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Regional Disparities in Social Development in Haryana

Devender [a,b++,#] and Jagdeep Kumar [a#*]

[a] Department of Economics, Maharshi Dayanand University, Rohtak (Haryana), India.
[b] Department of Economics, Govt. College for Girls, Pillukhera, Jind (Haryana), India.

Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

The main objective of the present study was to analyse the pattern of district-level regional disparities in social development in Haryana. The study constructed a social development index (SDI) with consideration of 33 key indicators at the four-point of time, i.e., 1991-92, 2001-02, 2011-12, and 2018-19. The study used the "Wroclaw taxonomic" technique to construct composite indices. It was found that in 1991-92, Ambala, Karnal, and Sirsa districts were highly socially developed, whereas Jind, Faridabad, Panipat, and Kaithal districts were the least developed. Moreover, in 2018-19, Rewari, Kurukshetra, Ambala, and Panchkula had the highest level of social development, and Jhajjar, Gurugram, Panipat, and Rohtak districts had the least social development. Moreover, the study also observed that districts in the northern and southern regions had improved their level of social development. In contrast, districts surrounding the National Capital and the districts in the western region had deteriorated their level of social development. The study confirmed that the most economically well-developed districts, including Gurugram, Faridabad, Panipat, Jhajjar, and Rohtak, were deprived of social development, and also revealed that the disparities in social development in Haryana had widened over the period and suggested that the Government should immediately formulate policies to uplift social development in lagging districts and reduce the disparities.

[++] Ph.D. Research Scholar;
[#] Assistant Professor;
**Corresponding author: Email: jagdeep_dhy.eco@mdurohtak.ac.in;*

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1. INTRODUCTION

Social development has been determined as a prerequisite for the economic as well as the sustained human development of an economy [1]. It has emerged as an utmost necessary area of the academic field in the last few decades. The term "social development" is a multidimensional concept which contains different social issues, mainly demography, health, education, and social security. Social development is not predetermined but a continuous process of uplifting the standard of living [2]. After independence, the Government of India (GOI) has emphasised economic growth with maintaining social integrity. In the case of the Indian economy, social development has not been uniformed; therefore, regional disparities have been observed in most of the social indicators like education, water supply, health, sanitation, etc. Moreover, the Indian economy has noticed adequate economic growth in recent decades, yet the economy still grapples with disparities in the socio-economic development across the nation. Similarly, the economy of Haryana has also confronted the issues of regional disparities in social development, where some districts are generally viewed as forward and some also as backward. Regional disparities in social development refer to situations where the standard of living in some regions has diminished asymmetrically or has not improved comparatively. Regional disparity is a worldwide phenomenon, and it also exists in both developed and developing economies [3].

The present study attempts to analyse the district-level regional disparities in Haryana state after the post-liberalisation period on the basis of selected major social indicators. The main objective of the present study is to construct a district level composite index for the social development in Haryana and find out the factors responsible for uneven social development.

2. LITERATURE REVIEW

Khan and Zerby [4] examined regional disparities among Latin American countries in 1980s with use of 120 socio-economic indicators, of which 66 were related to social and 54 were from economic development. The study found that Puerto Rico was at the first rank, and Haiti was the least developed. Khan and Islam [5] investigated disparities in social indicators in Indonesia between 1970 and 1980 using 20 indicators and found that the disparities in education, culture, health and the social sector declined over the period, whereas disparities had widened in demographic and economic sectors. Raychaudhuri and Haldar [6] explored disparities in West Bengal from 1991 to 2005 with the use of 15 variables of social and physical infrastructure and found that the disparities in physical infrastructure had declined initially and then increased, whereas disparities in social infrastructure had reduced from 1990-91 to 1995-96, it again widened from 1995-96 to 2000-01 and later again declined in 2004-05. Kumar and Rani [7] investigated the social development disparities among 28 states and 7 UTs of India in 2011, with use of 12 social sector indicators and found the existence south-north divide in social sector development where states in southern India, such as Kerala, Tamil Nadu, and Karnataka, were better developed than the northern states, including Haryana, Uttar Pradesh, and Punjab.

3. METHODOLOGY

3.1 Choice of Indicators for the Infrastructure Development

The measurement of social development is a multidimensional process based on numerous factors; therefore, it is not possible to investigate the social development by using any single indicator. Moreover, when several indicators are analysed separately, they do not provide an understandable actual picture of development. Therefore, it is required to integrate all the major indicators and make a composite index for the social development. Each district has a unique environment of geographical, economic, and political aspects. Therefore, 33 homogeneous indicators available for all points in time as well as all districts had been considered in the study to analyse the level of infrastructure development. The selected indicators are the decennial growth rate of population (SD_1); population density (SD_2); urban population as percent to total population (SD_3); percentage of SC population to total population (SD_4); sex ratio (SD_5); sex ratio at births (SD_6); birth rate (SD_7); death rate (SD_8); infant mortality rate (SD_9);

percentage of working population to total population (SD_{10}); percentage of non-agricultural workers to total workers (SD_{11}); percentage of SC working population to total SC population (SD_{12}); number of primary schools per 100 square km of area (SD_{13}); number of primary schools per lakhs of population (SD_{14}); teacher-pupil ratio in primary schools (SD_{15}); number of middle schools per 100 square km of area (SD_{16}); number of middle schools per lakhs of population (SD_{17}); teacher-pupil ratio in middle schools (SD_{18}); number of high/senior secondary schools per 100 square km of area (SD_{19}); number of high/senior secondary per lakhs of population (SD_{20}); teacher-pupil ratio in high/senior secondary schools (SD_{21}); number of colleges per 100 square km of area (SD_{22}); number of colleges per lakhs of population (SD_{23}); literacy rate of male (SD_{24}); literacy rate of female (SD_{25}); literacy rate of SC population (SD_{26}); number of hospitals, dispensaries, and health centres per 100 sq. km. of area (SD_{27}); number of hospitals, dispensaries, and health centres in per lakh of population (SD_{28}); number of medical staff per lakh of population (SD_{29}); available beds in hospitals per lakh of population (SD_{30}); number of police stations and police posts per lakh of population (SD_{31}); crime rate per lakh of population (SD_{32}); per capita consumption of liquor (SD_{33}). The data has been collected at four points in time, i.e., 1991-92, 2001-02, 2011-12, and 2018-19, from various issues of the Statistical Abstract of Haryana and the Economic Survey of Haryana issued by the Department of Economic and Statistical Analysis (DESA), Haryana.

3.2 Choice of Methodology

There are several statistical methods available in the literature to construct a composite index for development such as ranking method, monetary index, ratio index, aggregation method, principal component analyses, and multiple factor analyses. Most of the mentioned methods have their own limitations, which are mainly based on their assumptions and aggregation of the weightage. Consequently, the present study has used the "Wroclaw Taxonomic method" to construct the composite index of infrastructure development developed by Florek et al. [8]. It is a straight forward method for calculating the development index's value; this method assumes equal importance to all indicators because each indicator is equally important for overall infrastructure development. Florek et al. [8] strongly argued that this technique is extremely useful to measure the pattern of development. Moreover, Gostowski [9] also argued that the taxonomic distance is a more appropriate and valid measure to identify the levels of development because this method does include the variance among indicators.

Steps of the method are:

Let assume $[X_{ij}]$ has a data matrix for *i*th district and *j*th indicators, in which, i = 1, 2, 3, 4, …., 21 (no of districts) and j = 1, 2, 3, 4, …., 33 (no of indicators). The above-selected indicators have expressed in different units of measurement; therefore, there is a need to transform $[X_{ij}]$ into the standardized score $[Z_{ij}]$ to direct comparability among indicators. Calculate $[Z_{ij}]$ as follows:

$$[Z_{ij}] = \frac{x_{ij} - \bar{x_j}}{s_j}$$

In which, $\overline{x_j}$ = mean of the *j*th indicator and s_j = standard deviation of *j*th indicator.

$$P_{ij} = (z_{ij} - z_{oj})^2$$

where Z_{oj} is the optimal (best) value of each indicator from $[Z_{ij}]$. The optimum value of the indicator will be the maximum value for all stimulant and the minimum value for all destimulant; it will depend upon the direction of an indicator's impact on development level. The pattern of development is given as:

$$C_i = \sqrt{\sum_{J=1}^{n} P_i \,/\, (CV_j)}$$

Where (CV_j) = Coefficient of variation of the *j*th indicator in $[X_{ij}]$.

The composite index of infrastructure sector development is given by $\boldsymbol{D_i = C_i / C}$

Where $\boldsymbol{C = \bar{C} + 3\sigma C_i}$, $\bar{C}$ = mean value of C_i and σ = standard deviation of C_i.

Where $\mathbf{0 < D_i < 1}$ (If the value of *Di* is close to zero (0), then the particular district is relatively more developed).

3.3 Classification of Various Stages of Infrastructure Development

However, a simple ranking of the index value is sufficient for the classification purpose.

Nevertheless, a more meaningful classification of the districts on the basis of their stages of development has been carried out with the help of mean value and standard deviation value. These stages of development have explained as below:

Highly Social Development (4th Stage) = $D_i \leq (\bar{X} - \sigma)$
High Middle Social Development (3rd Stage) = $\bar{X} > D_i > (\bar{X} - \sigma)$
Low Middle Social Development (2nd Stage) = $\bar{X} < D_i < (\bar{X} + \sigma)$
Low Social Development (1st Stage) = $D_i \geq (\bar{X} + \sigma)$

4. RESULTS

Table 1 presents the value of the composite index, rankings, and stages of development (I to IV) of 21 districts. In 1991-92, the district of Ambala (0.688) got the first position, and Jind (0.902) was last in the index. Ambala was followed by the districts of Karnal (0.711) and Sirsa (0.712), obtaining second and third ranks, respectively, and both districts achieved the IV stage in the social development index. Out of 16 districts, six districts, namely Mahendragarh, Rewari, Bhiwani, Yamunanagar, Hisar, and Kurukshetra, were situated in the third stage of development; the third stage of social development index varied from 0.744 to 0.777. On the other hand, the districts of Sonipat, Gurugram, and Rohtak were in the second stage of social development, with index values varying from 0.791 to 0.804. Whereas the remaining four districts, namely Kaithal, Panipat, Faridabad, and Jind, were situated at the first stage of social development.

In 2001-02, out of 19 districts, Mahendragarh district occupied the first position in social development with an index value of 0.599, and Kaithal (0.900) was ranked last. Mahendragarh district was followed by the districts of Bhiwani (0.643) and Rewari (0.652), obtaining second and third ranks, respectively, and both districts achieved the IV stage in the social development index. Moreover, three districts, namely Sirsa, Rohtak, and Hisar, were situated in the third stage of development; the third stage of social development varied from 0.720 to 0.772. On the other hand, 11 districts, namely Fatehabad, Yamunanagar, Karnal, Kurukshetra, Jhajjar, Ambala, Sonipat, Jind, Panchkula, Faridabad, and Gurugram, were situated in the second stage of development; the second stage of social development varied from 0.778 to 0.846. In addition, Panipat (0.867) and Kaithal (0.900) districts were in the first stage of social development.

In 2011-12, out of 21 districts, the district of Rewari (0.553) occupied the first rank, followed by the districts of Ambala (0.570) and Bhiwani (0.575), which obtained the second and third ranks, respectively, and both districts were in the IV stage in the social development index. Whereas, Gurugram (0.928) was in the last place in social development by obtaining the status of the most backward district. Out of 21 districts, in 2011-12, eight districts, namely Panchkula, Karnal, Mahendragarh, Fatehabad, Sirsa, Kurukshetra, Yamunanagar, and Faridabad, were in the third stage of social development with index values varying from 0.605 to 0.672. Moreover, seven districts, namely Jind, Kaithal, Hisar, Jhajjar, Panipat, Rohtak, and Palwal, were in the second stage of development in which index values varied from 0.699 to 0.796. Whereas, three districts, namely Sonipat (0.807), Nuh (0.860), and Gurugram (0.928), were in the first stage of social development.

In 2018-19, out of 21 districts, the district of Rewari (0.445) maintained its status as the first rank, followed by the districts of Kurukshetra (0.475), Ambala (0.477), and Panchkula (0.504), and all districts were in the fourth stage of social development. Whereas, Jhajjar (0.885) ranked last as the most backward district in social development. Out of 21 districts, seven districts, namely Karnal, Yamunanagar, Sirsa, Bhiwani, Mahendragarh, Jind, and Kaithal, were in the third stage of social development with index values varying from 0.529 to 0.626. On the other hand, six districts, namely Faridabad, Hisar, Fatehabad, Sonipat, Palwal, and Nuh, were situated in the second stage of development, with index values varying from 0.648 to 0.744. Whereas, four districts, namely Rohtak (0.765), Panipat (0.787), Gurugram (0.813), and Jhajjar (0.885), were in the first stage of social development.

The value of the coefficient of variation (CV) showed that the disparities in social development in Haryana increased continuously from 8.82 per cent in 1991-92 to 18.77 per cent in 2018-19. Fig. 1 also shows the level of social development in Haryana.

Table 1. Composite Index of Social Development (SDI), Rank of Districts and Stage of Development (SD) in Haryana

Sr. no.	District	1991-92			2001-02			2011-12			2018-19		
		SDI	Rank	SD	SDI	Rank	SD	SDI	Rank	SD	SDI	Rank	SD
1	Rewari	0.749	5	III	0.652	3	IV	0.553	1	IV	0.445	1	IV
2	Kurukshetra	0.777	9	III	0.786	10	II	0.639	9	III	0.475	2	IV
3	Ambala	0.688	1	IV	0.799	12	II	0.570	2	IV	0.477	3	IV
4	Panchkula	-	-	-	0.806	15	II	0.605	4	III	0.504	4	IV
5	Karnal	0.711	2	IV	0.779	9	II	0.624	5	III	0.529	5	III
6	Yamunanagar	0.772	7	III	0.778	8	II	0.639	10	III	0.568	6	III
7	Sirsa	0.712	3	IV	0.720	4	III	0.636	8	III	0.569	7	III
8	Bhiwani	0.749	6	III	0.643	2	IV	0.575	3	IV	0.593	8	III
9	Mahendragarh	0.744	4	III	0.599	1	IV	0.630	6	III	0.601	9	III
10	Jind	0.902	16	I	0.803	14	II	0.699	12	II	0.623	10	III
11	Kaithal	0.883	13	I	0.900	19	I	0.707	13	II	0.626	11	III
12	Faridabad	0.898	15	I	0.822	16	II	0.672	11	III	0.648	12	II
13	Hisar	0.774	8	III	0.772	6	III	0.722	14	II	0.689	13	II
14	Fatehabad	-	-	-	0.778	7	II	0.633	7	III	0.689	14	II
15	Sonipat	0.791	10	II	0.801	13	II	0.807	19	I	0.701	15	II
16	Palwal	-	-	-	-	-	-	0.796	18	II	0.707	16	II
17	Nuh	-	-	-	-	-	-	0.860	20	I	0.744	17	II
18	Rohtak	0.804	12	II	0.767	5	III	0.781	17	II	0.765	18	I
19	Panipat	0.894	14	I	0.867	18	I	0.780	16	II	0.787	19	I
20	Gurugram	0.803	11	II	0.846	17	II	0.928	21	I	0.813	20	I
21	Jhajjar	-	-	-	0.797	11	II	0.759	15	II	0.885	21	I
	$\bar{X}$	0.79			0.77			0.70			0.64		
	σ	0.07			0.08			0.10			0.12		
	CV	**8.82**			**9.70**			**14.56**			**18.77**		

Note: (-) means district did not exist; SD: Stage of Development; $\bar{X}$: Mean; σ: Standard Deviation; CV: Coefficient of Variation.
Source: Computed by researcher, Raw data available in Statistical Abstract of Haryana (Various issues).

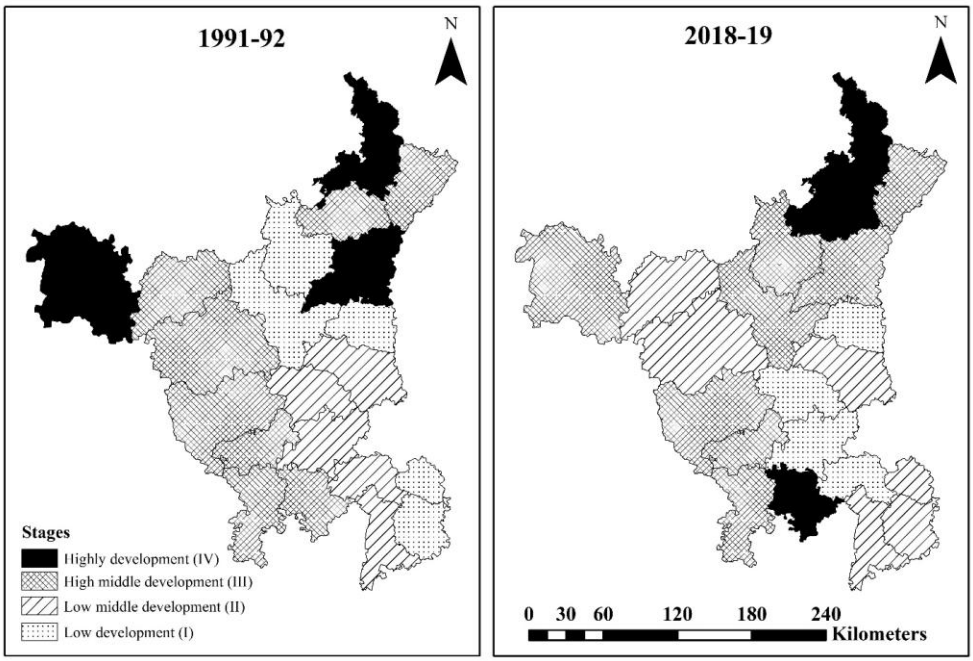

Fig. 1. Distribution of Social Development in Haryana
Source: Author's own estimations and map created through AcrGIS 10.3

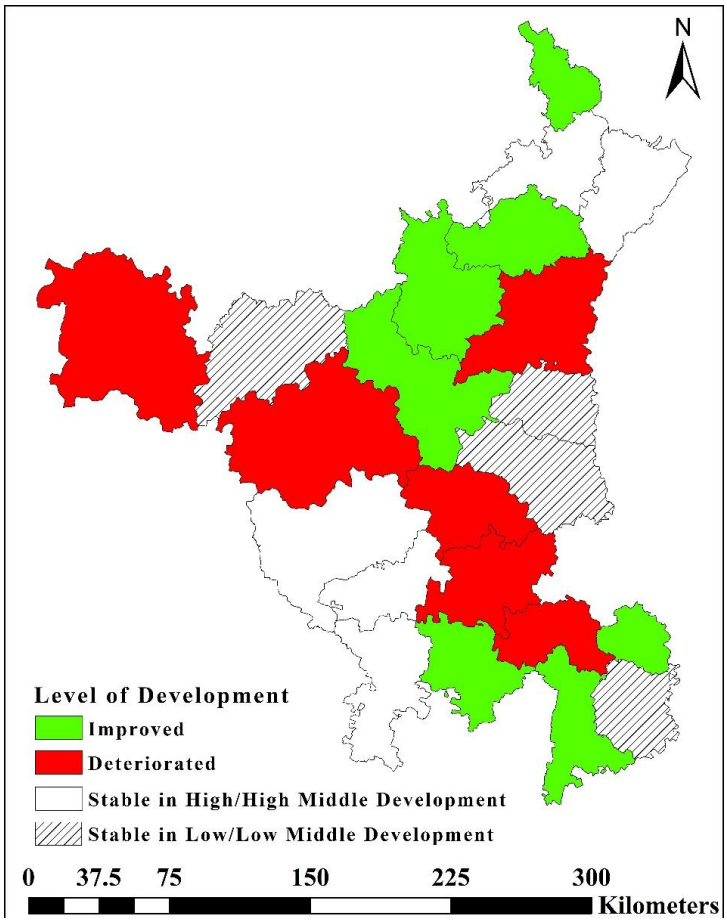

Fig. 2. Pattern of Social Development in Haryana
Source: Author's own estimations and map created through AcrGIS 10.3

Table 2. Classification of Districts in respect of their Geographical Area and Population

Stages of Development	Number of Districts	Area (in percent)	Population (in percent)
1991-92			
Highly Development (IV)	3	19.52	16.46
High middle Development (III)	6	39.89	36.34
Low middle Development (II)	3	17.87	23.43
Low Development (I)	4	22.73	23.78
2001-02			
Highly Development (IV)	3	18.71	14.20
High middle Development (III)	3	22.63	17.00
Low middle Development (II)	11	50.55	59.75
Low Development (I)	2	8.11	9.05
2011-12			
Highly Development (IV)	3	17.97	14.45
High middle Development (III)	8	36.67	36.35
Low middle Development (II)	7	34.42	33.21
Low Development (I)	3	10.94	15.99
2018-19			
Highly Development (IV)	4	12.66	14.02
High middle Development (III)	7	45.83	35.42
Low middle Development (II)	6	27.79	31.86
Low Development (I)	4	13.72	18.70

Source: Computed from Table 1

4.1 Pattern of Social Development in Haryana

Fig. 2 shows the pattern of social development in Haryana. It has been clearly observed that districts situated in the northern as well as southern regions have improved their level of social development. Whereas, districts surrounding the National Capital, i.e., New Delhi as well as the districts in the western region of the state, deteriorated their level of social development.

Perusal of the Fig. 2 depicts that in Haryana over the study period, seven districts, namely Rewari, Kurukshetra, Panchkula, Jind, Kaithal, Faridabad, and Nuh, had improved their level of social development. Whereas, in six districts, namely Karnal, Sirsa, Hisar, Rohtak, Gurugram, and Jhajjar, the level of social development had deteriorated. On the other hand, the level of social development in eight districts, including Ambala, Yamunanagar, Bhiwani, Mahendragarh, Fatehabad, Sonipat, Palwal and Panipat, stayed the same.

From a policy point of view, it is more important to classify or categories the districts having the same level of development in respect of their geographical area and population. Therefore, the study made an attempt to categories the districts with consideration of their area and population as given in Table 2.

It was found that in 1991-92, merely three districts were in the highly social development category, having 19.5 per cent of the total area and 16.5 per cent of the state population. Whereas, in 2018-19, the number of districts in the highly development category had increased to four districts. However, their per cent area and population have declined to 12.7 and 14.0 per cent, respectively. On the other hand, in the case of the low development category, in 1991-92, four districts were in this category, which comprised 22.7 per cent of the total area and 23.8 per cent of the state population; and in 2018-19, there are also four districts in this category, which have 13.7 per cent of the total area and 18.7 per cent of the state population. It may be concluded here that over the period of study, relatively area and population had decreased in the highly as well as the low development categories. In contrast, the area under the high middle development category had increased, whereas the population under this category had decreased marginally. Moreover, the area and population of the low-middle development category had increased over the period.

5. DISCUSSION

In the case of social development, it was found that four districts situated in the low development category and six districts placed in the low-

middle development category in 2018-19 required special attention from the policymakers. It was found that Faridabad, Panipat, and Gurugram districts lagged behind in social development due to the backwardness of the following indicators jointly: high decennial growth rate of the population; high population density; low percentage of SC population; lower sex ratio; lower sex ratio at births; high birth rate; low percentage of SC working population; low number of primary and high/senior secondary schools; high teacher-pupil ratio in primary and high/senior secondary schools; low number of colleges; low number of hospitals, dispensaries, and health centres; low number of medical staff; low available beds in hospitals; high crime rate; and high per capita consumption of liquor. Moreover, Palwal and Mewat districts also lagged behind in social development due to the backwardness of the following indicators jointly: higher decennial growth rate of the population; high population density; lower rate of urbanization; low percentage of SC population; high birth rate; low percentage of working population; low percentage of non-agricultural working population; low percentage of SC working population; high teacher-pupil ratio in high/senior secondary schools; low number of colleges; lower literacy rate of male, female, and SC population; low number of medical staff; low number of available beds in hospitals; and low number of police stations and police posts. Besides this, Hisar and Fatehabad districts also lagged behind in social development due to the backwardness of the following indicators jointly: lower rate of urbanization; low sex ratio at births; low percentage of non-agricultural working population; low number of primary, middle, and high/senior secondary schools; high teacher-pupil ratio in middle schools; low number of colleges; lower literacy rate of male, female, and SC population; low number of hospitals, dispensaries, and health centres; and low number of police stations and police posts. On the other hand, Sonipat, Rohtak, and Jhajjar districts also lagged behind in social development due to the backwardness of the following indicators jointly: low percentage of SC population; low sex ratio; low sex ratio at births; low percentage of working population; low percentage of SC working population; low number of primary and middle schools; and high teacher-pupil ratio in primary and middle schools. Conclusively, the policymakers and the government should also focus on the lagging indicators to bring about balanced regional development across the districts in Haryana.

6. CONCLUSION

District level social development disparities in Haryana state have existed for a long time. The findings of the present study confirmed the existence of district-level regional disparities in social development in Haryana. It was found that, out of 21 districts, merely seven districts, namely Rewari, Kurukshetra, Panchkula, Jind, Kaithal, Faridabad, and Nuh, had improved their level of social development. Whereas, in six districts, namely Karnal, Sirsa, Hisar, Rohtak, Gurugram, and Jhajjar, the level of social development had deteriorated. Moreover, 8 districts were remained maintained their level of development, in which Ambala, Yamunanagar, Bhiwani, and Mahendragarh maintained their high or high middle level of development, whereas, Fatehabad, Sonipat, Palwal, and Panipat were situated in low or low middle development category. The study found that the disparities had increased continuously from 8.82 per cent in 1991-92 to 18.77 per cent in 2018-19, which shows that the disparities in social development had widened over the period. Moreover, the districts situated in the second and first stages of social development required special attention from the policymakers and government through better developmental policies based on lagged indicators. Conclusively, the government should take immediate steps to improve level of social development and also to focused on to reduce the disparities.

7. LIMITATIONS OF THE STUDY

The study is entirely based on secondary data, commonly available for all time points and all districts. Due to the unavailability of the data, the analysis excluded the Charkhi Dadri district.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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