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REGIONAL DISPARITY IN THE ROAD TRANSPORT NETWORK OF WEST BENGAL

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ABSTRACT

One of the major characteristics of development experience of India is the wide regional disparity in development levels. The planners have emphasized on the policies for reducing interstate disparities. But in spite of some success in post-independent plan periods, regional disparity among the states as well as inter-district/intra-district disparities within a state continues. The regions with better infrastructure enjoy a far better location advantage for trade and development than landlocked regions. More investment in physical infrastructure such as road transport network will bring the interior regions closer to the markets and reduce regional disparity. In this background this paper tracks spatial inequality in physical infrastructure in West Bengal as evidenced from the district-level data as well as from the block-level data. It judges the variability in road transport network in respect of efficiency measures, density measures and accessibility measures. The paper concludes that significant regional disparity exists in the road transport network of West Bengal.

KEY WORDS: Regional disparity, Road Transport Network, Efficiency Measure, Accessibility Measure, Density Measure.

1. INTRODUCTION

Regional science emerges as the separate branch of economics in recent times with one of its major propositions that the nature and extent of transport network plays a significant role in determining the development potential of a region. With a given amount of investment, a region with better transport network will generate greater development momentum compared to a region with poor transport network. Variations in regional experiences and achievements coupled with even sharper contrast in some fields of social development have resulted in remarkable internal disparity in India. The long-term progress in raising living standards has been diverse across space (Dutta and Ravillion, 1998). Kant (1999) argued that 'spatial efficiency' had increased at the cost of 'spatial equity', thereby increasing inter-regional inequality in India. The major part of regional disparity can be attributed to regional imbalance in physical infrastructure. In this background this study tries to find out the regional disparity in the road transport network of West Bengal. This study considers only the surfaced road coverage as there is no systematic data of un-surfaced road coverage.

2. LITERATURE REVIEW

An efficient and well-developed road network is considered as a factor in the development of a region and also as the indicator of the degree of development of a region. Within the social development factors, the physical infrastructure such as road network turned out to be crucial one in economic activities (Fan et al. 1999; Sachs, et al.2002; Raychaudhuri, 2004; GOI, 2006). The majority of poor people in the world live in rural areas, where the levels of public infrastructure especially roads, are low. Inadequate roads and poor road access put high cost of transportation; reduce ability to use access high quality inputs; limit the uses of local markets to the sell their produces, the purchase of consumer goods and opportunities for off-farm employment. Poor road access puts constraints for rural poor in terms of access to other social infrastructures such as education and health facilities (Oraboune, 2008). Rao, et al (1999) argues that India's more development regions, with relatively better physical infrastructure, human resources, and accessibilities to markets, has been able to exploit the opportunities offered by economic liberalization better than the relatively poor states.

3. STUDY AREA

In the context of current issues in regional studies, the study undertaken here makes an empirical investigation into the patterns of regional disparity of West Bengal, one of the major states of India located in the Eastern part of the country. It lies in between $85^{0}50^{3}$ E & $89^{0}50^{3}$ E longitudes and in between $21^{0}10^{3}$ N & $27^{0}38^{3}$ N latitudes. The state has a total area of 88.752 square kilometers. The state shares international borders with Bangladesh on its eastern border, Bhutan on its north-eastern border, Jharkhand and Bihar on its West Border, and Nepal on its north-west border. Most of the settlements in West Bengal are along the roads. In 2002, the road network became of 92,023 km among which the network of surfaced road became of 49,517 km. Out of 19 districts of West Bengal, the Kolkata Metropolitan city is left outside scope of the study, leaving 18 districts. This study tries to find out the regional disparity of road transport network of these 18 districts.

4. METHODOLOGY

There is much disparity among districts of West Bengal in respect of levels of

development road infrastructure in their respective blocks. This study uses the conventional measure of dispersion to compare the extent of variation: the relative measure of dispersion known as Coefficient of Variation (C.V.). Here the unit of observations is blocks segregated by their respective districts. For each district, at first, I have calculated the mean and standard deviations for its blocks and then I have calculated the Coefficient of Variation for its blocks. I have judged the regional disparity using the C.Vs of all the blocks using both the conventional measures and structural measures. There are two types of conventional measures: Density measures (Road length (km) per 100 sq. km. area, Road length (km) per thousand populations and Ratio of Road length (km) to number of villages and towns) and Accessibility measure (Percent of villages & towns connected by road). I have used the following four graph-theoretic structural measures: β index, γ index, η index and θ index. I have also judged the regional disparity using the C.Vs of all the blocks using Composite Index of Effectiveness (C.I.E) which covers the density, accessibility and efficiency aspects of road infrastructure.

5. REGIONAL DISPARITY IN ROAD TRANSPORT NETWORK

In 2002, the total road length of West Bengal was 92023 km, while that in India was 2483344 km, that is, West Bengal accounted for 3.71 percent of total road in India. At that period the length of surfaced road in West Bengal was 49517 km accounting for 3.49 percent of surfaced road in India (Shown in Table 1). During 2002-03, in respect of road length per 100 sq.km area, West Bengal ranked 6th among the major states in India. In 2002, West Bengal occupied 3.05 per cent of highways. At that period the percentage of NHs in West Bengal was 3.27 per cent of total NHs in India, the percentage of SHs in West Bengal was 2.57 per cent of total SHs in India and the percentage of other PWD roads was 1.73 per cent of other PWD roads in India. At that period, in respect of rural roads (Panchayat and Zilla Parishad), this state of West Bengal had 4.01 per cent of total Panchayat roads and 8.50 percent of total Zilla Parishad roads in India. The percentage of urban roads in West Bengal was 9.91 percent of India in 2002. Surfaced roads are not uniformly distributed among the blocks as well as among the districts of West Bengal; rather extreme regional disparity is found in this respect. I first examined in terms of the coefficient of variation of surfaced road lengths in the blocks of districts. The block-level disparity, as reflected by the coefficient of variation in the surface road coverage, ranges from 0.17 to 1.02. Darjeeling suffered from extreme regional disparity (1.02) followed by 24 Parganas-North (0.92) and Medinipur-West (0.63). Birbhum (0.29) and Nadia (0.29) were similar in regional disparity. The lowest variability of the same was in Puruliya district (0.17) followed by Malda district (0.18) and Bankura district (0.19) (shown in Table 2).

5.1 Disparity of Road Network Accessibility:-

In Medinipur-East the variation in the road accessibility ratio (0.690) was the highest. The second highest variability (0.682) was found in the Medinipur-West and the third highest (0.665) was in Puruliya. The lowest variability was in Howrah (0.174) followed by 24 Parganas-North (0.180) and Jalpaiguri (0.201) (shown in Table 3).

5.2 Disparity of Road Network Efficiency:-

This study also tries to find out block-level variability in districts in terms of the graph-theoretic structural measures for measuring the efficiency of road network. The

regional variations as reflected by the coefficient of variations in these indices at the block-level of the districts are shown in Table 4. The lowest variability in β index was found in 24 Parganas-South and highest in Hooghly. The lowest variability in γ measure was found in Dakhsin Dinajpur and highest variability in Medinipur-West. On the other hand, the lowest variability in η measure was found in Medinipur-East, whereas the highest variability was found in Coochbehar. The variability in θ measure was found to be as like as the variability in η measure. Thus, in terms of these measures, this study finds out significant regional disparity in road network efficiency in West Bengal (shown in Table 4).

5.3 Disparity of Road Network Density:-

The other conventional measure of development of road infrastructure is road density. Road density is the ratio of the length of the region's total road network to the region's land area/inhabitants/connected villages & towns. This study has considered all the three types of density measures with respect to area (R_A), population (R_p), and number of villages and towns (R_V). The block-level coefficient of variations of the three density indices for each district were calculated and reported in Table 5. The highest variability in R_A was in 24 Parganas-North (0.884) and the lowest variability was in Uttar Dinajpur (0.161). The highest variability in R_p was in North 24 Parganas district (0.853) and the lowest variability in R_p was in Uttar Dinajpur district (0.191). The highest variability in R_V was in Darjeeling district (1.075) and the lowest variability in R_V was in Bankura district (0.253). On the whole, in terms of these density measures also this study finds out significant variations in regional development of road infrastructure in West Bengal.

5.4 Disparity of Road Network C.I.E:-

As this study covers the entire state of West Bengal covering extensive rural underdeveloped areas, so this study has also to look into the regional disparity in respect of Effectiveness Measure incorporating density, accessibility, and efficiency, and combining them into a single Composite Index of Effectiveness for measuring development of road infrastructure in underdeveloped regions. The regional disparity of road infrastructure at the block-level of districts, are also reflected in the coefficient of variations of the three Composite Indices. The block-level variability of road infrastructure in districts of West Bengal in terms of C.I.E is shown in Table 6. The results can be summarized as below –

1. The variability in road infrastructure is highest in Uttar Dinajpur;
2. The variability in road infrastructure is lowest in Coochbehar district;
3. In the districts of Medinipur-East, Medinipur-West, Puruliya, Bankura, Dakhsin Dinajpur, Birbhum, Murshidabad and Hooghly the variability in road infrastructure are relatively high;
4. In the districts of Coochbehar, 24 Parganas -South (excluding 9 blocks), Howrah (excluding 2 blocks), Jalpaiguri, Malda, Burdwan, Nadia, 24 Parganas-North, and Darjeeling block-level variability in road infrastructure are relatively low; and
5. With the exception of Malda and Hooghly, block level disparities are low in districts with more developed of road infrastructure.

6. CONCLUSION

On the whole, from variability of the various measures of road infrastructure development at the block level of West Bengal, it may be concluded that significant regional disparity exists in the regional economy of West Bengal. Measure of Composite Index Effectiveness (C.I.E) also reflects it in more meaningful and unambiguous manner. The more the developed a district or a block the less is the disparity. Development of road infrastructure in a region cannot be achieved unless spatial spread of development is simultaneously ensured. There is an urgent need for an adequate allocation of resources from the provincial government to the districts in order to remove the growing inequalities within districts and between districts.

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TABLES

Table 1 Road by Categories and Authorities in 2002

Category/ Authority	West Bengal	India	Percent share of West
A. Highways	60475	1981409	3.05
P.W.D Roads	17996	921248	1.95
i) National Highways	1898	58112	3.27
ii) State Highways	3533	137711	2.57
iii) Other PWD Roads	12565	725425	1.73
B. Panchayat Raj	42479	1060161	4.01
i) Zilla Parishad	42479	499462	8.5
ii) Village Panchayat	_	412595	_
iii) CD/ Panchayat	_	148104	_
C. Urban Roads	24783	250122	9.91
i) Municipal Roads	22453	226706	9.9
ii) Military	941	11918	7.9
iii) Railway Roads	1241	10325	12.02
iv) Port Roads	148	1173	12.62

Source: Govt. of West Bengal, Statistical Handbook, 2007, BAES.

Table 2 Variation of Surfaced Roads in Districts

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Districts	**CV of Road length**
Darjeeling	1.02
Jalpaiguri	0.31
Coochbehar	0.38
Uttar Dinajpur	0.22
Dakhsin Dinajpur	0.44
Malda	0.18
Murshidabad	0.46
Birbhum	0.29
Burdwan	0.40
Nadia	0.29
North 24 Parganas	0.92
Hooghly	0.51
Bankura	0.19
Puruliya	0.17
East Medinipur	0.50
Howrah	0.60
South 24 Parganas	0.39
West Medinipur	0.63
Source: Calculated by author from District Statistical Handbook of West Bengal,	

Table 3 Variation in District Accessibility Ratios	
Districts	CV of A
Darjeeling	0.254
Jalpaiguri	0.201
Coochbehar	0.256
Uttar Dinajpur	0.661
Dakhsin Dinajpur	0.415
Malda	0.295
Murshidabad	0.382
Birbhum	0.498
Burdwan	0.263
Nadia	0.270
North 24 Parganas	0.180
Hooghly	0.339
Bankura	0.475
Puruliya	0.665
East Medinipur	0.690
Howrah	0.174
South 24 Parganas	0.212
West Medinipur	0.682
Source: Same as Table 2.	

Table 4 Variation in Structural Measures of Surfaced Roads of West Bengal Districts

Districts	CV of β	CV of ¥	CV of η	CV of θ
Darjeeling	0.085	0.523	0.974	0.981
Jalpaiguri	0.078	0.408	0.546	0.589
Coochbehar	0.036	0.783	0.302	0.284
Uttar Dinajpur	0.036	0.740	0.728	0.767
Dakhsin Dinajpur	0.027	0.370	0.366	0.389
Malda	0.078	0.484	0.377	0.410
Murshidabad	0.081	0.665	0.571	0.533
Birbhum	0.051	0.573	0.493	0.542
Burdwan	0.072	0.502	0.424	0.417
Nadia	0.033	0.617	0.359	0.368
North 24 Parganas	0.045	0.703	0.802	0.810
Hooghly	0.093	0.679	0.427	0.426
Bankura	0.035	0.458	0.380	0.399
Puruliya	0.052	0.573	0.490	0.507
East Medinipur	0.073	0.771	1.125	1.090
Howrah	0.052	0.400	0.740	0.800
South 24 Parganas	0.025	0.659	0.521	0.516
West Medinipur	0.057	0.838	0.801	0.829

Source: Same as Table 2.

Table 5 Variation in Road Densities in Districts

Districts	CV of R_A	CV of R_P	CV of R_V
Darjeeling	0.617	0.763	1.075
Jalpaiguri	0.286	0.326	0.629
Coochbehar	0.305	0.295	0.312
Uttar Dinajpur	0.161	0.191	0.385
Dakhsin Dinajpur	0.259	0.229	0.313
Malda	0.439	0.299	0.440
Murshidabad	0.662	0.487	0.557
Birbhum	0.460	0.462	0.536
Burdwan	0.449	0.434	0.395
Nadia	0.251	0.257	0.330
North 24 Parganas	0.884	0.853	0.809
Hooghly	0.569	0.389	0.533
Bankura	0.296	0.262	0.253
Puruliya	0.292	0.277	0.302
East Medinipur	0.506	0.542	0.947
Howrah	0.611	0.507	0.638
South 24 Parganas	0.606	0.439	0.466
West Medinipur	0.731	0.650	0.804

Source: Same as Table 2.

Table 6 Variation in C.I.E in Districts

Districts	CV of C.I.E
Darjeeling	0.401
Jalpaiguri	0.315
Coochbehar	0.211
Uttar Dinajpur	1.000
Dakhsin Dinajpur	0.561
Malda	0.359
Murshidabad	0.501
Birbhum	0.552
Burdwan	0.378
Nadia	0.380
North 24 Parganas	0.385
Hooghly	0.490
Bankura	0.595
Puruliya	0.757
East Medinipur	0.775
Howrah	0.226
South 24 Parganas	0.265
West Medinipur	0.921

Source: Same as Table 2.