

## **Health Infrastructure Development in Haryana: A district wise composite index analysis.**

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**Abstract:** The present paper is an attempt to finding the Health infrastructure development in the districts of Haryana for the period of four years from 2005 to 2018. The level of districts in Health infrastructure development has been assigned by Deprivation Index Method. Further, districts are classified into developed (D), moderately developed (MD) and less developed (LD) category on the basis of values of index. The study reveals that health infrastructure development in the state is found to be concentrated mainly in ten districts of the west-south part of Haryana over the period. This proves the divergent Health infrastructure development in the state and is a serious issue of concern and requires immediate attention of state government to balance the regional disparities.

**Keywords:** *Health Infrastructure Development, Regional disparities, Deprivation Index Method, Health Infrastructure Development Indicators.*

### **Introduction**

The Oxford dictionary defines infrastructure as basic - structural foundation of a society. The term 'infrastructure' was invented during Second World War by military strategists to indicate wide-ranging elements of war logistics (Ahmed and Donovan, 1992). Thereafter economists adopted the term into the literature of development economics for use interchangeably with overhead capital (Youngson, 1967). Soon distinctions such as "social infrastructure", "economic infrastructure", "physically infrastructure", and institutional infrastructure were developed to emphasize a particular aspect or attribute the word infrastructure represented (Ahmed and Donovan, 1992). Development of an economy is to be viewed as a long-term process in which its different sectors move from the existing levels to the higher level of performance. Now the



concept of economic development has been made more comprehensive. Development must be conceived of as a multidimensional process involving changes in structure, attitudes and institutions, as well as acceleration of economic growth, the reduction of inequalities and the reduction of absolute poverty (Todaro, 1977). In essence development must represent the entire spectrum of changes by which entire social system and state of India and social groups within the system moves away from conditions of miseries and sorrow and provides social justice to all.

The availability of Health infrastructure facilities is imperative for the overall economic development of a country. A high correlation exists between the availability of certain infrastructure services like health, telecommunication, road-power and access to safe water with per capita GDP (Rao. 1971).

Health infrastructure covers a wide range of services; transportation, road railways and water transportation, power generation transmission distribution, telecommunication, water supply and sewage disposal, urban mass transport system, irrigation medical, educational and other primary services etc. Some of the services have a direct impact on the working of business enterprise while the others are most important from a societal point of view.

The World Health Statistics, one of WHO's annual flagship publications, compiles data from the organization's 194. Member States on 21 health-related SDG targets, providing a snapshot of both gains and threats to the health of the world's people. While the quality of health data has improved significantly in recent years, many countries still do not routinely collect high-quality data to monitor health-related SDG indicators. Health is the holistic process related to the overall growth and development of the nation. Generally scholars assess people's health by taking into account indicators like infant mortality and maternal mortality rates, life expectancy and nutrition levels, along with the incidence of communicable and non-communicable diseases.

### **The state Haryana**

Haryana is a landlocked state in northern India one of the 29 states in India. It was carved out of the former state of East Punjab on 1 November 1966 on a linguistic basis. It is between 27°39' to 30°35' N latitude and between 74°28' and 77°36' E longitude. It is bordered by Punjab and Himachal Pradesh to the north and by Rajasthan to the west and south. The river

Yamuna defines its eastern border with Uttar Pradesh. Haryana surrounds the country's capital Delhi on three sides, forming the northern, western and southern borders of Delhi. Consequently, a large area of south Haryana is included in the National Capital Region for purposes of planning for development. It stands 21st in terms of its area, which is spread about 44,212 km sq which is 1.3% of the geographical area of the country. As of 2011 census of India, the state is eighteenth largest by population with 25,353,081 inhabitants. GDP of Haryana is 3.89 lakh crore. Haryana health infrastructure and health care is made up of a three-tier system – primary, secondary and tertiary. In order to provide primary health care, hospitals have been setup in villages and small towns which are generally manned by a single doctor, a nurse and a limited quantity of medicines. They are known as Primary Health Centres (PHC), Community HealthCentres (CHC) and sub-centres. When the condition of a patient is not managed by PHCs, they are referred to secondary or tertiary hospitals. Hospitals which have better facilities for surgery, X-ray, ECG (Electro Cardio Gram) are called secondary health care institution. The Tertiary sector also includes many premier institutes which not only impart quality medical education and conduct research but also provide specialized health care.

Therefore keeping above discussion in mind the present study is an attempt to measure the rank of districts in infrastructure development in Haryana over the period of 2005-2018.

### **Objective and Methodology of Study**

The main objective of the study is to measure the incidence of Health disparities existing at district level in Haryana. For the purpose, we have computed the Health development level attained in certain indicators at district. A vector of 08 indicators encompassing all dimensions of Health development is used for working out the inter-district Health development indices. (List of the indicators is at (Appendix-I) Further in the study it is hypothesized that the regional disparities in Health development are growing over time and secondly, Health development in the state is concentrated around north eastern and middle part of Haryana.

## Construction of Composite Index

Development is a multidimensional phenomenon. Each of these dimensions is measured in different units. Given the difficulties in analyzing development with respect to each of these dimensions, researchers generally prefer to aggregate them—what one calls composite index, to depict the overall status of region. For reduction of this dimensionality problem many methods have been suggested in the literature. While some are weighted others are weight free. The literature is silent vis-à-vis superiority of any method over others. Keeping the limitation in mind, a weight free index has been constructed.

### Deprivation Index

The Deprivation index (DI) is constructed in following steps...The first is to define a measure of deprivation that a region suffers in each of its variables. The notion of deprivation used by the UNDP (United Nation Development Programme) is one of absolute deprivation. In order to get an index of deprivation, the measure of regions is divided by the difference between the maximum and minimum value. Mathematically,  $D_{ij}$  is the deprivation indicator for the  $Z$ th region with respect to the variable is defined as:

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$$D_{ij} = \frac{\text{Actual} - \text{Mini}}{\text{Maxi} - \text{Mini}}$$

The second step is to define an average deprivation index by taking a simple average of all the indicators. Finally, the Development index (DI) is defined as absence of deprivation:

$$D_j = \sum_{i=1}^n D_{ij} / n$$

Mathematically:  $(DI)_j = (1 - \sum D_{ij} / n)$

### Division of Districts

For the sake of easy comparison among development dynamics across different districts over time the study classified all the districts into three categories namely; developed, moderately developed and underdeveloped. This categorization for both method used in study is made by assuming that the worked out composite index follows a normal distribution with mean ( $\mu$ ) and standard deviation  $\sigma$ . The groups are categorized by using the following cut-off points.

Developed  $(D) \geq \mu + 0.5 \sigma$

Moderately Developed (MD)  $\mu - 0.5 \sigma \leq \text{and} < \mu + 0.5 \sigma$

Less Developed (LD)  $LD = \leq \mu - 0.5 \sigma$

### Source of Data

The nature of study dictates the requirement of the secondary sources of information. Accordingly, all the required data has been obtained from various authentic sources. Some indicators have been manipulated by taking two and more different variables related with parent variable. The main source of data is as follow:

- (i). Statistical Hand Book of Haryana issued by Economic and Statistical Organization, Planning Department Government of Haryana, 2015-16.
- (iii). Government of Haryana, "Census of India 2011-Census Department Haryana", Chandigarh.

### Major Findings

In this section major finding of inter districts disparities, district wise growth rate of Health infrastructure development are discussed.

(A) The result pertaining to Health infrastructure development are depicted in table 1.1. The table 1.1 demonstrate that in 2005-2006 Rohtak stands first in Health infrastructure development followed by Bhiwani, Panchkula, Hisar, Jind. But Mewat get last rank. The mean, standard deviation and coefficient of variation are 0.483, 0.196 and 40.65%.

In 2007-2008, as shows in table position slightly change i.e. Rohtak get first rank after that Panchkula, Bhiwani, Mahendergarh, Hisar. But mean, standard deviation and coefficient of

variation more or less same. In Haryana, as manifest in table 1.1 in 2013-2014 rank more or less same of district. But coefficient of variation has decreased to 38.57%.

In 2017-2018, a few upward and downward changes in rank of districts can be observed. As exhibit in table 1.1 the rank of Rohtak has declined may be because of formation of new district i.e. Charkhi Dadri. A look at ranks of districts reveals that districts namely Rohtak, Bhiwani, Hisar, Sirsa show downward trend in their rank over the period of study.

Haryana state has achieved an impressive growth rate in overall Health infrastructure development over the period 2005-2018. Through the study period i.e. 2005-2006 to 2017-2018 it has been observed that Health infrastructure development has shown a tendency of divergence.

**Table: 1.1 Infrastructure Development Index for Haryana**

District	DI(2005-06)	Rank	DI(2007-08)	Rank	DI(2013-14)	Rank	DI(2017-18)	Rank
Rohtak	0.798	1	0.806	1	0.797	1	0.174	7
Panchkula	0.736	3	0.699	2	0.695	2	0.406	2
Bhiwani	0.746	2	0.698	3	0.688	3	0.213	5
Mahendergarh	0.559	6	0.632	4	0.636	4	0.217	4
Hisar	0.644	4	0.619	5	0.605	6	0.173	8
Jhajjar	0.542	8	0.605	6	0.609	5	0.222	3
Jind	0.573	5	0.496	8	0.576	7	0.161	9
Rewari	0.541	9	0.554	7	0.499	9	0.134	11
Sirsa	0.548	7	0.495	9	0.506	8	0.126	14
Ambala	0.500	12	0.469	11	0.464	14	0.178	6
Fatehabad	0.489	14	0.467	12	0.475	12	0.156	10
Sonapat	0.498	13	0.482	10	0.474	13	0.117	15
Kaithal	0.525	11	0.442	13	0.488	11	0.110	17
Yamunanagr	0.529	10	0.405	16	0.457	15	0.132	12
Kurukshetra	0.451	16	0.414	15	0.489	10	0.131	13
Karnal	0.459	15	0.441	14	0.432	16	0.116	16
Panipat	0.357	19	0.316	17	0.314	17	0.074	19
Faridabad	0.448	17	0.264	19	0.243	21	0.051	21
Mewat	0.317	20	0.302	18	0.314	18	0.072	20
Charkhi Dadri	0.000	21	0.000	22	0.000	22	0.624	1
Gurugram	0.370	18	0.227	20	0.267	20	0.095	18
Palwal	0.000	21	0.223	21	0.276	19	0.033	22
Mean	0.483		0.457		0.468		0.169	
S.D	0.196		0.187		0.181		0.128	
C.V	40.65%		40.89%		38.57%		75.61%	

**Note:** DI = Deprivation Index, S.D = Standard Deviation, C.V = Coefficient of Variation

The difference in the values of index among the district bring out in some extent unequal development in Health infrastructure in Haryana and these inequalities are rising as value of Coefficient of Variation is increasing during the study period 2005-2006 from 40.65% to 75.61% in 2017-2018 by the table 1.1.

(B) The table 1.2 demonstrates the overall result pertaining to Health infrastructure development. It reveals that over the period 2005-2018 Rohtak stand first followed by Panchkula, Bhiwani, Mahendergarh, Hisar, Jhajjar, Jind, Rewari, Sirsa, Ambala, and Fatehabad. All these eleven districts are in the category of developed districts. Albeit six districts namely Sonipat, Kaithal, Yamunanagar, Kurukshetra, Karnal, Panipat are moderately developed and rest five are in less developed category. Palwal obtain endmost position in Health infrastructure development. The above explication is depicted graphically where dark green colour, light green colour and yellow colour represent category of districts i.e. developed, moderately developed and less developed respectively.

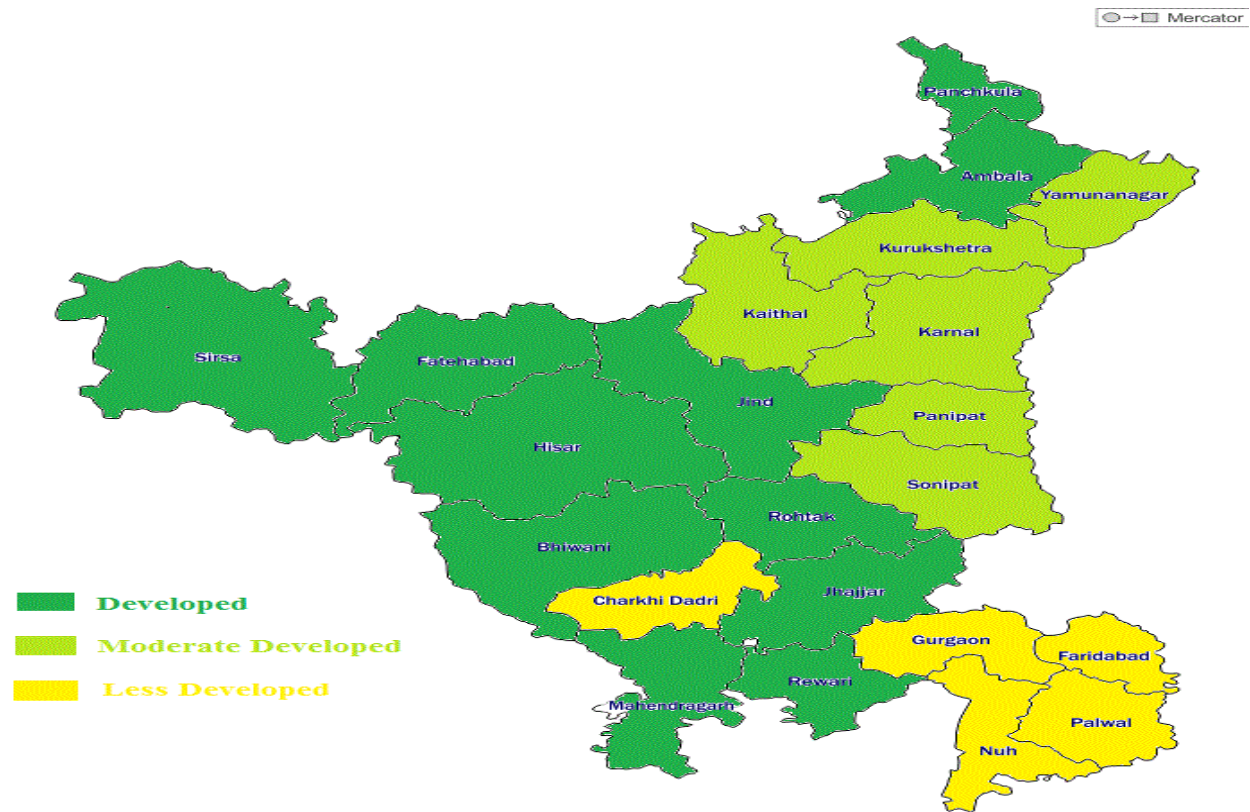
**Table: 1.2 Composite Index of Health Infrastructure Development over the period of 2005 to 2018 (Deprivation Method)**

District	HDI	Rank	Status
Rohatk	0.712	1	DD
Panchkula	0.704	2	DD
Bhiwani	0.655	3	DD
Mahendergarh	0.581	4	DD
Hisar	0.579	5	DD
Jhajjar	0.564	6	DD
Jind	0.521	7	DD
Rewari	0.502	8	DD
Sirsa	0.488	9	DD
Ambala	0.472	10	DD
Fatehabad	0.469	11	DD
Sonipat	0.462	12	MD
Kaithal	0.461	13	MD
Yamunanagar	0.450	14	MD
Kurukshetra	0.441	15	MD
Karnal	0.432	16	MD
Panipat	0.335	17	MD
Faridabad	0.321	18	LD
Mewat	0.321	19	LD
Gurugram	0.309	20	LD
CharkhiDadri	0.226	21	LD
Palwal	0.202	22	LD

Note:

Where,

- (1)  $DD = \geq 0.46, MD = > 0.32 \text{ \&lt; } 0.46, LD = \leq 0.32$
- (2) HDI implies Health Development Index.
- (3) DD refers to Developed, MD refers to Moderately Developed and LD refers to Less Developed.



**Conclusion:** The study found that the regional disparities in the Health infrastructure development in the state of Haryana are increasing marginally over time. It is evidenced by the increasing value of coefficient of variation of the constructed index. Further, development in the state is concentrating in the north-eastern and middle part of Haryana. This proves the diverging health development in the state and is a serious issue of concern and requires immediate attention of policy makers.



## Appendix-I

### Health Development Indicators

- H1 = District Wise Hospital in Haryana per lakh of Population.
- H2 = District Wise No. Of CHC per lakh population
- H3 = District Wise No. Of PHC per lakh population
- H4 = District Wise No. Of Dispensaries per lakh population
- H5 = District Wise No. Of Sub Centre per lakh population
- H6 = District Wise NO. Of Ayurvedic per lakh population
- H7 = District Wise NO. Of Bed per lakh population
- H8 = District Wise NO. Of Staff per lakh population

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