

# Multivariate Analysis of Regional Disparities in India

Urvashi Bist and ArushiRana

---

## Abstract

The research emphasizes on the regional disparities persisting in India based on several variables. The variables depend on economy, demography, employment, education, medical and health facilities. Using these variables an overall status of the states is determined. Data used in the research is based on 2015-2016 survey and then possessed using the Composite Index method. The assessment is done with the objective of analyzing the status of development in each Indian state.

**Key Words:** Regional Disparities, Development and Composite Index

---

Date of Submission: 10-07-2022

Date of Acceptance: 26-07-2022

---

## I. Introduction

Regional Disparities are the spatial imbalances between different regions. Regional disparities are a relevant issue from the point of theoretical consideration and policy designation. (Puljiz, J., et. al., 2015) Every region differs in economic balance and welfare which is the major cause of disparity from place to place.

It is a proven fact that in a large economy, different regions with varying resource bases and endowmentssupport dissimilar growth paths over time (Williamson, J. G. 1965).In the case of India, it becomes more crucial to concentrate on these disparities as the new economic strategies have additionally extended thegap between the rich and the poor states.Regional research has been of great importance for scholars who are studying the economic aspect of India. Ever since its independence, India has focused on regional growth and development. (Ghosh, B., et. al., 1998)

A number of recent studies (Kant, S. 1999; Nagaraj, R.A. et al., 2015; Shand, R. and Bhide, S. 2000; Ahluwalia, M.S. 2000 and 2002; Krishan, G. 2001; Kar, S. and Sakthivel, S. 2007 among others.) brought forth the observation that regional disparity in India widened during the 1990's, raising the concern. States like Maharashtra, Gujarat, Tamil Nadu, West Bengal, Karnataka and Delhi, had better infrastructure, received higher investments and the regional disparities situation escalated further (Kant, S. 1999). Therefore the aim of the research is to test the above observation.

Regional development disparity is a continuous developmental challenge for Indian policy makers. The aim of the research is to understand which state of the country lacks behind in terms of disparities be it in terms of human resources, socio-culture aspect , economical or educational.In order to assess these disparities and the cause behind them different variables are taken into consideration. These are brought together for analysis by the composite index method.

The Composite Index is a statistical method and tool that brings together different indexes, data, equities in order to create singular values to assess the status and performance. The method is used in different fields, including commerce, economics, demographics and even geographical study.

The method uses different variables which are solved by statistical method. In the research, variables deal with economic, educational, social, medical and resource factor of the country. Further, the variables are converted to an aggregate for comparison, results and discussions. Therefore, a complete assessment of regional disparities is made in terms of different aspects.

## Data Base

Collection of data for the research is based on secondary sources. The secondary sources constitute of data from official government records based on census and surveys. Data has been collected from official web pages of organizations including, NITI Ayog, Indian State of Forest Report (ISFR), Ministry of Road Transport and Highways (MORTH), Ministry of Education, Ministry of Power and Reserve Bank of India (RBI).

## II. Methodology

Data collected via secondary sources consists of different variables. In order to make them comparable, it needs to be segregated and converted into a common unit. Therefore the Composite Index has been used to extract data in the form of Standard Values which is further used to obtain Composite Index Value. The computation for the same has been done in Microsoft Excel.

Using statistical formulas, the mean, deviation and standard deviation of the data is done. Using these values, the standardized value is calculated. Formula used for computing the standard values (z) is -

$$z = \frac{x-\mu}{\sigma} \text{ Where, } \mu = \text{mean}, \sigma = \text{standard deviation.}$$

The Composite Index Value is then used to assess the regional disparities and status of development in the different states of India. An ordinal scale is created to determine development status as low, medium, high and very high. Using Arc GIS a thematic map of India for the following is made.

## III. Discussions

The variables selected include aspects of economy, demography, education, health and medical facilities in order to analyze the overall regional disparity. Table 1 represents the aspects of demography and social being in terms of sex ratio. It also deals with health and medical outlook, considering the infant mortality rate and number of physical health care centers state wise.

### 1- Demography

#### a) Sex Ratio

Sex ratio is the ratio of males to females per 1000 males. In India practices including female feticide and sex determination have been abolished to increase the sex ratio. The social structure is such that it gives males superiority over females. Over the years the practices have reduced and the sex ratio has boosted. Highest recorded sex ratio of 2015-2016 was in the state of Kerala with 967 and lowest in Haryana, that of 831.(Table1)

### 2- Medical and Health Facilities

#### a) Infant Mortality Rate (IMR)

World Health Organization describes Infant Mortality Rate as the probability of a child born in a specific year or period dying before reaching the age of one. In 2019, India's IMR was one fourth of what it was in 1971. Considering the 2015-2016 statistics by NITI Ayog, the state with highest IMR is Assam with 47 and lowest in Goa and Manipur which is 9.

The decrease in IMR is a clear indication of growing medical facilities and health care in India. Among these Bihar, Uttar Pradesh, Chhattisgarh, Rajasthan, Orissa and Meghalaya also have IMR above 40. These states lack medical care and need to cope with states like Nagaland, Tamil Nadu and Kerala that have IMR below 20. (Table 1)

States	Sex Ratio	Infant Mortality Rate	Health Facilities Physical Health Centers
Andhra Pradesh	918	37	1069
Arunachal Pradesh	-	30	117
Assam	900	47	1014
Bihar	916	42	1883
Chhattisgarh	961	41	792
Goa	869	9	21
Gujarat	854	33	1247
Haryana	831	36	461
Himachal Pradesh	924	28	500

Jharkhand	902	32	327
Karnataka	939	28	2353
Kerala	967	12	827
Madhya Pradesh	919	50	1171
Maharashtra	878	21	1811
Manipur	-	9	85
Meghalaya	-	42	110
Mizoram	-	32	57
Nagaland	-	12	128
Odisha	950	46	1305
Punjab	889	23	427
Rajasthan	861	43	2083
Sikkim	-	18	24
Tamil Nadu	911	19	1372
Telangana	-	34	668
Tripura	-	20	91
Uttar Pradesh	879	46	3497
Uttarakhand	844	34	257
West Bengal	951	26	909

b) Number of Ph Table 1

b) Physical Health Care Centers

Highest	Lowest
---------	--------

The health facilities depend largely on the number of organization carrying out the job. In the case of India, Uttar Pradesh has the highest number of health care centers but 2<sup>nd</sup> highest IMR. Whereas Goa has the lowest health care centers but accounts for the lowest number of IMR.

Clearly, having health care centers is an added advantage but the medical facilities provided in the centers determine the development of a region. In this case Tamil Nadu, Karnataka and Maharashtra have not only high number of health care centers but also lower rates of IMR. While, Madhya Pradesh, Bihar and Rajasthan have a large number of health care centers long with a high IMR.

In order to cope with the lacking health care, states need to enhance their work ethics and management so that they can serve the public well. Along with this, emphasis on technology is required to provide better healthcare service.

### 3- Education

a) Number of Universities

Access to education is a right everyone should be granted. India has an uneven distribution of universities when it comes to higher education. This results in migration of students to different states or quitting studies. They tend to work instead and this affects them economically.

While Rajasthan has the highest of 70 universities, Goa has only 2. Among the others are Maharashtra (35), Tamil Nadu (58) and Madhya Pradesh (43). (Table 2) These are some of the states to which students prefer moving for higher education. Manipur, Meghalaya, Nagaland and Mizoram are some of the states with the least number of universities. Students from these states move to other parts of the country for higher education.

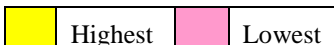
**4- Economy**  
a) Per Capita Income

The PCI is taken in the form of Net State Domestic Product (NSDP) which is the state income. It therefore gives an idea of the income earned by per person in a state. The NSDP tells about how developed a state is in terms of economy.

In 2015-2016, the state with the highest PCI is Goa whereas Bihar has the lowest PCI. (Table 2) Sikkim, Uttarakhand, Maharashtra, Gujarat and Himachal Pradesh are some of the other states with a high NSDP. These states have a well developed economy due to reasons like tourism and entertainment industry.

Jharkhand, Assam and Uttar Pradesh are states with lower NSDP which clearly denotes the economic backwardness.

States	Number of Universities	Per Capita Income (NSDP)	Forest Cover Area
Andhra Pradesh	28	88609	48848
Arunachal Pradesh	9	85020	134496
Assam	21	50642	55246
Bihar	22	24064	14576
Chhattisgarh	22	61515	111172
Goa	2	278601	4448
Gujarat	57	120683	29320
Haryana	39	137818	3168
Himachal Pradesh	25	112723	29392
Jharkhand	14	44524	46956
Karnataka	52	116813	72842
Kerala	20	120387	38478
Madhya Pradesh	43	47351	154924
Maharashtra	35	122889	101256
Manipur	4	46389	33988
Meghalaya	10	56039	34434
Mizoram	3	91845	37496
Nagaland	4	60663	25932
Odisha	21	58838	100708
Punjab	26	100141	3542
Rajasthan	70	68565	32342
Sikkim	7	195066	6714
Tamil Nadu	58	115875	52690
Telangana	21	112267	43182
Tripura	3	61612	15622
Uttar Pradesh	67	36973	28922
Uttarakhand	28	126952	48480
West Bengal	34	57255	33656

Table 2 

**5- Natural Resources**  
a) Forest Cover

Natural resources define the economic growth of a region. Forest cover is one of the major natural resource that provides for the economy and welfare. States with larger forest cover have access to more natural resources and in this way it becomes powerful as a region as compared to others.

Madhya Pradesh with the highest forest cover will have advantage over other states in terms of natural resources from forest. (Table 2)

States	Length of Roads (Kms)	LPG Domestic Consumers	Number of Electrified Houses	Per Capita Availability of Power (Kilowatt-Hour)
Andhra Pradesh	179022	13447001	11186717	1020
Arunachal Pradesh	25362	263025	150951	427.5
Assam	326512	3936216	2749133	265.4
Bihar	206010	7582324	5530277	228.8
Chhattisgarh	97534	2364266	3867881	990.6
Goa	14624	571752	128207	3511.6
Gujarat	182287	8574716	6694051	1714.7
Haryana	46287	5790299	2712671	1871.1
Himachal Pradesh	55593	2013732	1441959	1277.3
Jharkhand	42705	2343277	2269092	229.5
Karnataka	321808	12109163	8398019	1000.5
Kerala	194854	8810144	7091249	693.2
Madhya Pradesh	288931	8577654	6779984	858.1
Maharashtra	608140	23458706	11878487	1258
Manipur	24247	419321	280528	297.6
Meghalaya	13372	198840	323755	582
Mizoram	9831	307884	96994	417
Nagaland	37176	244125	71738	373.1
Odisha	283692	3915685	4564354	635.5
Punjab	105368	8113938	3688646	1793.2
Rajasthan	248156	9947374	6901679	979.2
Sikkim	7450	168589	31652	668.1
Tamil Nadu	261100	18310045	10284578	1337.3
Telangana	-	10467723	4927904	1414.2
Tripura	37384	512023	573087	312.2
Uttar Pradesh	415383	24839294	14916654	466.2
Uttarakhand	62945	2617444	1486636	1252.9
West Bengal	295997	12167353	13692761	514.2

Table 3

**6- Connectivity and Access to Amenities**

a) Length of Roads



Connectivity and transportation determines the access to resources and amenities in a region. The regions with better connectivity have higher chances of trade, industrial growth and transportation. It becomes an important factor to determine regional development.

In India, Maharashtra has the largest road network (Table 3). Maharashtra is one of the core areas of India and well developed in industries, trade and connectivity. All these factors combined result in its growth as a region.

States like Sikkim, Nagaland and Mizoram have the least road connectivity. This is the reason why these regions feel alienated and lay economically backwards. States with low connectivity face issues in transportation and access to amenities from their neighboring regions.

b) LPG Domestic Consumers

The methods used by rural India for cooking have been gas fire and fireplace traditionally. The usage of LPG has significantly grown in the past few decades. The rise in LPG consumers indicates the growth of a region as a whole.

In 2015-2016 Uttar Pradesh had the highest number of LPG consumers including urban and rural areas. (Table 3) The stats denote its growth and welfare. Maharashtra, Karnataka and Tamil Nadu are among the others that are providing LPG and related subsidy for economic growth. Recently, provisions like Pradhan Mantri Ujjwala Yojana have also been started to grant LPG access to the maximum population.

c) Number of Electrified Houses

Electricity is an important part of modern life. Rural India struggles for this basic service. In the past decades the number of electrified houses has witnessed a spike. Electrification has reached in most of the interior villages. It is one of the indicators denoting the regional development.

In 2015-2016 Uttar Pradesh had the largest number of electrified houses. Along with the LPG consumers it also topped the list for electrification. Thus, it can be stated that the growth of Uttar Pradesh as a region has drastically risen.

At the same time states including, Sikkim, Nagaland, Goa and Mizoram have the lowest number of electrified houses. (Table 3) This indicated how some regions enjoy the access to basic amenities while some regions lay backward in terms of progress.

d) Per Capita Availability of Power

Per Capita Availability of Power is the measure of power granted to per head in a region. Goa topped this chart in 2015-2016 (Table 3). Power availability specifies the power development of a region. As industrialization rises the power consumption also grows.

For Goa, the high per capita power denotes its rising urbanization. States of Bihar, Jharkhand, Mizoram and Nagaland have low per capita power availability. This indicates lower industrialization and urbanization.

**IV. Results and Conclusion**

States	Composite Index Value
Andhra Pradesh	0.48
Arunachal Pradesh	0.72
Assam	0.49
Bihar	0.64
Chhattisgarh	0.75
Goa	1.69
Gujarat	0.72
Haryana	0.89
Himachal Pradesh	0.56
Jharkhand	0.45
Karnataka	0.88
Kerala	0.58

Madhya Pradesh	0.90
Maharashtra	1.38
Manipur	0.80
Meghalaya	0.70
Mizoram	0.57
Nagaland	0.76
Odisha	0.69
Punjab	0.56
Rajasthan	0.90
Sikkim	0.95
Tamil Nadu	0.88
Telangana	0.34
Tripura	0.71
Uttar Pradesh	1.53
Uttarakhand	0.54
West Bengal	0.75

### References

- [1]. Ahluwalia, M. S. 2000, Economic Reforms: A policy agenda for the future, Economic Development in India, 25. pp. 19-40.
- [2]. Ahluwalia, M. S. 2002, Economic Reforms in India since 1991: Has graduation worked?, Journal of Economic Perspectives, 16. (3): 67-88.
- [3]. Ghosh, B., Marjit, S., Neogi, C., 1998, Economic Growth and Regional Divergence in India, 1960-1995, Special Article, Economic and Political Weekly.
- [4]. Indian State of Forest Report, Reports 2015-2016.
- [5]. Kant, S. 1999, Spatial Implications of India's New Economic Policy, Tijdschrift, Voor Economische en Sociale Geografie, 90. (1): 80-96.
- [6]. Kar, S. and Sakthivel, S. 2007. Reforms and Regional Inequality in India, Economic and Political Weekly, XLII. (47): 69-77.
- [7]. Krishan, G. 2001. Presidential Address: Development, Environment and Decentralized planning, Annals NAGI, 21. (1): 3-14.
- [8]. Ministry of Road Transport and Highways, Reports 2015-2016.
- [9]. Ministry of Education, Reports 2015-2016.
- [10]. Ministry of Power, Reports 2015-2016.
- [11]. Nagaraj, R. 2000. Indian Economy since 1980: Virtuous Growth or Polarization, Economic and Political Weekly, XXXV. (32): 2831-2838.
- [12]. Neeti Ayog, Reports 2015-2016.
- [13]. Puljiz, J., Malekovic, S., 2015, Regional Income and Unemployment Disparities in Croatia, EU Enlargement and Economic and Regional Development, Session 7.
- [14]. Reserve Bank of India, Reports 2015-2016.
- [15]. Shand, R. and Bhide, S. 2000, Sources of Economic Growth: Regional Dimensions of Reforms, Economic and Political Weekly, XXXV. (42): 3747-3757.
- [16]. Williamson, J. G. 1965. Regional Inequality and the Process of National Development: A Description of the Patterns, Economic Development and Cultural Change, 13. (4): 3-45.

Urvashi Bist, et. al. "Multivariate Analysis of Regional Disparities in India." *IOSR Journal of Humanities and Social Science (IOSR-JHSS)*, 27(07), 2022, pp. 54-60.