

A Comparative Analysis of Gender Disparity in Work Participation in Bhagalpur District, Bihar, India

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Abstract:

Gender disparity in work participation remains a critical development challenge in India, particularly at sub-regional levels where pronounced spatial and rural–urban inequalities persist. This study analyses the block-wise and temporal patterns of gender disparity in work participation in Bhagalpur district, Bihar, using secondary data from the Census of India. Sopher's Disparity Index has been employed to assess spatial variations and gender disparities in work participation. The findings reveal that changes in work participation during the study period were largely driven by increased male participation, while female participation stagnated or declined in several blocks. Marked inter-block variations reflect localised socio-economic, cultural, and structural constraints on women's employment. Rural areas exhibit comparatively lower gender disparity, largely due to women's involvement in agriculture and allied activities. In contrast, urban areas show sharper gender gaps and limited female engagement in formal employment. The study highlights persistent and spatially uneven gender inequality in work participation and underscores the need for region-specific, gender-sensitive employment policies to promote inclusive and balanced development in Bhagalpur district.

Keywords: Gender Differentials, Gender Disparity, Rural–Urban Inequality, Sopher's Disparity Index, Work Participation.

1. INTRODUCTION

The working population plays a crucial role in a nation's economic growth and development and serves as a key agent of socio-cultural and demographic transformation. It comprises both males and females who are either actively engaged in productive employment or are temporarily unemployed (Trewartha, 1969). Work participation is a key indicator of economic development and social inclusion, yet gender disparity in employment remains a persistent challenge in India. Female work participation is influenced by socio-cultural norms, access to education, and the structure of local labour markets, resulting in marked spatial and gender-based inequalities. These disparities are particularly evident at the regional and sub-regional levels. Bhagalpur district of Bihar provides an important context for examining gender differences in work participation due to its diverse rural–urban structure and uneven development. Census data for 2001–2011 reveal that growth in the working population has been largely male-driven, while female participation has remained stagnant or declined in several blocks. Significant inter-block variations further highlight localised patterns of inequality, with some blocks showing relatively better female participation and others exhibiting severe gender imbalance. Moreover, rural–urban differences indicate higher female participation in rural areas, largely associated with agricultural activities, while urban areas display sharper gender disparities. The present study undertakes a comparative block-wise

analysis of gender disparity in work participation in Bhagalpur district to examine spatial, temporal, and rural–urban dimensions of employment inequality.

2. REVIEW OF LITERATURE

Gender disparity in work participation has been a central concern in development studies, labour economics, and social geography, particularly in the context of developing countries like India. A large body of literature highlights persistent gender gaps in employment, shaped by socio-economic, cultural, and spatial factors. At the national level, **Boserup (1970)** laid the foundation for understanding women's role in economic development, emphasizing the systematic marginalization of women from productive activities. **Sen (1990)** and **Kabeer (1999)** further conceptualized gender inequality in work as a consequence of unequal access to resources, capabilities, and decision-making power. These theoretical perspectives underscore that women's work participation cannot be understood merely in economic terms but must be situated within broader social structures. Several studies have examined trends in female work participation in India. **Himanshu (2011)** observed a paradoxical decline in female labour force participation despite economic growth, attributing it to rising educational enrolment, income effects, and under-reporting of women's work. **Chaudhary and Verick (2014)** highlighted the influence of education, fertility, and household income on women's labour supply, noting wide regional variations. **Mehrotra and Parida (2017)** emphasized that structural transformation in India has failed to generate adequate employment opportunities for women, especially in non-agricultural sectors.

Spatial and regional dimensions of work participation have been explored by several scholars. **Bhagat (2014)** demonstrated strong inter-state and rural–urban disparities in female workforce participation across India. **Kundu and Saraswati (2012)** emphasized that urbanization does not necessarily improve women's employment prospects, as urban labour markets often remain male-dominated. **Shah and Kanbur (2015)** highlighted the importance of micro-level spatial analysis, showing that district and sub-district variations often mask deeper inequalities. At the rural–urban interface, **Srivastava and Srivastava (2010)** found that rural women's participation is largely driven by agricultural and informal sector activities, while urban women face barriers related to skill mismatch and social norms. **Raveendran (2016)** argued that female work in rural areas is often invisible and under-enumerated, leading to distorted estimates of gender disparity. **Deshpande and Kabeer (2019)** further noted that caste and class intersect with gender to shape women's access to work, particularly in rural India. Several studies have focused on gender disparity indices and quantitative measurement of inequality. **UNDP (2015)** and **World Bank (2012)** provided methodological frameworks for measuring gender gaps in employment and economic participation. In the Indian context, **Singh and Kaur (2018)** applied gender disparity indices at the district level and revealed sharp intra-regional contrasts. **Pal and Ghosh (2016)** emphasized that higher work participation rates do not necessarily imply gender equality, as women's work is often concentrated in low-paid and insecure sectors. Bihar-specific studies provide important insights for the present research. **Kumar and Singh (2013)** reported extremely low female work participation in Bihar compared to the national average, attributing it to patriarchal norms and limited industrial development. **Jha and Pushendra (2016)** highlighted strong regional disparities within Bihar, with northern districts performing relatively better than southern ones. **Sarkar (2018)** emphasized that women's employment in Bihar is largely confined to agriculture, construction, and household-based activities. Micro-level and block-wise analyses remain limited. **Mitra and Singh (2017)** stressed the need for sub-district studies to capture localized labour market conditions. **Verma and Prasad (2020)** demonstrated that block-level analysis reveals significant variation in gender disparity that district averages tend to obscure. Similarly, **NSSO (2011)** and **Census of India (2011)**

reports consistently highlight under-reporting of female work, particularly in rural and informal settings. More recent studies, such as **Chatterjee, Murgai, and Rama (2018)**, argue that social norms and safety concerns significantly constrain women's mobility and employment choices. **Kushawaha and Sharma (2019)** highlighted through comparative district-level analysis, particularly in Varanasi, that urban areas often exhibit higher gender disparity than rural areas due to social restrictions, unsafe work environments, and unequal access to formal employment. **ILO (2019)** emphasized the role of skill development and institutional support in reducing gender gaps in labour markets. **Sahoo and Pattanaik (2021)** further observed that regional employment policies must be gender-sensitive and spatially targeted to be effective. The present study addresses this gap through a micro-level analysis of gender disparity in work participation in Bhagalpur district, Bihar.

3. STUDY AREA

Bhagalpur district, situated in eastern Bihar, is historically significant and socio-economically diverse. Administratively constituted as a district in 1773, Bhagalpur is presently known as the "Silk City" due to its traditional Tassar silk industry. Geographically, the district lies between **25°07'–25°30' N latitude** and **86°37'–87°30' E longitude**, covering about 2,569 sq. km and comprising both rural and urban settlements. According to the Census 2011, Bhagalpur had a population of about 3.03 million, with a literacy rate of 63.1% and a low sex ratio of 880 females per 1,000 males. The economy is predominantly agrarian, and the coexistence of rural livelihoods with emerging urban functions strongly influences patterns of literacy, work participation, and gender disparity in the district.

4. OBJECTIVES

Here are the objectives that have been taken for study:

- i. To examine the temporal variations in male and female work participation in Bhagalpur district during 2001–2011.
- ii. To assess the extent of gender disparity in work participation across blocks using a disparity index.
- iii. To analyse rural–urban differentials and spatial patterns of gender inequality in work participation within the district.

5. HYPOTHESIS

Gender disparity in work participation is lower in rural areas than in urban areas of the Bhagalpur district.

6. DATA SOURCES AND METHODOLOGY

The study relies on secondary data taken from the Census of India (PCA), District Census Handbook for the years 2001 and 2011. Spatial analysis was conducted using Q-GIS, and thematic maps were prepared from derived census indicators. Separate gender disparity maps for rural and urban work participation were generated using the district-based map along with census data. The formula measures the work participation rate,

$$\text{WPR (X)} = (\text{TW}/\text{TP}) * 100$$

Where,

WPR = Work Participation Rate,

TW=Total Worker,

TP= Total Population

The **Gender Disparity Index** is measured by Sopher's method, Sopher's Disparity Index (1974), a widely used measure for assessing inequality between male and female populations.

$$DI_s = \log (X_2/X_1) + \log ((100-X_1)/ (100-X_2))$$

Where,

X1= Value of Deprived Group (Female)

X2= Value of Dominant Group (Male)

The index is based on the logarithm of the odds ratio, which helps reduce the levelling-off effect whereby areas with high participation levels may appear to have lower disparity despite similar absolute gender gaps. A disparity index value of zero denotes perfect equality, while higher values indicate increasing levels of gender inequality. Gender disparity index values were analysed using the Mann–Whitney U test in SPSS. The index was treated as the test variable, while area type (rural = 1, urban = 2) was used as the grouping variable.

Figure 1: Location Map of Study Area



7. RESULTS AND DISCUSSION

7.1 The Temporal Variations in Male and Female Work Participation

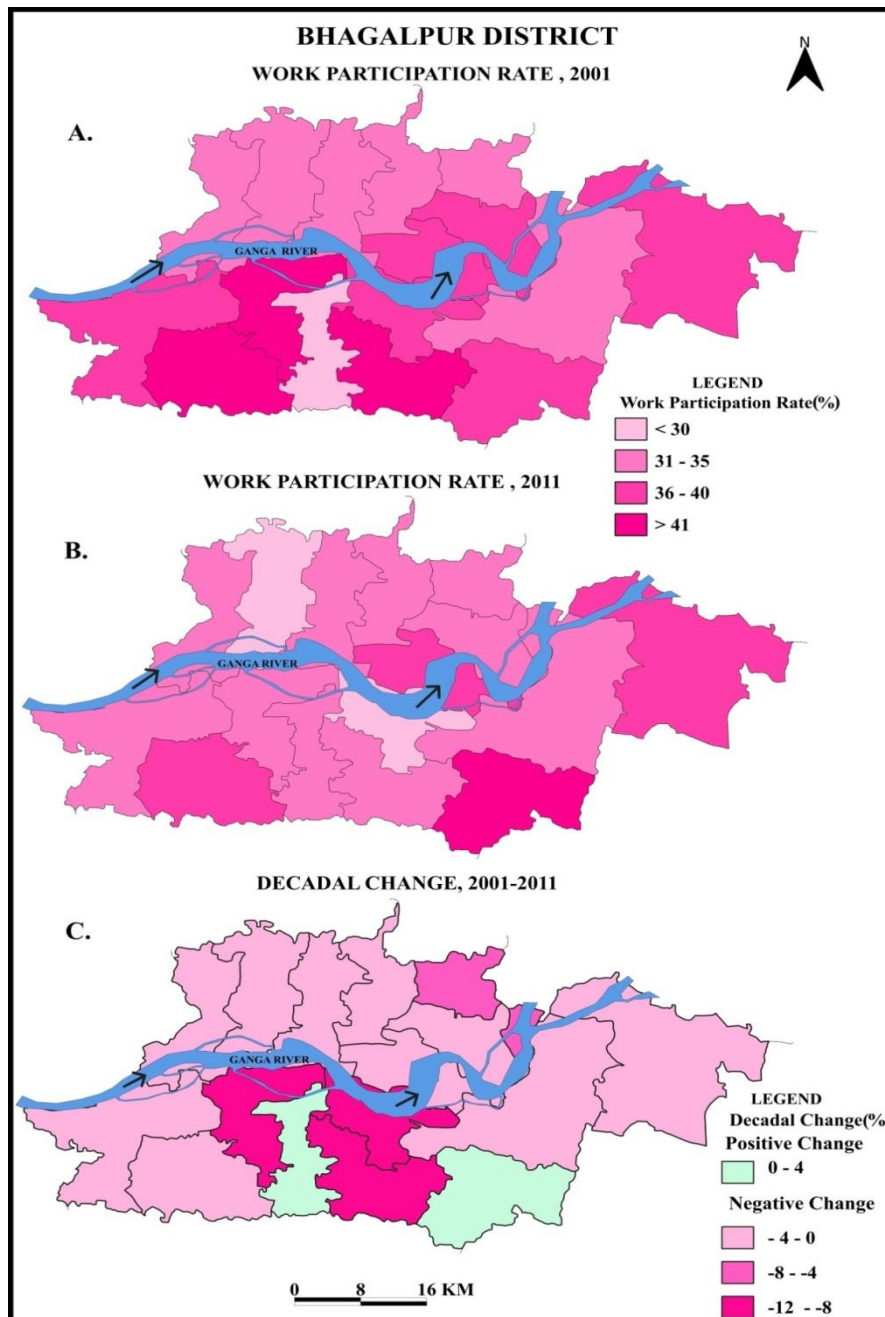
Table 1 reveals a general decline in the overall Work Participation Rate (WPR) in Bhagalpur district between 2001 and 2011, with the district average falling from 35.30% to 32.38%. Most blocks experienced negative decadal change, indicating shrinking workforce engagement over the decade.

Table 1: Block-wise Work Participation Rate and Growth in Bhagalpur District (2001-2011)

Sl. No.	Block	Work Participation Rate (%)			Absolute Work Participation Growth(2001-2011)		
		2001	2011	Decadal Change	Total (%)	Male (%)	Female (%)
1.	Narayanpur	32.29	30.59	-1.70	23.31	24.29	20.03
2.	Bihpur	31.56	28.06	-3.50	13.06	21.12	-18.37
3.	Kharik	34.77	31.96	-2.81	18.79	23.40	6.48
4.	Naugachhia	34.13	31.09	-3.04	14.53	16.87	7.37
5.	Rangra Chowk	34.87	30.40	-4.47	8.15	13.63	-7.60
6.	Gopalpur	35.41	33.27	-2.14	16.76	17.16	15.62
7.	Pirpanti	38.88	35.42	-3.46	18.40	22.33	9.96
8.	Colgong	34.24	30.35	-3.89	10.95	23.52	-21.63
9.	Ismailpur	39.10	35.20	-3.90	4.01	5.34	1.12
10.	Sabour	36.26	27.46	-8.80	-1.36	16.90	-46.54
11.	Nathnagar	41.46	31.44	-10.02	-6.05	10.49	-37.11
12.	Sultanganj	35.09	32.87	-2.21	16.10	16.82	14.34
13.	Shahkund	40.81	36.88	-3.93	10.79	18.41	-2.94
14.	Goradih	43.41	34.71	-8.70	3.77	16.65	-18.18
15.	Jagdishpur	28.88	30.14	1.26	26.67	28.25	20.19
16.	Sonhaula	39.66	40.86	1.20	31.31	23.58	46.28
Bhagalpur District		35.30	32.38	-2.92	14.99	20.80	0.32

Sources: Calculated by authors from District Census Handbook, Bhagalpur District (2001& 2011)

Figure 2: Block-wise Work Participation Rate (2001& 2011) and Decadal Change



The sharpest declines are observed in Nathnagar (-10.02), Sabour (-8.80), and Goradih (-8.70), reflecting structural and sectoral employment challenges. Despite the decline in total WPR, absolute work participation growth shows mixed trends. Male work participation increased in all blocks, suggesting greater male engagement in economic activities. In contrast, female work participation exhibits wide spatial variation, with substantial declines in blocks such as Sabour (-46.54), Nathnagar (-37.11), and Colgong (-21.63), highlighting persistent gender disparities. Only a few blocks, notably Sonhaura (46.28), Jagdishpur (20.19), and Narayanpur (20.03), show notable improvement in female participation. Thus, the study highlights that economic growth in work participation during 2001–2011

was uneven and predominantly male-centric, while female participation remained stagnant or declined across many blocks. These pronounced spatial and gender disparities reflect deep-rooted structural, socio-cultural, and sectoral constraints that continue to limit women’s access to employment in Bhagalpur district.

Table 2: Gender Work Participation and Disparity Index in Bhagalpur District (2011)

Sl. No.	Block	Total Population	Work Participation (%)			Disparity Index
			Total	Males (X2)	Females (X1)	
1.	Narayanpur	106701	30.59	44.42	14.64	0.67
2.	Bihpur	123386	28.06	44.95	8.84	0.93
3.	Kharik	132898	31.96	45.28	16.74	0.61
4.	Naugachhia	154428	31.09	44.91	15.36	0.65
5.	Rangra Chowk	90284	30.40	44.35	14.39	0.68
6.	Gopalpur	94952	33.27	46.13	18.59	0.57
7.	Pirpainti	285357	35.42	46.70	22.47	0.48
8.	Colgong	365285	30.35	45.65	12.81	0.76
9.	Ismailpur	43440	35.20	45.47	23.35	0.44
10.	Sabour	142805	27.46	43.57	9.15	0.88
11.	Nathnagar	151291	31.44	45.44	15.59	0.65
12.	Sultanganj	248001	32.87	44.31	20.00	0.50
13.	Shahkund	188078	36.88	47.64	24.65	0.44
14.	Goradih	146210	34.71	46.27	21.60	0.50
15.	Jagdishpur	572253	30.14	46.26	11.94	0.80
16.	Sonhaula	192397	40.86	48.15	32.75	0.28
Bhagalpur District		3037766	32.38	45.81	17.12	0.61

Sources: Calculated by authors from Census of India (PCA), Bhagalpur District (2011)

7.2 Block-Wise Gender Disparity in Work Participation (2011)

Table 2 analyses block-wise work participation in Bhagalpur district in 2011 and quantifies gender inequality through a disparity index. At the district level, 32.38% of the population was engaged in economic activities. However, work participation is highly skewed by gender, with 45.81% of males participating in work compared to only 17.12% of females, resulting in a high disparity index of 0.61, which reflects substantial gender-based exclusion from the workforce. Significant spatial variations are observed across blocks. Sonhaula stands out with the highest overall work participation rate (40.86%) and female participation (32.75%), accompanied by the lowest disparity index (0.28), indicating a relatively balanced gender structure in employment.

Blocks such as Pirpainti (0.48), Shahkund (0.44), Ismailpur (0.44), and Goradih (0.50) also demonstrate comparatively lower gender disparities, suggesting better integration of women into economic activities, possibly due to the dominance of agricultural and informal sector employment. In contrast, blocks including Bihpur (0.93), Sabour (0.88), Jagdishpur (0.80), and Colgong (0.76) exhibit very high disparity indices. In these blocks, relatively high male work participation is coupled with extremely low female participation, highlighting structural barriers such as limited non-farm employment opportunities for women, socio-cultural restrictions, and under-enumeration of female work in census data. Overall, the table demonstrates that gender disparity in work participation remains a pervasive issue across Bhagalpur district, though its intensity varies spatially. Blocks with lower disparity indices suggest

localised contexts where women’s economic engagement is comparatively stronger, while high-disparity blocks underline the need for gender-sensitive employment policies and region-specific interventions to enhance female workforce participation.

7.3 Rural–Urban Differentials in Work Participation

Table 3 presents the block-wise rural–urban composition of work participation and the corresponding gender disparity index in Bhagalpur district in 2011. At the district level, rural areas exhibit a higher overall work participation rate, with 45.82% of rural males and 18.62% of rural females engaged in work, resulting in a disparity index of 0.57. In contrast, urban areas show a sharper gender imbalance, where 45.72% of males and only 11.07% of females are workers, leading to a significantly higher disparity index of 0.83. This clearly indicates that gender disparity in work participation is more prevalent in urban areas than in rural areas.

Table 3: Rural & Urban Work Participation Disparity Index of Bhagalpur District (2011)

Sl. No.	Block	Rural Work Participation			Urban Work Participation		
		Male (X2)	Female (X1)	Disparity Index (DI)	Male (X2)	Female (X1)	Disparity Index (DI)
1.	Narayanpur	44.42	14.64	0.67	NA	NA	NA
2.	Bihpur	44.95	8.84	0.93	NA	NA	NA
3.	Kharik	45.28	16.74	0.61	NA	NA	NA
4.	Naugachhia	45.14	18.05	0.57	44.42	9.53	0.88
5.	Rangra Chowk	44.35	14.39	0.68	NA	NA	NA
6.	Gopalpur	46.13	18.59	0.57	NA	NA	NA
7.	Pirpanti	46.70	22.47	0.48	NA	NA	NA
8.	Colgong	45.80	13.55	0.73	44.24	5.93	1.10
9.	Ismailpur	45.47	23.35	0.44	NA	NA	NA
10.	Sabour	43.71	9.62	0.86	42.20	4.28	1.21
11.	Nathnagar	45.51	16.00	0.64	43.64	4.83	1.18
12.	Sultanganj	44.54	21.97	0.46	43.48	12.67	0.72
13.	Shahkund	47.64	24.65	0.44	NA	NA	NA
14.	Goradih	46.27	21.60	0.50	NA	NA	NA
15.	Jagdishpur	45.85	12.73	0.76	46.38	11.72	0.81
16.	Sonhaula	48.15	32.75	0.28	NA	NA	NA
Bhagalpur District		45.82	18.62	0.57	45.72	11.07	0.83

Sources: Calculated by authors from Census of India (PCA), Bhagalpur District (2011)

Block-wise analysis reveals considerable spatial variation. In rural areas, Sonhaula (0.28) records the lowest gender disparity, supported by comparatively high female work participation (32.75%), and followed by Shahkund (0.44) and Ismailpur (0.44). Conversely, rural blocks such as Bihpur (0.93), Sabour (0.86), and Colgong (0.73) exhibit high disparity indices, reflecting limited female engagement in rural employment despite substantial male participation. Urban work participation is confined to a few blocks, notably Naugachhia, Colgong, Sabour, Nathnagar, Sultanganj, and Jagdishpur. Among these, Colgong (1.10), Sabour (1.21), and Nathnagar (1.18) display extremely high urban gender disparities, indicating near exclusion of women from urban employment activities. In contrast, Sultanganj (0.72) and Jagdishpur (0.81) show relatively lower, though still significant, gender gaps. Overall, the table

underscores a critical spatial dimension of gender inequality in work participation. While rural areas offer relatively greater scope for female participation, largely in agriculture and allied activities, urban labour markets in Bhagalpur district remain highly male-dominated, emphasising the need for gender-sensitive urban employment policies and skill development programmes tailored to women.

7.4 Hypothesis Testing

To statistically examine rural–urban differences in gender disparity in work participation in Bhagalpur district, hypotheses were tested:

The gender disparity index values for rural and urban areas were used as the test variable. Given the small and unequal number of rural and urban observations across blocks and the index-based nature of the data, a non-parametric Mann–Whitney U test was applied.

Table 4: Mann–Whitney U Test Results for Rural–Urban Differences in Gender Disparity Index

Grouping Variable Area	N	Mean Rank	Sum of Ranks
Rural (1)	16	8.94	143.00
Urban (2)	6	18.33	110.00
Total	22		

Statistic	Value
Mann–Whitney U	7.00
Wilcoxon W	143.00
Z value	–3.024
Asymp. Sig. (2-tailed)	0.002
Exact Sig. (2-tailed)	0.001

Sources: IBM SPSS Statistics 27.0.1

The results indicate a statistically significant difference between rural and urban areas (Asymp. Sig. = 0.002, $p < 0.05$). The mean rank value is substantially higher for urban areas (18.33) than for rural areas (8.94), indicating **greater gender disparity in urban work participation**. Accordingly, the **null hypothesis is rejected**, and the **alternative hypothesis is accepted**, confirming that **gender disparity in work participation is significantly lower in rural areas than in urban areas of Bhagalpur district**. The Mann–Whitney U test confirms a statistically significant rural–urban difference in gender disparity in work participation, with urban areas exhibiting markedly higher disparity.

7.5 Spatial Distribution of Gender Disparity in Work Participation

The gender disparity index has been used to classify blocks of Bhagalpur district into low, medium, and high disparity categories as shown in Table 5, revealing spatial and rural–urban variations in work participation. Blocks falling under low disparity are mainly concentrated in rural areas, indicating comparatively higher female participation, largely associated with agricultural and allied activities. Medium disparity blocks exhibit mixed characteristics, reflecting transitional employment structures. In contrast, high-disparity blocks are predominantly urban or semi-urban, where female participation remains extremely limited, resulting in sharp gender gaps in work participation.

Table 5: Block-wise Gender Disparity Index of Work Participation (2011)

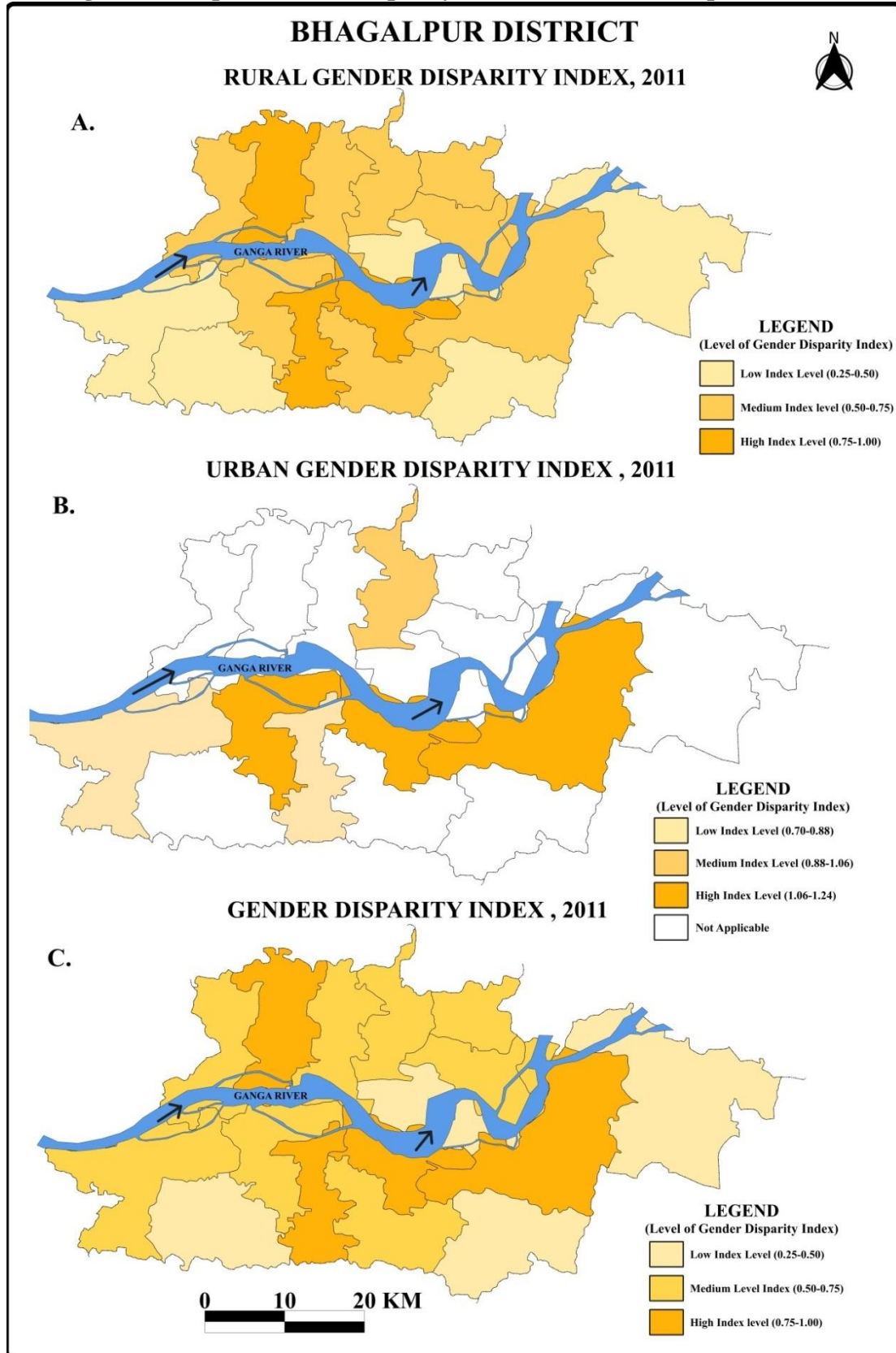
Sl. No.	Disparity Index Level	Total		Rural		Urban	
		Index	Block	Index	Block	Index	Block
1.	Low	0.25-0.50	Pirpainti, Ismailpur, Shahkund, Sonhaura	0.25-0.50	Pirpainti, Ismailpur, Shahkund, Sultanganj, Sonhaura	0.70-0.88	Sultanganj, Jagdishpur
2.	Medium	0.50-0.75	Narayanpur, Kharik, Naugachnia, RangraChowk, Gopalpur, Nathnagar, Sultanganj, Goradih	0.50-0.75	Narayanpur, Kharik, Naugachnia, RangraChowk, Gopalpur, Colgong, Nathnagar, Goradih	0.88-1.06	Naugachnia
3.	High	0.75-1.00	Bihpur, Colgong, Sabour, Jagdishpur	0.75-1.00	Bihpur, Sabour, Jagdishpur	1.06-1.24	Colgong, Sabour, Nathnagar

Sources: Calculated by authors from Census of India (PCA), Bhagalpur District (2011)

8. CONCLUSION

The present study provides a comparative block-wise analysis of gender disparity in work participation in Bhagalpur district, Bihar, using Census data for 2001 and 2011. The findings clearly establish that work participation in the district remains highly gendered, with male participation significantly exceeding female participation across all blocks. Although overall work participation increased during the study period, this growth was largely male-centric, while female participation remained stagnant or declined in several blocks, confirming persistent gender inequality in employment. Marked spatial and rural–urban variations in gender disparity were observed. Rural areas exhibited relatively higher female participation, primarily due to women’s involvement in agricultural and allied activities, whereas urban areas showed much sharper gender gaps, reflecting limited employment opportunities and structural barriers for women. Block-level analysis further revealed that higher overall work participation does not necessarily translate into gender equity, as several blocks with substantial male participation continued to marginalise women in the workforce. Overall, the study validates the hypotheses that significant gender differences exist in work participation and that rural–urban differentials strongly influence the magnitude of disparity. The findings highlight the need for region-specific, gender-sensitive employment policies, skill development initiatives, and improved recognition of women’s work, particularly in urban and high-disparity blocks. Addressing these issues is essential for promoting inclusive and balanced regional development in Bhagalpur district.

Figure 3: Map of Gender Disparity Index of Work Participation (2011)



REFERENCES:

- [1] E. Boserup, *Women's Role in Economic Development*. London, U.K.: George Allen & Unwin, 1970.
- [2] Census of India, *Primary Census Abstract*. New Delhi, India: Office of the Registrar General of India, 2001.
- [3] Census of India, *Primary Census Abstract*. New Delhi, India: Office of the Registrar General of India, 2011.
- [4] R. Chaudhary and S. Verick, "Female labour force participation in India and beyond," ILO Working Paper No. 9948, International Labour Organisation, Geneva, Switzerland, 2014.
- [5] U. Chatterjee, R. Murgai, and M. Rama, "Job opportunities along the rural–urban gradation in India," *World Bank Econ. Rev.*, vol. 32, no. 3, pp. 675–702, 2018.
- [6] A. Deshpande and N. Kabeer, "Social norms and women's employment in India," *Feminist Econ.*, vol. 25, no. 4, pp. 1–30, 2019.
- [7] G. Devi and S. Tiwari, "Gender disparity in literacy in Bareilly district," *Natl. Geographical J. India*, vol. 65, no. 1, 2019.
- [8] Himanshu, "Employment trends in India: A re-examination," *Econ. Political Weekly*, vol. 46, no. 37, pp. 43–59, 2011.
- [9] International Labour Organisation, *Women in the World of Work: Trends 2019*. Geneva, Switzerland: ILO, 2019.
- [10] P. Jha and Pushpendra, "Female workforce participation in Bihar: Regional dimensions," *Indian J. Labour Econ.*, vol. 59, no. 3, pp. 389–406, 2016.
- [11] N. Kabeer, "Resources, agency, achievements: Reflections on the measurement of women's empowerment," *Development and Change*, vol. 30, no. 3, pp. 435–464, 1999.
- [12] A. Kumar and R. Singh, "Gender inequality in workforce participation in Bihar," *J. Regional Development Studies*, vol. 5, no. 2, pp. 77–92, 2013.
- [13] A. Kundu and L. R. Saraswati, "Urbanisation and gender disparity in employment in India," *Social Change*, vol. 42, no. 4, pp. 475–495, 2012.
- [14] S. Kushawaha and V. N. Sharma, "Gender disparity in work participation: A comparative study of Varanasi District, U.P.," *Natl. Geographical J. India*, vol. 65, no. 1, 2019.
- [15] S. Mehrotra and J. K. Parida, "Why is the labour force participation of women declining in India?" *World Development*, vol. 98, pp. 360–380, 2017.
- [16] A. Mitra and P. Singh, "Gender disparity in employment: A sub-regional analysis," *Indian J. Human Development*, vol. 11, no. 2, pp. 181–199, 2017.
- [17] National Sample Survey Office, *Employment and Unemployment Situation in India, NSS 66th Round*. New Delhi, India: NSSO, 2011.
- [18] S. Pal and B. Ghosh, "Gender gap in work participation in India: A spatial analysis," *Trans. Inst. Indian Geographers*, vol. 38, no. 2, pp. 245–260, 2016.
- [19] G. Raveendran, "Unpaid work and women's employment in India," *Econ. Political Weekly*, vol. 51, no. 33, pp. 55–62, 2016.
- [20] B. Sahoo and F. Pattanaik, "Regional labour markets and women's employment in India," *J. Asian African Studies*, vol. 56, no. 6, pp. 1432–1448, 2021.
- [21] S. Sarkar, "Structure of female employment in Bihar," *J. Rural Development*, vol. 37, no. 1, pp. 89–105, 2018.
- [22] A. Sen, "Gender and cooperative conflicts," in *Persistent Inequalities*, I. Tinker, Ed. New York, NY, USA: Oxford Univ. Press, 1990, pp. 123–149.

- [23] A. Shah and R. Kanbur, "Spatial inequality in India," *World Development*, vol. 72, pp. 27–44, 2015.
- [24] J. Singh and G. Kaur, "Measuring gender disparity in work participation: A district-level study," *Indian J. Social Development*, vol. 18, no. 2, pp. 201–217, 2018.
- [25] N. Srivastava and R. Srivastava, "Women, work, and employment outcomes in rural India," *Indian J. Labour Econ.*, vol. 53, no. 2, pp. 231–252, 2010.
- [26] G. T. Trewartha, *Geography of Population: World Patterns*. New York, NY, USA: McGraw-Hill, 1969.
- [27] United Nations Development Programme, *Human Development Report 2015: Work for Human Development*. New York, NY, USA: UNDP, 2015.
- [28] World Bank, *World Development Report 2012: Gender Equality and Development*. Washington, DC, USA: World Bank, 2012.

1. Author Profile (Dr. Prashant Kumar)

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