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Infrastructure and Economic Development in Himachal Pradesh: An Inter District Study

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***Abstract**: In this paper an attempt has been made to provide a comparative picture of inter- district infrastructure and economic development in Himachal Pradesh. It is based on district level secondary data. In order to measure the inter-district disparities in infrastructure and economic development, the indicators have been identified and composite index of Infrastructure and economic development has been formed by using first principal component for two time of periods.*

I. Introduction

Infrastructure is generally defined as the physical frame work of facilities through which goods and services are provided to the public. Infrastructure that makes more sense from an economic standpoint consists of large capital intensive natural monopolies such as highways, other transportation facilities, water and sewerage lines and communication system (Indian Economic Review, 2003)[1].It is well recognized fact that in order to promote substantial growth, a big amount of investment is necessary for developing and building the infrastructure in the country as a whole as well as in the different regions and areas of the country. The existence of infrastructure facilities stimulates more economic growth in agriculture and industries. The absence of adequate infrastructure facilities adversely effects the growth of agriculture and industries (Vasadevarajan, 1980).Himachal Pradesh secures a prime position in economic development among all the hill states in India. Healthy and adequately dispersed infrastructural facilities act as a catalytic agent in promoting growth and minimizing other ills of the economy. Infrastructure is necessary for all kinds of production viz. agriculture, manufacturing or service industries, consumer goods, capital goods or export goods(Tiwari, 2000)[3]. Economic development is the necessity ofthe economy. The economic development depends on the availability and utilization of various natural, human and derived resources.Better developed socio-economic infrastructure attracts more investment to developed states while backward state face multiple problems, as they are not in a position to provide infrastructural facilities on their own. Due to a lack of invertible funds, they are also fail to attract investment, resulting in less developed states with better developed infrastructural facilities have high degree of economic prosperity.

II. Objectives

The study related to the infrastructure and economic development in Himachal Pradesh an inter district study has been taken in the view to achieve the following objectives:-

- To examine the status ofinfrastructure and economic development in Himachal Pradesh
- To examine the inter-state disparities in infrastructure and economic development of Himachal Pradesh.
- To identify the backward districts so that this could be helpful in formulating regional plan for balance regional development.

III. Methodology

The most crucial task was to analyse the patterns of infrastructure and economic development at the district level, where multi-area unit analysis has been used. For this purpose construction of composite index of development was felt imperative for the analysis of the study. Further, in order to examine the inter-district disparities in the levels of infrastructure and economic development, some simple statistical tools such as coefficient of range, coefficient of variation etc., were also used. The methods which have been generally used for construction of composite index of development by pooling several indicators are those of indexing, ranking and Principal Component Analysis (including Factor Analysis). To determine the weights of selected indicators and to identify basic factors, which are crucial for constructing Principal Component Analysis (PCA) based on statistical techniques termed as Factor Analysis.[4]

DISTRICT-WISE COMPOSIT INDICES OF INFRASTRUCTURE DEVELOPMENT

The district-wise level of infrastructural development have been analysed with the help of composite indices of infrastructural development. These indices have been calculated by taking first principal component matrix derived from the inter-correlation matrix of 19 variables. It includes roads, post offices, irrigation, banking, primary agricultural co-operative societies, education and health.

The inter-correlation matrices of the selected 19 variables of infrastructural development separately for the years 2000-01 and 2010-11.

The composite index of infrastructure development for each district at two selected point of time was computed. Such an index for 2000-01 was computed using the following equation:

$ID_1 = (-0.875)Z_1 + (0.897)Z_2 + (-0.834)Z_3 + (0.890)Z_4 + (.891)Z_5 + (-0.855)Z_6 + (0.837)Z_7 + (-0.172)Z_8 + (-0.716)Z_9 + (0.734)Z_{10} + (-0.894)Z_{11} + (0.897)Z_{12} + (-0.846)Z_{13} + (0.930)Z_{14} + (0.830)Z_{15} + (-0.825)Z_{16} + (0.915)Z_{17} + (-0.888)Z_{18} + (0.205)Z_{19}$ ------ (I)

Where ID_1 is composite index of infrastructure development for a district, Z_1, Z_2, Z_3, -------- Z_{19} are the standardized values of variables and figures in parentheses are factor loading or weights. The above equation (1) shows that the coefficient of correlation of infrastructural development ranges between + 0.93 to - 0.89.

The composite index of infrastructure development of a district for 2010-11 was prepared by using the following equation:

$ID_2 = (-0.856)Z_1 + (0.912)Z_2 + (-0.802)Z_3 + (0.911)Z_4 + (.899)Z_5 + (-0.778)Z_6 + (0.774)Z_7 + (-0.110)Z_8 + (-0.677)Z_9 + (0.797)Z_{10} + (-0.754)Z_{11} + (0.841)Z_{12} + (-0.802)Z_{13} + (0.935)Z_{14} + (0.891)Z_{15} + (-0.850)Z_{16} + (0.919)Z_{17} + (-0.849)Z_{18} + (0.380)Z_{19}$ --------- (I)

Where ID_2 is composite index of infrastructure development for a district, Z_1, Z_2, Z_3, -------- Z_{19} are the standardized values of variables and figures in parentheses are factor loading or weights.

The district-wise indices are shown in Table 1. All the districts have been ranked according to their level of socio-economic infrastructural development during the two selected year i.e. 2000-01 and 2010-11. The rank correlation coefficient was statistically significant at 1 per cent level of significance. Inter temporal analysis of the indices as shown that there was no significant change in the ranking pattern during 2001-11 as rank correlation coefficient was 0.99

Table 1: District-wise Indices of Infrastructure Development of H.P.

Sr. No.	Districts	2000-01		2010-11	
		Index	Rank	Index	Rank
1.	Bilaspur	3.98	11	3.77	11
2.	Chamba	17.40	3	14.74	4
3.	Hamirpur	0.00	12	0.00	12
4.	Kangra	8.33	7	8.25	7
5.	Kinnaur	30.22	2	26.94	2
6.	Kullu	16.40	4	14.84	3
7.	Lahaul&Spiti	45.07	1	44.76	1
8.	Mandi	8.06	8	6.95	8
9.	Shimla	14.12	5	12.72	5
10.	Sirmour	10.87	6	9.66	6
11.	Solan	6.70	9	6.32	9
12.	Una	5.71	10	5.64	10
Mean		13.92		12.88	
S.D.		12.59		11.67	
C.V.		90.45		90.57	

Rank correlation coefficient is = 0.99

It is observed from the Table 1 that the level of infrastructural development in Himachal Pradesh during 2000-01, district Lahaul&Spiti was at the top, followed by Kinnour, Chamba and Kullu. While in the same period district Hamirpur was at the bottom, followed by Bilaspur and Una. In 2010-11 the comparative levels of infrastructure development as reflected in the ranking of the districts did not show any significant change. The absolute average index for the state as a whole has not changed significantly as it decreased marginally by 1.04 points during the 2001-11. The value of coefficient of variance increased from 90.45 in 2000-01 to 90.57 in 2010-11. This indicates that the disparities in the level of infrastructure development have increased during the period.

DISTRICT-WISE COMPOSIT INDICES OF ECONOMIC DEVELOPMENT

To analysed the extent of inter-district disparities in terms of various indicators of economic development. Economic development index is prepared with the help of per capita income, urban population, main worker, agricultural worker, net sown area, area under commercial crops, cropping intensity, irrigation intensity, fertilizer consumption, registered factories, factory workers, small scale industrial units, literacy rate and household with latrine (toilets) facilities. It is now imperative to present an aggregated picture for different

districts with the help of composite indices of development. It has been calculated by the technique of 'Frist principal Component Analysis'. The inter-correlation matrices of the selected 20 variables of economic development for the years 2000-01 and 2010-11

The composite index of economic development for each district at two selected point of time was computed. Such an index for 2000-01 was computed using the following equation:

$ED_1 = (-0.672)Z_1 + (0.331)Z_2 + (-0.860)Z_3 + (0.709)Z_4 + (.473)Z_5 + (-0.551)Z_6 + (-0.917)Z_7 + (0.724)Z_8 + (-0.301)Z_9 + (0.515)Z_{10} + (0.646)Z_{11} + (0.311)Z_{12} + (0.271)Z_{13} + (0.832)Z_{14} + (-0.317)Z_{15} + (0.386)Z_{16} + (0.464)Z_{17} + (-0.757)Z_{18} + (0.074)Z_{19} + (0.074)Z_{20}$ ----- (1)

Where ED_1 is composite index of economic development for a district, Z_1, Z_2, Z_3, -------- Z_{20} are the standardized values of variables and figures in parentheses are factor loading or weights.

The above equation (1) shows that the coefficient of correlation of economic development range between + 0.97 to - 0.53.The composite index of economic development of a district for 2010-11 was prepared by using the following equation:

$ED_2 = (0.152)Z_1 + (0.535)Z_2 + (-0.233)Z_3 + (-0.196)Z_4 + (.183)Z_5 + (-0.534)Z_6 + (0.448)Z_7 + (0.407)Z_8 + (0.135)Z_9 + (0.927)Z_{10} + (0.899)Z_{11} + (0.890)Z_{12} + (0.874)Z_{13} + (0.977)Z_{14} + (0.893)Z_{15} + (0.565)Z_{16} + (0.583)Z_{17} + (0.398)Z_{18} + (-0.092)Z_{19} + (0.200)Z_{20}$ --- (II)

Where ED_2 is composite index of economic development for a district, Z_1, Z_2, Z_3, -------- Z_{20} are the standardized values of variables and figures in parentheses are factor loading or weights.

The district-wise indices are shown in Table 2. All the districts have been ranked according to their level of economic development during the two selected year i.e. 2000-01 and 2010-11. The rank correlation coefficient was statistically significant at 1 per cent level of significance. Table 2 revealed that the rank correlation coefficient during the period was 0.826.

Table 2: District-wise indices of Economic Development in Himachal Pradesh

Sr. No.	Districts	2000-01		2010-11	
		Index	Rank	Index	Rank
1.	Bilaspur	18.04	3	7.72	5
2.	Chamba	12.04	9	0.62	9
3.	Hamirpur	21.27	1	9.78	3
4.	Kangra	16.69	6	7.79	6
5.	Kinnaur	5.78	11	0.61	10
6.	Kullu	13.58	8	0.04	11
7.	Lahaul&Spiti	0.00	12	0.00	12
8.	Mandi	17.36	5	4.31	8
9.	Shimla	9.71	10	5.25	7
10.	Sirmour	14.70	7	8.52	4
11.	Solan	18.82	2	25.88	1
12.	Una	17.78	4	11.46	2
Mean		13.81		6.83	
S.D.		5.86		6.94	
C.V.		42.39		101.50	

Rank correlation coefficient is = 0.83.

It is observed from the Table 2 that the level of economic development suggested that district Hamirpur was at the top, followed by Solan, Bilaspur and Una in Himachal Pradesh during 2000-01. While in the same period district Lahaul&Spiti was at the bottom, followed by Kinnaur and Shimla. In 2010-11 the district Solan was at the top, followed by Una, Hamirpur and Sirmour. While again the district Lahaul&Spiti at the bottom, followed by Kullu and Kinnaur. The absolute average index for the state as a whole has changed significantly as it increased by 6.98 points during the 2001-11. The value of coefficient of variance increased from 42.38 to 101.50 during 2001-11. This indicates that the disparities in the level of economic development have increased during the period.

The graphic presentation clearly indicates the growth trend of both the indices i.e. infrastructure development and economic development in Himachal Pradesh. It is presented in figure I. and II.

Figure I: Comparative Assessment between Infrastructure Development and Economic Development in Himachal Pradesh (2000-01)

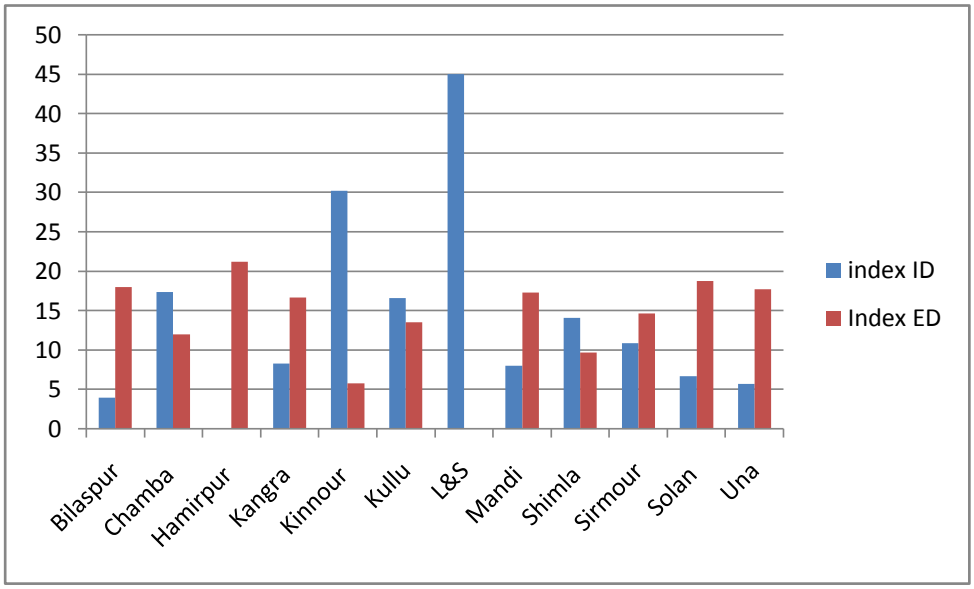
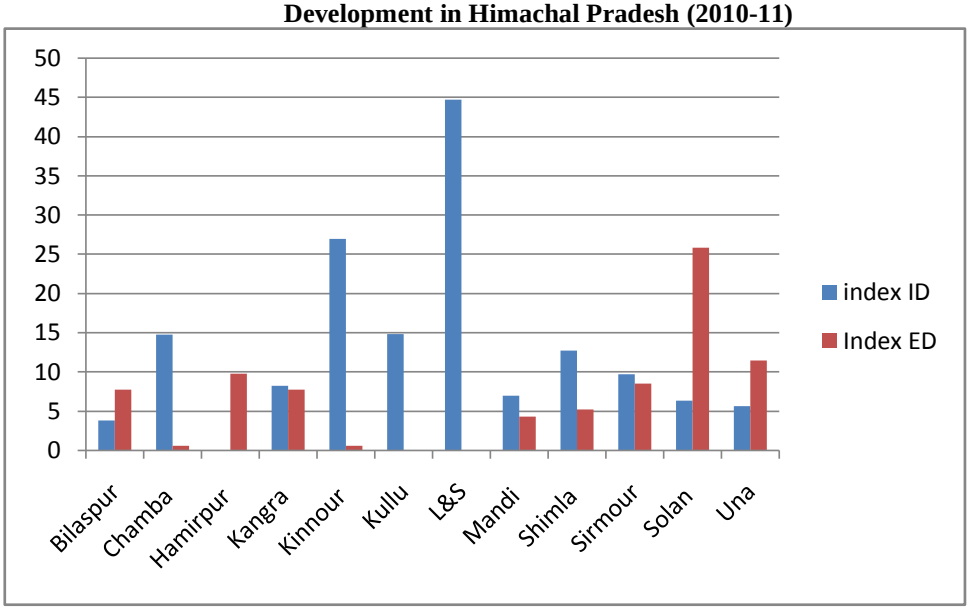


Figure II: Comparative Assessment between Infrastructure Development and Economic Development in Himachal Pradesh (2010-11)



IV. Results And Conclusions

In Himachal Pradesh district-wise result clearly shows that Lahaul&Spiti district is achieving highest value in case of infrastructure development while the composite index of economic development value is almost the minimum level in both the study period. This may be due to at low density of population (2 persons per km.). However the per capita share of infrastructural facilities is at the highest level among all the districts of Himachal Pradesh. Similarly other tribal district of Kinnour rank second in infrastructure development. Moreover in tribal areas particularly in both districts number of infrastructure development programmes such as Hill Area Development Programme (HADP), Tribal Area Development Programme (TADP), Desert Development Programme (DDP), Drought Prone Area Programme (DPAP) and Border Area Development Programmes (BADP) are introduced on war footing.

Regarding composite index of economic development the highly populated districts rank top position during 2000-01. Among these are Hamirpur rank 1st followed by Solan, Bilaspur, una and Kangra. However during 2010-11 Solan district gives manifold value of economic development i.e. 25.88 among all the districts. The reason may be faster growth of industrial development.

The analysis in the study shows that in general there is symbolic relationship between infrastructure and economic development in Himachal Pradesh accept in case of those districts whose location are unfavorable for economic development particularly for agricultural, horticulture and industrial development. Nevertheless quantum of figures relating to per capita income of these districts may be due to the fact that the high altitude districts were backward in agriculture activity due to unfavorable geo-climatic conditions.

On the whole our study shows that for the development of infrastructure as well as economic development well-being is directly related to many socio-economic factors. The result suggested that for the development of standard of living, people in hilly areas the only growth of infrastructural development is not only the parameter of betterment of the economy of whole region. It is also observed that where education is higher those are found to be significantly better progressed area. While Plan formulation should be made for the different physiographic districts of the state based on their resource capacities, level of development, regional stability and the objectives of socio-economic equalityefforts should be made to bring them up to accepted norms. Economic development strategies pay more attention on regional potentialities and maximisation of production.

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