always defined as the underprivileged sections of Indian society. According to the Indian Census of 2011, there are 1,501,170 (49.92%) Muslims population in the district of Uttar Dinajpur. The overall literacy rate is 49.54%, lower than the district average of 59.07%, while Muslim female literacy is even lower (48.63%). This study used the Standard Score (Z-Score) and Sopher's Disparity Index (Journal of Survey in Fisheries Sciences, 1326–1339, 2023) to determine disparity. Cartographic techniques, including maps, bar, and line diagrams, using Arc-GIS Software, have been used to illustrate results.

Keywords Literacy · Gender disparity · Rural-urban disparity · Z- score · Sopher's index · Worker participation

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Introduction

The Indian religious hierarchy perceives Muslims as being fifth and backward (Hussain 2009). Other religious groups significantly surpass Muslim religious groups regarding employment prospects, social aspects, political participation, and education (Hussain 2009; Biswas 2015). The socioeconomic development of human society and the improvement of individuals are directly correlated to overall skill development, making literacy one of the most essential qualitative factors (Ghosh and Mistri 2016). These quality factors ensure a higher social status and quality of life through social mobility (Logan 2010). Literacy is described by the United Nations Educational Scientific and Cultural Organization (UNESCO) as the "capacity to identify, understand, interpret, produce, communicate, and compute utilizing printed and written resources linked with diverse contexts. In order to fulfill one's objectives, expand one's knowledge and potential, and actively engage in society at large, one must learn how to read and write (Jafri 2007). Studying a region's literacy pattern and how it differs by gender is extremely helpful because it is one of the most significant elements of socioeconomic change (Bano 2017). In developing countries, studies by Stromquist (2005) and Chattoraj and Chand (2015) show the positive impacts of literacy and education on health, population dynamics, children's education, maternal health, and women's empowerment. However, the Indian government has since implemented several proactive methods and programs to improve the educational and literacy level of Muslim religious (Siddiqui and Naseer 2004). As a result, since the 20th century, literacy growth and educational attainment have increased (Pandey 1986). Any human being, as well as human civilization, cannot advance without education. Both men and women need to be educated for the correct development of society (Chouhan 2013). The factors that directly affect the rate of difference in literacy between males and females in rural and urban areas are low levels of urbanization, low economic and political status, low levels of development in transportation and communication, a dearth of educational facilities (Coleman 1990), a small number of educational institutions, low status of women in society, and low standard of living. India is one of the world's developing nations, typified by low literacy rates and significant differences in literacy rates between urban and rural areas, men and women, and young and old individuals (Khurshid 2010). One of the most essential prerequisites for closing the gender gap in all areas is female literacy, which also promotes women's empowerment. However, West Bengal's districts' levels of female literacy and education are not outstanding, and there is a significant gender gap that contributes to a spatial divide in literacy across the state. The analysis of spatio-temporal variation and the gender gap in literacy reveals the regions of education that want improvement, which can aid policy or planning makers.

Objectives

1. To show the spatial distribution of population among different religious groups in Uttar Dinajpur District.

2. To analyze the trend in growth of the Muslim population from 1961 through 2011.
3. To discuss the spatial variation in literacy of different Blocks in Uttar Dinajpur district.
4. To show the block-wise gender disparity in literacy among the Muslim population in rural and urban areas in the Uttar Dinajpur District.
5. To show the spatial distribution of literacy and illiteracy among religious groups.
6. To present the spatial variation of the Muslim population's working and non-working population.

Review of literature

The literature review draws attention to notable gender disparities in the Muslim community, especially in the area of education. Hussain's (2009) study examines the relationship between educational attainment and Muslim literacy rates. However Kundu and Chakraborty (2012) contend that literacy rates alone are insufficient to account for women's illiteracy, highlighting the necessity of empowering policies as determined by the Cumulative Empowerment Index (CEI). Despite the significance of educating women Bano (2017) notes that there is still a persistent disparity between boys and girls. She discusses women's educational attainment and suggests policy directions while considering family dynamics and economic engagement.

The scant literature on gender inequality in Muslim education examines Muslims' place in Indian society, the effects of female education, and increases in the literacy rate. (Hamid et al., 2012) suggests a novel strategy for rural women Hussain and Siddiqui (2013) examine Muslim women's employment in West Bengal, Chattoraj and Chand (2015) analyze literacy trends, geographic distribution, and rural-urban disparities Maity (2016) attributes lower literacy rates to a range of social, economic, and cultural factors, and Sahu, Jeffery, and emphasizes the difficulties young Muslim women encounter when pursuing education. Kar and Ghosh (2017) emphasize how socioeconomic circumstances and the number of Muslim women working in agriculture impact female backwardness. Although Hossain (2013) notes that parental beliefs obstruct girls' education, leading to high dropout rates among Muslim girls, as argued by Laskar (2018), Bhat and Mathur (2017) examine the Concentration Index (CI) of the Muslim population, literacy rates, and work participation.

As noted by Islam and Siddiqui (2020), who point out a more developed understanding of Muslim gender differences in South Bengal, district-level analysis—frequently disregarded—becomes critical for North Bengal due to spatial gender gaps. The literature highlights the complex nature of gender differences in the Muslim community overall, emphasizing the need for district-level studies and comprehensive policies to address these problems effectively.

Study area

The NH-31 and NH-34 highways divide the district. The major rivers Kulik, Nagar, and Mahananda flow toward a moderately southerly slope on the region's primar-

ily flat topography (NIC n.d.). The study will be conducted in West Bengal's Uttar Dinajpur area. The district is bounded on the east by Bangladesh's Panchgaon, Thakurgaon, and Dinajpur district, on the west by Bihar's Kishanganj, Purnia, and Kathiar district, and on the north by Darjeeling and Jalpaiguri district. Its latitudinal extent is 25°11′ N to 26°49′ N, and its longitudinal extent is 87°49′ E to 90°00′ E. (Hoque and Hashmi 2020). The district is divided into two subdivisions: Raiganj and Islampur. The district's nine assembly districts are Chopra, Islampur, Goalpokhar-I, Chakulia, Karandighi, Raiganj, Hemtabad, Kaliyaganj, and Itahar (Sarkar et al. 2021). 3,007,134 people live in the Uttar Dinajpur district, which has a total size of 3142 km^2. 958 people live there in every area and 939 women for every 1000 men (Verma and Roy 2022). With 3.5% of the state's total land area, it ranks 16th among the 19 West Bengal districts and 17th overall in population, with 3% of the entire state population (Human Development in Uttar Dinajpur n.d.). One of West Bengal's least developed districts is Uttar Dinajpur. The area is characterized by rapid population increase, severe poverty, economic backwardness, and a high prevalence of illiteracy (Biswas et al. 2020; (Fig. 1).

Physiographic

One crucial region in North Bengal is the district of Uttar Dinajpur, which has a strategic geographic structure comprising three different physiographic zones. The mature floodplain is the principal zone, which makes up more than half of the district and significantly contributes to its environment with its rich and productive land. The landscape of the dynamic Mahananda floodplain in the Itahar Block is constantly changing due to interactions with the Mahananda River. As one approaches the Chopra Block, the landscape changes into Piedmont terraces, dotted with lowland areas marked by raised structures known as Dangas. One prominent feature is the 45 km^2 Mahananda alluvial fan, which affects the flow dynamics of the adjacent rivers. To summarise, Uttar Dinajpur's physiographic composition comprises the Piedmont terraces, the mature floodplain, and the active Mahananda floodplain. These features are vital in determining the district's topographical and hydrological features within the North Bengal region (Fig. 2).

Climate

In the North Bengal Plain, Uttar Dinajpur experiences an average annual temperature of 24.4 °C and 851 mm of rainfall due to its tropical humid climate. Remarkably, the region experiences less rain in the south. Summers are hot with persistent breezes from the west and last from March to mid-June. May is the hottest month and requires irrigation for fruit harvesting in dry conditions. The humidity is higher in the north. The onset of the monsoon in June brings heavy rains, with the wettest months being July and August. The monsoon is considered a productive agricultural season, and easterly winds cool the region in the evenings. The proximity to the Himalayan slopes moderates temperatures, with low temperatures between 12 and 29 °C from October to March and maximum temperatures between 23 and 37 °C from April to September.

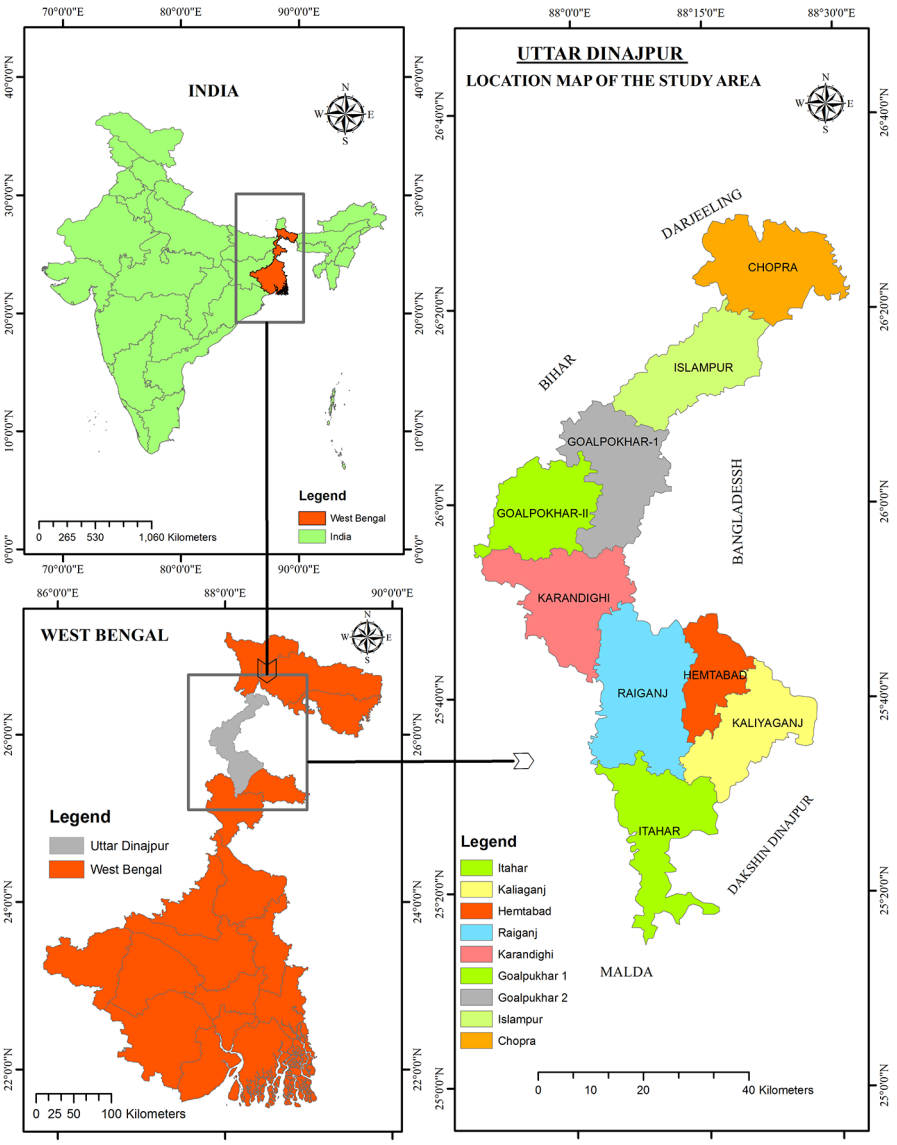

Fig. 1 Location map of the study area. Prepared by the Researcher

The district has different rainfall patterns; the northern portion receives more precipitation (2400–2700 mm) than the southern portion (1400–1500 mm). The poorly drained northern regions are the source of several tiny rivers. The district has continuously high relative humidity, with drops from 31 to 55% during the dry months of March and April. During monsoon season, humidity levels often fall between 69 and 75%. Strong winds from the southwest due to depressions and light storms are expected during the monsoon season. These winds have an average speed between 13.1 mph and 14.5 mph, with sporadic gusts reaching 18 mph.

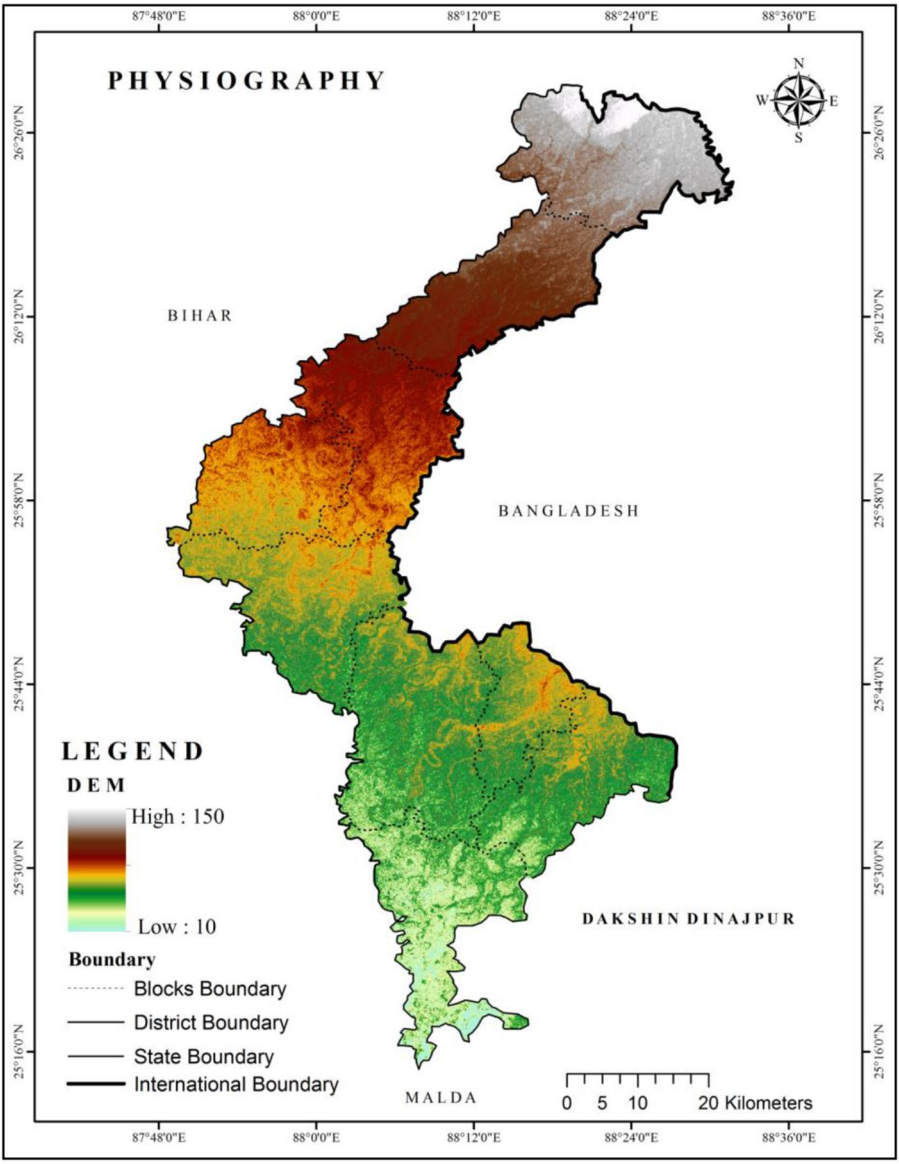

Fig. 2 Physiographic map of Uttar Dinajpur. Cartosat-1, Bhuvan India (Prepared by Researcher)

Land use and land cover

The Uttar Dinajpur district's land use and cover data are derived from Sentinel2_10m_LandCover and Esri. Rivers and Water Bodies occupy 1.75% of the total area, supporting hydrology and providing vital resources. Vegetation covers 3.24%, including forests and naturally vegetated areas, serving ecological harmony and various ecosystem services. Grasslands, at 0.14%, offer habitats and grazing spaces. Agriculture

dominates, constituting 74.66%, contributing to the local economy. Settlement areas, comprising urban infrastructure and residential zones, make up 19.90%. Bare ground is minimal at 0.04%, representing areas without flora. Rangeland constitutes 0.28%, crucial for pastoral operations. This land distribution highlights the district's reliance on settlements, water bodies, vegetation, and land features (Table 1, Fig. 3).

Demographic profile

Based on the 2011 Census, the Table 2 shows the Uttar Dinajpur District's population distribution in West Bengal, India. Islampur and Raiganj are the two subdivisions that make up the district. With 1,669,895 residents, the Islampur Sub-Division comprises 55.53% of the district's population. Its component areas include Islampur (M), Karandighi, Goalpokhar I, Goalpokhar II, and Chopra. With 1,337,239 residents, the Raiganj Sub-Division makes up 44.47% of the district's population. Its subdivisions are Raiganj, Hemtabad, Kaliaganj, Itahar, Kaliaganj (M), and Raiganj (M). 3,007,134 people live in the district overall, of which 1,551,066 are men and 1,456,068 are women. The district's population is concentrated mainly in Islampur and Raiganj, with Raiganj Sub-Division covering a more extensive territory. The information provides an understanding of the population distribution among several administrative divisions within the District.

Sex composition

Table 3 shows the sex ratio contrast between Uttar Dinajpur and West Bengal. The sex ratio in West Bengal increased steadily from 865 in 1951 to 950 in 2011, suggesting that the gender gap is narrowing. The sex ratio of Uttar Dinajpur has also increased, although the changes are not as noticeable; it went from 884 in 1951 to 939 in 2011. From 1951 to 2011, the growth rate of West Bengal's sex ratio varied between 0.7% and 2.2%, with the maximum growth rate of 2.2% noted between 1971 and 1981. This implies steady development in the direction of gender parity. On the other hand, the growth rate of the sex ratio in Uttar Dinajpur varied from −1.1% to 2.3%, and there was a minor decrease from 1981 to 1991. The sex ratios in West Bengal and Uttar Dinajpur have improved over time, especially in the 2011 census, despite some variations. Nevertheless, as compared to West Bengal as a whole, Uttar Dinajpur's development rate was more unpredictable.

Table 1 District Land use and Land cover (2022)

Land use Land cover of District	Area (sq/km)	Area in (%)
Rivers and water bodies	54.58	1.75
Vegetation cover	101.27	3.24
Grass land	4.45	0.14
Agriculture land	2334.96	74.66
Settlement area	622.19	19.90
Bare ground	1.16	0.04
Rangeland	8.68	0.28

Sentinel2_10m_LandCover, 2022

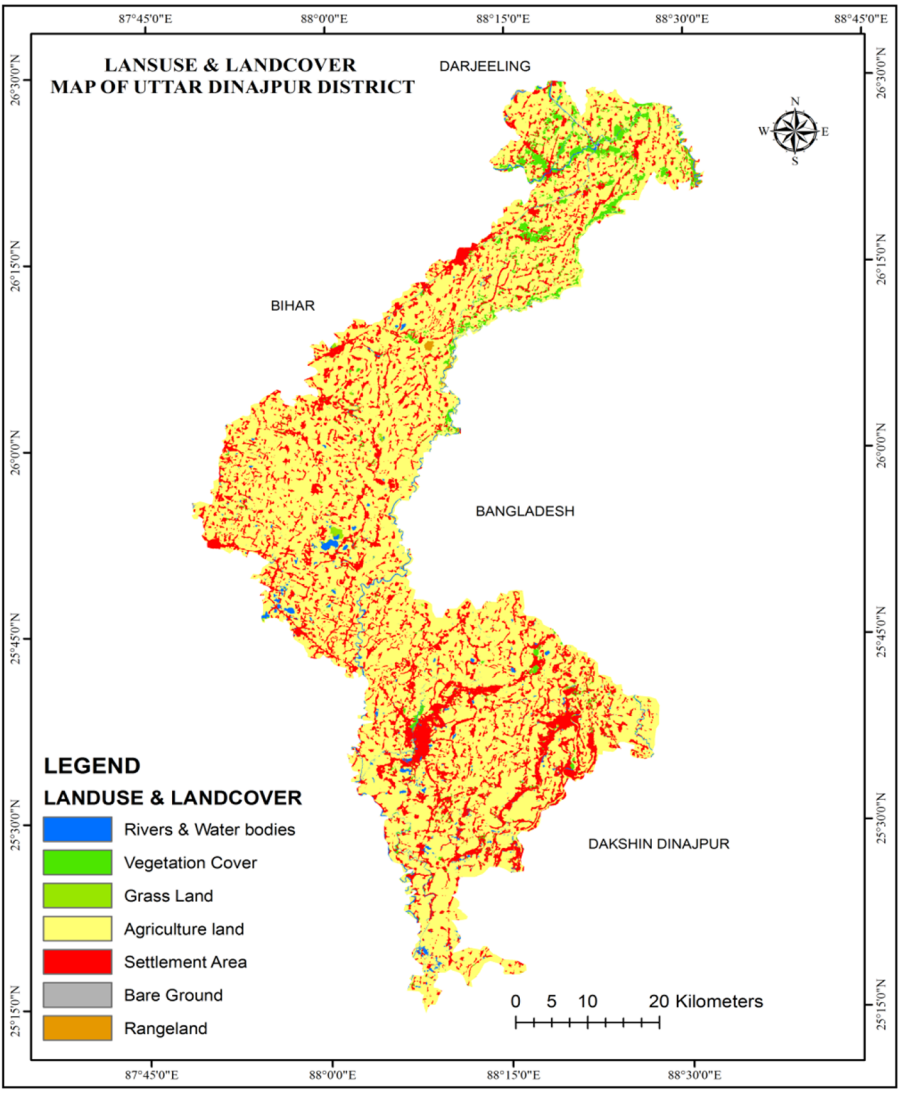

Fig. 3 Land use and land cover map of Uttar Dinajpur District. Sentinel-2 L2A, Bhuvan India

Block wise government school of Uttar Dinajpur District

The Table 4 shows the distribution of educational institutions in terms of high schools, Madrasas, and junior high schools for various blocks and municipalities in Uttar Dinajpur District. There are 180 high schools, 31 Madrasas, and 167 junior high schools, with 378 educational institutions in the district. Blocks like Raiganj, Kaliyaganj, Itahar, and Chopra have a significant number of high schools, contributing to the overall education infrastructure in the district. Raiganj has the highest number of educational institutions (58), followed by Kaliyaganj (42) and Chopra (41). The

Table 2 Demographic distribution of Uttar Dinajpur district

CD Blocks/Municipality	Total population	Male population	Female population	% of population to District Pop.	Area (sq. km.) 2011
Islampur Sub-Division	**1,669,895**	**862,114**	**807,781**	**55.53**	**1768.57**
Islampur	308,518	158,933	149,585	10.26	329.44
Islampur (M)	54,340	28,227	26,113	1.81	13.99
Chopra	284,403	147,073	137,330	9.46	380.82
Goalpokhar I	326,120	169,954	156,166	10.84	355.11
Goalpokhar II	291,252	150,125	141,127	9.69	298.69
Karandighi	368,332	188,572	179,760	12.25	390.52
Dalkhola(M)	36,930	19,230	17,700	1.23	
Raiganj Sub-Division	**1,337,239**	**688,952**	**648,287**	**44.47**	**1350.56**
Raiganj	430,221	221,738	208,483	14.31	472.12
Raiganj (M)	183,612	96,388	87,224	6.11	10.64
Hemtabad	142,056	72,624	69,432	4.72	191.82
Kaliaganj	224,142	115,104	109,038	7.45	301.90
Kaliaganj (M)	183,612	27,321	26,209	1.78	11.67
Itahar	303,678	155,777	147,901	10.10	362.40
Total	**3,007,134**	**1,551,066**	**1,456,068**	**100**	**3140.00**

Primary Census Abstract, 2011

Table 3 Sex ratio of the State and the District, 1901–2011

Census Year (2011)	Sex ratio	
	West Bengal	Uttar Dinajpur
1951	865	884
1961	878	888
1971	891	908
1981	911	931
1991	917	921
2001	934	938
2011	950	939

Primary Census Abstract, 2011

distribution of Madrasas is not uniform across all areas. While some blocks have a substantial number of Madrasas, others have none. Junior high schools are spread relatively evenly, with notable numbers in Raiganj, Itahar, and Chopra.

The total number of high schools indicates the district's availability of secondary education facilities. Madrasas contribute to religious education, and the distribution suggests variations in religious education facilities across different areas. Junior high schools play a crucial role in providing education at the middle school level, and their distribution reflects the emphasis on middle-level education in the district. This table provides a snapshot of the educational infrastructure in Uttar Dinajpur District, helping policymakers and educators understand the distribution and availability of different types of educational institutions across various regions.

Table 4 Block wise government school of study area

Sl no.	Block/Municipality	High school	Madrasha	Jr. High	Total
1	Kaliyaganj	18	9	15	42
2	Hemtaad	12	6	11	29
3	Raiganj	28	0	30	58
4	Itahar	18	3	30	51
5	Karandighi	17	4	9	30
6	Goalpokher-I	14	3	12	29
7	Goalpokher-II	17	2	15	34
8	Islampur	16	2	16	34
9	Islampur SDO	11	0	2	13
10	Raiganj SDO	15	0	2	17
11	Chopra	14	2	25	41
12	Total	180	31	167	378

Office of the District magistrate and collector, Government of West Bengal

Database and methodology

Data

The present paper aims to study the block-wise gender disparity in rural and urban areas among the Muslim population in Uttar Dinajpur district. The Census of India 2011 and other secondary data sources are the primary foundation for the current analysis. In order to determine the location of Muslim literacy, the study is based on two types of data: literacy across all religions and spatial literacy of the Muslim population; as a result, the religiously specific data (Religious PCA or Primary Census Abstract) of Uttar Dinajpur were used for the present study. MS Excel, MS Word, and Arc GIS software were used to create maps, diagrams, and tables, which are fundamental cartographic techniques. Numerous parametric metrics have been employed to complete the study.

Population growth rate

The flowing formula has been used to get the decadal growth rate of the Muslim population between 1961 and 2011.

$$D_{GP} = \frac{P_1 - P_2}{P_2} \times K$$

In this equation, P_1 represents the population in the present census year, P_2 represents the population in the previous census year, and K is constant, the value is 100. D_{GP} is stands for decadal growth rate.

A comparison of religious literacy

A society's level of development can be determined with the aid of literacy, a social development indicator. However, a broad analysis of the population's religious

makeup reveals that not all religions have an equal literacy rate. Therefore, we can evaluate religious literacy in this context along with their condition.

Standard score (Z-score)

The raw results were given in various units for several cognitive activities. All Z scores are expressed as a percentage of the standard deviation (SD), the same for all Z scores. Z scores are helpful because they enable many interpretations or uses of the data (Sharif and Blank 2010; Andrade 2021). Standard score, which measures the sign of the number of standard deviations an observation or piece of data is above the mean, has been used to study the spatial distribution of the gender gap in literacy. Because it is a dimensionless quantity that includes varying means and standard deviations, it may be effectively utilized to investigate a variable's regional distribution pattern (Sharif and Blank 2010). The formula below has been used to determine the Standard Score (Z-Score):

$$Z = \frac{x - \mu}{\sigma}$$

Where,

x is the particular value

μ indicate mean

σ represent Standard deviation

A positive value in standard score analysis indicates a datum above the sample mean, whereas a negative value displays the outcome as a datum below the sample mean (Barman and Chouhan 2017).

Disparity index

The foremost aim of this research is to address the gender gap in literacy rates and to do so, we employ V. Sopher's Disparity Index (Sopher's Method), a statistical method. Using this widely used technique, the following formula can be used to determine the gap between male and female literacy groups.

$$\mathrm{DI} = \mathrm{Log}\ (\mathrm{X2}/\mathrm{X1}) + \mathrm{Log}\ (100 - \mathrm{X1}) / (100 - \mathrm{X2})$$

Since it violates the principles of additive monotonicity, distribution, repeating transfers, and growing monotonicity, Sopher's (1974) activity technique for inequality has numerous disadvantages (Hira 2018). As a result, Hira and Das (2018) pushed for a change to the Sopher's Index that adheres to all four axioms (Hira and Das 2018). Put it this way:

$$\mathrm{DI} = \mathrm{Log}\ (\mathrm{X2}/\mathrm{X1}) + \mathrm{Log}\ (200 - \mathrm{X1}) / (200 - \mathrm{X2})$$

Where, DI = Disparity Index

X1 = Percentage of Female Literates.

X2 = Percentage of Male Literates.
X1 is considered for Rural literacy and
X2 is considered for Urban literacy rate.

In this calculation, the values 2 and 1 are used to represent higher and lower values, respectively. If there is perfect equality, that is, no disparity at all, the value of D will be 0. In the case of men, X1 represents the percentage of literate women, and X2 represents the percentage of literate men. Additionally, the rural literacy rate should be considered X1 and the urban literacy rate X2 to quantify the literacy gap between rural and urban areas. Due to the technique's preference for percentages over absolute numbers, all values are expressed in percentage figures (Zaidi n.d.).

Sampling and research design

The research was conducted utilizing secondary data sourced from the Census of India (2011) and Primary Census Abstract (PCA). The sample for this study was derived from these datasets, forming the basis for the research analysis (Fig. 4).

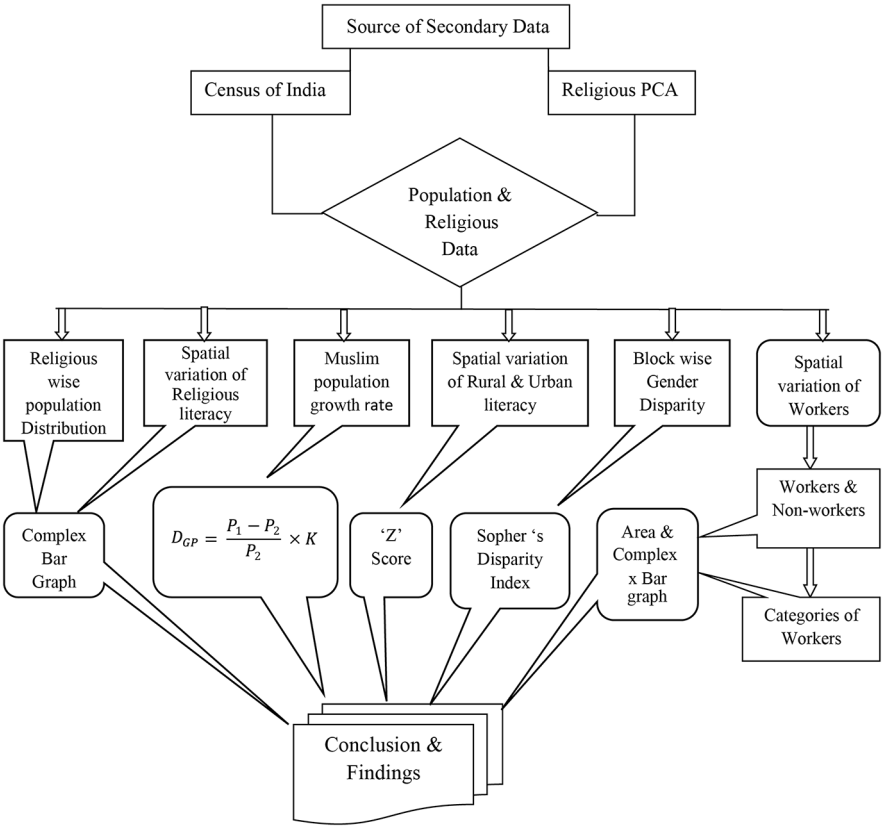

Fig. 4 Data flow chart of research design. Prepared by the Researcher

Result and discussion

Spatial distribution of population

The population distribution in the different blocks in the Uttar Dinajpur District is statistically represented in Table 5. This analysis aims to examine the many demographic factors based on religious information extensively. The table offers demographic information split down by gender and religious preference for each block in the district. Islampur and Raiganj are the two most populated cities in the district, with 3.5 million inhabitants overall.

According to the gender ratio in the district, men outnumber women somewhat. Hinduism is the most popular religion in numbers, with the Raiganj and Kaliaganj

Table 5 Blocks wise population data of Uttar Dinajpur District

Population	CD Blocks wise population data of Uttar Dinajpur District								
	Islampur	Chopra	Goal-pokhar I	Goal-pokhar II	Karan-dighi	Raiganj	Hem-tabad	Kalia-ganj	Itahar
Tot. pop.	308,518	284,403	326,120	291,252	368,332	430,221	142,056	224,142	303,678
Tot. Male	158,933	147,073	169,954	150,125	188,572	221,738	72,624	115,104	155,777
Female	149,585	137,330	156,166	141,127	179,760	208,483	69,432	109,038	147,901
Hindu	85,039	96,469	72,892	100,546	168,462	280,214	69,957	177,257	144,049
Male	44,429	49,988	38,406	52,347	86,958	145,314	35,708	91,112	74,148
Female	40,610	46,481	34,486	48,199	81,504	134,900	34,249	86,145	69,901
Muslim	222,548	182,050	251,965	186,818	197,832	146,871	71,225	46,066	157,855
Male	114,018	94,100	130,885	95,837	100,642	74,921	36,472	23,577	80,724
Female	108,530	87,950	121,080	90,981	97,190	71,950	34,753	22,489	77,131
Christian	781	5235	676	3348	1460	2075	331	646	1295
Male	400	2667	362	1659	690	941	173	337	641
Female	381	2568	314	1689	770	1134	158	309	654
Sikh	16	57	68	23	31	105	18	17	32
Male	12	38	51	11	13	61	13	9	18
Female	4	19	17	12	18	44	5	8	14
Buddhist	5	108	37	10	22	89	33	8	28
Male	4	54	17	5	9	49	13	3	18
Female	1	54	20	5	13	40	20	5	10
Jain	31	29	41	239	9	27	3	7	6
Male	14	17	19	129	4	15	2	3	4
Female	17	12	22	110	5	12	1	4	2
Other Religious	5	159	3	14	299	494	377	3	229
Male	3	76	1	7	142	238	185	3	128
Female	2	83	2	7	157	256	192	0	101
No religious specified	93	296	438	254	217	346	112	138	184
Male	54	133	213	130	114	199	58	60	96
Female	40	163	225	124	103	147	54	78	88

Census of India, 2011

blocks having the most significant concentration of followers. Most people are Muslims, with Chopra and Goalpokhar II having the most significant percentage.

There are gender differences in religious affiliation, with a higher proportion of men than women in the Hindu and Muslim communities. Further, study of this disparity may be required, and it can be attributed to several sociocultural problems. The district also contains a small number of Christians, Sikhs, Buddhists, Jains, and adherents of other religions. Investigators have identified some fascinating trends by analyzing these data. Goalpokhar II block, for instance, stands out as having a higher percentage of Muslims than its total population, likely indicating a concentration of the Muslim community in this area. The relatively high proportion of Muslims in Chopra block compared to its whole population probably indicates a significant Muslim presence in this area.

It is critical to remember that this analysis only uses quantitative data and lacks qualitative insights. An extensive research plan that includes surveys, interviews, and ethnographic studies may shed further light on the district's gender and religious dynamics. Such qualitative study could create more complex policies and interventions by illuminating the underlying sociocultural influences on population patterns. The block-level table data for the Uttar Dinajpur District provides an insightful look at the demographic breakdown, gender ratios, and religious affiliations. This analysis offers early insights into the district's demographics, including gender inequalities across religious communities and Hindu and Islamic domination.

Decadal growth rate of Muslim population

Overall, the study area's Muslim population steadily grew from 1961 to 2011. Despite some fluctuations in the growth rate, the population nearly tripled over this 50-year period, which indicates a significant demographic shift—the two decades between 1971 and 1981 witnessed rapid growth in the Muslim population, with growth rates of 27.92% and 28.97%, respectively. The growth rate dropped significantly in the decade 1991, with a decline in the population growth (–0.06%). The growth rate reduction influenced a reduced birth rate, epidemic, and increased emigration. Between 2001 and 2011, the Muslim population experienced a resurgence in growth, with a growth rate of 34.43% and 29.80% (Table 6, Fig. 5).

The inverse growth rate happened because of improved healthcare, increased birth rates, and immigration. The data suggests a transition from high growth rates in the 1970s and 1980s to a phase of lower, but still positive, growth rates in the 1990s and early 2000s, followed by another period of higher growth in the 2010s. Sev-

Table 6 Decadal growth rate of Muslim population (1961–2011)

Census year	Muslim population	Decadal growth rate (%)
1961	521,758	–
1971	667,447	27.92%
1981	860,797	28.97%
1991	860,281	–0.06%
2001	1,156,503	34.43%
2011	1,501,170	29.80%

Calculate by researcher base on religious PCA

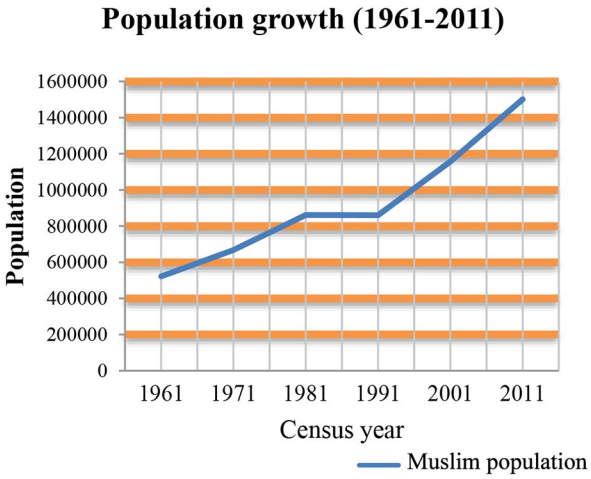

Fig. 5 Decadal growth rate of Muslim population (1961–2011). Prepared by the researcher

Table 7 Level of literacy of different block's of Uttar Dinajpur District

Region/Block	Total	Hindu	Muslim	Christian	Sikh	Buddhist	Jain	O.R.P.	R.N.S.
Uttar Dinajpur	45.54	57.58	41.56	51.12	65.4	53.94	85	38.66	47.89
Islampur	43.5	57.09	38.3	48.66	56.3	60	38	60	32.26
Chopra	49.42	57.2	45.39	46.32	59.7	38.89	52	47.17	51.35
Goalpokhar 1	34.24	47.27	30.41	46.75	76.5	75.68	76	66.67	34.47
Goalpokhar 2	37.31	45.6	32.57	48.57	43.5	40	90	57.14	44.88
Karandighi	43.7	49.02	39.13	50.96	45.2	45.45	67	42.14	39.63
Raiganj	54.44	57.66	48.19	64.1	66.7	46.07	70	38.26	52.89
Hemtabad	58.34	56.23	60.65	41.09	72.2	66.67	67	28.12	58.04
Kaliaganj	57.54	56.19	63.62	65.48	47.1	25	71	66.67	50.73
Itahar	50.5	51.75	49.41	45.33	68.8	50	17	46.29	42.94

Calculated by researcher from religious data (PCA, 2011)

O.R.P. Other religious persuasions, *R.N.S.* Religious not started

eral factors influence population growth, including birth, death, immigration, and emigration.

A comparison of different religious literacy in Uttar Dinajpur

The literacy rate across different blocks of the Uttar Dinajpur District is shown in Table 7 and is divided by religion. Each religious group's literacy rates are shown as percentages in different blocks. The total literacy rate for each block is shown in the "Total" column. Goalpokhar 1 has the lowest overall literacy rate (34.24%), while Raiganj has the most significant overall literacy rate (54.44%), closely followed by Kaliaganj (57.54%). The literacy rates among various religious groups vary noticeably. For instance, compared to other religious groups in Islampur, Muslims have the lowest literacy percentage (38.3%), whereas Christians in the same block have a higher literacy rate (48.66%). This shows that there are religiously-based differences

in educational opportunities. Sikhs have a relatively high literacy rate, surpassing the national average in specific neighborhoods (such as Uttar Dinajpur and Chopra).

However, the Buddhist population in Kaliaganj has a lower literacy rate (25%), indicating differences within the same religion in various neighborhoods. In some blocks, such as Uttar Dinajpur and Kaliaganj, the Jain community's literacy rate is very high, reaching 85% and 71%, respectively. Goalpokhar 1 and Islampur have "R.N.S." literacy rates of about 30%. In contrast, Goalpokhar 2 and Hemtabad have a category called "O.R.P." These classifications may correspond to specific socio-economic or racial groupings, each with distinctive literacy traits. In Uttar Dinajpur District, Table 7 shows stark differences in literacy rates amongst several blocks, with gaps between different religious and other categorized groups. Policymakers and educators can use these variations as crucial information to target areas with lower levels of development.

Discussion

The third objective is depicted in the provided figure. As can be observed in Fig. 6, the Jain religion has the highest literacy rate (85%), while the Muslim religion in the Uttar Dinajpur district has the lowest literacy rate (41.55%). 45.54 percent of the district's population is literate across all religions. In contrast, according to block-level data, Hemtabad had the highest average literacy (58.34%), and Goalpokhar 1 had the lowest average literacy (34.24%).

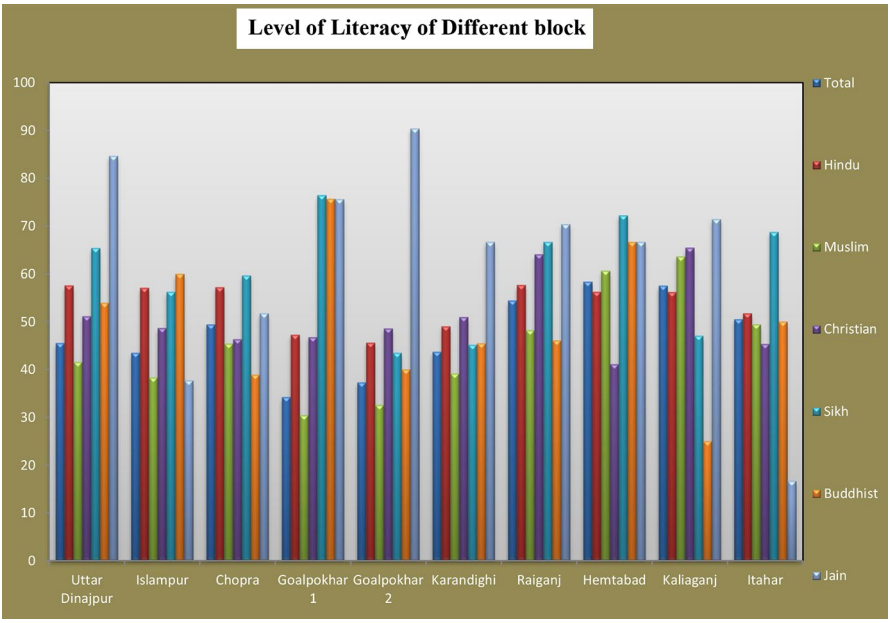

Fig. 6 Religious PCA of West Bengal, 2011. Prepared by the researcher

The highest percentages of Jain religious literacy were found in Goalpokhar 1 (76%) and Goalpokhar 2 (90%) among the blocks, followed by Raiganj (70%) and Karandighi (67%) and Kaliaganj (71%). However, Islampur, Chopra, Hemtabad, and Itehar are the exceptions. In contrast, Muslim literacy is the least common religion in a specific block, with the lowest rates seen in Goalpokhar 1 (30.41%), Goalpokhar 2 (32.57%), Raiganj (48.19%), and Karandighi (39.13%).

Muslim literacy in Uttar Dinajpur District (2011)

Rural vs. Urban Variation According to the 2011 census, Uttar Dinajpur District has a total population of 3,007,134, of which 2,644,906 (87.95%) are rural and 362,228 (12.05%) are urban. Muslims make up 1,501,170 (49.92%) of the district's total population, making them the most economically disadvantaged group in our society. Hindus make up 49.31% of the population of Uttar Dinajpur district, followed by Christians with 0.56%, Sikhs with 0.02%, Buddhists with 0.01%, and Jains with 0.04% (Census of India, 2011).

Uttar Dinajpur District has a Muslim literacy rate of 41.56%, lower than the district average of 45.54%. The district's male Muslim literacy rate is 46.06%, while the female literacy rate is 36.78%. The district's literacy rate is more significant (51.41%) in urban regions and somewhat lower (41.30%) in rural areas. The gap in literacy rates between urban and rural areas in Uttar Dinajpur district's nine blocks is largest in Itahar block (20.36%, Table 8), followed by Islampur block (15.92%), and lowest in Chopra block (–0.74%), followed by Raiganj block 1.37%, Table 8 and Fig. 7 illustrates the gender disparity between rural and urban locations regarding literacy rates in both male and female populations. The Hemtabad block has the highest gender difference (3.43%), and the Karandighi block has the lowest rural-urban gender disparity in literacy (–5.78%).

The gender gap in literacy is measured using the Standard Score (Z- Score), a dimensionless variable that considers the fluctuating mean and standard deviation. Table 9 shows the difference between male and female literacy rates. According to the 2011 Census, the Z-Score displays (Table 9) the average gender disparity in literacy across various blocks in the Uttar Dinajpur district. From Table 9, it can be seen those four blocks, Islampur (11.82), Chopra (11.96), Goalpokhar I (10.12), and Goalpokhar II (9.2), all scored above the mean, indicating that there is a more significant gender gap in literacy in these four districts. The data indicate that the gender difference is relatively low in the five blocks of Karandighi (7.68), Raiganj (8.27), Hemtabad (6.33), and Itahar (5.99), which are all below the datum (Table 9).

Rural literacy status

Rural areas (Fig. 8) have comparatively poor conditions. Four Uttar Dinajpur blocks—Islampur (1.4), Chopra (1.46), Goalpokhae-I (0.62), and Goalpokhar II (0.20)—have 'Z' scores that are positive, indicating that there is a significant gender gap in literacy above the mean value. The remaining five blocks, Karandhighi (–0.50), Raiganj (–0.23), Hemtabad (–1.12), Kaliaganj (–0.56), and Itahar (–1.27),

Table 8 Distribution of Muslim literacy rate of Uttar Dinajpur

Blocks	Rural/Urban	Literacy rate in % (2011)			Gender gap	Urban-rural difference	
		Persons	Male	Female		Literacy	Gender gap
Islampur	Total	38.3	44.06	32.24	11.82	15.92	0.4
	Rural	38.3	44.06	32.24	11.82		
	Urban	54.22	60.07	47.85	12.22		
Chopra	Total	45.39	51.17	39.21	11.96	–0.74	2.2
	Rural	45.4	51.17	39.23	11.94		
	Urban	44.66	51.46	37.32	14.14		
Goalpokhar 1	Total	30.41	35.27	25.15	10.12	14.58	0.83
	Rural	30.19	35.05	24.94	10.11		
	Urban	44.77	50.02	39.08	10.94		
Goalpokhar 2	Total	32.57	37.05	27.85	9.2	1.68	3.4
	Rural	32.57	37.05	27.85	9.2		
	Urban	34.25	41.02	35.22	5.8		
Karandighi	Total	39.13	42.9	35.22	7.68	4.72	–5.78
	Rural	39.13	42.9	35.22	7.68		
	Urban	43.85	46.87	44.97	1.9		
Raiganj	Total	48.19	52.24	43.97	8.27	1.37	1.33
	Rural	48.19	52.24	43.97	8.27		
	Urban	49.56	52.98	46.04	6.94		
Hemtabad	Total	60.65	63.74	57.41	6.33	1.89	3.43
	Rural	60.65	63.74	57.41	6.33		
	Urban	62.54	66.81	63.91	2.9		
Kaliaganj	Total	63.62	67.3	59.76	7.54	3.62	1.59
	Rural	63.62	67.3	59.76	7.54		
	Urban	67.24	70.1	64.15	5.95		
Itahar	Total	49.41	52.33	46.34	5.99	20.36	0.81
	Rural	49.25	52.18	46.19	5.99		
	Urban	69.61	73.02	66.22	6.8		
UTTAR DINAJPUR	Total	41.55	46.06	36.78	9.28	10.11	2.18
	Rural	41.30	45.72	36.52	9.20		
	Urban	51.41	56.81	45.43	11.38		

Calculate by researcher based on census data, 2011

all received a "Z" score of zero, indicating that there is less of a gender gap in literacy in rural areas (Table 10).

On a density map, we categorize all the blocks into five zones to better understand the disparity between them (Fig. 8). Five zones are created using nine Blocks. Two blocks, Itahar (–1.27) and Hemtabad (–1.120) are included in the zone of very low gender disparity or low "Z" ratings (–1.12). Two blocks, such as Karandighi (–0.50) and Kaliaganj, are also covered in the low disparity zone (–1.120000 to –0.500000), (–0.56). However, only the Raiganj (–0.23) block is covered by the moderate zone (–0.500000 to –0.230000). Goalpokhar I (0.62) and Goalpokhar II (–0.230000 to 0.620000) are also visible in the high disparity zone (0.20). However, the blocks of Islampur (1.40) and Chopra (1.46) are located in a very high disparity zone (0.620000 to 1.460000).

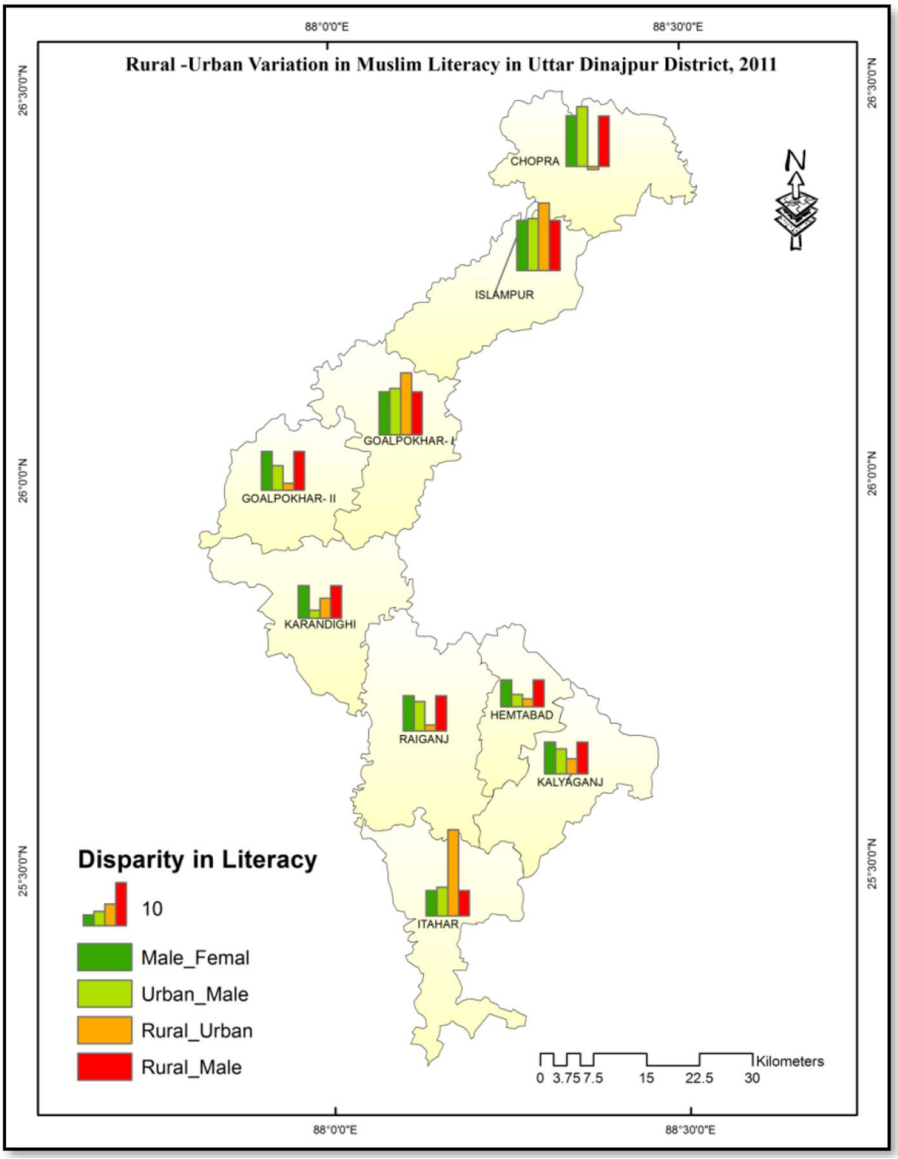

Fig. 7 Rural-Urban disparity of literacy, 2011. Prepared by the research

Urban literacy status

Urban regions (Fig. 8) are in considerably worse condition. The 'Z' score is positive for three blocks in Uttar Dinajpur: Islmampur (1.14), Chopra (1.60), and Goalpokhae-I (0.83), indicating that there is a significant gender gap in literacy above the mean value. Goalpokhar-II (–0.41), Karandhighi (–1.36), Raiganj (–0.14), Hemtabad (–1.11), Kaliaganj (–0.38), and Itahar (–0.17) all have negative 'Z' scores,

Table 9 Calculation average gender gap in literacy

Blocks	Gender disparity in literacy (Xi)	Mean	Standard deviation (S.D.)	Z-score
Islampur	11.82	8.77	2.18	1.40
Chopra	11.96			1.46
Goalpokhar 1	10.12			0.62
Goalpokhar 2	9.2			0.20
Karandighi	7.68			–0.50
Raiganj	8.27			–0.23
Hemtabad	6.33			–1.12
Kaliaganj	7.54			–0.56
Itahar	5.99			–1.27

Calculate by researcher base on census data 2011

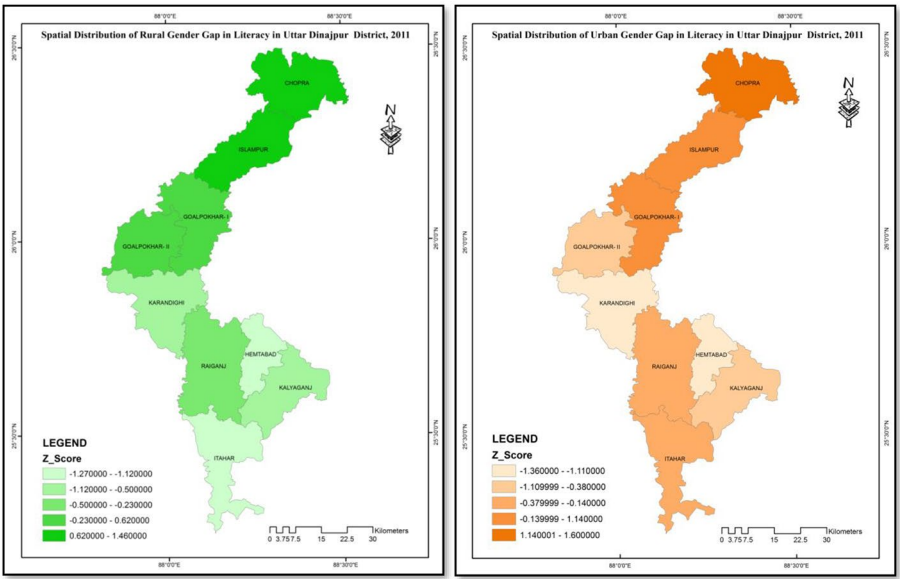

Fig. 8 Rural and urban gender disparity of the District, 2011. Prepared by the researcher

indicating that there is less of a gender gap in literacy in urban areas than there is in rural areas (Table 11).

On a density map, we categorize all the blocks into five zones for a better understanding of the disparity between them (Fig. 6). Two blocks, Karandighi (–1.36) and Hemtabad (–1.110), are included in the shallow gender disparity zone, or low "Z" scores, which range from 1.360000 to 1.110000. Goalpokhar II (–0.41) and Kaliaganj(–0.38) are two blocks that are covered in the low disparity zone (–1.109999 to – 0.380000). (–0.38). Raiganj (–0.14), Itahar (–0.13), and the other two blocks are included in the moderate zone (–0.370000 to –0.140000). (–0.17). Additionally, Islaampur (–1.14) and Gooaalpokhaar I may be seen in the high disparity zone (–0.139999 to 0.1400000). (0.83). However, only Chopra Block is in a zone of extreme inequality (1.140001 to 1.160000)

Table 10 Calculation rural gender gap in literacy

Blocks	Rural gender disparity in Literacy (Xi)	Mean	S.D.	Z-score
Islampur	11.82	8.76	2.18	1.40
Chopra	11.94			1.46
Goalpokhar 1	10.11			0.62
Goalpokhar 2	9.2			0.20
Karandighi	7.68			–0.50
Raiganj	8.27			–0.23
Hemtabad	6.33			–1.12
Kaliaganj	7.54			–0.56
Itahar	5.99			–1.27

Calculate by researcher base on census data 2011

Table 11 Calculation urban literacy

Blocks	Urban gender disparity in literacy (Xi)	Mean	S.D.	Z-score
Islampur	12.22	7.51	4.14	1.14
Chopra	14.14			1.60
Goalpokhar 1	10.94			0.83
Goalpokhar 2	5.8			–0.41
Karandighi	1.9			–1.36
Raiganj	6.94			–0.14
Hemtabad	2.9			–1.11
Kaliaganj	5.95			–0.38
Itahar	6.8			–0.17

Calculate by researcher base on census data 2011

Literacy among different religious community

Table 12 information on the literacy and illiteracy rates among various religious groups. The "Total Illiteracy" columns reveal the percentage of illiterates in each religious group, whereas the "Total Literacy" columns display the percentage of literates in every religious group. The Jain population has the most significant literacy rate (84.67%). Sikhs have a comparatively high literacy rate as well, at 65.41%. The literacy percentages for Hindu, Christian, Buddhist, and "Religion not stated" groups range from 47.89 to 57.58%. However, Muslims have the lowest literacy percentage, at 41.55%.

Male and female literacy rates across diverse religious groups differ from one another. Most of the time, males have higher literacy rates than females. Among Muslims, where the male literacy rate is 46.06% and the female literacy rate is 36.78%, this gender difference is particularly significant. The pattern in literacy rates and the trend in illiteracy rates are similar. Muslims have the highest illiteracy rate, at 58.45%, while Jains have the lowest, at 15.33%. An illiteracy rate of between 50.46% and 61.34% is seen among the remaining religious groups and the category "Religion not stated."

Table 12 Literacy and illiteracy among religious group in Uttar Dinajpur District

Religious group	Total literacy of various religious group in %			Total illiteracy of various religious group in %		
	Total	Male	Female	Total	Male	Female
Hindu	57.58	63.97	50.71	42.42	36.03	49.29
Muslim	41.55	46.06	36.78	58.45	53.94	63.22
Christian	51.12	57.11	45.19	48.88	42.89	54.81
Sikh	65.41	75.69	49.74	34.59	24.31	50.26
Buddhist	53.94	60.27	47.42	46.06	39.73	52.58
Jain	84.67	88.68	80.31	15.33	11.32	19.69
Other religions	38.66	49.07	28.40	61.34	50.93	71.60
Religion not stated	47.89	52.20	43.45	52.11	47.80	56.55
Total	**49.54**	**55.03**	**43.69**	**50.46**	**44.97**	**56.31**

Religious PCA, 2011

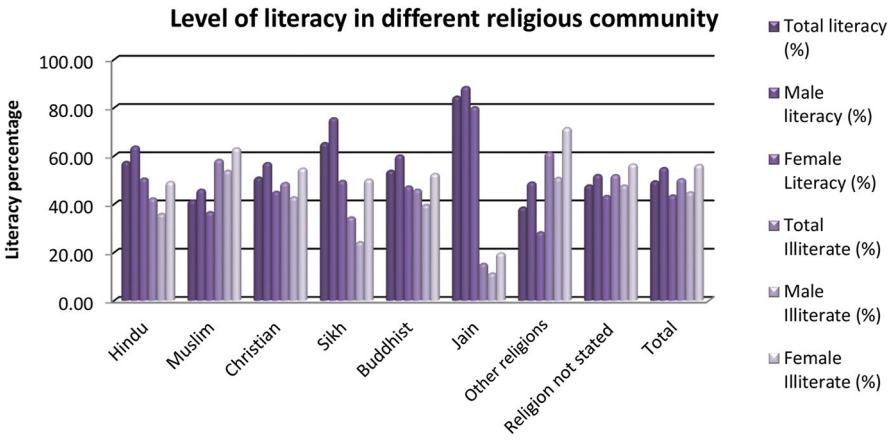

Fig. 9 Religious wise literacy in study area. Prepared by the researcher

Muslims have the highest rate of illiteracy and the lowest rate of literacy among all the religious groups. This result demonstrates the need for targeted initiatives and efforts to raise education and reading levels among the Muslim community. It is crucial to address the gender gap in literacy rates among Muslims, as there is a sizable difference between male and female rates. The research emphasizes the importance of targeted interventions and educational measures to promote literacy and close the gender gap, particularly within the Muslim community, by highlighting differences in literacy and illiteracy rates along with different religious groupings (Fig. 9).

Spatial variation of working and non-working Muslim population

"Workforce participation" refers to the proportion of the population involved in economic activities, categorized into "main workers" and "marginal workers." Among the CD Blocks, Goalpokhar - II records the lowest total worker percentage at 28.85%, while Karandighi boasts the highest at 38.53%. Hemtabad and Islampur stand out for

their marginal work participation rates, with 12.33% and 7.00% respectively. Kaliaganj exhibits the highest (8.66%) and lowest (5.73%) marginal worker percentages in comparison to Goalpokhar-I. Typically, the male workforce percentage surpasses that of females in CD Blocks. The most pronounced gender gap in labor force participation is observed in Karandighi, where 38.17% of males and only 17.49% of females are employed. Conversely, Raiganj shows the lowest gender gap, with 41.37% of males and 8.80% of females participating in the workforce. Those not engaged in employment constitute the non-worker population, with Goalpokhar I (89.87%) and Kaliaganj (83.27%) reporting the highest and lowest non-working percentages, respectively.

The district-wide workforce participation rate averages 32.21%. Regarding the gender disparity in workforce participation across the district, only 6.95% of females are employed compared to 40.61% of males. In conclusion, various CD Blocks in the Uttar Dinajpur District display notable discrepancies in population distribution and employment engagement. While some CD Blocks have higher proportions of active workforce, others exhibit higher unemployment rates. Furthermore, there exists a prominent gender divide in workforce involvement, with males being more actively engaged in economic activities than females (Table 13, Fig. 10).

Spatial variation of worker categories among the Muslim population

The percentage of individuals engaged in agricultural activities varies across different CD blocks, ranging from 20.91% in Karandighi to 44.72% in Kaliaganj. This figure represents the proportion of cultivators in each CD block. The percentage of agriculture laborers also shows significant diversity, with rates ranging from 32.33% in Karandighi to 68.19% in Hemtabad. In contrast, household industry workers form a relatively small portion of all CD blocks, with percentages ranging from 0.44% in Kaliaganj to 32.03% in Karandighi. This category encompasses those in cottage or small-scale industries operated from their homes and individuals engaged in various non-agricultural activities. The percentage of other workers exhibits wide variation, with the highest recorded in Karandighi at 53.41% and the lowest in Kaliaganj at 10.91%.

Notable disparities exist between male and female workforce participation. In several CD blocks, the percentage of female workers is lower than that of their male counterparts. Furthermore, in certain areas, the distribution of female workers across different categories, such as agriculture laborers and household industry workers, differs significantly from that of males. The economic structures of the CD blocks are diverse. For instance, Goalpokhar - I and Goalpokhar - II have relatively higher proportions of cultivators, while Raiganj and Itahar have a more significant percentage of agriculture laborers.

Conversely, Karandighi stands out for its significant proportion of other workers. When examining the entire Uttar Dinajpur district, agriculture laborers constitute the largest group at 45.31% among all workers, followed by cultivators at 29.07%. Other workers form a substantial segment at 21.28%, underscoring the district's vast economic activities (Table 14, Fig. 11). The table displays the district data spatially, which is the mean of all blocks within the Uttar Dinajpur District, highlighted in bold.

Table 13 Number and percentage of main workers, marginal workers and non-workers of Muslim population in C.D. blocks, 2011

Name of CD block	Persons/Males/Females	Total population	Main workers		Marginal workers		Total workers (main and marginal workers)		Non workers	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chopra	Persons	179,737	40,427	22.49	10,293	5.73	50,720	28.22	129,017	71.78
	Males	92,899	36,602	39.40	5319	5.73	41,921	45.13	50,978	54.87
	Females	86,838	3825	4.40	4974	5.73	8799	10.13	78,039	89.87
Islampur	Persons	222,548	49,814	22.38	15,575	7.00	65,389	29.38	157,159	70.62
	Males	114,018	45,529	39.93	8196	7.19	53,725	47.12	60,293	52.88
	Females	108,530	4285	3.95	7379	6.80	11,664	10.75	96,866	89.25
Goalpokhar - I	Persons	248,105	58,518	23.59	14,480	5.84	72,998	29.42	175,107	70.58
	Males	128,880	52,537	40.76	7614	5.91	60,151	46.67	68,729	53.33
	Females	119,225	5981	5.02	6866	5.76	12,847	10.78	106,378	89.22
Goalpokhar - II	Persons	186,818	38,908	20.83	14,990	8.02	53,898	28.85	132,920	71.15
	Males	95,837	35,216	36.75	8822	9.21	44,038	45.95	51,799	54.05
	Females	90,981	3692	4.06	6168	6.78	9860	10.84	81,121	89.16
Karandighi	Persons	197,832	55,421	28.01	20,801	10.51	76,222	38.53	121,610	61.47
	Males	100,642	38,419	38.17	8018	7.97	46,437	46.14	54,205	53.86
	Females	97,190	17,002	17.49	12,783	13.15	29,785	30.65	67,405	69.35
Raiganj	Persons	146,308	37,188	25.42	15,643	10.69	52,831	36.11	93,477	63.89
	Males	74,636	30,880	41.37	7077	9.48	37,957	50.86	36,679	49.14
	Females	71,672	6308	8.80	8566	11.95	14,874	20.75	56,798	79.25

Table 13 (continued)

Name of CD block	Persons/Males/Females	Total population	Main workers		Marginal workers		Total workers (main and marginal workers)		Non workers	
			Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Hemtabad	Persons	71,225	18,570	26.07	8780	12.33	27,350	38.40	43,875	61.60
	Males	36,472	16,000	43.87	3844	10.54	19,844	54.41	16,628	45.59
	Females	34,753	2570	7.40	4936	14.20	7506	21.60	27,247	78.40
Kaliaganj	Persons	46,066	13,436	29.17	3153	6.84	16,589	36.01	29,477	63.99
	Males	23,577	11,622	49.29	1205	5.11	12,827	54.40	10,750	45.60
	Females	22,489	1814	8.07	1948	8.66	3762	16.73	18,727	83.27
Itahar	Persons	156,664	40,314	25.73	12,464	7.96	52,778	33.69	103,886	66.31
	Males	80,131	36,566	45.63	6128	7.65	42,694	53.28	37,437	46.72
	Females	76,533	3748	4.90	6336	8.28	10,084	13.18	66,449	86.82
Total	Persons	14,555,303	352,596	2.42	116,179	0.80	468,775	3.22	14,086,528	96.78
	Males	747,092	303,371	40.61	56,223	7.53	359,594	48.13	387,498	51.87
	Females	708,211	49,225	6.95	59,956	8.47	109,181	15.42	599,030	84.58

Primary Census Abstract, 2011

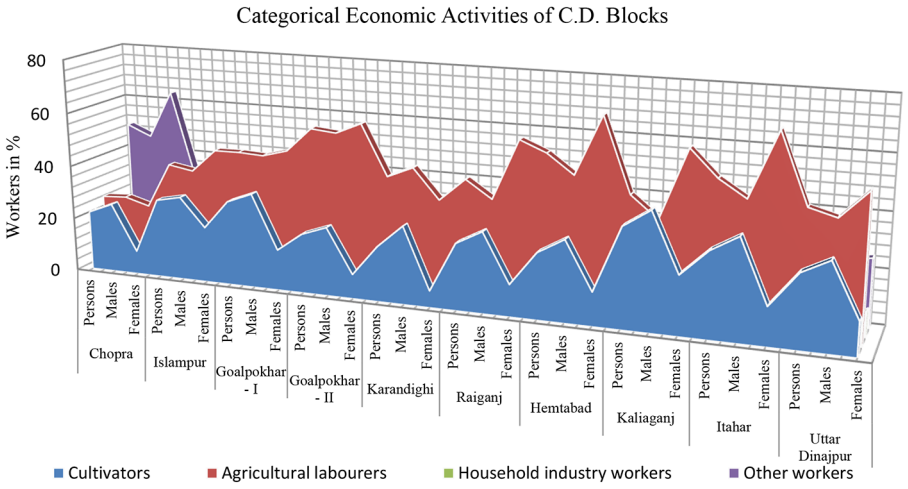

Fig. 10 Different categories workers of C.D. blocks, Uttar Dinajpur. Prepared by the researcher

Conclusion and findings

The Muslim population in the Uttar Dinajpur district is consistently growing decade by decade, although literacy rates are not rising at the same rate as the population. It has been discovered that the rising literacy trend in urban and rural areas differs significantly. Compared to urban regions, rural areas have lower literacy rates. Notably, the total literacy rates in urban and rural areas are similar in Chopra Block, except for this block, where rural literacy rates are more significant than the urban literacy rate. Except for Chopra, every block in Uttar Dinajpur has a higher urban than rural literacy rate. The Itahar Block had the most considerable rural-urban discrepancy (20.36%). All of the blocks in the district of Uttar Dinajpur are familiar with the gender discrepancy in literacy, albeit some have a more significant disparity than others. Different social, economic, political, and sociological issues related to gender inequality hinder overall progress. The government's educational policies, programs, and reservation policies are being better implemented, which is suitable for achieving a higher social status and contributing to socioeconomic growth. As a result, the female literacy rate is rising. Also, increasing female literacy improves the participation rate of female workers in different sectors.

In Uttar Dinajpur district, educational disparities across blocks stem from a complex interplay of factors. Religious affiliations contribute to the primary factors because Muslim-dominated areas are significantly backward in social, cultural, economic, and also politics. The data of the study area also explains that the Jain community boasts the highest literacy (85%) and Muslims the lowest (41.55%). Rural-urban differences are another significant evidence, favoring urban areas with a 51.41% literacy rate compared to 41.30% in rural areas. Gender disparities further amplify the educational divide, varying across blocks. Islampur, Chopra, Goalpokhar I, and Goalpokhar II exhibit higher gender gaps, while Karandighi, Raiganj, Hemtabad, and

Table 14 Distribution of Muslim workers by sex in four categories of economic activity in CD blocks, 2011

Name of CD block	Persons/Males/Females	Total population	Total workers (main + marginal workers)	Category of Workers							
				Cultivators		Agricultural labourers		Household industry workers		Other workers	
				Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Chopra	Persons	179,737	50,720	13,539	26.69	17,333	34.17	906	1.79	18,942	37.35
	Males	92,899	41,921	12,427	29.64	14,430	34.42	464	1.11	14,600	34.83
	Females	86,838	8799	1112	12.64	2903	32.99	442	5.02	4342	49.35
Islampur	Persons	222,548	65,389	20,017	30.61	30,071	45.99	514	0.79	14,787	22.61
	Males	114,018	53,725	16,996	31.64	23,982	44.64	253	0.47	12,494	23.26
	Females	108,530	11,664	3021	25.90	6089	52.20	261	2.24	2293	19.66
Goalpokhar - I	Persons	248,105	72,998	25,511	34.95	34,479	47.23	3030	4.15	9978	13.67
	Males	128,880	60,151	23,256	38.66	29,052	48.30	296	0.49	7547	12.55
	Females	119,225	12,847	2255	17.55	5427	42.24	2734	21.28	2431	18.92
Goalpokhar - II	Persons	186,818	53,898	13,009	24.14	31,359	58.18	1860	3.45	7670	14.23
	Males	95,837	44,038	11,941	27.12	26,338	59.81	345	0.78	5414	12.29
	Females	90,981	9860	1068	10.83	5021	50.92	1515	15.37	2256	22.88
Karandighi	Persons	197,832	76,222	15,940	20.91	24,640	32.33	10,176	13.35	25,466	33.41
	Males	100,642	46,437	14,956	32.21	21,287	45.84	637	1.37	9557	20.58
	Females	97,190	29,785	984	3.30	3353	11.26	9539	32.03	15,909	53.41
Raiganj	Persons	146,308	52,831	15,259	28.88	25,022	47.36	2690	5.09	9860	18.66
	Males	74,636	37,957	13,296	35.03	16,759	44.15	503	1.33	7399	19.49
	Females	71,672	14,874	1963	13.20	8263	55.55	2187	14.70	2461	16.55
Hemtabad	Persons	71,225	27,350	7792	28.49	14,579	53.31	456	1.67	4523	16.54
	Males	36,472	19,844	6810	34.32	9461	47.68	152	0.77	3421	17.24
	Females	34,753	7506	982	13.08	5118	68.19	304	4.05	1102	14.68
Kaliaganj	Persons	46,066	16,589	7419	44.72	7189	43.34	165	0.99	1816	10.95
	Males	23,577	12,827	6392	49.83	4979	38.82	57	0.44	1399	10.91
	Females	22,489	3762	1027	27.30	2210	58.75	108	2.87	417	11.08

Table 14 (continued)

Name of CD block	Persons/Males/Females	Total population	Total workers (main+marginal workers)	Category of Workers							
				Cultivators		Agricultural labourers		Household industry workers		Other workers	
				Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Itahar	Persons	156,664	52,778	17,794	33.71	27,724	52.53	529	1.00	6731	12.75
	Males	80,131	42,694	16,167	37.87	21,105	49.43	226	0.53	5196	12.17
	Females	76,533	10,084	1627	16.13	6619	65.64	303	3.00	1535	15.22
Uttar Dinajpur	**Persons**	**14,555,303**	**468,775**	**136,280**	**29.07**	**212,396**	**45.31**	**20,326**	**4.34**	**99,773**	**21.28**
	Males	**747,092**	**359,594**	**122,241**	**33.99**	**167,393**	**46.55**	**2933**	**0.82**	**67,027**	**18.64**
	Females	**708,211**	**109,181**	**14,039**	**12.86**	**45,003**	**41.22**	**17,393**	**15.93**	**32,746**	**29.99**

Primary Census Abstract, 2011

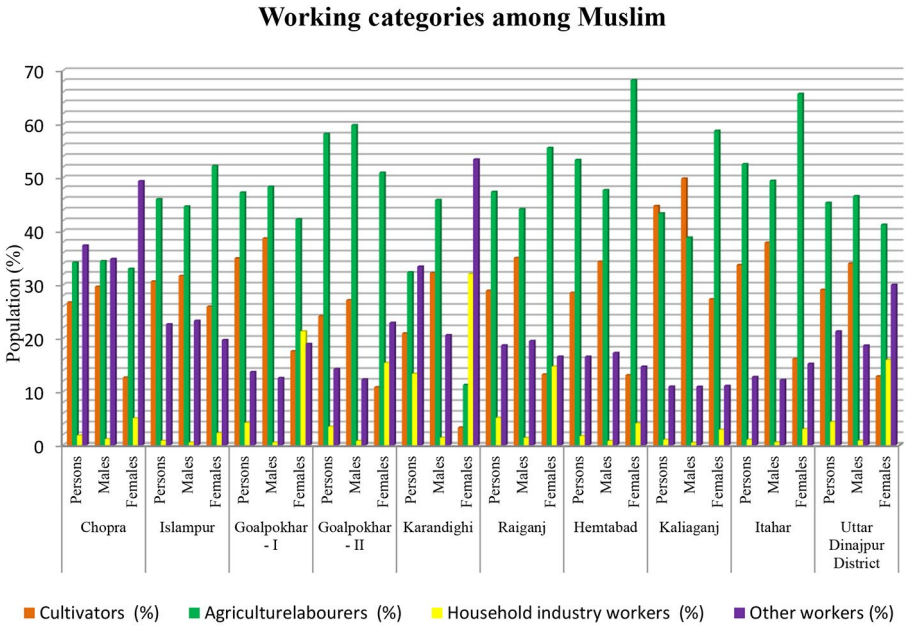

Fig. 11 Working population of the District. Prepared by the researcher, base on table 2.12 data

Itahar show lower gaps. Addressing these multifaceted challenges requires targeted interventions tailored to each block's unique dynamics for inclusive and equitable education opportunities.

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Data availability All the data are collected by the author from District Census Handbook report, Census of India report, and different online journals.

Declarations

Informed consent Informed consent was obtained from all individual participants included in the study.

Conflict of interest All the authors declare that they have no conflict of interest.

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