

REPORT SUBMITTED TO THE PLANNING AND POLICY SUPPORT
UNIT SOCIETY OF STATE PLANNING COMMISSION OF MADHYA
PRADESH, BHOPAL



EVOLVING DEPRIVATION BASED FUND DEVOLUTION METHOD - A STUDY OF MADHYA PRADESH

Dr. Ganesh Kawadia, Sujay S Phatak

APRIL 2018

PLANNING CHAIR OF STATE PLANNING COMMISSION ON
MICRO ECONOMIC GOVERNANCE, SCHOOL OF ECONOMICS
DEVI AHILYA UNIVERSITY INDORE, MADHYA PRADESH

The paper has tried to develop an index of funds devolution based on the level of deprivation, concentration of population, SC/ST population and forest area in the region using secondary data for 51 districts of Madhya Pradesh. The study suggests that this fund devolution method can be of great use for the devolution of any fund from State to districts as it not only includes the level of deprivation but also the concentration of population and sustained environment while computing the share of funds for each district.

Dr. Ganesh Kawadia is the **Chair Head** of the **State Planning Commission's Chair on Micro Economic Governance** established by the State Planning Commission of Madhya Pradesh, Bhopal at the School of Economics, Devi Ahilya University Indore. Being an accomplished Ex-Professor and retired Head of School of Economics, Devi Ahilya University Indore, he has published nine books and more than 70 research articles in national/international journals. His visionary leadership brought many laurels to the School of Economics under his Headship which include; financial support under **UGC-SAP at DRS Phase – III**, department being identified as a “**Center with Potential for Excellence**” (**CPEPA**) by the **University Grants Commission, New Delhi** and awarded as a “Centre for Excellence in Teaching and Research” by **Government of Madhya Pradesh, Bhopal**. He has been an eloquent public speaker having delivered several addresses in various national and international seminars on Indian Economic Policy Issues, many of which were part of live telecast programs on **UGC EDUSAT Gyanvani Channel**.

Sujay S Phatak is a **Project Fellow** under the **University Grant Commission's Special Assistance Program** at School of Economics, Devi Ahilya University of Indore. He is involved into a series of research projects on various themes under his position and is currently pursuing his PhD in economics at the same department. A co-author of several reports on different issues of policy implication for the State Planning Commission, Government of Madhya Pradesh (India) and a regular contributor of sections in numerous books, he has authored a monograph along with many research papers in his career. His primary research inclination is in the economics of education, subject area of his PhD dissertation while most of his research works are on economic development, sustainability, innovation, employment and inclusive growth. His areas of academic interest include econometrics, mathematical economics and history of economic thought.

For further details write to

Chair on Micro-Economic Governance

Coordinator: Dr. Kanhaiya Ahuja. Phone: +91-99260-20907 | Email: kanhaiya.ahuja@gmail.com

Chair Head: Dr. Ganesh Kawadia. Phone: +91-94253-52521 | Email: ganesh.kawadia@gmail.com

School of Economics, Devi Ahilya University

Takshashila Parisar, Khandwa Road, Indore.

Phone: +91-731-2361087/2363088 (fax) | Email: enquiry@soedavv.ac.in | website: www.soedavv.ac.in

Executive Summary

1. The paper has tried to develop an index of funds devolution based on the level of deprivation, concentration of population, SC/ST population and forest area in the region using secondary data for 51 districts of Madhya Pradesh.

2. The process of developing the index is as follows:

Fifteen out of twenty variables were selected on the basis of their strong correlation with Per Capita Income. To make these indicators additive, we have converted them into standardized format using a distant function. These variables were then classified into three categories viz. SDI, ECOI, and INFI. Thereafter, an overall index of development (CIOD) is calculated by converting the indicators into ratio scale and further normalizing them using the distant function method for construction of composite indexes which are then added up with equal weight. To measure the level of deprivation, inverse value of CIOD is taken into account as the deprivation index. A devolution index is formulated based on the level of deprivation (with 60 percent weight) and share of population (20 percent), share of ST/SC population (10 percent) and the share of forest area (10 percent) which can be the basis of fund allocation from the State to the districts.

3. Based on the calculations of overall index of development, we have found that Indore is the most developed district in the State followed by Bhopal, Jabalpur, Ujjain, Gwalior and others. Singrauli, Umaria, Shahdol, Panna and Dindori are the least developed districts in Madhya Pradesh.
4. The devolution index indicates that Chhindwara needs highest amount of allocation (2.6994 percent) followed by Balaghat (2.6022), Sagar (2.4666), Sidhi (2.4263), and Satna (2.4165) with others. Burhanpur (1.4613), Datia (1.4383), Neemuch (1.4777), Harda (1.3687), Bhopal (1.3149), Agar-Malwa (1.3074) and Indore (1.4892) are the districts to get least amount of allocation from the State.
5. The study suggests that this fund devolution method can be of great use for the devolution of any fund from State to districts as it not only includes the level of deprivation but also the concentration of population and sustained environment while computing the share of funds for each district.

Introduction

The Republic of India is one of the largest and most unique democracies around the world, accommodating around 16.9 percent of a very complex composition of world population in only 2.4 percent of the world surface area. On the top of it, great geographical, cultural and social diversities tend to worsen the situation of management of the economy with equity. Yet, the country is performing quite well on the path of economic growth since its independence, being the seventh largest economy (measured by nominal GDP) and the third largest by Purchasing Power Parity (PPP). The decadal average growth rate of the economy has been over 7 percent for the last two decades. But, this path has not been equal for all. It can be seen that spectacular growth attained by some regions and in some sectors in India, after independence, is in contrast to low levels of development still prevailing in many parts of the country. This unbalanced development creates much havoc and many serious problems in the country and also reflects the failure of planning mechanism adopted by different Governments. Most of the time, Government tried to move on the concept of *“equal treatment for all”* leading to more inequality among different regions of the economy. Less developed regions should have been allotted more funds according to their need. Rationality in distribution of funds was interpreted politically in a much different way during this period. Madhya Pradesh in this case,

is no exception. Only a few districts in the State portray the status of development while the others aren't much developed in terms of socio-demographic, economic and infrastructural end. Thus, proper allocation of funds among various regions is needed to catalyze the development process with equity. This can only be achieved with proper government intervention in terms of fund allocation which can lead to balanced development across different regions of the economy. Following this scenario, the study intends to develop an index of funds devolution based on the level of deprivation and concentration of population in the region. This method of funds allocation is logical to create better opportunities among the districts by the State Government [of Madhya Pradesh].

Theoretical Background

After independence, India chose to be a planned economy with healthy Centre-State quasi federal relations. But the first three quinquennial plans were criticized on the basis of the transfers being more or less *ad hoc* in nature, as described by Ramalingom and Kurup (1991) who further explain that the Forth Plan brought *a well laid out* method, named as the famous 'Gadgil Formula' which formed the base for Central assistance to States as approved by the National Development Council (NDC). The formula was then modified in the Sixth Plan and further revised as 'Gadgil-Mukherjee Formula' in 1990. This was reviewed once more in 2000 and finally after dismantling Planning Commission, the formula was

discontinued. The Planning Commission during its tenure had only a partial success in dealing with the problem of regional disparity, thus continuing it seemed highly unnecessary by the newly formed Government of India (2014) and was then replaced by the NITI Aayog. After NITI Aayog took over, devolution has been increased from the divisible pool. Still, the problem seems to persist among different regions in India. Other attempts towards devolution were made in 2004 when the Ministry of Panchayat Raj (MoPR) appointed the National Council of Applied Economic Research (NCAER) to develop a Devolution Index (DI) to set an accountability framework for the States (Unnikrishnan, 2016). Meanwhile, a *Committee for Evolving a Composite Development Index of States* was constituted by the Government of India, chaired by Dr. Raghuram G Rajan (the then Chief Economic Advisor, Ministry of Finance) to develop a Development Index in order to address the issue of regional disparities and to attain a more balanced and inclusive growth (Rajan, Pandey, Jayal, Ramaswami, & Gupta, 2013). A loosely similar attempt was made by Bhanumurthy et.al. (2016) for examining the link between quality of governance, public expenditure and human development outcomes in the State of Madhya Pradesh. The team constructed a Governance Index (GI) using 22 indicators in five dimensions. This shows that over the years, Government has tried various methods for proper financial devolution to the States. However despite all such efforts, regional disparity is still a major problem

that the Government has to deal with. This study attempts to develop a method of funds allocation which can help the government to properly deal with the problem of imbalanced regional growth.

Objectives

1. To develop the index of economic, socio-demographic, and infrastructural development for Madhya Pradesh at district level
2. To study the association of various indicators of economic, socio-demographic and infrastructural development in the State
3. To develop a Funds Devolution Index of Madhya Pradesh

Methodology

Development in true sense should reflect overall economic, socio-demographic and infrastructural progress. Thus, it is important to develop a criteria based on which the State could allocate funds to its districts for their betterment. Grounded on such thoughts, the devolution index presented in this study is established on a concept that the allocation of funds should be associated with four factors viz. the level of deprivation, concentration of population, SC/ST population and concentration of forest area in each district as major differences among the districts are present not only in the level of development but also in

the density of these variables of overall development. While analyzing the effect of population, its composition in the region should also be considered. Some districts have a high density of population along with higher rate of development (e.g. Indore, Bhopal) while there are many with lower population density with lower rate of development (e.g. Mandla, Sheopur). The cost of delivery of social sector on one hand depends not only on population but also on the concentration of SC/ST and on the other hand the need of the fund depends on the degree of deprivation. Finally we have to give some consideration on the status of environmental friendly efforts. We therefore have tried to assign appropriate weights to both deprivation and other issues of development in the devolution index.

The first task for developing such index is to identify different indicators which can capture the status of economic, social, demographic and infrastructural development as well as the state of environment in the region. We therefore have identified twenty indicators of socio-demographic development, economic development and infrastructural development (see table 1). To make the study more explainable, we then worked out the correlation of these indicators with Per Capita Income of the district which is shown in the table as 'r'. It is quite indicative that some of the variables have better correlation while the others have poor correlation with Per Capita Income.

Table 1: List of All Indicators along with correlation with PCI

No	Name	Unit	Code	r
SOCIO-DEMOGRAPHIC				
1	Infant Mortality Rate	Deaths per 1,000 Births	IMRI	-0.57
2	Population Density	People per square Km	PDI	0.74
3	Sex Ratio	Females per 1000 Males	SRI	0.02
4	Literacy Rate	Actual Figure	LRI	0.50
5	Literacy Difference	Actual Figure	LDI	-0.28
6	Population Under BPL	Percentage to Total Population	BPLI	-0.27
ECONOMIC				
1	Population Involved in Non-Agriculture Activities	Percentage to Total Workers	NAAI	0.80
2	HH with Tap-Water Facility	Percentage to Total HH	HHTWFI	0.39
3	HH with Toilet Facility	Percentage to Total HH	HHTFI	0.85
4	Per Capita Income	INR	IPCI	1.00
5	Industrial Units	Per '000 Sq. Km.	IUI	0.79
6	Electricity Consumption	Per Capita KW	ECI	0.36
7	Credit-Deposit Ratio	Actual Figure	CDRI	0.10
INFRASTRUCTURAL				
1	Number of Schools	Per '00 Sq. Km.	NTI	-0.02
2	Number of PHCs	Per '000 Sq. Km.	PHCsl	0.13
3	Electrified HH	Percentage to Total HH	EHHI	0.49
4	Net Irrigated Area	Percentage to Total Area	NIAI	0.36
5	Number of Pumps	Per Sq. Km.	NPSI	0.29
6	Electrified Villages	Percentage to Total Villages	EVI	0.05
7	Commercial Banks	Per '000 Sq. Km.	CBI	0.82
	Electrified HH	Percentage to Total HH	EHHI	0.49

The Per Capita Income can be taken up as the yard stick of economic development of the region. We therefore have selected only those indicators for this study which have correlation more than ± 0.250 .

Table 2: Final List of Indicators considered in SDI, ECOI and INFI

SDI	ECOI	INFI
Infant Mortality Rate	Population Involved in Non-Agriculture Activities	Electrified HH
Population Density	HH with Tap-Water Facility	Net Irrigated Area
Literacy Rate	HH with Toilet Facility	Number of Pumps
Literacy Difference	Per Capita Income	Commercial Banks
Population Under BPL	Industrial Units	Electrified HH
	Electricity Consumption	

The final selection of the variables for different categories is shown in table 2. From the list of indicators provided in table 1, seventeen are strongly correlated with Per Capita Income.

To make these indicators additive, we have converted them into standardized format using a distant function. The indicator value is thus normalized as,

$$X_i = \frac{X_i - \text{Min}X_i}{\text{Max}X_i - \text{Min}X_i}$$

Where, X_i is the variables X for i^{th} district; $\text{Min}X_i$ is the minimum value of variable and $\text{Max}X_i$ is its maximum value in the State.

After normalizing the variables, the three composite Indexes were calculated by averaging all the indicators for each category, i.e.

$$SDI = \frac{IMRI + PDI + LRI + LDI + BPLI}{5}$$

$$ECOI = \frac{NAAI + HHTWFI + HHTFI + IPCI + IUI + ECI}{6}$$

$$INFI = \frac{EHHI + NIAI + NPSI + CBI}{4}$$

Where the codes have their usual meaning.

Finally we developed the overall index of development of the district called as the *Composite Index of Overall Development (CIOD)*, which shows the level of overall development of a district. The components of CIOD are calculated by converting the indicators into ratio scale and further normalizing them using the distant function method for construction of composite indexes which are then added up with equal weight as the formula demonstrates:

$$CIOD = \frac{SDI + ECOI + INFI}{3}$$

Where, SDI stands for Socio-Demographic Index of Development; ECOI is the Economic Index of Development; and INFI is the Infrastructural Index of Development. To measure the level of deprivation, inverse value of CIOD is taken into account as the deprivation index. This implies that lower the level of development, higher should be the allocation of funds and therefore, more deprived districts would get more funds while keeping in mind their share of population, SC/ST population and concentration of forest cover of the State. This method seems logical as the level of deprivation of each district reflects their need for funds.

Mathematically,

$$\text{Deprivation Index} = 1 - \text{Composite Index of Overall Development}$$

Based on the level of deprivation (with 60 percent weight), share of population (20 percent weight), an additional weightage to SC-ST population (10 percent) and an extra weight to environment (Forest Cover being its proxy) (10 percent), the formula to calculate the devolution index forms to be:

$$\begin{aligned} \text{Devolution Index} &= (0.6 * \text{Deprivation Index}) \\ &+ (0.2 * \text{Share of Population}) \\ &+ (0.1 * \text{Share of SC – ST Population}) \\ &+ (0.1 * \text{Share of Forest Area}) \end{aligned}$$

As can be seen, devolution Index is the weighted sum of the ratios of level of deprivation, share and composition of population and share of sustained environment.

The population of this study comprises of all the 51 Districts of Madhya Pradesh and is based on secondary data, collected from various government portals including Census of India (2011); Economic Survey of Madhya Pradesh (2014-15, 2015-16, and 2016-17); Compendium for Agricultural Statistics MP (2009-10); “*Madhya Pradesh ki Vividh Sankhyiki (2014)*” by Directorate of Economics and Statistics, Government of Madhya Pradesh.

Analysis

To examine the performance of districts on the basis of these dimensions, we have first calculated central value of each dimension using arithmetic mean and then used standard deviation as a measure of dispersion. Then, we used the formula $limits = \bar{X} \pm 0.5 * \sigma$, \bar{X} being mean of indicator and σ as its standard deviation, to set the upper and the lower limits of moderately developed districts. Districts having values higher than the upper limit are considered as developed while districts having values lower than the lower limit are considered as less developed districts. This analysis enabled us to compare variability of districts based on the level of development. Table 3 provides ranks of districts based on different dimensions of CIOD, sorted on the basis of their CIOD ranks in ascending order. Ranks of CIOD, SDI, ECOI, and INFI are shown in the columns adjacent to their right side. A careful look through the table articulates that Indore is topping all the charts while Bhopal, the second most developed district (based on CIOD) which has performed well on the infrastructural and socio-demographic fronts, but is far behind Indore when it comes to economic development. This depicts the level of regional disparity in development among socio-demographic, economic and infrastructural ends in the State.

Table 3: District Ranking based on the SDI, ECOI, INFI and CIOD

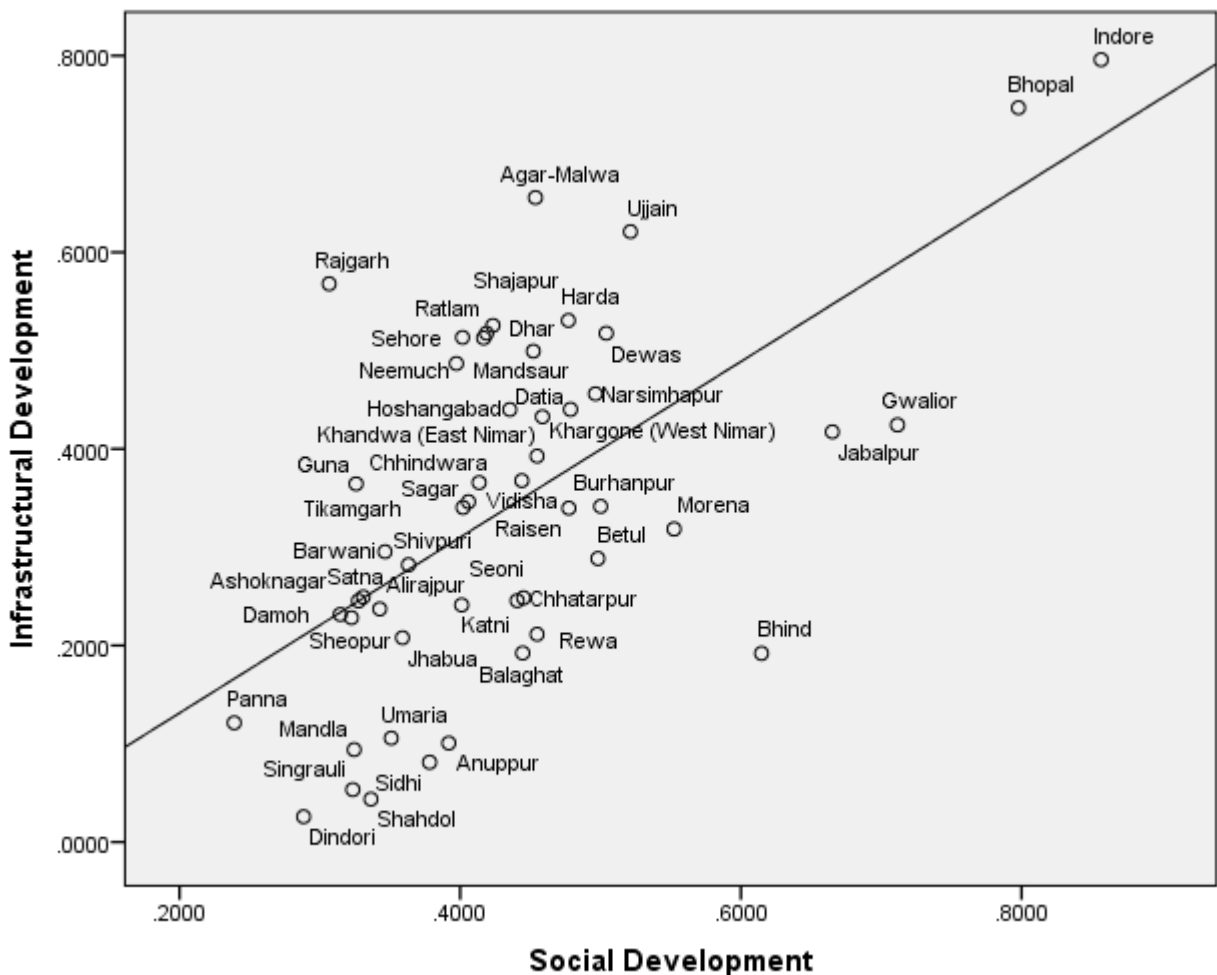
District	CIOD	Rank	SDI	Rank	ECOI	Rank	INFI	Rank
Indore	0.8774	01	0.8567	01	0.9796	01	0.7960	01
Bhopal	0.7462	02	0.7978	02	0.6937	02	0.7470	02
Jabalpur	0.5701	03	0.6652	04	0.6279	03	0.4173	19
Ujjain	0.5593	04	0.5213	07	0.5356	04	0.6210	04
Gwalior	0.5315	05	0.7116	03	0.4585	05	0.4244	18
Dewas	0.4921	06	0.5041	08	0.4545	06	0.5176	09
Harda	0.4566	07	0.4771	14	0.3621	10	0.5306	06
Agar-Malwa	0.4509	08	0.4536	18	0.2435	30	0.6556	03
Ratlam	0.4492	09	0.4188	26	0.4111	07	0.5176	08
Narsimhapur	0.4453	10	0.4964	11	0.3834	09	0.4560	14
Hoshangabad	0.4266	11	0.4354	24	0.4044	08	0.4400	16
Khargone (West Nimar)	0.4168	12	0.4786	12	0.3317	13	0.4402	15
Dhar	0.4158	13	0.4521	19	0.2960	18	0.4994	12
Mandsaur	0.4126	14	0.4167	27	0.3084	16	0.5128	11
Neemuch	0.4077	15	0.3973	33	0.3389	12	0.4868	13
Sehore	0.4000	16	0.4017	31	0.2850	19	0.5134	10
Burhanpur	0.3979	17	0.5001	09	0.3522	11	0.3415	25
Shajapur	0.3943	18	0.4233	25	0.2339	32	0.5256	07
Khandwa (East Nimar)	0.3921	19	0.4548	16	0.3288	15	0.3926	20
Datia	0.3845	20	0.4586	15	0.2622	22	0.4327	17
Morena	0.3792	21	0.5524	06	0.2665	20	0.3185	28
Rajgarh	0.3613	22	0.3066	49	0.2093	38	0.5680	05
Raisen	0.3574	23	0.4774	13	0.2552	24	0.3397	27
Vidisha	0.3565	24	0.4439	22	0.2580	23	0.3677	21
Bhind	0.3525	25	0.6147	05	0.2508	26	0.1919	43
Sagar	0.3496	26	0.4059	29	0.2968	17	0.3462	24
Chhindwara	0.3479	27	0.4135	28	0.2644	21	0.3657	22
Betul	0.3446	28	0.4981	10	0.2473	27	0.2884	30
Katni	0.3389	29	0.4406	23	0.3304	14	0.2456	34
Guna	0.3121	30	0.3258	44	0.2460	28	0.3645	23
Barwani	0.2952	31	0.3464	39	0.2436	29	0.2954	29
Rewa	0.2943	32	0.4548	17	0.2168	36	0.2114	40
Tikamgarh	0.2888	33	0.4020	30	0.1240	47	0.3404	26
Seoni	0.2764	34	0.4010	32	0.1871	40	0.2412	36
Shivpuri	0.2745	35	0.3631	36	0.1783	42	0.2821	31
Satna	0.2744	36	0.3309	42	0.2431	31	0.2494	32
Balaghat	0.2731	37	0.4445	21	0.1824	41	0.1923	42
Alirajpur	0.2675	38	0.3427	40	0.2225	33	0.2372	37
Sheopur	0.2674	39	0.3225	47	0.2515	25	0.2282	39
Chhatarpur	0.2669	40	0.4451	20	0.1069	50	0.2485	33
Ashoknagar	0.2649	41	0.3276	43	0.2217	35	0.2454	35
Jhabua	0.2610	42	0.3589	37	0.2161	37	0.2079	41
Damoh	0.2560	43	0.3145	48	0.2218	34	0.2316	38
Anuppur	0.2112	44	0.3919	34	0.1409	46	0.1007	46
Sidhi	0.2096	45	0.3782	35	0.1694	43	0.0812	48
Mandla	0.1908	46	0.3244	45	0.1539	44	0.0940	47
Singrauli	0.1889	47	0.3235	46	0.1898	39	0.0534	49
Umaria	0.1882	48	0.3509	38	0.1079	49	0.1057	45
Shahdol	0.1761	49	0.3364	41	0.1481	45	0.0436	50
Panna	0.1612	50	0.2390	51	0.1232	48	0.1213	44
Dindori	0.1335	51	0.2884	50	0.0862	51	0.0258	51
Upper Limit	0.4282		0.4996		0.3705		0.4369	
Lower Limit	0.2903		0.3777		0.2126		0.2581	

Further examples can be districts like Bhind, Morena and Balaghat who are among the leading districts at socio-demographic end but are performing very poorly in economic and infrastructural development. Another example of Hoshangabad shows that it is performing very well in economic development but is poor in socio-demographic development and moderate in infrastructural development. Correspondingly, districts like Shajapur and Rajgarh are performing quite well in infrastructural development but still aren't able to use this growth to improve their economic development and social development. On the other hand, there are districts like Chhatarpur, Sidhi, Mandla, Sheopur, Panna, Anuppur, Shahdol, Singrauli, and Dindori which are not much developed on any of the indicative ends. These districts not only contradict the picture of a high rate of growth in Madhya Pradesh but also questions sustainability and equity components of growth, which are much propagated by the government. But this regional and environmental imbalance cannot be solely justified using such descriptive tools. So to look deeper into the problem, considering associations among the three dimensions of development and environment in the districts is also necessary. For this purpose, we have used scatter plots which determine association of districts among the three dimensions of overall development index.

Social Development and Infrastructural Development

Figure 1 shows the association between infrastructural index and socio-demographic index. It can be seen that districts like Bhind, Balaghat, Rewa, Jabalpur etc. are more developed on socio-economic front than their infrastructural end, while Rajgarh, Indore, Bhopal, Ujjain etc. are more developed in infrastructural facilities.

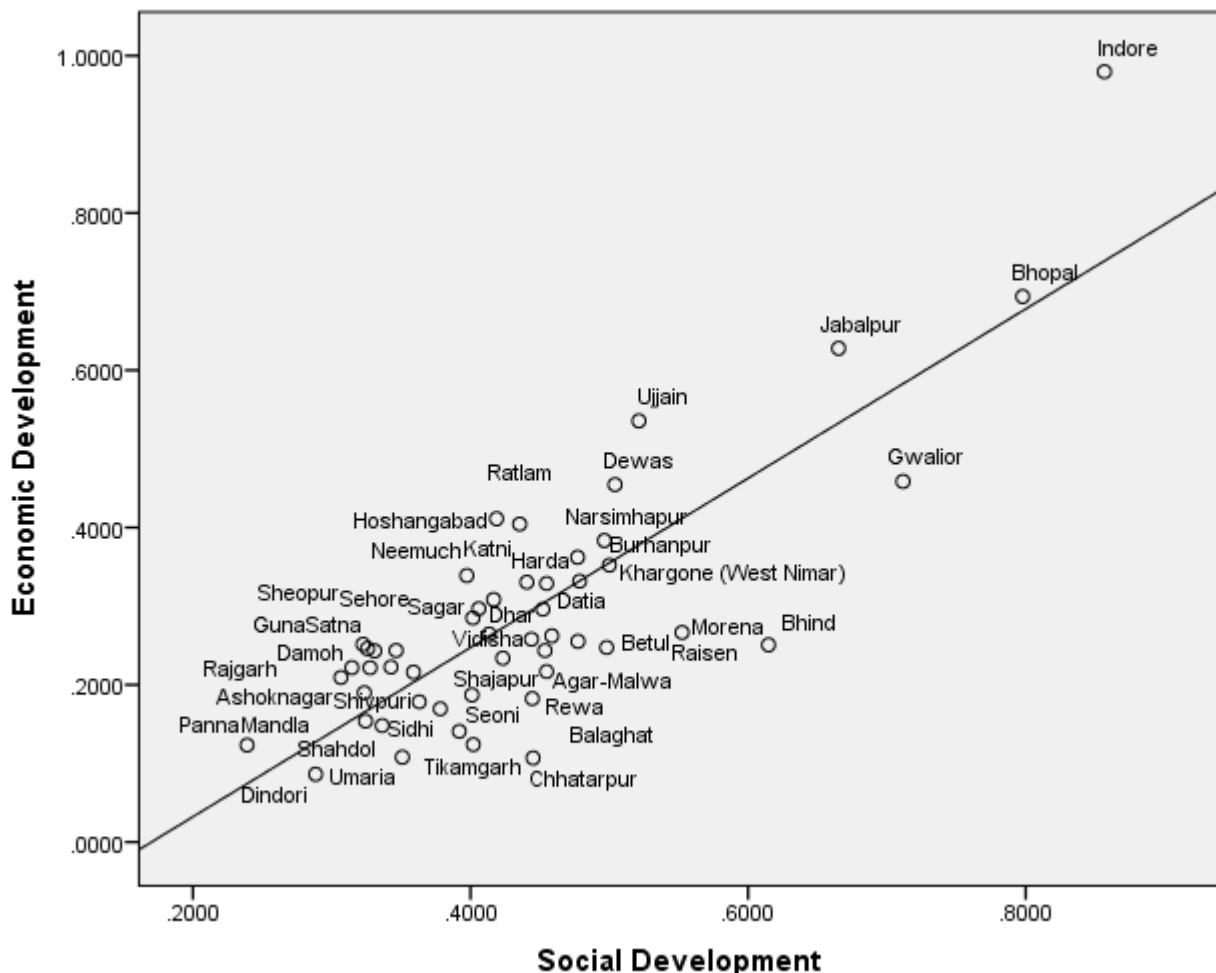
Figure 1: District Scatter Plot between Infrastructural and Socio-Demographic Indices



Economic Development and Social Development

Similarly, Figure 2 (showing association between economic and socio-demographic indices) directs some districts to be better in economic development, e.g. Indore, Ujjain, Dewas, Ratlam, Jabalpur etc. while the others to be more socio-demographically developed e.g. Rewa, Chhatarpur, Bhind, Morena, Betul etc.

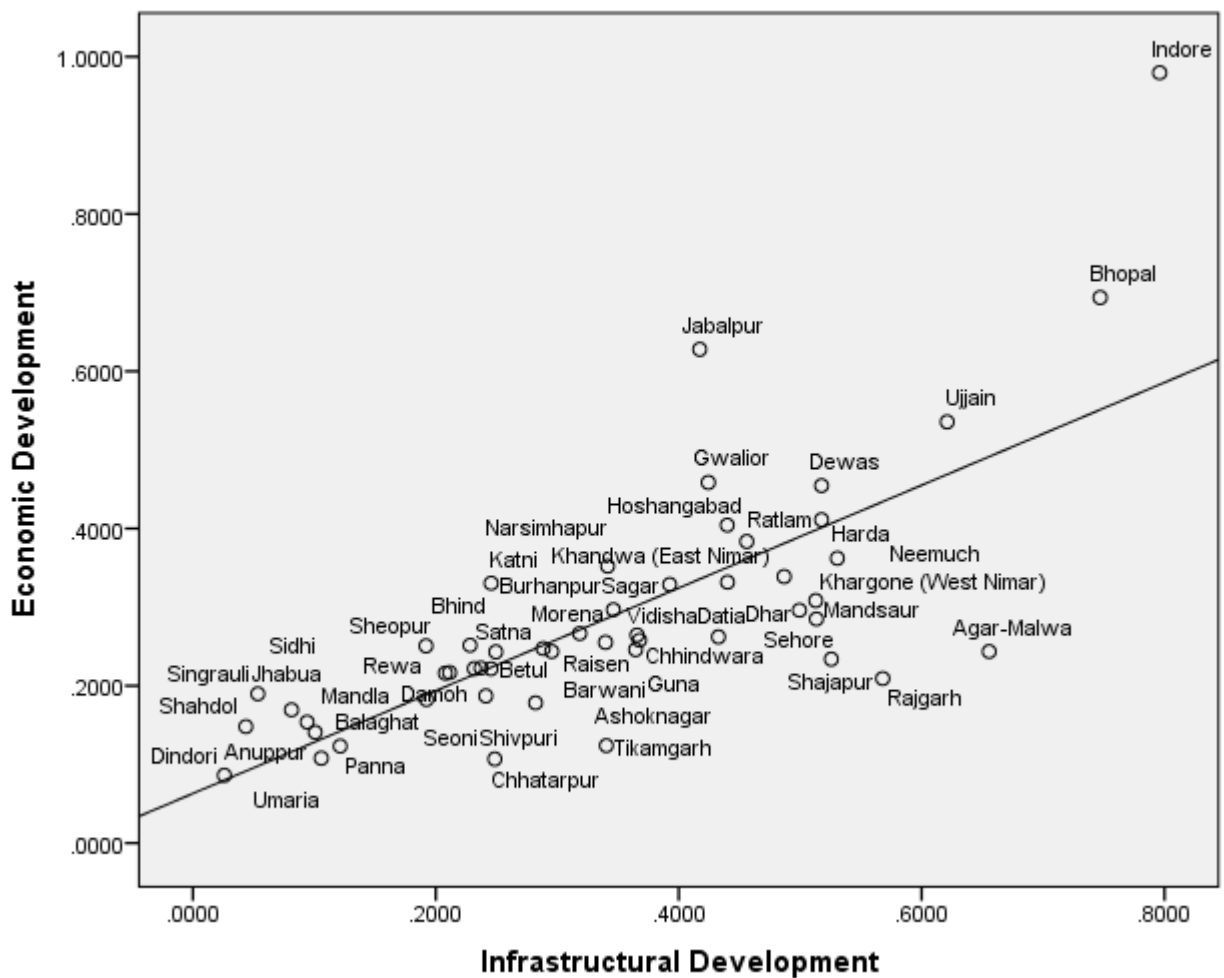
Figure 2: District Scatter Plot between Economic and Socio-Demographic Indices



Infrastructural Development and Economic Development

Further, Figure 3 (showing association between infrastructural and economic indices) illustrates that some of the districts are performing well in infrastructural development (e.g. Barwani, Chhatarpur, Tikamgarh, Rajgarh etc.) while other districts have a higher economic index (e.g. Ujjain, Dewas, Jabalpur, Gwalior, Narsimhapur, Bhind etc.).

Figure 3: District Scatter Plot between Economic and Infrastructural Indices



This suggests that the regional imbalance is not only present but is much higher between the three dimensions of composite index of overall development (CIOD) and the environmental factor. This statement can be verified by taking a closer look at the graphs along with table 3. As explained, there is a high level of variability among the districts at social, demographic, economic, and infrastructural ends.

Overall Development and Devolution Index

Moving towards the overall development, we found that Indore, Bhopal, Jabalpur, Ujjain, Gwalior, Dewas, Harda, Agar-Malwa, Ratlam, and Narsimhapur are the highly developed districts in the State while Hoshangabad, Khargone, Dhar, Mandsaur, Neemuch, Sehore, Burhanpur, Shajapur, Khandwa, Datia, Morena, Rajgarh, Raisen, Vidisha, Bhind, Sagar, Chhindwara, Betul, Katni, Guna, Barwani, and Rewa are moderately developed districts. Singrauli, Umaria, Shahdol, Panna and Dindori are the least five developed districts in the State. This regional imbalance of growth suggests development of a strong method of fund devolution through which needs of the districts could be reviewed and a balanced growth could be achieved in whole State. Along with annexure I, table 4 shows the ranks and figures of districts attained from excel calculations of the devolution Index. The Index, as explained in methodology, is the weighted sum of the ratios of level of deprivation, share of population and sustained environment, making it

a ratio scale variable. The ratio, when multiplied by 100, becomes the percent share of each district in the total funds available. To explain it numerically, a separate column is defined in Table 4 named *Fund Allocation* which shows distribution of a hypothetical figure of INR 1,000,000,000 among districts of the State based on the devolution index. A careful look at the table shows that Indore, being the most developed district in Madhya Pradesh, is entitled to only 1.4892 percent of the total allocation which comes out to be INR 14,892,499.04 from the hypothetical fund. At this point, it is interesting to note that Indore, being the most developed district in the State is entitled to get more share than Harda, which holds seventh rank on the composite index of overall development. The reason of a more deprived district (like Harda) bagging less funds than a less deprived district (like Indore) is the share of overall population and the additional share benefit provided to SC-ST population as it holds 20 percent and 10 percent weight respectively in the index of devolution. Note that the concentration of population in Indore is 0.0448 while Harda has the lowest share of population (0.0078) in the State. Also, SC-ST population in Indore has a share of 0.0282 while Harda has 0.0093 share among the districts. This implies that Indore, being way more developed than Harda needs more funds as it has more population (including SC-ST) to be looked after.

Table 4: Ranking of Districts based on Devolution Index

Rank	District	Devolution Index	Percent Allocation	Fund Allocation (INR)
01	Chhindwara	0.0270	2.6994	26,994,461.59
02	Balaghat	0.0260	2.6022	26,021,508.43
03	Sagar	0.0247	2.4666	24,665,715.61
04	Sidhi	0.0243	2.4263	24,262,801.89
05	Satna	0.0242	2.4165	24,164,920.91
06	Betul	0.0238	2.3794	23,793,565.66
07	Mandla	0.0236	2.3643	23,643,111.72
08	Shahdol	0.0235	2.3453	23,452,546.06
09	Seoni	0.0232	2.3243	23,242,873.97
10	Shivpuri	0.0230	2.3039	23,039,218.45
11	Dindori	0.0230	2.3029	23,029,221.66
12	Rewa	0.0229	2.2892	22,892,432.61
13	Panna	0.0228	2.2813	22,813,100.78
14	Dhar	0.0226	2.2614	22,614,477.91
15	Chhatarpur	0.0222	2.2155	22,155,148.32
16	Damoh	0.0218	2.1828	21,827,570.45
17	Barwani	0.0218	2.1753	21,753,050.20
18	Khandwa (East Nimar)	0.0212	2.1194	21,194,395.91
19	Khargone (West Nimar)	0.0209	2.0864	20,863,959.32
20	Jhabua	0.0208	2.0831	20,830,907.68
21	Sheopur	0.0206	2.0648	20,647,699.76
22	Singrauli	0.0205	2.0513	20,512,772.16
23	Raisen	0.0204	2.0381	20,380,867.48
24	Guna	0.0200	2.0002	20,002,441.24
25	Morena	0.0192	1.9244	19,244,211.25
26	Umaria	0.0190	1.8996	18,995,506.87
27	Katni	0.0190	1.8955	18,955,073.33
28	Alirajpur	0.0188	1.8801	18,801,416.92
29	Jabalpur	0.0187	1.8718	18,718,318.50
30	Tikamgarh	0.0186	1.8563	18,562,900.89
31	Anuppur	0.0184	1.8392	18,392,471.37
32	Hoshangabad	0.0184	1.8383	18,383,067.66
33	Vidisha	0.0181	1.8149	18,148,527.76
34	Ujjain	0.0181	1.8135	18,135,359.13
35	Bhind	0.0180	1.8010	18,009,923.80
36	Dewas	0.0180	1.8001	18,001,307.33
37	Sehore	0.0178	1.7808	17,808,085.06
38	Rajgarh	0.0174	1.7372	17,371,710.14
39	Gwalior	0.0173	1.7320	17,320,434.28
40	Ashoknagar	0.0170	1.6951	16,950,525.94
41	Shajapur	0.0167	1.6680	16,680,171.75
42	Ratlam	0.0164	1.6357	16,357,018.79
43	Narsimhapur	0.0160	1.6031	16,031,380.95
44	Mandsaur	0.0158	1.5758	15,758,151.59
45	Indore	0.0149	1.4892	14,892,499.04
46	Neemuch	0.0148	1.4777	14,776,515.99
47	Burhanpur	0.0146	1.4613	14,613,305.23
48	Datia	0.0144	1.4383	14,383,201.17
49	Harda	0.0137	1.3687	13,687,393.88
50	Bhopal	0.0131	1.3149	13,148,914.19
51	Agar-Malwa	0.0131	1.3074	13,073,837.38

Another dimension of this fact is that if more funds are given to Harda, having a less share of population, it will only increase the per capita cost of delivery of social sector. Another interesting comparison between Umaria and Sagar shows how environmental factor also has an impact over the devolution index. Umaria, being the fourth most deprived district in Madhya Pradesh, is entitled to receive 1.8996 percent of the funds while being on 26th place in the list while Sagar (26th in CIOD) is entitled to receive 2.3718 percent share (third in MP). As Sagar (ranked 8th) is in a much better position (see PrENVI to be 0.0361 in annexure) of sustained environment than Umaria (ranked 31st, PrENVI: 0.0108), it should be given more funds as an award for conserving the environment more than a district like Umaria. Such allocation will encourage other districts to conserve their environment and position themselves in a better position. Thus, it is evident that a deprived district with lesser population and worse condition of environment must be entitled to lesser amount of funds. Similar scenario can be seen in many other districts like Dindori, the most deprived district in the State entitled to less funds than Chhindwara and Sagar, both being much less deprived districts. With many more examples at hand, like Singrauli, Shahdol, Umaria, Agar-Malwa, Panna etc. it can be stated that this index gives every district a chance to undergo a path of development that will be inclusive of their needs.

Conclusion

Primary findings of the study highlight that regional diversity is present to a large extent in Madhya Pradesh. There are many districts which are far more behind in terms of development (e.g. Dindori, Singrauli, Shahdol, Umaria, and Anuppur) than a few which are at the top (Indore, Bhopal, Jabalpur, Ujjain and Gwalior). Further, disparity among different dimensions of overall development, namely socio-demographic development, economic development and infrastructural development, and index of environment were also found among the districts. This method highlights that though Dindori is the least developed district but gets small chunk of the funds than Chhindwara and Sagar mainly because of low population density. This is because its share of overall and SC-ST population is relatively less than other districts having a higher deprivation index. According to our calculations, Chhindwara is entitled to receive highest share of funds followed by Balaghat, Sagar, Sidhi, Satna, Betul, Mandla, Shahdol and others. On the other hand districts like Neemuch, Harda, Burhanpur, Bhopal, and Datia etc. are entitled to lesser share of funds in the State. Agar-Malwa is entitled to receive least amount of share (1.3074 percent). The study thus suggests that this fund devolution method can be of great use for the devolution of any fund from State to districts as it not only includes the level of deprivation but also the concentration of population while computing the share of funds for each district.

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Annexure I: Ranking of Districts based on Deprivation Index and Population Ratio

District	Depl	Rank	PrPop*	Rank	PrPopSCST^	Rank	PrENVI#	Rank
Dindori	0.8665	01	0.0096	47	0.0183	23	0.0345	10
Panna	0.8388	02	0.0139	40	0.0140	40	0.0332	13
Shahdol	0.8239	03	0.0146	37	0.0209	18	0.0340	12
Umaria	0.8118	04	0.0088	49	0.0133	42	0.0108	31
Singrauli	0.8111	05	0.0161	34	0.0198	21	0.0050	39
Mandla	0.8092	06	0.0144	38	0.0244	13	0.0355	09
Sidhi	0.7904	07	0.0154	35	0.0164	27	0.0511	03
Anuppur	0.7888	08	0.0102	45	0.0160	29	0.0034	42
Damoh	0.7440	09	0.0173	31	0.0153	34	0.0326	14
Jhabua	0.7390	10	0.0140	39	0.0336	05	0.0117	30
Ashoknagar	0.7351	11	0.0115	41	0.0095	48	0.0026	44
Chhatarpur	0.7331	12	0.0241	13	0.0177	24	0.0218	20
Sheopur	0.7326	13	0.0094	48	0.0100	47	0.0439	05
Alirajpur	0.7325	14	0.0100	46	0.0250	12	0.0093	35
Balaghat	0.7269	15	0.0232	16	0.0188	22	0.0622	01
Satna	0.7256	16	0.0305	06	0.0266	10	0.0217	21
Shivpuri	0.7255	17	0.0236	14	0.0203	20	0.0304	15
Seoni	0.7236	18	0.0188	25	0.0241	14	0.0385	07
Tikamgarh	0.7112	19	0.0197	23	0.0159	31	0.0004	49
Rewa	0.7057	20	0.0323	05	0.0257	11	0.0097	34
Barwani	0.7048	21	0.0189	24	0.0388	02	0.0121	29
Guna	0.6879	22	0.0170	32	0.0142	38	0.0263	17
Katni	0.6611	23	0.0177	30	0.0175	25	0.0160	25
Betul	0.6554	24	0.0215	17	0.0305	06	0.0447	04
Chhindwara	0.6521	25	0.0286	08	0.0370	03	0.0567	02
Sagar	0.6504	26	0.0325	03	0.0267	08	0.0361	08
Bhind	0.6475	27	0.0233	15	0.0141	39	0.0012	47
Vidisha	0.6435	28	0.0199	21	0.0133	41	0.0108	32
Raisen	0.6426	29	0.0182	27	0.0159	30	0.0341	11
Rajgarh	0.6387	30	0.0211	19	0.0129	43	0.0019	46
Morena	0.6208	31	0.0269	11	0.0162	28	0.0091	37
Datia	0.6155	32	0.0107	43	0.0080	50	0.0020	45
Khandwa (East Nimar)	0.6079	33	0.0179	29	0.0228	15	0.0424	06
Shajapur	0.6057	34	0.0207	20	0.0145	37	0.0004	51
Burhanpur	0.6021	35	0.0104	44	0.0109	45	0.0046	40
Sehore	0.6000	36	0.0179	28	0.0154	33	0.0173	22
Neemuch	0.5923	37	0.0113	42	0.0068	51	0.0103	33
Mandsaur	0.5874	38	0.0183	26	0.0104	46	0.0033	43
Dhar	0.5842	39	0.0299	07	0.0506	01	0.0092	36
Khargone (West Nimar)	0.5832	40	0.0256	12	0.0347	04	0.0162	24
Hoshangabad	0.5734	41	0.0170	33	0.0149	35	0.0303	16
Narsimhapur	0.5547	42	0.0149	36	0.0122	44	0.0170	23
Ratlam	0.5508	43	0.0199	22	0.0225	16	0.0007	48
Agar-Malwa	0.5491	44	0.0078	50	0.0145	36	0.0004	50
Harda	0.5434	45	0.0078	51	0.0093	49	0.0127	28
Dewas	0.5079	46	0.0214	18	0.0209	19	0.0237	19
Gwalior	0.4685	47	0.0278	09	0.0172	26	0.0149	26
Ujjain	0.4407	48	0.0271	10	0.0212	17	0.0254	18
Jabalpur	0.4299	49	0.0337	02	0.0267	09	0.0146	27
Bhopal	0.2538	50	0.0324	04	0.0158	32	0.0046	41
Indore	0.1226	51	0.0448	01	0.0282	07	0.0088	38

*Proportion of Population; ^Proportion of SC-ST Population; #Proportion of Forest Cover (Proxy to Environment)