SPATIAL PATTERNS OF GENDER DEPRIVATION IN WESTERN UTTAR PRADESH, INDIA

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Abstract

This paper examines gender deprivation in education, work participation rate, morbidity, and mortality in Western Uttar Pradesh. The composite gender deprivation index has been calculated to analyze the levels of deprivation between males and females under four major components comprising 13 variables. The study is based on secondary sources of data. The results show that effective literacy rate and work participation rate are lower among women than males, whereas males are more deprived than females in terms of health indicators. The districts such as Meerut, Gautum Buddha (G.B.) Nagar, Ghaziabad, Aligarh, Mathura, Agra, and Firozabad have recorded least gendered deprivation, while the districts of Bijnor, Budaun, Bareilly, Pilibhit, and Kannauj have witnessed a high level of gender deprivation. The more job opportunities for females will strengthen the financial base and to reduce mortality and morbidity rate, adequate health facilities must be ensured.

Keywords: Gender, Deprivation, Work participation, Effective education, Western Uttar Pradesh.

Introduction

Inequalities in human development are alarming and affect the normal functioning of the society. Inequalities damage economies by preventing people from achieving their full potential at work and other domains of life. Gender inequality or especially gender selected deprivation is one of the prominent hurdles to balance the requisite human development. Gender deprivation is complex and multi-dimensional. It is related to gender differences and consequential differentials in attainments. Generally, deprivation in capabilities is due to the lack of conveniences signifying that society has not provided people with access to the means to develop or maintain essential human potentiality. It is reflected in a lack of basic capabilities, when people are unable to obtain a certain level of basic goals and functioning (Haldar and Roy, 2006). Deprivation develops the sense of insecurities, which hamper the standard of living that leads to severe socio-economic imbalances in the society (Labbe et al., 2015). It can be analyzed in many forms such as economic deprivation, social deprivation, and psychological deprivation.

The term gender and sex are frequently used as synonyms, but these two terms are social categories of diversity (Siller et al., 2020). The sex and gender debate relates to the ontological basis of the difference between men and women. Gender refers to an array of socially constructed roles and relationships, personality traits, attitudes, behaviours, values, relative power and influence the society ascribes to the two sexes on a differential basis. Gender roles

and characteristics do not exist in isolation, but are defined in relation to one another and through the relationships between women and men, girls and boys (Health Canada, 2000). Gender discrimination is manifested through differences in male and female literacy levels, labour force participation, and other socio-economic variables. Removing gender-based inequality in access to basic education and educational attainment are key elements on the path to attain gender equality and this is one of the Millennium Development Goals. United Nations Educational, Scientific and Cultural Organization's Global Education Monitoring Report, 2020 shows that the attainment of higher levels of education among mothers improves children's nutrition and vaccination rates, while, it reduces preventable child deaths, maternal mortality and Human Immuno-deficiency Virus (HIV). However, lack of work opportunity might lead to alienation from society, and in turn increases the risk of many socio-economic problems (Pohlan, 2019). However, the level of deprivation in individuals can be counted in one or more domains; it depends on the experience of a particular individual (Noble et al., 2008).

Considering the various multidimensional aspects of gender deprivation, there is a need of composite index, comprising multiple key indicators which can be helpful in scientific studies for geographical distribution patterns. Documenting the nature of inequities or deprivation with multiple variables has better validity and explanatory power than a single variable (Singh, 2003). Uttar Pradesh Human Development Report, 2008 has reported that except G.B. Nagar, Bulandshahar and Mathura, all other districts of western Uttar Pradesh have gender development index rankings less than the corresponding human development index. This reflects the alleviation of gender inequality in the region. Therefore, the present study has been taken up to highlight gender deprivation in western Uttar Pradesh.

Objectives

Major objectives of the study are:

- to analyze the spatial pattern of gender deprivation in education, work participation rate, morbidity and mortality and
- to highlight the levels of gender deprivation in Western Uttar Pradesh.

Study Area

The state of Uttar Pradesh has been divided into four administrative divisions known as Western Uttar Pradesh, Eastern Uttar Pradesh, Central Uttar Pradesh and Bundelkhand region. Western Uttar Pradesh is located between 26° 20' to 30° 20' N latitudes and 77° 45' to 80° 22' E longitudes (Fig. 1). It lies in the upper Ganga plain, which is bestowed with very fertile alluvium soil, plain topography and favourable climatic conditions. It covers an area of about 80076 km^2 and holds a population of about 74.26 million. The districts of western Uttar Pradesh, especially on the western side, show a higher population growth rate. High population growth is mainly due to the migration of the rural population to the urban centers in these districts. The western region of Uttar Pradesh has a more diversified economy, having almost half of the industrial setup because of its proximity to the national capital, Delhi.

Database and Methodology

The present study is based on secondary sources of data. Data regarding effective education rate and work participation rate have
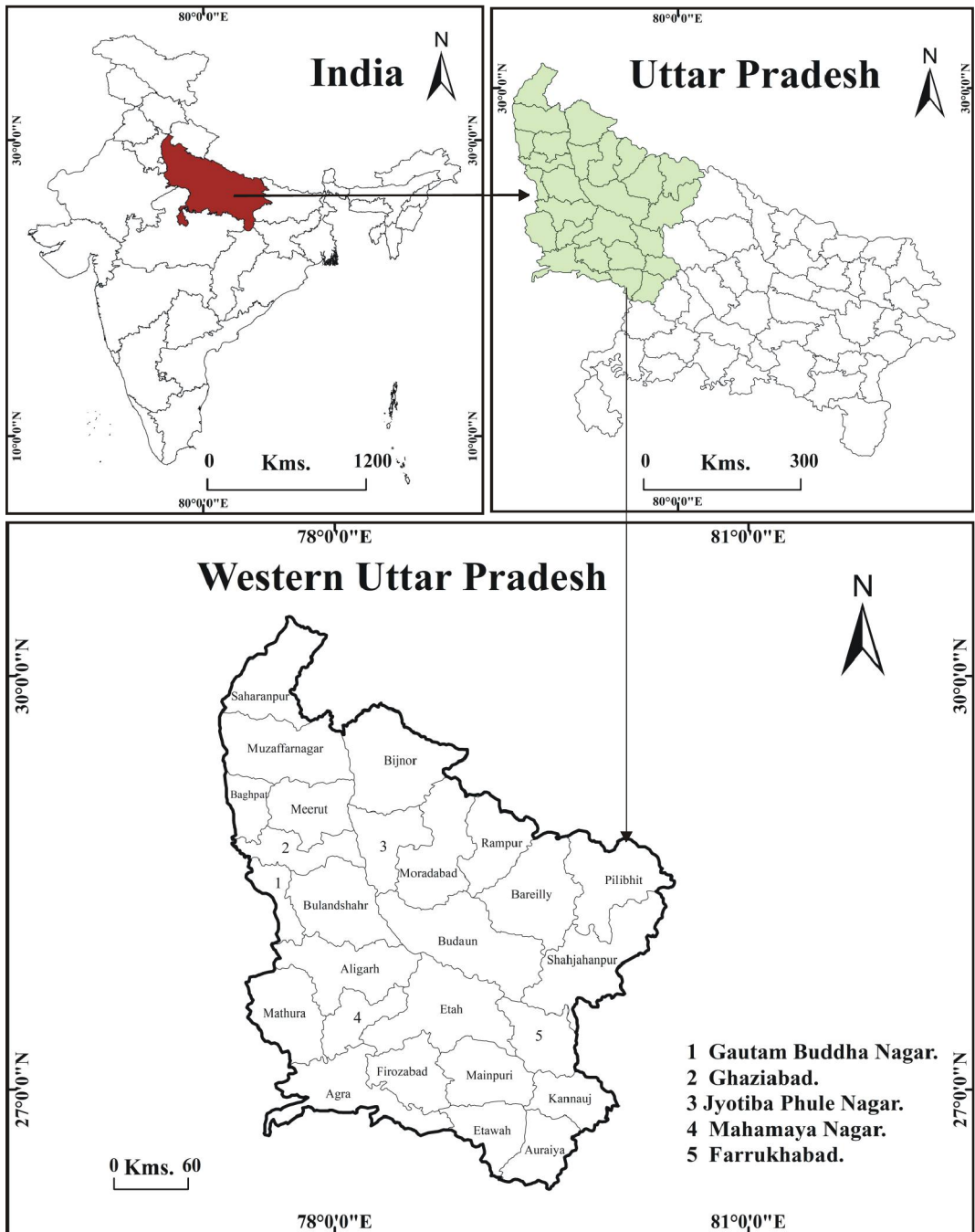
Fig. 1

been collected from the Census of India, 2011. Data related to health and mortality variables have been obtained from the Annual Health Survey Report of 2011, published by the Office of the Registrar General and Census Commissioner, India. Further, in this study, 13 variables grouped into 4 components of education, employment, morbidity and mortality have been used to find out the gender deprivation (Table 1). These variables are heterogeneous in nature and have different scales of measurement. Therefore, z-score method has been used to normalize the data and remove scale biases. Z-scores have been calculated by applying the following formula:

$$Zij = \frac{Xij - mean}{Standard\ Deviation} \ or\ \frac{Raw\ value - mean}{Standard\ Deviation}$$

where, Zij is the standard score of the variable i in district j, Xij is the raw value of variable i in district j, is the mean value of the variable i in all districts and denotes standard deviation of variable i in all districts.

Here, it must be mentioned that mortality and morbidity are negative variables, while effective education and work participation rate are positive variables. Higher values of mortality and morbidity rate depict lower development or poor social conditions, while higher values of education rate or work participation rate show a higher development and better social conditions (Pandey et al., 2021). For instance, infant mortality rate per 1000 live births is a negative indicator, meaning thereby that if the value of mortality increases it means poor social conditions and vice-versa. In this study, the direction of the indicator has been changed by subtracting the raw value from 1000 (1000-x_i). Further, if the infant mortality rate is 30 per 1000, then it becomes 970 after using the formula mentioned above. Apart from this, if the value

increases, then it will have positive impact on development or social conditions. In this way, the eight variables of morbidity index and three variables of mortality index have been converted into positive variables to calculate z scores so that a composite index of deprivation could be formulated. The composite indices of education, employment, morbidity and mortality have been calculated by averaging the z-scores of all the selected indicators. Male and female deprivation indices have been computed by summing up the composite scores of all the components and dividing the sum by the number of components i.e., 4 in this study. Mathematically, it has been expressed as:

$$C_{MDI} = \frac{Z_E + Z_{WPR} + Z_{MORB} + Z_{MORT}}{4}$$

$$C_{FDI} = \frac{Z_E + Z_{WPR} + Z_{MORB} + Z_{MORT}}{4}$$

where, C_{MDI}= Composite Male Deprivation Index, C_{FDI}= Composite Female Deprivation Index. Maps and tables have been drawn for the explanation and interpretation of the results.

Results and Discussion
Gender Deprivation in Educational Attainment

Education is a powerful instrument for overcoming inequalities, promoting human development, accelerating social transformation, and achieving economic progress. Ensuring equitable distribution of educational facilities and opportunities is the cornerstone of strategies to overcome educational deprivation (Govt. of India, 2009). The study highlights that Baghpat, Ghaziabad, Gautam Buddha (G.B.) Nagar, Mahamaya Nagar, Aligarh, Agra, Firozabad, Mainpuri, Etawah, and Auraiya are the most developed districts both in terms of male and female educational attainment rate (Fig. 2). Mathura and Etah are

Table 1
Uttar Pradesh: Indicators Taken to Measure Gender Deprivation

Major Components	Minor Components	Indicators
Education	Effective Education Rate	• Number of educated person per lakh of literates
Employment	Work Participation Rate	• Percentage of total workers to total population
Morbidity	Morbidity Rate	• Persons suffering from Diarrhea dysentery per lakh of population • Persons suffering from acute respiratory illness per lakh of population • Persons Suffering from any type of fever per lakh of population • Persons suffering from diabetes per lakh of population • Persons suffering from hypertension per lakh of population • Persons suffering from chronic tuberculosis per lakh of population • Persons suffering from asthma per lakh of population Persons suffering from arthritis per lakh of population
Mortality	Mortality Rate	• Number of deaths occurring during the year, per thousand population estimated at midyear • Number of deaths of children under 1 year of age per thousand live births in given year • Number of deaths per thousand live births

Source: Compiled by Authors

the districts with a high male education rate but medium female effective education. Meerut is the only district where female education is high, but the male education rate falls under the medium category. Muzaffarnagar, Buland-shahr, Farrukhabad and Kannauj are the districts recording moderate level of male as well as female educational attainment. The spatial pattern shows a clear pocket of depriva-tion of both males and females on the north-eastern side of the western Uttar Pradesh (Fig. 2). As many as nine districts, comprising 35 per cent of total districts, have low male as well as female effective educational attainment rate, while 65 per cent districts have better educa-tional attainment (Table 2).
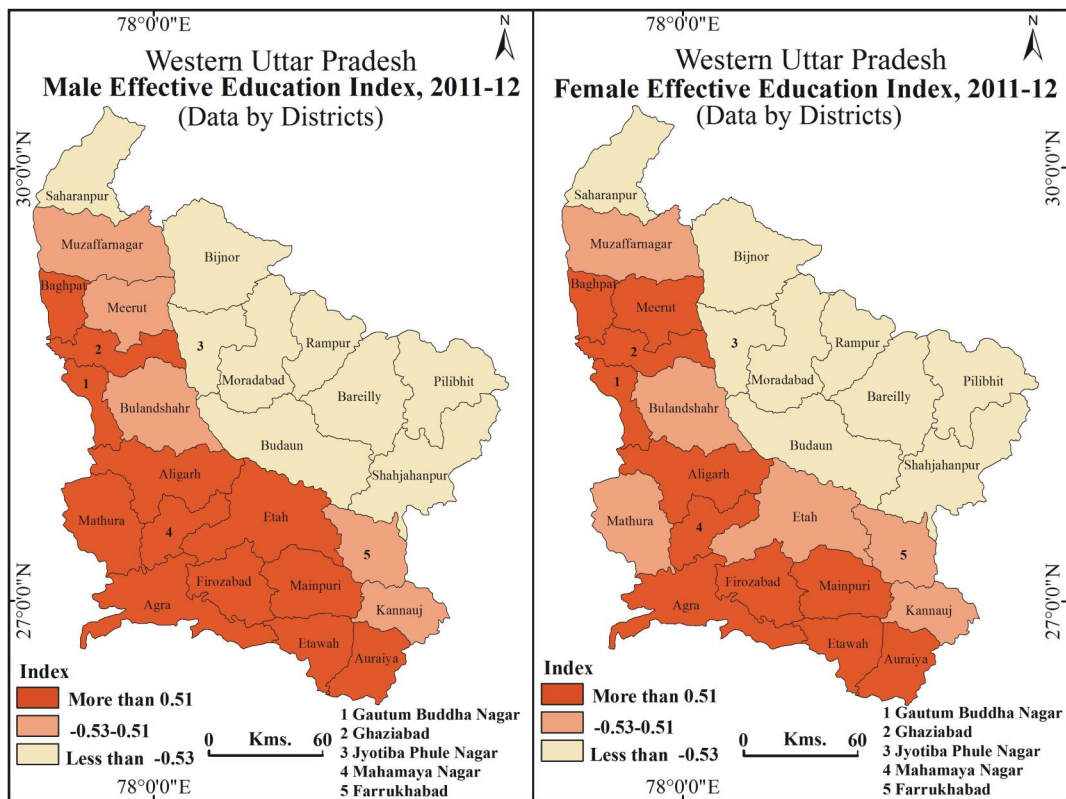
Fig. 2

Gender Deprivation in Work Participation

Work Participation Rate is one of the indicators of the economic condition of the households. It is simply the percentage of workers to the total population. The distribution of female workers in different occupations depends upon the economy's structure, educational levels, attitude of females towards jobs of different kinds, and various social factors (Stamarski and Son Hing, 2015). The percentage of male and female workers in economic activities and their share in the total working force gives a comprehensive view of how much they contribute to the region's economic activities. Fig. 3 reveals that only two districts Bareilly and Pilibhit have a high male and female work participation rate. There

are districts like Muzaffarnagar, Bulandshahr, Baghpat and Aligarh which have recorded high female work participation rate, but medium to low male work participation rate. Two districts of Etawah and Auraiya have recorded low work participation rate both for the males and females (Fig. 3). As many as 14 districts, comprising 54 per cent of total districts, have shown that females are more deprived than males on the work front (Table 2). The study reveals that the number of female workers is about one-fourth of the male workers in the study area, suggesting that most of the females are confined to the four walls of the house.

Gender Deprivation in Morbidity

Morbidity refers to the consequences

Table 2
Uttar Pradesh: Gender Deprivation Indices

| Districts	Effective Education Rate		Work Participation Rate		Morbidity Rate		Mortality Rate		Deprivation Index	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Agra	0.63	0.74	0.22	-0.05	-0.10	-0.11	1.18	1.08	0.48	0.41
Aligarh	0.69	0.60	0.42	1.53	-0.03	-0.04	-0.19	-0.02	0.22	0.52
Auraiya	0.69	1.11	-1.03	-1.16	-0.09	0.24	-0.19	0.16	-0.15	0.09
Baghpat	0.88	1.00	-1.73	1.25	-0.14	-0.16	-0.30	0.64	-0.32	0.68
Bareilly	-1.31	-1.36	1.46	1.03	0.02	-0.12	-1.02	-1.00	-0.21	-0.36
Bijnor	-1.15	-0.70	0.15	-1.83	-0.09	-0.14	0.31	0.24	-0.20	-0.61
Budaun	-1.66	-2.27	1.59	-1.16	-0.46	-0.44	-1.03	-2.03	-0.39	-1.48
Bulandshahar	0.50	0.43	-0.93	1.69	-0.38	-0.53	-0.52	-0.48	-0.33	0.28
Etah	0.98	0.52	-0.19	-1.38	0.15	0.13	-0.20	0.06	0.18	-0.17
Etawah	0.65	0.73	-1.26	-0.50	1.02	1.21	0.02	0.26	0.11	0.42
Farrukhabad	0.35	-0.08	0.69	-0.40	0.22	0.48	-0.52	-0.50	0.19	-0.12
Firozabad	1.08	0.94	-0.09	-0.88	0.96	0.87	0.27	-0.30	0.55	0.16
Gautam Buddha Nagar	1.05	1.04	-0.86	-0.11	0.10	0.07	1.05	1.19	0.33	0.55
Ghaziabad	1.08	1.07	-0.62	0.49	0.26	0.15	1.80	1.20	0.63	0.72
Mahamaya Nagar	0.95	0.60	-0.52	0.55	-0.63	-0.58	0.48	-0.22	0.07	0.09
Jyotiba Phule Nagar	-1.03	-0.76	-0.42	-0.05	0.33	0.24	-0.64	-0.03	-0.44	-0.15
Kannauj	0.39	0.40	-0.15	-0.37	-0.54	-0.59	-1.36	-0.93	-0.42	-0.37
Mainpuri	1.24	0.80	-1.26	-0.05	0.38	0.36	-0.33	0.09	0.01	0.30
Mathura	0.83	0.40	-0.69	0.65	-0.08	-0.14	1.54	1.10	0.40	0.50
Meerut	0.24	0.75	-0.59	-0.40	-0.37	-0.33	1.54	1.54	0.21	0.39
Moradabad	-1.16	-0.65	0.52	-1.16	0.13	0.26	0.29	-0.07	-0.05	-0.40
Muzaffarnagar	-0.25	-0.17	-0.32	1.88	0.03	-0.04	0.55	0.36	0.23	0.51
Pilibhit	-1.42	-1.65	1.12	0.74	-0.85	-0.79	-0.72	-0.51	-0.47	-0.55
Rampur	-1.58	-1.31	2.06	0.33	-0.33	-0.37	-0.12	-0.38	0.01	-0.43
Saharanpur	-0.78	-0.54	0.89	0.39	0.39	0.28	-1.23	-0.66	-0.19	-0.13
Shahjahanpur	-1.35	-1.61	1.56	-1.03	0.10	0.10	-0.65	-0.76	-0.09	-0.83

Source: Compiled by Authors
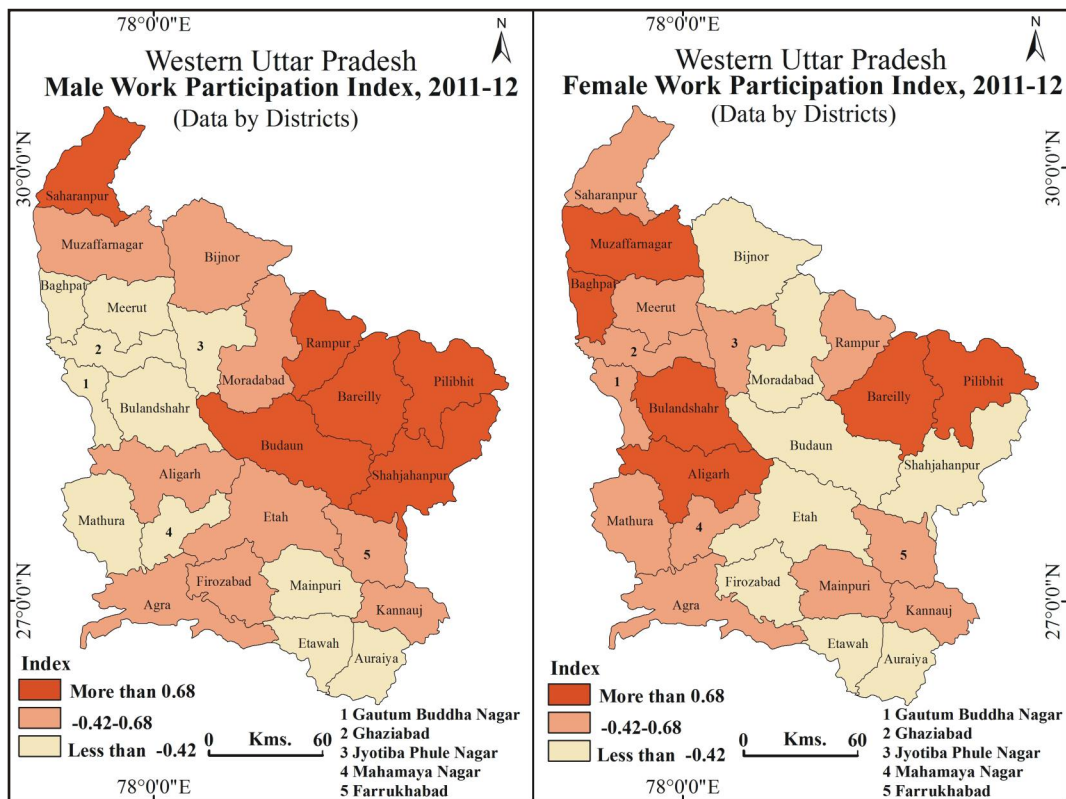
Fig. 3

and complications (other than death) resulting from disease. The morbidity index has been calculated by taking into account the diseases like diarrhea, respiratory illness, fever, diabetes, hypertension, tuberculosis, asthma, and arthritis (Table 1). The morbidity index is a negative index. For unidirectional analysis, the higher index value means the condition of district is good, with low level of morbidity, while lower index value means higher morbidity rate and high level of deprivation. Two districts, namely Firozabad and Etawah, have a high index value, which means low morbidity rates and better health conditions both for males and females.

The study reveals that Farrukhabad is the only district with a high female morbidity

index and medium male morbidity index, suggesting higher male deprivation as compared to females (Fig. 4). The district of Meerut, Rampur, Bulandshahr, Mahamaya Nagar, Budaun, Kannauj, and Pilibhit have high morbidity rates and low index values for both males and females suggesting the high level of gender deprivation. As many as 18 out of 26 districts in the Western Uttar Pradesh show that females are more deprived than males in respect of morbidity (Table 2). Poor female health in the study area is a matter of concern. The analysis shows that males generally are more likely to have the mortal situation, related to diabetes, hypertension, and asthma, while females are more likely to have less fatal diseases such as arthritis and fever.
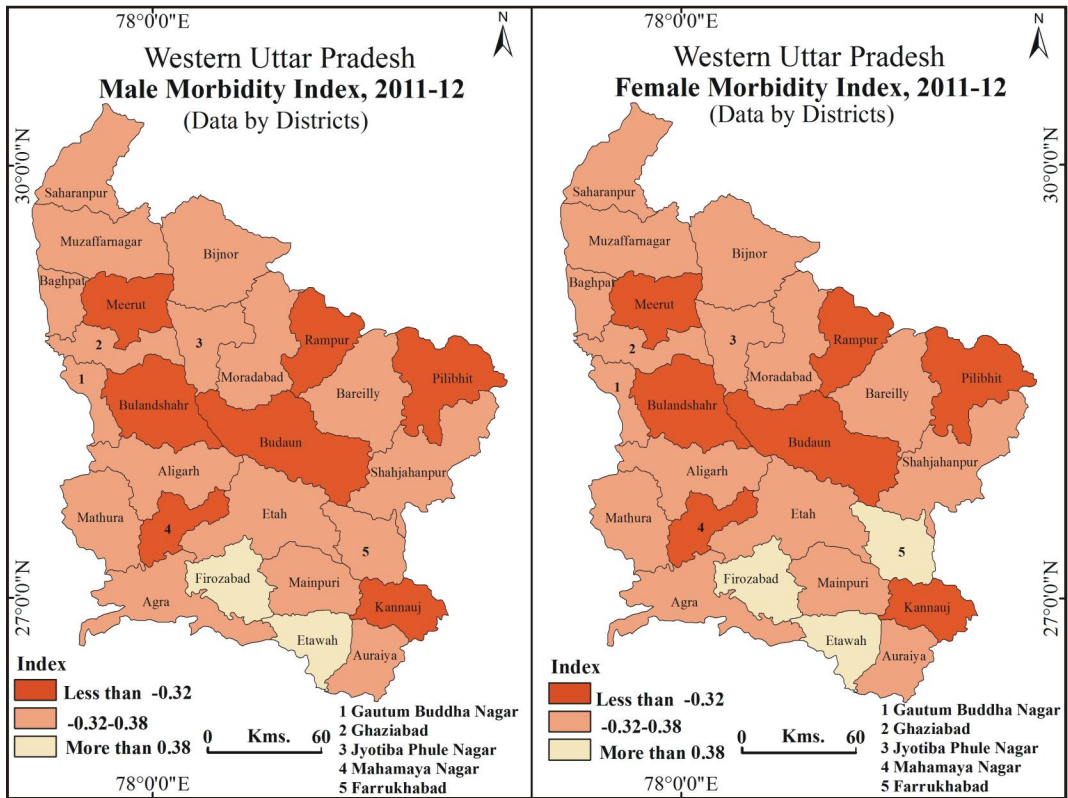
Fig. 4

Gender Deprivation in Mortality

The high mortality rate reflects the poor health care infrastructure and lack of development of medical facilities. Meerut, G.B. Nagar, Ghaziabad, Mathura, and Agra districts have recorded a high index value, which shows the low rate of male and female mortality and better health status of the population residing in these districts (Fig. 5). However, Baghpat is only district with a low female mortality rate (high index value) and moderate male mortality rate (medium index value). This indicates that female's health status is comparatively better than males in the Baghpat district. Five districts, namely Saharanpur, Budaun, Bareilly, Shahjahanpur, and Kannauj have witnessed high male as well as female mortal-ity rate, suggesting higher gender deprivation. The study highlights that three districts, namely Jyotiba Phule Nagar, Bulandshahr, and Farrukhabad, have moderate female mortality rate, but high male mortality rate represented by a low index value. It means that males are more deprived than females in these districts. On the whole, on account of mortality as many as 14 districts, constituting about 53.8 per cent of the total districts, have recorded that males are more deprived than females (Table 2). The difference in the mortality rate among males and females may be because the females are biologically more fit than males (Rogers et al., 2010; Crimmins et al., 2019). However, many social, biological, economic, and environmen-tal factors are responsible for the inequalities in
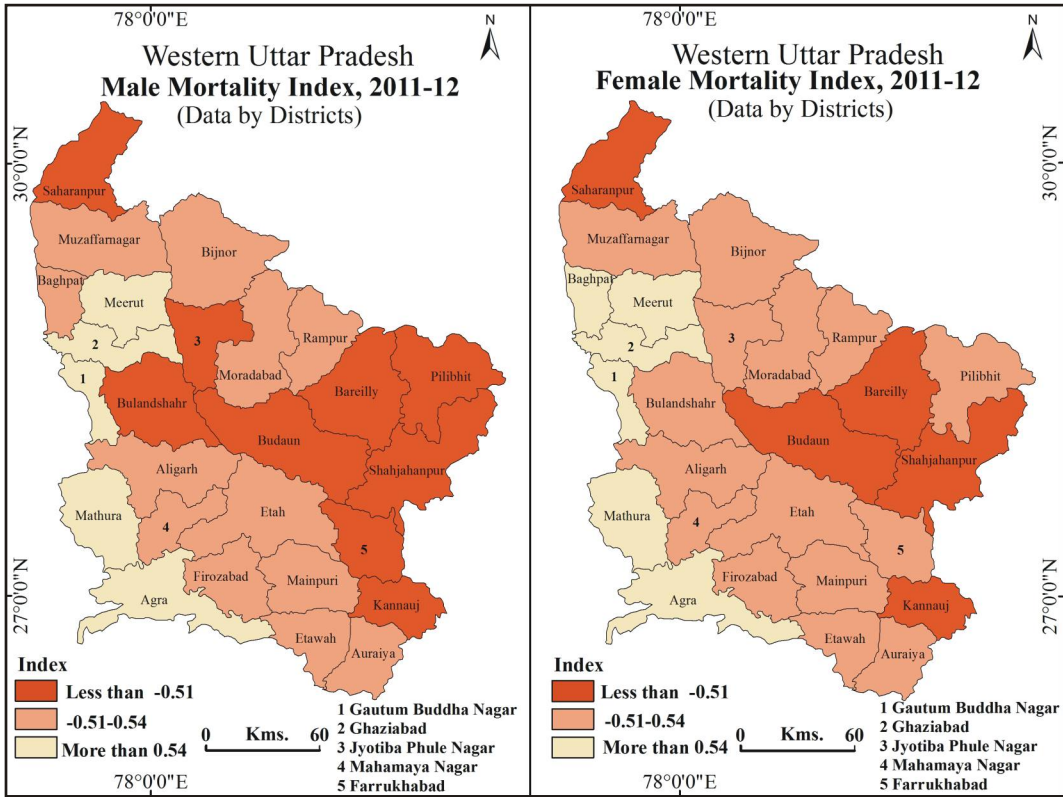
Fig. 5

mortality among males and females (Kraemer, 2000).

Levels of Gender Deprivation

In this study, the deprivation index has been constructed separately for males and females to highlight the crucial difference between them. Fig. 6 reveals that only seven districts, namely Meerut, G.B. Nagar, Ghaziabad, Aligarh, Mathura, Agra, and Firozabad have recoded high index showing better situation both for females and males in terms of deprivation. There are five districts, namely Bijnor, Budaun, Bareilly, Pilibhit, and Kannauj, which have recorded high level of gender deprivation, suggesting that both males and females have deplorable conditions in

these districts on account of education, work participation, morbidity and mortality. Mahamaya Nagar and Auraiya are the districts in which both males and females fall under moderate levels of deprivation. In districts such as Mainpuri, Etawah, Saharanpur, Baghpat, Muzaffarnagar, Jyotiba Phule Nagar, and Bulandshahr, males are comparatively more deprived than females due to high incidence of mortality rates. In these districts, the mortality rate of females is lower than males, due to high vulnerability among males regarding diarrhea, diabetes, tuberculosis, and asthma diseases. Research has shown that childhood mortality is higher among boys than girls, and these higher mortality rates for males continue throughout their natural life (Owens, 2002).
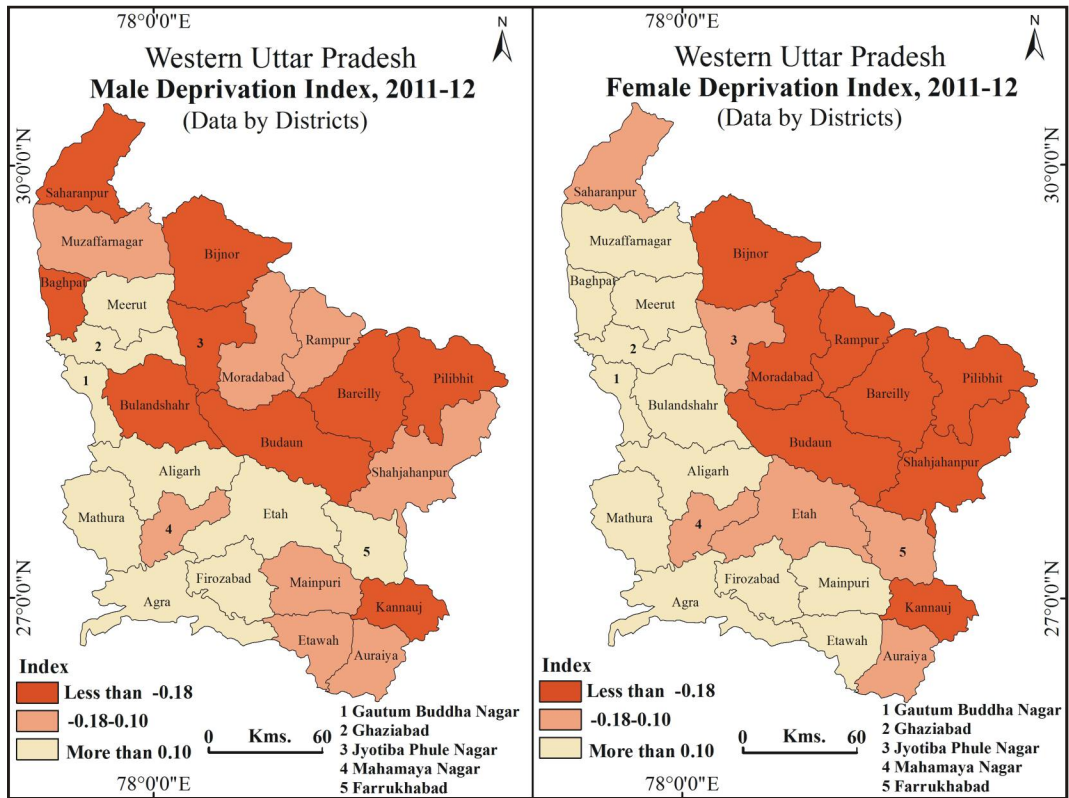
Fig. 6

There are districts like Shahjahanpur, Rampur, Etah, Farrukhabad, and Moradabad, where females are more vulnerable than males. Female vulnerability in these districts may be due to the high Muslim population, financial constraints, and families' restrictions on females on their free movement, leading them out of basic education and health facilities. It may also be on account of low female literacy rate and low female work participation rate. Only 23 per cent of women, aged 15-49, in Uttar Pradesh have completed 12 or more years of schooling, compared to 28 per cent of men (IIPS, 2017). Similarly, only 25 per cent of all females, aged 15-49 have been employed for the whole year during 2014-15, as compared to 78 per cent of males. On account of female

work participation rate, only 16.30 per cent of females are working in western Uttar Pradesh against the state average of 25.00 per cent. Low work participation rate among females is on account of their responsibilities of household works, limited movement due to various socio-economic constraints and high rate of gender discrimination in appointments and wages (ILER, 2014).

Fig. 6 further shows that the north-eastern part of Western Uttar Pradesh forms a pocket of most deprived districts both for males and females as compared to the western and south-western parts of the study region. These parts of the western Uttar Pradesh share the boundary and are in close proximity to the national capital region (NCR), the satellite hub

of Delhi's manufacturing and service sector. This locational advantage has its own impact on the educational, employment and health services, making these districts as less deprived both for males and females.

Conclusions

Based on district-level data, the present study looks at gender deprivation patterns in Western Uttar Pradesh. There is an evident inequality among gender in major development components such as education, work participation, morbidity, and mortality rates. Analysis of the result highlights that the effective education rate is the only indicator that marked the low gap between females and males. On the other hand, the work participation rate shows a higher gap between the genders. Variable of morbidity rate shows an almost similar pattern among males and females except in one district of Farrukhabad, where males have a higher morbidity rate than females. On account of mortality rate, the study shows that males are more fragile than females. This divergence in male and female mortality rates may have resulted from males' greater vulnerability to fatal diseases and habit of smoking which is more prevalent among males. The analysis shows that Pilibhit, Jyotiba Phule Nagar, Kannauj, Budaun, and Bulandshahr are the five most male-deprived districts of Western Uttar Pradesh. While, the districts like Budaun, Shahjahanpur, Bijnor, Pilibhit, and Rampur are the most female deprived districts. A closer analysis of the results shows that there are few districts, namely, Bulandshahr, Saharanpur, Mainpuri, Etawah, Baghpat, and Jyotiba Phule Nagar, where males are comparatively more deprived than females. Similarly, there are districts namely Shahjahanpur, Rampur, Etah, Farrukhabad, and Moradabad where females

are more vulnerable and deprived than males. The study suggests that the state government policies should refer to deprivation problem for males and females separately. Increased job opportunities for females will increase their presence in work participation. More health facilities should be provided to reduce the mortality and morbidity rate in Western Uttar Pradesh.

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