SOCIO-ECONOMIC IMPACT OF TRANSPORT INFRASTRUCTURE: A BANGLADESH CASE STUDY

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ABSTRACT

One of the prime objectives of constructing physical infrastructure is to speed up the economic development of a country. Since resources are scarce in developing economies therefore, the policy makers in these countries are quite conscious regarding the optimal utilization of nation's wealth. In many instances it has been observed in Bangladesh that these types of physical infrastructures (road transport system) have played excellent catalytic roles in regional economic development and the national economy as a whole. The South-West Road Network Development Project (SRNDP) is one of the latest examples in Bangladesh. The length of the highway is 163.4 km with 1.2 km of small bridges and similar structures. The project was completed in the year 2005. The amazing fact is that within a year of the completion of the project, communities adjacent to the highway have started enjoying the benefits. The objective of this paper is to portray the impact of such a huge infrastructure in the social and economic life from a micro (locality) rather than macro point of view. The immediate concentration of this paper is to depict and analyze direct and indirect impact of the project on the people's lifestyles (quality of life). Case study approach has been adopted in this study. Data and information has been collected simultaneously from primary and secondary sources.

1.0 INTRODUCTION

The poverty was identified as the main problem of Bangladesh and all out efforts are being made to reduce the poverty at the accepted millennium goal level. To this effect the Poverty Reduction Strategy Papers (PRSP) are being prepared since 2002 in place of traditional Five- Year Plans. The objective of the PRSP was to reduce the poverty by half by 2015. Major criteria of poverty were identified. It was suggested that poverty issues could be better addressed through following types of project interventions: (i) pro-poor economic growth projects along with infrastructure development; (ii) human development project; (iii) micro-credit base self-employment projects; and (iv) the social safety net (income transfer) programs and (v) participatory governance.

In the past it was thought that paved road construction benefits the rich who can use automobiles, undertake business and industrial activities, needs more mobility than others. But the concept has changed now that it can equally benefit the poor r even more. Although poverty reduction impacts of infrastructure are not direct but derived have far reaching consequences than any other direct intervention. It has been observed in many instances that the impacts of infrastructure development particularly the rural infrastructure have more positive impacts on the lives and livelihoods of the people reducing poverty to a significant ways. This paper will discuss some of the poverty reduction impacts of ADB funded South West Road Network Development Project (SRNDP), Bangladesh.

2.0 COUNTRY PROFILE: BANGLADESH

The People's Republic of Bangladesh is located in North-Eastern part of South Asia, between 20°34' and 26°38' north latitude and between 88°01' and 92°41' east latitude. Area is 147,570 square km consisted of flat fertile alluvial land, and in most cases with a population of 130.0 million (census, 2001) and 135.2 million (projection, 2004). Climate; of the country is sub-tropical with annual rainfall varies between, 1194mm -3454 mm. Population is predominantly Muslim (88%), Hindu (10.5%) and Buddhist (0.6%) with, literacy rate of 64% (for 15 years and above). Total GDP was approximately, $56.5 billion US (2004). The GDP growth at constant price was 5.52% per annum (2004) and per capita GDP was $421 US (2004). Relevant national data and map are presented in Table-2.1 and in Figure 2.1

Table 2.1: National Data

Area	147,570 sq. km
Population	137 Million
Capital	Dhaka
Major Cities	Chittagong, Khulna, Rajshahi, Barisal, Sylhet
Currency	Taka (In Short Tk.)
GDP (2004)	Tk. 3,325,670 Million
GDP Per Capita	Tk.. 24,598 US$ 421
PC Income	Tk. 25,944 US$ 444
Pop. Density	919/sq. km
Literacy	62.66 (%)
Life Ex.	64.9 Years
Male	64.5 Years
Female	65.4 Years

3.0 POVERTY SITUATION IN BANGLADESH: A BRIEF CHRONOLOGY

The country is a poor developing nation striving hard to overcome the catastrophic poverty situation and to achieve a minimum standard of living. The poverty standard is determined on the basis of level of income to be able to purchase food and nutrition worth of 1850 kilo calorie and 2122 kilo calorie of energy per capita per day. Poverty levels are defined as extreme poverty income (lower poverty line) where a household can afford up to 1850 kilo calorie nutritional intake per capita per day, whereas in the moderate poverty income (upper poverty line) a household can afford to buy 2122 kilo calorie of intake per capita per day.

The headcount poverty ratio for 1995-96 and 2000 are presented in Table 3.1 and 3.2 have been worked out by cost of basic needs (CBN), consumption expenditure method show the incidence of poverty by regions and by land class. During 1995-6 the incidence of poverty at national level was found to be 34.4% using lower poverty line while it was, 51% using upper poverty line. In the year 2000 this has reduced to 33.7% and 49.8% using lower and upper poverty lines respectively. During 1985-86 the poverty rates at national level were 26.86% and 55.65% respectively. The poverty situation was stationary between 1990-91 and 1995-6 at 35% and 51%.

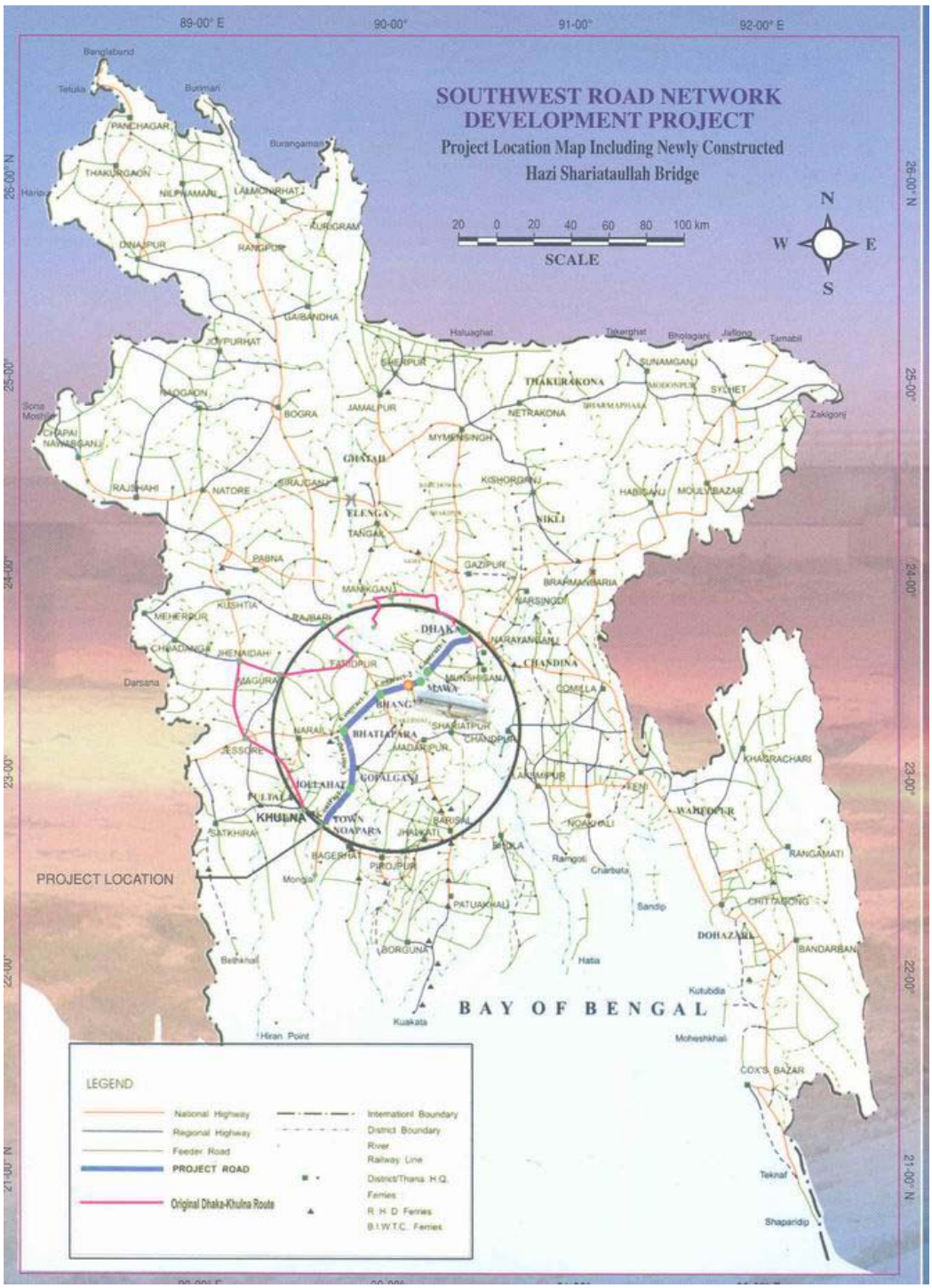

Figure 2.1: Map of Bangladesh and showing the location of South West Road Network Development Project.

Table 3.1: Division-wise Rate of Poverty on the Basis of CBN Method (Head Cont Ratio), 2000

National/Division	Using the Lower Poverty Line			Using the Upper Poverty Line		
	Total	Rural	Urban	Total	Rural	Urban
National	33.7	37.4	19.1	49.8	53.1	36.6
Barisal	28.8	29.6	19.5	39.8	40.0	37.9
Chittagong	25.0	25.3	23.3	47.7	48.4	44.0
Dhaka	32.0	41.7	12.0	44.8	52.9	28.2
Khulna	35.4	36.8	27.5	51.4	52.2	47.1
Rajshahi	46.7	48.8	32.3	61.0	62.8	48.1

Table 3.2: Distribution of Poverty by Land Ownership, Household (%)

Ownership of Land (Acre)	Using the Lower Poverty Line			Using the Upper Poverty Line		
	Total	Rural	Urban	Total	Rural	Urban
All Size	33.7	37.4	19.1	49.8	53.1	36.6
Landless	31.0	57.1	19.7	47.8	70.6	37.9
0.01-0.04	42.7	48.1	22.0	59.1	64.2	37.3
0.05-0.49	38.1	39.8	15.4	57.1	59.1	30.4
0.50-1.49	29.2	30.6	7.5	46.4	47.6	27.6
1.50-2.49	21.3	22.2	1.4	34.7	35.7	12.3
2.50-7.49	11.7	12.5	-	23.8	24.4	15.9
7.50 & more	4.0	4.1	-	8.0	8.1	-

4.0 INFRASTRUCTURE AND POVERTY REDUCTION

Two important agencies of the government are responsible to provide national road network (RHD) and rural infrastructure (LGED). Bangladesh has gained tremendous success in road infrastructure improvement. In 1972 the length of paved road network was only 4000 km which is now more than 60,000 km. The total road length maintained, by RHD and LGED stands to be 240,208 km including improved earth roads. In addition to this figure there are extended urban and city road networks. Every year a huge allocations are made to transport sector for example Tk.33,880 million ($594 million) in ' 2003-04 and Tk.31 ,360 million ($ 523 million) in 2004-05 to improve the road network in the country. While rural development got allocation of Tk.25,6730 million ($442 million) in 2003-04 and Tk.24220 million ($404 million) in 2004-05. The contribution of road in communication sector is approximately 10% while rural infrastructure 12% of the national GDP.

Infrastructure variables such as extent of accessibility and paved road, electricity coverage, availability of bus transport, etc have significant inverse association with poverty (WB 2005). More and better the infrastructures less and less is the poverty incidence in the area. Such poverty impacts can not be directly attributed to infrastructures but derived through other important causal factors. For example the GDP growth through enhancing agriculture and manufacturing output can not be achieved without necessary infrastructure facilities. An efficient transport and communication system is indispensable for mobility of labor and inputs, mobilization of society to production, distribution, marketing, export, import, tourism and others. Even the school completion rate is dependent on the extent of

paved road in the district, or proximity to a bus station. In the subsequent presentation two case studies will be presented, socioeconomic and poverty impacts of ADB funded South West Road Network Development Project (SRNDP) under RHD.

5.0 THE SOUTH WEST ROAD NETWORK DEVELOPMENT PROJECT (SRNDP)-BANGLADESH: CASE STUDY OF POVERTY REDUCTION IMPACT

SRNDP is an important road project recently completed by RHD under the financial support of ADB, OPEC, NDF and DANIDA. This is necessarily an infrastructure development and economic growth project. The objectives of the project are,

- Open a shorter (165 km) and more cost-effective road corridor linking Dhaka, the capital and industrial city with Mongla (second sea port), Khulna (third industrial city), Jessore (regional business center) and Benapole (1st land port);
- Induce economic growth in relatively neglected South-west region and facilitate greater regional co-operation;
- Address poverty reduction and human development needs by providing access to income and employment opportunities;
- Improve public sector governance through Institutional Reform and private participation and
- Strengthen Institutional responses in Social and Environmental aspects.

6.0 PROJECT COMPONENTS AND IMPLEMENTATION:

The length of the highway is 163.4 km with 1.2 km bridge and structures. The project was implemented during the period 2000-2005. Total Budget Outlay was Tk.11,560 million ($218 million equivalent) for civil works. Poverty Reduction Impact Monitoring Study was launched as a special study designed to monitor the impacts of road construction on the spatial poverty of the project influence area. Although poverty reduction impacts of infrastructure are not direct but derived having far reaching consequences than any single direct intervention. It has been observed in many instances (PRIMS, SRNDP) that the impacts of infrastructure development particularly the road infrastructure have positive impacts on the lives and livelihoods of the people reducing poverty to a significant ways. The process starts with creation of huge job opportunities in the transport sector particularly in the NMT and para-transits (40%). Then it contributes to growth of markets, growth centers, etc as rural hubs increasing business and small trade (32%) and then production, sales and other services at local level (28%).

7.0 POVERTY MONITORING SYSTEM

The monitoring studies were planned and carried out in 5 trances since 1999. Studies are: (i) Poverty Reduction Impact Study (PRIS), Benchmark, 1999; (ii) Project Performance Monitoring and Evaluation (PPME), 2002; (iii) Poverty Reduction Impact Monitoring Study (PRIMS), Round-I, 2003; (iv) PRIMS, Round-2, 2004; and (v) PRIMS, Round-3, 2005.

In the past not in each and every project implemented had the components of poverty monitoring studies but in some special cases. The Socioeconomic and Poverty Monitoring special studies are now become the integral part of donor funded projects. These are specific studies design to record data and information regarding socioeconomic changes outside the purview of normal and routine performance monitoring of the project. Empirical studies are undertaken starting from the preparation and establishment of benchmark and then continue the study on regular basis collecting data and information as the project works progress. Important components of PRIMS were household interview survey, village survey, growth center market survey, enterprises and business surveys, and transport operators survey.

8.0 IMPACT ASSESSMENT RESULTS

Poverty impact assessments are undertaken for seven sample villages in the zone of influence of SRNDP in Gopalganj and Faridpur districts considered most backward among project districts and compared with the pre-determined indicators fixed at Benchmark. The results are presented in reports based on assessment of each round of survey iteration. Some of the results revealed from monitoring studies are presented.

The Poverty Reduction Impact: Table 8.1 shows the trend of poverty (upper poverty) reduction in the project region. It has been reduced by 7 percentage point in 5 years (1999-2004) i.e. 1.4 percentage points more than national average of 1.0 percentage point. The remarkable results obtained are rapid reduction of hard core poverty (lower poverty) by 24 percentage points in 5 years (more than 4 percentage point per year) much faster than national average of 1.5 percentage points implying faster reduction of severity and hunger. The additional improvements after the national average (0.4 point in case of upper poverty and more than 2.5 points in case of hard core poverty) could be the contribution of road construction (SRNDP) through improvements of connecting roads, additional labor employment and money circulation, opportunities for agriculture extension and product marketing, introduction of High Yielding Varity (HYV) technology of crop production, small trade and business, opportunities for rickshaw van driving, etc.

Table 8.1: Poverty Reduction Impacts, SRNDP

Item	1999 Benchmark	2002 PPME	2003 Monitoring	2004 Monitoring
Upper Poverty Line	52%	48%	47%	45%
Lower Poverty Line	46%	31 %	26%	22%
Non-Poor	48%	52%	53%	55%

PPME: Project Performance Monitoring and Evaluation

Table 8.2 represents the comparative position of poverty (upper) in sample villages in successive survey years. Five villages out of 7 were severely poor having much higher poverty rate than national average in 1999. The upper poverty has significantly reduced in six villages out of seven between 1999 and 2004.

Table 8.2: Poverty Comparison of 7 Study Villages under SRNDP

Village Name	1999	2002	2004
Char Pathalia	77.7%	64.4%	60%
Sowadi	58.8%	53.2%	46%
Bishnudi	53%	42%	41%
Maligram	50.6%	40.8%	39%
Chota Sribardi	34.4%	47.7%	46%
Gopalpur	41%	45.2%	41%
Mohanag	48%	48%	42%

Employment Generation: Table 8.3 shows the amount of employment generated by the project directly during construction and after implementation. During the construction the project created 8.1 million man-days of employment for labours of different skill levels. Up to the project completion 185,382 permanent jobs have been created in transport (MT and NMT), small enterprises, trades and service sectors as impacts of the SRNDP.

Table 8.3: Employment Generated by SRNDP

Employment During Construction (M-days)	
Skilled	3,32,475
Semiskilled	11,11,770
Unskilled	66,57,750
Total	81,01,995

Direct Employment after Construction (Permanent)	
NMT	49,500
Auto/Para Transit	8,910
MT	10,725
Sub-Total	69,135
Trade & Business	59,079
Small Enterprise	57,168
Total	185,382

Household Income Groups: Table 8.4 presents the trends of households moving upward to changing within among income groups. In 1999 approximately 15% of the surveyed households belonged to lowest income group up to Tk.4000/- ($70 US) per capita per month has reduced to only 6% in 2004. While the proportion of highest income group at Tk.10000/- ($175 US) and above was 7.7% in 1999 has increased to 14.61 % in 2004. This has almost doubled. In this way all lower income groups have shifted to subsequent higher income groups.

Table 8.4: Change in Household Income-Groups under SRNDP

Per Capita Income ($)	Percentage of Household		
	1999	2002	2004
Up to Tk. 4000 ($ 70)	14.7%	12.9%	6.02%
Tk. 4001- 6000 ($ 70-$105)	25.6%	22.1%	15.83%
Tk. 6001 -8000 ($ 105 -$ 140)	14.3%	14.6%	16.98%
Tk. 8001 -10,000 ($ 140 -$ 175)	37.7%	40.2%	46.56%
Tk. 10,000 & above ($ 175 above)	7.7%	10.2%	14.61%

Cropping Intensity: Table 8.5 presents cropping intensity survey in 7 villages. It shows a remarkable change from an average of 132% in 1999 to 184% in 2004. This is a logging from certain joint contribution of agriculture research introducing flood resistant HYV rice, removing water areas, quick technology transfer and adaptation for road communication. This has contributed to the change in cropping patterns. Table 8.6 shows that in 1999 only 23% land was used for double crops and the rest 77% was for one single crop. The situation has reversed now having 72% double crop, 3% triple crop and only 26% single crop.

Table 8.5: Cropping Intensity of 7 Villages under SRNDP

Village Name	1999	2002	2003	2005
CharPathalia	93%	99%	174%	180%
Sowadi	96%	133%	168%	178%
Bishnudi	194%	200%	185%	186%
Maligram	148%	156%	180%	184%
Chota Sribardi	106%	181%	184%	195%
Gopalpur	82%	144%	163%	170%
Mohanag	204%	212%	210%	202%
Average Intensity	132%	162%	181%	184%

Table 8.6: Trends of Change in Cropping Pattern under SRNDP

Cropping	1999	2002	2003	2004
Single Crop	77%	42%	32%	26%
Double Crop	23%	56%	64%	72%
Triple- Crop	--	1%	4%	3%

Change in Occupation: The trend of change in occupation is also remarkable. Although the trend is declining the agriculture remains the main occupation of the household around 40%. The unskilled labour as an occupational class is declining to 9% in 2004 from 17% in 1999. They are shifting to permanent rickshaw pulling and other services sector jobs instead of uncertain day labor jobs. Small trade and business, and artisanship are expanding to become about 15% of all rural employment. The government and private services remained 10-12% while transport services including NMT increased to 17%. Table 8.7 presents the occupational distribution of sample households.

Table 8.7: Trends of Change in Occupation Distribution

Occupation	1999	2002	2003	2004
Agriculture	45%	42%	40%	41 %
Day Labour	17%	12%	11.6%	9%
Business	8%	8%	7.1%	8.7%
Services	11%	12%	12%	9.5%
Small Trade	12%	14%	14.3%	14.8%
Transport (NMT)	7%	12%	15%	17%

Development of Growth Center Markets: Table 8.8 presents the trend of changes in lease value of rural markets. For decades the small roadside markets remained weekly and bi-weekly haats serving surrounding villagers. But as soon as the roads are improved these are suddenly become Growth Center Markets (GCM), a rural hub of business and trading. They generate non-farm activities in the rural areas with a potential to grow to townships. During 1999 total lease value (govt. revenue) from sample markets was Tk.845,000 ($15,400) while it was Tk.6295,OOO ($104,920) in 2004 an increase of about 7 times. The number of permanent shops and self-employment in sample GCMs has also increased and expanding to become smaller townships.

Table 8.8: Lease Value of Selected Growth Center Markets under SRNDP

GCM	1999	2002	2003	2004
Maligram	50	2,200	3,800	4,000
Dattapara	25	25	35	50
Fakirhat	572	650	1,135	1,600
Town Noapara	152	500	471	600
Mansurabad	50	160	230	N/A
Salimabox	8	10	16	16
Fukura	26	20	26	10
Mazra	7	9	18	20

Table 8.9 presents the trend of growth of both permanent shops and employment found in subsequent surveys. There are about 70 haats and markets along side the road. With the improvement of road annual transactions have increased from Tk.9378 million ($170 million) in 1999 to Tk.38,807 million ($646 million) in 2004. Table 8.10 presents the annual transactions in the selected GCMs.

Table 8.9: Lease Value of Selected Growth Center Markets under SRNDP

GCM	1999		2002		2003		2004	
	Shop	EMP	Shop	EMP	Shop	EMP	Shop	EMP
Maligram	285	652	220	551	300	760	375	1012
Dattapara	108	296	150	375	285	652	325	747
Fakirhat	634	1900	800	2007	950	2564	998	2595
Town Noapara	208	592	250	626	280	715	294	735
Mansurabad	117	275	115	276	110	269	110	269
Salimabox	89	236	95	243	102	264	102	260
Fukura	84	287	115	291	250	712	264	727
Mazra	98	214	95	238	100	257	100	257
Total	**1623**	**4452**	**1840**	**4607**	**2377**	**6193**	**2568**	**6602**

Table 8.10: Annual Turnover in Selected GCM under SRNDP

GCM	1999	2002	2004
Maligram	1,519.5	2,672.5	15,036
Datt~ara	192.6	267.3	579.5
Fakirhat	5024.1	5,711.5	15,954.5
Town Noapara	1498.7	1,836.0	6,274.5
Mansurabad	297.8	324.0	60.3
Salimabox	205.0	220.6	170.5
Fukura	322.9	347.6	352.9
Mazra	317.7	348.8	379.3

Shrimp Culture: Shrimp is the second largest export item of Bangladesh. It earns approximately Tk.24000 million ($ 400 million) per annum. Bagerhat district is one of the 3 major shrimp growers in the southwest. SRNDP helped extend the culture to remote sub-districts of Bagerhat. Table 8.11 presents information of area and production of Shrimp in the project district. During the project implementation the area under cultivation as well as production has increased by 25% of the district production.

Table 8.11: Shrimp Production in Study Area

	1998-99	2001-02	2003-04	% of Change in 2004 over 1999
Area (ha)	47,710	47,710	59,421	24.5%
Production (MT)	23,378	23,760	29,692	25%

9.0 CONCLUSIONS

Some specific conclusions can be drawn from the above presentation as follows:

- Investment in infrastructure such as SRNDP has significant impacts on social Development and poverty reduction along with better accessibility and transport facilities.
- Poverty reduction monitoring studies of SRNDP confirms the relationships between infrastructure investment and poverty reduction.
- Creates employment opportunities both in farm and non-farm sectors.
- Evidences show that upper poverty is reducing at more than stipulated 1.2 percentage points in SRNDP areas (1.5 percentage points).
- Remarkable results found were reducing rates of hard core poverty (lower poverty) at a faster speed than upper poverty.
- These reductions are caused by increasing outputs and activities in all economic sectors as well as better implementation of government safety net programs.

Bangladesh has been changing from within itself attributed to increasing GDP growth, per capita income growth, creation of job opportunities in farm and non-farm sectors, growth in manufacturing and exports, trade and commerce due to infrastructure improvement realized so far along with other contributing factors. Investment in infrastructure is highly responsive in Bangladesh. The sustainability of socioeconomic programs and activities towards emancipation from the poverty and backwardness the country needs more and more investment in infrastructure development.