CHAPTER 1

INTRODUCTION

1.0 INTRODUCTION

1.1 Background of the Study

Bangladesh has a geographical area of 147,570 sq. km divided into 6 administrative Divisions covering 64 Districts/Zillas and 469 Thana/Upazilas with a population of nearly 130 million, 80% of whom lives in rural areas. The growth of population is higher than the generation of employment opportunities. As a result, poverty and unemployment rate is increasing. Furthermore, the flood causes extensive damage almost every year to road structures such as pavement, embankment, bridges etc. and many road sections cannot be negotiated during rainy season, causing a constraint to rural development. Aiming at reduction of rural poverty, the government has been implementing various projects including rural infrastructure such as growth centres and roads, bridges and culverts connecting such centres, small irrigation and flood control related structure, etc. About 60% of financial outlay for rural development in the Fifth Five Year Plan (1997-2002) is allocated to rural infrastructure development, as an important strategy for the reduction of rural poverty.

Bangladesh transportation system is extensive and diversified comprising more than 226,000 km of roads (outside city areas), 4,425 km of railway (BG & MG), nearly 4,000 km of perennial waterway and 11 airports two of which are equipped to handle international traffic. The road sector handles the largest transportation share (more than 60% of freight) for inland transportation and has been playing a dominant role in the socio-economic development in Bangladesh.

The road network of Bangladesh comprises National Highways, Regional Highways, Feeder Roads Type-A, Feeder Roads Type-B and Rural Roads Types I, II and III. The first three categories of roads are under the jurisdiction of Roads and Highways Department (RHD) while all other roads fall under the purview of Local Government Engineering Department (LGED).

National trunk roads have been improved to some extent but the rural infrastructure is still undeveloped and cannot ensure all weather year-round transportation in many areas due to the lack of bridges crossing numerous rivers and canals. In due consideration of the poor infrastructure for transportation which is a serious constraint to overall development of the rural areas, the Government of Bangladesh through LGED formulated the Potable Steel Bridge Construction Project and requested the Government of Japan to assist in the implementation. In response, the Government of Japan conducted a Basic Design Study on the Project for Procurement of Potable Steel Bridge in 1993 and supplied the bridge construction materials for 74 bridges in 1994-1996, as Phase-1. The Basic Design Study of the second phase of the project started in October, 1999 and 80 bridges were selected.

However, there still remain a large number of bridges to be constructed/ reconstructed urgently in the rural areas. According to the recent survey by the LGED, about 1,200 bridges are urgently needed. In order to pursue the systematic implementation of the bridge construction for rural development purpose, it is of urgent necessity to investigate the present condition of the existing bridges and formulate a master plan.

Under such situation, the Government of Bangladesh through LGED requested the Government of Japan to conduct the Master Plan Study for Portable Steel Bridge Construction on Feeder and Rural Roads in Bangladesh (the Study). In response to the request, the Government of Japan decided to conduct the Study and entrusted the implementation of the Study to the Japan International Cooperation Agency (JICA). The contract for consultancy services for the Study was made between JICA and Bangladesh Consultants Ltd and the Study started in the middle of February 2002.

1.2 Objectives of the Study

The overall objectives of the Study are as follows:

- To obtain basic data and information on the bridges needing construction/ reconstruction on Feeder (Type-B) and Rural Roads in Bangladesh,
- To formulate a master plan for portable steel bridge construction on Feeder and Rural Roads, and
- To assess the impacts of the construction of bridges in the priority zones and to formulate an investment plan thereof.

1.3 Study Area and Study Bridges

The study area covers the whole country. The bridges to be covered by the Study (study bridge) were listed by LGED consisting of 1,579 bridges. On the basis of data received from field offices of LGED and data obtained from field visit, the study bridges were revised excluding 924 bridges (288 duplicate/ unnecessary and 636 completed/ ongoing/ under process) and adding 497 newly proposed bridges, final number being 1,152.

1.4 Scope of the Study

The Study shall cover the following items:

1. Preparation of location map of study bridges.
2. Division of the country into zones.
3. Collection of socio-economic data by zone.
4. Collection of information of relevant projects.
5. Evaluation of zones on effect and urgency of bridge construction.
6. Request to LGED local offices for providing basic data of study bridges.
7. Collection of basic data of study bridges and spot check.
8. Study on fund availability and implementation system
9. Formulation of master plan for portable steel bridge construction.
10. Selection of priority zones.
11. Site survey of project bridges in the priority zones.
12. Formulation of investment plan for project bridges in the priority zones.
13. Assessment of project effects.

1.5 Composition of the Final Report

The Final Report comprises the following volumes:

Volume I	:	Executive Summary
Volume II	:	Main Report
		Appendix A Terms of Reference
Volume III	:	Appendix B Basic Data of Study Bridges
Volume IV	:	Appendix C Prioritization of Study Bridges
		Appendix D Cost Estimate of Study Bridges
		Appendix E Bridge Site Survey Data
Volume V	:	Location Maps of Study Bridges
Volume VI	:	Bridge Site Photographs

CHAPTER 2

DIVISION OF THE COUNTRY INTO ZONES

2.0 DIVISION OF THE COUNTRY INTO ZONES

Since the project bridges are to be packaged by area for the efficient construction in formulating the master plan for portable steel bridge construction, the country is divided into zones. The zoning is made such that each zone has roughly 50 to 100 bridges considering the financial capacity of the implementing agency. Consequently, number of zones is about 15 since total number of the study bridges is about 1,200.

2.1 Criteria for Zoning

The criteria for zoning are as follows:

- A zone shall not spread over two or more divisions.
- A district shall not be divided.
- A zone shall not spread over both sides of the big river like Megna, Padma and Jamuna.
- Districts with strong economic connection shall be integrated into a zone as much as possible.
- A zone shall be homogeneous as much as possible in terms of geography, socioeconomic condition and road density.

2.2 Zoning

Following the above criteria, the country is divided into 15 zones as shown in Table 2.2-1 and **Figure 2.2-1.**

Table 2.2-1 Zoning **( ): Number of study bridges**

Dhaka Division		Chittagong Division		Sylhet Division	
Zone Number	District	Zone Number	District	Zone Number	District
1	Dhaka (19) Narayangonj (15) Munshigonj (30) Manikgonj (56) Narshingdi (4) **Total (124)**	6	Comilla (17) B.Baria (6) Chandpur (26) Feni (16) Noakhali (18) Laxmipur (4) **Total (87)**	8	Sylhet (31) Moulvibazar (6) Sunamgonj (35) Habigonj (12) **Total (84)**
2	Gazipur (19) Sherpur (16) Tangail (20) Jamalpur (26) **Total (81)**				
3	Mymensingh (22) Kishoregonj (6) Netrakona (13) **Total (41)**	7	Chittagong (45) Cox's Bazar (16) Rangamati (16) Khagrachari (6) Bandarban (8) **Total (91)**		
4	Rajbari (5) Gopalgonj (13) Faridpur (14) **Total (32)**				
5	Shariatpur (19) Madaripur (27) **Total (46)**				

Khulna Division		Barisal Division		Rajshahi Division	
Zone Number	District	Zone Number	District	Zone Number	District
9	Khulna (13) Bagerhat (59) Satkhira (16) **Total (88)**	11	Barisal (61) Bhola (2) **Total (63)**	13	Natore (12) Sirajganj (31) Pabna (12) Bogra (41) **Total (96)**
10	Jessore (14) Jhenaidah (7) Magura (5) Kushtia (10) Narail (8) Meherpur (7) Chuadanga (9) **Total (60)**	12	Pirojpur (21) Jhalakathi (30) Patuakhali (17) Borguna (13) **Total (81)**	14	Rajshahi (8) Nawabgonj (28) Naogaon (18) Joypurhat (10) **Total (64)**
				15	Gaibanda (9) Rangpur (19) Dinajpur (31) Panchagar (14) Thakurgaon (15) Lalmonirhat (7) Nilphamari (14) Kurigram (5) **Total (114)**

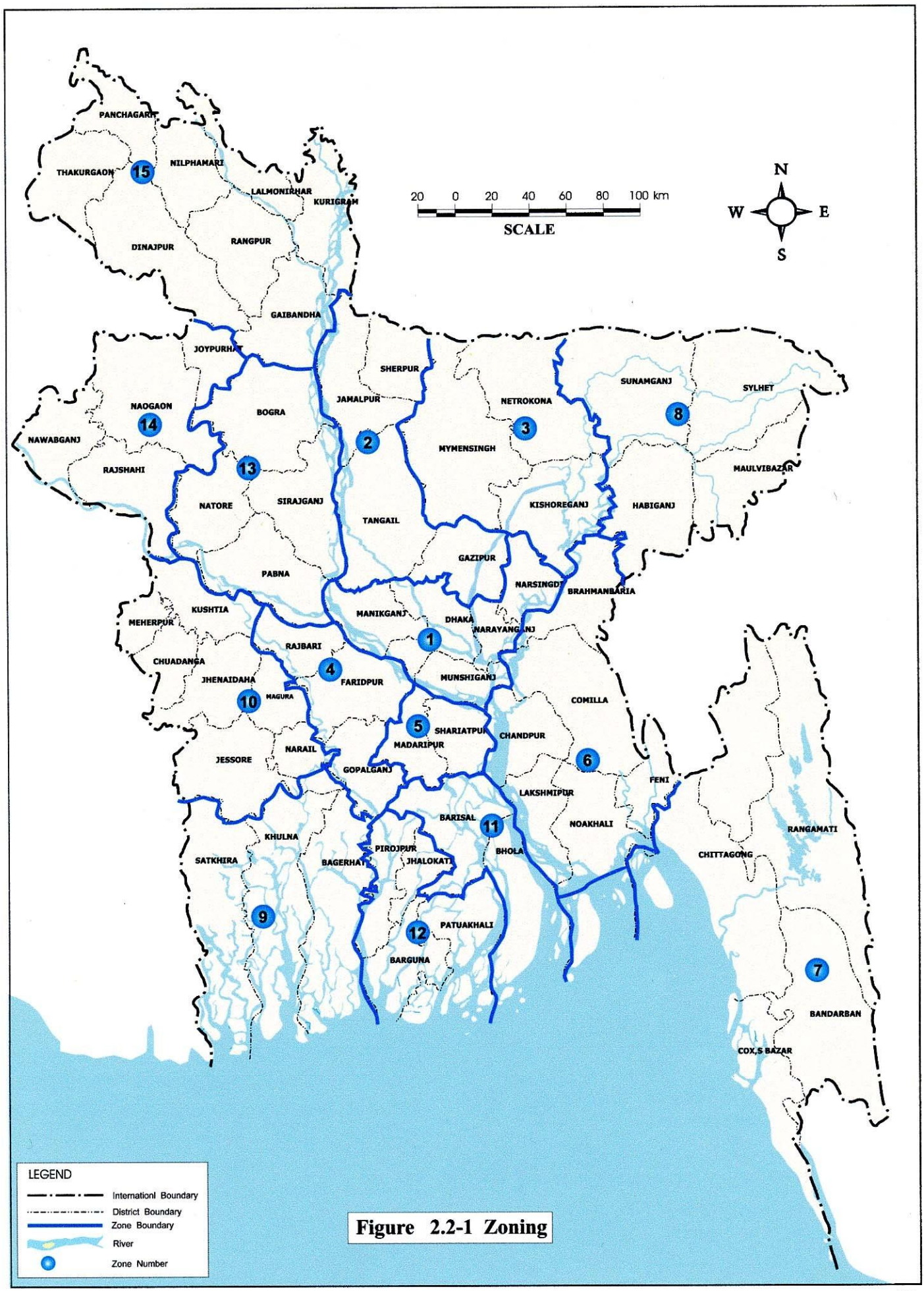

Figure 2.2-1 Zoning

CHAPTER 3

SOCIO-ECONOMIC CHARACTERISTICS OF DISTRICTS/ZONES

3.0 SOCIO-ECONOMIC CHARACTERISTICS OF DISTRICTS/ZONES

3.1 List of Socio-economic Data and Indicators

Socio-economic data were collected and compiled by district (new 64 districts) and then zone totals were calculated. For the data which were not available by new 64 districts, the districtwise data were estimated based on the available data as shown in Table 3.1-1

The socio-economic data collected and compiled are listed in Table 3.1-1.

Table 3.1-1 List of Socio-economic Data

Data	Unit	Year	Data Source	Remarks (Processing)
1) Land Area				
Total Land Area	km^2		1999 Statistical Yearbook of Bangladesh	
Culturable Waste Land	km^2	1998-99	1999 Statistical Yearbook of Bangladesh (by 23 former districts) (unit: '000' acre)	- Breakdown of 23 former districts data into 64 districts data in proportion to total land area - Conversion from 000 acre to km^2
Current Fallow Land	km^2			
Net Cropped Area	km^2			
Total Cropped Area	km^2			
2) Population and Household				
Population	person	2001	Population Census 2001, Preliminary Report	
Number of Households	number			
3) Gross Regional Product (GRP)				
Agriculture Sector	million taka	1998-99	1999 Statistical Yearbook of Bangladesh (by 20 former districts)	Breakdown of 20 former districts data into 64 districts data in proportion to total cropped area (for agriculture sector) and number of economically active persons in "1999 Statistical Yearbook" (for industrial & service sectors)
Industrial Sector	million taka			
Service Sector	million taka			
Total	million taka			
4) Agriculture Production				
Cereals	million taka	1998-99	1999 Statistical Yearbook of Bangladesh (by 20 former districts)	Breakdown of 20 former districts data into 64 districts data in proportion to total cropped area.
Fibres	million taka			
Fruits	million taka			
Vegetables	million taka			
Others	million taka			
Total	million taka			
5) Incidence of Poverty				
Incidence of Poverty	percent	1995-96	Road Network Improvement & Maintenance I (categorization of districts by range of incidence of poverty) 1999 Statistical Yearbook of Bangladesh (by 5 divisions)	Adjustment of categorized data by divisional average (mean value of the cases using lower poverty line and upper poverty line.)
6) Tribal Population				
Tribal Population	person	2001	1999 Statistical Yearbook of Bangladesh (1991 figures)	Adjustment of 1991 data by applying population growth rate from 1991 to 2001.
7) Number of Educational Facilities				
Primary School	number	1997-98	1999 Statistical Yearbook of Bangladesh (by 21 former districts)	Breakdown of 21 former districts data into 64 districts data in proportion to population.
Secondary School	number			
College/Institute	number			
University	number	2001	University Grant Commission, Ministry of Education	

Data	Unit	Year	Data Source	Remarks (Processing)
8) Number of Health Facilities				
Hospital (Govt.)	number	1996-97	1999 Statistical Yearbook of Bangladesh	
Hospital (Non Govt.)	number			
9) Number of Growth Center/Bazaars/Hats				
Growth Center/Bazaar/Hat	number	1997-98	Planning & Maintenance Manual for Growth Center, 1999, LGED	
10) Road Length				
National Highway	km	2000-01	RHD	
Regional Highway	km			
Feeder Road-A	km			
Feeder Road-B	km	2000-01	LGED	
Rural Raod-1	km			
Rural Road-2	km			
Rural Road-3	km			
Total	km	2000-01	RHD/LGED	
11) Number of Bridges/Gaps				
Feeder Road-B	number	2000-01	LGED	
Rural Road-1	number			
Rural Road-2	number			
Rural Road-3	number			
Total	number			
12) Number of Study Bridges				
Study Bridges	number	-	LGED	

Various indicators were developed in order to assess the socio-economic condition of districts/zones and impact of road/bridge improvement on rural development. The socio-economic indicators are listed in Table 3.1-2.

Table 3.1-2 List of Socio-economic Indicators

Indicator	Unit	Definition		
1) Demographic Indicator				
Population Density	person / km^2	P / A	where,	P=population (person) A=land Area (km^2)
2) Economic Indicators				
Agricultural Sector Share	percent	G1 / Gtx100	where,	G1=GRP in agricultural sector (million Tk) Gt=total GRP (million Tk)
Per Capita GRP, Agricultural Sector	taka / person	G1 / Px1,000,000	where,	G1=GRP in agricultural sector (million Tk)
Per Capita GRP, Industrial Sector	taka / person	G2 / Px1,000,000		G2=GRP in industrial sector (million Tk)
Per Capita GRP, Service Sector	taka / person	G3 / Px1,000,000		G3=GRP in service sector (million Tk)
Per Capita GRP, Total	taka / person	Gt / Px1,000,000		Gt=total GRP (million Tk) P =population (person)
Land Productivity	million taka / km^2	Gt/A	where,	Gt=total GRP (million Tk) A =land area (km^2)
Agricultural Productivity	million taka / km^2	Pagr / Anca	where,	Pagr = total agricultural production (million Tk) Anca = net cropped area (km^2)
Unutilized Land Ratio	Percent	(Awas+Afal) / (Awas+Afal+Anca)x100	where,	Awas=culturable waste land (km2) Afal=current fallow land (km^2) Anca=net cropped area (km^2)

Indicator	Unit	Definition	
3) Social Indicators			
Incidence of Poverty	Percent		
Tribal Population Ratio	Percent	Ptr / Px100	where, Ptr =tribal population (person) P =total population (person)
Public Facility Ratio	number / 1,000person	Npub / P'	where, Npub =total number of educational facilities and health facilities (number) P' =population (1,000person)
Growth Center/Bazar/Hat Ratio	number / 1,000person	Ngr / P'	where, Ngr = number of growth centers/Bazars/hats number) P' =population (1,000person)
4) Road Development Indicators			
Road Density per Area, National+Regional+Feeder-A	km / km^2	(Lna+Lre+Lfa) / A	where, Lna=length of national highway (km) Lre=length of regional highway (km) Lfa=length of feeder road-A (km) Lfb=length of feeder road-B (km) Lr1=length of rural road-1 (km) Lr2=length of rural road-2 (km) Lr3=length of rural road-3 (km) Lt =total road length (km) A =land area (km^2) 1) P' =population (1,000person) 2)
Road Density per Area, National+Regional+Feeder-A & B	km / km^2	(Lna+Lre+Lfa+Lfb) / A	
Road Density per Area, All Road	km / km^2	Lt / A	
Road Dencity per Area & Population, National+Regional+Feeder-A	km / $\sqrt{(km^2 . 1{,}000person)}$	(Lna+Lre+Lfa) / $\sqrt{(A . P')}$	
Road Dencity per Area & Population, National+Regional+Feeder-A & B	km / $\sqrt{(km^2 . 1{,}000person)}$	(Lna+Lre+Lfa+Lfb) / $\sqrt{(A . P')}$	
Road Dencity per Area & Population, All Road	km / $\sqrt{(km^2 . 1{,}000person)}$	Lt / $\sqrt{(A . P')}$	
Study Bridges Ratio	percent	Nst / Ntb . 100	where, Nst=number of study bridges (number) Ntb=total number of bridges/gaps on feeder-B, rural-1, rural-2 & rural-3
Study Bridges per Population	number / 1,000person	Nst / P'	where, Nst=number of study bridges (number) P' =population (1,000person)

Note: 1) Deducting the land areas of Dhaka, Chittagong, Khulna and Rajshahi Cities from the areas of the districts where those cities are located, because the road length does not include the road inside the city.
2) Deducting the populations of Dhaka, Chittagong, Khulna and Rajshahi Cities from the populations of the districts where those cities are located, because the road length does not include the road inside the city.

The areas and populations of the cities are as follows:

City	Land Area (km^2)	2001 Population of City (1,000 person)
Dhaka	304	5378
Chittagong	204	2096
Khulna	37	773
Rajshahi	97	384

3.2 Socio-economic Data

Socio-economic data are tabulated in Tables 3.2-1, 3.2-2 and 3.2-3 by district/zone.

Table 3.2-1 Socio-economic Data by District/Zone (1)

District	Land Area (km^2)					Population & Household		Gross Regional Products (million taka)			
	Total Land Area	Culturable Waste Land	Current Fallow Land	Net Cropped Area	Total Cropped Area	Population	Number of Households	Agric. Sector	Industrial Sector	Service Sector	Total
DHAKA	1464	19	76	693	1223	8575533	1788281	5789	35448	81518	122755
NARAYANGANJ	759	10	40	359	634	2138492	444326	3001	6814	15670	25485
MUNSHIGANJ	955	12	50	452	798	1293536	251280	3776	3260	7496	14532
MANIKGANJ	1379	18	72	653	1152	1274829	276661	5453	2621	6027	14101
NARSINGDI	1141	15	60	540	953	1891281	387681	4511	5586	12846	22943
ZONE-1	5698	74	298	2697	4760	15173671	3148229	22530	53729	123557	199816
GAZIPUR	1741	23	91	824	1455	2026244	443307	6884	7762	17849	32495
SHERPUR	1364	46	23	954	1850	1246511	296535	5292	3369	8678	17339
TANGAIL	3414	28	20	2546	4063	3253961	726561	13838	5395	24667	43900
JAMALPUR	2032	68	34	1421	2756	2089366	481152	7884	5631	14503	28018
ZONE-2	8551	165	168	5745	10124	8616082	1947555	33898	22157	65697	121752
MYMENSINGH	4363	10	0	1797	3491	4439017	965123	10537	4874	31622	47033
KISHOREGANJ	2689	162	170	3824	6265	2525221	528323	18913	2860	18554	40327
NETRAKONA	2810	6	0	1157	2248	1937794	406153	6787	2049	13294	22130
ZONE-3	9862	178	170	6778	12004	8902032	1899599	36237	9783	63470	109490
RAJBARI	1119	19	101	671	1225	940360	189427	3432	1164	6878	11474
GOPALGANJ	1490	26	135	894	1631	1132046	217445	4570	1997	11807	18374
FARIDPUR	2073	36	188	1244	2269	1719496	345357	6357	2091	12361	20809
ZONE-4	4682	81	424	2809	5125	3791902	752229	14359	5252	31046	50657
SHARIATPUR	1181	20	107	709	1292	1057181	213239	3622	2136	12625	18383
MADARIPUR	1145	20	104	687	1253	1137008	232111	3511	1452	8585	13548
ZONE-5	2326	40	211	1396	2545	2194189	445350	7133	3588	21210	31931
COMILLA	3085	26	45	2036	3878	4586879	831033	14322	7232	37332	58886
B.BARIA	1927	16	28	1272	2422	2365880	432380	8946	3887	20064	32897
CHANDPUR	1704	14	25	1124	2142	2210162	422697	7910	4041	20862	32813
FENI	928	27	48	437	814	1196219	213030	2773	2240	12076	17089
NOAKHALI	3601	105	185	1697	3158	2533394	455321	10763	2746	14806	28315
LAKSHMIPUR	1456	42	75	686	1277	1479371	288214	4352	1948	10499	16799
ZONE-6	12701	230	406	7252	13691	14371905	2642675	49066	22094	115639	186799
CHITTAGONG	5283	635	96	1911	3413	6545078	1234682	22064	46303	70249	138616
COX'S BAZAR	2492	300	45	901	1610	1757321	294094	10408	8648	13120	32176
RANGAMATI	6116	0	0	453	571	507180	103974	17122	1241	6747	25110
KHAGRACHHARI	2700	0	0	154	251	524961	109718	7529	1288	7006	15823
BANDARBAN	4479	563	0	295	433	292900	59345	12993	728	3957	17678
ZONE-7	21070	1498	141	3714	6278	9627440	1801813	70116	58208	101079	229403
SYLHET	3490	207	241	1969	2888	2569788	420564	8721	3804	17144	29669
MOULAVIBAZAR	2799	166	193	1579	2317	1604028	291663	6994	3896	17561	28451
SUNAMGANJ	3670	218	254	2071	3037	1968669	345190	9170	3151	14205	26526
HABIGANJ	2637	157	182	1488	2183	1757331	321954	6589	3046	13730	23365
ZONE-8	12596	748	870	7107	10425	7899816	1379371	31474	13897	62640	108011
KHULNA	4395	124	102	1433	1968	2334285	494603	12014	8080	28826	48920
BAGERHAT	3959	112	92	1291	1773	1515815	321634	10823	3279	11699	25801
SATKHIRA	3858	109	89	1258	1727	1843194	390179	10547	2945	10508	24000
ZONE-9	12212	345	283	3982	5468	5693294	1206416	33384	14304	51033	98721
JESSORE	2578	29	118	1845	3592	2440693	521360	10714	3297	20022	34033
JHENAIDAH	1950	22	89	1395	2717	1554514	331601	8104	1717	10429	20250
MAGURA	1049	12	48	751	1462	811160	161474	4359	826	5013	10198
KUSHTIA	1621	56	39	1070	2100	1713224	375444	6003	2955	11441	20399
NARAIL	990	11	45	708	1379	689021	140013	4114	874	5307	10295
MEHERPUR	716	25	17	473	928	579531	135908	2652	536	2076	5264
CHUADANGA	1158	40	28	764	1500	987382	223233	4288	2391	9256	15935
ZONE-10	10062	195	384	7006	13678	8775525	1889033	40234	12596	63544	116374
BARISAL	2791	116	123	1436	2456	2330960	474840	8482	3297	21997	33776
BHOLA	3403	142	150	1751	2994	1676600	328559	10342	1980	13209	25531
ZONE-11	6194	258	273	3187	5450	4007560	803399	18824	5277	35206	59307
PIROJPUR	1308	54	58	673	1151	1126525	231983	3975	1396	9319	14690
JHALAKATI	758	32	33	390	667	696055	145868	2304	1104	7367	10775
PATUAKHALI	3205	23	82	2166	3134	1444340	288605	9376	1978	8468	19822
BARGUNA	1832	13	47	1238	1791	837955	179189	5360	1551	6637	13548
ZONE-12	7103	122	220	4467	6743	4104875	845645	21015	6029	31791	58835
NATORE	1896	20	53	1361	2013	1521359	337476	5523	1023	6831	13377
SIRAJGANJ	2498	71	31	1416	2716	2707011	563195	7396	3725	18542	29663
PABNA	2371	67	30	1344	2578	2153921	442049	7020	2392	11910	21322
BOGRA	2920	12	12	2047	4298	2988567	687287	13197	3875	23221	40293
ZONE-13	9685	170	126	6168	11605	9370858	2030007	33136	11015	60504	104655
RAJSHAHI	2407	26	67	1728	2556	2262483	498152	7011	3456	23073	33540
NAWABGANJ	1702	18	47	1222	1807	1419536	275122	4958	1079	7203	13240
NAOGAON	3436	37	96	2467	3648	2377314	539833	10008	2169	14483	26660
JOYPURHAT	965	4	4	677	1420	844814	203255	4362	901	5397	10660
ZONE-14	8510	85	214	6094	9431	6904147	1516362	26339	7605	50156	84100
GAIBANDHA	2179	31	43	1476	2944	2117959	493101	8383	2204	13325	23912
RANGPUR	2308	33	45	1564	3118	2534365	579815	8879	2852	17243	28974
DINAJPUR	3438	65	69	2554	4758	2617942	576403	11402	3202	18388	32992
PANCHAGARH	1405	26	28	1044	1945	829374	177905	4659	1072	6158	11889
THAKURGAON	1809	34	36	1344	2504	1196429	256034	5999	1301	7468	14768
LALMANIRHAT	1242	18	24	841	1678	1088918	241713	4778	885	5346	11009
NILPHAMARI	1641	23	32	1112	2217	1550686	332646	6313	2016	12185	20514
KURIGRAM	2296	33	45	1555	3102	1782277	397021	8833	1952	11800	22585
ZONE-15	16318	263	322	11490	22266	13717950	3054638	59246	15484	91913	166643
TOTAL	147570	4452	4510	79892	139593	123151246	25362321	496991	261018	968485	1726494

Table 3.2-2 Socio-economic Data by District/Zone (2)

District	Agricultural Production (million taka)						Incidence of Poverty (%)	Tribal Population	No. of Educational Facilities				No. of Health Facilities		No. of Growth Center/Hat & Bazaar
	Cereals	Fibres	Fruits	Vegetables	Others	Total			Primary Schools	Secondary Schools	Colleges/ Institutes	Universities	Hospitals (Gov't)	Hospitals (Non Gov.)	
DHAKA	2149	122	223	918	296	3708	27	9826	1989	608	1037	17	27	122	28
NARAYANGANJ	1114	63	115	476	153	1921	37	1899	496	152	86	0	6	2	21
MUNSHIGANJ	1402	79	145	599	193	2418	37	1080	300	92	52	0	7	0	23
MANIKGANJ	2024	114	210	864	278	3490	48	569	296	90	52	0	8	1	27
NARSINGDI	1675	95	173	715	230	2888	37	2021	438	134	76	0	7	3	27
ZONE-1	8364	473	866	3572	1150	14425	32	15395	3519	1076	1303	17	55	128	126
GAZIPUR	2556	144	265	1091	351	4407	48	1666	470	144	82	2	6	3	24
SHERPUR	3437	239	109	161	421	4367	58	17278	608	121	16	0	6	2	21
TANGAIL	6957	631	838	539	1261	10226	48	14743	1396	360	44	0	12	4	52
JAMALPUR	5121	355	162	239	626	6503	58	4770	1019	204	26	0	8	0	32
ZONE-2	18071	1369	1374	2030	2659	25503	52	38457	3493	829	168	2	32	9	129
MYMENSINGH	7698	186	174	321	444	8823	48	38257	2402	394	52	1	13	7	62
KISHOREGANJ	13815	333	311	575	798	15832	48	3262	1366	224	29	0	14	0	48
NETRAKONA	4958	119	112	206	286	5681	48	31717	1049	172	23	0	11	3	44
ZONE-3	26471	638	597	1102	1528	30336	48	73236	4817	790	104	1	38	10	154
RAJBARI	1481	301	96	69	669	2616	48	1297	1149	95	16	0	5	0	18
GOPALGANJ	1972	401	128	92	891	3484	48	1634	1384	115	19	0	6	1	24
FARIDPUR	2744	557	178	127	1239	4845	48	2153	2101	175	28	0	9	3	37
ZONE-4	6197	1259	402	288	2799	10945	48	5084	4634	385	63	0	20	4	79
SHARIATPUR	1563	317	102	73	706	2761	48	567	1292	107	17	0	7	0	25
MADARIPUR	1515	308	98	70	684	2675	48	2040	1390	115	19	0	5	1	20
ZONE-5	3078	625	200	143	1390	5436	48	2607	2682	222	36	0	12	1	45
COMILLA	8766	238	213	926	891	11034	44	4108	2145	435	113	1	13	2	60
B.BARIA	5476	148	133	578	556	6891	44	2554	1106	224	58	0	8	3	31
CHANDPUR	4842	131	117	511	492	6093	44	2345	1034	209	55	0	8	0	36
FENI	1602	1	57	50	272	1982	34	138	558	121	15	0	6	0	20
NOAKHALI	6216	3	220	193	1058	7690	44	15626	1182	257	32	0	7	1	34
LAKSHMIPUR	2514	1	89	78	428	3110	44	156	691	150	19	0	5	2	22
ZONE-6	29416	522	829	2336	3697	36800	43	24927	6716	1396	292	1	47	8	203
CHITTAGONG	8272	0	669	571	1169	10681	25	56854	2857	577	84	3	21	20	70
COX'S BAZAR	3902	0	315	269	551	5037	34	25935	767	155	23	0	8	4	32
RANGAMATI	721	15	789	164	421	2110	34	263124	516	57	8	0	11	3	30
KHAGRACHHARI	317	7	347	72	185	928	44	240493	535	59	7	0	9	0	18
BANDARBAN	547	11	598	124	320	1600	44	131207	348	26	3	0	8	0	13
ZONE-7	13759	33	2718	1200	2646	20356	29	717613	5023	874	125	3	57	27	163
SYLHET	5379	5	312	202	870	6768	44	15384	1571	179	31	1	12	10	51
MOULAVIBAZAR	4314	4	250	162	697	5427	34	34490	981	112	20	0	7	23	32
SUNAMGANJ	5657	5	328	212	914	7116	44	7257	1204	137	24	0	11	0	41
HABIGANJ	4064	4	235	152	657	5112	44	42795	1074	123	22	0	9	5	34
ZONE-8	19414	18	1125	728	3138	24423	42	99926	4830	551	97	1	39	38	158
KHULNA	4038	66	188	224	621	5137	42	15593	1330	419	49	1	15	9	38
BAGERHAT	3637	60	170	201	560	4628	42	10131	864	272	32	0	10	3	39
SATKHIRA	3544	58	165	196	545	4508	33	4688	1050	330	39	0	8	0	38
ZONE-9	11219	184	523	621	1726	14273	39	30412	3244	1021	120	1	33	12	115
JESSORE	6808	575	247	367	1517	9514	42	4449	1299	346	43	0	9	1	41
JHENAIDAH	5150	435	187	277	1148	7197	42	2644	828	220	27	0	7	0	28
MAGURA	2770	234	101	149	617	3871	42	276	432	115	14	0	5	0	18
KUSHTIA	2937	470	188	218	1311	5124	52	1800	797	180	28	1	7	3	29
NARAIL	2615	221	95	141	583	3655	33	1486	367	98	12	0	4	0	15
MEHERPUR	1297	208	83	96	579	2263	42	487	270	61	9	0	3	2	10
CHUADANGA	2098	336	134	155	936	3659	42	2273	459	104	16	0	5	1	20
ZONE-10	23675	2479	1035	1403	6691	35283	43	13415	4452	1124	149	1	40	7	161
BARISAL	3510	10	560	178	965	5223	43	4711	1570	338	44	0	11	2	44
BHOLA	4279	13	682	218	1177	6369	55	12320	1129	243	32	0	8	0	35
ZONE-11	7789	23	1242	396	2142	11592	48	17031	2699	581	76	0	19	2	79
PIROJPUR	1645	5	262	84	452	2448	55	2089	759	164	21	0	7	1	22
JHALAKATI	953	3	152	48	262	1418	55	780	469	101	13	0	5	0	16
PATUAKHALI	5106	4	368	176	512	6166	55	14500	1194	219	26	0	7	0	31
BARGUNA	2919	3	210	100	293	3525	55	8844	692	127	15	0	6	1	23
ZONE-12	10623	15	992	408	1519	13557	55	26213	3114	611	75	0	25	2	92
NATORE	3217	55	210	178	794	4454	48	12012	738	220	45	0	7	0	24
SIRAJGANJ	4158	282	233	241	817	5731	59	2151	1476	243	74	0	10	2	40
PABNA	3946	267	221	229	776	5439	48	3554	1175	194	58	0	10	2	38
BOGRA	9137	108	307	877	858	11287	48	22061	1643	335	64	0	12	5	47
ZONE-13	20458	712	971	1525	3245	26911	51	39778	5032	992	241	0	39	9	149
RAJSHAHI	4084	70	267	227	1008	5656	37	50241	1097	328	67	1	14	9	38
NAWABGANJ	2888	49	189	160	712	3998	48	27087	688	206	42	0	6	0	25
NAOGAON	5829	100	381	324	1439	8073	48	78391	1152	345	70	0	12	0	49
JOYPURHAT	3020	36	102	290	284	3732	48	19554	464	95	18	0	6	0	16
ZONE-14	15821	255	939	1001	3443	21459	44	175273	3401	974	197	1	38	9	128
GAIBANDHA	5434	455	143	221	669	6922	59	7740	1229	258	42	0	8	0	34
RANGPUR	5755	482	151	235	708	7331	59	33087	1470	309	50	0	9	6	38
DINAJPUR	7844	192	249	480	936	9701	48	68169	1869	501	67	0	14	10	55
PANCHAGARH	3206	78	101	196	383	3964	59	1740	592	158	21	0	6	1	20
THAKURGAON	4128	101	131	252	492	5104	48	9939	854	229	30	0	6	0	24
LALMANIRHAT	3097	259	81	126	381	3944	59	1611	632	132	22	0	6	1	20
NILPHAMARI	4092	343	108	167	504	5214	59	3332	899	189	31	0	7	1	25
KURIGRAM	5725	479	151	233	705	7293	59	3003	1034	217	35	0	10	2	37
ZONE-15	39281	2389	1115	1910	4778	49473	56	128621	8579	1993	298	0	66	21	253
TOTAL	253636	10994	14928	18663	42551	340772	44	1407988	66235	13419	3344	28	560	287	2034

Table 3.2-3 Socio-economic Data by District/Zone (3)

District	Road Length (km)								No. of Bridges Inculding gaps without Structure					No. of Study Bridges
	Nat'l Hway	Reg. Hway	Feeder-A	Feeder-B	Rural-1	Rural-2	Rural-3	Total	Feeder-B	Rural-1	Rural-2	Rural-3	Total	
DHAKA	32	38	80	207	1126	669	802	2954	234	1048	426	417	2125	19
NARAYANGANJ	74	23	113	199	563	306	351	1629	207	450	102	116	875	15
MUNSHIGANJ	33	3	164	172	433	305	446	1556	182	452	238	189	1061	30
MANIKGANJ	54	16	120	198	923	607	480	2398	212	702	150	13	1077	56
NARSINGDI	54	0	238	160	950	460	623	2485	385	1875	569	829	3658	4
ZONE-1	247	80	715	936	3995	2347	2702	11022	1220	4527	1485	1564	8796	124
GAZIPUR	93	5	172	253	869	787	1161	3340	422	914	79	59	1474	19
SHERPUR	0	18	337	203	632	441	490	2121	223	817	153	124	1317	16
TANGAIL	122	22	242	639	2123	1061	1047	5256	898	2063	736	673	4370	20
JAMALPUR	20	1	140	407	1374	1012	1015	3969	616	1170	181	18	1985	26
ZONE-2	235	46	891	1502	4998	3301	3713	14686	2159	4964	1149	874	9146	81
MYMENSINGH	87	19	544	635	2532	1934	2441	8192	1183	3768	1209	2877	9037	22
KISHOREGANJ	3	120	308	360	1133	633	1906	4463	796	2837	924	3086	7643	6
NETRAKONA	0	20	252	502	1285	843	889	3791	776	1658	0	0	2434	13
ZONE-3	90	159	1104	1497	4950	3410	5236	16446	2755	8263	2133	5963	19114	41
RAJBARI	19	46	176	254	502	453	558	2008	185	365	310	248	1108	5
GOPALGANJ	88	58	352	311	621	459	518	2407	190	279	129	13	611	13
FARIDPUR	83	0	208	408	729	902	1031	3361	325	510	600	557	1992	14
ZONE-4	190	104	736	973	1852	1814	2107	7776	700	1154	1039	818	3711	32
SHARIATPUR	0	37	124	262	611	553	949	2536	347	567	476	637	2027	19
MADARIPUR	59	17	99	141	432	493	748	1989	146	336	379	432	1293	27
ZONE-5	59	54	223	403	1043	1046	1697	4525	493	903	855	1069	3320	46
COMILLA	139	28	734	401	2018	2007	1914	7241	592	2564	0	0	3156	17
B.BARIA	78	0	211	244	687	668	936	2824	380	1040	738	872	3030	6
CHANDPUR	0	60	238	259	1046	808	888	3299	432	1181	764	647	3024	26
FENI	50	0	254	80	511	635	890	2420	149	1278	758	692	2877	16
NOAKHALI	29	12	401	212	1736	1551	1573	5514	218	1579	468	237	2502	18
LAKSHMIPUR	0	39	346	164	658	692	1425	3324	220	870	69	34	1193	4
ZONE-6	296	139	2184	1360	6656	6361	7626	24622	1991	8512	2797	2482	15782	87
CHITTAGONG	175	33	1020	216	2075	2353	2643	8515	353	2098	2312	1665	6428	45
COX'S BAZAR	154	7	232	110	666	641	1128	2938	258	973	660	1140	3031	16
RANGAMATI	48	0	200	463	1214	443	497	2865	340	279	217	219	1055	16
KHAGRACHHARI	0	62	408	190	449	483	775	2367	195	497	439	662	1793	6
BANDARBAN	23	0	486	189	521	376	951	2546	303	572	352	305	1532	8
ZONE-7	400	102	2346	1168	4925	4296	5994	19231	1449	4419	3980	3991	13839	91
SYLHET	120	22	298	308	992	953	1746	4439	664	1459	937	1124	4184	31
MOULAVIBAZAR	94	0	242	174	1108	1075	878	3571	371	1545	1264	10	3190	6
SUNAMGANJ	0	46	219	466	843	670	969	3213	629	870	576	887	2962	35
HABIGANJ	61	16	171	290	813	628	1100	3079	389	1151	166	201	1907	12
ZONE-8	275	84	930	1238	3756	3326	4693	14302	2053	5025	2943	2222	12243	84
KHULNA	33	34	246	432	1062	805	1312	3924	584	1504	500	236	2824	13
BAGERHAT	30	78	243	326	1102	829	961	3569	432	1828	746	844	3850	59
SATKHIRA	0	29	237	328	1291	943	1963	4791	715	2922	811	1523	5971	16
ZONE-9	63	141	726	1086	3455	2577	4236	12284	1731	6254	2057	2603	12645	88
JESSORE	110	61	119	483	1388	1141	1617	4919	1091	2963	423	365	4842	14
JHENAIDAH	51	0	336	413	1211	837	1005	3853	539	1490	498	377	2904	7
MAGURA	67	0	100	282	603	242	631	1925	351	575	86	243	1255	5
KUSHTIA	49	57	135	410	778	945	430	2804	581	845	579	290	2295	10
NARAIL	0	12	83	160	501	469	583	1808	202	526	381	529	1638	8
MEHERPUR	0	81	139	143	564	197	356	1480	241	584	167	206	1198	7
CHUADANGA	0	28	85	304	685	416	473	1991	418	848	289	256	1811	9
ZONE-10	277	239	997	2195	5730	4247	5095	18780	3423	7831	2423	2266	15943	60
BARISAL	60	40	453	320	1344	1530	3414	7161	332	1294	920	1080	3626	61
BHOLA	0	13	497	170	768	1058	989	3495	161	562	387	265	1375	2
ZONE-11	60	53	950	490	2112	2588	4403	10656	493	1856	1307	1345	5001	63
PIROJPUR	0	20	477	93	1049	984	939	3562	219	1529	959	957	3664	21
JHALAKATI	0	13	148	90	859	532	626	2268	99	1378	857	1000	3334	30
PATUAKHALI	38	30	211	306	1408	1459	2123	5575	273	1264	1180	1441	4158	17
BARGUNA	0	26	198	195	725	884	1754	3782	260	892	882	1688	3722	13
ZONE-12	38	89	1034	684	4041	3859	5442	15187	851	5063	3878	5086	14878	81
NATORE	72	0	151	254	922	940	698	3037	214	794	464	267	1739	12
SIRAJGANJ	56	20	288	365	1455	745	800	3729	429	1955	2	4	2390	31
PABNA	116	0	256	456	1649	780	638	3895	344	1299	358	216	2217	12
BOGRA	101	63	337	560	1765	945	1191	4962	845	3575	817	885	6122	41
ZONE-13	345	83	1032	1635	5791	3410	3327	15623	1832	7623	1641	1372	12468	96
RAJSHAHI	51	73	200	607	1504	1101	491	4027	876	1890	554	165	3485	8
NAWABGANJ	0	8	170	190	634	680	532	2214	228	835	54	11	1128	28
NAOGAON	7	108	319	580	1324	914	1379	4631	813	1636	81	11	2541	18
JOYPURHAT	0	31	96	238	593	289	465	1712	480	1395	470	586	2931	10
ZONE-14	58	220	785	1615	4055	2984	2867	12584	2397	5756	1159	773	10085	64
GAIBANDHA	61	36	195	373	996	829	681	3171	472	1444	641	625	3182	9
RANGPUR	71	0	252	784	1672	577	1239	4595	990	2149	456	799	4394	19
DINAJPUR	59	49	256	551	2143	1597	1381	6036	733	3376	1362	1014	6485	31
PANCHAGARH	73	0	56	262	1010	631	1122	3154	338	1656	609	932	3535	14
THAKURGAON	42	0	115	253	1171	716	1208	3505	460	1898	297	95	2750	15
LALMANIRHAT	122	0	62	269	888	333	697	2371	374	1019	13	0	1406	7
NILPHAMARI	11	20	172	373	1079	588	653	2896	530	1749	144	135	2558	14
KURIGRAM	14	53	201	314	1183	653	695	3113	381	1112	244	118	1855	5
ZONE-15	453	158	1309	3179	10142	5924	7676	28841	4278	14403	3766	3718	26165	114
TOTAL	3086	1751	15962	19961	67501	51490	66814	226565	27825	86553	32612	36146	183136	1152

3.3 Socio-economic Indicators

Socio-economic indicators calculated from the data in Tables 3.2-1 through 3.2-3 are shown in Tables 3.3-1 and 3.3-2 by district/zone.

Table 3.3-1 Socio-economic Indicators by District/zone (1)

District	Population Density (person/km²)	Agricultural Sector Share (%)	Per Capita GRP (Taka)				Land Productivity (million taka/km²)	Agricultue Productivity (million taka/km2)	Unutilized Land Ratio (%)	Incidence of Poverty (%)	Tribal Population Ratio (%)	Public Facility Ratio (/1,000person)	G.Centre/ Bazaar/Hat Ratio (/1,000person)
			Agric.	Industrial	Service	Total							
DHAKA	5858	4.70	675	4134	9506	14315	83.849	5.351	12.10	27	0.11	0.443	0.003
NARAYANGANJ	2818	11.80	1403	3186	7328	11917	33.577	5.351	12.20	37	0.09	0.347	0.010
MUNSHIGANJ	1354	26.00	2919	2520	5795	11234	15.217	5.350	12.10	37	0.08	0.349	0.018
MANIKGANJ	924	38.70	4277	2056	4728	11061	10.226	5.345	12.10	48	0.04	0.351	0.021
NARSINGDI	1658	19.70	2385	2954	6792	12131	20.108	5.348	12.20	37	0.11	0.348	0.014
ZONE-1	2663	11.30	1485	3541	8143	13169	35.068	5.349	12.10	32	0.10	0.402	0.008
GAZIPUR	1164	21.20	3397	3831	8809	16037	18.665	5.348	12.20	48	0.08	0.349	0.012
SHERPUR	914	30.50	4245	2703	6962	13910	12.712	4.578	6.70	58	1.39	0.604	0.017
TANGAIL	953	31.50	4253	1658	7581	13491	12.859	4.016	1.90	48	0.45	0.558	0.016
JAMALPUR	1028	28.10	3773	2695	6941	13410	13.788	4.576	6.70	58	0.23	0.602	0.015
ZONE-2	1008	27.80	3934	2572	7625	14131	14.238	4.439	5.50	52	0.45	0.526	0.015
MYMENSINGH	1017	22.40	2374	1098	7124	10595	10.780	4.910	0.60	48	0.86	0.646	0.014
KISHOREGANJ	939	46.90	7490	1133	7347	15970	14.997	4.140	8.00	48	0.13	0.647	0.019
NETRAKONA	690	30.70	3502	1057	6860	11420	7.875	4.910	0.50	48	1.64	0.649	0.023
ZONE-3	903	33.10	4071	1099	7130	12299	11.102	4.476	4.90	48	0.82	0.647	0.017
RAJBARI	840	29.90	3650	1238	7314	12202	10.254	3.899	15.20	48	0.14	1.345	0.019
GOPALGANJ	760	24.90	4037	1764	10430	16231	12.332	3.897	15.30	48	0.14	1.347	0.021
FARIDPUR	829	30.50	3697	1216	7189	12102	10.038	3.895	15.30	48	0.13	1.347	0.022
ZONE-4	810	28.30	3787	1385	8187	13359	10.820	3.896	15.20	48	0.13	1.347	0.021
SHARIATPUR	895	19.70	3426	2020	11942	17389	15.566	3.894	15.20	48	0.05	1.346	0.024
MADARIPUR	993	25.90	3088	1277	7551	11915	11.832	3.894	15.30	48	0.18	1.346	0.018
ZONE-5	943	22.30	3251	1635	9666	14553	13.728	3.894	15.20	48	0.12	1.346	0.021
COMILLA	1487	24.30	3122	1577	8139	12838	19.088	5.419	3.40	44	0.09	0.591	0.013
B.BARIA	1228	27.20	3781	1643	8481	13905	17.072	5.417	3.30	44	0.11	0.591	0.013
CHANDPUR	1297	24.10	3579	1828	9439	14846	19.256	5.421	3.40	44	0.11	0.591	0.016
FENI	1289	16.20	2318	1873	10095	14286	18.415	4.535	14.60	34	0.01	0.585	0.017
NOAKHALI	704	38.00	4248	1084	5844	11177	7.863	4.532	14.60	44	0.62	0.584	0.013
LAKSHMIPUR	1016	25.90	2942	1317	7097	11356	11.538	4.534	14.60	44	0.01	0.586	0.015
ZONE-6	1132	26.30	3414	1537	8046	12998	14.707	5.074	8.10	43	0.17	0.589	0.014
CHITTAGONG	1239	15.90	3371	7074	10733	21179	26.238	5.589	27.70	25	0.87	0.544	0.011
COX'S BAZAR	705	32.30	5923	4921	7466	18310	12.912	5.590	27.70	34	1.48	0.545	0.018
RANGAMATI	83	68.20	33759	2447	13303	49509	4.106	4.658	0.00	34	51.88	1.173	0.059
KHAGRACHHARI	194	47.60	14342	2454	13346	30141	5.860	6.026	0.00	44	45.81	1.162	0.034
BANDARBAN	65	73.50	44360	2485	13510	60355	3.947	5.424	65.60	44	44.80	1.314	0.044
ZONE-7	457	30.60	7283	6046	10499	23828	10.888	5.481	30.60	29	7.45	0.635	0.017
SYLHET	736	29.40	3394	1480	6671	11545	8.501	3.437	18.50	44	0.60	0.702	0.020
MOULAVIBAZAR	573	24.60	4360	2429	10948	17737	10.165	3.437	18.50	34	2.15	0.713	0.020
SUNAMGANJ	536	34.60	4658	1601	7216	13474	7.228	3.436	18.60	44	0.37	0.699	0.021
HABIGANJ	666	28.20	3749	1733	7813	13296	8.860	3.435	18.60	44	2.44	0.702	0.019
ZONE-8	627	29.10	3984	1759	7929	13673	8.575	3.436	18.50	42	1.26	0.703	0.020
KHULNA	531	24.60	5147	3461	12349	20957	11.131	3.585	13.60	42	0.67	0.781	0.016
BAGERHAT	383	41.90	7140	2163	7718	17021	6.517	3.585	13.60	42	0.67	0.779	0.026
SATKHIRA	478	43.90	5722	1598	5701	13021	6.221	3.583	13.60	33	0.25	0.774	0.021
ZONE-9	466	33.80	5864	2512	8964	17340	8.084	3.584	13.60	39	0.53	0.778	0.020
JESSORE	947	31.50	4390	1351	8203	13944	13.201	5.157	7.40	42	0.18	0.696	0.017
JHENAIDAH	797	40.00	5213	1105	6709	13027	10.385	5.159	7.40	42	0.17	0.696	0.018
MAGURA	773	42.70	5374	1018	6180	12572	9.722	5.154	7.40	42	0.03	0.698	0.022
KUSHTIA	1057	29.40	3504	1725	6678	11907	12.584	4.789	8.20	52	0.11	0.593	0.017
NARAIL	696	40.00	5971	1268	7702	14941	10.399	5.162	7.30	33	0.22	0.698	0.022
MEHERPUR	809	50.40	4576	925	3582	9083	7.352	4.784	8.20	42	0.08	0.595	0.017
CHUADANGA	853	26.90	4343	2422	9374	16139	13.761	4.789	8.20	42	0.23	0.592	0.020
ZONE-10	872	34.60	4585	1435	7241	13261	11.566	5.036	7.60	43	0.15	0.658	0.018
BARISAL	835	25.10	3639	1414	9437	14490	12.102	3.637	14.30	43	0.20	0.843	0.019
BHOLA	493	40.50	6168	1181	7878	15228	7.502	3.637	14.30	55	0.73	0.842	0.021
ZONE-11	647	31.70	4697	1317	8785	14799	9.575	3.637	14.30	48	0.42	0.843	0.020
PIROJPUR	861	27.10	3529	1239	8272	13040	11.231	3.637	14.30	55	0.19	0.845	0.020
JHALAKATI	918	21.40	3310	1586	10584	15480	14.215	3.636	14.30	55	0.11	0.845	0.023
PATUAKHALI	451	47.30	6492	1369	5863	13724	6.185	2.847	4.60	55	1.00	1.001	0.021
BARGUNA	457	39.60	6397	1851	7920	16168	7.395	2.847	4.60	55	1.06	1.004	0.027
ZONE-12	578	35.70	5120	1469	7745	14333	8.283	3.035	7.10	55	0.64	0.932	0.022
NATORE	802	41.30	3630	672	4490	8793	7.055	3.273	5.10	48	0.79	0.664	0.016
SIRAJGANJ	1084	24.90	2732	1376	6850	10958	11.875	4.047	6.70	59	0.08	0.667	0.015
PABNA	908	32.90	3259	1111	5529	9899	8.993	4.047	6.70	48	0.17	0.668	0.018
BOGRA	1023	32.80	4416	1297	7770	13482	13.799	5.514	1.20	48	0.74	0.689	0.016
ZONE-13	968	31.70	3536	1175	6457	11168	10.806	4.363	4.60	51	0.42	0.674	0.016
RAJSHAHI	940	20.90	3099	1528	10198	14824	13.934	3.273	5.10	37	2.22	0.670	0.017
NAWABGANJ	834	37.40	3493	760	5074	9327	7.779	3.272	5.10	48	1.91	0.664	0.018
NAOGAON	692	37.50	4210	912	6092	11214	7.759	3.272	5.10	48	3.30	0.664	0.021
JOYPURHAT	875	40.90	5163	1067	6388	12618	11.047	5.513	1.20	48	2.31	0.690	0.019
ZONE-14	811	31.30	3815	1102	7265	12181	9.882	3.521	4.70	44	2.54	0.669	0.019
GAIBANDHA	972	35.10	3958	1041	6291	11290	10.974	4.690	4.80	59	0.37	0.726	0.016
RANGPUR	1098	30.60	3503	1125	6804	11432	12.554	4.687	4.80	59	1.31	0.728	0.015
DINAJPUR	761	34.60	4355	1223	7024	12602	9.596	3.798	5.00	48	2.60	0.940	0.021
PANCHAGARH	590	39.20	5617	1293	7425	14335	8.462	3.797	4.90	59	0.21	0.938	0.024
THAKURGAON	661	40.60	5014	1087	6242	12343	8.164	3.798	5.00	48	0.83	0.935	0.020
LALMANIRHAT	877	43.40	4388	813	4909	10110	8.864	4.690	4.80	59	0.15	0.728	0.018
NILPHAMARI	945	30.80	4071	1300	7858	13229	12.501	4.689	4.70	59	0.21	0.727	0.016
KURIGRAM	776	39.10	4956	1095	6621	12672	9.837	4.690	4.80	59	0.17	0.728	0.021
ZONE-15	841	35.60	4319	1129	6700	12148	10.212	4.306	4.80	56	0.94	0.799	0.018
National Avg.	835	28.80	4036	2119	7864	14019	11.699	4.265	10.10	44	1.14	0.681	0.017

Table 3.3-2 Socio-economic Indicators by District/zone (2)

District	Road Density per Area (km/km²)			Road Density per Area & Population (km/√(km²x1000person))			Study Bridges Ratio (%)	Study Bridges per Popul. (/1000person)
	Nat'l+Reg'l+ Feeder-A	Nat'l+Reg'l+ Feeder-A & B	All Roads	Nat'l+Reg'l+ Feeder-A	Nat'l+Reg'l+ Feeder-A & B	All Roads		
DHAKA	0.129	0.308	2.547	0.078	0.185	1.534	0.894	0.002
NARAYANGANJ	0.277	0.539	2.146	0.165	0.321	1.279	1.714	0.007
MUNSHIGANJ	0.209	0.39	1.629	0.18	0.335	1.4	2.828	0.023
MANIKGANJ	0.138	0.281	1.739	0.143	0.293	1.809	5.2	0.044
NARSINGDI	0.256	0.396	2.178	0.199	0.308	1.692	0.109	0.002
ZONE-1	0.193	0.367	2.043	0.143	0.272	1.516	1.41	0.008
GAZIPUR	0.155	0.3	1.918	0.144	0.278	1.778	1.289	0.009
SHERPUR	0.26	0.409	1.555	0.272	0.428	1.627	1.215	0.013
TANGAIL	0.113	0.3	1.54	0.116	0.308	1.577	0.458	0.006
JAMALPUR	0.079	0.28	1.953	0.078	0.276	1.926	1.31	0.012
ZONE-2	0.137	0.313	1.717	0.137	0.312	1.711	0.886	0.009
MYMENSINGH	0.149	0.295	1.878	0.148	0.292	1.861	0.243	0.005
KISHOREGANJ	0.16	0.294	1.66	0.165	0.304	1.713	0.079	0.002
NETRAKONA	0.097	0.275	1.349	0.117	0.332	1.625	0.534	0.007
ZONE-3	0.137	0.289	1.668	0.144	0.304	1.755	0.215	0.005
RAJBARI	0.215	0.442	1.794	0.235	0.483	1.957	0.451	0.005
GOPALGANJ	0.334	0.543	1.615	0.383	0.623	1.853	2.128	0.011
FARIDPUR	0.14	0.337	1.621	0.154	0.37	1.78	0.703	0.008
ZONE-4	0.22	0.428	1.661	0.244	0.475	1.845	0.862	0.008
SHARIATPUR	0.136	0.358	2.147	0.144	0.379	2.27	0.937	0.018
MADARIPUR	0.153	0.276	1.737	0.153	0.277	1.743	2.088	0.024
ZONE-5	0.144	0.318	1.945	0.149	0.327	2.003	1.386	0.021
COMILLA	0.292	0.422	2.347	0.24	0.346	1.925	0.539	0.004
B.BARIA	0.15	0.277	1.465	0.135	0.25	1.323	0.198	0.003
CHANDPUR	0.175	0.327	1.936	0.154	0.287	1.7	0.86	0.012
FENI	0.328	0.414	2.608	0.289	0.364	2.297	0.556	0.013
NOAKHALI	0.123	0.182	1.531	0.146	0.217	1.826	0.719	0.007
LAKSHMIPUR	0.264	0.377	2.283	0.262	0.374	2.265	0.335	0.003
ZONE-6	0.206	0.313	1.939	0.194	0.295	1.822	0.551	0.006
CHITTAGONG	0.242	0.284	1.677	0.258	0.304	1.791	0.7	0.007
COX'S BAZAR	0.158	0.202	1.179	0.188	0.24	1.404	0.528	0.009
RANGAMATI	0.041	0.116	0.468	0.141	0.404	1.627	1.517	0.032
KHAGRACHHARI	0.174	0.244	0.877	0.395	0.554	1.988	0.335	0.011
BANDARBAN	0.114	0.156	0.568	0.444	0.609	2.223	0.522	0.027
ZONE-7	0.136	0.192	0.922	0.227	0.32	1.534	0.658	0.009
SYLHET	0.126	0.214	1.272	0.147	0.25	1.482	0.741	0.012
MOULAVIBAZAR	0.12	0.182	1.276	0.159	0.241	1.685	0.188	0.004
SUNAMGANJ	0.072	0.199	0.875	0.099	0.272	1.195	1.182	0.018
HABIGANJ	0.094	0.204	1.168	0.115	0.25	1.43	0.629	0.007
ZONE-8	0.102	0.201	1.135	0.129	0.253	1.434	0.686	0.011
KHULNA	0.072	0.171	0.9	0.12	0.286	1.504	0.46	0.006
BAGERHAT	0.089	0.171	0.901	0.143	0.276	1.457	1.532	0.039
SATKHIRA	0.069	0.154	1.242	0.1	0.223	1.797	0.268	0.009
ZONE-9	0.076	0.166	1.009	0.12	0.26	1.587	0.696	0.015
JESSORE	0.112	0.3	1.908	0.116	0.308	1.961	0.289	0.006
JHENAIDAH	0.198	0.41	1.976	0.222	0.459	2.213	0.241	0.005
MAGURA	0.159	0.428	1.835	0.181	0.487	2.087	0.398	0.006
KUSHTIA	0.149	0.402	1.73	0.145	0.391	1.683	0.436	0.006
NARAIL	0.096	0.258	1.826	0.115	0.309	2.189	0.488	0.012
MEHERPUR	0.307	0.507	2.067	0.342	0.564	2.298	0.584	0.012
CHUADANGA	0.098	0.36	1.719	0.106	0.39	1.862	0.497	0.009
ZONE-10	0.15	0.369	1.866	0.161	0.395	1.999	0.376	0.007
BARISAL	0.198	0.313	2.566	0.217	0.342	2.808	1.682	0.026
BHOLA	0.15	0.2	1.027	0.214	0.285	1.463	0.145	0.001
ZONE-11	0.172	0.251	1.72	0.213	0.312	2.139	1.26	0.016
PIROJPUR	0.38	0.451	2.723	0.409	0.486	2.934	0.573	0.019
JHALAKATI	0.212	0.331	2.992	0.222	0.346	3.122	0.9	0.043
PATUAKHALI	0.087	0.183	1.739	0.13	0.272	2.591	0.409	0.012
BARGUNA	0.122	0.229	2.064	0.181	0.338	3.052	0.349	0.016
ZONE-12	0.163	0.26	2.138	0.215	0.342	2.813	0.544	0.02
NATORE	0.118	0.252	1.602	0.131	0.281	1.788	0.69	0.008
SIRAJGANJ	0.146	0.292	1.493	0.14	0.28	1.434	1.297	0.011
PABNA	0.157	0.349	1.643	0.165	0.366	1.724	0.541	0.006
BOGRA	0.172	0.363	1.699	0.17	0.359	1.68	0.67	0.014
ZONE-13	0.151	0.32	1.613	0.153	0.325	1.64	0.77	0.01
RAJSHAHI	0.14	0.403	1.743	0.156	0.447	1.933	0.23	0.004
NAWABGANJ	0.105	0.216	1.301	0.115	0.237	1.424	2.482	0.02
NAOGAON	0.126	0.295	1.348	0.152	0.355	1.62	0.708	0.008
JOYPURHAT	0.132	0.378	1.774	0.141	0.404	1.896	0.341	0.012
ZONE-14	0.126	0.318	1.496	0.144	0.362	1.699	0.635	0.009
GAIBANDHA	0.134	0.305	1.455	0.136	0.31	1.476	0.283	0.004
RANGPUR	0.14	0.48	1.991	0.134	0.458	1.9	0.432	0.007
DINAJPUR	0.106	0.266	1.756	0.121	0.305	2.012	0.478	0.012
PANCHAGARH	0.092	0.278	2.245	0.12	0.362	2.922	0.396	0.017
THAKURGAON	0.087	0.227	1.938	0.107	0.279	2.382	0.545	0.013
LALMANIRHAT	0.148	0.365	1.909	0.158	0.39	2.039	0.498	0.006
NILPHAMARI	0.124	0.351	1.765	0.127	0.361	1.815	0.547	0.009
KURIGRAM	0.117	0.253	1.356	0.132	0.288	1.539	0.27	0.003
ZONE-15	0.118	0.312	1.767	0.128	0.341	1.928	0.436	0.008
National Average	0.142	0.277	1.542	0.16	0.314	1.747	0.629	0.009

3.4 Assessment of Socio-economic Condition

3.4.1 Demographic Characteristics

Population Density: Total population of the country is approximately 123 million. The population density varies from zone to zone due to different geographical and socio-economic conditions. Population density of Zone 1 is the highest which is 2,663 persons per square km because the capital is located in this zone, followed by Zone 6 which is 1,132. Zone 7 has the lowest density, 457 persons per square km because it is the most hilly part of the country, followed by zone 9 where population density is 466 because the largest mangrove forest Sundarbans is located in this zone. District-wise, Dhaka stands at the top with 5,858 persons per square km and Bandarban at the bottom with 65 persons per square km. District-wise population density is shown in **Figure 3.4-1.**

Household Size: National average household size is 4.86. Household size in Zone 8 stands at the top with 5.73 and Zone 2 at the bottom with 4.42 because contraceptive prevalence (CPR) is the lowest in Zone 8 while a significant number of people live without family in Zone 2. In general, household size in the northern part of the country is low comparing to eastern part mainly due to the acceptance rate of different family planning method. Household size in Zones 4,5,6,7,8 and 11 is above the national average. Zone wise household size is shown in Table 3.4-1.

Table 3.4-1 Household Size by Zone

Zone No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Household Size	4.82	4.42	4.69	5.04	4.93	5.44	5.34	5.73	4.72	4.65	4.99	4.85	4.62	4.55	4.49
National Average	4.86														

3.4.2 Economic Characteristics

Agricultural Sector Share: The share of agricultural sector in gross regional product (GRP) in Zones 3, 7, 9, 10, 11, 12, 13, 14 and 15 exceeds 30 percent, Zone 12 being the highest with 35.7 percent, while the share in Zone 1 is extremely low being 11.30 percent.

Per Capita GRP in Agricultural Sector: Zone 7 stands at the top with 7,283 Taka, followed by Zone 9 with 5,864 Taka and Zone 12 with 5,120 Taka. Zone 1 stands at the bottom with 1,485 Taka because of relatively low agricultural activity. National average is 4,036 Taka and Zones 3, 7, 9, 10, 11, 12, and 15 are above the national average.

Per Capita GRP in Industrial Sector: Zone 7 is the highest with 6,046 Taka followed by Zone 1 with 3,541 Taka, Zone 2 with 2,572 Taka and Zone 9 with 2,512 Taka. All other 11 zones are below the national average which is 2,119 Taka. Zone 3 stands at the bottom with 1,099 Taka.

Per Capita GRP in Service Sector: Zone 7 is the highest with 10,499 Taka followed by Zone 5 with 9,666 Taka and Zone 9 with 8,964 Taka. National average is 7,864 Taka. Zones 1, 4, 5, 6, 7, 8, 9 and 11 are above the national average.

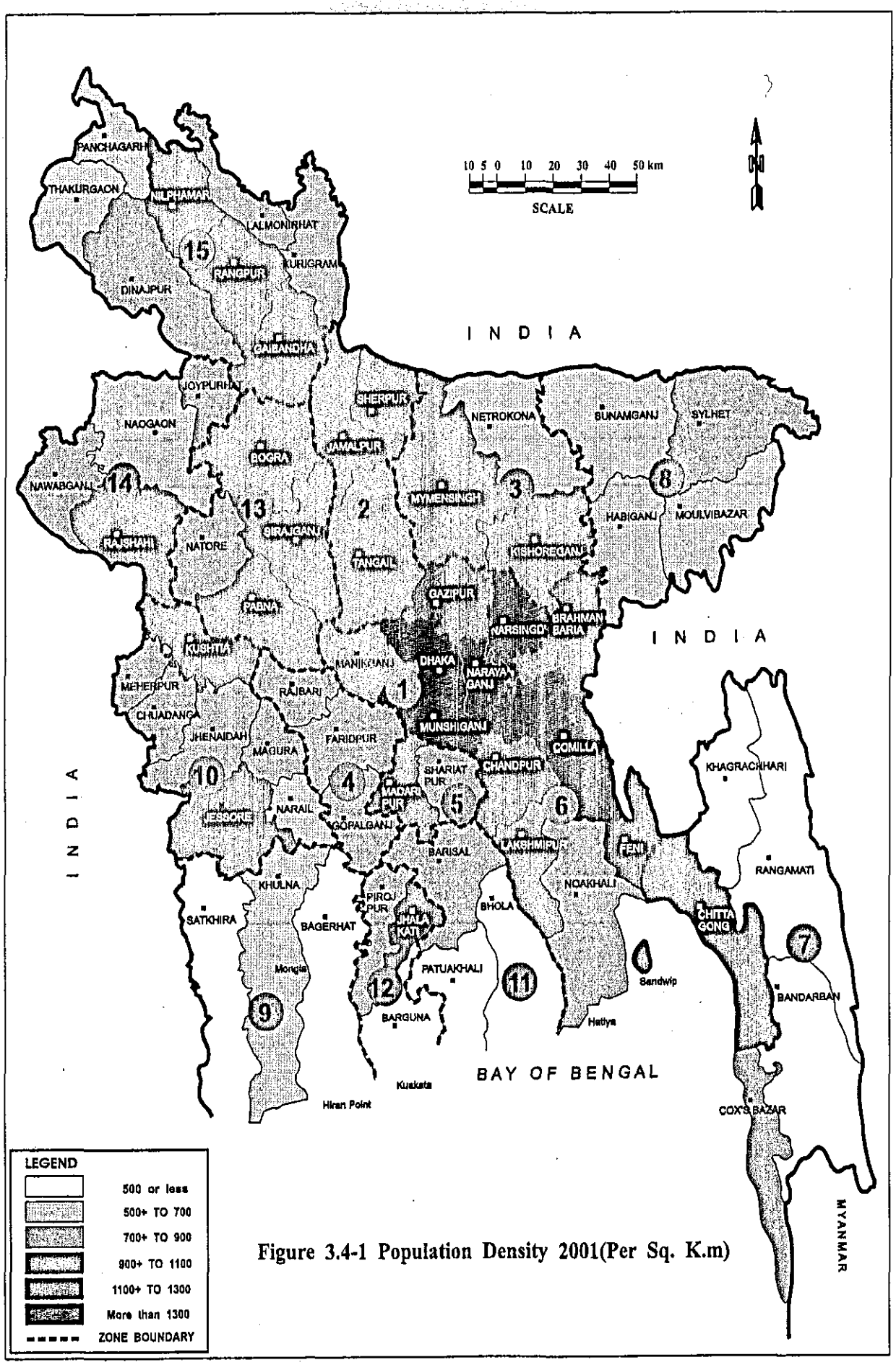

Figure 3.4-1 Population Density 2001(Per Sq. K.m)

Total Per Capita GRP: Zone 7 is at the top with 23,828 Taka followed by Zones 9, 11, 5, 12 and 2. These 6 zones are above national average which is14,019 Taka.

The main reasons of high GRP of zone 7 are as follows:

- Concentration of major industries of the country
- Main Sea Port located in this zone
- Low population density

District-wise per capita GRP is shown in **Figure 3.4-2**

Land Productivity: Land productivity (GRP per land area) of Zone 1 is the highest with 35.07 million Taka per square km followed by Zones 6, 2 and 5. The rest of Zones are below national average which is 11.70. Even in Zone 7, land productivity is below the national average although per capita GRP is very high.

Agricultural Productivity: Agricultural productivity (agricultural production per net cropped area) in Zone 7 is the highest with 5.48 million Taka per square km followed by Zone 1 with 5.35 million Taka per square km, while Zone 12 shows the lowest agricultural productivity (3.04) followed by Zone 8 (3.44). The national average is 4.265 million Taka per square km.

Unutilized Land Ratio: This is defined as the ratio of culturable waste land plus current fallow land to the total area of culturable waste, current fallow and net cropped lands, i.e. the ratio of the land available for agriculture but not utilized. The unutilized land ratio of Zone 7 is predominantly high with 30.6 percent followed by Zone 8 with 18.5 percent. National average is 10.1 percent and Zones 2, 3, 6, 10, 12, 13, 14 and 15 are below the national average.

3.4.3 Social Characteristics

Incidence of Poverty: The incidence of poverty in Zone 15 is the highest with 56 percent, followed by Zones 12 and 2 with 55 and 52 percent respectively. Zones 15 and 2 are recognized as the major poverty area in the country due to landlessness and river erosion. Another reason of poverty in these zones is that industrial activity is the lowest and unemployment rate is the highest due to less industrial investment. Incidence of poverty in Zone 7 is the lowest with 29 percent followed by Zone 1 with 32 percent. The rest zones are more or less similar varying from 40 to 50 percent. District-wise incidence of poverty is shown in **Figure 3.4-3.**

Tribal Population Ratio: The tribal population ratio in Zone 7 is outstandingly high with 7.45 percent, followed by Zones 14 and 8 with 2.54 and 1.26 percent respectively. Zone 7 and a part of Zone 8 is hilly regions and styles of living in hilly area are quite different from plain area. The tribal population ratio in the rest zones is below 1 percent.

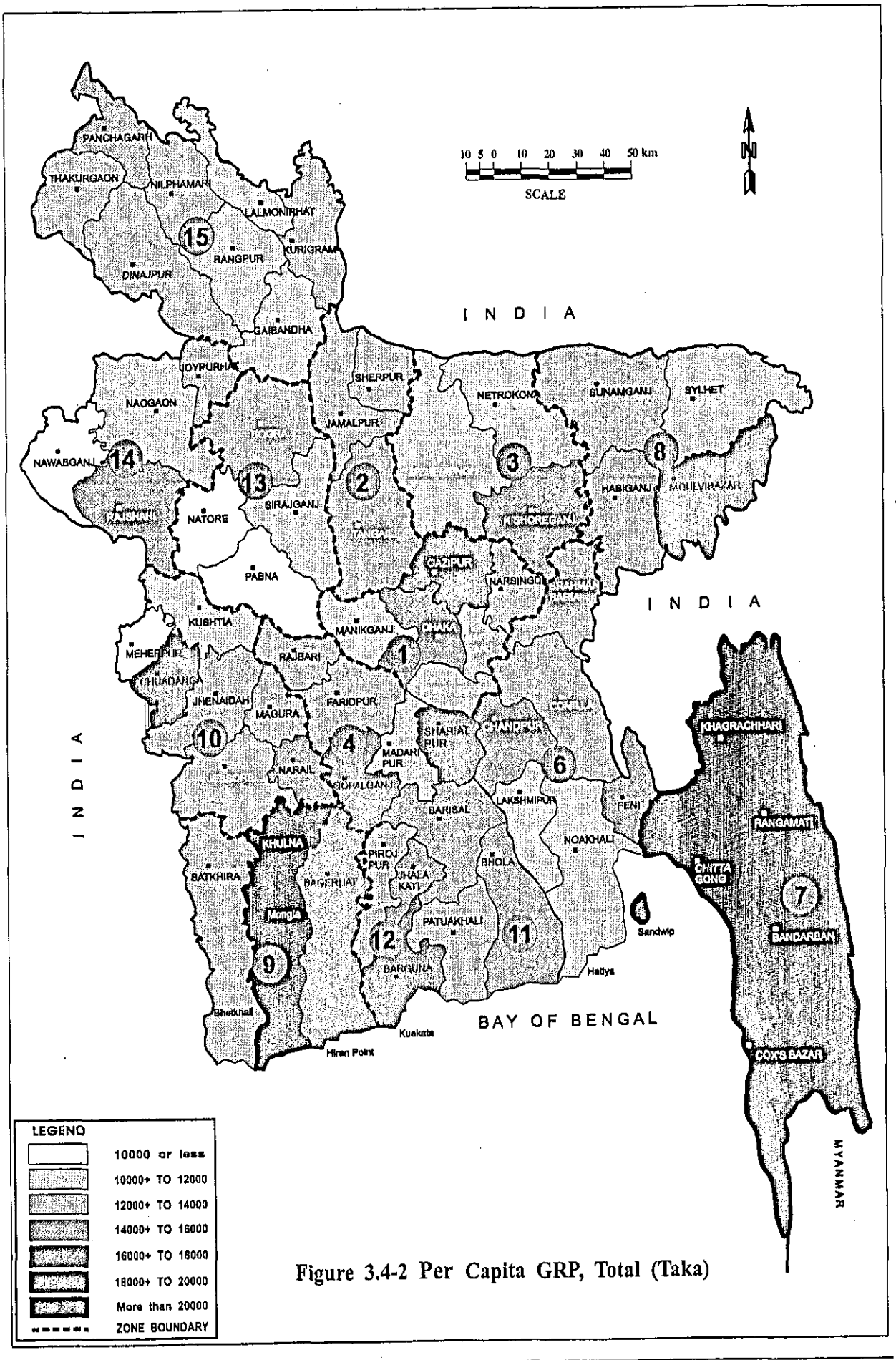

Figure 3.4-2 Per Capita GRP, Total (Taka)

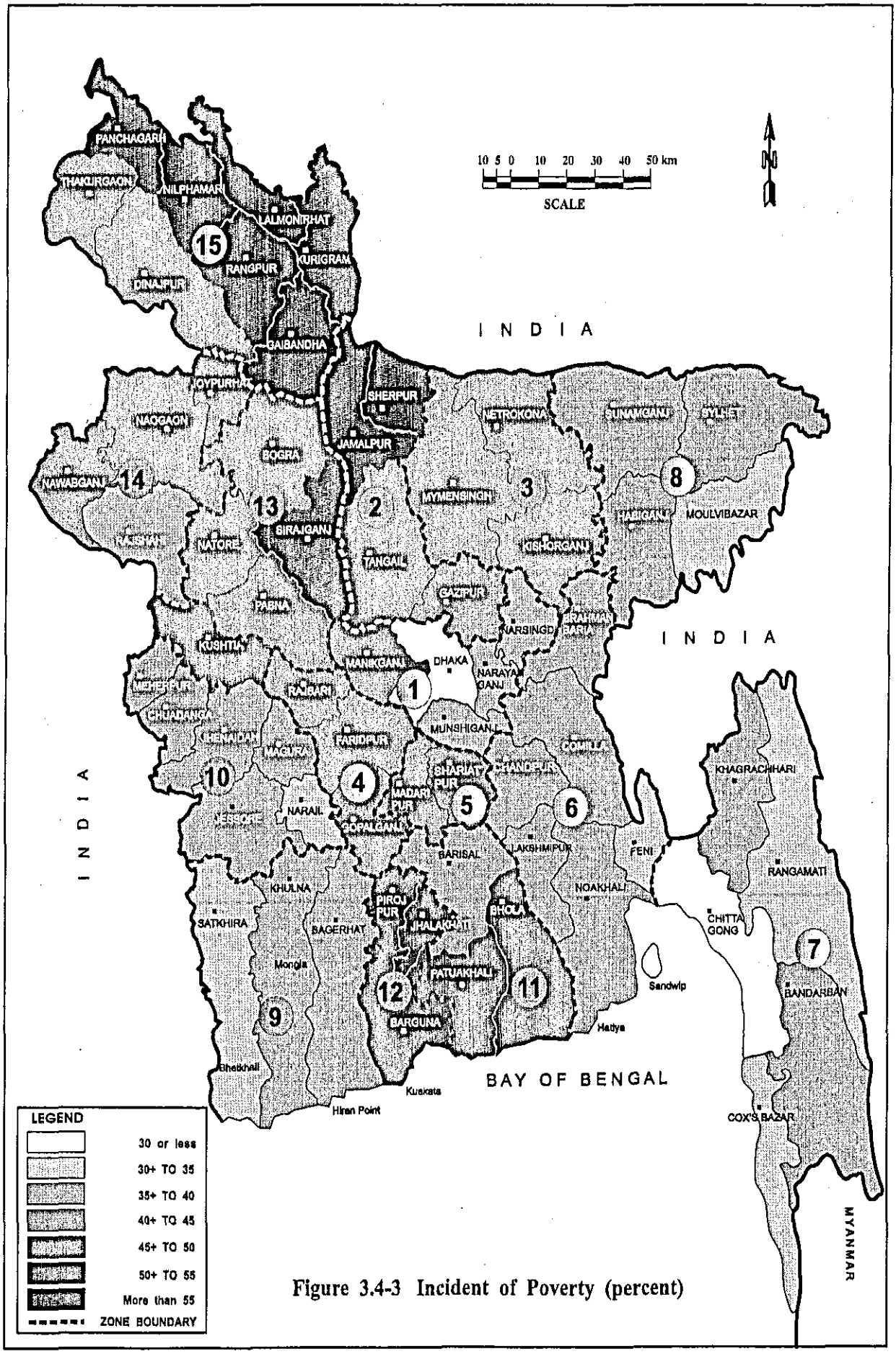

Figure 3.4-3 Incident of Poverty (percent)

Public Facility Ratio: Number of public facilities per 1,000 population is shown in Table 3.4-2.

Table 3.4-2 Public Facility Ratio (per 1,000 population)

	Primary School	Secondary School	College/ Institute	University	Health Facility	Total
Maximum	1.222 (Zone 5)	0.179 (Zone 9)	0.086 (Zone 1)	0.0011 (Zone 1)	0.012 (Zone 1)	1.347 (Zone 4)
Minimum	0.232 (Zone 1)	0.070 (Zone 8)	0.012 (Zone 3)	0.000 (Zones 4, 5, 11, 12, 13 & 15)	0.004 (Zone 6)	0.402 (Zone 1)
National Average	0.538	0.109	0.027	0.0002	0.007	0.681

Small number of primary schools and secondary schools per population in Zone 1 might be caused by the error in estimation based on the data by former districts. Number of colleges/institutes and universities per population in Zone 1 is the highest.

As for number of health facilities (hospitals) per 1,000 populations, Zone 1 is the highest with 0.0121 followed by Zone 8 with 0.0097 and Zone 6 is the lowest with 0.0038 preceded by Zone 2 with 0.0048. In Zone 1, there is one hospital per 83,000 population, while in Zone 6, one hospital per 261,000 population.

Public facility ratio (total number of educational and health facilities per 1,000 population) varies from 1.347 in Zone 4 to 0.402 in Zone 1. District-wise public facility ratio is shown in **Figure 3.4-4.**

Growth Center/ Bazaar/ Hat Ratio: Growth centre, Bazaar and hat are called market in general term. Number of markets per 1,000 population in Zone 12 is the highest with 0.022 and that in Zone 1 is the smallest with 0.008. However, the size of market is not reflected in the comparison. Area-wise, markets are most densely located in Zone 1, one market in every 45.2 square km in average, followed by Zone 5, one market in 51.7 square km, while they are least densely located in Zone 7, one market in 129.3 square km, preceded by Zones 9 and 8, one market in 106.2 and 79.7 square km respectively. Zone 7 is hilly area and Zone 9 has Sundarbans mangrove forest and very often submerged. These are the main causes of the sparse location of markets. District-wise growth centre/bazaar/hat ratio is shown in **Figure 3.4-5.**

3.4.4 Road Development Condition

Road density varies as shown in Table 3.4-3

Table 3.4-3 Road Density by Zone

	Road Density per Area (km/km²)			Road Density per Area & Population (km/√(km² . 1,000 population))		
	(1) Nat'l+Reg'l +Feeder-A	(2) Nat'l+Reg'l +Feeder-A&B	(3) All Road	(4) Nat'l+Reg'l +Feeder-A	(5) Nat'l+Reg'l +Feeder-A& B (Figure 3.4-6)	(6) All Road (Fig. 3.4-7)
Maximum	0.220 (Zone 4)	0.428 (Zone 4)	2.138 (Zone12)	0.244 (Zone 4)	0.475 (Zone 4)	2.813 (Zone12)
Minimum	0.076 (Zone 9)	0.166 (Zone9)	0.922 (Zone 7)	0.120 (Zone9)	0.253 (Zone 8)	1.434 (Zone 8)
National Average	0.142	0.277	1.542	0.160	0.314	1.747

Note: Road length, land area and population inside city are not included.

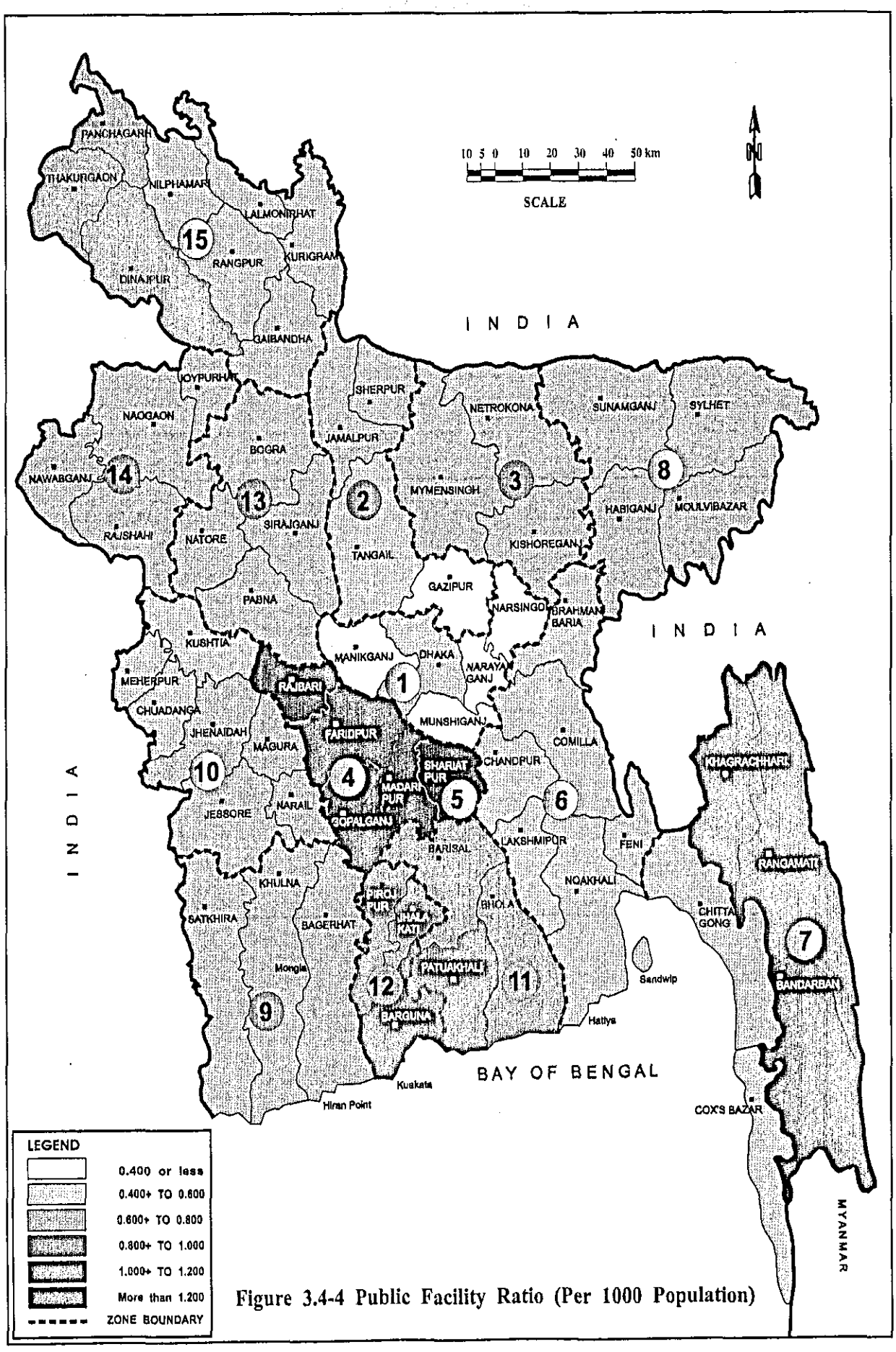

Figure 3.4-4 Public Facility Ratio (Per 1000 Population)

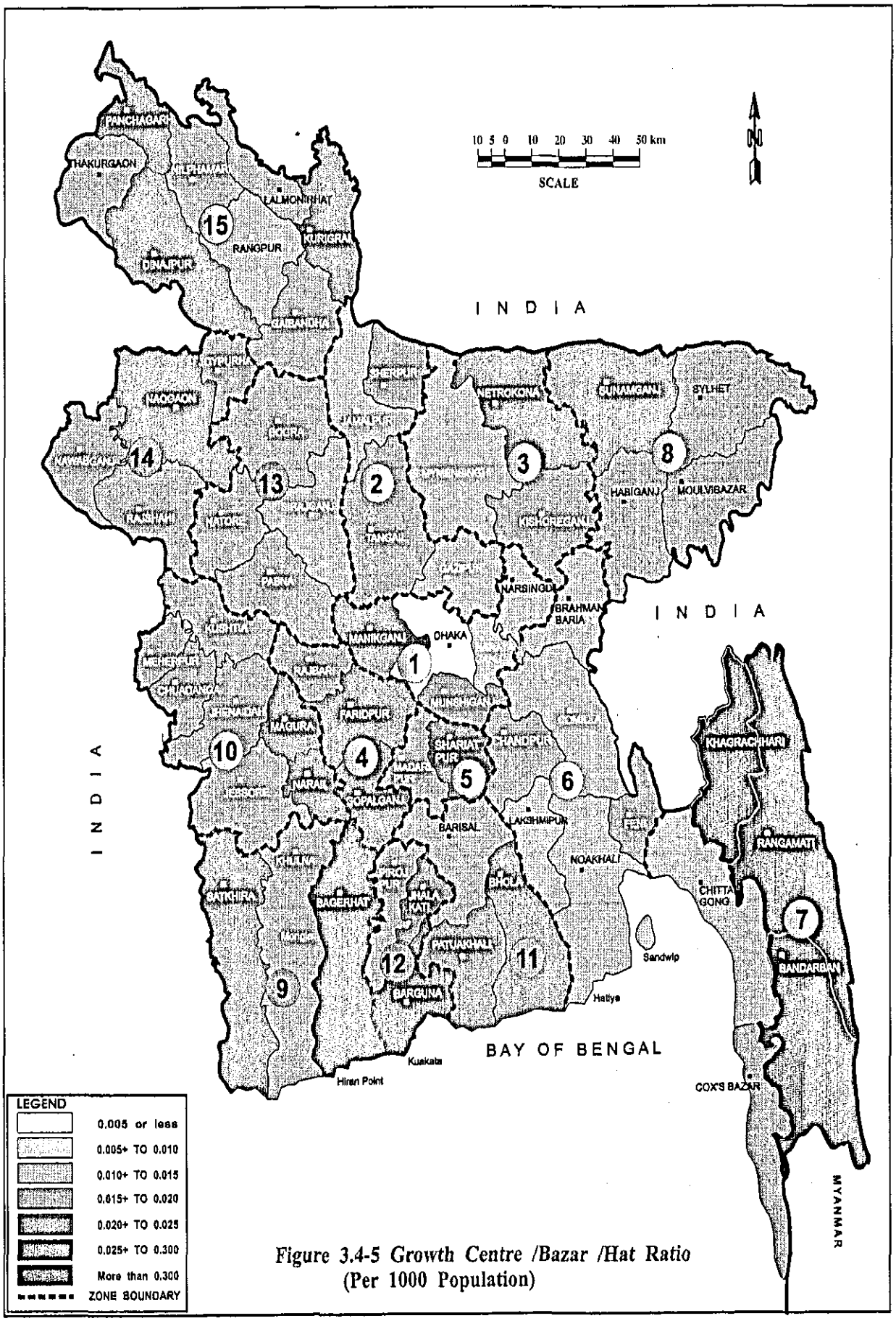

Figure 3.4-5 Growth Centre /Bazar /Hat Ratio (Per 1000 Population)

The orders of zones in (1) to (6) in Table 3.4-3 are not always in the same tendency as shown below:

- Zone 4 : (1), (2), (4) and (5) are first rank high: but (3) and 6) are close to the national average.
- Zone 6 : (1) to (3) are high: but (5) is low and (4) and (6) are close to the national average.
- Zone 1 : (1) to (3) are high: (1) third rank, (2) third rank, (3) second rank, but (4) to (6) are low: (4) fifth last, (5) second last, (6) second last.
- Zones 8 and 9 : low in all (1) to (6).

District-wise road density per area and population (National Highway + Regional Highway + Feeder Roads- A & B) and Road density per area and population (all roads) are shown in **Figure 3.4-6 & 3.4-7** respectively.

Figure 3.4-6 Road Density Per Area & Population, National Regional, Feeder-A&B [Km/√(Km.^{2} 1000 Population)]

Figure 3.4-7 Road Density Per Area & Population, All Roads [Km/√(Km.² 1000 Population)]

3.4.5 Summary

Zone-wise characteristics are summarized in Table 3.4-4.

Table 3.4-4 Socio-economic Condition of Each Zone

Zone	General	Demo-graphic Charac-teristics	Economical Characteristics	Social Characteristics	Road Development Condition
1	• Capital located • Center of commerce and government • Low and flat terrain	• Population density highest	• Per capita GRP close to average (Agricultural sector lowest, Industrial sector second highest, Service sector slightly higher than average) • Land productivity highest	• Incidence of poverty second lowest • Public facility ratio and growth center ratio per population lowest but those per land area highest	• Road density per area high • Road density per area & population low
2	• Close to the capital with good road link • Mostly flat land • Jamuna bridge located	• Population density third highest	• Per capita GRP close to average (Agricultural sector below average, Industrial sector above average, Service sector below average • Land productivity above average	• Incidence of poverty third highest • Public facility ratio second lowest • Growth center ratio third lowest	• Road density per area average • Road density per area and population average
3	• Close to capital • Most of land low and flood prone	• Population density above average	• Per capita GRP below average (Agricultural sector close to average, Industrial & Service sectors low) • Land productivity close to average	• Incidence of poverty medium • Public facility ratio below average • Growth center ratio average	• Road density per area average • Road density per area & population average
4	• High Incidence of flood	• Population density below average	• Per capita GRP below average in all sectors except in Service sector (slightly above average) • Land productivity below average	• Incidence of poverty medium • Public facility ratio highest • Growth center ratio second highest	• Road density per area: Nat'l+Reg'l +Feeder-A+B highest, all road average • Road density per area & population: same as above
5	• Close to capital • Means of communication to Dhaka mainly waterway	• Population density above average	• Per capita GRP slightly above average (Agricultural & Industrial sectors low, Service sector second highest) • Land productivity fourth highest	• Incidence of poverty medium • Public facility ratio second highest • Growth center ratio third highest	• Road density per area above average • Road density per area & population above average
6	• Partly highland • Partly hilly • Partly flood prone • Partly siltation area • Small islands located	• Population density second highest	• Per capita GRP below average (Agricultural & Industrial sectors low, Service sector slightly above average) • Land productivity second highest	• Incidence of poverty medium • Public facility ratio third lowest • Growth center ratio second lowest	• Road density per area above average • Road density per area & population close to average
7	• Mostly hilly area • Flood free area • Main sea port of the country located • Commercial capital of the country	• Population density lowest • Highest rate of tribal people	• Per capita GRP highest in all sectors • Land productivity slightly below average	• Incidence of poverty lowest • Public facility ratio below average • Growth center ratio average	• Road density per area low • Road density per area & population: close to average

Zone	General	Demo-graphic Charac-teristics	Economical Characteristics	Social Characteristics	Road Development Condition
8	• Mixture of hills and depressed land • Partly flood prone • Tea producing district	• Population density below average • High rate of tribal people (third highest)	• Per capita GRP close to average in all sectors • Land productivity third lowest	• Incidence of poverty medium • Public facility ratio and Growth center ratio above average	• Road density per area low • Road density per area & population lowest
9	• Biggest mangrove forest located • Mostly flood area • Tidal surge prone • Shrimp producing area	• Population density second lowest	• Per Capita GRP second highest (all sectors above average) • Land productivity lowest	• Incidence of poverty third lowest • Public facility ratio and Growth center ratio above average	• Road density per area lowest • Road density per area & population low
10	• Flat plain • Seasonal flood • Biggest irrigation project located	• Population density slightly above average	• Per capita GRP below average (Agricultural sector high, Industrial & Service sectors low) • Land productivity close to average	• Incidence of poverty medium • Public facility ratio below average • Growth center ratio slightly above average	• Road density per area high • Road density per area & population high
11	• Flat plain • Predominantly riverline area • Partly tidal surge	• Population density below average	• Per capita GRP third highest (Agricultural & Service sectors high, Industrial sector low) • Land productivity low	• Incidence of poverty medium • Public facility ratio & Growth center ratio above average	• Road density per area: Nat'l +Reg'l + Feeder-A+B low, all road above average • Road density per area & population: Nat'l +Reg'l + Feeder-A+B average, all road second highest
12	• Mostly riverline area (highest river density in the country) • Partly tidal surge	• Population density third lowest	• Per capita GRP close to average (Agricultural sector high, Industrial sector low, Service sector average) • Land productivity second lowest	• Incidence of poverty second highest • Public facility ratio third highest • Growth center ratio highest	• Road density per area: Nat'l +Reg'l + Feeder-A+B average, all road highest • Road density per area & population: Nat'l +Reg'l + Feeder-A+B above average, all road highest
13	• Biggest depressed area (Chalanbeal)	• Population density above average	• Per capita GRP lowest (Agricultural sector low, Industrial sector low, Service sector lowest) • Land productivity low	• Incidence of poverty fourth highest • Public facility ratio & Growth center ratio close to average	• Road density per area close to average • Road density per area & population same as above
14	• Mostly flat land • Archaeologically important (Mohasthangar)	• Population density below average • High rate of tribal people (second highest)	• Per capita GRP third lowest (all sectors below average) • Land productivity low	• Incidence of poverty average • Public facility ratio & Growth center ratio close to average	• Road density per area: Nat'l +Reg'l + Feeder-A+B above average, all road average • Road density per area & population: same as above
15	• Flat plain area • Stone chips available • Mining resources located	• Population density close to national average	• Per capita GRP second lowest (Agricultural sector above average, Industrial sector third lowest, Service sector second lowest) • Land productivity low	• Incidence of poverty highest • Public facility ratio & Growth center ratio above average	• Road density per area above average • Road density per area & population same as above

3.5 Assessment of Impact of Bridge Construction on Rural Development

In order to assess the impact of bridge construction on rural development, the correlations between the indicators are analyzed using the data by district.

Correlation between economic indicator and social indicator

Selecting the following indicators as representative of the economic and social conditions, their correlations are analyzed:

- Economic indicator : Per Capita Gross Regional Product (GRP), Total
- Social Indicators : Incidence of Poverty
  Public Facility Ratio
  Growth Centre/Bazaar/Hat Ratio

Figures 3.5-1, 3.5-2 and 3.5-3 show the relations of incidence of poverty vs. per capita GRP, public facility ratio vs. per capita GRP and growth centre/bazaar/hat ratio vs. per capita GRP respectively.

The following correlations are found:

- Incidence of Poverty vs. per capita GRP: negative correlation (the higher the per capita GRP, the lower the incidence of poverty)
- Public Facility Ratio vs. per Capita GRP: positive correlation (the higher the per capita GRP, the more the public facilities)
- Growth Centre/Bazaar/Hat Ratio vs. per Capita GRP: positive correlation (the higher the per capita GRP, the more the growth centres/bazaars/hats)

The above correlations suggest that the per capita GRP can be used as an indicator representing the socio-economic conditions.

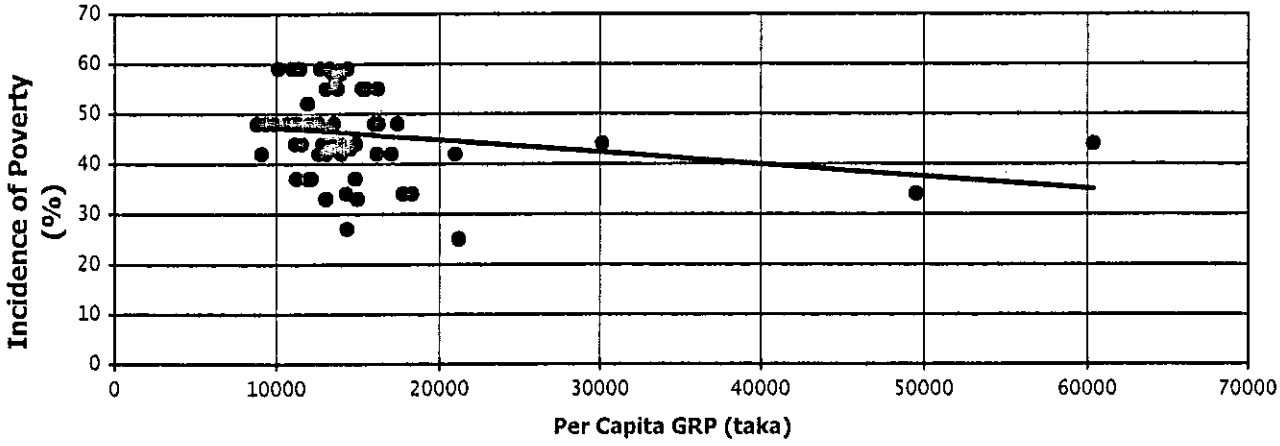

Figure 3.5-1 Incidence of Poverty vs. Per Capita GRP

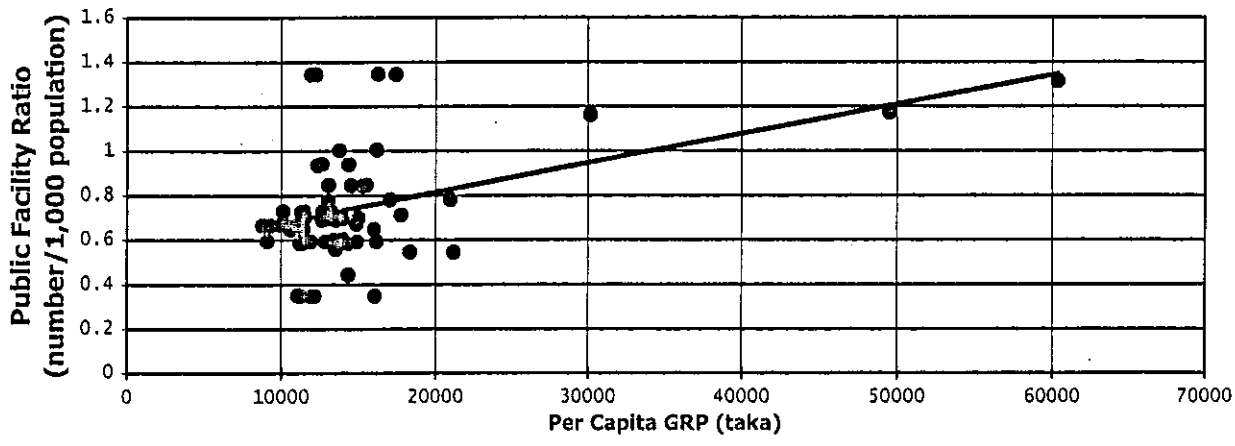

Figure 3.5-2 Public Facility Ratio vs. Per Capita GRP

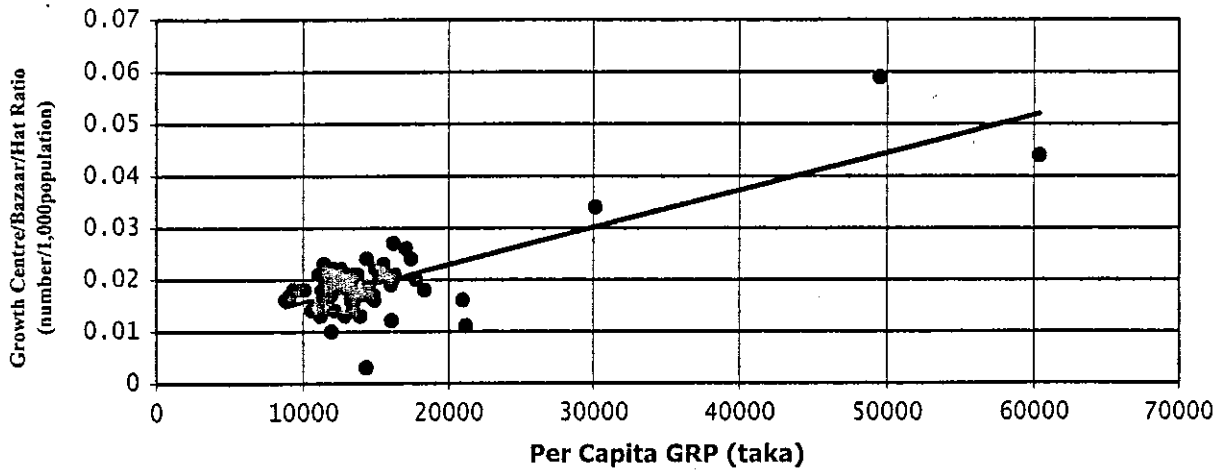

Figure 3.5-3 Growth Centre/Bazaar/Hat Ratio vs. Per Capita GRP

Correlation between Road Density and Per Capita GRP

Since the necessity of road is related to the land area and population, the road density per area and population (road length divided by square root of land area times population) is used as the indicator expressing the road development condition. **Figures 3.5-4, 3.5-5 and 3.5-6** show the relations of per capita GRP vs. road density in three cases: (1) National Highway + Regional Highway + Feeder Road-A; (2) National Highway + Regional Highway + Feeder Road-A&B; (3) All roads. Per Capita GRP is correlated to road density in cases (1) and (2), but not in case (3). This is interpreted as the per capita GRP is related to development of higher class of road but not to lower class of road, suggesting the significance of road quality since the higher class of road is of higher quality in general. One of the determinant factors affecting the quality of road is the all weather passability. To make a road passable all year round, construction of bridge is essential for the gap without structure. Thus the road improvement through the construction of bridge will have a positive impact on economic development.

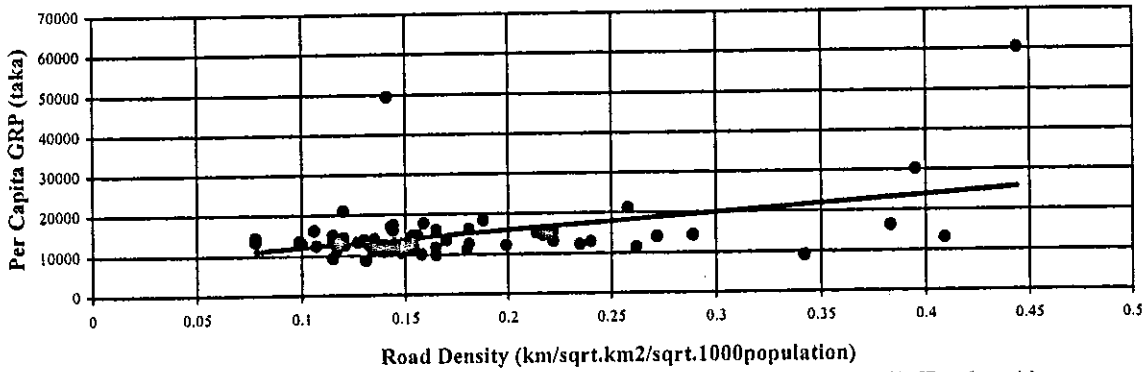

Figure 3.5-4 Per Capita GRP vs. Road Density (Nat'l+Reg'l+Feeder-A)

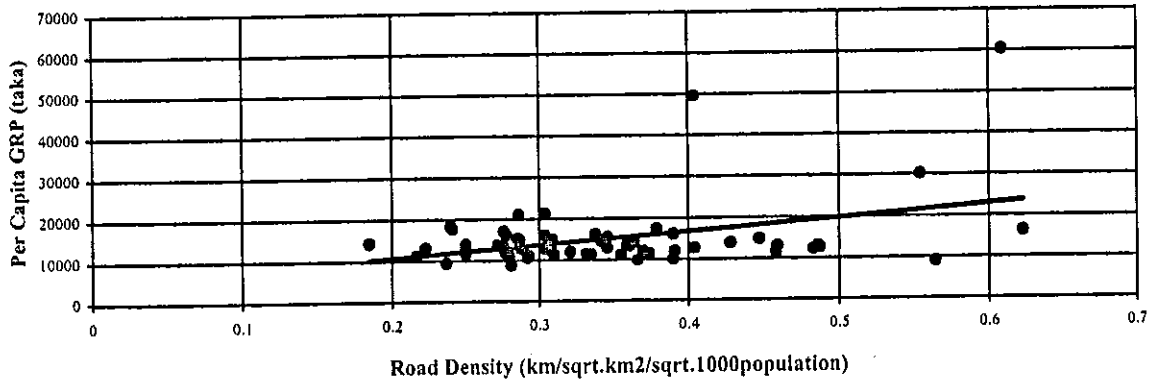

Figure 3.5-5 Per Capita GRP vs. Road Density (Nat'l+Reg'l+Feeder-A & B)

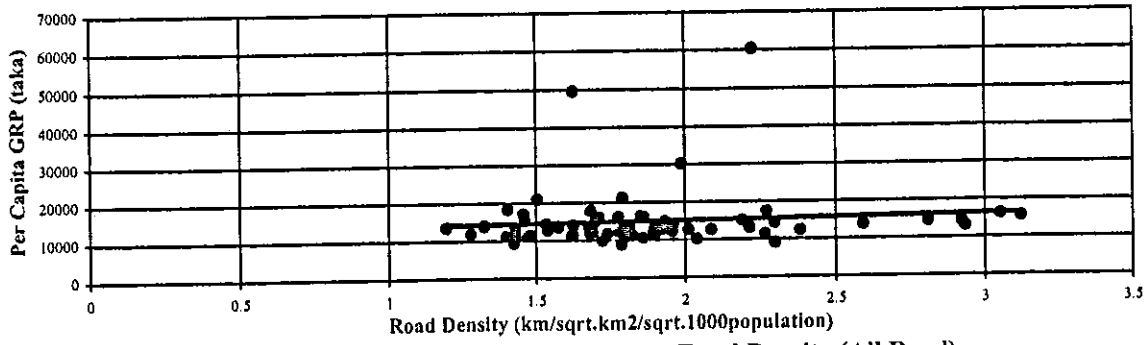

Figure 3.5-6 Per Capita GRP vs. Road Density (All Road)

Correlation between Study Bridges Ratio and Road Density

Figure 3.5-7 shows the relation of road density (all roads) vs. study bridges ratio (ratio of number of study bridges to the total number of brides/gaps). A negative correlation is found slightly, i.e. the higher the study bridges ratio, the lower the road density.

The study bridges ratio is considered to reflect the degree of bridge construction needs, i.e. the ratio of the gaps needing bridge construction to total number of bridges/gaps. The negative correlation between the degree of bridge construction needs and road density suggests that the impact of bridge construction on rural development is similar to the impact of road density improvement discussed above.

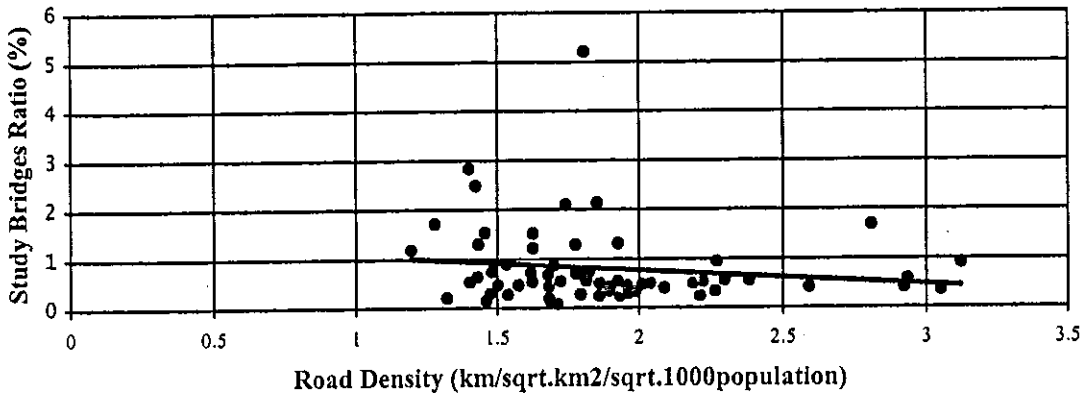

Figure 3.5-7 Study Bridges Ratio vs. Road Density (All Road)