

Working Paper No. 165

**Infrastructure and Growth in a Regional Context:
Indian States since the 1980s**

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December 2005

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First Published December 2005

ISBN 81-89023-23-3

Price Rs.30. 00

Abstract

The central focus of this paper is to underscore emerging patterns and issues in the availability of and access to physical infrastructure in major Indian states during the two decades since the 1980s. A distinct approach followed here desists from the typically preferred techniques of *clubbing* select infrastructure variables to ultimately construct indices across states. Investing in infrastructure, primarily, continues to be a central government activity. In a competing federal polity, which decides the direction and quantum of flow of such central investment to the federating units, the infrastructural outcome at the regional level largely reflects the bargaining strength and tactics of participating states. Poorer states have generally lagged behind in infrastructural endowments; internal resource generation for the purpose has remained a difficult proposition. The private sector has preferred investing mostly in the information and communications sector, but in relatively better-off states. It has shied away from those sectors and regions where accrual of returns is either low or slow to come by. States with poor infrastructure have not been attractive, although urban pockets within these may be. All through both the Centre and states (with few exceptions) have grossly neglected the basic infrastructure in rural areas; the need for state intervention cannot be overemphasized. Detailed studies examining the dynamics of *processes* underlying lopsided growth and endowment of infrastructure across Indian states are essential for understanding the actual context within which development decisions are taken.

JEL Classification : *H54, O18, R53, R58*

Keywords : *Regional disparity; Physical infrastructure; Rural infrastructure; Investment decisions; Indian federalism*

Acknowledgements

This is a substantially revised version of a paper presented at the National Seminar on Accelerated Economic Growth and Regional Balance: Recent Experiences and Implications for Inter-State Variations in Development, organised jointly by the Indian Economic Association, Institute for Studies in Industrial Development and Institute for Human Development and held at ISID, New Delhi, 16-18, September, 2005. Sincere thanks are due to Alakh N. Sharma and T.S. Papola for offering the opportunity, encouragement and comments. Excellent comments and suggestions from the discussants Arvind Virmani and Charan Wadhwa and conference participants, particularly, K.L. Krishna, Ruddar Datt, V.R. Panchamukhi, K.R.G. Nair, R.S. Deshpande and Ravindra Dholakia are gratefully acknowledged. Useful suggestions from Buddhadeb Ghosh are much appreciated. Discussions with Jaya Prakash Pradhan, Amalendu Jyotishi and Tara Nair were of much use in preparing the paper. For research support, Neha Panchal and Ganibhai Memon deserve thanks.

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Infrastructure and Growth in a Regional Context: Indian States since the 1980s

Keshab Das

1. Introduction

Over half-a-century now, in the post World War II scenario, the crucial role of infrastructure in promoting regional development has been identified and eminently articulated in the literature on development economics. The well-known early protagonists, namely, Hirschman (1973), Myrdal (1964), Hansen (1967) and Fleming (1955), while debating strategies of regional growth - balanced or unbalanced - unequivocally underscored the 'transformative' role of infrastructure not merely as an intermediate input "but because it permits and, in fact, invites DPA (directly productive activities) to come in" (Hirschman, 1973: 84). The later genre of scholars probing decline in productivity growth, especially in advanced industrialized nations, could establish positive relation between increased infrastructural investment and economic growth (e.g., Aschauer, 1989; and Munnell, 1992).

Numerous studies, largely concerned with developed nations, have established that a stronger infrastructure base contributed directly or indirectly to the generation of income and employment in a given region. Such an outcome has encouraged policies enhancing investment in infrastructure as a major policy strategy. With economic reforms and globalization gaining ground especially since the 1980s, the sphere and scope of private investment has risen remarkably, often through an approach of public-private participation. In fact, the World Bank documents, notably, the *World Development Report: Infrastructure for Development* (World Bank, 1994), have remained influential in broad-basing the approach at a policy level, focusing upon developing economies. Between the strategies of 'infrastructure first' and 'infrastructure following', policy and planning induced growth in most countries indicates the preference for the former.

While an improved infrastructure could help augment income, economically lagging regions and nations would find it enormously difficult to generate

adequate income to finance infrastructure. Constraints facing economies in promoting infrastructure also reflect the complexity of the institutional framework within which they function. In the Indian context, a few detailed studies particularly during the 1990s and beyond have analysed links between availability of infrastructure and regional growth.¹ Despite differences in methodological sophistication in these studies, two broad findings can be surmised from the literature. First, inter-state convergence in income has not occurred at least since the 1970s; rather, differences between richer and poorer states have risen during the 1990s.² Second, at least, variations in physical (core) infrastructure across states largely explain the persisting regional income inequalities. It needs to be emphasized, however, that in addition to the fewness of such studies, one hardly finds any meaningful enquiries into the question of why certain infrastructure failed to be made available in a certain state. Probing the processes influencing the provision of infrastructure would yield greater insights in a federal set-up as complex as it is in India.

2. Focus and Approach of the Study

Keeping the aforesaid available literature in view, the central focus of this paper is to underscore emerging patterns and issues in availability of access to physical infrastructure in major Indian states during the period starting from the 1980s. A distinct approach followed here desists from the typically preferred techniques of clubbing select infrastructure variables to ultimately construct indices across states. While such composite indices provide an impression about state ranks in terms of infrastructure endowment, the aggregative picture conceals the status of provision of individual key infrastructure. Eventually, the absence of infrastructure-specific analyses obfuscates the dynamism of provisioning, especially the role played by public and private investment. This paper exclusively considers certain important physical infrastructure, namely,

¹ For example, see, Barnes and Binswanger (1986); Das and Barua (1996); Ghosh and De (1998 and 2004); Anant *et al.* (1999); Sahoo and Saxena (1999); Fan *et al.* (2000); Nagaraj *et al.* (2000); and Majumder (2003).

² Numerous studies on regional growth in India, have established a widening of disparities in state incomes. For example, see, Bhattacharya and Sakthivel (2004); Bandyopadhyay (2003); Sachs *et al.* (2002); Singh (1999); and Rao *et al.* (1999). For an excellent review of the issues, covering the period 1965-2000, see, Chaudhuri *et al.* (2005).

transportation, power, telecommunications, irrigation, drinking water and sanitation. With reference to 18 major states, this paper confines the analysis to three time points, 1980-81, 1990-91 and 2000-01.

3. State Incomes and the Elusive Convergence

Persistence of regional disparities in growth in India has remained a familiar phenomenon at least since the 1960s; the basic flaw with Indian Planning had been the lack of a spatial development perspective (Das, 1993). As regretted by an early important work, "it is interesting to note that, while Indian planning models have become fairly sophisticated in relation to inter-temporal phasing and perspective planning, there has been no comparable extension of analysis to questions of spatial planning. This is somewhat surprising in a country with a federal set up and where the constituent states have come to follow increasingly inward looking policies" (Bhagwati and Chakravarty, 1969: 28).

Even by the early 1980s, it was disturbing to note that though the so-called 'backward' states had made the 'expected' efforts to improve their economic conditions, the financial transfer policy of the centre had not been 'appropriately' progressive to prevent the growing disparities (Ansari, 1987). As another intensive study established that all the central agencies entrusted with the task of resource allocation among the states, "have without exception failed to bring succor to the poorer states. All the major instruments of regional policy have failed to arrest widening trend in regional disparities in India. In fact, some of the agencies wielding these instruments had actually contributed to the accentuation of the divergence trends as they only acted as conduits for the outflow of savings from the poorer to the richer regions" (George, 1988: 235-6). So far as the recent period, 1980-2001, is concerned, it has been observed that going by the distribution of Finance Commission awards among various states, based on their income position, no significant improvement has been witnessed. "It is clearly evident that each Finance Commission tried to address the issues on hand at that point of time rather than addressing the improvement of financial position of states in a sustainable manner" (Kannan *et.al.*, 2004: 491). Especially, during the 1990s there was "considerable deterioration" of the states' fiscal position.

That inter-state disparities in income have worsened since the 1980s has been strongly established. Whether one considers the SDP (Bhattacharya and

Sakthivel, 2000) and per capita NSDP (Table 1), the conclusion hardly varies. Even when state level gross fixed capital formation is taken for analysis convergence seems to be absent. Moreover, the relative ranking of the states has also remained practically unchanged; for instance, the top five and bottom five states in Table 1, have maintained their position during the three time points under study.

Table 1: Per Capita Net State Domestic Product

(In Rs.)

State	1980-81	1990-91	2000-01
Andhra Pradesh	1380	2060	9982
Assam	1284	1544	6157
Bihar	917	1197	3345
Goa	3145	4883	26106
Gujarat	1940	2641	12975
Haryana	2370	3509	14331
Himachal Pradesh	1704	2241	10942
Jammu & Kashmir	1776	1784	7383
Karnataka	1520	2039	11910
Kerala	1508	1815	10627
Madhya Pradesh	1358	1696	7003
Maharashtra	2435	3483	15172
Orissa	1314	1383	5187
Punjab	2674	3730	15390
Rajasthan	1222	1942	7937
Tamil Nadu	1498	2237	12779
Uttar Pradesh	1278	1652	5770
West Bengal	1773	2145	9778
India	1563	2109	9508
CV	0.37	0.46	0.55

Note: Figures for 1980-81 and 1990-91 are at 1980-81 prices and those for 2000-01 are at 1993-94 prices.

Source: EPW Research Foundation (2003)

4. Availability of Physical Infrastructure

Whether regional disparities in income reflects or gets reflected in differences in infrastructural endowment, needs to be explored. As suggested earlier, we shall attempt such an enquiry by observing state level distribution of important types of physical infrastructure, namely, surface transport, power, telecommunications and irrigation.

Surface Transport

A look at the main surface transport infrastructure, namely, national highways and railways, indicates contrasting patterns of development of these sectors across states. A clear decline in the coefficient of variation (CV) of the density of national highway route length between 1980-81 and 2000-01 (Table 2) shows improvement in the share of this transport in the relatively lagging states, as in case of Bihar and Madhya Pradesh. However, one notices hardly any changes in the CV so far as railway route length distribution is concerned (Table 3). Marginal additions in route length can be seen only in a few states. It is important to note here that these two forms of infrastructure are under the Central List and, hence, depends upon individual state's articulation at the centre for investment.

Table 2: Density of National Highways by State

(km of length per '000 sq. km of geographical area)

State	1980-81	1990-91	2000-01
Andhra Pradesh	9	9	15
Assam	28	28	36
Bihar	13	12	52
Goa	56	56	73
Gujarat	7	8	13
Haryana	15	15	31
Himachal Pradesh	11	13	21
Jammu & Kashmir	3	3	4
Karnataka	10	10	19
Kerala	21	21	37
Madhya Pradesh	6	7	21
Maharashtra	10	10	12
Orissa	10	10	21
Punjab	20	19	31
Rajasthan	7	8	13
Tamil Nadu	14	15	29
Uttar Pradesh	8	9	24
West Bengal	18	19	22
India	10	10	18
CV	1.24	1.16	0.92

Source: CMIE, *Infrastructure*, relevant volumes.

Table 3: Statewise Distribution of Railway Route Length

(km of length per '000 sq. km of geographical area)

State	1981-82	1990-91	2000-01
Andhra Pradesh	17.39	18.26	18.71
Assam	27.58	31.45	32.08
Bihar	30.82	30.53	36.55
Goa	19.75	21.35	18.65
Gujarat	28.73	26.97	27.1
Haryana	34.09	33.93	35.01
Himachal Pradesh	4.57	4.8	4.83
Jammu & Kashmir	0.35	0.35	0.43
Karnataka	15.7	15.98	15.51
Kerala	23.49	25.32	27.02
Madhya Pradesh	12.95	13.23	15.56
Maharashtra	17.32	17.66	17.74
Orissa	12.71	12.86	14.83
Punjab	42.78	42.89	41.74
Rajasthan	16.42	17.03	17.32
TN	29.96	30.85	32.24
Uttar Pradesh	30.2	30.32	29.12
West Bengal	41.85	43	41.26
India	18.63	18.97	19.17
CV	0.63	0.62	0.61

Source: CMIE, *Infrastructure*, relevant volumes.

However, when one considers the state highways, as Table 4 shows, the data on its density during the three time points indicate efforts at the regional level, backed up by investible resources. Not surprisingly, advanced and proactive states, namely, Maharashtra, Gujarat, Haryana and Kerala have been in the forefront of promoting this crucial infrastructure. The states which have made the least progress are Madhya Pradesh, Assam, Bihar and Orissa; it reflects the inability of these states to mobilize resources for financing state highways.

Table 4: Density of State Highways

(km of length per '000 sq. km of geographical area)

State	1980-81	1990-91	1998-99
Andhra Pradesh	19.8	31.5	31.9
Assam	27.6	24.2	23.1
Bihar	24.1	24.1	23.5
Goa	-	-	62.7
Gujarat	46.7	97.2	101.0
Haryana	70.9	70.9	70.9
Himachal Pradesh	58.3	65.9	66.1
Jammu & Kashmir	3.1	3.1	3.1
Karnataka	40.7	58.8	52.2
Kerala	52.9	52.7	97.0
Madhya Pradesh	25.9	26.4	26.6
Maharashtra	61.6	99.4	108.0
Orissa	18.2	18.8	26.0
Punjab	37.7	43.2	43.0
Rajasthan	22.4	21.2	29.4
Tamil Nadu	13.9	14.7	32.4
Uttar Pradesh	27.1	33.2	32.1
West Bengal	35.5	38.9	38.5
India	29.0	38.7	42.0
CV	0.64	0.72	0.71

Source: CMIE, *Infrastructure*, relevant volumes.**Electricity**

Availability and consumption of electricity, the vital economic infrastructure, is a clear sign of a region's progress and future potential of growth. As shown in Table 5, in terms of per capita electricity consumption across states, again, advanced states such as Gujarat, Punjab, Goa, Maharashtra and Tamil Nadu are far ahead of low-consuming states as Assam, Bihar, Uttar Pradesh, West Bengal and Madhya Pradesh. Further, the inter-state disparity (as indicated by the CV) has risen during the two decades, 1980s and 1990s.

Table 5: Statewise Per Capita Consumption of Electricity in India

(In kwh)

States	1980-81	1990-91	2000-01
Andhra Pradesh	102	245	433
Assam	33	94	104
Bihar	74	110	145
Goa	-	452	810
Gujarat	237	469	854
Haryana	206	400	544
Himachal Pradesh	66	209	343
Jammu & Kashmir	74	193	286
Karnataka	151	296	412
Kerala	113	188	329
Madhya Pradesh	100	247	295
Maharashtra	237	411	552
Orissa	114	271	343
Punjab	304	606	842
Rajasthan	99	201	350
TN	186	323	599
Uttar Pradesh	83	166	191
West Bengal	118	148	208
India	132	253	366
CV	0.56	0.55	0.63

Source: CMIE, *Basic Statistics Relating to the Indian Economy*; and Government of India, *Statistical Abstract of India*, relevant volumes.

Telecommunications

Access to telephones has been one of the fast growing modern infrastructures in the country during the recent decades. Table 6 provides state level teledensity (number of telephone connections per 100 population) figures over a decade, 1991-92 and 2000-01. It may be observed that states where teledensity has risen sharply include the advanced and middle level ones. Further, as the rising value of CV suggests, the disparity in access between the states has grown during the period. One clear implication of such a scenario is that even during the period of reforms, the poorer states have failed to catch up with the much-acclaimed 'communications revolution' and not been able to derive benefits of major advancement in the sphere of information and communications technology (ICT). This is not to undermine the significant achievement of rural telephony, the single most important success story in the sphere of physical infrastructure in India.

Table 6: Teledensity by States

(No. of telephones per 100 population)

States	1991-92	2000-01
Andhra Pradesh	0.56	4.1
Assam	0.21	1.3
Bihar	0.15	0.9
Gujarat	1.17	5.2
Haryana	0.77	4.0
Himachal Pradesh	0.77	5.9
Jammu & Kashmir	0.4	1.7
Karnataka	0.82	4.7
Kerala	1.04	7.6
Madhya Pradesh	0.41	2.0
Maharashtra	1.5	7.2
Orissa	0.25	1.5
Punjab	1.1	6.8
Rajasthan	0.41	2.5
TN	0.87	5.9
Uttar Pradesh	0.27	1.7
West Bengal	0.49	2.7
India	0.67	3.2
CV	0.58	0.85

Source: <http://www.indiastat.com>

Irrigation

Another important infrastructure for rural India is the availability of irrigation; as is well known, those states which experienced prosperity through the Green Revolution, had rich endowment of irrigation infrastructure. As shown in Table 7, the decline in the CV of irrigation intensity would suggest an apparent improvement of access to this infrastructure across states. But it is obvious that at the all India level, the irrigation availability position has hardly changed. Nevertheless, it is unclear, if such a result is influenced by the rather unusual fact of a discernible decline in irrigation intensity for states such as Punjab, Haryana and even Tamil Nadu. Greater probing is called for to comprehend this phenomenon.

Table 7: Statewise Irrigation Intensity

(Ratio of gross irrigated area to gross cropped area)

States	1980-81	1990-91	2000-01
Andhra Pradesh	0.35	0.33	0.42
Assam	0.17	0.15	0.14
Bihar	0.33	0.32	0.36
Goa	0.09	0.13	0.13
Gujarat	0.22	0.24	0.30
Haryana	0.61	0.44	0.48
Himachal Pradesh	0.16	0.10	0.11
Jammu & Kashmir	0.40	0.28	0.28
Karnataka	0.16	0.18	0.21
Kerala	0.13	0.11	0.13
Madhya Pradesh	0.11	0.18	0.28
Maharashtra	0.12	0.09	0.13
Orissa	0.20	0.20	0.25
Punjab	0.85	0.52	0.49
Rajasthan	0.22	0.20	0.29
Tamil Nadu	0.51	0.36	0.46
Uttar Pradesh	0.46	0.41	-
West Bengal	0.20	0.22	0.20
India	0.29	0.26	0.30
CV	0.71	0.48	0.62

Source: CMIE, *Infrastructure*; CMIE, *Agriculture*; and Government of India, *Statistical Abstract of India*, relevant volumes.

As expected, a perusal of infrastructure availability in the states confirmed that poorer states, by and large, lagged behind their advanced counterparts. To what extent the individual states were responsible for the extent and level of infrastructure that they are endowed with could be best understood by exploring their efforts both at endogenous resources mobilization and influencing the central investment decisions. Such an exercise, however, has not been carried out here. Instead, through a regression analysis, we have tried to show if state incomes are related to the availability of certain key physical infrastructure.

5. Income and Infrastructure at State Level: Regression Results

In order to examine the relationship between income and infrastructure at the regional level, we have presented results of a simple linear regression analysis

using OLS method, which shows how per capita NSDP is determined by a certain chosen infrastructure variables. This exercise has been undertaken for 18 states taking three time points, 1980-81, 1990-91 and 2000-01 and for independent variables such as density of national highways (NH), density of rail route (Rail), irrigation intensity (Irr), per capita consumption of electricity (Ele) and teledensity (Tel). For the purpose, initially the density of state highways was also considered as an independent variable. However, due to multi-collinearity problem this variable was dropped later. It may be noted here that the variable 'Tel' was found to have strong collinearity with the variable 'Ele' for the year 1990-91 (the coefficient of correlation was 0.74). Of these two variables, for the year 1990-91, the coefficient of determination (R^2) was high when 'Ele' was considered instead of 'Tel'. Hence 'Tel' has been dropped in this regression. However, for 2000-01, the collinearity between the variables being strong (correlation being 0.67, but R^2 was high by introducing 'Tel'), 'Ele' has been dropped in this regression. For 1980-81, as no data on 'Tel' was available, only 'Ele' has been considered.

Table 8: Descriptive Statistics of the Variables

1980-81			
Variable	Mean	Standard Deviation	N
NSDP80	1727.5556	581.68217	18
NH80	14.7778	12.01252	18
Rail80	22.5922	11.66318	18
Irr80	0.2939	0.20457	18
Ele80	135.1176	73.90947	17
1990-91			
NSDP90	2332.2778	966.37837	18
NH90	15.1111	11.84155	18
Rail90	23.1544	11.78299	18
Irr90	0.2478	0.12526	18
Ele90	279.3889	139.08657	18
2000-01			
NSDP01	11709.667	5239.28080	18
NH01	26.1128	16.12992	18
Rail01	23.6500	11.77763	18
Tel01	3.8604	2.26670	17
Irr01	0.3718	0.24661	17

From the regression results (Tables 8 and 9) it may be observed that during the early 1980s the density of national highways and per capita consumption of electricity were important infrastructure variables that influenced the level of per

capita state income. Similarly, by the early 1990s, national highways continued to be an important infrastructure, although one notices a slight decline in the value of standardized beta coefficient for 'Ele'. By the turn of the 20th century, teledensity had assumed a major role in influencing state income. It may be noted that during the entire period, 1980-81 to 2000-01, all the four selected infrastructure variables had grown in importance in impacting per capita state income; the rising values of adjusted R² clearly establish that.

Table 9: Regression Results

Model	Unstandardized Coefficients		Standardized Coefficients	t
	B	Std. Error	Beta	
1980-81				
Constant	827.510	200.713	-	4.123*
NH80	22.377	14.686	0.301	1.524
Rail80	-15.827	9.305	0.399	-1.701***
Irr80	398.619	433.113	0.171	0.920
Ele80	5.762	1.186	0.895	4.859*
Dependent Variable NSDP80 Adjusted R ² = 0.644				
1990-91				
Constant	481.495	312.342	-	1.542
NH90	38.309	10.794	0.469	3.549*
Rail90	-5.811	11.771	-0.071	-0.494
Irr90	65.241	1152.164	0.008	0.057
Ele90	4.976	0.826	0.716	6.023*
Dependent Variable NSDP90 Adjusted R ² = 0.804				
2000-01				
Constant	4825.270	986.893	-	4.889*
NH01	-134.400	37.627	-0.440	-3.572*
Rail01	88.929	40.533	0.303	2.194**
Tel01	1217.772	147.965	0.759	8.230*
Irr01	3661.858	1538.663	0.253	2.380**
Dependent Variable NSDP01 Adjusted R ² = 0.877				
* Significant at 1 per cent level ** Significant at 5 per cent level *** Significant at 10 per cent level				

By implication, these results show that greater access to key physical infrastructure could be a contributing factor in enhancing the per capita state income. Nevertheless, the neglect of rural areas in terms of infrastructure

remains a pervasive phenomenon. Even the so called advanced states have failed to improve the state of basic infrastructure in rural regions. We shall discuss this aspect in the following section.

6. Rural Basic Infrastructure: A Neglected Area

Although rural poverty ratio has declined during the 1980s through 1990s, the absolute number of people in poverty has not declined substantially; abject poverty still remains ubiquitous in rural regions. Absence or inadequacy of basic infrastructure continues to plague the progress in numerous villages and habitations. Even during the reform era, the dismal state of rural infrastructure underscores the persistent neglect this sector has suffered from.

In this section, we have focused on three components of basic infrastructure, namely, electrification, drinking water and sanitation, which contribute immensely to enhance productive activity as well as quality of life (Table 10). Given the strong linkage between electricity and rural development (Das, 2004), the coverage has been very low in states such as Bihar, Orissa, Uttar Pradesh and West Bengal, ranging between just 5 and 20 per cent. What is still unknown from the data on electricity is the actual hours per day of supply and the voltage available in the villages. In fact, despite growing household demand for energy consumption in the rural areas, electricity is yet to reach another 80,000 or, above 12.5 per cent of all villages.

The figures for coverage of rural households by safe potable water seem quite encouraging. However, as has been argued elsewhere, such data are remarkably misleading. More often than not these figures are gross overestimates as there exist serious definitional anomalies regarding what and how habitations be classified as 'fully', 'partially' and 'not covered' by public safe sources; this database influences intervention. Various field survey based studies have commented upon the reliability of such official statistics.³

One of the most neglected infrastructures in rural India is the availability of sanitation facilities. In poorer states, as in Orissa, Madhya Pradesh and Bihar the coverage of this facility is abysmally low. What, however, is striking is that even

³ For detailed discussions, see, Das (2001).

in many developed states, the corresponding figures are very poor. For instance, in the two top ranking developed states, namely, Maharashtra and Gujarat, a meagre 18.21 per cent and 21.65 per cent of rural households have some access to sanitation facilities. Irrespective of the economic status, an overall low coverage of rural households in terms of access to toilets is a blotch on development, irrespective of the macroeconomic regime being pursued.

Table 10: Coverage of Rural Households by Electricity, Drinking Water and Sanitation

(Percentage of households)

States	Electrification		Drinking Water		Sanitation	
	1991	2001	1991	2001	1991	2001
Andhra Pradesh	37.50	59.65	48.98	78.09	6.62	18.15
Assam	12.44	16.54	43.28	75.53	30.53	59.57
Bihar	5.57	5.13	56.55	87.43	4.96	13.91
Goa	81.82	92.43	30.54	85.71	29.99	
Gujarat	56.43	72.12	60.04	79.23	11.16	21.65
Haryana	63.20	78.50	67.14	73.40	6.53	28.66
Himachal Pradesh	85.86	94.48	75.51	85.73	6.42	
Jammu & Kashmir		74.77		68.01		
Karnataka	41.75	72.16	67.31	73.88	6.85	17.40
Kerala	41.95	65.53	12.22	86.50	44.07	81.33
Madhya Pradesh	34.49	62.32	45.56	72.67	3.64	8.94
Maharashtra	58.45	65.17	54.02	82.77	6.64	18.21
Orissa	17.45	19.35	35.32	67.61	3.58	7.71
Punjab	76.98	89.46	92.09	95.82	15.79	40.91
Rajasthan	22.44	44.02	50.62	71.43	6.65	14.61
Tamil Nadu	44.49	71.18	64.28	86.68	7.17	14.36
Uttar Pradesh	10.96	19.84	56.62	88.75	6.44	19.23
West Bengal	17.75	20.27	80.26	79.56	12.31	26.93
India	30.54	43.52	55.54	80.46	9.48	21.92
CV	0.84	0.66	0.35	0.10	1.22	0.92

Source: Government of India (1997 and 2003).

It is only, of late, that rural infrastructure has been attracting policy attention. There is a clear urgency to address the serious issue of providing these basic amenities in rural areas. That the private capital has shied away from these no- or low-paying investment has been acknowledged in the 10th Plan document itself (Das, 2005).

7. Case for Investment by the State in Poor Regions

The recent study on competitiveness of Indian states (NPC, 2004) ranks, from 'bigger' states, such as Maharashtra, Gujarat, Punjab, Karnataka and Kerala as top five and those Orissa, Rajasthan, Bihar, Uttar Pradesh and Assam as least competitive. Similarly, from the smaller states, Goa and Himachal Pradesh occupy first and third position in terms of the same ranking. These estimates take into account such criteria as economic strength, business efficiency, governance quality, human resources and infrastructure. Hence, in terms of business attractiveness of states, it is once more made clear that poorer states have failed to catch up with their better-off counterparts; the inadequacy of infrastructure continues to plague progress.

Further, in the rural regions, the evident reluctance of private investors in rural infrastructure projects has been based on not only no or low returns to their capital but also uncertainties and delays involved in realising anticipated revenue from the rural poor. This *shying away syndrome* of private capital from rural *unprofitable* projects has been widely observed and that calls for a major role of the state in promoting basic infrastructure (Das, 2005: 6). Acknowledging the necessity of a growing role of the government in promoting rural infrastructure, the *Draft Approach Paper: Tenth Five Year Plan 2002-2007*, notes that "It will have to increase in some areas of infrastructure development which are *unlikely to attract private investment* e.g., rural infrastructure and road development" (<http://planningcommission.nic.in>, Chapter 1, p. 2. Emphasis ours).

At this stage, it may be useful to look into the sources of financing various types of physical infrastructure. Table 11 presents a compilation of major sources of investment in infrastructure in India during the period 1980s and beyond. From a traditionally near-monopoly control of infrastructure by the centre, especially during the pre-reforms phase, there has been a certain cautious move by the private capital to come into the infrastructure sector. Nevertheless, as is obvious, the centre continues to dominate in the sphere of infrastructure investment either directly, or through centrally sponsored schemes. The preferred domain of investment for the private capital has been the information and communication sector where it competes/ coexists with central government's growing presence. This reconfirms the fact that much of the investment in these infrastructure falls under the so-called Central List, and even in such areas as rural roads, drinking

water and sanitation the centre has been playing a major role. There remains a strong case for public sector investment in infrastructure in poorer states.

Table 11: Major Sources of Investment in Infrastructure in India

Infrastructure	State	Centre	Centre and State	CSS	Private
A. Transport					
Roads					
National Highway		■			
State Highway	■				
Others (Rural roads)	■			■	
Railways		■			
Port		■			
Aviation (Airports)		■			
B. Energy					
Electricity			■		
C. Communications					
Telephone		■			
Cellular network		■			■
Internet/PC		■			
Posts		■			
D. Information					
Newspapers					■
Television		■			■
Radio		■			■
E. Water related					
Irrigation	■				
Drinking water	■			■	
Sanitation	■			■	

Note: CSS – Centrally sponsored schemes

8. Concluding Observations

While most of the available econometric analyses on regional income and infrastructure have only addressed the dimensions of nature and extent of relationship at an empirical level, very little can be learnt about the dominant extra-economic factors influencing the final decisions on infrastructure investment. Notwithstanding the sophistication of techniques used, aggregative analyses, i.e., bunching a set of discrete infrastructural variables as in case of constructing indices, are bereft of any meaningful policy insights. Belated though, deeper enquiries addressing the dynamics of *processes* underlying

lopsided growth and endowment of infrastructure across Indian states are essential for understanding the actual context within which development decisions are taken (Das, forthcoming) and, in turn, rendering the analyses policy-relevant. Such studies are best done at a disaggregated level of infrastructure provisioning.

Investing in infrastructure continues to be a central government activity. In a competing federal polity, which decides the direction and quantum of flow of such central investment to the federating units, the infrastructural outcome at the regional level largely reflects the bargaining strength and tactics of participating states. Poorer states have generally lagged behind in infrastructural endowments; internal resource generation for the purpose has remained a difficult proposition. The private sector has preferred investing in the information and communications sector, but in relatively better-off states. It has shied away from those sectors and regions where accrual of returns is either low or slow to come by. States with poor infrastructure have not been attractive, although urban pockets within these may be. All these planned decades, with or without reforms, the centre and states (with few exceptions) have grossly neglected the basic infrastructure in rural areas.

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