Draft Final Report

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THE PEOPLE'S REPUBLIC OF BANGLADESH

**MINISTRY OF LOCAL GOVERNMENT,
RURAL DEVELOPMENT AND COOPERATIVES (MLGRD&C)**

LOCAL GOVERNMENT ENGINEERING DEPARTMENT (LGED)

SUSTAINABLE RURAL INFRASTRUCTURE IMPROVEMENT PROJECT (SRIIP)

Institutional Support & Monitoring Consultancy (ISMC)

RESULTS OF TERMINAL SURVEYS/ PROJECT COMPLITION REPORT CARRIED OUT UNDER SRIIP-ISMC IN 2015

May, 2016

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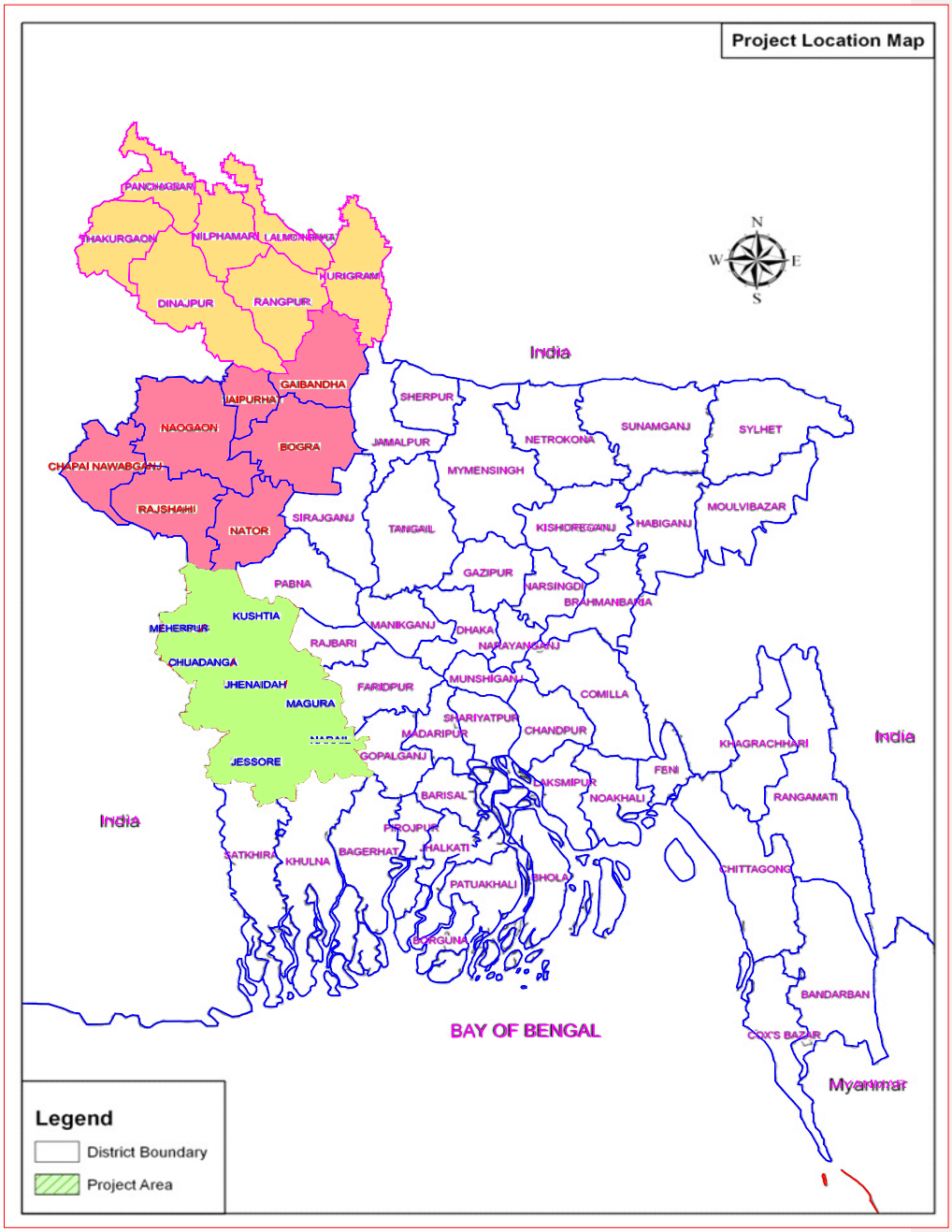
Abbreviations

ADB	=	Asian Development Bank
AADT	=	Annual Average Daily Traffic
BCR	=	Benefit Cost Ratio
BME	=	Benefit Monitoring and Evaluation
DPP	=	Development of Project Proposal
DSMC	=	Design Supervision and Monitoring Consultants
EIRR	=	Economic Internal Rate of Return
GCM	=	Growth Centre Markets
GOB	=	Government of Bangladesh
ISMC	=	Institutional Support and Monitoring Consultants
KfW	=	Kreditanstalt für Wiederaufbau
LCS	=	Labor Contracting Societies
LGED	=	Local Government Engineering Department
LGED	=	Local Government Engineering Department
LGIs	=	Local Government Institutions
MMC	=	Market Management Committee
NPV	=	Net Present Value
NGO	=	Non Governmental Organization
PAM	=	Project Administrative Manual
PMO	=	Project Management Office
PKm	=	Passenger Kilometer
PPMS	=	Performance Management System
QD	=	Quantity Deterioration
RIIP	=	Rural Infrastructure Improvement Project
RM	=	Rural Market
RPO	=	Regional Project Office
SAR	=	Subproject Appraisal Report
SOE	=	Statement of Expenditure
SPS	=	Safeguard Policy Statement
SS	=	Quality Deterioration Saving
TKm	=	Tonne Kilometer
UNR	=	Union Road
UZR	=	Upazila Zila Road
VOC	=	Vehicle Operating Cost
WADT	=	Weekly Average Daily Traffic
VKm	=	Vehicle Kilometer
DTW	=	Deep Tube well

PROJECT LOCATION MAP OF SRIIP-ISMC



EXECUTIVE SUMMERY

The Sustainable Rural Infrastructure Improvement Project (SRIIP) of the Local Government Engineering Department is a well conceived program aiming at combating rural poverty in the designated project areas of Khulna, Rajshahi and Rangpur divisions. The project follows the National Strategy for infrastructure improvement and socio-economic development. Many previous studies and reports have identified the absence of essential basic physical infrastructure (roads, bridges, culverts and markets) leading to restricted access, considered as one of the main hindrances for rural development. Lack of easy and all weather transport infrastructure among the service oriented agricultural organizations and particularly the dilapidated infrastructure continue to be impediments to rural development. Any expenditure on rural transport and marketing sectors development would be contributing factors to assist the interests of farmers and creating additional opportunities for employment.

The Terminal survey concentrated on measuring the current characteristics and activities of roads and market users along sampled 47.61 kilometer roads at Upaqzila level in 9 Upazilas, 18.95 kilometer roads at Union level in 3 unions, 7 growth centers and 2 rural markets of 15 Upazilas that are included in the project activities. The aim was to ascertain the effect of the project implementation on rural transportation and as a consequence changes that took place in the market trading activities, which, if could be sustained, will bring about wider impact on social and economic development of the project areas.

The Terminal BME survey aimed at collecting information on dry and wet season roads. In the process the survey gathered information on market user of sixteen roads of which four were control roads. As well, the survey also collected information on twelve markets of which three were control market sites. Article 3 & 4 concentrates on the comparative analysis of the dry and wet season survey data of the above mentioned roads and markets.

Based on the baseline methodological framework the ***Terminal Surveys/Project Completion Report*** had been carried out during 2015-16 period, concentrating on the following fields:

- executive summary (article-1);
- project background (article-2)
- traffic surveys along project and control roads (article-3)
- growth centre surveys in project and control markets (article-4);
- household surveys along project and control roads (article-5);

The methodology used for the surveys is described in the article-2. The following paragraphs summarize the findings from the surveys covering the fields mentioned above.

The respective consultants of the ISMC under this project, developed appropriate training programs for officials and staffs involved in monitoring and evaluation and ensured that the required training was adequately understood by the participants. The consultants, in association with the concerned officials worked together in the preparation of the BME in accordance with the prescribed methodology.

Road User: The survey data on road use by the total local population during the recent Terminal survey is presented in Table 3.3 & 3.4. The data depict that movement of motorized and non-motorized vehicles increased respectively by 43.78% and 3.69% in the project roads. In the control roads, the increase was 4.45% and 2.61% respectively for motorized and non motorized vehicle. The rate of increase of pedestrians in project roads was 15.91% and in the control road it was 35.25%.

Volume of Traffic: In the Terminal survey, data on weekly average daily traffic volume of passengers and cargos have also been estimated for dry and wet seasons in both project and control roads. Table 3.5 shows the weekly average daily traffic per kilometer on the project roads. The findings were 8191 Passenger Kilometer (PKM) and 551 Ton Kilometer (TKM) during dry seasons. On the other hand, the baseline survey data on weekly average daily per kilometer volume of traffic and cargo during dry season on the control road was estimated at 6014 PKM and 398 TKM respectively.

Model Mix of Traffic: The model mix in average percentage during wet and dry seasons is presented in Table 3.6. Data show that of the total traffics, 31.9% were non motorized vehicles, 61.0% Motorized Traffic (MT,) and 42.5% were pedestrians. Similarly in baseline survey the model mix in percentage, during both seasons average, were found to be -0.60% non-motorized followed by -2.0% r motorized, and 24.1% pedestrians in the control roads.

Travel Time of Traffic: In Terminal survey average travel time spent per kilometer to travel on the project road by Motorized vehicles was 2.32 minutes during dry season and for non-motorized vehicle it was estimated at 5.98 minutes during dry season. In the control roads for both seasons average travel time spent by motorized vehicle was estimated at 3.07minutes and for non-motorized vehicle it was 6.53 minutes. (Table 3.7)

Transportation Cost: Transportation costs of cargos and passengers analysis: During the Terminal survey it was estimated that the transportation cost per passenger per kilometer and transportation cost of cargos per ton per kilometer by motorized vehicle were estimated respectively at Tk.7.4 per passenger and Tk.96.25 per ton per kilometer for cargos. Transportation cost by non-motorized vehicles on the project road was estimated at Tk 6.3 and Tk.240.19 respectively for passengers and cargos respectively. On the other hand the baseline survey showed cost of transportation per passenger at Tk. 2.39 per kilometer and Tk. 54 per ton for transportation of cargos by motorized vehicle, while on non-motorized vehicle the estimates were Tk. 2.54 per kilometer for passengers and Tk. 166.98 per ton per kilometer for cargos by non-motorized vehicles. Data thus depict that the per Pkm and Tkm cost of transportation has been reduced on an average by 5.01% and 14.7% and 21% due to the development of roads. Respectively in motorized, and non-motorized vehicles

Operators Average Income: During the Terminal survey it was observed that in the project road the daily average income for non-motorized vehicle operators was approximately TK.440 per day, and for the operators of the motorized vehicle the income was about Tk. 718 per day. On the other hand, the baseline survey data present an estimated income of Tk. 331 per day for non-motorized vehicle operators on an average. It seems that change in income of motorized vehicle operators/drivers after implementation of the project was not very large.

Road side Education Institutions: The Terminal survey provided data on road side educational institutions. As per the survey data, average enrollment per educational institute was 371 (male 205 and female 166), and average attendance of male students: was 75% and of female students it was 76%. Average dropout rate for male students was 5% and for females it was estimated at 4%. The findings of the baseline survey show that the average enrollment per institute was 270 (male 162 and female 108). Average attendance of students: in the educational institutions for males was 72 percent and for females it was 74 percent. The average dropout rate of male students was 6% and for female it was 5%. Baseline data depict increased female enrollment by 14%, increased daily attendance by 3.42% and reduced dropout rate by 18% due to project intervention..

Health Services: Improved access to health services is one of the objectives of improving infrastructure. Terminal data based on 19 health service units stated that on an average 53 males and 29 female patients visited these units per day. During the baseline survey, data from 19 health service units show that on an average in each unit, 53 patients visited the clinics of which 29 were males and 24 were females. Increase in the number of patients

visiting each health service units indicates better access to these units by the patients that resulted in the increased number of patients receiving medical care.

Road Side Land Value: During the Terminal survey period the average per decimal homestead land value was found to be Tk 73073, while the baseline survey data determined the value of the same at Tk. 60,420 per decimal. It can thus be concluded that the value of land has increased by 17% on implementation of the project.

Results of Economic Analysis for Road: The results of the economic analysis of the 9 UZRs, 3 Union project roads are discussed below. The Terminal survey data analysis on road use by the local population show that estimated average EIRR for motorized and non-motorized vehicles in project road was at 46.81% and in the control road it was 61.02% respectively. In project road and in control road EIRR increased by 32.6% and 6.74%. On the other hand in baseline survey the average EIRR of the project roads was estimated at 37.17% and in control road it was 57.44%. In Terminal survey, EIRR increased by 32.6% in the project road and & in the control road the increase was 6.74%.

Market Analysis: In total 9 projects and 3 control markets had been covered in this survey. The number of project markets were 4 in Rangpur, 3 in Rajshahi and 2 in Khulna division.

Market Users. The average number of market users in a Market (market) day had been found to be 13,087 on an average during dry season in each project market and 10,433 in a Market day in each control market according to Terminal survey. Whereas, the baseline survey showed 10,994 in each project market and 9,967 in each control market.

Market Turnover: Data on financial turnover on market days were collected in the Terminal survey as following baseline methodology by appointing field enumerators. The average per annum turnover in dry season in a big Market was estimated on an average Tk.12, 824,000 in the project market and Tk. 9230 in the control market. In the baseline survey it was estimated at Tk.13, 628,000 on an average in the project market and Tk. 9118,000 in the control market.

Sellers Profit & Margin: Summary data from the Terminal survey show that on an average Market day in the project market,, per unit profit of the retailer on rice in both seasons was approximately 5.49% followed by potatoes with a profit of .75%, vegetables, 9.05% and molasses 7.90%. In the baseline survey, profit on rice was estimated at 5.16% followed by potatoes at 8.62%, vegetable at 8.34% and molasses at 7.33% in the project area markets.

Market Quality Deterioration Turnover: The Quality Deterioration Turnover (QDT) benefits are measured by all types of perishable goods in the wet and dry seasons to estimate the loss in financial terms during the baseline period as well as in the Terminal period to assess the project intervention impacts. From the Terminal BME survey it was found that the yearly average Quality Deterioration Turnover per project market was around Tk.6.33 million and for control market it was estimated at Tk.4.64 million.. On the other hand, during the baseline survey period Quality Deterioration Turnover was estimated pproximated at Tk.8.82 million in the project markets and Tk.6.64 million in the control markets. This means the yearly Quality Deterioration Turnover losses of traders/producers had been reduced by 36.44% due to the project road interventions.

Market Economic Analysis: The economic analysis made at the project pre-development stage is based on the survey of all selected market sub-projects for BME study under this projects. The five types of indicator had been used for quantification of the economic benefit of the selected sub-projects viz. Net Present Value (NPV), Benefit Cost Ratio (BCR) and Economic Internal Rate of Return (EIRR). The discounted costs and benefits of the selected market sub-projects were reflected into the economic cash flow from where the NPV, BCR and EIRR are calculated. All assumptions made on the experience of recently implemented

similar LGED projects. The Terminal project market average EIRR, NPV and BCR were calculated at 47.99%, 171.98 Lac Tk. and 4.84 respectively. In Terminal survey the project market increased in percentage EIRR 0.93%.

Dependency Ratio: In the Terminal survey the age structure profile had been prepared to look at whether there had been any change over time in it or not. . The age structure of the project area is characterized by high proportion of economically active group[1] (10-59 years of age) and low proportion of dependent group (age below 10 years and above 60 years). The proportion of economically active group in the influence area of project road was estimated at 79.19%. In the influence area of control roads it was 81.40%; a figure which is higher compared to that of the project road. The dependent population in the project road areas below 10 years and above 60 years was respectively 8.78% and 2.44% and the figures were 5.64 % and 1.70% in the control road area. The total dependent people in the project and control road area are unchanged 26.23% and 15.31%. The percentage of dependent people in project area was higher than the area under control road. See Table 5.1.

HH Education Status: During Terminal survey period the literacy rate was found to be 89.00 percent among the population residing besides the project roads and 89.20 per cent along the control roads. A few household members were identified who were highly educated (graduate and post- graduate) resending within the influence zone of both the project road area (2.43%) as well as of the control roads (1.02%). The baseline survey showed 86.21 percent of the population was literate within the influence zone of the project road area and 88.2 per cent along the control roads. Only a few household members were educated at a higher level (graduate and post- graduate) locating within the project road area (2.43%) as well as in the control roads (1.02%). It is visible that the literacy rate had increased due to project interventions. Table 5.3 presents education status.

HH Primary Occupation: The primary occupation of sampled households members living in the project area is home worker 18.38% followed by student 28.84% and cultivation 16.42%. The percentage of non-income earner persons in the project area is 8.52%. About 13.77% is daily labor followed by business 5.34% and service 4.31%. Whereas, during baseline survey it was found in the project road home worker constituted 28.86% followed by student 26.81 percent and farmers 15.20 percent. The percentage of non income earner persons in the project area is 7.54%. About 12.92% is daily laborer followed by business 4.11% and service 3.10%. Table 5.4 presents Primary Occupation.

HH Employment Status: Employment/self employment status of household family members categorized as employed in primary occupation for full 12 months was estimated at 86.37%, below 12 months 1.12%, 6.1-9 months 1.22%, 3.1-6 months .28%, up to 3 months below .68% and no earning 1.24%, along the project roads. Within the influence zone of the project area, more than 89.6% of the household members are maintaining their primary occupation for the whole year. In secondary occupations, 6.98% had employment for 12 months, below 12 months .02, 6.1-9 months .04, 3.1-6 months .66, up to 3 months below .16 and no earning 92.14 for up to twelve months. Table 5.5 presents Employment Status.

Household Income: Based on information provided by the respondents concerning monthly household income, nearly 19.21% of the households fall within the income range of Tk. 6000-6999 per month along the project roads. In the control road areas the highest percentage (11.09%) of households was in the same income range Tk.7,000-Tk.7,999. 12.86% household along project road had income between Tk.10000- Tk.12499 per month by 9.63%

[1] Economically active population or Labour Force is defined as persons aged 10 years and above (10-59 years) who are either employed or unemployed during the reference period. It exclude disabled and retired persons, income recipients, fulltime house wives and students, beggars or other persons who do not work for pay or profit during the reference week (source: Bangladesh Population census 1991).

as 2nd highest income group. In the control road area the figure was 12.12%. Table 5.6 presents Household Income.

Household Expenditure: Based on information provided by the respondents concerning monthly household expenditure, around 3.93% of the households fall within the income range of Tk. 6000-6999 per month along the project roads. In the control road areas the approximate percentage of households falling within the same income range was 8.02%. Tk.5000–Tk.5999. we 4.99% household along project road had income of Tk. 10,000-Tk.12,499 per month as 2nd highest income group. In the control road area 4.07% household fall in the income range between Tk.10,000-Tk. 12499. Table 5.7 presents Household Expenditure.

HH Daily Wage Rate: The average daily wage rate for male and female residing along the project roads in the project area was Tk. 278 for males and about 235 for females respectively. In the control road areas this figure stands at Tk. 280 for male labor and about Tk. 208 for female labor. Wage rate in project and control road was almost same for both males and females. Detail of wage rate is furnished below in Table 5.8.

HH Land Holding: The Terminal survey followed the baseline survey and classified landholding size as landless (less than 0.5 acres), marginal/small farmers (0.50 to 2.49 acres), medium farmers (2.50 to 4.99 acres) and large farmers (5.0 acres and above). A significant percentage 46.12% of respondent households along the project roads were landless and were likely to lie below the extreme poverty line, while along the control road areas this share was18.77%. A significant number of the households were marginal or small farmers both along project 37.65% and control (61,95%) roads. Large farmers were very few 3.76% along the project roads and 2.05% remain in control roads. Table 5.10 presents land holding.

HH Agriculture Production: At the time of the survey the cropping pattern along the project road area was dominated by Boro-paddy (local and high yield variety) which covers 44.77% of the total cultivated area while the remaining 20.35% were covered by vegetables, jute, maize, pulses, Wheat, potato and others. The cropping pattern along the control road area was also dominated by paddy which covered about 44.95% of the total cultivated area. Among the crops, production of high yield variety paddy (Boro) in the project (15.06%) and control roads (14.98%) topped the list with the yield of 3425 kg and 2263 kg per acre respectively. Table 5.11 presents agriculture production.

HH Marketing of Agriculture Products: The surplus agricultural produce is generally sold in the local markets located in project, (36.83%) & Control (52.39%) roads. Total 2077 no of HH involved in project and 586 in Control. Therefore, round the year accessibility of the households to the local markets or of market traders to the producers' farms or houses is a pre-requisite for ensuring a fair price for the producers. The project considers the change of accessibility to markets as an important indicator for measuring effect and impact of the improvement of rural transportation. Table 5.12 presents agriculture product.

HH Involvement with NGOs: Involvement of households with different NGOs. The survey findings revealed that majority of the HHs (51.56%) living along the project roads had involvement with one or different NGOs. Involvement of the HHs along the control roads of the project area with NGOs were 61.43%.. In total 2077 HHs in project and 586 HHs in control roads had their involvement with the NGOs. . Table 5.13 presents involvement of NGO.

Household Investment: The Terminal survey investigated the household investment status over the year preceding the survey, on lease of agricultural land, business, deposit in bank, loans and others. the findings show 71.55% households along project road had investment in the bank. But the percentage of household along control road investing in Banks was

estimated at 14.54%. Along the project road 7.37% household had investment in business while 26.28% household along the control road had investment depositing money in the business. Table 5.14 presents household investment.

HH Sources of Borrowing Money**:** The survey collected Terminal data on extent and sources of money borrowing to assess the socio-economic changes due to the project intervention. The survey categorized the sources of money borrowing as bank, cooperative society, money lender, relatives, NGOs and others. Bank was the main source of borrowing money for the respondents and it was found that the number of borrowers from the same along the project roads was 55.37% and in the control road it was 23.32%. The 2nd highest percentages of households in the project road area borrowed money from NGO (31.49%) and in the control road area the 2nd highest number of households borrowed money from relatives (45.22%). Table 5.15 presents borrowing money.

HH Treatment Received Against Reported Diseases: In Terminal survey respondents reported that the number and quality of health facilities provided by the government were quite limited in the project areas. People as alternatives, avail various other health care providers mainly from the private sectors. This is a common feature of the country including the project area. In the project area treatment facilities/methods available were homeopathic, traditional, Govt. health care facilities such as Upazila health complex 14.80%, Treatment were received by the HHs from Union health and family welfare center, (15.50%) Community Health Clinics,(14.80%) of the treatment facilities were provided by the Upazila Health Complex and 40.50% received treatment from private sector (Registered private clinic/Doctors) along project roads. Table 5.16 presents diseases.

Distribution of Household Head by Sex: It has been revealed from the survey market that the percentage of household headed by male in the project and control road area were 71% and 66% respectively, whereas, in the baseline survey the figures for the same respectively were 68.90% and 65%.. Table 5.28 presents household by sex.

HH Distribution of Arranged Marriage: In the project area 73.89% families were tied by arranged marriage and 75% for other than arranged marriage. In the control road area, the percentage for arranged and other types of marriage was 26.11% and 25%. Table 5.29 presents household arranged marriage.

HH Faced Physical and Mental Torture: The percentage of households those who faced physical and mental torture in the project area was estimated at 17.21% whereas in the contro area it was 35.25%. It is encouaging ??? , in the project and control road area the percentage of households free from physical and mental toure for realizing dowry. Table 5.30 presents Percentage distribution of household faced physical and mental torture for dowry.

Last of all, it may be mentioned market the project, SRIIP is a commendable initiative of LGED towards upgrading the socio-economic situation of the beneficiaries through developing rural roads network, facilitating improved situation in the markets to ensure inflow of goods/commodities as well as providing all weather road access to people in the project areas. These endeavors will certainly help improve the socio-economic conditions of the beneficiaries which would positively lead to reduce poverty among the poor and disadvantaged people of the community. However, it should also be mentioned that the impact of these inputs would possibly only be seen after one or two years rather than during the middle of the project.

1. PROJECT BACKGROUND

1.1 Introduction

The "Sustainable Rural Infrastructure Improvement Project (SRIIP)" is one of the development scheme for transport and trading infrastructure development in rural areas and is funded by ADB, KfW and GOB. The ultimate aim of the SRIIP is, to reduce rural poverty through providing easier and better accessibility to various service sectors by reducing transportation cost and travel time of the project beneficiaries and thus to ensure sustainable development of rural people.

The project area covers 21 districts of Rangpur, Rajshahi and Khulna divisions in the Northern and North-western regions of Bangladesh. The following components are proposed to be developed under SRIIP,

- 700 km Upazila roads (UZR) and 100 km Union roads (UNR) with bitumen-surface standard including construction of 3270 meter Bridges/Culverts,
- 92 nos. of Growth Center Markets (GCM) including construction of 50 nos. of Women Market Sections.

1.2 Project Objectives

The proposed improvement of the rural transportation and marketing system in the project area will provide year round access to transports at reduced costs, thus stimulating agricultural production, help flourishing rural industries, allow flow of information technology and services. The net effect/impact of these factors as expected, will be, increased agricultural production; creation of rural employment opportunities and concomitant increase in both national and rural level household incomes consequently reducing human poverty in the rural areas.

1.3 Project Goals

The Project will reduce poverty and raise incomes of the project population in its operational area by fostering economic growth, enhancing rural people's access to social services (specifically for the poor and women) such as health and education, and will widened economic opportunities. The expected benefits to be accrued from the project interventions are:

- Reduce poverty by 6% (Baseline 42.70%);
- Reduce average travel time by 50.00%;
- Reduce costs of transportation by 60.00%;
- Reduce wage differential rate between man and women by 10.00%;
- Increase farm household income by 49.00%;
- All weather access to market and other social services including health and education;
- Creation of direct & indirect employment opportunity for 100,000 rural male as and females;
- 13,000 person years of employment opportunity create for women in the construction and maintenance work.

2. Benefit Monitoring and Evaluation (BME) Study

The BME is an instrument to monitor and evaluate the changes in traffic and other socio-economic indicators following development of roads, markets under the SRIIP. It envisages periodic monitoring (Baseline, Midterm & Terminal) on socio-economic changes in the project areas and evaluating to what extent such changes have been triggered by the project interventions in roads and markets. Another focal objective of the project is, to develop Monitoring and Evaluation system to track the activities of project components and their progress and to ascertain the constraints in achieving the objective of the project. Relevant key indicators have been developed both for project designated and control areas to justify the impact and project intervention. The information generated from this process would help learn best practices, potentials, probabilities and constraints which in the long run ultimately could be used , applied and planned for designing similar type of projects in future.

2.1 The Terminal Study

The Terminals study is relevant to the project administration cycle for improving project implementation and performance. Terminals provide an opportunity for monitoring and assessing project progress from a longer time perspective towards its expected outcome and impact. A Terminal needs not have to be undertaken at the exact midpoint; but it may be advanced or delayed according to the project situation. To monitor the project impact and outcome a Terminal survey has been conducted in three regions (Rangpur, Rajshahi and Jessore) of the project. The data and information of Terminal survey will help to determine the rate of change in the socio-economic condition of households within project impacted areas during middle of implementation period. The ISMC conducted the Terminal survey as per project TOR to gather information and data during middle of project implementation period in order to evaluate the impact due to project intervention. It is necessary for the stakeholders to quantify the current and future changes in transport, trade, agricultural production, local governance and its sustainability

The Project appraisal mission of the SRIIP did not include socio-economist and BME specialists. The sample sub-projects assessed the achievements of project input performance indicators, and also assessed the project outcome, which is a key expected MT survey output. In appendices, assessment statements indicating market project outcomes and impacts of 21 sampled sub-projects of which 12 were road sub-projects and the rest 9 were market sub-projects are presented.

2.1.1 Objectives of Terminal Study

- The objective of Terminal study is to assess the overall progress and Impact of the project.
- To assess the quantitative and qualitative impacts of the project took place till to date.
- Ascertain the key constraints which are impeding to achieve the targeted goals of the project along with recommendations .

2.2 Methodology of Terminal Study

2.2.1 Survey Design

The study design covers a variety of aspects to create a Terminal database to facilitate the Terminal assessment of the effect of SRIIP intervention at the middle stage of project implementation period. This includes both project and control groups. The control groups where respondents will not feel any direct influence of the project on their livelihood. The Terminal survey in project and control areas is expected to generate data which will be used

to monitor the changes in the socio-economic indicators in project influenced areas as well as in control areas.

2.2.2 Selection of Sub-projects

For both Terminal and baseline surveys, out of 21 project districts, a total of 12 road sub-projects, were selected. Of the sub-projects selected for the studies, 5 are located in Rangpur region, 4 in Rajshahi region and 3 in Jessore region. Multistage sampling procedure had been followed to select the sampling unit. At the first stage, the sampled district had been selected considering geographical location. The selected roads for the survey is presented below (Table 1)

Table 1: Regional Distribution

Region	Total Road sub-projects	Sample allocation for BME	District Name
Rangpur	71	5	Gaibandha, Kurigram, Nilphamari, Dinajpur and Thakurgaon
Rajshahi	46	4	Naogaon, Bogra, Rajshahi and Chapi.Nawababganj.
Jessore	31	3	Chuadanga, Jhenaidah and Jessore
Total	**148**	**12**	

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

In addition 4 control roads from 4 districts were also selected from areas having social and economic set up similar to that of the selected project roads. Thus 16 road sub-projects including 4 control roads had been selected to conduct the BME study. Table-2 & 3 shows the list of selected sub-projects:

Table 2: Selected sub-project Road for BME Study under SRIIP

Sl. No	District	Upazila	Road ID #	Road sub-project	Project Length (Km)
Upzila Road (UZR) Sub-projects					
Rangpur Division					
1	Nilphamari	Kishoreganj	173452002	Kishoregonj GC-Borovita GC UZR	4.26
2	Dinajpur	Fulbari	127382005	MadilaMarket GC to Ambari Market GC Road UZR	10.15
3	Gaibanda	Palashbari	132672001	Palasbari Upazila HQ- CMarketra GC via Kishoreganj UP	3.95
Rajshahi Division					
4	Rajshahi	Bagmara	181122012	Marketgongopara-KashorMarket	5.58
5	Naogaon	Mohadebpur	164502012	Mohisibatan Gc - Khajur R&H	4.15
6	Bogra	Sadar	110202007	Baghopara NHW-Ghoradhap GCM	3.45
Khulna Division					
7	Jhenidah	Kaligonj	244332004	Kola GC-Gazir Bazar GC.	3.37
8	Jessore	Bagherpara	241092008	RHD at datarasta-narkelbaria GC via Chaibaria &Agra Ut	15.15
9	Chuadanga	Alamdanga	218072010	Gholdari GC - Sarajgonj R&H (Alamdanga Portion) .	7.20
Union Road (UNR) Sub-projects					
1	Thakurgaon	Sadar	194943004	Ruthia UP office- Egaromile NHW via Dediganj UP	8.20
2	Kurigram	Sadar	149523007	Zatiner Market (Durgapur Rail line)-Mogolbasa UP	3.13
3	Chapi N.Ganj	Nachole	170563004	Fatepur UP - Mollickpur GC road	7.60
Control road					
1	Nilphamari	Sadar	173642018	Nilphamari – Jaldaka RH at Kachukata Bandor	15.15
2	Gaibanda	SagMarketa	132883005	Garidah up office to Batola bazaar road	3.25
3	Naogaon	Sadar	164602003	Naogaon RH to Fatepur GC	5.30
4	Jessore	Chowgacha	241112008	Sholoua GC to Arpara Gc road	7.50

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

Table 3: Selected sub-project Markets for BME Study under SRIIP

Sl. No	District	Upazila	Name of GCM/Rural Market	Area (acre)
Rangpur division				
1	Nilphamari	Sadar	Babrijhar GC	3.71
2	Dinajpur	Birol	Fulbari	1.11
3	Kurigram	Ulipur	Nagrakora Market	0.84
4	Gaibandha	SagMarketa	MonsirMarket	0.28
Rajshahi division				
5	Noagaon	Sadar	GoaliMarket	0.91
6	Chapai N. Ganj	Nachole	Sonaichandipur GC	1.20
7	Bogra	Dhonut	SomuaMarket	2.24
Khulna division				
8	Chaudanga	Alamdanga	Munshoganj GC	1.25
9	Jessore	Bagherpara	Narikelbaria Gc	9.60
Control Markets				
1	Jhenaidah	Kaliganj	Bagergachi	0.70
2	Naogaon	Mohadebpur	Pathakata	0.70
3	Nilphamari	Kishoreganj	Kishoreganj	0.70

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

2.2.3 The Key Indicators for Monitoring and Evaluation

To evaluate the project outcomes in the context of the project objectives the following indicators were been identified by the consultants. And all survey formats had been developed based on the following indicators:

Table 4: Indicators to measure the SRIIP Impact

Sl. No.	Indicator Category	Indicators
1	**Road Survey**	• Traffic volume • Vehicle operator income • Freight and fare • Time required by different mode of transport • Model Mix • Volume of road side business and productive units • Social aspects: Health and education
2	**Village level household survey**	
	Household profile	• Household size • Age and sex • Literacy rate • Occupation
	Land ownership, Cultivation and Marketing	• Landownership and use • Main crop production and cost per hectare • Marketing system • Agriculture Extension services
	Household income and expenditure	• Household income by sources • Household expenditure by heads • Saving practices
	Health	• Diseases suffered from • Cost of treatment • Place of treatment • Child and maternal mortality
	Household Assets	• Structure by type • Ownership of domestic animals • Furniture • Cooking Utensils • Electrical and Electronic Appliances • Tree etc
	Gender Equality and Women	• Decision making

Sl. No.	Indicator Category	Indicators
	Empowerment	• NGO/ GO affiliation and support services • Social Obstacles uncounted in outside working
	Water Supply and Sanitation	• Sources of drinking water • Type of toilet used • Toilet distance from drinking water
	IGA	• Type of IGA • Investment • Loan facilities • Sources and amount
3	**Market Survey**	• Market physical facilities • Market day turnover • Market day users • Quality Deteriorations losses • Lease value and • Market day revenue collection
4	**Road Safety Survey**	• By Road Safety Specialist
5	**Local Governance (Pilot Ups)**	• By LGS

2.2.4 Design Survey Formats/ Tools

Consultants developed three sets of survey formats based on above mention indicators;

(i) For Roads Survey:
Road survey formats are comprised of the following information;

- Traffic Tally Sheet
- O/D Study sheet
- Road side village including h/h within road catchments area
- Road side establishment survey format
- Road side land value survey Sheet

(ii) For Market Survey
Market survey formats are comprised of the following information;

- Market physical facilities survey
- Market Quality Deterioration survey
- Market day turnover and Revenue collection
- Trader's profit margin survey

(iii) Household Survey Questionnaire
Household survey questionnaire are comprised of the following information;

- Household Demography Profile
- Landownership, use and Cultivation
- Household monthly income and expenditure by sources
- Health services
- Water supply and sanitation
- Community Empowerment and
- Household Assets;

2.2.5 Enumerators Orientation Training:

District Sociologist/Socio-economist/Community organizers were deployed for collecting information from the field with the help of the survey questionnaire. Before their deployment, the ISMC consultants provided two days orientation training on rapport building, survey methodology, respondents' selection procedure, contents of the questionnaire, data collection techniques, etc. Both lecture and participatory methods were followed. Each enumerator filled up questionnaire as mock test during orientation where participants act as interviewer and

interviewee. After the mock test, all participants sat together to ascertain how far the questionnaires were filled in appropriately. Mistakes were identified and field stafss were briefed again about their mistakes in filling up the questionnaire in the mock test. The Transport Economist/DTL and Local Government Specialist were invited to provide training to the enumerators. 2-3 Enumerators per road were assigned for the purpose of data collection from the field. One experienced Supervisor having minimum Bachelor Degree was recruited to supervise and guide the LGED Enumerators assigned for collecting the data in the selected BME sites. The Deputy Team Leader/Transport Economist was engaged to oversee entire field activities.

2.2.6 Data Collection process:

The traffic and market surveys were conducted to help monitor the changes in the volume of existing traffic and the level of market transaction because of project intervention during dry and wet season. A good number of people had been deployed to carry out the surveys. The selected local LGED officials worked as field enumerators for collection of data in three regions. A team was composed of 2-4 enumerators for this survey. Before conducting the survey, two days training was arranged for the LGED officials on dry and wet season traffic and market users' survey.

2.1.7 Supervision and Monitoring:

The field supervisors visited all the selected sample spots for supervising the survey work in different regions, districts and Upazilas. The data collectors collected data primarily on movements of vehicles, market trading and production, price and cost of agriculture crops, and trend of production and consumption and marketing network etc. The enumerators were directed to maintain regular contact with the DTL/ Transport Economist to keep him informed about the progress, constraints and seek technical guidance over telephone as needed.

2.2.8 Cooperation of LGED:

The study team involved LGED personnel in all stages of the Terminal survey. The LGED personnel were very helpful in providing basic information required for the development of sample designs, identification of the sample units, length of roads, accessibility of the localities etc. The study team members and local LGED personnel worked together to the selected sampled project and control Roads and Markets.

2.2.9 Data Processing and Analysis

Traffic and Market Data processing were done at the SRIIP HQ. Household Data processing tasks were done by SRIIP-ISMC Officials.

The DTL of ISMC designed the table plan based on which output tables were generated.
Data processing activities were performed in the following stages:

- Editing of filled in questionnaire by community organizers/enumerators;
- Data entry using Access/Excel Program by the Consultant;
- Tables have been generated by the Consultant;

2.2.10 Report Preparation and its Finalization:

Terminal Draft Report has been prepared by the DTL/ Transport Economist of ISMC, SRIIP. With the help of Local Gov, Specialist (LGS), Training Specialist (TS) Gender Specialist (GS), Team Leader (TL), Project Director and concern Superintend Engineers, Executive Engineers, Upazila Engineers in district and Upazila level. The Draft Final Report will be presented to the PM, SRIIP for onward transmission to LGED/Client and ADB/KfW management. After the incorporation of comments, the Report will be finalized.

3. TRAFFIC STUDY

3.1 Introduction

To assess the project impact a Terminal traffic survey had been conducted in all pre selected sampled sub-projects including control areas in three regions (Rangpur, Rajshahi and Jessore) of the project. The Terminal Traffic Surveys were conducted during dry and wet seasons because the socio-economic activities of rural areas in Bangladesh were subject to high fluctuation mainly in two seasons viz. wet and dry. Seasonal variation in traffic movements will be significantly reduced in the project area after road development. The traffic survey involved continuous monitoring of traffic data on each selected study road sub-projects for two days (one Market day and one non-Market day) in a week in the dry season and two days in a week in the wet season.

3.2 Selection of Sample Road sub-project

For the baseline traffic and market surveys a set of criteria were used, such as;

i) Geographical Location, ii) Length of subproject, iii) Subproject frequency and iv) Construction period for roads subproject.12 road sub-projects, one in each 12 districts out of total 21 districts, which were enlisted for development under SRIIP. There are 12 project roads (sub-projects): 5 in Rangpur region, 4 in Rajshahi region and 3 in Jessore region. These 12 selected roads/ sub-projects would be implemented during early stage of the project. In addition 3 control roads, (one in each region) which were not enlisted for development, had also been selected from areas similar to that of the areas around the selected project roads. For selection of roads subproject to conduct the BME study, following criteria were considered:

- Geographical Location;
- Length of subproject;
- Subproject frequency; and
- Construction period;

A list of selected project roads and markets (sub-projects) for BME survey including control roads and markets (sub-projects) is shown below in the Table 3.1 & Table 3.2:

Table 3.1: Twelve road sub-projects have been selected for BME study

Sl. no	District	Upazila	Road ID #	Road sub-project	Project Length (Km)
Upzila Road(UZR) Sub-projects					
Rangpur Division					
1	Nilphamari	Kishoreganj	173452002	Kishoregonj GC-Borovita GC UZR	4.26
2	Dinajpur	Fulbari	127382005	MadilaMarket GC to Ambari Market GC Road UZR	10.15
3	Gaibanda	Palashbari	132672001	Palasbari Upazila HQ- CMarketra GC via Kishoreganj UP	3.95
Rajshahi Division					
4	Rajshahi	Bagmara	181122012	Marketgongopara-KashorMarket	5.58
5	Naogaon	Mohadebpur	164502012	Mohisibatan Gc - Khajur R&H	4.15
6	Bogra	Sadar	110202007	Baghopara NHW-Ghoradhap GCM	3.45
Khulna Division					
7	Jhenidah	Kaligonj	244332004	Kola GC-Gazir Bazar GC.	3.37
8	Jessore	Bagherpara	241092008	RHD at datarasta-narkelbaria GC via Chaibaria &Agra Ut	5.50
9	Chuadanga	Alamdanga	218072010	Gholdari GC - Sarajgonj R&H (Alamdanga Portion)	7.20
Union Road (UNR) Sub-projects					
1	Thakurgaon	Sadar	194943004	Ruthia UP office- Egaromile NHW via Dediganj UP	8.20
2	Kurigram	Sadar	149523007	Zatiner Market (Durgapur Rail line)-Mogolbasa UP	3.13
3	Chapi. N.Ganj	Nachole	170563004	Fatepur UP - Mollickpur GC road	7.60
Control Road					
1	Nilphamari	Sadar	241112088	Nilphamari – Jaldaka RH at Kachukata Bandor	15.15
2	Gaibanda	SagMarketa	132883005	Garidah up office to Batola bazaar road	3.25
3	Naogaon	Sadar	241112008	Naogaon RH to Fatepur GC	5.30
4	Jessore	Chowgacha	164602003	Sholoua GC to Arpara Gc road	7.50

Table 3.2: Nine Growth Center / Rural Market sub-projects have been selected for BME study

Sl. No	District & Constituency #	Upazila	Name of GCMs/Market
Rangpur division			
1	Nilphamari	Sadar	Babrijhar GC
2	Dinajpur	Birol	Fulbari
3	Kurigram	Ulipur	Nagrakora Market
4	Gaibandha	SagMarketa	MonsirMarket
Rajshahi division			
5	Noagaon	Sadar	GoaliMarket
6	Chapai N. Ganj	Nachole	Sonaichandipur GC
7	Bogra	Dhonut	SomuaMarket
Khulna division			
8	Chaudanga	Alamdanga	Munshoganj GC
9	Jessore	Bagherpara	Narikelbaria Gc
Control Markets			
1	Jhenaidah	Kaliganj	Bagergachi
2	Naogaon	Mohadebpur	PatagMarketa
3	Nilphamari	Kishoreganj	Kishoreganj

3.3 Location, Physical features of Project Roads

PR-01-UZR from Kishoregonj GC to Barovita GC, Nilphamari, Kishoregonj (ID. 173452002)

Total Length: 9.89 Km (6.00 km Earthen, 3.89 km BC)

Physical features of the road: This is an Upazila Road starting from Kishoregonj Upazila uns up to Barovita GC on the R&H from Rangpur to Duani (Teesta Barrage)-Panchgorh. The part of the road from Upazila is paved, then the rest is earthen passing by the side of a river that continuously have been eroding the bank. Then the road runs few hundred meter on BWDB's embankment through BWDB's structure and passing through the low beel area ends up in Barovita GC. The 1st section of the road up to the river is satisfactory having dense settlements on both the sides but the condition of the middle section of the road is very poor and passes through few hundred meter very narrow earthen strip, 200m of which has already been eroded in the river. Few homesteads on the side of the road in this section are also in danger from the river. These section of the road needs reconstruction with heavy and costly side protection. Mentionab;e that the population density is very low in this section. There is an alternative way for movement towards the GC or to the Upazila HQ and vece-versa. If the road is reconstructed with an extra bridge, than river training works will be needed. Some of the pictures taken from the sites are enclosed herewith for observation (P-01 to P-06)

PR-02-UZR from MadiliaMarket GC to Ambari GC Road, Fulbari UZ, Dinajpur (ID 127382005)

Total Length: Total-10+150 Km (2.0 km Earthen,0 km HBB/WBM, 1.8 km BC)

Physical features of the road: The road starts from Chintamon to Ambari GC and runs up to Fulbari NHW. It is an Upazila road combined of BC, HBB and earthen sections. The width of existing BC and HBB is around 3.00m to 3.5m having the embankment width varying from 4.5m to 5m. The existing height of the embankment in most part trough the beel area is very high. There need many structures to replace and instructed Upazila and DSC staffs to consider sufficient drainage structures as it passes through the huge beel area. It passes

through the villages connecting schools, madrassas, social institutions, Union Parishad office, health services etc.

The starting point of the road is, Madina Market RM and it passes through the areas having lot of populace, institutions, health centers, social institutions, rural market and growth centers etc. If this road is developed atper to Upazila road standard that will generate huge economic activities as it will connect the river way and also will connect the neighbouring districts. The cost estimate here will be very reasonable as no earth filling cost will be needed and may be executed properly following the construction criteria and specifications etc.

PR-03-Palasbari UPZ HQ to Chartra GC via Kishoregonj UP office Road, Palasbari, Gaibandah (ID.1322672001)
Total Length–8.25km, Effective length-3.9 km (Earthen- 3.9km), BC-4.3km

Physical features of the road: The road starts from a location on the Bogra Ranpur National Highway. The effective length starts from 4.3km from the starting point of the road. A culvert is proposed at km 0+950. The WBM has been completed. The Brick on edigning was not properly done and it needs to be reconstructed properly. The sholuder should be scarified, vegetation needs to be removed and reconstructed properly.

PR-04-UZR from Marketgongopara to Kashor Market, Bagmara, Rajshahi (ID.181102009)
Total Length: 5.40 Km(Earthen)

Physical features of the road: The road starts from Market gongopara GC to Keshor Market (Mohonpur Upazila) up to Khal gram. This is one of the good alignment having sufficient height and average width of it is around 5.50m. The full alignment is earthen and need some small structure. But after about few hundred meter the alignment passes over the middle of play ground of High school and primary school. It will be unwise to construct the road separating the schools by a road running between. There should be only way to pass the road behind the primary school to a save distance without creating any environmental hazzards.

The UE, Bagmara present during the visit was suggested to take a full inventory and inform it to PD and XEN, Rajshahi how much land is required to make an acquisition and propose it to PD, SRIIP.

PR-05-Mohishbathan GC to Khajur R&H, Mohadevpur, Naogaon (ID.164502012)
Total Length: 4.10 km (4.10 km Earthen, 0.00km HBB/WBM, 0.00 Km BC)

Physical features of the road: The road starts from Khajur point on R&H from Naogaon-Mohadebpur-Porsha and runs up to Mohishbathan GC. It has also passed over the BWDB embankment about 200m, most parts of the road are earthen having only 60m BC and HBB having a width about 3.00m. The width of the road embankment is about 6.5m. The earth works on the road was carried out by local destitute women laborer of the area under 40 days Giovernment Food For Worksw program. At the end point of the road near Mahisghbathan GC a very small part of the road may needs protection measure. The SAE accompanied was requested to provide small drainage structures to drain out water from houses and rain water at different points.

PR-06-UZR from Baghopara NHW-Ghoradhap GCM at Bogra Sadar (ID. 11020007)
Total Length: 2.25 Km (2.25 km Earthen, 0.0 Km HBB/WBM, 0.0 km BC)

Physical features of the road: This Upazila Road starts at Baghopara from Bogra Ranpur NHW and runs up to Bogra. Althought the total road length is 3.25 km the first km of road length is left out of SRIIP project. In the sencond km there some resettlements will be needed. It is agreed for svoulantarily resettelment. The whole road length is earthen. The road also passes through some beel areas on both sides. The road has now been awarded.

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The road connects Bogra City and some other Upazilas with short distances. Further, it will provide the connectivity to several GCMs, educational and social institutions, health service facilities etc. It will also facilitate the local enterpreneurs and farmers to transport their commodities to the local market and will ensure that they get proper prices through enhancing the trading activities.

PR-07-Kola GC to Gazirbazar GC road, Kaligonj, Jhenidah (ID.244332004)
Total Length: 4.20 Km (3.80 km Earthen, 0.00 km HBB/WBM, 0.400 Km BC)

Physical features of the road: The road starts from approximately 1 km distance of Kola GC on Kaligonj-Shalikha-Magura up to Gazirbazar GC towards Jessore through Barobazar on Jhenaidah-Jessore R7H. About 500m road is under construction from Greater Kushtia Jessore, Rural Development project of LGED is sufficient width both crest and embankment. Though the name has been given Kola GC but it remains 1.00km away from it to connect another road in Jhenaidah Sadar. The main development objective of this road is to provide connectivity but ironically this won't work out because 1 km road will be left away. This is an important alignment connectiong Narikelbaria GC to Jhenaidah at one side and another end towards Jessore.

PR-08-UZR from Dattarasta at R&H to Narikelbaria GC via Chaibaria & Agra Uttarpara, Bagharpara, Jessore (ID.241092008)
Total Length: 16.10km (14.52 km Earthen, 0.75 km HBB/WBM, 0.83 Km BC)

Physical features of the road : The Upazila road, starts from the Datta Rasta on R&H from Narail to Jessore and runs up to Narikelbari GC through the villages, beels (Low Lying areas) etc. The initial few Kms of the roads at Dattaprasta end are paved, between both ends the of the road is a combination of BC, HBB and Earthen. In two places 2 km alignment of the said road has been overlapped by 1 Upazila road and one Union road. At the end a few killometers are paved. The middle section which is located in the beel areas is more vulnerable because the farmers for irrigation purposes have installed number of pipes underneath the suface of the road for passing irrigation water to iirigate crop lands on both isdes of the road. There should be numbers of u-drain type structures to pass the water from one side to another and also to keep the option to pass water during rainy season. If these facilities are not provided the farmers will cut open the road for irrigation purpose. There may be a need for more structures than kept provisionally. The existing pavement width is about 3.5m and the edges are damaged. The embankment widths are variable from 5.8m to 7.0m. The existing pavement condition at the starting end might need immediate maintenance otherwise it will become unusable .for traffic movements.

During the field visit on 23 March 2013, the ADB representative expressed his view in favour of providing hard shoulders all along on both sides the roads for sustainability by preventing shoulder damaging and to reduce the risk of accidents.

It has been proposed to construct a large bridge (around 90.00m) over the Naboganga/Afra river adjacent to Narikelbaria GC. The preliminary studies have been taken up to ascertain environmental and resettlement issues.The resettlementy and other surveys and soil investigation have also been started. Constructed of the bridge will be beneficial for people of two districts viz. Magura and Jessore because it will help in making better connectivity and consequntely will create opportunities for huge economic activities for the population.. At

present, large number of people are using bamboo bridge/small country boat to cross the river risking their lives to go to the GC everyday.

ADB representative stressed on the study on resettlement at the location of bridge as well as the approaches, so that the issues regarding this might be followed as the Resettlement Policy Adopted by ADB. ADB also stressed to construct the PC Girder bridge over here.

PR-09-Ghordari GC to Sarojgonj R&H (Alamdanga portion) at Alamdanga Upazila (ID.218072010)
Total Length: 8.20 Km (7.20 km Earthen, 0.57 HBB/WBM, 0.43 Km BC)

Physical features of the road: The road starts from Ghordari GC on Chuadanga to Alamdanga R&H and meets at Sarojgonj GC on Chuadanga to Jhenaidah GC. At both ends the length of BC and HBB (about 1.00km) are inadequate. The middle section opf the road is earthen but the width of the embankment is around 7.00m only. The height of the embankment is low and needs re-sectioning to increase the height. The amount of soil that will be collected from the box cutting could be utilized to widen the road up to 7.32m. The road will provide direct linkage of Gholdari GC and 3 unions, about 10 villages and regional Highways. Moreover schools/madrassas, Market and bazars, social institutions of the localities that the road goes through will be benefited. There are produces agricultural crops in large quantuty such as of beetle, bamboo, sugarcane, tobacco as well as lot of vegetables. These agro products could be easily transported to the market in Dhaka and other districts on implementation of the project. The UE and SAE were reqquested to provide sufficient drainage structures to drain out rain and flash flood water as per the instruction of CE, LGED.

PR-10-UNR Improvement of Ruhia U.P. Office-Egaromile NHW via Debipur UP office Road, Thakurgoan Sadar, Thakurgoan (ID. 194943004)
Total Length: 15.2 Km, Effective length-8.234. (8.2 km Earthen, BC-km 7.00)

Physical features of the road : This is a Union Road that starts from Ruhia U.P. Office-Egaromile NHW via Debipur UP office Road. The First part of the road is paved from km 0+000 to 7+000. The road is very narrow having an embankment width of about 4.00m on an average the road need to be widen and uopgrade to Union road standard.

PR-11-UNR from ZatinerMarket (Durgapur Rail way line) to Mogholbassa UP, Kurigram Sadar, Kurigram (ID.149523007)
Total Length: 3.90 Km (3.90 km Earthen, 0.00km HBB/WBM, 0.05 Km BC)

Physical features of the road : This Union road starts from R&H Kurigram to Ulipur-Chilmari at JatinerMarket to Moghulbassa UP office. The alignment of the rioad is very narrow and runs on the bank of a canal, and through homesteads, lot of trees and rail way crossing. The existing widths varied from 3.50m to 4.50m. the road needs replace one large box culvert and some small drainage structures. Further, a huge protection works as well as earth works are needed to improve the road condition..

PR-12-UNR from Fatehpur UP office to Mallickpur GC, Nachole Upazila, C Nawabgonj (ID.17563004)
Total Length: 9.30 Km (8.45 km Earthen, 0.85km HBB/WBM, 0.00 Km BC)

Physical features of the road: The road starts from Fatehpur UP Office to Mallickpur GC. Except for 0.85km HBB part at the end, the embankment is earth filled. There are about 200m earthen section behind the starting point will remain earthen, therefore, the local people demamded to include these length within the project. This can be taken up for improvement if fund allows. The road has the average width around 5.00m having sufficient

hieght and do not require increase of the level' But in some places a few people asked for needs protection from ponds and ditches and for some small drainage structures to drain out water. It connects alot of villages, social and educational institutions, GC and RM etc. The road will provide connectivity of the local road network and also will provide easy communication facilities to the people of these areas. Further, it will also facilitate the traders and farmers to reach their products to the markets etc. The road will reduce distance to the district town.

3.4 Design Survey Formats

A set of field survey instrument was prepared for collecting information regarding the impact of road, market infrastructure improvement on various sectors of the rural economy.

3.2 Data Collection

Data on the findings and information of baseline survey on traffic would be helpful to look at the rate of existing traffic and could make projection on possible changes due to project interventions that might occur in future. It is difficult to determine post project impact without a baseline survey. As such, baseline traffic surveys were undertaken in both dry and wet seasons. A good number of people were engaged to carry out this survey. The selected local LGED officials were also deputed for collection of data in three regions. A team was composed of one supervisor and four enumerators for this survey. Before conducting the dry and wet season traffic and O-D survey two days training, one for each three regions were arranged for the LGED officials. Traffic volume varied on seasonal basis in dry and wet seasons therefore, traffic data were collected between 7th October to 20th October, 2015 (dry season) and 7th April 20th April, 2016 (wet season) by LGED staffs who were trained by ISMC consultants. Traffic counts were undertaken on BME selected road subprojects over a 12-hour period (6 a.m. to 6 p.m.) on one market day and one non-market day in a week to capture the variation in traffic volume. Sets of structured survey formats were used to collect the necessary data. Traffic was counted according to six categories viz. motorized traffic and four categories of non-motorized traffic, plus pedestrians. For each traffic survey location 3 to 4 enumerators were engaged by LGED to collect relevant data.

3.3 Traffic Information

3.3.1 Weekly Average Daily Traffic (WADT) Frequency/ Mode of Transportation

All types of motorized, non-motorized were found to carry more or less passenger and goods from and to rural market and other places. On the 12 projects and 4 control roads 2 day traffic count were conducted in a week during dry and wet season. For each day, 6.00am to 6.00pm 12-hour traffic counts were converted to 24-hour traffic volumes by a multiplier of FHM & FMM, ***Ref: Simplified Methodology for SEME Study of RDP-7.***

Daily traffic counts have been converted into weekly average daily traffic (WADT) on the assumption market, on average, there are two market and five non-market days per week. On this basis:

WADT = {(Tm x 2) + (Tn x 5)} / 7
Where,
Tm = 24-hour traffic volume on market day.
Tn = 24-hour traffic volume on non-market

Terminal traffic survey results show that the total traffic volume for all BME selected roads has increased. Traffic volume increased in all project and control roads. The analysis of road use by the total local population during the recent Terminal survey shows motorized and non-motorized vehicles have increased weighted average 43.8% and 3.69% respectively in project road, in Control Road increased 4.45% and 2.61% (Table 3.5) the pedestrian increased in project road 9.74% and Control 9.78%. The following Table-3.4 & 3.5 shows the findings regarding the estimated weekly volume of traffic by alternative modes of transport in the selected roads and control roads.

[1] Final Report, Sept. 1999 & Economic Analysis of Vehicle Operating Costs (VOC) ADB: Rrp: Ban 28023 on October 1997; Mustafa G, Ullah Mohammed Zafar, Feasibility Study of 192 FRBs & 189 Markets of RIDP, LGED, May 2001,

Table 3.3: Weekly Average Daily Traffic (WADT) in Wet & Dry Season (Terminal)

Road Name	Project Roads								
	Wet Season Traffic				Dry Season Traffic				Changed in % for Total
	Motorised	Non-motorised	Pedestrians	Total	Motorised	Non-motorised	Pedestrians	Total	
Project Roads									
Khishoreganj GC - Baravita GC Road	175	434	377	986	210	437	455	1102	-5.40%
MadilMarket GC - AmbariMarket GC Road	166	216	192	575	195	710	557	1462	3.32%
Palasbari Upazila HQ - CMarketra GC via K.ganj UP	150	387	99	637	161	535	719	1416	7.61%
Marketgongapara - KasherMarket Road	120	181	147	449	143	281	377	801	11.43%
Mohisibatan GC - Khajur R&H Road	206	440	228	875	254	571	642	1468	6.04%
Baghopara NHW - Ghoradhap GC Road	124	190	103	417	268	550	698	1516	17.04%
Kola GC - Gazir Bazar GC Road	266	465	114	845	278	515	804	1597	4.53%
RHD at Datarasta - Narkelbaria GC via Chaibaria	120	142	86	347	245	615	104	964	5.29%
Gholdari GC - Sarajgonj R&H (Alamdanga part)	124	313	52	489	328	786	412	1526	6.86%
Ruthia UP offic - Egaromile NHW via Debiganj	138	388	104	631	177	622	418	1218	30.36%
ZatinerMarket (Durgapur rail line) - Mogolbasa UP.	215	282	161	658	349	298	749	1396	23.64%
Fatepur GC - Mollickpur GC Road	110	312	248	670	127	506	849	1482	13.21%
Average	**160**	**312**	**159**	**632**	**228**	**535**	**565**	**1329**	**10.33%**
Control Roads									
Nilphamari - Jaldaka R&H, Sadar, Nilphamari	134	198	128	460	266	512	183	961	12.71%
Garidah UP office - Batola bazar, SagMarketa	114	159	125	397	234	553	147	934	8.59%
Naogaon R&H - Fatepur GC, Sadar, Naogaon	114	117	118	349	778	791	390	1959	7.31%
Sholoua GC - Arpara GC Road,	99	539	153	791	446	626	648	1719	-78.88%
Average	**115**	**253**	**131**	**499**	**431**	**620**	**342**	**1393**	**-12.57%**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

Figure 3.3: Weekly Average Daily Traffic in Wet & Dry Season (Terminal)

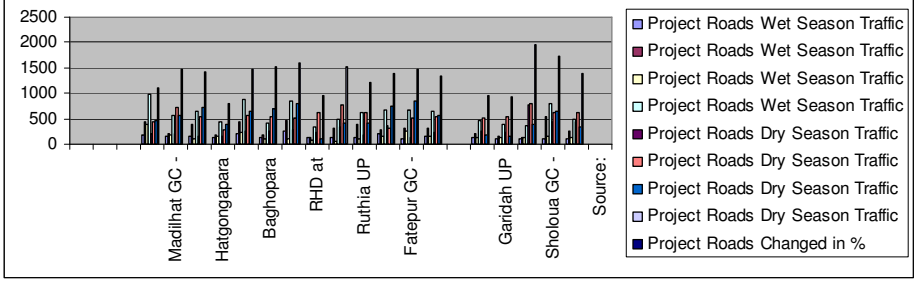
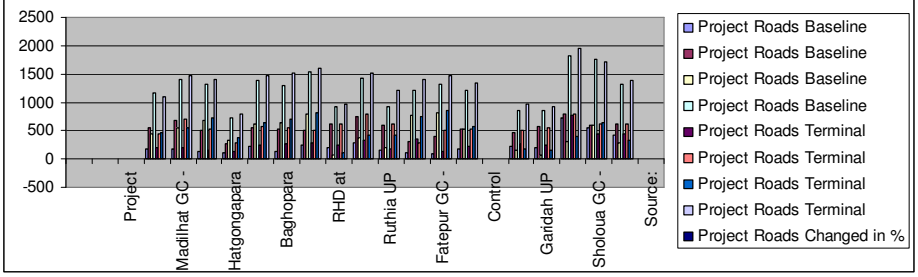


Table 3.4: Weekly Average Daily Traffic (WADT) in Dry Season (Baseline-Terminal)

Road Name	Project Roads								
	Baseline				Terminal				Changed in %
	Motorised	Non-motorised	Pedestrians	Total	Motorised	Non-motorised	Pedestrians	Total	
Project Roads									
Khishoreganj GC - Baravita GC Road	178	555	432	1164	210	437	455	1102	-5.40%
MadilMarket GC - AmbariMarket GC Road	174	693	548	1415	195	710	557	1462	3.32%
Palasbari Upazila HQ - CMarketra GC via K.ganj UP	126	509	680	1315	161	535	719	1416	7.61%
Marketgongapara - KasherMarket Road	116	260	343	719	143	281	377	801	11.43%
Mohisibatan GC - Khajur R&H Road	213	554	617	1384	254	571	642	1468	6.04%
Baghopara NHW - Ghoradhap GC Road	126	522	648	1296	268	550	698	1516	17.04%
Kola GC - Gazir Bazar GC Road	248	498	782	1528	278	515	804	1597	4.53%
RHD at Datarasta - Narkelbaria GC via Chaibaria	208	627	80	915	245	615	104	964	5.29%
Gholdari GC - Sarajgonj R&H (Alamdanga part)	297	748	383	1428	328	786	412	1526	6.86%
Ruthia UP offic - Egaromile NHW via Debiganj	147	588	199	934	177	622	418	1218	30.36%
ZatinerMarket (Durgapur rail line) - Mogolbasa UP.	124	304	773	1201	349	298	749	1396	23.64%
Fatepur GC - Mollickpur GC Road	83	407	818	1309	127	506	849	1482	13.21%
Average	170	522	525	1217	**228**	**535**	**565**	**1329**	**10.33%**
Control Roads									
Nilphamari - Jaldaka R&H, Sadar, Nilphamari	224	474	154	852	266	512	183	961	12.71%
Garidah UP office - Batola bazar, SagMarketa	208	574	78	860	234	553	147	934	8.59%
Naogaon R&H - Fatepur GC, Sadar, Naogaon	726	792	308	1826	778	791	390	1959	7.31%
Sholoua GC - Arpara GC Road,	561	589	599	1749	446	626	648	1719	11.06%
Average	430	607	285	1322	**431**	**620**	**342**	**1393**	**9.91%**

Source: Direct Field survey, Baseline & Terminal Survey, SRIIP-ISMC, LGED

Figure 3.4: Weekly Average Daily Traffic in Dry Season (Baseline-Terminal)



3.5.2 Volume of Traffic

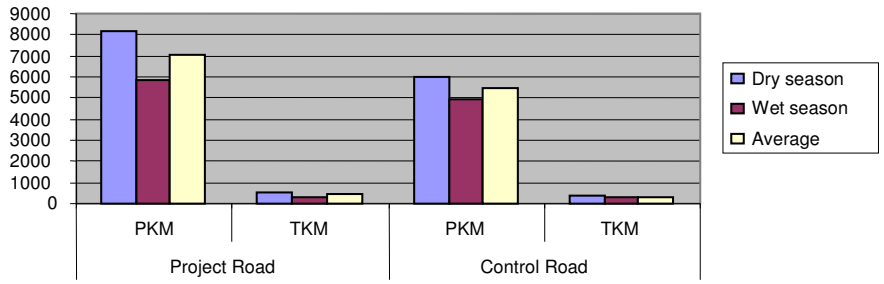
Development of road transportation improve accessibility to various facilities much easier by reducing effective distance, time and cost of movement in both the wet and dry season in the project area. Easy transportation systems help increasing of local communities in traditional and non-traditional income generating activities due to roads improvements.

The weekly average daily per road volume of traffic both passenger and cargo has been estimated during dry and wet season for both project and control roads. Table 3.5 shows market the weekly average daily per kilometer volume of traffic during dry season on the project road is calculated 8191 PKM and 551 TKM. Similarly the weekly average daily per kilometer volume of traffic during dry season on the control road is calculated 6014 PKM and 398 TKM. In dry season PKM and TKM increased 20% & 30%.

Table 3.5: Per Road Average Daily Traffic Volume (PKM & TKM)

Study Area	Project Road		Control Road	
	PKM	TKM	PKM	TKM
Dry season	8191	551	6014	398
Wet season	5886	330	4982	266
Average	**7039**	**441**	**5498**	**332**

Figure 3.5: Per road average daily traffic volume



3.5.3 Model Mix of Traffic

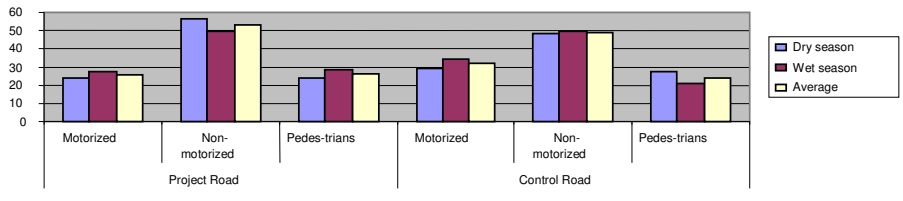
The model mix of traffic has been carried out from Terminal survey data. Above Table 3.6 shows market the model mix in percentage during wet and dry season (average) was found maximum with non-motorized 57%, followed by motorize 24%, pedestrians 24% in the project roads. Similarly the model mix in percentage for control during both season averages was found non-motorized is 49% followed by 35% motorized, and 21% pedestrians in the control roads. In dry season project road increased motorized 62% and non-motorized 32%.

Table 3.6: Modal Mix of Traffic (Fig. in %)

Study Area	Project Road			Control Road		
Season	Motorized	Non-motorized	Pedestrians	Motorized	Non-motorized	Pedestrians
Dry season	24	57	24	29	48	27
Wet season	27	49	28	35	49	21
Average	**26**	**53**	**26**	**32**	**49**	**24**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

Figure 3.6: Modal Composition of traffic



3.5.4 Travel Time of Traffic

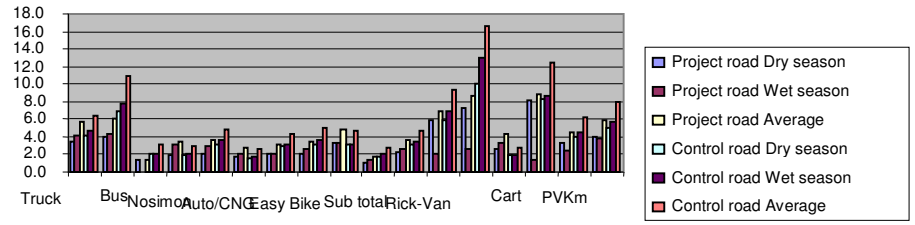
Traders and farmers can transport their goods faster throughout the year as a result of due to road development. Transportation time both passenger and cargo also roughly halves on developed road even without a shift in mode of transport. Table 3.7 shows on an average time spent per kilometer to travel the project road by Motorized vehicles is 2.3 and 2.6 minutes during wet and dry season and non-motorized vehicle is 3.3 and 2.5 minutes during dry and wet season. But in case of the control roads both season average times spent of motorized vehicle is 3.1 and non-motorized vehicle is 3.4 minutes. In dry season project road travel time decreased 18.70%.

Table 3.7: Per Vehicle Kilometer Journey Time in Minutes

Type types	Project road			Control road		
	Dry season	Wet season	Average	Dry season	Wet season	Average
Truck	3.5	4.2	5.6	4.2	4.6	6.5
Shallow Van	3.9	4.4	6.1	7.0	7.8	10.9
Bus	1.4	0.0	1.4	2.1	2.0	3.1
Micro bus	1.9	3.0	3.4	1.9	2.1	3.0
Nosimon	2.2	2.9	3.6	3.1	3.5	4.9
Car	1.8	2.0	2.8	1.6	1.8	2.5
Auto/CNG	2.0	2.1	3.1	2.9	3.1	4.4
Tempo	2.2	2.6	3.4	3.1	3.7	5.0
Easy Bike	3.2	3.3	4.9	3.1	3.2	4.7
Motor cycle	1.1	1.3	1.7	1.7	2.0	2.8
Sub total	**2.3**	**2.6**	**3.6**	**3.1**	**3.4**	**4.8**
Rickshaw	5.9	2.1	7.0	5.9	6.9	9.4
Rick-Van	7.3	2.6	8.6	10.1	13.0	16.6
Bicycle	2.6	3.3	4.2	1.8	1.9	2.8
Cart	8.1	1.3	8.7	8.3	8.6	12.5
Sub total	**3.3**	**2.5**	**4.5**	**4.0**	**4.5**	**6.2**
PVKm	**4.0**	**3.8**	**5.9**	**5.1**	**5.6**	**7.9**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

Figure 3.7: Per Vehicle Kilometer Journey Time



3.5.5 Transportation Cost of Cargo & Passenger Traffic

Passenger transportation cost of undeveloped road roughly higher than on developed road even without a shift in mode of transport. Traders and farmer can transported their goods more cheaply throughout the year due to road development. However, on the basis of Terminal BME study under ISMC of SRIIP consultants have summarized per passenger kilometer (PKM) and ton kilometer (TKM) transportation cost by mode and road. Table 3.8 shows per passenger and ton kilometer average transportation cost of motorized vehicle is Tk.5.2 and motorized vehicle is 4.4 during dry season in project roads. Similarly in the control

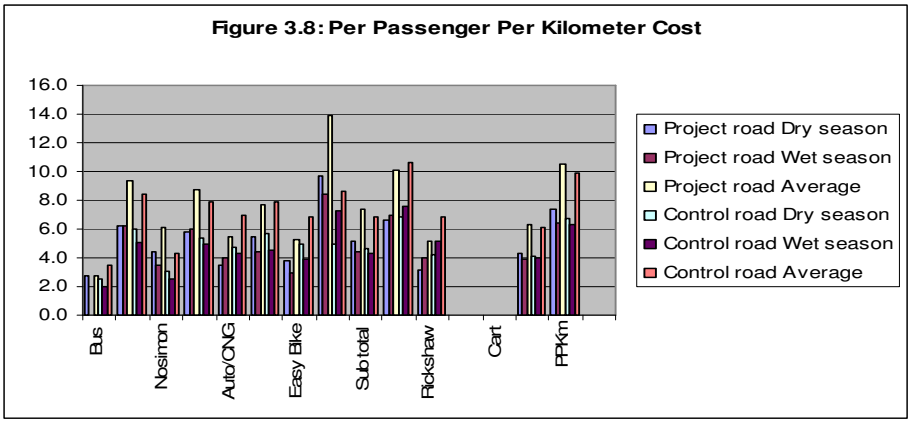
roads the motorized vehicle is an average cost Tk.4.7 and Tk.4.3 per passenger per kilometer. In dry season project road per passenger cost decreased 133%icle) (motorized vehicle) and control road 154%.

Table 3.8: Per Passenger Per Kilometer Cost

Type types	Project road			Control road		
	Dry season	Wet season	Average	Dry season	Wet season	Average
Bus	2.7	0.0	2.7	2.5	2.0	3.5
Micro bus	6.3	6.2	9.4	6.0	5.0	8.5
Nosimon	4.4	3.5	6.1	3.1	2.5	4.3
Car	5.8	6.0	8.8	5.4	5.0	7.9
Auto/CNG	3.5	4.0	5.5	4.8	4.3	6.9
Tempo	5.5	4.4	7.7	5.7	4.5	7.9
Easy Bike	3.8	3.0	5.3	4.9	3.9	6.9
Motor cycle	9.7	8.4	13.9	5.0	7.3	8.7
Sub total	**5.2**	**4.4**	**7.4**	**4.7**	**4.3**	**6.8**
Rickshaw	6.6	7.0	10.1	6.9	7.6	10.7
Rickshaw Van	3.1	4.0	5.1	4.3	5.2	6.9
Bicycle	0.0	0.0	0.0	0.0	0.0	0.0
Cart	0.0	0.0	0.0	0.0	0.0	0.0
Sub total	**4.3**	**3.9**	**6.3**	**4.1**	**4.0**	**6.1**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

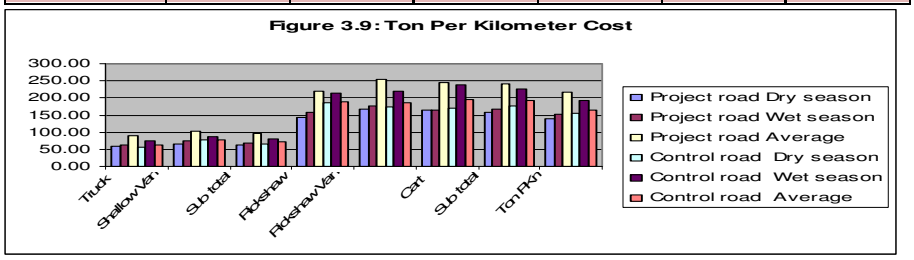
Figure 3.8: Per Passenger Per Kilometer Cost



Improvements of roads are expected to reduce the costs of transportation by each mode of transportation. Cargo transportation cost of undeveloped road much higher than on developed road even without a shift in mode of transport. Traders and farmer can transported their goods more cheaply throughout the year as a result of road development. However, on the basis of Terminal BME study under ISMC of SRIIP consultants have summarized per Ton Kilometer (Tkm) cargo transportation cost by mode and road. Table 3.9 shows per ton kilometer average transportation cost of motorized vehicle is Tk.62.20 during dry season followed by non-motorized vehicle is Tk.156. Similarly in the control roads the motorized vehicle is an average cost Tk. 66.47 ton per kilometer cost followed by non-motorized vehicle is an average Tk.176.23 in the control roads both dry and wet season during Terminal survey. In dry season project road per ton cost decreased 5.07% (motorized vehicle) and control road 12.95%.

Table 3.9: Per Ton Per Kilometer Cost_TKm (Fig. in Tk.)

Type types	Project road			Control road		
	Dry season	Wet season	Average	Dry season	Wet season	Average
Truck	59.06	63.38	90.74	56.20	74.51	62.27
Shallow Van	65.35	72.81	101.76	76.73	86.11	77.57
Sub total	**62.20**	**68.09**	**96.25**	**66.47**	**80.31**	**69.92**
Rickshaw	142.24	157.66	221.07	184.28	214.31	189.89
Rickshaw Van	165.54	177.36	254.23	173.61	219.08	187.07
Cart	162.88	164.77	245.26	170.82	239.59	195.51
Sub total	**156.89**	**166.60**	**240.19**	**176.23**	**224.32**	**190.82**
Ton PKm	**140.65**	**151.39**	**216.34**	**154.58**	**192.47**	**165.33**

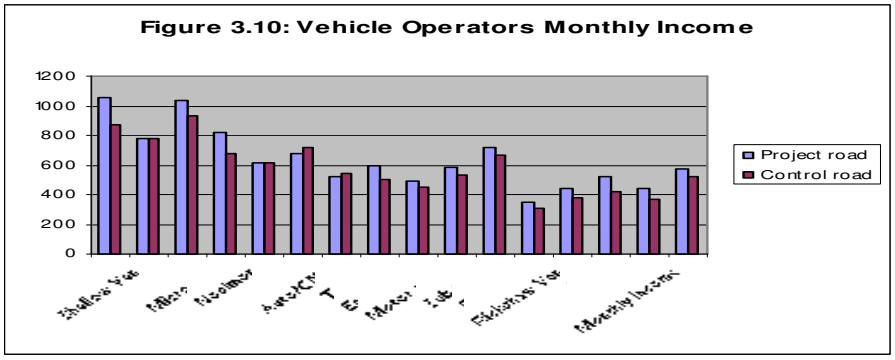


3.5.6 Vehicle Operators Monthly Income

Data was collected on the daily and monthly income of transport operators during Terminal survey period on both project and control road Table 3.10 shows the Average earning for non-motorized vehicle rickshaw, rickshaw van and cart/ push cart operator is about TK.440, and Motorized vehicle like as Auto/ tempo, Nosimon and Truck operator daily average income is estimated Tk.718 in the project road. Similarly average earning for non-motorized vehicle rickshaw, rickshaw van and cart/ push cart operator is about TK.374 and Auto/ tempo and Truck operator daily average income is estimated Tk.663 in the control road. In dry season project road operators monthly income increased 45.42% (motorized vehicle) and control road 16.28%.

Table 3.10: Vehicle Operators Monthly Income in Tk. (Fig. in Taka)

Vehicle Type	Project road	Control road
Truck	1053	876
Shallow Van	775	780
Bus	1031	936
Micro bus	825	672
Nosimon	619	614
Car	678	720
Auto/CNG	525	540
Tempo	600	504
Easy Bike	488	456
Motor cycle	588	534
Sub total	**718**	**663**
Rickshaw	350	312
Rickshaw Van	445	384
Cart	525	425
Sub total	**440**	**374**
Monthly Income	**579**	**518**



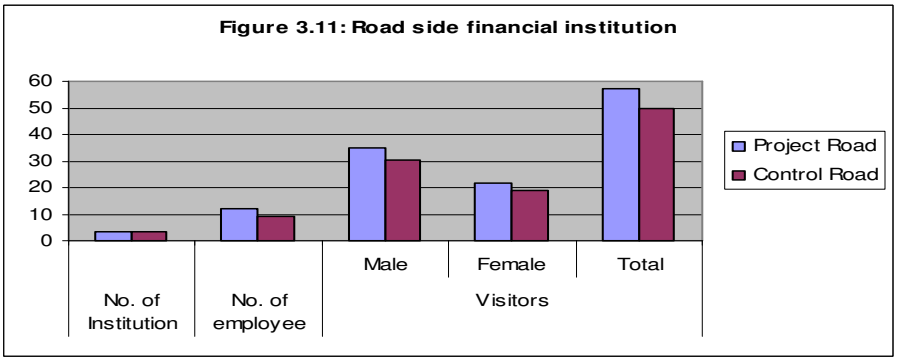
3.5.7 Roads side Financial Institutions

Road side financial institutions and NGO's information has been collected during Terminal survey period from both side of road within 0.5 km radius in the project and control road. Table 3.11 shows the average 4 number of financial institutions were estimated both side of the project roads and 57 depositors and borrowers are visited daily where male 35 and female 22. Similarly the average 3 number of financial institutions were estimated both side of the control roads and 49 depositors and borrowers are visited daily. There are male 30 and female 19. In dry season project road financial institutions increased 21% and control road 12.36%.

Table 3.11: Road side financial institution and daily visitors by gender

Study Area	No. of Institution	No. of employee	Visitors		
			Male	Female	Total
Project Road	4	12	35	22	57
Control Road	3	9	30	19	49
Total	**7**	**21**	**65**	**41**	**106**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED



3.5.8 Road side Shops

The service and repairing shops for transport vehicles also grow as a result of construction of road infrastructures. Data on roads side trade and business activities, their users and daily turnover are presented in Table 3.14. We can estimate from the data on table 3.12 shows the number of shop both side of per road is 188. The average size of daily users per shop is about 666 and daily turnover is Tk. 15830 in the project area and the average number of shop in each control road is 164 and the average size of users per shop was found 547 and daily

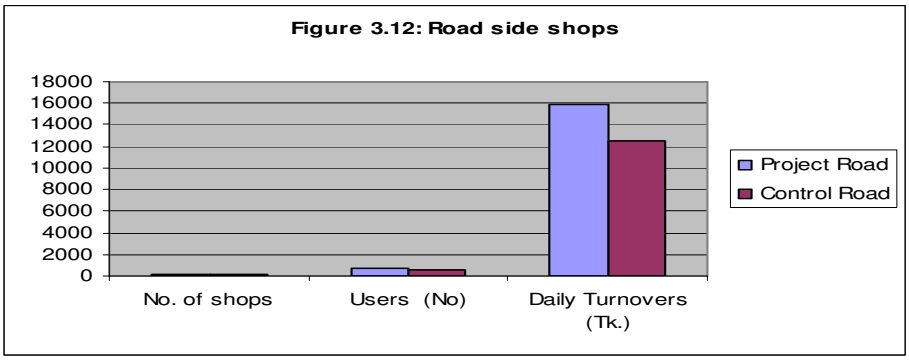
turnover is about Tk. 12518 in the control road. Detail has been presented in Table: 3.14. In project road side shops increased 25% and control road 20%.

Table 3.12: Road side Shops and their Daily Turnover in Tk.

Study Area	No. of shops	Users (No)	Daily Turnovers (Tk.)
Project Road	188	665	15830
Control Road	164	547	12518
Total	**352**	**1212**	**28348**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

Figure 3.12: Road side shops



3.5.9 Road side NGO,s

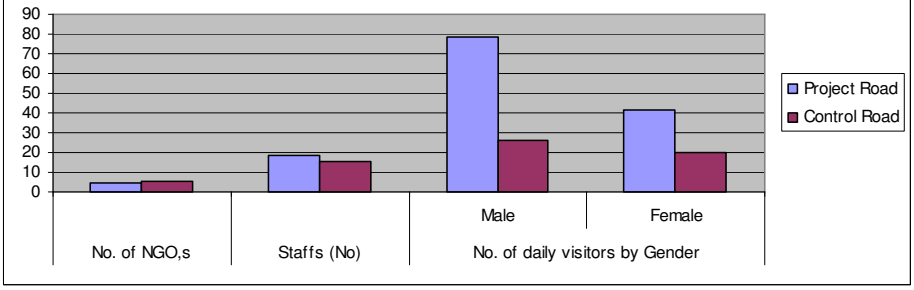
Data on road side no. of NGO's during Terminal and their employment and services by gender are presented Table 3.13 shows. Per road average number of NGO's units is about 04 and employee is 18. The average size of visitors by gender is about 78 male and 41 female in the project road. Similarly per kilometer average number of productive units is about 6 and employee is 15 among them male 26 and female 20 in the control road. In project road side NGOs increased 15% and control road 10%.

Table 3.13: Road side NGO,s Services

Study Area	No. of NGO,s	Staffs (No)	No. of daily visitors by Gender	
			Male	Female
Project Road	5	18	78	41
Control Road	6	15	26	20
Total	**10**	**34**	**105**	**61**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

Figure 3.13: Road side NGO,s



3.5.10 Road side Market/ Hat Bazar and Visitors

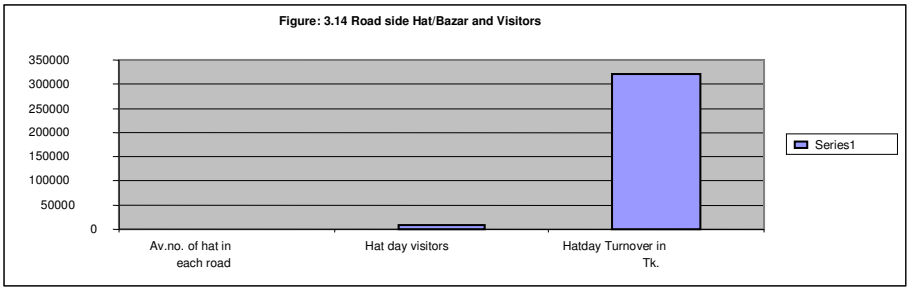
The UZR and UNR being improved under the SRIIP is to connect one or two growth or rural Market located along or at the end of the road, other, smaller markets along the road usually also play a major role for marketing of goods and for procurement of inputs. In order to monitor such properly, data on road side Market bazaar, Market users and Market day transaction during midpoint of project implementation has been collected and is presented summarized in the following Table 3.16. In project road Market/Hat bazar increased 43.93%.

Table 3.14: Road side Market/Bazar

Av.no. of Market in each road	Market day visitors	Marketday Turnover in Tk.
2	8060	321755

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

Figure: 3.14 Road side Hat/Bazar and Visitors



3.5.11 Road side Educational Institutions

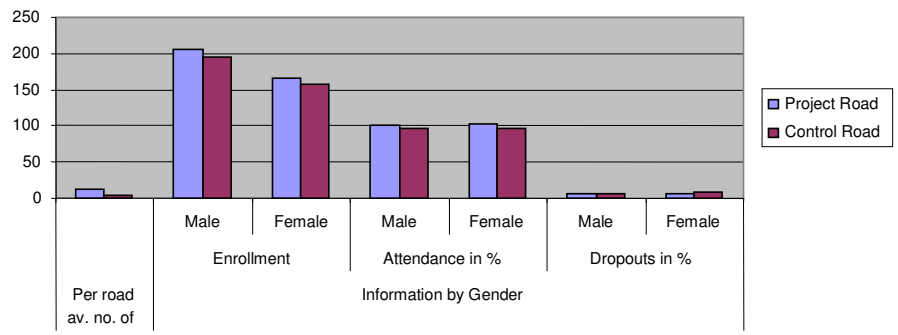
Education of the family members was highly emphasized in the baseline survey. Because, the project intervention through improvement of rural transportation system will enhance access to educational institutions, increase attendance and improve success rate thereby reducing dropouts. The Terminal survey collected information about enrollment, attendance and dropouts of students of the road side educational institutions. The survey results shows the rate of enrollment and attendance of student has been silently change. Table 3.15 shows the summarized information of mid-point of project implementation period**.** In project road educational institutions increased 9.90%.

Table 3.15: Road side educational institutions

Study Area	Per road av. no. of institution	Information by Gender					
		Enrollment		Attendance in %		Dropouts in %	
		Male	Female	Male	Female	Male	Female
Project Road	12	205	166	101	103	7	5
Control Road	4	195	159	96	98	7	9
Total	**16**	**400**	**325**	**197**	**200**	**13**	**15**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

Figure 3.15: Road side educational institutions



3.5.12 Road side Health Services

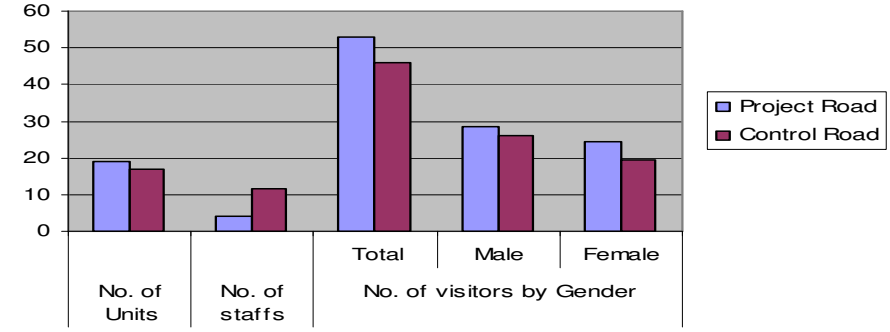
Proper Terminal information on pre development services and attendance is therefore assessing project effects and impact. The following Terminal summarized data Table 3.16 shows the average 19 no. of Govt. Non Govt. health services unit situated both side of the each project road and 53 patients where male 29 and female 24 visited the clinic in a day in the project road. In project road health services increased 73.09% and in control 41.92%.

Table 3.16: Road side health services

Study Area	No. of Units	No. of staffs	No. of visitors by Gender		
			Total	Male	Female
Project Road	19	4	53	29	24
Control Road	17	12	46	26	20
Total	**36**	**16**	**99**	**55**	**44**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

Figure 3.16: Road side health services



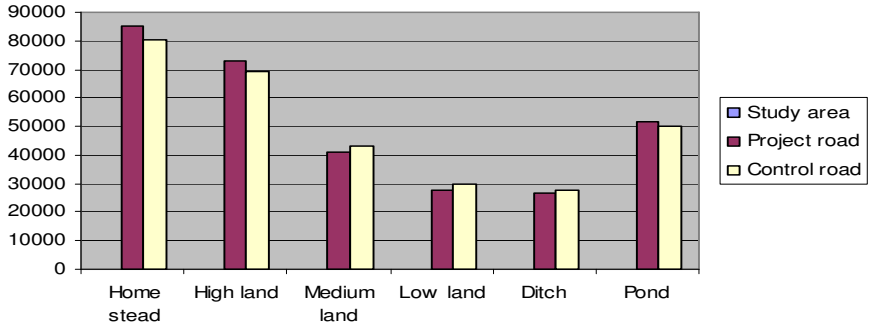
3.5.13 Road Side Land Value

It is expected as a result of the road side land value would go up at higher rates in project road due to project intervention. The ISMC survey team has been collected per decimal road adjacent land value data during Terminal survey period. The average price of different categories of land both project and control road has been shown in Table 3.17. In project road land value increased homestead 41.15% and in control 19.29%.

Table 3.17: Per decimal road side land value by land type (Fig. in Tk.)

Study Area	Land Type					
	Home stead	High land	Medium land	Low land	Ditch	Pond
Project Road	85,284	73,073	41,165	27,872	26,441	51,458
Control Road	80,307	68,977	43038.75	29,580	27,607	50,124
Total	**165591**	**142050**	**84204**	**57453**	**54048**	**101582**

Figure 3.17: Per decimal road side land value



3.5.14 Economic Internal Rate of Return (EIRR)

Methodology for Economic Analysis

Background

Economic analysis was carried out initially for three core Upazila Road (UZR) with collecting primary data from the sample roads. In addition, economic analysis of the selected roads was done using direct data collection from project area by LGED. ***Model & Ref****.: This Model have been developed by Dr.Gholam Mustafa and Mohammed Zafar Ullah from a Cross-Sectional study of 10 Roads of SEME Study of RDP 7, LGED; FRB Monthly Multiplier (FMM) those Roads are taken from the Post Project Survey of January, 1997; Mustafa G, Ullah Mohammed Zafar, Page 60 to 70 of "Rural Infrastructure Impact Study, With Special Reference to RDP7 and other Recent Projects", Final Report, Sept. 1999 & Economic Analysis of Vehicle Operating Costs (VOC) ADB: Rrp: Ban 28023 on October 1997; Mustafa G, Ullah Mohammed Zafar, Feasibility Study of 192 FRBs & 189 Markets of RIDP, LGED, May 2001.* Detailed Methodology is presented below:

i. Maintenance Cost : RIMMU, LGED, 2009, adjusted for inflation;

ii. Construction Costs are actual Costs;

iii. Maintenance Cost modified on the basis of new Maintenance as in RDP-25, LGED, 2009;

iv. Vehicle Operating Costs report-2009. RDP-25, LGED, Traffic volume with project is estimated on the basis of RIIP-1 experience of completed 10 LGED roads;

v. VOC: Road User Cost for LGED- 2009;

vi. Pedestrian's cost are determined at the opportunity cost of Bicycles;

vii. VOC: updated to 2008 using Bangladesh Inflation rate of for NMT 6.5% and USA Inflation rate of 3.24% for MT;.

viii. PCR, RIIP, ADB Loan No: 1952-BAN (SF), 2009;

ix. FRB Monthly Multiplier (FMM) to derive AADT from WADT (Earthen Situation);

x. TTC: Road User Cost for LGED- 2009; Truck/Tractor, Bullock and Carts are Cargo Carriers. 50% of Rickshaw Van are also Cargo carriers;

Source: Mustafa G, Ullah Mohammed Zafar, Feasibility Study of 192 FRBs & 189 Markets of RIDP, LGED, May 2001.

Methodology

The aim of economic analysis of projects is to determine the economic viability of public investments. In the present case, the main tasks are to quantify the benefits of the project and estimate the costs. For estimating the benefits at the core UZR the vehicle operating cost savings (VOCs) approach has been followed. The following input parameters are followed in performing the economic analysis of the three samples UZR.

- Traffic Count by Upazila Engineer's office to determine pre-development AADT;
- Collect per km unit construction cost of upazila & union roads from Rural Infrastructure Maintenance Management Unit (RIMMU) of LGED;
- Calculation of Annual Average Daily Traffic (AADT);
- Use Road User Cost for LGED, 2009 for VOC of each Vehicle Type, Value of Time and Time savings;
- For Pedestrians, Human Operating Cost (HOC) has been included as Shadow price/ Opportunity cost of Bicycle;
- Time savings of Pedestrians are not considered;
- Time savings for passengers are considered but not for commodities;
- Assumption of 6% Transport Growth rate in future;
- Construction cost of road supplied by Design Unit of SRIIP;
- Use routine maintenance cost is used as Tk. 0.44 Lac per year per Km. Supplied by Rural Infrastructure Maintenance Management Unit (RIMMU) of LGED;
- Routine maintenance on Periodic maintenance year Tk. 0.37 Lac per year per Km; and average Periodic maintenance cost is used as Tk. 4.40 Lac for every 5th year per Km.;

- Standard Conversion Factor (SCF)/ Inflation rate used in this analysis 0.906, which are shown in analytical Software;
- Period of construction varied project to project;
- Calculation of Economic Internal Rate of Return (EIRR);
- Conducting Sensitivity Analysis.

Traffic Count

On the sample road a neutral point was identified at the mid point of the total length of the road. A market connected by the road or within the influence area of the road was identified as one distinction point. Market ('Market') days and the number of market days per week were recorded. Traffic counts were conducted once at the market day and another at the non-market day from 6 am to 6 pm. All types of traffic-motorized and non-motorized and pedestrians passing through the selected point were counted.

Calculation of Annual Average Daily Traffic (AADT)

The Annual Average Daily Traffic (AADT) was derived from the traffic count following some basic principles. Daily traffic was converted to weekly average daily traffic (WADT) based on the number of Markets and non-market days in a week.

WADT = {(Daily Traffic x no. of market days) + (Daily Traffic x no. of non-market days)} ÷7

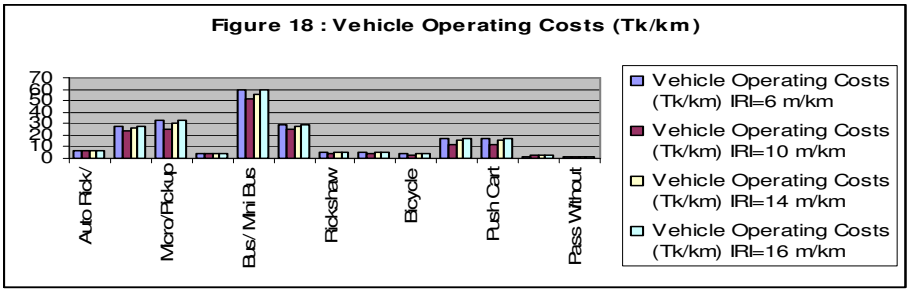
Calculation of Vehicle Operating Costs (VOC)

The major source of benefits from improving rural roads is savings in vehicle operating costs (VOC) over the smoother road surface for vehicles of all types. The incremental benefit increases at the rate corresponding to the traffic growth rate of 6 percent. The normal post project benefit (i.e., the benefit accruing from the existing traffic due to VOC reduction) is estimated to be one third of the total benefits in the second year, two third and full from the third year. Benefits in terms of time savings were also calculated additional benefits will be realized but not quantified in the present analyses are increased agricultural income arising from higher fertilizer use due to its lower delivered price, greater use of high-yielding crop varieties, and higher market prices for agricultural produce. The adjusted VOCs are shown in Table 3.18.

Table 3.18: **Vehicle Operating Costs by Vehicle Type and Surface Roughness, 2009 Price**

Type of vehicles	Vehicle Operating Costs (Tk/km)			
	IRI=6 m/km	IRI=10 m/km	IRI=14 m/km	IRI=16 m/km
Auto Rick/ Tempo	7.23	6.53	6.95	7.23
Jeep/Car/Taxi	27.41	23.48	26.20	27.41
Micro/Pickup	33.10	25.39	30.46	33.10
Motor cycle	4.42	3.79	4.14	4.42
Bus/ Mini Bus	59.03	51.32	55.63	59.03
Truck/Trucktor	28.49	25.04	27.81	28.49
Rickshaw	5.66	4.08	5.54	5.66
Rickshaw Van	5.66	4.08	5.54	5.66
Bicycle	3.86	2.71	3.34	3.86
Bullock Cart	16.98	11.37	15.81	16.98
Push Cart	16.98	11.37	15.81	16.98
Pass With Load	1.12	2.04	2.77	2.83
Pass Without Load	1.12	1.02	1.39	1.42

Source: Direct Field Survey, SRIIP-ISMC-2015,



Upazila Road Improvement Cost and O&M Costs

The costs of rural roads under the Project include the cost of upgrading existing roads (generally earthen) to bituminous-paved condition in line with LGED standards. The investment cost, the annual routine cost of maintenance and the periodic maintenance carried out every five years were included in the costs estimates.

Expected Life of Improved/Upgraded Road

The life of the road is assumed to be 20 years in line with the practice followed in earlier projects of LGED funded by different donors.

Growth Rate of Traffic

The growth rate of normal traffic is set at 6.0% per year. This growth rate is considered to be conservative as growth rate of traffic volume country-wide is about 10.5% a year[2].

Economic Cost

The financial costs were converted to economic costs by first deducting taxes and duties, adding physical contingency and management costs then applying the standard conversion factor of 0.986. This is in line with the assumptions used in the economic analysis of similar road projects implemented in Bangladesh.

Traffic Volume

The existing traffic volume on the sample UZR is estimated from the 12 hour traffic count survey with adjustment to 24 hour traffic and converted to AADT using hourly and seasonal correction factors (HMM & FMM). The traffic growth is assumed to be 6.0% a year while the national growth rate of traffic is 10.5% per year. The existing traffic is assumed to represent traffic volume without the project. *Traffic volume with project is estimated on the basis of **RIIP-1/ RDP-25 experience of completed 10 LGED roads**.*

Road Users Costs (RUC) for LGED Components

RUC consists of following three components:

- Vehicle operating costs (VOC), the physical costs of operating a vehicle such as fuel, spare parts, depreciation, crew costs, etc.,
- Travel time costs (TTC), the value of time spent in travelling could be used in other activities, and
- Accident costs (ACC), the physical costs of an accident and the value of injuries and fatalities.

All costs in the report are given in financial and economic prices. The financial price is the retail market price to the consumer of the product. The economic price reflects the true value (the real worth) as well as the scarcity premium of the resource to the economy. In the

[2] Annual Report for 2002-2003, Roads and Highways Department, Dhaka, Bangladesh, February 2003.

economic jargon, this is termed as a “shadow” or “accounting” price of the resource in the economy. The savings in Accident Costs has not been included in the analysis.

Project Benefits

The ultimate aim of project analysis is to determine whether the investment is economically worthy or not. Investment worth may be defined as the accrued net benefits over costs of a project, benefits and costs being measured in the same way. Profitability is measured in terms of the "rate of return" or the "present value" of the project. There is evidence infrastructure improvement provides a considerable range of benefits for rural people. Frequently cited benefits include:

- reducing transport costs and saving of vehicle operating cost;
- increasing competition among the parties concerned;
- creation of employment;
- decrease of rural-urban migration;
- increase of agricultural production especially cash crops;
- reduction of cost of basic daily commodities;
- better utilization of transport and market network;
- reduction of marketing margin due to market improvement;
- increase of farm-level income; and, time savings.

Evaluation Process

The Economic Analysis has been carried out on the basis of total investment cost including construction, land acquisition, environment mitigation measures and maintenance cost. In the benefit side, we have considered only measurable benefits. Vehicle Operating Costs (VOC) savings with and without passenger time savings have been considered in EIRR computation. The model assumed a time horizon of 20 years after construction of the road. The discounted costs and benefits of the selected Upazila and Union roads are reflected into the Economic Cash flow of them where from the NPV, BCR and EIRR are calculated. The economic analysis made at the project midpoint of the emplementation stage is based on a number of assumptions made on the experience of recently implemented similar LGED projects. In Terminal survey the average EIRR 45.08%, NPV 1249.30 and BCR 5.29 was found in project road & in control road average EIRR 45.08%, NPV 2271.99 and BCR 7.81. while in Baseline survey the average EIRR 37.17%, NPV 104.67 and BCR 2.96 was found in project road & in control road average EIRR 25.20%, NPV 465.80 and BCR 2.61 respectively.

Capital/ Investment Cost of Roads

The Capital/ Investment Cost of Roads of the 9 Upazila and 3 Union project 12 project road & 4 control roads are discussed below. In Terminal the Project Road Capital Cost 4601.56 (Lac Tk.) and Control 1895.72 (Lac Tk.) Table 3.19.

Table 3.19: Terminal Indivisual Sub-Project Cost (Lac Tk.)

Sl. No	Road ID no.	Road subproject name	Length (Km)	Capital Cost (Tk.)
Project Road				
1	173452002	Kishoregonj GC-Borovita GC UZR	4.26	314.15
2	127382005	MadilaMarket GC to Ambari Market GC Road UZR	10.15	633.714
3	132672001	Palasbari Upazila HQ- CMarketra GC via Kishoreganj UP	3,95	291.519
4	181122012	Marketgongopara-KashorMarket	5.58	422.564
5	164502012	Mohisibatan Gc - Khajur R&H	4.15	360.255
6	110202007	Baghopara NHW-Ghoradhap GCM	3.45	184.312
7	244332004	Kola GC-Gazir Bazar GC.	3.37	348.799
8	241092008	RHD at Datarasta-Narkelbaria GC via Chaibaria &Agra Ut	15.15	496.971
9	218072010	Gholdari GC - Sarajgonj R&H (Alamdanga Portion) .	7.20	204.572
10	194943004	Ruthia UP office- Egaromile NHW via Dediganj UP	8.20	605.281
11	149523007	Zatiner Market (Durgapur Rail line)-Mogolbasa UP	3.13	248.534
12	170563004	Fatepur UP - Mollickpur GC road	7.60	490.885
		Sub-Total	**72.24**	**4601.56**
Control Road				
1	241112088	Nilphamary - Jaldaka RH at Kachukata Bondor	15.15	981.97
2	132883005	Garidah UP office - Batola	3.25	211.25
3	241112008	Naogaon RH - Fatepur GC	3.30	251.25
4	164602003	Soloua GC - Arpara GC	7.50	451.25
		Sub-Total	**29.2**	**1895.72**
		Total	**101.44**	**6497.28**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

Results of Economic Analysis

The results of the economic analysis of the 9 Upazila and 3 Union project 12 project road & 4 control roads are discussed below. In Terminal the average EIRR project roads were 46.81% and in the control roads 61.02%, while in baseline the average EIRR project roads are 37.17% and in control roads were 57.44%, In Terminal EIRR has increased in the project road 31.91% & control road 106.54%. The Terminal EIRR, NPV and BCR are shown in Table 3.20.

Table 3.20: Terminal EIRR, NPV and BCR of BME

Sl. No	Road ID no.	Road subproject name	EIRR in %	NPV in lac. Tk	BCR
Project Road					
1	173452002	Kishoregonj GC-Borovita GC UZR	33.23%	604.27	3.59
2	127382005	MadilaMarket GC to Ambari Market GC Road UZR	54.00%	2755.19	6.62
3	132672001	Palasbari Upazila HQ- CMarketra GC via Kishoreganj UP	37.90%	709.83	4.25
4	181122012	Marketgongopara-KashorMarket	26.07%	502.33	2.65
5	164502012	Mohisibatan Gc - Khajur R&H	35.03%	762.74	3.88
6	110202007	Baghopara NHW-Ghoradhap GCM	55.37%	833.11	6.73
7	244332004	Kola GC-Gazir Bazar GC.	34.07%	701.68	3.78
8	241092008	RHD at datarasta-narkelbaria GC via Chaibaria &Agra Ut	83.28%	4113.20	10.65
9	218072010	Gholdari GC - Sarajgonj R&H (Alamdanga Portion) .	100.94%	2224.12	13.29
10	194943004	Ruthia UP office- Egaromile NHW via Dediganj UP	35.69%	1325.43	3.93
11	149523007	Zatiner Market (Durgapur Rail line)-Mogolbasa UP	32.45%	457.20	3.50
12	170563004	Fatepur UP - Mollickpur GC road	33.71%	970.12	3.63
		Average	**46.81%**	**1329.93**	**5.54**
Control Road					
1	241112088	Nilphamary - Jaldaka RH at Kachukata Bondor	36.33%	2219.92	3.99
2	132883005	Garidah UP office - Batola	35.82%	465.80	3.92
3	241112008	Naogaon RH - Fatepur GC	63.38%	1394.07	8.27
4	164602003	Soloua GC - Arpara GC	108.53%	5430.71	16.27
		Average	**61.02%**	**2377.63**	**8.11**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

Figure 3.20: Terminal EIRR, NPV and BCR

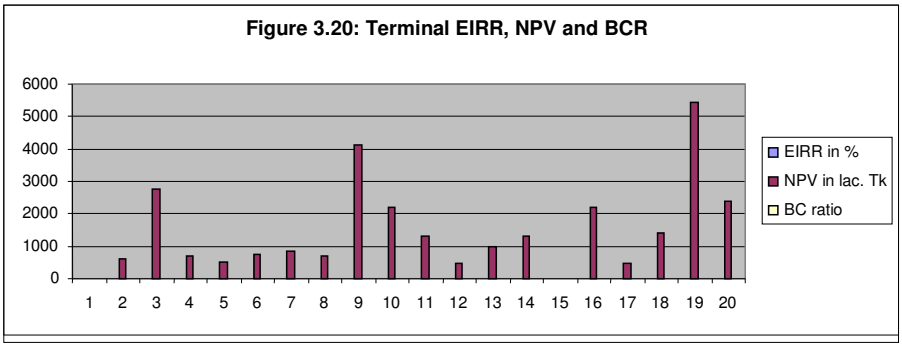


Table 3.21: Baseline and Terminal comparison of EIRR

		Baseline			Terminal		
Sl No	Road name	EIRR	NPV	BCR	EIRR	NPV	BCR
	Project Road						
1	Khishoreganj GC - Baravita GC Road	32.00%	77	2.21	33.23%	604.27	3.59
2	MadilMarket GC - AmbariMarket GC Road	31.00%	97.4	2.27	54.00%	2755.19	6.62
3	Palasbari Upazila HQ - CMarketra GC via K.ganj UP	32.00%	74.7	2.17	37.90%	709.83	4.25
4	Marketgongapara - KasherMarket Road	23.00%	53.8	1.71	26.07%	502.33	2.65
5	Mohisibatan GC - Khajur R&H Road	33.00%	105.9	2.38	35.03%	762.74	3.88
6	Baghopara NHW - Ghoradhap GC Road	32.00%	98	2.28	55.37%	833.11	6.73
7	Kola GC - Gazir Bazar GC Road	78.00%	219.7	8.72	34.07%	701.68	3.78
8	RHD at Datarasta - Narkelbaria GC via Chaibaria	34.00%	110.4	2.77	83.28%	4113.20	10.65
9	Gholdari GC - Sarajgonj R&H (Alamdanga part)	61.00%	263.1	4.79	100.94%	2224.12	13.29
10	Ruthia UP offic - Egaromile NHW via Debiganj	32.00%	51.5	2.13	35.69%	1325.43	3.93
11	ZatinerMarket (Durgapur rail line) - Mogolbasa UP.	29.00%	45.3	2	32.45%	457.20	3.50
12	Fatepur GC - Mollickpur GC Road	29.00%	59.2	2.08	33.71%	970.12	3.63
	Average	**37.17%**	**104.67**	**2.96**	**46.81%**	**1329.93**	**5.54**
	Control Road						
1	Nilphamary - Jaldaka RH at Kachukata Bondor	35.41%	2120.78	3.86	36.33%	2219.92	3.99
2	Garidah UP office - Batola	34.87%	443.91	3.79	35.82%	465.80	3.92
3	Naogaon RH - Fatepur GC	62.05%	1350.35	8.05	63.38%	1394.07	8.27
4	Soloua GC - Arpara GC	97.44%	4668.85	14.15	108.53%	5430.71	16.27
	Average	**57.44%**	**2145.97**	**7.46**	**61.02%**	**2377.63**	**8.11**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

Figure 3.21: Baseline and Terminal comparison of EIRR

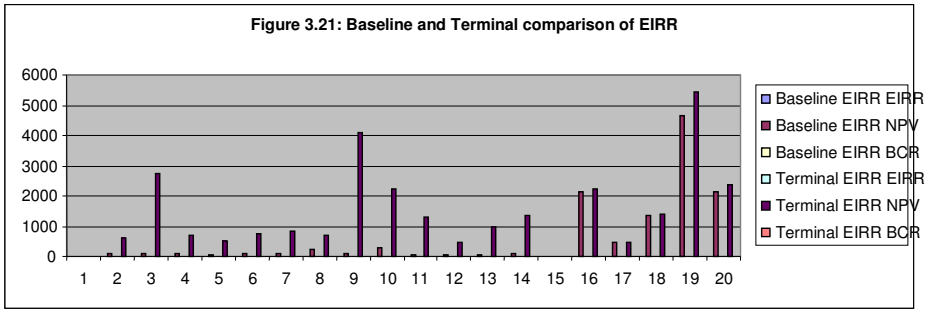


Table 3.22: **Economic Analysis Format**

Economic Analysis Format
Sustainable Rural Infrastructure Improvement Project (SRIIP-ISMC)_Terminal
Road Name: P-01-Kishoregonj GC - Borovita GC_NIL_W-69

EIRR with Time Savings

Report		EIRR with Time Savings									
Normal Savings (Tk/Day/Km)=			Generated Savings (Tk/Day/Km) =				Unit Cost=	Lac Tk.	T. Growth =		
Normal Time Savings (Tk/DayKm)=			Generated Time Savings (Tk/Day/Km)=				R. Length=		Sensitivity Tests		
Year	Construction Cost	Routine Maintenance Cost	Periodic Maintenance Cost	Total Cost	Normal Savings	Generated Savings	Total Savings	Net Savings	Net Savings with Cost +20%	Net Savings with Benefit -20%	Both Together
1											
2											
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19											
20											
21											
Salvage V											
NPV											
BCR											
EIRR											

4. GROWTH CENTER AND RURAL MARKET

4.1 Introduction

The major rural markets known as growth center are the economic nerve center of the rural economy. The rural trade and commerce is based on the growth centers. Rural development is closely linked to development of the growth centers. The physical condition of the growth centers especially internal roads, market sheds, pavements, water supply, sanitation, surface drainage ,etc are not good are impediments to not only the growth of the markets but to the market users such as buyer and sellers and the neighbors at large. Considering the poor conditions of the growth centers the Government took initiatives to improve the physical infrastructures, management system, finance and communication network in all over the Bangladesh through LGED. The SRIIP envisaged to developing 92 markets under this project in Rangpur, Rajshahi and Khulna division. To assess the post development effects/impacts of those markets accrue from the project intervention the baseline information were collected, the analytical results and findings are interpreted in compare with the post project database at the post project situation.

4.2 Market Selection

A total of 92 market sub projects under SRIIP are planned for improvement. The effect/impact monitoring and evaluation of the market sub projects involved the BME in a comprehensive survey the consultants has been selected 9 market sub project out of total project market sub projects and also 3 control markets selected which are not listed under this project for BME study. For the selection of 9 market sub projects including control the ISMC consultant considered the following criteria; Table 4.1 presents Growth Center / Rural Market.

i. No. of markets in project region;
ii. Geographical location;
iii. Markets Identification;
iv. Link between project road and market.

Table 4.1: Nine Growth Center / Rural Market have been selected for BME study

Sl. No	District	Upazila	Name of GCM/Rural Market	Area (acre)
Rangpur division				
1	Nilphamari	Sadar	Babrijhar GC	3.71
2	Dinajpur	Birol	Fulbari	1.11
3	Kurigram	Ulipur	Nagrakora Market	0.84
4	Gaibandha	SagMarketa	MonsirMarket	0.28
Rajshahi division				
5	Noagaon	Sadar	GoaliMarket	0.91
6	Chapai N. Ganj	Nachole	Sonaichandipur GC	1.20
7	Bogra	Dhonut	SomuaMarket	2.24
Khulna division				
8	Chaudanga	Alamdanga	Munshoganj GC	1.25
9	Jessore	Bagherpara	Narikelbaria Gc	9.60
Control Markets				
1	Jhenaidah	Kaliganj	Bagergachi	0.70
2	Naogaon	Mohadebpur	Pathakata	0.70
3	Nilphamari	Kishoreganj	Kishoreganj	0.70

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

4.3 Market Survey

Market baseline survey data were collected through field survey by the LGED local officials with a set of structured survey formats which were prepared by ISMC consultants.

Baseline/Terminal market surveys were conducted two times in a year is in wet and dry season and coverings one Market day as well as on non Market day in a week because of socio-economic activities of rural area in Bangladesh highly fluctuated by the main two seasons, wet and dry. Seasonal variation in market transactions will be significantly reduced in the project area after markets improvements.

4.4 Survey Instruments and Data Collection

Field enumerators were used 4 types of survey formats to collect market baseline data. They are:

- Format-M1 (Market Physical Inventory Survey);
- Format-M2 (Quality Deterioration Assessment);
- Format-M3 (Traders' Profit Margin Survey); and
- Format-M4 (Other establishment of market influence areas).

Field enumerators have been gone to the market during, before or after the Market time and filled up these format discussing with the members of traders association, MMC, Auctioneer and by self observation. Data on Quality Deterioration of major perishable items in consultation with the sellers/traders before one (1) hour of closing of the Market-time with these formats were collected. Field enumerators have gone to the market before pick hour for item wise to collect purchase price, transportation and other cost data and again one hour before end of the Market time to same sellers to collect selling prices. All data were collected two times for two days one Market-day and one non-Market day in a week in each time during wet and dry season.

4.4 Location, Physical features of Project Markets

PM-01-Babrijhar GC at Sadar Upazila, Nilphamari District

Physical features of the GC/RM: The Babrijhar GC is a big market situated both sides of road from Nilphamary to Charaikhola upazila. It is a big market having sufficient spaces for development of different types of components such as sheds, drain, road, MMC offices, Women corners etc. The market area is around 7800 sqm. If this GCM is developed properly, it will explore an oppotunity for the local people for trading their commodities near to the houses with the proper prices.

PM-02-Fulbari Market, Birol Upazila, Dinjpur District

Physical features of the RM: The Fulbari Market is situated on the side of Darapartapa road to Mahpur GC road. It earns an annual income of 5 to 7 lakhs per annum. There is only semi pucca sheds in the RM and has some temporary ched sheds and open sale area. There is no toilet, no Pucca roads, drains, shops etc. The local people informed about 2000 people in the Marketday(Sunday/Wednesday) selling/buying of local commodities.attle market held once a week. There is some low areas where rain water is to be drained out.

The area is the fully vacant, therefore, sheds like-Fish, vegetable, Multipurpose; internal roads, drains, open space, toilet, tube wells etc may be included in the plan.

PM-03-NagrakoraMarket GC at Ulipur Upazila, Kurigram District

Physical features of the GC/RM: This is one of the GC at Ulipur Upazila in Kurigram district. The GCM is situated near the Upazila HQ and have prospect to explore the facilities. The GCM has been developed by different Road projects of LGED from 1988. There are few sheds, permanent shops in a mixed area of public and private land. There is one Women Market having 8 shops but semi pucca. There are scopes for construction of 2/3 shops, internal roads and drains. The approach road passing through the market is poor in

condition, it should undertake by some other projects to facilitate the GCM activities because it is out of the scope of SRIIP. As the GCM is close to Upazila therefore it has the scope to enhance the economic activities in future.

PM-04-Munsir RM, ShagMarketa Upazila, Gaibanda District

Physical features of the GC/RM: This Rural Market about 1km away Kachua gat-ShagaMarketa hospital road. The bazaar area is around 01 acre. The income is about 2 laks per year. There is no MMC office. There are no multipurpose sheds but people are selling vegetable, fish and meat, there are 50 good shops. The Market day is on Sunday & Wednesday. There is a cattle market. No slaughter shed. About 9000 to 10,000 people visit the market on Market day.There is 1 cattle market. No slaughter shed. There are 2 nos toilets.

PM-05-Goali Market, Naogao Sadar Upazila, Naogaon district

Physical features of the GC/RM: The Goali Bazar is situated on the side of road passing from Hapania to Badhaikhara at Atrai Upazila in Naogaon. The land for this market may be around 2 acres but can not be confirmed by MMC member and the local people. The revenue income from this bazar is BDT.1.00 Lakh in the fiscal year. Rice is the main agricultural product in these areas and a huge quantities are traded every Market day twice a week. There are other products traded like vegetables, fishes, mustard etc.

There are about 20 nos. permanent shops, 1 fish shed, 1 vegetable/Grossary shed and a lot of open sale temporary sheds, one toilet but poor in condition etc.

There are the open space for other infrastructures to enrich the market facilities like internal road, drain, other sheds, open plat forms etc may be decided later on after discussion with MMC, Shopkeepers and local elite by MPP and master plan will be prepared accordingly.

PM-06-Sonaichandi GC, Nachole Upazila, Chapai Nababgonj district

Physical features of the GC/RM: This is very big GC at the end of our UZR at Gomostapur. There are all sorts of facilities in the market and the revenue income is very high, 136 LT this year beyond this there are other income from the traders.

Though there are all sorts of facilities but there need more development activities to provide more facilities to the people. There are spaces to make a proper planning to develop the market.

PM-07-Sonmuha Upazila, Dhanut Upazila, Bogra district

Physical features of the GC/RM: This is a big market having an acerage of 54 acers an the yearly revenue income BDT.5.00Lakh. There are two Market days Monday and Friday. Attendance on Monday and Friday are around 3000 to 10,000 people respectively. On Friday there is cattle market. Ther is small slaughter house.There are two big sheds and 50-60 semi puka sheds. There are fish and vegetable sheds, 1 toilet.

There are the land and scope to develop the market in proper way. The need assessment and the requirement may be undertaken later on by the Market Physical Planner and other consultants of ISMC and DSC.

PM-08-Munshigonj GC, Fulbaria Union, Alamdanga Upazila, Chuadanga district

Physical features of the GC/RM: This is a very big Growth Center situated at the side of Chuadanga to Alamdanga R&H. The area of market is about 4.00 acres on both sides of the road. There is a river close to the GC nearly dead but lot of people come from the other side of the river with their commodities. There is a small fish shed, cloths shed and 2 other small sheds constructed by LGED/Zila Parishad almost damaged. There is a big gatthering for the beetle market, bamboo market and other commodities. There area many other items for which people come from a long distance to this GC. There is also a large cattle market and a huge revenue is earned by the Govenment annualy.

This may be an ideal GC to construct all the components like fish shed, vegetable shed, Multipurpose shed, meat shed, Slaughter house, Grossary shed, open Sale plat form , Open paved space; toilets, TWs, Women corners, office for MMC etc.

A landing ramp for loading and unloading the goods through river ways (GMarket) and other side of the river, may be constructed and a foot bridge is also needed to cross the river which is running close by, to facilitate the people to cross the river.

PM-09-Narikelbaria GC, Bagharpara Upazila, Jessore district

Physical features of the GC/RM: This is one of the GCs in Jessore district having huge importance but it might be more areas as visible. There are some facilities which exist comparing to other but it needs further improvement providing certain additional facilities to expand the trading activities. The ADB/KfW mission visited the GCM. We have a large bridge here to connect the people on the other part of river and also the UZR. Thus, this market has to be developed as the model market providing all sorts of facilities.

4.5 Market Data Presentation

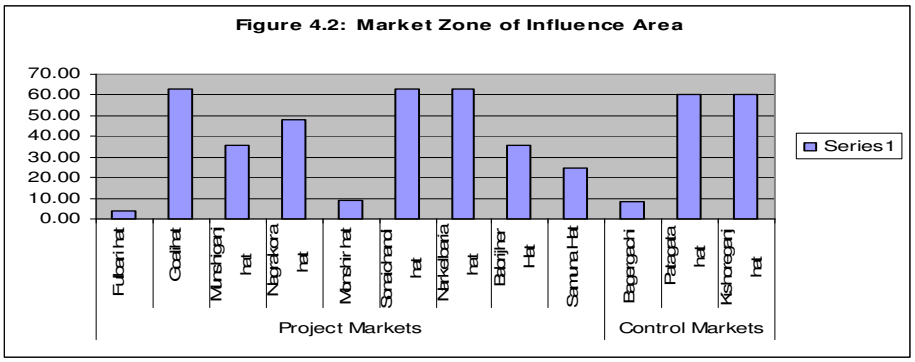
4.5.1 Influence Zone of Market

For the market the influence area is the immediate services area from where most of the Market users come to the market. This may be turned as usual service areas which is guided by the topographical features as well as attractiveness of the market. Normally this area varies from market to market depending upon its size and volume of commodities transacted. In most of the market users come to the market from within 2 to 5 km distance. The enumerators collected information regarding markets zone of influence in each market by the structured survey instruments. High volumes of market users come to market are found from Table 4.2 within this range. Highest zone of influence increased in Nagrakora Market 977%) and lowest in Sonaichandi Market 44.90%. Area covered by this distance for each market has been shown below;

Table 4.2: Market Zone Of Influence Area (Sq. Km)

Project Markets									**Control Markets**		
Fulbari Market	Goali Market	Munshiganj Market	Nagrakora Market	Monshir Market	Sonaichandi Market	Narkelbaria Market	Babrijher Market	Samuna Market	Bagergachi	Patagata Market	Kishoreganj Market
3.14	50.24	28.46	38.46	7.06	50.24	50.24	28.26	19.62	7.06	50.24	50.24

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED



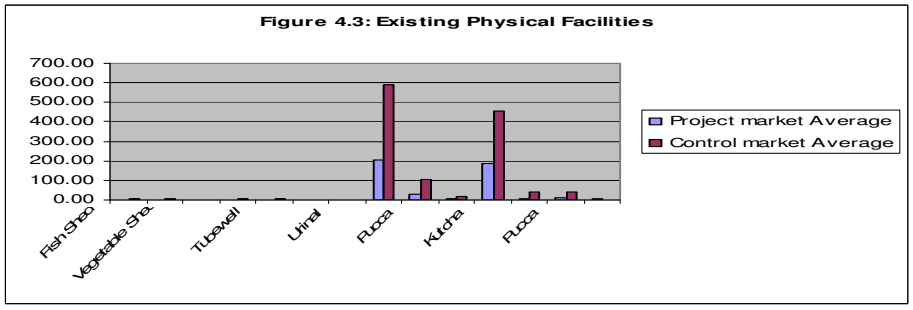
4.5.2 Market Physical Facilities

For monitoring and evaluation purpose the number of various infrastructure facilities both project markets and control markets facilities have been collected to assessed the number of the facilities in each BME selected market and shown in Table 4.3 the most of the markets physical facilities are inadequate because of the market development work is being started by this project. During Terminal survey it has been found those markets are lacking sufficient internal road for the movement of goods and the market users and proper drainage system in any of the markets. Existing Physical Facilities increased in fish shed 181.41% and lowest in internal road 3.24%.

Table 4.3: Existing Physical Facilities

Shop type	Project market Average	Control market Average
Fish Shed	1.13	3.19
Meat Shed	1.28	3.19
Vegetable Shed	1.13	0.00
Others	1.13	3.19
Tubewell	2.65	6.50
Latrine	1.28	2.00
Urinal	0.00	2.00
Internal Road (m)	201.94	587.91
Pucca	30.17	105.18
Semi-pucca	8.43	14.90
Kutcha	185.14	457.61
Drainage	8.65	39.47
Pucca	11.54	39.47
Kutcha	4.35	0.00

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED



4.5.3 Market Permanent Shops and Market day Transaction

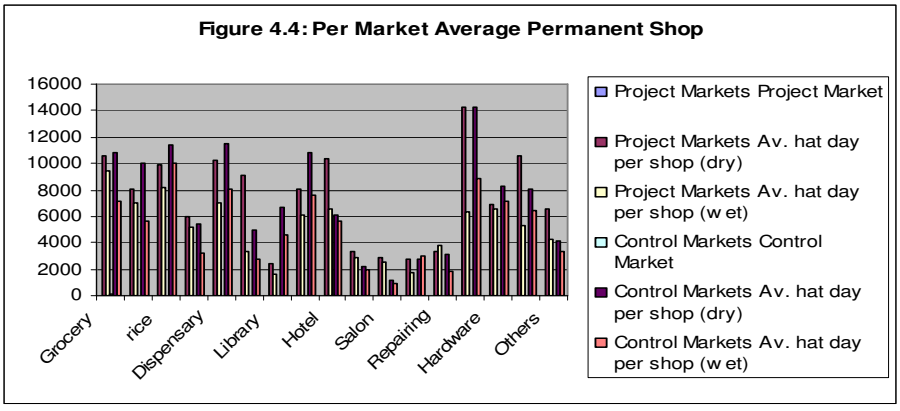
The survey estimated the number of sellers in terms of the number of shops instead of individual persons involved permanently in selling commodities and services. The survey collected item wise number of permanent shops in each selected project and control markets. Table 4.4 shows the project markets have on total 129 permanent shops per market while the control markets have on average 195 shops per markets. Per shop average transaction per Market day is about Tk. 7391 and Tk. 5178 during dry and wet season in the project areas followed by Tk. 7158 and Tk. 5190 in the control areas. Detail has been presented in Table: 4.4. Existing Permanent Shops increased in hotel 80% and lowest in Dispensary 15.71%.

Table 4.4: **Per Market Average Permanent Shops and per shop transaction per Market day**

Sl. No.	Category of shops	Project Markets			Control Markets		
		Project Market	Av. Market day per shop (dry)	Av. Market day per shop (wet)	Control Market	Av. Market day per shop (dry)	Av. Market day per shop (wet)
1	Grocery	23	10548	9480	62	10833	7150
2	Stationary	12	8016	7050	22	10010	5590
3	Rice	12	9956	8220	27	11353	9967
4	Fruit	3	5963	5206	12	5460	3250
5	Dispensary	8	10294	7035	13	11483	8017
6	Tailoring	7	9146	3390	25	4940	2817
7	Library	1	2363	1605	5	6717	4593
8	Cloth	11	8100	6060	34	10833	7583
9	Hotel	5	10414	6615	8	6067	5633
10	Tea stall	12	3384	2873	31	2167	1993
11	Salon	7	2886	2565	18	1170	910
12	Mobile	1	2734	1710	12	2817	3033
13	Repairing	3	3375	3742	22	3163	1820
14	Construction	3	14310	6315	5	14300	8883
15	Hardware	3	6919	6615	7	8233	7150
16	Furniture	3	10631	5324	9	8017	6500
17	Others	15	6615	4215	10	4117	3337
	Average	**8**	**7391**	**5178**	**19**	**7158**	**5190**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

Figure 4.4: Per Market Average Permanent Shop



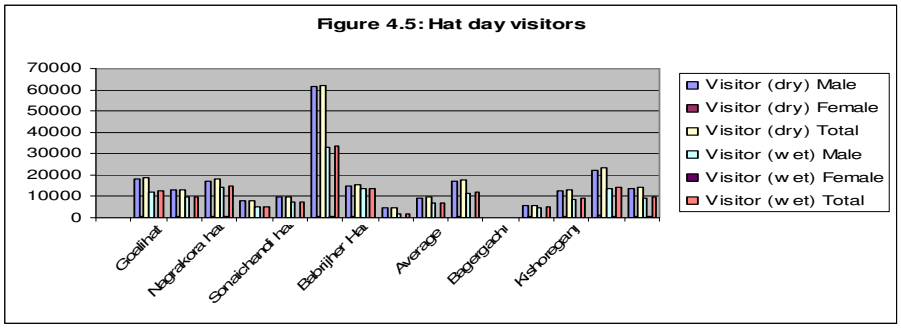
4.5.4 Market Users

During mid-point of project implementation the survey collected data for the number of market users on a Market day during wet and dry season both project and control markets by the field enumerators through interviews and focus group discussion of knowledgeable persons of market. It has been found from Terminal survey the Market day average visitors in dry season 17288 and wet 11556 in project area. Existing market users increased in Monshir Market 57.50% and lowest in Babrijher Market 2.33%.User data has been presented in Table 4.5.

Table 4.5: Market day Visitors

Sl. No.	Shop type / Market name	Visitor (dry season)			Visitor (wet season)		
		Male	Female	Total	Male	Female	Total
Project Markets							
1	Fulbari Market	18225	378	18603	12220	247	12467
2	GoaliMarket	12825	337.5	13163	9750	169	9919
3	Munshiganj Market	17280	675	17955	14300	390	14690
4	Nagrakora Market	7830	270	8100	5265	130	5395
5	Monshir Market	9450	155	9605	7150	58.5	7209
6	Sonaichandi Market	61425	810	62235	33150	455	33605
7	Narkelbaria Market	14850	405	15255	13650	208	13858
8	Babrijher Market	4387	270	4658	1755	195	1950
9	Samuna Market	9315	162	9477	6760	65	6825
	Average	**17288**	**385**	**17672**	**11556**	**213**	**11769**
Control Markets							
1	Bagergachi	5535	405	5940	4810	182	4992
2	Patagahta	12420	540	12960	8710	260	8970
3	Kishoreganj	22275	1080	23355	13780	520	14300
	Average	**13410**	**675**	**14085**	**9100**	**321**	**9421**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED



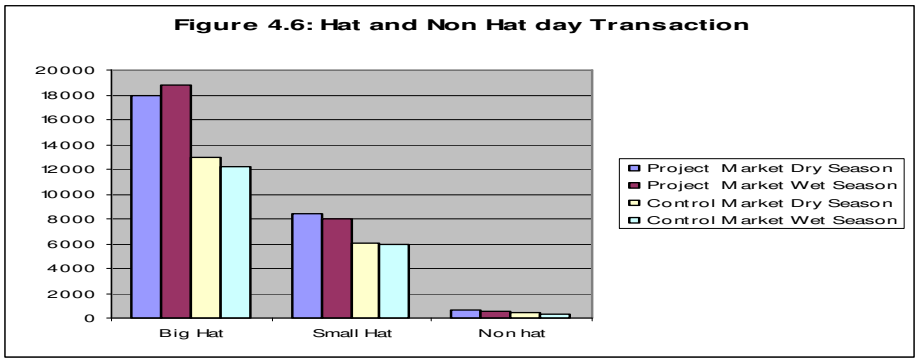
4.5.5 Market day Transaction

The Terminal survey team has collected the turnover of one Market day and one non Market day through field survey with design survey formats. The survey collected data on Market day turnover during wet and dry season both project and control markets by the field enumerators through interviews and focus group discussion of knowledgeable persons of market. Market day and non Market day turnover data has been presented in Table 4.6 detail have been presented. Terminal survey collected data on Market day turnover as per baseline methodology by using field enumerators. The yearly average turnover dry season on a big Market has been found in big Market Tk.17954 in the project market and Tk. 12922 in the control market. During the baseline survey it was found Tk.13628 in the project market and Tk. 9118 in the control market. Existing market users Transaction average increased project market 46.28% & control Market 40.02%.

Table 4.6: Market and Non-Market day Transaction in '000' Tk.

Days	Project Market		Control Market	
	Dry Season	Wet Season	Dry Season	Wet Season
Big Market	17954	18833	12922	12239
Small Market	8462	7992	6010	5990
Non Market	642	515	408	282
Average	9019	9113	6447	6170

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED



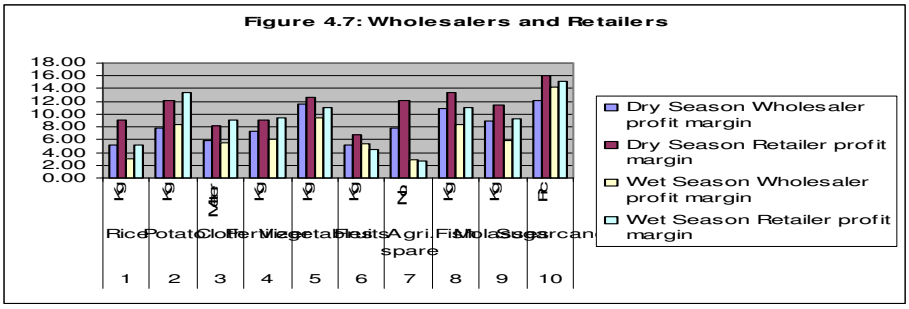
4.5.6 Market Sellers Profit & Margin

Daily total profit of the wholesalers were dependent on their number of trade and quantity of item transacted through there store/shop. Individual daily total profits of the retailers were generally lower than those of wholesalers. Table 4.7 shows the average Market day per unit profits of a rice retailer dry season was an average 5.11% followed by potato 7.89%, vegetable 11.56%, molasses 8.87%, Fertilizer 7.22% and fish 10.86% respectively. Existing market wholesaler average increased project market 38.20% & control Market 41.56%.

Table 4.7: Wholesalers and Retailers average Profits Margin in % Project market

Sl. No.	Name of Items	Units	Dry Season		Wet Season	
			Wholesaler profit margin	Retailer profit margin	Wholesaler profit margin	Retailer profit margin
1	Rice	Kg	5.11	9.17	2.95	5.24
2	Potato	Kg	7.89	12.14	8.40	13.39
3	Cloth	Meter	5.97	8.22	5.59	9.10
4	Fertilizer	Kg	7.22	9.08	6.05	9.36
5	Vegetables	Kg	11.56	12.59	9.52	11.13
6	Fruits	Kg	5.08	6.73	5.33	4.45
7	Agri. spare parts	No.	7.76	12.04	2.86	2.60
8	Fish	Kg	10.86	13.33	8.42	11.10
9	Molasses	Kg	8.87	11.42	5.81	9.30
10	Sugarcane	Pic	12.14	15.97	14.20	15.15
	Average		**8.25**	**11.07**	**6.91**	**9.08**
Control market						
1	Rice	Kg	3.35	5.52	4.58	6.19
2	Potato	Kg	7.89	10.06	10.76	13.73
3	Cloth	Meter	5.41	7.59	9.75	13.12
4	Fertilizer	Kg	7.19	10.30	5.85	6.63
5	Vegetables	Kg	12.43	20.06	12.29	16.20
6	Fruits	Kg	4.62	7.46	6.33	5.46
7	Agri. spare parts	No.	8.18	10.51	9.91	13.42
8	Fish	Kg	11.85	19.17	13.31	16.87
9	Molasses	Kg	14.45	20.79	20.02	24.34
10	Sugarcane	Pic	9.07	16.24	7.48	20.02
	Average		**8.45**	**12.77**	**10.03**	**13.60**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED



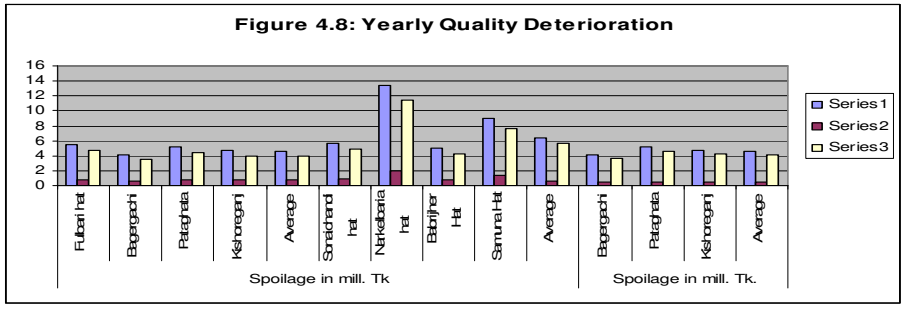
4.5.7 Market Quality Deterioration Turnover

The economic effects of market improvement can be estimated by different indicators: such as Turnover, Lease money, Level of tolls and Quality Deterioration Savings etc. Of them Quality Deterioration saving indicator is prominent and successfully used in a number of LGED rural development project. Considerable importance has been attached to the degree to which market improvement reduce seller's losses from Quality Deterioration. It is also termed as Quantity Deterioration Saving (QDS). The QDS benefits is measured by the all types of perishable goods during wet and dry season to estimate the loss in financial terms baseline line, Terminal and post project period to find the project impacts. The ISMC survey team has collected unit price and quantity of perishable items of one Market day and one non Market day by structure format during wet and dry season. Table 4.8 shows the selected market wise yearly Quality Deterioration losses during Terminal period. From the Terminal BME survey it was found the yearly Quality Deterioration per project market is about Tk. 5.70 million and Tk. 4.18 million in the control markets. On the other hand, during the baseline survey period Quality Deterioration was about Tk. 8.82 million in the project markets and Tk. 6.64 million in the control markets. Existing market QDT average highest decreased project market Bagergachi 48.43% & lowest Narkelbaria Market 29.97%.

Table 4.8: Market Quality Deterioration Turnover

Quality Deterioration in mill. Tk										Quality Deterioration in mill. Tk.			
Fulbari Market	Bagergachi	PatagMarketa	Kishoreganj	Average	Sonaichandi Market	Narkelbaria Market	Babrijher Market	Samuna Market	Average	Bagergachi	PatagMarketa	Kishoreganj	Average
4.65	3.51	4.35	3.98	3.94	4.83	11.46	4.28	7.61	5.70	3.72	4.61	4.21	4.18

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED



4.5.8 Market wise Quality Deterioration Turnover

The economic effects of market improvement can be estimated by different indicators: such as Inflow, Turnover, QD Turnover etc., In baseline survey average Inflow are 11602375 Kg while in terminal survey average Inflow are 16524701 Kg, Av. Increase in percentage 4.17%. In baseline survey average Turnover are 11229221 while in terminal survey average Inflow are 16064737, Av. Increase in percentage 4.42%. In baseline survey average QD Turnover are 1067386 while in terminal survey average Inflow are 948820, Av. decrease in percentage 1.14%. Existing market turnover average highest increased project market Sonaichandipur GC 274.75% & lowest Narikelbaria GC 26.63%.

Table 4.9: Baseline-Terminal Comparison (Market wise)-Inflow, Turnover & QD Turnover

Market day_Inflow, Turnover and Quality Deterioration Turnover Tk.									
Quality Deterioration Savings Items	Market day Inflow			**Total Turnover (BDT)**			**QD Turnover (BDT)**		
	Market day Inflow (TUUDM) In Kg/No.		Increase in %	Total Turnover (BDT)		Increase in %	QD Turnover (BDT)		Increase in %
	Terminal	Baseline		Terminal	Baseline		Terminal	Baseline	
Project Market									
Babrijhar GC	16184770	10922180	53.58%	15329738	10441842	53.58%	767284	850698	-21.48%
Fulbari	9389957	6028180	38.08%	8786971	5672776	38.08%	516333	627098	-13.53%
Nagrakora Market	8833240	5398891	43.73%	8266004	5084494	43.73%	466781	708798	-14.83%
MonsirMarket	7096285	5464420	15.27%	6605771	4494506	41.79%	688289	720383	-3.73%
GoaliMarket	16241487	6195781	184.62%	15198522	5774310	184.62%	688289	574883	4.00%
Sonaichandipur GC	18605559	14916589	24.73%	17410783	4840930	274.75%	739020	536312	20.11%
SomuaMarket	11297858	6720934	68.10%	10572354	4215229	114.97%	632191	520623	17.37%
Munshoganj GC	7334303	4653408	52.45%	6863323	4494506	52.45%	529600	539536	-2.22%
Narikelbaria Gc	6061408	4980971	24.63%	5672168	4691256	24.63%	453742	691642	-26.71%
9 P Markets Total	**101044867**	**69883354**	**38.91%**	**94705634**	**65195533**	**41.08%**	**5481529**	**6240799**	**-10.83%**
9 P Markets Av.	**16524701**	**11602375**	**4.17%**	**16064737**	**11229221**	**4.42%**	**948820**	**1067386**	**-1.14%**
Control Market									
Bagergachi	7039164	4947705	42.73%	6587136	4803714	42.73%	495176	665876	-21.69%
Pathakata	7340420	5428925	51.91%	6869047	5102274	51.91%	501827	710827	-16.79%
Kishoreganj	7393139	5050117	62.17%	6918381	4707335	62.17%	470279	691979	-22.80%
3 C Markets Total	**21772724**	**15426747**	**50.65%**	**20374564**	**14613323**	**50.65%**	**1467282**	**2068682**	**-20.88%**
3 C Markets Av.	**7257575**	**7708904**	**16.96%**	**10371887**	**7578716**	**16.96%**	**828855**	**1126455**	**-6.22%**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

4.5.8.1 The Concept of Quality Deterioration (QD)

The QD of perishable items is the portion of revenue lost to the seller as a result of not being able to sell his product. In an undeveloped market the sale is not quick and the sellers have to take substantial amount back for next market or next market day. As a result the qualities of perishable commodities deteriorate and so they get less price. This forms the basis of QD.

The prices of most commodities and specially perishable commodities are not sold as fixed in Bangladesh. Prices fluctuate throughout the day. This fluctuation is less in a developed market. The fluctuation is measured by the difference of maximum price of the day and actual average price received by the sellers.

Considering the reduced price of the unsold amount and price fluctuations of the day, OD of the selected commodities are determined. In this way QD for both developed and undeveloped markets are calculated and its difference is the QD savings.

Perishable Items

The Perishable items are

1. Fish	2. Meat
3. Egg	4. Fruits
5. Vegetables	6. Rice
7. Ata	8. Milk

Calculation of QD Saving of Perishable Items Due to Development of a Market

The basic principle is as follows

$$\text{QD in \%} = \frac{TRm - TRn}{TRm} \times 100$$

Where,

TRa	=	Actual Total Revenue received which has 2 components one form sold amount and one form unsold amount (to be sold later at reduced costs).
TRm	=	Total Revenue on the basis of maximum price of the day.
QD Savings in %	=	QD in % from undeveloped market - QD in % from developed market.

QD Savings arise due to stable price in the developed market and lesser volume of unsold amount of the product which will fetch less price next time.

QD Savings as Benefit

The QD savings as benefit to the economy have been estimated for 12 markets and presented in Table 4.8. The Net Present Value (NPV) of 20 years QD savings have been compared with NPV of investment costs of all 12 markets. All the markets were found economically viable.

4.5.9 Market Yearly Lease Value and Market day Toll Collection

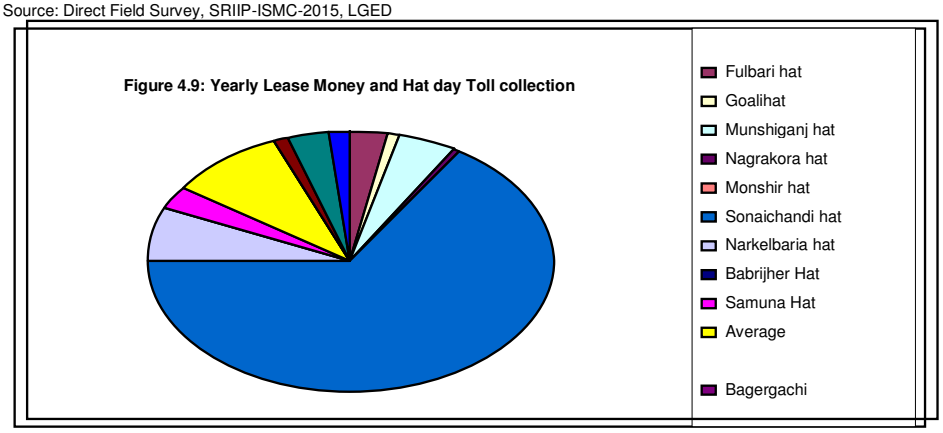
Basically there are two different kind of income one for the Government and other for the lease holder. The project markets are Government owned markets which are leased every year to Izaradar who then recover their lease money by collecting Government approved tolls which are levied on the temporary traders using the sales platform, shed and other open space in the market areas. Project improvement to these selling spaces will directly benefits the traders and indirectly benefits the buyers through the creation of cleaner and more orderly market environment. The size of a market is sometimes estimated in terms of its revenue earning from lease money collected by the Government from the lease and also the toll collected by the lease from buyers and sellers is revenue earning for the lease. Existing market lease value highest increased project market Munshiganj Market 22.84% & lowest Fulbari Market 16.70%. The baseline survey has collected information of both revenue collections through lease money for the government and market and the Market day toll collection for the lease has been shown in Table 4.9

Table 4.10: Yearly Lease Money and Market day Toll collection

Sl. No.	Market Name	Yearly lease value in Tk.	Market day toll collection in Tk.	
			Wet	Dry
Project Markets				
1	Fulbari Market	790625	14904	12535
2	GoaliMarket	257600	4870	4915
3	Munshiganj Market	1229925	43068	37605
4	Nagrakora Market	180626	5060	4468
5	Monshir Market	19320	3134	3163
6	Sonaichandi Market	17673200	838350	844684
7	Narkelbaria Market	1738800	16146	15042
8	Babrijher Market	49018	1771	1780
9	Samuna Market	708400	25070	25300
	Average	**2516390**	**105819**	**105499**
Control Markets				
1	Bagergachi	57110	1323	1113
2	Patagata	242301	6678	5618
3	Kishoreganj	952560	24806	27825
	Average	**417324**	**10936**	**11519**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

Figure 4.9: Yearly Lease Money and Hat day Toll collection

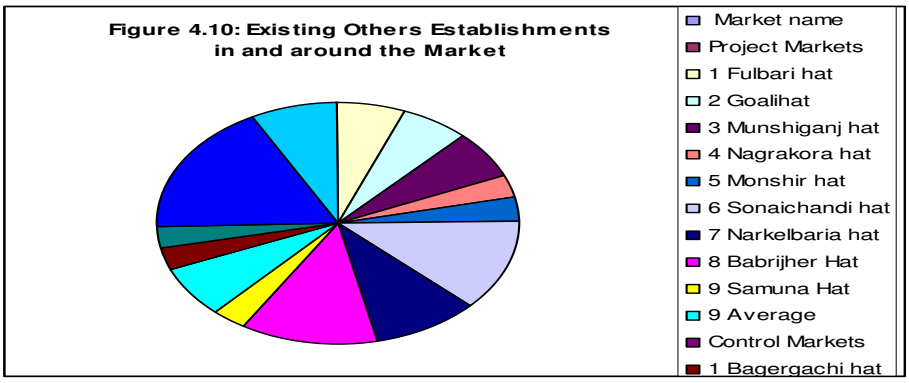


4.5.10 Establishment of different Institutions in and around the Market

The survey team found and listed there are several enterprises of various categories within and around the markets. The enterprises located within and around the markets did not exclude but included saw mill, rice mill, flour mill, processing mill, carpentry, soap factory and nursery. The number of enterprises and their employee from each market for both sample and control market are shown at Table 4.10

Table 4.11: Existing Others Establishments in and around the Market

Sl. No.	Institutions Market name	Financial institutions	Social Institutions	Processing mill	Godown/Stores	Fish culture
Project Markets						
1	Fulbari Market	3	3	4	6	1
2	GoaliMarket	3	3	3	0	20
3	Munshiganj Market	3	4	1	0	0
4	Nagrakora Market	1	4	6	0	1
5	Monshir Market	1	3	4	0	0
6	Sonaichandi Market	6	17	3	0	7
7	Narkelbaria Market	4	9	11	43	3
8	Babrijher Market	6	11	11	13	3
9	Samuna Market	1	13	14	9	4
	Average	**3**	**7**	**6**	**8**	**4**
Control Markets						
1	Bagergachi Market	1	3	1	0	3
2	PatagMarketa Market	1	1	4	1	5
3	Kishoreganj Market	8	16	5	16	4
	Average	**4**	**7**	**4**	**6**	**4**



4.5.11 Economic Internal Rate Return (EIRR)

Economic Analysis of Growth Center Markets

Introduction

Growth center markets are the focal points for the sale of rural produce, agricultural inputs and consumer goods. In addition to growth center markets there are also other small rural markets. Unimproved markets are congested, unhygienic, dusty in the dry season and muddy in the wet season. The improved market provides a clean, decongested and efficient market place for the trading of farm and non farm products. Different studies indicated after improvement of the markets there are increased number of sellers and buyers, an increased volume of trading and higher market turnover and toll revenues. New business activities also develop within the vicinity of the markets and land values around the markets raise. It has also positive impact on poverty reduction. Therefore, the component of market improvement is included in the proposed project. In the present project three types of markets will be developed. These are growth center markets located at the sub-district headquarters, growth center markets located outside the sub-district headquarters and small rural markets which are not designated as growth center markets. Due to population growth and increase of trading of farm and non farm inputs and outputs in the rural areas the demand for the third category of markets (local markets) have been increasing.

Methodology of Economic Analysis

The Project will improve growth centre markets located at the Upazila level, growth center markets located in areas other than the Upazila headquarters and small rural markets which are not designated as growth center markets. The economic analysis of growth center markets uses the method of Quality Deterioration Savings (QDS). The Quality Deterioration savings is the measure of the portion of revenue lost to the seller as a result of deterioration of the quality of the product. Due to poor condition of the existing markets and lack of transportation facilities the sale of commodities is not quick and exhaustive. The sellers have to take back the unsold commodities for other markets or for next market day and therefore, there is a great chance of deterioration of quality of the perishable goods. Commodities may also get damaged due to lack of selling sheds and storage facilities. Due to fear of quality deterioration and need for cash, the seller would be obliged to sell the perishable commodities at a lower price at the end of the market day. Thus most of the commodities, especially the perishable commodities are not sold at fixed prices and the prices fluctuate widely in the market throughout the day. The price fluctuation is less in the developed market. This forms the basis of Quality Deterioration Savings (QDS) method. The steps followed in performing economic analysis of markets are presented below.

Estimating Costs
The costs of developing a growth center markets (GCM) includes the investment costs in construction. Maintenance cost is not included as project cost, because the operation and maintenance cost is assumed to carried out by Ijaradar's using their own labor force. For economic cost standard conversion factor of 0.906 was used.

Estimation of Benefits
A quality deterioration savings approach was used to quantify benefits. Quality deterioration savings are the portion of revenue lost to the seller as a result of product quality deterioration. The benefit is the difference in quality deterioration savings of turnover of perishable goods in the market The turnover and quality deterioration savings were estimated for our surveyed markets.

Expected Life of Growth Centre Markets
The life of the growth centre markets is assumed to be 20 years as a standard followed in case of other projects of LGED funded by different donors.

Economic Costs
The financial costs were converted to economic costs by first deducting taxes and duties and then applying the standard conversion factor of 0.8. This is in line with the assumptions used in the economic analysis of similar projects in Bangladesh.

Capital/ Investment Cost of Markets
The Capital/ Investment Cost of Roads of the 9 Upazila and 3 Union project 9 project markets & 3 control markets are discussed below. In Terminal the Project markets Capital Cost 417.05 (Lac Tk.) and Control 138.64 (Lac Tk.) Table 4.12.

Results of Economic Analysis
This section describes the results of economic analyses of sub-project growth center markets conducted in June 2014 and the results of the economic analysis for growth center markets located in the Upazila and growth center markets located in areas other than the Upazila head quarters.

The economic analysis made at the project pre development stage is based on the survey of all selected market sub projects for BME study under this projects. The five type of indicator has been used for quantification of the economic benefit of the selected subprojects are Net Present Value (NPV), Benefit Cost Ratio (BCR) and Economic Internal Rate of Return (EIRR). The discounted costs and benefits of the selected market sub projects are reflected into the Economic Cash flow of them where from the NPV, BCR and EIRR are calculated. All assumptions made on the experience of recently implemented similar LGED projects.Table 4.13 & 4.14 shows the assumption based analytical results. The Terminal project market average EIRR, NPV and BCR are 49.42%, 179.68 Lac Tk. and 5.01. While in baseline EIRR 48.22, NPV 94.42 & BCR 4.30. In Terminal survey the project market increased EIRR 0.93%.

Model & Ref.: This Model have been developed by Dr.Gholam Mustafa and Mohammed Zafar Ullah from a Cross-Sectional study of 10 Markets of SEME Study of RDP 7, LGED; Quality Deterioration (QD) Turnover of those Markets are taken from the Post Project Survey of January, 1997; Mustafa G, Ullah Mohammed Zafar, Page 60 to 70 of "Rural Infrastructure Impact Study, With Special Reference to RDP7 and other Recent Projects", Final Report, Sept. 1999 & Economic Analysis of Vehicle Operating Costs (VOC) ADB: Rrp: Ban 28023 on October 1997; Mustafa G, Ullah Mohammed Zafar, Feasibility Study of 192 FRBs & 189 Markets of RIDP, LGED, May 2001.

Market Model: QD_A = 1.24383 + 0.40686 QD_B

Quality Deterioration After (QD_A), Quality Deterioration Before (QD_B)

QD saving = Tu (Pu - Pd) + 1/2(Pu - Pd) (Td - Tu)
= (Pu - Pd) (Tu + Td)/2
= Net QD saving in % X Mean of before and after Perishable Items Turnover
= (Pu-Pd) (Tu+3Tu)/2 Since Td=3Tu from previous LGED Study
= 2 Tu (Pu-Pd)
= 2Tu (Net QD saving in %)

Table 4.12: Capital/ Investment Cost of Markets

Sl.no	Districts	Upazilas	Market sub-projects	Area in Acra	Capital Cost in Lac Tk	Maint. Cost in Lac Tk
Project Market						
1	Nilphamari	Sadar	Babrijhar GC	3.71	70.74	3.54
2	Dinajpur	Birol	Fulbari	1.11	42.81	2.14
3	Kurigram	Ulipur	Nagrakora Market	0.84	44.47	2.22
4	Gaibandha	SagMarketa	MonsirMarket	0.28	44.47	2,22
5	Noagaon	Sadar	GoaliMarket	0.91	37.13	1.86
6	Chapai N. Ganj	Nachole	Sonaichandipur GC	1.20	45.79	2.29
7	Bogra	Dhonut	SomuaMarket	2.24	43.88	2.19
8	Chaudanga	Alamdanga	Munshoganj GC	1.25	43.88	2.19
9	Jessore	Bagherpara	Narikelbaria Gc	9.60	43.88	2.19
			Market Average	**21.14**	**417.05**	**42.62**
Control Market						
1	Nilphamari	Sadar	Babrijhar GC	0.70	40.88	2.04
2	Dinajpur	Birol	Fulbari	0.70	53.88	2.69
3	Kurigram	Ulipur	Nagrakora Market	0.70	43.88	2.19
			Market Average	**140.7**	**138.64**	**6.92**

Table 4.13: Terminal EIRR, NPV and BCR of BME

Sl.no	Districts	Upazilas	Market sub-projects	EIRR in %	NPV in Lac Tk.	BC ratio
Project Market						
1	Nilphamari	Sadar	Babrijhar GC	47.62%	4.70	256.21
2	Dinajpur	Birol	Fulbari	39.71%	3.73	114.19
3	Kurigram	Ulipur	Nagrakora Market	33.87%	3.05	89.15
4	Gaibandha	SagMarketa	MonsirMarket	27.61%	2.37	59.67
5	Noagaon	Sadar	GoaliMarket	65.28%	7.08	220.70
6	Chapai N. Ganj	Nachole	Sonaichandipur GC	63.75%	6.86	262.58
7	Bogra	Dhonut	SomuaMarket	62.96%	6.75	246.88
8	Chaudanga	Alamdanga	Munshoganj GC	58.82%	6.18	222.36
9	Jessore	Bagherpara	Narikelbaria Gc	45.11%	4.39	145.37
			Market Average	**49.42%**	**5.01**	**179.68**
Control Market						
1	Nilphamari	Sadar	Babrijhar GC	35.89%	3.28	91.11
2	Dinajpur	Birol	Fulbari	36.34%	3.33	122.81
3	Kurigram	Ulipur	Nagrakora Market	37.65%	3.48	106.56
			Market Average	**36.62%**	**3.36**	**106.83**

Figure 4.13: Terminal EIRR, NPV and BCR of BME

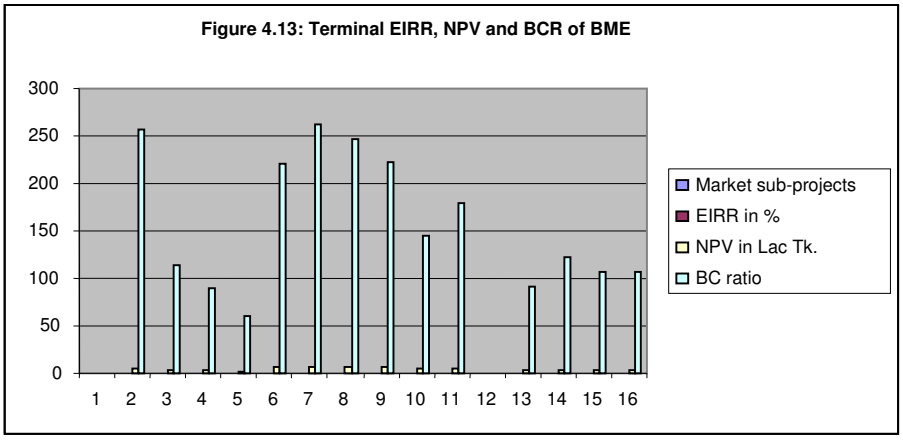


Table 4.14: Baseline and Terminal comparison of EIRR

Market Information				Baseline			Terminal			Changed in %		
Sl.no	Districts	Upazilas	Market subprojects	EIRR in %	BC ratio	NPV in Lac Tk.	EIRR in %	BC ratio	NPV in mill. Tk	EIRR in %	BC ratio	NPV in Lac Tk.
Project Markets												
1	Nilphamari	Sadar	Babrijhar GC	45.00%	3.83	80.40	47.62%	4.70	256.21	5.82%	22.82%	218.67%
2	Dinajpur	Birol	Fulbari	37.00%	3.01	57.10	39.71%	3.73	114.19	7.33%	23.85%	99.98%
3	Kurigram	Ulipur	Nagrakora Market	31.00%	2.56	44.00	33.87%	3.05	89.15	9.27%	19.14%	102.61%
4	Gaibandha	SagMarket a	MonsirMarket	23.00%	1.77	28.00	27.61%	2.37	59.67	20.06%	34.01%	113.10%
5	Noagaon	Sadar	GoaliMarket	63.00%	5.74	135.00	65.28%	7.08	220.70	3.61%	23.32%	63.48%
6	Chapai N. Ganj	Nachole	Sonaichandipur GC	75.00%	6.84	166.00	63.75%	6.86	262.58	-15.00%	0.35%	58.18%
7	Bogra	Dhonut	SonamuaMarket	61.00%	5.57	128.70	62.96%	6.75	246.88	3.22%	21.26%	91.83%
8	Chaudanga	Alamdanga	Munshoganj GC	56.00%	5.49	127.70	58.82%	6.18	222.36	5.04%	12.62%	74.13%
9	Jessore	Bagherpar a	Narikelbaria Gc	43.00%	3.91	82.90	45.11%	4.39	145.37	4.91%	12.23%	75.35%
			Market Average	**48.22%**	**4.30**	**94.42**	**49.42%**	**5.01**	**179.68**	**4.92%**	**18.84%**	**99.70%**
Control Markets												
1	Jhenaidah	Kaliganj	Bagergachi	33.53%	80.38	3.01	35.89%	3.28	91.11	7.03%	-95.92%	2925.99%
2	Naogaon	Mohadebp ur	Pathakata	33.55%	106.08	3.01	36.34%	3.33	122.81	8.31%	-96.86%	3975.20%
3	Nilphamari	Kishoregan j	Kishoreganj	32.90%	83.28	2.94	37.65%	3.48	106.56	14.43%	-95.82%	3523.51%
			Market Average	**33.33%**	**89.91**	**2.99**	**36.62%**	**3.36**	**106.83**	**9.92%**	**-96.20%**	**3474.90%**

Figure 4.14: Baseline and Terminal comparison of EIRR

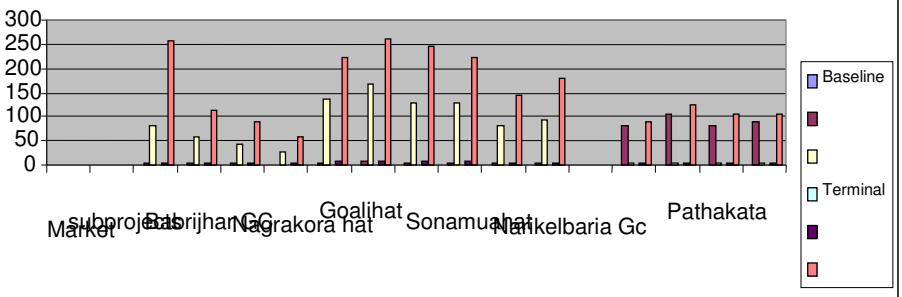


Table 4.15: Baseline and Terminal comparison of EIRR
Economic Analysis Format for Market (Sample)

ECONOMIC ANALYSIS OF A MARKET AT CONSTANT PRICE

Base Case

Investment Cost =		*1.Economic Cost =*	0.925 X Financial Cost
Investesment. Cost at Constant Price =		*2.Benefit Savings =*	*0 On 1st Year, 1/3 On 2nd Year,1/3 On 2nd Year,2/3 On 3rd Year, full in 4th Year.*
TO of QD items Before (Tu) =		*3.Total Compound Growth =*	*Rate in Benefit = 5%, 2/3 On 3rd Year,2/3 On 3rd Year,*
QD_B in % =		*4.Total Compound Growth =*	Rate in Benefit = 5%
QD_A in % =		*5.Maintenance Cost =*	First 5 yrs 2%, Second 5 yrs 3% and Rest of Years 4% of Capital Cost
Annual QD Savings =			

Year	Capital Cost (Ec.)	Maintenance Cost	Total Cost	Benefit Savings	Net Benefit	Net Savings with Cost +20%	Net Savings with Benefit -20%	Both Together	**Sensitivity Tests**	EIRR (%)	BCR	NPV (Lac Tk)
1									Base Case			
2									Cost 20% Higher			
3									Benefit 20% Lower			
4									Both Case			
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
NPV@12%												
BCR												
EIRR %												

5. SOCIO-ECONOMIC HOUSEHOLD SURVEYS

5.1 Introduction

The benefit monitoring and evaluation activities were commenced in the inception phase of the project to be able to assess at a later stage the benefit, impact or achievement of the project investment. Based on a methodological framework for monitoring and evaluation, a Terminal survey at household level was conducted mainly during 2015 which captured the mid-point of project implementation situation of all related aspects which may be influenced due to project intervention.

The household Terminal survey included benchmark data and information collection on 12 project and 4 control roads in project area, to be able to assess the changes in social and economic indicators during and after the project in areas of demography, education, agricultural production, income, occupation and employment generation, accessibility, health and health care services and socio-economic change due to the project interventions. The objective of the Terminal survey was to acquire baseline socio-economic scenarios and establish a framework for the collection of subsequent data at regular intervals during and beyond the project period. It is also intended the baseline will assist LGED to carryout subsequent surveys, analyze the data and monitor the changes against the Terminal situation. In this articles, the analytical results for the SRIIP area are presented and interpreted, and present socio-economic features are highlighted.

5.2 Demographic Features and Population Structure

The structure and interactions of the population are associated with social and family composition, economic activities and other related issues. The structure may be analyzed mainly based on a) Age structure and b) Household member structure.

5.2.1 Age Structure

Age structure of a population has greater demographic importance than any other characteristics since a wide range of socio-economic phenomena of a population are directly related to it. It has direct implications on the size, composition, entry and departure rates of labour force, on family formation, child bearing and consequently on demands of a number of infrastructural and social services.

Terminal age structure profile has been prepared to compare the profile over time if there is any change. The age structure of the project area is characterized by high proportion of economically active group[3] (10-59 years of age) and low proportion of dependent group (age below 10 years and above 60 years). The proportion of economically active group in the influence area of project road is 79.21%. In the influence area of control roads it is 86.72%; it is higher in respect to project road. The dependent population in the project road areas below 10 years and above 60 years is respectively 14.21% and 6.6% and 10.68% and 2.60% in the control road area. The total dependent people in the project and control road area are 20.78% and 13.28%. The percentage of dependent people in project area is higher than the area under control road (see table 5.1).

Table 5.2 shows a similar age structure in the project area both in case of project and control roads. The highest percentage of population is dominant in the age group 30-49 in the project and as well as in the control road area followed by age group 25-29 in the project road areas

[3] Economically active population or Labour Force is defined as persons aged 10 years and above (10-59 years) who are either employed or unemployed during the reference period. It exclude disabled and retired persons, income recipients, fulltime house wives and students, beggars or other persons who do not work for pay or profit during the reference week (source: Bangladesh Population census 1991).

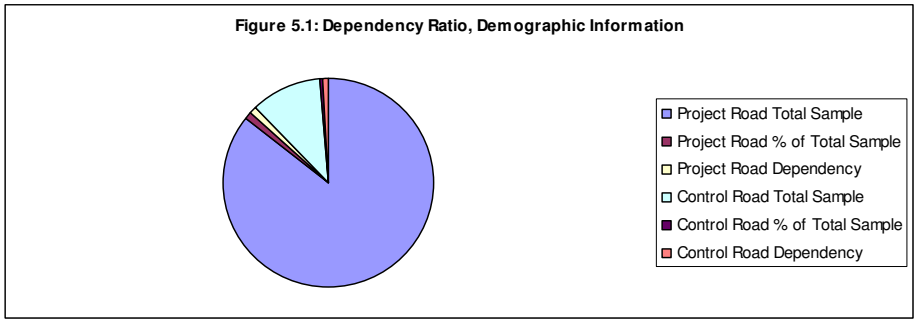
and 15-19 age group in the control road areas. Percentage of population is lower in the age group 0-4, 60-64 and 65+ years both in the case of project and control road. The dependency ratio both of project and control road area furnished in table below Table 5.1.

Table 5.1 : Dependency Ratio, Project and Control Road in project area

Age Group	Project Road Area			Control Road Area		
	Total Sample Population	% of Total Sample Population	Dependency Ratio	Total Sample Population	% of Total Sample Population	Dependency Ratio
0-9	1259	15.34	17.94	160	6.31	12.31
10-59	6482	79.00	0	1299	51.22	0
60+	464	5.66	8.29	39	1.54	3.00
Total	**8205**	**100**	**26.23**	**1498**	**59.07**	**15.31**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

Figure 5.1: Dependency Ratio, Demographic Information



5.2.2 Sex Structure

Sex structure of a population is very important as it affects a number of factors like labour force or occupational structure, marital status and migration. Predominance of male is the basic characteristics of demographic feature in the country as well as the project area where the share of male is 54.31% and of female 45.69%. The male in the project and control road area is 52.77% and 47.22%. Table 5.2 presents the situation.

5.2.3 Household and Household Size

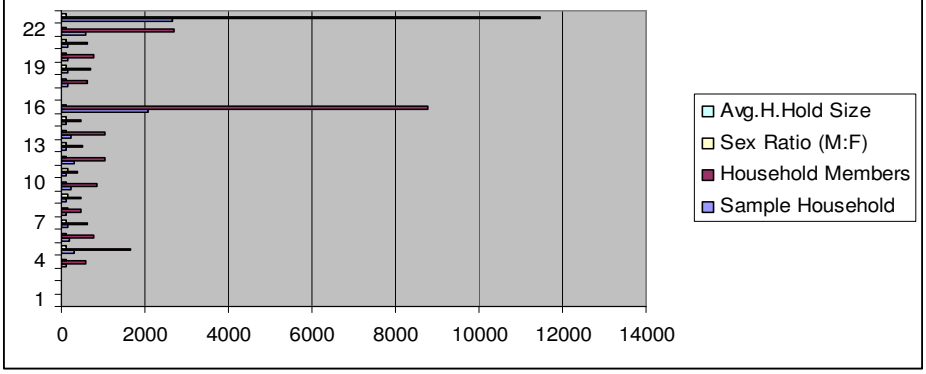
The family size respectively household size is important for family economy as the number of non earning members supported by each income earning members is a socio-economic indicator of the family. The family size may change over time due to various economic and social factors including the project developments.

Table 5.2 : Household Member, Size and Sex structure

Sl. No	Road ID No.	Baseline				Terminal			
		Sample Household	Household Members	Sex Ratio (M:F)	Avg.H.Hold Size	Sample Household	Household Members	Sex Ratio (M:F)	Avg.H.Hold Size
Project Road									
1	Rd-01	102	500	111	5.00	102	564	111	5.00
2	Rd-02	300	1550	120	5.19	300	1643	120	5.19
3	Rd-03	199	700	121	3.55	199	767	121	3.55
4	Rd-04	169	562	117	3.35	169	605	117	3.35
5	Rd-05	117	425	135	3.65	117	461	135	3.65
6	Rd-06	100	411	149	4.15	100	455	149	4.15
7	Rd-07	228	809	120	3.58	228	857	120	3.58
8	Rd-08	103	348	139	3.39	103	380	139	3.39
9	Rd-09	290	975	119	3.38	290	1021	119	3.38
10	Rd-10	120	473	109	3.96	120	510	109	3.96
11	Rd-11	248	1013	125	4.40	248	1057	125	4.40
12	Rd-12	101	439	123	4.37	101	464	123	4.37
Sub-total		**2077**	**8205**	**124**	**4.00**	**2077**	**8785**	**124.00**	**4.00**
Control Road									
1	Rd-01	148	584	116	3.97	148	612	116	3.97
2	Rd-02	145	652	114	4.52	145	694	114	4.52
3	Rd-03	150	710	112	4.75	150	766	112	4.75
4	Rd-04	143	590	124	4.14	143	618	124	4.14
Sub-total		**586**	**2536**	**117**	**4.35**	**586**	**2691**	**117**	**4.35**
Grand Total		**2663**	**10741**	**120**	**4.17**	**2663**	**11476**	**120**	**4.17**

Source: Direct Field Survey, SRIIP-ISMC, LGED, 2014

Figure 5.2: Household, Household Member, Household Size and Sex Ratio



5.3 Education

Educational attainment is an important indicator of the development of human resources. Bangladesh is lagging far behind in terms of producing skilled and qualified human resources. It is perhaps due to the lack of necessary condition for the promotion of education. The majority of the population is poor and disadvantaged and therefore has no access to education facilities. Education level of household members was investigated during the baseline survey, because it is assumed the project intervention - through improvement of the

rural transport system including improvement of the condition of the roads will enhance access to schools, increase attendance and improve success rate thereby reducing dropouts. The changes of the rate of education and enrolment will therefore stand for an important indicator of socio-economic and future employment opportunity.

The surveyed area has been maintaining a remarkable position in terms of literacy level. Overall, the rate of literacy has been recorded highest in Up to class Five 37.59% and Self-Educated 1.55% in project area.

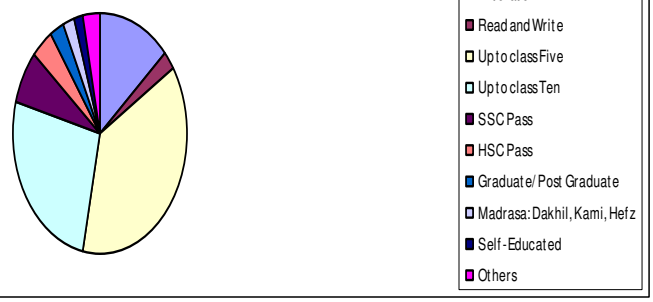
The Terminal survey has been categorized literary level as illiterate, can read and write, upto 5th class, upto 10th class, SSC pass, HSC pass, graduate/ post graduate, Madrasha education (Dhakil, Kamil, Hafez), Self educated and others. The status of illiteracy along the project and control roads is (76.00%) and (24.0%) respectively. Along project roads area highest numbers of household family members are literate madrasha class and in control road area also madrasha. Only a few household family members are highly educated (graduate and post- graduate) in the project road areas (2.34%) as well as in the control road areas (3.22%) of the project area.

Table 5.3 : Household member, Level of Education

Educational Level	Project Road		Control Road		Overall	
	Total	%	Total	%	Total	%
Illiterate	1144	13.45	220	8.45	1429	13.30
Read and Write	201	2.36	74	2.84	107	1.00
Up to class Five	3197	37.59	599	22.99	3792	35.30
Up to class Ten	2188	25.73	966	37.08	2932	27.30
SSC Pass	629	7.40	299	11.48	848	7.89
HSC Pass	348	4.09	208	7.98	507	4.72
Graduate/Post Graduate	199	2.34	84	3.22	257	2.39
Madrasa: Dakhil, Kami, Hefz	188	2.21	41	1.57	130	1.21
Self-Educated	132	1.55	38	1.46	174	1.62
Others	279	3.28	76	2.92	565	5.26
Total	**8505**	**100.0**	**2605**	**100.0**	**10741**	**100.0**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

Figure 5.3 Education Level of Household



5.4 Occupational Structure

Occupation status is highly relevant and important for assessing the impact of the project on employment creation and poverty reduction. Increased employment opportunities may bring surplus farm labour into the non-farm sector as a result of improvement of rural infrastructure and transportation systems. The Terminal survey followed baseline survey classified occupation structure as cultivation, daily labour, garment workers, service, business, wage earner, home work, student, non income earner and others. The primary occupation of highest number of household family members living in the project road area is student 28.64% followed by 16.420% household family members are engaged in cultivation. The percentage of non-income earner persons in the project area is 8.52%. The fourth largest group 13.77% is daily labour followed by business (5.34%) and service (4.31%). A very insignificant percentage of labour force is engaged in garment factory, wage earner and other profession.

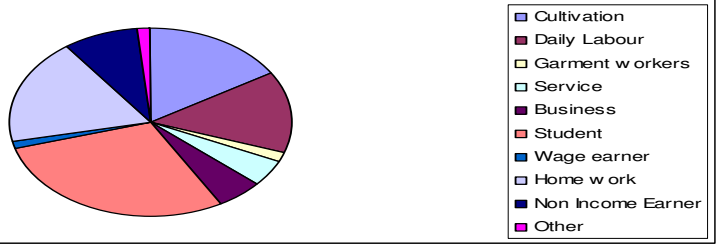
The control roads, percentage of non-income earner persons are 6%. The largest group (29.4%) is daily home work followed by student (4.9%) and service (29.1%). A very insignificant percentage of labour force is engaged in garment factory, wage earner and other profession. Table 5.4 presents occupational Structure.

Table 5.4: Household member, Occupational Structure

Occupation	Project Road				Control Road			
	Primary		Secondary		Primary		Secondary	
	No.	%	No.	%	No.	%	No.	%
Cultivation	1347	16.42	295	3.6	399	15.7	143	5.64
Daily Labour	1130	13.77	160	2.0	288	11.4	14	.55
Garment workers	155	1.89	124	1.5	70	2.8	2	.08
Service	354	4.31	110	1.3	129	5.1	2	.08
Business	438	5.34	157	1.9	128	5.0	17	.67
Student	2350	28.64	167	2.0	745	29.4	0	.00
Wage earner	110	1.34	108	1.3	7	.3	0	.00
Home work	1508	18.38	1508	18.4	617	24.3	40	1.58
Non Income Earner	699	8.52	5065	61.7	151	6.0	2274	89.67
Other	114	1.39	511	6.2	2	.1	44	1.74
Total	**8205**	**100.0**	**8205**	**100.0**	**2536**	**100.0**	**2536.0**	**100.0**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

Figure 5.4: Occupation Structure of Household



5.5 Employment Status of Household Family Members

The Terminal survey has made an attempt to capture information on employment status of all members between 10-65+ years of age. The employment status is highly relevant and important for comparing the impact of project on employment creation and poverty reduction.

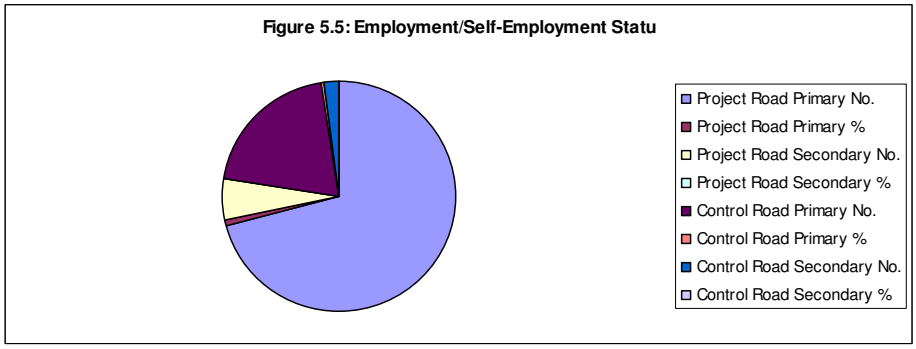
Along the project roads employment/self employment status of household family members categorized as employed in primary occupation full 12 months (86.37), below 12 months (1.21), 6.1-9 months 1.22, 1-6 months .28, up to 3 months below .68 and no earning 10.24,. The project area more than (89.6%) of the household members are maintaining their primary occupation for the whole year. In secondary occupation 12 months 7.11, below 12 months .05, 6.1-9 months .09, 3.1-6 months .95, up to 3 months below .28 and no earning 91.53 for up to twelve months. Table 5.5 presents Employment Status.

Table 5.5: Household member, Employment Status

Employment by Months	Project Road				Control Road			
	Primary		Secondary		Primary		Secondary	
	No.	%	No.	%	No.	%	No.	%
12 months	7087	86.37	583	7.11	1989	78.43	178	7.01
9.1-below 12 months	99	1.21	4	.05	84	3.31	1	.04
6.1-9.0 months	100	1.22	7	.09	88	3.47	3	.12
3.1-6.0 months	23	.28	78	.95	6	.24	15	.59
3 months and below	56	.68	23	.28	2	.08	7	.28
No Earning	840	10.24	7510	91.53	367	14.47	2335	91.97
Total	**8205**	**100**	**8205**	**100**	**2536**	**100**	**2539.0**	**100**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

Figure 5.5: Employment/Self-Employment Statu



5.6 Household Income and Expenditure

The Terminal survey estimated household income and expenditure status to predict pre-project poverty status and this will form a basis for comparison with post-project poverty levels towards the end of the project. It is assumed, of course, after the project income from both agriculture and non- agriculture sources will increase.

Based on information provided by the respondents concerning monthly household income, about 19.21% of the households lie within the income range of Tk. 6000-6999 per month along the project roads. In the control road areas the highest percentage 13.14% of households are in the same income range 7000-7999. 9.63% household along project road is enjoying income Tk. 10000-12499 per month as 2nd highest income group. In the control road area 12.12% household lies in the income range Tk.10,000-12499.

Based on information provided by the respondents concerning monthly household expenditure, about 4.48% of the households lie within the income range of Tk. 6000-6999 per month along the project roads. In the control road areas the highest percentage 6.67% of households are in the same income range 7000–7999. 6.36% household along project road is enjoying income Tk. 10000-12499 per month as 2nd highest income group. In the control

road area 6.36% household lies in the income range Tk.10,000-12499. Table 5.6 & 5.7 presents monthly income & expenditure.

Table 5.6 : Household member, Monthly Income

Income Range	Project Road		Control Road	
	No. of Household	%	No. of Household	%
No response	9	.43	31	5.29
01-1500	38	1.83	8	1.37
1501-1999	6	.29	21	3.58
2000-2499	27	1.30	54	9.22
2500-2999	34	1.64	39	6.66
3000-3999	97	4.67	31	5.29
4000-4999	146	7.03	21	3.58
5000-5999	288	13.87	43	7.34
6000-6999	399	19.21	65	11.09
7000-7999	267	12.86	77	13.14
8000-8999	149	7.17	54	9.22
9000-9999	86	4.14	32	5.46
10000-12499	200	9.63	71	12.12
12500-14999	65	3.13	12	2.05
15000-17499	96	4.62	7	1.19
17500-19999	43	2.07	4	.68
20000-24999	55	2.65	8	1.37
25000-29999	36	1.73	4	.68
30000-34999	17	.82	1	.17
35000+	19	.91	3	.51
Total	**2077**	**100**	**586**	**100**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

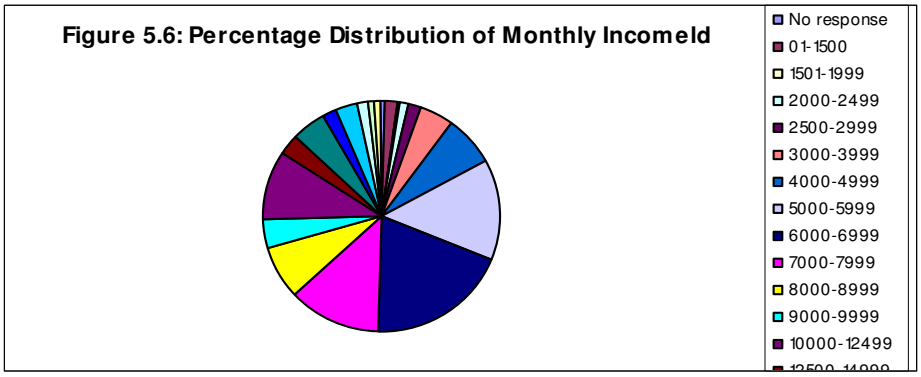
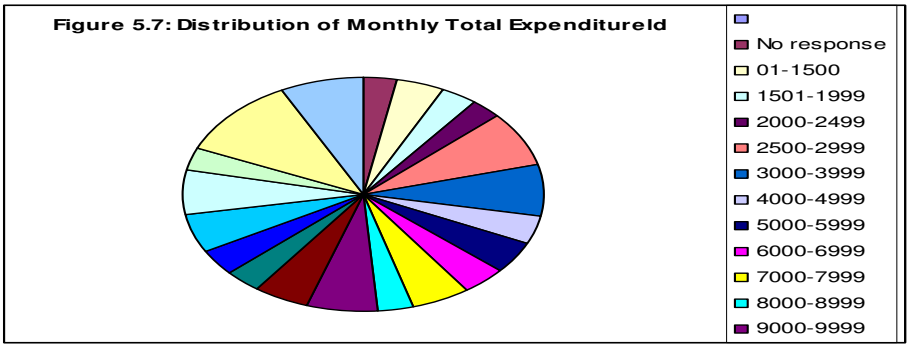


Table 5.7: Household member, Monthly Expenditure

Range of Expenditure	Project Road		Control Road	
	No. of Household	%	No. of Household	%
No response	78	3.06	27	3.33
01-1500	105	4.12	65	8.02
1501-1999	89	3.50	47	5.80
2000-2499	67	2.63	54	6.67
2500-2999	189	7.42	91	11.23
3000-3999	186	7.31	45	5.56
4000-4999	98	3.85	43	5.31
5000-5999	114	4.48	65	8.02
6000-6999	100	3.93	43	5.31
7000-7999	133	5.22	24	2.96
8000-8999	79	3.10	43	5.31
9000-9999	165	6.48	61	7.53
10000-12499	127	4.99	33	4.07
12500-14999	86	3.38	27	3.33
15000-17499	89	3.50	27	3.33
17500-19999	136	5.34	35	4.32
20000-24999	150	5.89	25	3.09
25000-29999	79	3.10	16	1.98
30000-34999	288	11.31	29	3.58
35000+	188	7.38	10	1.23
Total	**2546**	**100**	**810**	**100**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED



5.7 Daily Wage Rate

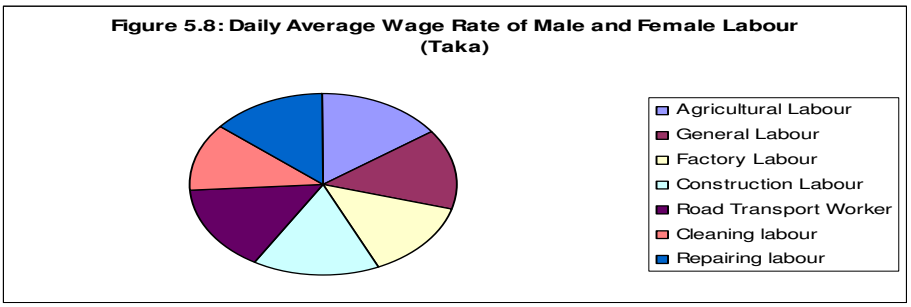
The baseline survey has also collected information on pre-project daily wage rate to compare with the post-project daily wage rate of male and female, both for project and control roads area. Prediction is the wage rate may increase in the project area more than in the control area, through creation of employment opportunities. The baseline survey classified labour force as agriculture labour, general/non-agriculture labour, factory labour, construction labour, road transport worker, cleaning labour and repairing labour.

The average daily wage rate for male and female residing along the project roads in the project area is Tk. 296 and about 265 respectively. In the control road areas this figure stands at Tk. 300 for male labour and about Tk. 230 for female labour. Wage rate in project and control road almost same for both male and female. Detail of wage rate is furnished below in Table 5.8.

Table 5.8: Household member, Daily Average Wage Rate

Labour Type	Terminal			
	Project Road		Control Road	
	Male	Female	Male	Female
Agricultural Labour	296	265	300	230
General Labour	276	210	240	150
Factory Labour	265	234	290	245
Construction Labour	300	276	300	210
Road Transport Worker	299	278	300	220
Cleaning labour	241	220	250	180
Repairing labour	268	161	280	220
Average Wage	**278**	**235**	**280**	**208**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED



5.8 Accessibility - Residence to Nearest Facilities

Residence areas should be located near communication routes allowing easy access to service facilities. They should be in convenient proximity to educational institutions, Market/bazaar, health center, NGO services, gMarket and recreational facilities. With the improvement of rural transport network, people will get increased access to services and use of common and cheaper transports will manifest itself as one type of impact of the improvement of rural transport. The Terminal survey, therefore, collected information on the existing level of access to service facilities and frequency of trip by individuals.

Walking, use of non- motorized vehicles (bicycle, rickshaw, rickshaw van), motorized vehicles (motorcycle, tempo, Nosimon, Easy bike bus) are the principal modes of transportation in the project and control areas. Overall, walking is the principal mode of transportation to close destinations, followed by rickshaw van and rickshaw. At present, locally developed motorized vehicle (Nosimon, Votvoti, Alam Shadu, Karimon) mostly plying on both project and control Road. Motorcycle, tempo and bus are also use as a means of transportation, but mainly to destinations further away. The highest percentages of household members in the project (35.16%) and control road (41.54%) area utilize Rickshaw or Rickshaw van. This statistics clearly embarked the development of paved road net work would facilitate increased number of household members to utilize motorized transport. It would result for household members to travel with reduced price. List of type of transport used in the project and control road area is given in Table 5.9.

Table 5.9: Household member, Mode of Transport utilized by Household Members

Mode of Transport	Terminal			
	Project Road		Control Road	
	No.	%	No.	%
On foot	140	2.62%	62	3.18%
Rikshaw / Rikshaw van	1880	35.16%	810	41.54%
By Bus/Tempo	699	13.07%	520	26.67%
Auto Rickshaw	280	5.24%	190	9.74%
Motor/Electronic Bike	200	3.74%	63	3.23%
Bi-Cycle	900	16.83%	225	11.54%
Nosomon / Votvoti	1177	22.01%	72	3.69%
Others	55	1.03%	1	0.05%
No. Answer	16	0.30%	7	0.36%
Total	**5347**	**100.00%**	**1950**	**100.00%**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

Figure 5.9: Mode of Transport

5.9 Agriculture

5.9.1 Land Holding Size

Assuming the land holding size and ownership pattern changes over time, the improvement of rural infrastructures may influence the land holding patterns and ownership characteristics and overall development of the area. The changes of the land holding and ownership pattern are therefore useful measures for the (unintended) impact of improvement of rural transports. The Terminal survey results indicate some minor variations among the land holding sizes between project and control roads.

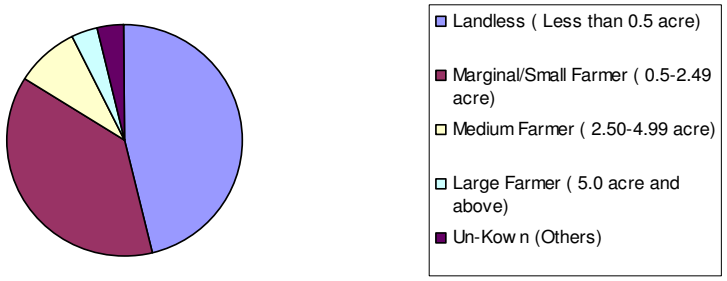
The Terminal survey followed the baseline survey classified landholding size as landless (less than 0.5 acres), marginal/small farmers (0.50 to 2.49 acres), medium farmers (2.50 to 4.99 acres) and large farmers (5.0 acres and above). A significant percentage 46.12% of respondent households along the project roads are landless and are likely to lie below the extreme poverty line, while along the control road areas this share is 20.75%. A significant number of the land holdings are marginal or small farmers both along project 37.65% and control (68.49%) roads. Large farmers are very few 3.76% in the project roads and 2.26% remain in control roads. Table 5.10 provides details of the land holding status.

Table 5.10: Household member, Land holding Size of the Household

Terminal				
Land Holding Status	**Project Road**		**Control Road**	
	No. of Household	**%**	**No. of Household**	**%**
Landless (Less than 0.5 acre)	958	46.12%	110	20.75%
Marginal/Small Farmer (0.5-2.49 acre)	782	37.65%	363	68.49%
Medium Farmer (2.50-4.99 acre)	186	8.96%	27	5.09%
Large Farmer (5.0 acre and above)	78	3.76%	12	2.26%
Un-Kown (Others)	73	3.51%	18	3.40%
Total	**2077**	**100.00%**	**530**	**100.00%**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

Figure 5.10: Landholding Size of the HouseholdId



5.9.2 Cost of Agricultural Production

The project may influence agriculture production due to easily available transport and marketing facilities, availability of agriculture inputs and transfer of modern technology. The Terminal survey captured information on production of agriculture crops needed for assessing changes with and without the project.

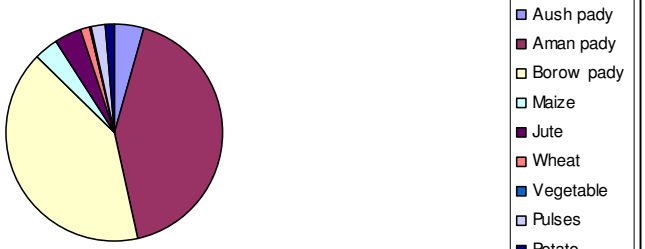
The cropping pattern along the project road area is dominated by paddy (local and high yield variety) which covers 85.94% of the total cultivated area while the remaining 14.06% are covered by vegetables, jute, maize, pulses, Wheat, potato and others. The cropping pattern along the control road area is also dominated by paddy which covers about 68.12% of the total cultivated area. Among the crops, production of high yield variety paddy (Borrow) in the project (2111) acre and control roads (387) acre of the project area ranks top with a yield per acre in project road 1965 kg and control 1529 kg respectively. Table 5.11 presents details of the Agriculture Crops by Household.

Table 5.11: Production of Agriculture Crops by Household

Crops	Project Road				Control Road			
	Cultivated area(acre)	Production per acre (Kg)	Total Production (Kg)	Per Acre Production Cost (acre)	Cultivated area(acre)	Production per acre (Kg)	Total Production (Kg)	Per Acre Production Cost (acre)
Aush pady	104	2456	193916	15734	16	1320	16	7901
Aman pady	1023	3260	2521972	23648	173	1831	1732131	14726
Borow pady	984	3425	2547891	25498	198	2263	1986663	17019
Maize	88	3190	212126	16449	24	2798	55950	14394
Jute	99	635	47699	7557	93	595	93	12941
Wheat	33	1137	28024	6446	8	2101	8	10134
Vegetable	7	759	4145	7763	20	738	20	3231
Pulses	46	440	15158	16068	15	385	4617	15198
Potato	36	2381	64535	8535	4	1734	4	7806
Total	**269**	**1965**	**626163**	**14189**	**61**	**1529**	**419945**	**11483**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

Figure 5.11: Production of Agriculture Crops by Household



5.9.3 Agricultural Inputs

(1) The Terminal survey collected information on sources of agricultural inputs to assess the pre-project situation of both project and control roads. Inputs for production of agricultural crops have been taken into consideration to assess their availability during pre-project situation and to compare with availability after implementation of the project. Seeds, fertilizer, pesticides, irrigation and other equipment have been considered as agricultural inputs.

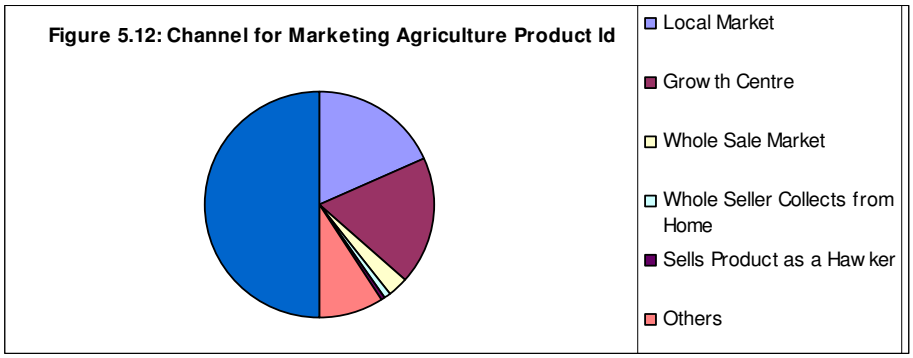
5.9.4 Marketing of Agriculture Products

The surplus agricultural produce is generally sold in the local markets. Therefore, all year accessibility of the households to the local markets or of market traders to the producers' farms or houses is a pre-requisite for ensuring a fair price for the producers. The project considers the change of accessibility to markets as an important indicator for measuring effect and impact of the improvement of rural transportation.

The Terminal survey followed the baseline survey classified local market, growth centre, whole sale market, selling from home and sell product as a hawker as selling points/agents for agriculture produce. Of these, marketing at local market/growth centre ranks top in case of project road (36.83%). Also, in control road local market/Growth centre stands top (52.39%) roads. Table 5.12 gives details on the marketing of agricultural produce for the project and control road area.

Table 5.12: Household member, Channel for Marketing Agriculture Product

Terminal				
Selling Point	Project Road		Control Road	
	No. of Household	% of Household	No. of Householhold	% of Household
Local Market	765	36.83%	307	52.39%
Growth Centre	755	36.35%	186	31.74%
Whole Sale Market	119	5.73%	37	6.31%
Whole Seller Collects from Home	32	1.54%	27	4.61%
Sells Product as a Hawker	23	1.11%	17	2.90%
Others	383	18.44%	12	2.05%
Total	**2077**	**100.00%**	**586**	**100.00%**



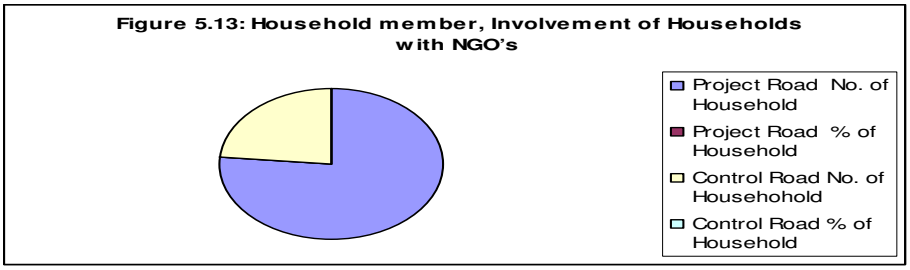
5.10 Involvement of Households with NGO's

The Terminal survey collected information on involvement of households with different NGOs. The survey findings reveal only 56.38% of the household living along the project roads are involved with one or different NGOs. In the control roads of the project area the involvement of NGOs 61.43%. Table-5.13

Table 5.13 : Household member, Involvement of Households with NGO's

Terminal				
Selling Point	Project Road		Control Road	
	No. of Household	% of Household	No. of Householhold	% of Household
Yes	1171	56.38%	360	61.43%
No	906	43.62%	226	38.57%
Total	**2077**	**100.00%**	**586**	**100.00%**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED



5.11 Household Investment

The Terminal survey investigated the household investment status over the past year in the categories of lease of agricultural land, business, deposit in bank, given loan and others. It has been observed highest for no investment (71.55%) of households along project road has made investment depositing money in the bank. But the highest percentage (33.28%) of household along control road area has invested money in the bank. Along the project road 7.37% household has invested money in business and along control roads 26.28% household has made investment depositing money in the business. Table 5.14 presents a picture of household investment.

Table 5.14: Household member, Household Investment during Last Year

Terminal				
Category of Investment	Project Road		Control Road	
	No. of Household	%	No. of Household	%
Lease of Land	74	3.56	102	17.41
Business	153	7.37	154	26.28
Give Loan	54	2.60	31	5.29
Deposit in bank	302	14.54	88	15.02
Other	8	.39	16	2.73
No answer/ No. Investment	1486	71.55	195	33.28
Total	**2077**	**#REF!**	**586**	**100.00**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

Figure 5.14: Household Investment During Last Year

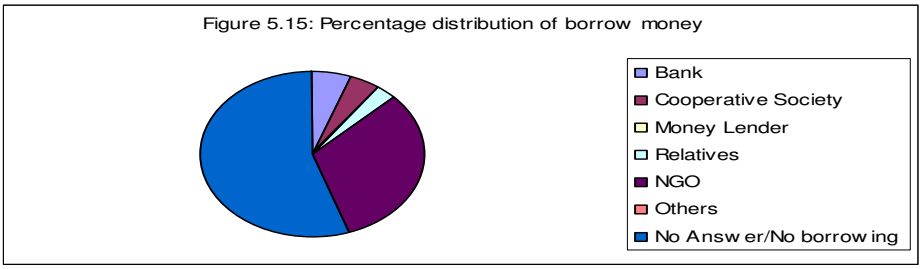
5.12 Sources of Borrowing Money

The survey collected Terminal data on extent and sources of money borrowing to be able at a later stage to assess the socio-economic changes due to the project intervention. The survey categorized the sources of money borrowing as bank, cooperative society, money lender, relatives, NGOs and others. No borrowing rank top both in the project roads 55.37% and in the control road 45.22%. The 2nd highest percentages of household in the project road area borrow money from NGO (31.49%) and in the control road area the 2nd highest number of households borrow money from relatives (45.22%). Details of source of borrow money are given in Table 5.15 Percentage distribution of borrow money from Different Institution

Table 5.15: Household member, Sources of Borrowing Money

Source of Borrow Money	Project Road		Control Road	
	No. of Household	%	No. of Household	%
Bank	120	5.78	55	9.39
Cooperative Society	85	4.09	13	2.22
Money Lender	2	.10	6	1.02
Relatives	64	3.08	105	17.92
NGO	654	31.49	265	45.22
Others	2	.10	6	1.02
No Answer/No borrowing	1150	55.37	136	23.21
Total	**2077**	**100.0**	**586**	**#REF!**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED



5.13 Health and Health Services

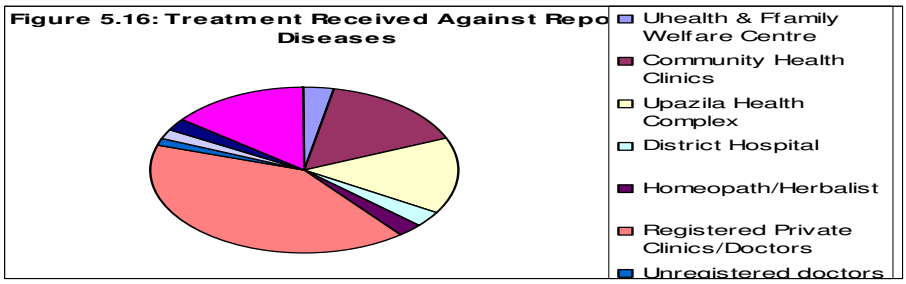
The incidence of sickness is primarily due to poor living conditions (including nutrition and hygiene), lack of access to health services because of bad communication and/or lack of transportation, poverty, lack of education and awareness. It is expected incidence of sickness will decline after the project as the project is expected to improve rural transportation network system and trading facilities including trading of essential drugs. Baseline information on health and health services has been collected on number of affected people by disease, treatment facilities, services of health assistant/ health workers, sanitation facilities etc.

Treatment Received Against Reported Diseases: In Terminal survey report, as the absolute number and quality of health facilities provided by the government are quite limited, people use various other providers of health care, mainly from the private sectors. This is a common feature of the country including the project area. In the project area treatment facilities/methods are homeopathic, traditional, Upazila health complex 14.80%, project area Treatment Received Union health and family welfare center, 15.50% Community Health Clinics, 14.60% of the treatment facilities were provided by the Upazila Health Complex, 14.80% received treatment private sector (Registered private clinic/Doctors) along project roads Table 5.16 gives details of the treatment facilities taken by project area.

Table 5.16: Household member, Treatment Received against Reported Diseases

Source of Treatment	Terminal	
	Project Road	Control Road
	%	%
Uhealth & Ffamily Welfare Centre	3.40	6.50
Community Health Clinics	15.50	16.00
Upazila Health Complex	14.80	21.50
District Hospital	3.00	17.13
Homeopath/Herbalist	2.70	4.90
Registered Private Clinics/Doctors	40.50	16.50

Unregistered doctors	1.50	0.90
Traditional Treatment	2.02	2.01
No Treatment	2.03	0.26
No Answer	14.90	14.50
Total	**100**	**100**



Provision for regular visits: There is a government provision for regular visits of health assistant/union health workers/family planning worker to households of the locality. The Terminal data analysis confirmed 86% in project road and 79% household in the control area have been visited by the local/Union level health assistant/union health workers/family planning at least once in six months.

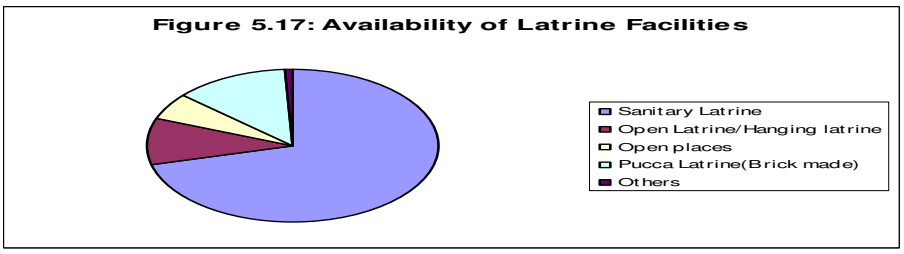
5.13.1 Availability of Latrine Facilities

Following the improvement of rural transport system, awareness on hygiene and improved access to sanitation may significantly improve hygienic behavior. The Terminal survey collected information of access to sanitary latrine to monitor the changes between pre and post project situation. The survey findings indicate 71% of the households along the project roads and 66% along the control roads have sanitary latrine facilities. 9.76% household along the project roads and 15.12% along the control roads of the project area still use open latrine. Table 5.17 presents details on sanitation facilities in the project area.

Table 5.17: Household member, Availability of Latrine Facilities

Terminal		
Available Latrine Facilities	**Project Road**	**Control Road**
	% of Household	**% of Household**
Sanitary Latrine	71.00	66.00
Open Latrine/Hanging latrine	9.76	15.20
Open places	5.84	2.40
Pucca Latrine(Brick made)	12.43	15.70
Others	0.97	0.70
Total	**100**	**100**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED



5.13.2 Description of Child Birth Place

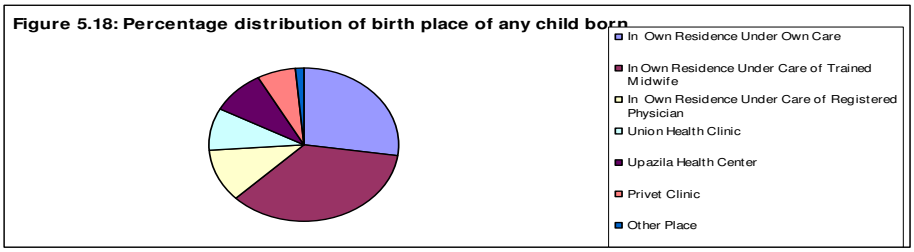
It has been embarked from the survey during last one year, the rate of child born Own Residence under own care in the project and control road area is 27.33% and 28%. Table 5.18 presents details on distribution of birth place of any child born.

Table 5.18 : Household member, % distribution of birth place of any child born during last one year

Terminal				
Description of Child Birth Place	Project road		Control road	
	No. Household	%	No. Household	%
In Own Residence Under Own Care	41	27.33%	28	28.00%
In Own Residence Under Care of Trained Midwife	53	35.33%	15	15.00%
In Own Residence Under Care of Registered Physician	17	11.33%	5	5.00%
Union Health Clinic	13	8.67%	11	11.00%
Upazila Health Center	14	9.33%	17	17.00%
Privet Clinic	10	6.67%	12	12.00%
Other Place	2	1.33%	12	12.00%
Total	**150**	**100.00%**	**100**	**100.00%**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

Figure 5.18: Percentage distribution of birth place of any child born



It has been found from the survey 20.7% child in the project area has been taken vaccine and 79.3 % not yet have taken vaccine. In the control road area, the % of child have taken vaccine is 30.4%. The percentage of child vaccinated in the study area has been shown in Table 5-17.

5.13.3 Reasons for no vaccination

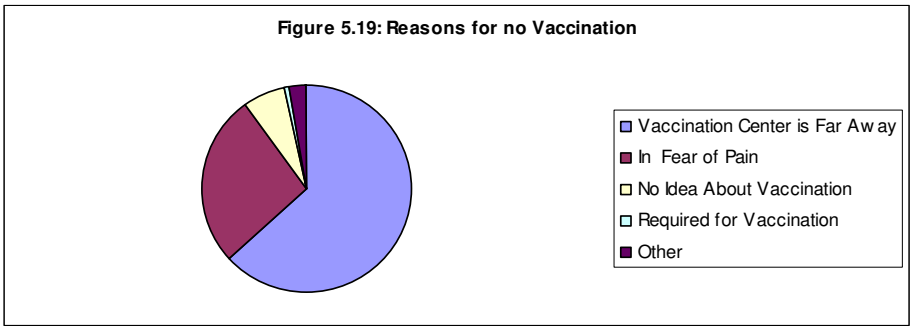
It has been embarked from the Terminal survey during last one year, the rate of reasons for no vaccination far away in the project and control road area is 63.09% and 43.82%. Table 5.18 presents details on distribution of r**easons for no vaccination**

Table 5.19 : Household member, Reasons for no vaccination

Terminal				
Reason for no vaccination	Project road		Control road	
	No. Household	%	No. Household	%
Vaccination Center is Far Away	600	63.09%	156	43.82%
In Fear of Pain	257	27.02%	99	27.81%
No Idea About Vaccination	62	6.52%	15	4.21%
Required for Vaccination	9	0.95%	76	21.35%
Other	23	2.42%	10	2.81%
Total	**951**	**100.00%**	**356**	**100.00%**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

Figure 5.19: Reasons for no Vaccination



5.14 Drinking Water

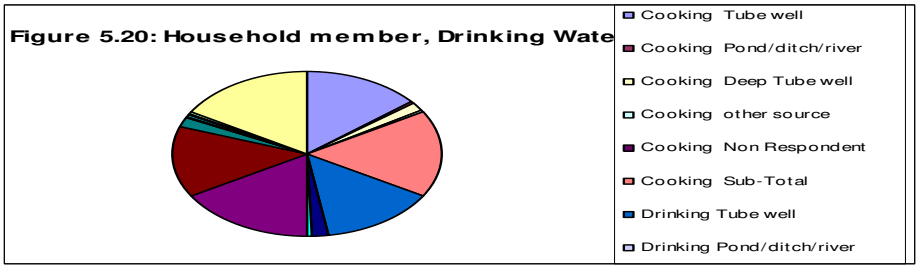
The main source of water supply in the project area is ground water, extracted through hand tube wells. Surface water is extracted from wells, ponds and river. The coverage of pure drinking water is about 94.4% (both in project and control roads) exploiting from both deep tube wells and hand tube wells.

In the project road areas utilization of Tube well water 83% for cooking, drinking and bathing. Utilization of Tube well water 85% for cooking 85% for drinking and 82.58% for bathing. See Table 5.20.

Table 5.20: Household Member, Drinking Water

Utilization of Water		Terminal	
		Project Road	Control Road
		% distribution	% distribution
Cooking	Tube well	85.00	91.50
	Pond/ditch/river	0.90	0.80
	Deep Tube well	11.50	2.80
	other source	0.30	1.80
	Non Respondent	2.40	3.10
	Sub-Total	**100.10**	**100.00**
Drinking	Tube well	85.00	91.50
	Pond/ditch/river	0.00	0.80
	Deep Tube well	11.70	2.80
	Pipeline supply	0.00	1.80
	other source	0.30	2.10
	Non Respondent	3.00	1.00
	Sub-Total	**100.00**	**100.00**
Bathing/Cleaning	Tube well	82.58	84.50
	Pond/ditch/river	10.30	10.30
	Deep Tube well	1.72	2.50
	Pipeline supply	1.20	1.12
	other source	3.20	1.50
	Non Respondent	1.00	1.00
	Sub-Total	**100.00**	**100.92**

Figure 5.20: Household member, Drinking Wate



5.15 Household Assets

5.15.1 Livestock, Poultry, Machinery, Tools, Equipments

The changes in the production of livestock and poultry over time are influenced by the improvement of rural transportation. Improved access to rural areas with all-weather condition roads and transports are directly linked to growth in the livestock and poultry sub-sector (for breeding, rearing, marketing and processing especially for getting chicks, feed, medicine and achieving fair market price). Details of live stock, poultry, machinery, tools and equipment are given in Table 5.21.

Ownership of goat or sheep is about 37.56% of households along project roads, 37.64% along control roads. Poultry/chicken is 37.89% of households along project roads and 37.83% of households along control roads.

Availability of household assets like machinery, tools and equipments is an important indicator for measuring socio-economic status of households and assessing the future changes with and without project. With the improvement of rural transport people will get increased access to agricultural equipment, pure drinking water facilities, various media, low cost transport for goods and passengers etc. The changes of the access to agricultural equipment, machinery, media and use of common and cheaper transport will manifest the impact of the improvement of rural transport. The Terminal survey, therefore, collected information on the existing level of ownership of agricultural equipment (tractor/power trailer), sewing machine, household furniture, cooking item, T.V. etc.

The Terminal survey findings indicate households along project roads are not well equipped with machinery, tools or equipment. About 15.12% of the households own agricultural equipment, 18.03% have TV and 32.48% have cooking item. Only a negligible percentage of households own solar system 2.09% and sewing machine 0.67%.

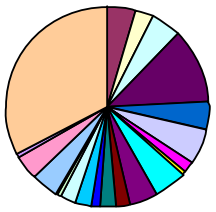
The Terminal survey findings indicate households along control roads are well equipped with machinery, tools or equipment. 7.40% of the households own agricultural equipment, 6.77% have TV and 10.50% have cooking item. Only a negligible percentage of households own solar system 0.26% and sewing machine 1.79%.

Table 5.21: Household Member, Household Assets

Terminal						
Household Asset	Project Road			Control Road		
	No. of Household	No. of Asset Per Household	% of Household	No. of Households	No. Asset Per Household	% of Household
Livestock and Poultry						
Buffalo/Cow	919	2.9	37.56	943	2.2	37.64
Goat/Sheep	600	3.7	24.54	615	2.2	24.53
Poultry/Birds	927	13.5	37.89	948	8.3	37.83
Subtotal	**2446**		**100**	**2506**		**100**
Trees	829	21.6	33.88	833	8.3	33.23
Subtotal	**1191**			**400**		
Machinery/Tools/Equipments						
Agricultural Equipment	370	5.3	15.12	387	4.7	15.44
Sewing Maching	44	1.6	1.79	45	1.3	1.80
Cot	1051	2.4	42.95	1077	2.6	42.99
Table/Chair/Alna	901	3.6	36.84	930	4.4	37.11
Almirah/Dressing Table	481	1.7	19.65	498	1.8	19.87
Telivision	441	1	18.03	457	1.1	18.22
Mobile Phone	253	1.5	10.36	282	1.6	11.23
Electric Charge Light	490	1.3	20.05	500	1.1	19.94
Torch Light	531	1.2	21.73	558	1	22.27
Fishing Net	112	1.1	4.59	118	1.1	4.72
Solar System	51	3.9	2.09	52	5.1	2.06
Silver/Other Materials	877	10.5	35.84	897	8.7	35.79
Cooking Items	794	7.9	32.48	819	9.7	32.67
Others	164	5.5	6.72	173	6.8	6.89
Subtotal	**6561**		**268.23**	**6791**		**271.00**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

Figure 5.21: Household Assets-Livestock, Poultry, Trees, Mach Tools and Equipments



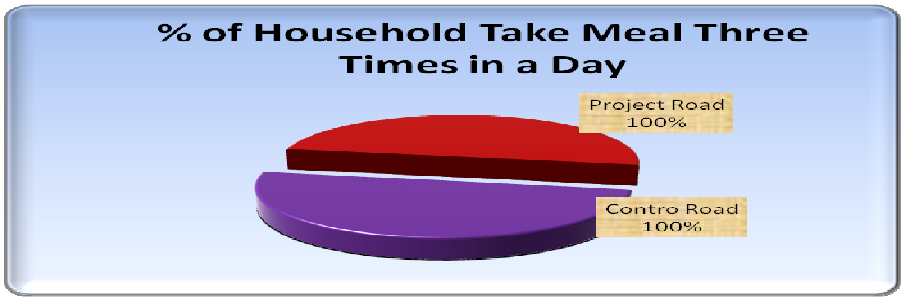
Livestock and Poultry
Buffalo/Cow
Goat/Sheep
Poultry/Birds
Subtotal
Trees
Subtotal
Machinery/Tools/Equipments

5.16 Food Consuming Status

The Terminal survey estimated the level of food sufficiency round the year in all households visited in terms of taking food in a day by household members. Rural infrastructure improvement has relationship with agricultural production and income which are both related to food security. The improvement of infrastructure may increase production and employment and there by improve food sufficiency.

Food sufficiency has been estimated in terms of how many time a household member takes meal in a day. It has been revealed from the survey 100% households of both in project and control road area take meal three times in a day. Food Consuming Status is given in Table 5.22.

Table 5.22: Food Consuming Status



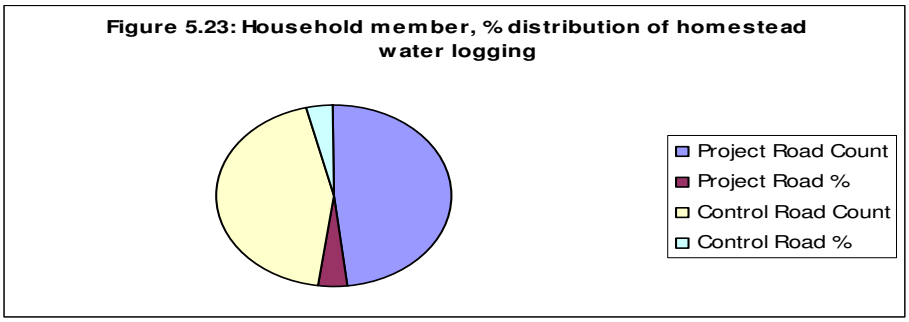
5.17 Issues Related to Environment

Physical environment within the individual household is signicant in ensuring the sound human health. Healthy humanbeing means active and potential work force and less diseases. Reduced diseases in the household ultimately create opportunity for saving money as incidence of visiting to the doctors for traetment are reduced. The improved communication net work will open scope for NGOs, LGIs and Gvernment agencies to make the people more aware on maintaining good envirnment. The survey emabarked 18.22% household in the project and 81.78% in the control road area has water logging problem. The water logging problem in control road area is more than Project road areas Table 5.23.

Table 5.23: Household Member, Percentage distribution of homestead water logging

	Project Road		Control Road	
	Count	%	Count	%
Yes	217	18.22	200	16.79
No	974	81.78	200	16.79
Total	**1191**	**1191**	**1191**	**1191**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

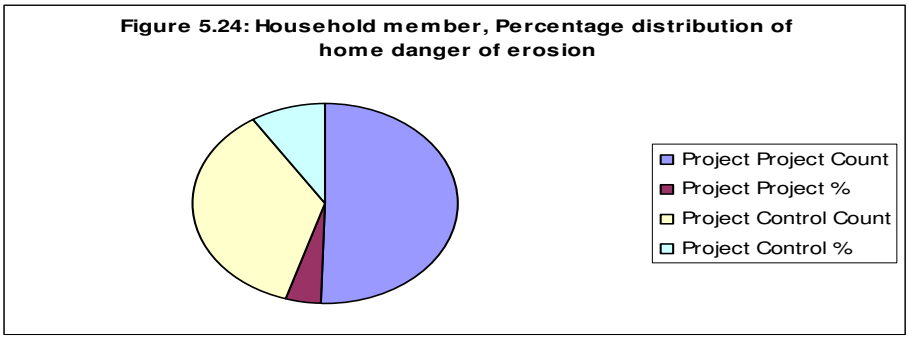


Distribution of home danger of erosion: The survey emabrked the perception of household about erosion of household by river is 15.87% in the project and 84.13% in the control road area. Household vulnerable to erosion by river is given in Table 5.24.

Table 5.24 : Household Member, Percentage distribution of home danger of erosion

	Project			
	Project		Control	
	Count	%	Count	%
Yes	189	15.87	135	33.75
No	1002	84.13	265	66.25
Total	**1191**	**100**	**400**	**100**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

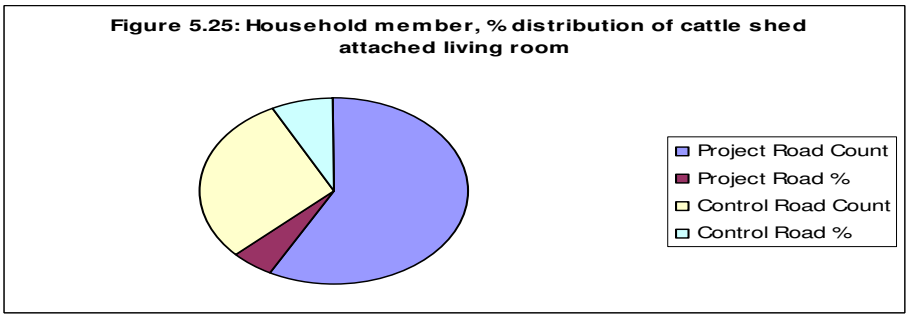


Cattle shed is important for maintaining environment and safety of the cattles. It has found from the survey 32.66% household along project road and 67.34% household in the control road area have cattle shed adjacent to the living room. Table 5.25 in present's statistics of cattle shed adjacent to living room.

Table 5.25: Household Member, % distribution of cattle shed attached living room

	Project Road		Control Road	
	Count	%	Count	%
Yes	389	32.66	200	50.00
No	802	67.34	200	50.00
Total	**1191**	**100**	**400**	**100**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

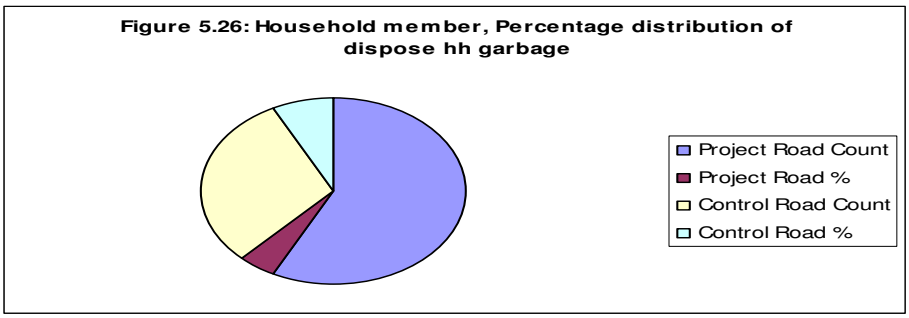


Establishing facilities for collection of household garbage s is an indicatore of awareness of household members and recognition of importance of maintaining healthy environment. The % of households maintaining facilities for collecting or disposing garbage in the project and control road area are 47.77% and 52.23%. Table 5.26 presents household garbage facilities.

Table 5.26: Household Member, Percentage distribution of dispose hh garbage

	Project Road		Control Road	
	Count	%	Count	%
Yes	569	47.77	300	75.00
No	622	52.23	100	25.00
Total	**1191**	**100**	**400**	**100**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

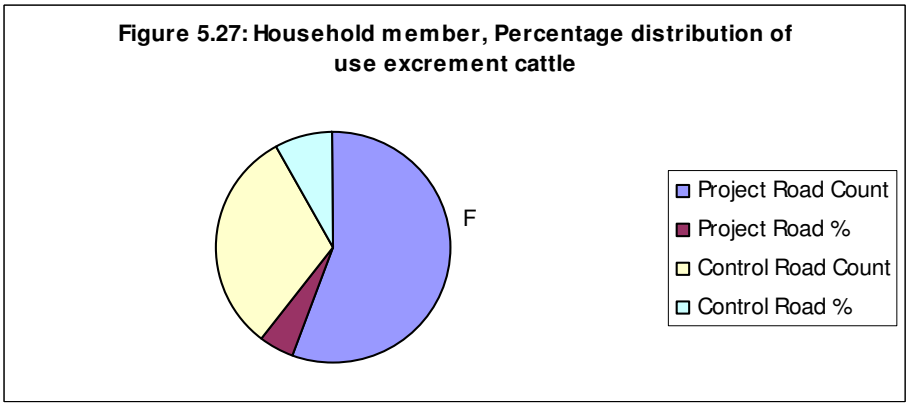


Excrement of cattle can be utilized as organic fertilizer which is very good for environment. 44.25% household in the project area and 55.75% household in the control area either store or use cattle excrement. Below Table 5.27 stated store/use of excrement of cattle.

Table 5.27: Household Member, Percentage distribution of use excrement cattle

	Project Road		Control Road	
	Count	**%**	**Count**	**%**
Yes	527	44.25	300	75.00
No	664	55.75	100	25.00
Total	**1191**	**100**	**400**	**100**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED



5.18 Gender Equity

5.18.1 Percentage Distribution of Household Head by Sex

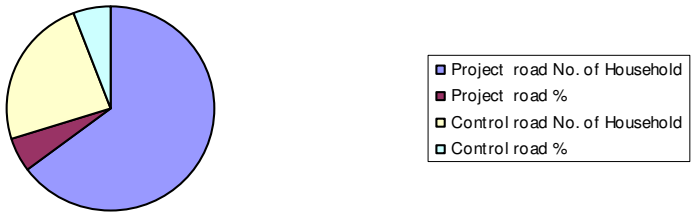
It has been revealed from the survey the percentage of household headed by male in the project and control road area is 89.17 and 10.83%. Whereas, the % of female headed household in the project and control road area are 97.50% female and 2.50%. Table 5.28 presents the detail of male and female headed household.

Table 5.28: Household Member, Male and Female Headed Household

Sex	Project road		Control road	
	No. of Household	%	No. of Household	%
Male	1062	89.17	390	97.50
Female	129	10.83	10	2.50
Total	**1191**	**100**	**400**	**100**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

Figure 5.28: Household member, Percentage distribution of Male and Female Headed Household

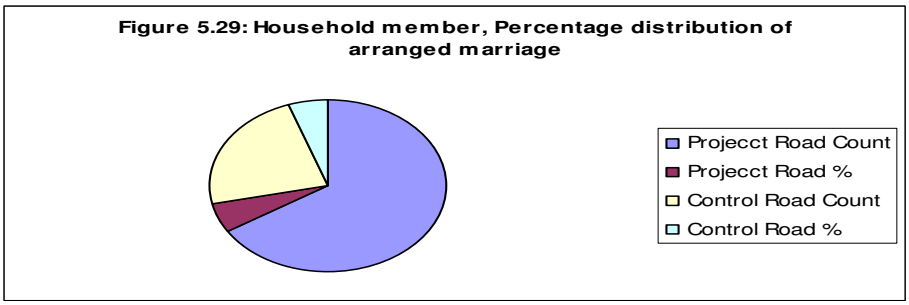


Distribution of arranged marriage: In the project area 73.89% household have instances for arranged marriage and 26.11% for other than arranged marriage. In the control road area, the percentage for arranged and other than marriage is 75.00% and 25.00%. Table 5.29 illustrated the percentage distribution of arranged marriage.

Table 5.29: Household member, Percentage distribution of arranged marriage

	Projecct Road		Control Road	
	Count	%	Count	%
Yes	880	73.89	300	75.00
No	311	26.11	100	25.00
Total	**1191**	**100**	**400**	**100**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

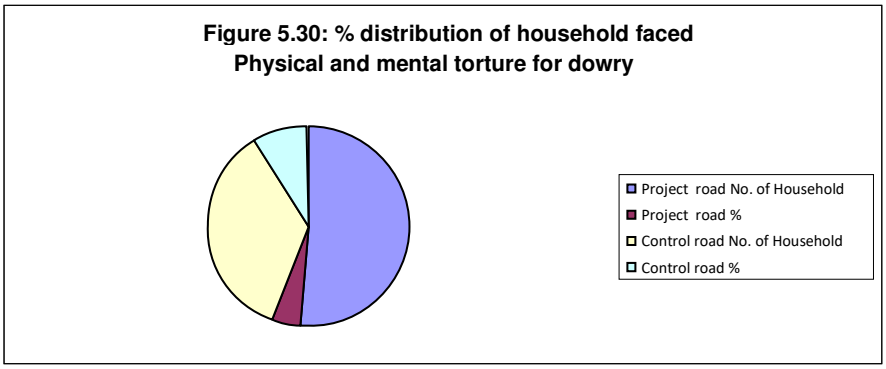


The percentage of household faced physical and mental torture in the project area is 17.21% whereas in the control area it is 35.25%. It is encouaging , in the project and control road area the percentage of household free from physical and mental toure for realizing dowry. Table 5.30 presents Percentage distribution of household faced physical and mental torture for dowry.

Table 5.30 : Household Member, % distribution of household faced physical and mental torture for dowry

Responses	Project road		Control road	
	No. of Household	%	No. of Household	%
Yes	205	17.21	141	35.25
No	986	82.79	259	64.75
Total	**1191**	**100**	**400**	**100**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

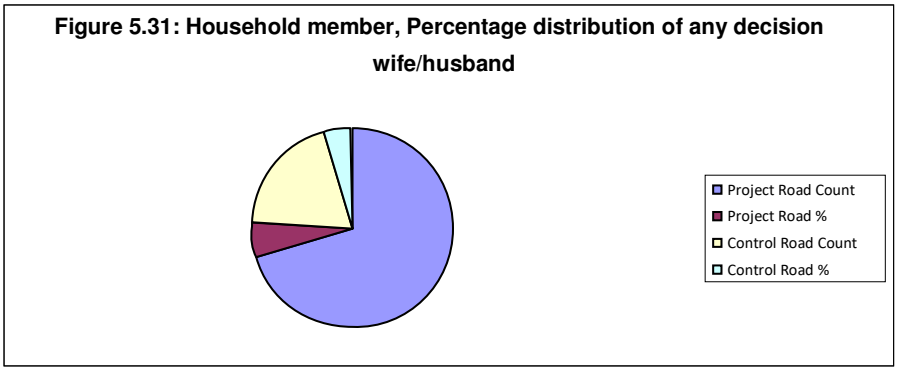


Percentage distribution of any decision wife/husband 83.96% household in the project area and 69.00% household in the control area have opined they seek decision of wife/husband for undertaking any family works. Table 5.31 presents distribution of household seek decision of wife/husband.

Table 5.31 : Household Member, Percentage distribution of any decision wife/husband

	Project Road		Control Road	
	Count	%	Count	%
Yes	1000	83.96	276	69.00
No	191	16.04	124	31.00
Total	**1191**	**100**	**400**	**100**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

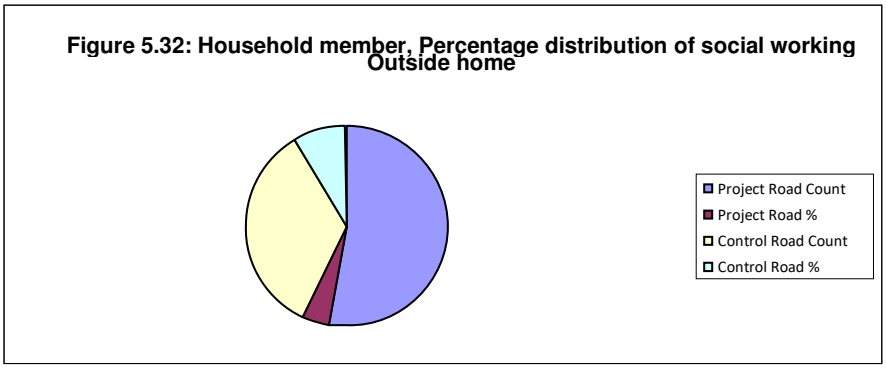


Percentage distribution of social working outside home. In the project road area 23.51% Female in the household and in the control road area 45.75% female in the household undertake social work outside their home. Table 5.32 presents social working outside home

Table 5.32 : Household Member, Percentage distribution of social working outside home

	Project Road		Control Road	
	Count	**%**	**Count**	**%**
Yes	280	23.51	183	45.75
No	911	76.49	217	54.25
Total	**1191**	**100**	**400**	**100**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED



6. Employment Status of Household Family Members

The Terminal survey has made an attempt to capture information on employment status of all members between 10-65+ years of age. The employment status is highly relevant and important for comparing the impact of project on employment creation and poverty reduction.

Along the project roads employment/self employment status of household family members categorized as employed in primary occupation full 12 months (53.78), below 12 months (6.44), 6.1-9 months (1.67), 1-6 months (0.17), up to 3 months below (0.42) and no earning (6.37),. The project area more than (68.87%) of the household members is maintaining their primary occupation for the whole year. In secondary occupation 12 months (26.89), below 12 months (0.38), 6.1-9 months (0.38), 3.1-6 months (0.09), up to 3 months below (0.21) and no earning (3.19) for up to twelve months. Table 6.1 presents Employment Status.

Table 6.1: Household member, Employment Status

Employment by Months	Project Road				Control Road			
	Primary		Secondary		Primary		Secondary	
	No.	%	No.	%	No.	%	No.	%
12 months	4725	53.78	2362	26.89	1298	48.23	664	24.67
9.1-below 12 months	566	6.44	33	0.38	84	3.12	28	1.04
6.1-9.0 months	147	1.67	33	0.38	88	3.27	29	1.09
3.1-6.0 months	15	0.17	8	0.09	6	0.22	2	0.07
3 months and below	37	0.42	19	0.21	2	0.07	1	0.02
No Earning	560	6.37	280	3.19	367	13.64	122	4.55
Total	**6050**	**68.87**	**2735**	**31.13**	**1845**	**68.55**	846	**31.45**

Source: Direct Field Survey, SRIIP-ISMC-2015, LGED

6.1 Employment Generation

(1) Concerning the impact on employment and income, it can be observed that additionally to the considerable number of direct employment through improvement measures (see Chapter **Error! Reference source not found.**), a substantial amount of indirect jobs were created, for example in newly established shops and establishments along the project roads and in the transport business (see Chapter **Error! Reference source not found.**).

(2) It can also be observed that the number of shops along the project roads grow faster than the number of road side establishments/ industries. The reason may be the short time span between completion of the project roads and conducting the Terminal survey. The survey was conducted after 7.8 months in average, 5 months in Rajshahi & Rangpur and 9 months in Khulna Division. From previous experience it can be said that investments like road side establishments need more time.

6.2 Direct Employment and Income Generation

6.2.1 Background

(1) The impact of 6.4 Billion Taka invested in infrastructure development of Rajshahi & Rangpur and Khulna Divisions under SRIIP has been a matter of interest to the planners, policy makers and development partners. The direct impact is on labour market which is easy to ascertain. The indirect impact is rather complex and takes some time to materialize. In this section, we have identified:

- the direct impact in the regional economy in the form of rural income and employment and
- the impact of road maintenance in 20 years life time of the project.

The Project Cost for rural infrastructure development of SRIIP is shown in Table 6.2.

Table 6.2: Infrastructure Development Cost of SRIIP

Infrastructure Unit, Development Cost and Economic Growth of SRIIP																	
Nature of Development	Unit	Rangpur				Rajshahi				Khulna				SRIIP			
		No. of Unit	Road Km/m/No	Project Cost (LTk)	Emp Gen (No)	No. of Unit	Road Km/m/No	Project Cost (LTk)	Emp Gen (No)	No. of Unit	Road Km/m/No	Project Cost (LTk)	Emp Gen (No)	No. of Unit	Road Km/m/No	Project Cost (LTk)	Emp Gen (No)
Upazila Road	Km	79	259	20038	1431284	39	214	15600	1114296	47	208	14842	1060155	165	681	50480	3605735
Union Road	Km	29	120	7422	530114	6	27	1567	111909	3	12	686	48968	38	158	9674	690990
Upazila Structure	m	57	1006	239	17100	38	547	547	39101	30	419	1382	98708	125	1972	2169	154909
Union Structure	m	18	328	81	5786	3	41	174	12450	3	14	59	4200	24	383	314	22436
Bridges	m	17	1024	5240	374281	9	697	4169	297800	6	398	2196	156856	32	2119	11605	828937
GC	No	9	35	2125	151807	11	31	1751	125056	7	20	898	64171	27	86	4774	341034
Tree Plantation	Km	35	139	214	15264	16	62	89	6366	20	92	142	10126	71	293	445	31756
Total		**244**	**2911**	**35359**	**2525635**	**122**	**1619**	**23898**	**1706979**	**116**	**1162**	**20205**	**1443184**	**482**	**5692**	**79461**	**5675797**

Source: D&S Consultant as of Nov 22, 2015

Note: EG 30% of Total Cost, Av. Lbour Cost Tk. 420 per labour.

6.2.2 Methods of Estimation

(1) The Direct Employment and Income Generation have been estimated in two ways. For Road Improvement, the Employment Generation (EG) has been estimated first on the basis of LGED's Database entitled, "Analysis of different type required labour (Developing 1 Km Upazila road and 1 metre bridge)". The EGs then were converted to Income Generation (IG) on the basis of weighted unit rate of labour, separately for Khulna, Rajshahi & Rangpur Divisions.

(2) The IG for Infrastructure development other than Road Improvement was estimated on the basis of conservative assumption of 20 percent income generation except Tree Plantation where IG is 79 percent. The IG then were converted to EG by using weighted average wage rate of labour which is Tk. 80 for Rajshahi & Rangpur and Tk. 76.4 for Khulna Divisions.

6.2.3 Road Construction

(1) The most recent labour requirements and unit rates as used by SRIIP are presented in Table 4.3. Direct employment and income generation in SRIIP-ISMC. The Table has been produced on the basis of 6.3.

Table 6.3: Direct Employment and Income Generation in SRIIP Project

Direct Employment and Income Generation								
Nature of Development	Rangpur		Rajshahi		Khulna		SRIIP	
	Labour Requirement (Person days)	Total Income Gen (LTk)	Labour Requirement (Person days)	Total Income Gen (LTk)	Labour Requirement (Person days)	Total Income Gen (LTk)	Labour Requirement (Person days)	Total Income Gen (LTk)
Upazila Road	1,431,284	601,139,100	1,114,296	468,004,500	1,060,155	445,265,100	3,605,735	1,514,408,700
Union Road	530,114	222,647,700	111,909	47,001,600	48,968	20,566,500	619,563	290,215,800
Upazila Structure	17,100	7,182,000	39,101	16,422,300	98,708	41,457,300	787,744	65,061,600
Union Structure	5,786	2,430,000	12,450	5,229,000	4,200	1,764,000	26,410	9,423,000
Bridges	374,281	157,197,900	297,800	125,076,000	156,856	65,879,700	464,138	348,153,600
GC	151,807	63,759,000	125,056	52,523,700	64,171	26,951,700	363,550	143,234,400
Tree Plantation	15,264	6,411,000	6,366	2,673,900	10,126	4,252,800	1,130,685	13,337,700
Total	**2,525,635**	**1,060,766,700**	**1,706,979**	**716,931,000**	**1,443,184**	**606,137,100**	**6,997,825**	**2,383,834,800**
Total Emp in Person Years	8419		5690		4811		23326	

Source: D&S Consultant as of Nov 22, 2015
Note: EG 30% of Total Cost, Av. Lbour Cost Tk. 420 per labour.
Source: This Table has been produced on the basis of 5 Tables presented in Annex 2.
Note: LTk = Lac Taka = 100,000 Taka

(2) As indicated in the above Table 6.3, the SRIIP is in the process of generating 23326 person years of employment and about 2 Billion Taka of income.

(3) Employment created to date in construction for poor and disadvantaged groups is estimated at approx. employment of 23325 person-years, of poor and disadvantaged persons among those who are involved in construction activities).

6.2.4 Road Maintenance

(1) We have so far estimated Income and Employment generation as a result of Infrastructure Development. The maintenance of roads after the improvement is equally important. This has been realized by LGED. Consequently, a unit entitled Rural Infrastructure Maintenance Management Unit (RIMMU) has been established within LGED. This unit estimates Short and Long Term Maintenance need of LGED (see Table 6.4).

(2) The Rural Road Master Plan (RRMP) of July 2005 estimated three kinds of maintenance in the time horizon of 20 years after the end of the project in 2025. These maintenance types are as follows:

- Routine Maintenance (RM): Every year @ Tk. 28,500 per km except Rehabilitation year.
- RM in PM year is @Tk. 22,500 per km.
- Periodic Maintenance (PM): Once every 5th year @ Tk. 1.00 Million per Km
- Rehabilitation: Once every 10^{th} year @ Tk. 3.2 Million Tk per Km

(3) Assuming 20 years life time, there will be need for 19 times Routine Maintenance, 3 times Periodic Maintenance and one time Rehabilitation. The total maintenance cost thus will be Tk. 111.6 Billion for 1,301 Km road in 2008-07 prices. This will generate about Tk. 2.5 Billion income along with 52,369 Person-years of employment. If the road infrastructure improved under SRIIP is properly maintained in future as per Rural Master Plan of LGED, Income and employment generation in the regional economy will be as presented in the following Table 6.4.

Table 6.4: Maintenance Cost and Income/Emp. Gen of SRIIP Upazila/ Union Road in 20 Years' Life Time

Sl. No.	Type of Maintenance	Frequency in Project Life	Rate (LTk/Km)	Total (LTk)
1	Routine Maintenance			
	Per Km in Tk.(Off & On Pavement)	15	0.44	6.60
2	Reduced Routine Maintenance			
	Per Km in Tk. (Off Pavement)	4	0.37	1.48
3	Periodic Maintenance (Re-seal)			
	7 mm Seal Coat Per Km (Tk)	1	4.40	4.40
4	Periodic Maintenance (Re-seal)			
	12 mm Seal Coat Per Km (Tk)	1	6.90	6.90
5	Periodic Maintenance Overlay			
	Tk per Km (25 mm BC)	2	15.25	30.50
6	Rehabilitation - Pavement Strengthening			
	in 20Yrs Per Km (LTk)	1	26.00	26.00
7	Total Maintenance in 20 Yrs Per Km (LTk)			75.88
8	Total Maintenance in 20 Yrs for 1335.76 Km (LTk)			101,357.47
9	Av. Maintenance Cost /Yr/Km (LTk)			379,400.00
10	Income Generation in 20 Yrs/Km (LTk)		21.40%	16.24
11	Employment Generationin 20 Yrs/Km (Person-days)		10.80%	8.20
12	Income Generation in 20Yrs on 1335.76 Km (LTk)			21,690.50

Source: D&S Consultant as of Nov 22, 2015

6.2.5 Conclusion

Combining Construction and Maintenance costs, the EG in the regional economy is 79,400 person-years and IG is Tk. 2.81 billion, provided the roads are properly maintained in the time horizon of 20 years.

6.3 Indirect Employment Generation

There are three types of indirect employment generation that can be linked to the RIIP: (i) Road Side Employment generation on project roads, (ii) Income Generating Activities under Pilot Union Parishad from RIIP Grant and (iii) Employment Generation of Household members living along the project roads.

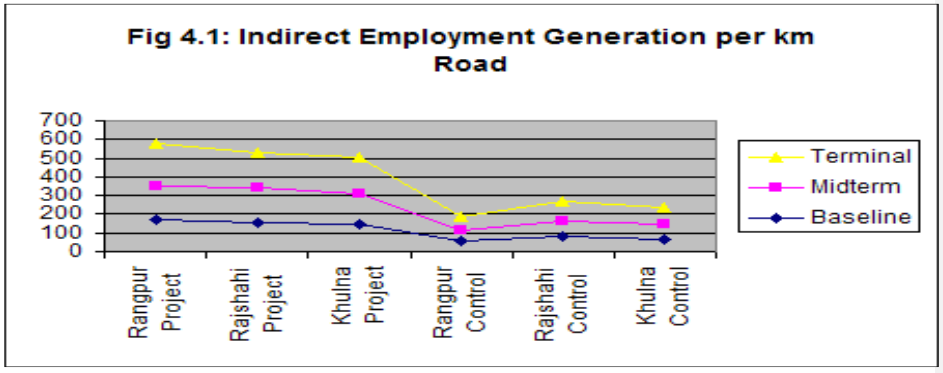
6.3.1 Road Side Employment

(1) Under the RIIP BME-System road side employment generation is separated into the development of road side shops, especially road side transport shops, the number of transport operators, of road side establishment/ industry and of number of permanent shops on road side markets.

(2) In total, the road side employment generation on project roads went up by 52 percent from 69 employees per km road to 105. In comparison there is a decrease of 1.5 percent on employment generation on control roads (from 74 to 73 employees per km road) (see Table 6.5).

Table 6.5: Indirect Employment Generation per km Road

Indirect Employment Generation per km Road					
Division	Baseline	Midterm	Terminal	B-M-in %	B-T-in %
Rangpur Project	167.38	184.12	222.62	10.00%	33.00%
Rajshahi Project	154.73	184.13	191.87	19.00%	24.00%
Khulna Project	144.73	167.89	195.39	16.00%	35.00%
Rangpur Control	54.38	61.99	71.24	14.00%	31.00%
Rajshahi Control	78.08	88.23	104.63	13.00%	34.00%
Khulna Control	68.08	76.25	88.50	12.00%	30.00%



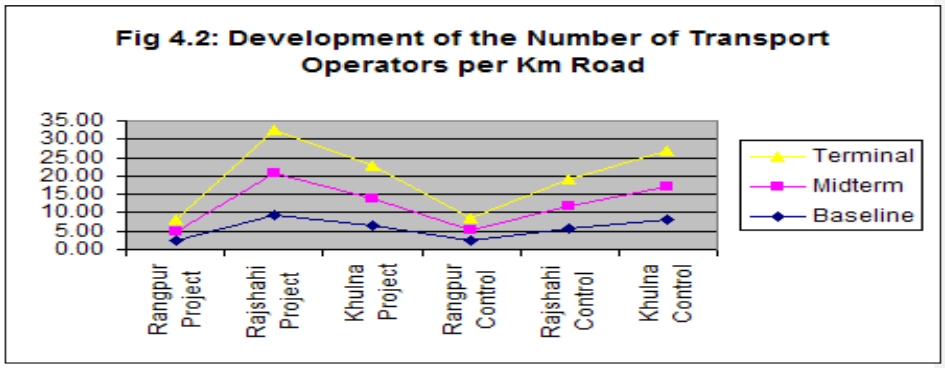
Source: SRIIP Baseline Survey 2013 and Terminal survey 2015 (n = 16 roads)

6.3.2 Transport Operator

(3) Regarding the number of transport operators on project roads, the positive development are very clear (see Table 6.6). In total, the number increased by 178 percent from 12.9 to 35.7 transport operators per km of project road. On control roads, the number increased by 35 percent from 10.1 to 13.6 transport operators per km road.

Table 6.6: Development of the Number of Transport Operators per Km Road

No. of Transport Operator per km Road					
Division	Baseline	Midterm	Terminal	B-M-in %	B-T-in %
Rangpur Project	2.32	2.60	3.13	12.00%	35.00%
Rajshahi Project	9.52	11.14	11.80	17.00%	24.00%
Khulna Project	6.52	7.37	9.00	13.00%	38.00%
Rangpur Control	2.43	2.72	3.23	12.00%	33.00%
Rajshahi Control	5.52	6.13	7.45	11.00%	35.00%
Khulna Control	8.02	9.14	9.86	14.00%	23.00%

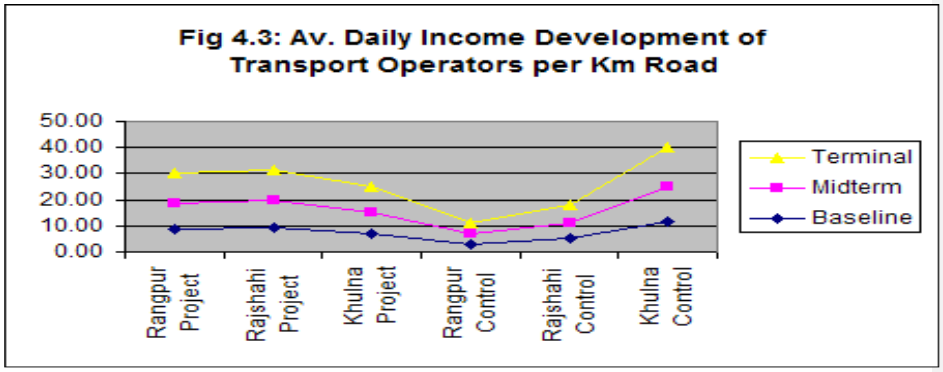


Source: SRIIP Baseline Survey 2013 and Terminal survey 2015 (n = 16 roads)

(4) not only the number of transport operators increased on project roads, their daily income increased as well. It went up by 36 percent from 149 to 202 Taka on project roads. On control roads the daily income decreased by 2 percent from 114 to 112 Taka a day (see Table 6.7).

Table 6.7: Daily Income Development of Transport Operators per Km Road

Av. Daily Income in Tk. of Transport Operators per Km Road					
Division	Baseline	Midterm	Terminal	B-M-in %	B-T-in %
Rangpur Project	8.55	9.83	11.80	15.00%	38.00%
Rajshahi Project	9.05	10.77	11.40	19.00%	26.00%
Khulna Project	7.05	8.18	9.80	16.00%	39.00%
Rangpur Control	3.16	3.57	4.27	13.00%	35.00%
Rajshahi Control	5.16	5.78	7.12	12.00%	38.00%
Khulna Control	11.91	13.34	15.01	12.00%	26.00%



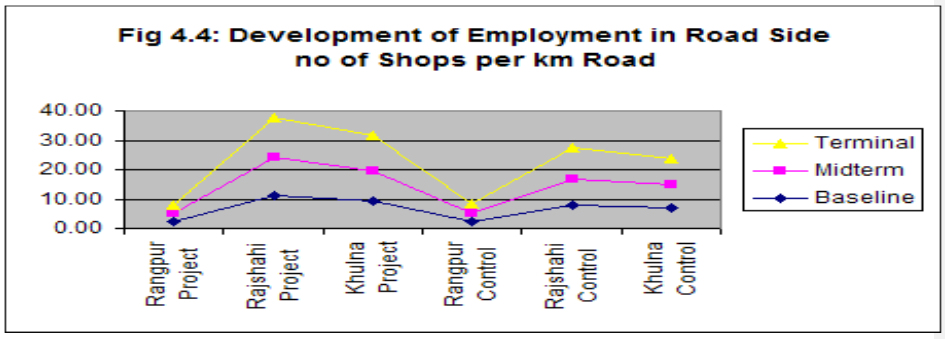
Source: SRIIP Baseline Survey 2013 and Terminal survey 2015 (n = 16 roads)

6.3.3 Road Side Shops (incl. Road Side Transport Shops)

(5) Due to an increase of road side shops, the number of employees (consisting of shop owners plus additional employees) increased as well. In total it went up by 44 percent from 5.2 to 7.5 employees per km of project road. In Khulna Division the increase is higher with 56 percent (from 3.5 to 5.4 employees per km of project road) compared to Rajshahi & Rangpur Division with 30 percent (from 11.7 to 15.3 employees per km of project road). On control roads the number of employees remained nearly unchanged on average (10.1 to 10.8 employees per km road). The positive development on control roads in Rajshahi & Rangpur Division (from 11.7 to 14.7 employees per km road) is compensated by a negative development in Khulna Division (from 7.6 to 5.1 employees per km road) (compare Table 6.8).

Table 6.8: Development of Employment in Road Side no of Shops per km Road

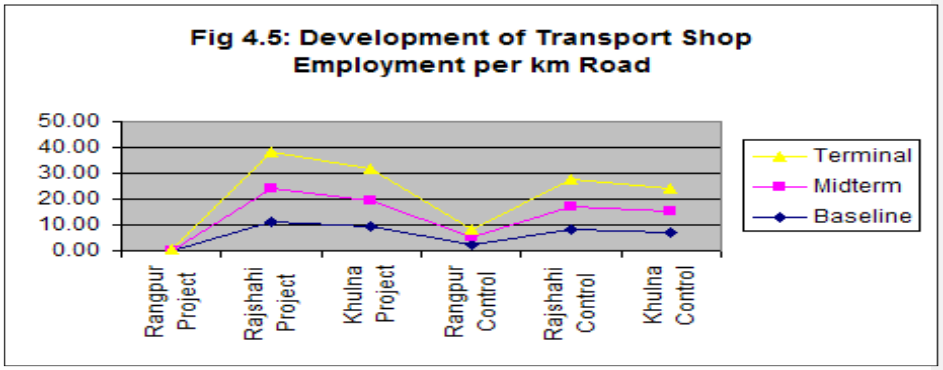
Road Side No of Shops Employment per km Road					
Division	Baseline	Midterm	Terminal	B-M-in %	B-T-in %
Rangpur Project	2.32	2.58	3.16	11.00%	36.00%
Rajshahi Project	11.14	12.92	13.59	16.00%	22.00%
Khulna Project	9.14	10.24	12.43	12.00%	36.00%
Rangpur Control	2.43	2.70	3.21	11.00%	32.00%
Rajshahi Control	8.02	8.90	10.75	11.00%	34.00%
Khulna Control	7.02	8.00	8.56	14.00%	22.00%



Consisting of rickshaw/ rickshaw van/ bicycle workshops, motorcycle workshops and fuel selling shops) increased as well see Table 6.9. Thus the number of employment (consisting of shop owners plus additional employees) increased on project roads by 67 percent from 0.24 to 0.40 employees per km road; while on control roads the development is less with 9 percent from 0.37 to 0.41 employees per km of road). In Rajshahi & Rangpur Division the number of employees of transport shops went up on both categories of roads, from 0.66 to 0.84 employees per km of project road (+29 percent) and from 0.51 to 0.68 employees per km of control road (+33 percent). This is in contrast to the development of employment in Khulna Division, where the number of employees increased on project roads by 120 percent from 0.13 to 0.28 per km and decreased on control roads by 100 percent from 0.17 to 0.0 employees per km road (All transport shops closed on control roads in Khulna Division (compare see Table 6.9)

Table 6.9: Development of Transport Shop Employment per km Road

Transport Shop Employment per km Road					
Division	Baseline	Midterm	Terminal	B-M-in %	B-T-in %
Rangpur Project	0.09	0.10	0.13	10.00%	39.00%
Rajshahi Project	11.14	12.81	14.15	15.00%	27.00%
Khulna Project	9.14	10.24	12.34	12.00%	35.00%
Rangpur Control	2.41	2.68	3.21	11.00%	33.00%
Rajshahi Control	8.02	8.82	10.75	10.00%	34.00%
Khulna Control	7.02	8.00	9.06	14.00%	29.00%



Source: SRIIP Baseline Survey 2013 and Terminal survey 2015 (n = 16 roads)

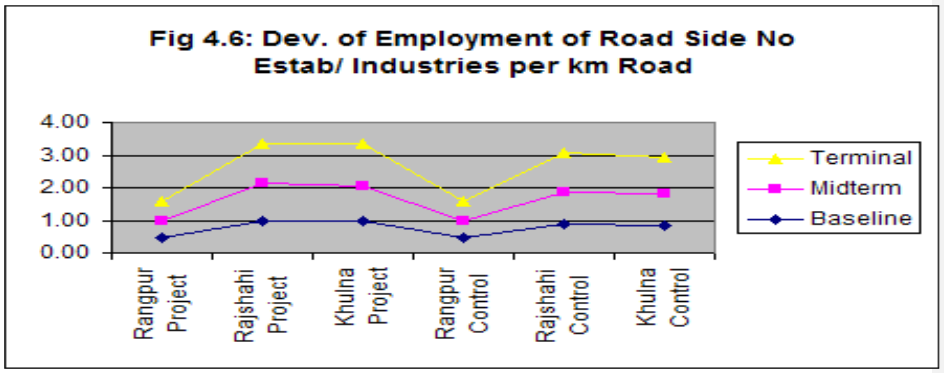
6.3.4 Road Side Establishments/ Industry

(7) The number of employees in road side establishment/ industries increased on project roads in total by 72.2 percent from 3.01 to 5.18 employees per km of project road. In Rajshahi & Rangpur Division, the number decreased by 50 percent from 0.28 to 0.14, because all four small rice mills on the project road in Bhola converted from stationary establishments to mobile rice mills on rickshaw vans and were not counted in the Terminal survey anymore. Furthermore, some road side establishments were closed on this road due to river erosion. In Khulna Division, the number increased by 74.7 percent from 3.75 to 6.55 employees per km of project road. shows the development of employment of road side establishments/ industries.

(8) Compared to the development on project roads, the number of employees per km of control road went down by 79.3 percent from 2.29 to 0.48. In Rajshahi & Rangpur Division, the decrease from 2.96 to 0.17 (-94.2 percent) is higher than in Khulna Division with 1.30 to 0.92 (-29 percent). This development is mainly caused by the decrease of road side establishments/ industries on control roads (see Table 6.10). On one control road in Bhola District, Rajshahi & Rangpur Division four establishments were closed because of river erosion.

Table 6.10: Dev. of Employment of Road Side No Estab/ Industries per km Road

No of Establishment/ Industry Employment per km Road					
Division	Baseline	Midterm	Terminal	B-M-in %	B-T-in %
Rangpur Project	0.45	0.51	0.62	14.00%	38.00%
Rajshahi Project	0.98	1.14	1.24	16.00%	27.00%
Khulna Project	0.96	1.08	1.30	12.00%	35.00%
Rangpur Control	0.46	0.51	0.61	11.00%	33.00%
Rajshahi Control	0.88	0.99	1.18	13.00%	34.00%
Khulna Control	0.86	0.96	1.09	12.00%	27.00%

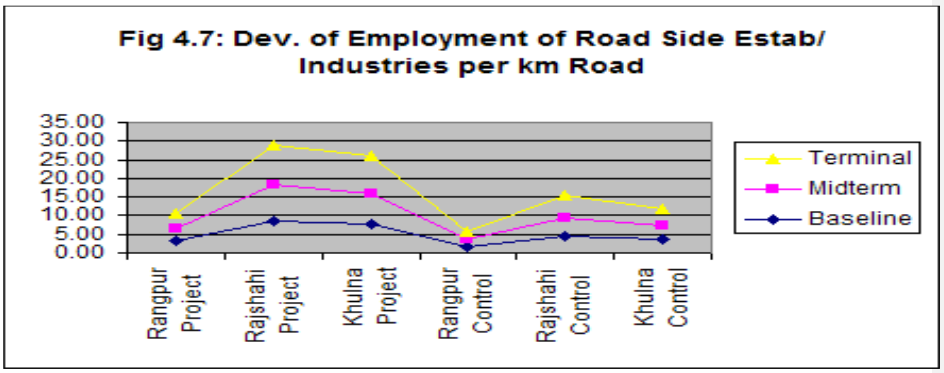


Source: SRIIP Baseline Survey 2013 and Terminal survey 2015 (n = 16 roads)

(9) In general the development of road side employment correlates first of all with the development of road side establishments/ industries. More road side establishments lead to more employment and a decline of establishments lead to less employment. This explains partly the positive development in Khulna Division and the negative development in Rajshahi & Rangpur Division (see Table 6.11) shows the positive development of road side establishments in Khulna and the negative development in Rajshahi & Rangpur Division). But despite the negative development of establishments on project roads in Rajshahi & Rangpur Division the average employment per establishment went up as shown in Table 4.11. This shows the overall economic growth on project roads.

Table 6.11: Dev. of Employment of Road Side Estab/ Industries per km Road

Establishment/ Industry Employment per km Road					
Division	Baseline	Midterm	Terminal	B-M-in %	B-T-in %
Rangpur Project	3.08	3.51	4.19	14.00%	36.00%
Rajshahi Project	8.54	9.65	10.85	13.00%	27.00%
Khulna Project	7.54	8.44	10.18	12.00%	35.00%
Rangpur Control	1.70	1.89	2.24	11.00%	32.00%
Rajshahi Control	4.50	4.95	6.03	10.00%	34.00%
Khulna Control	3.50	3.96	4.45	13.00%	27.00%

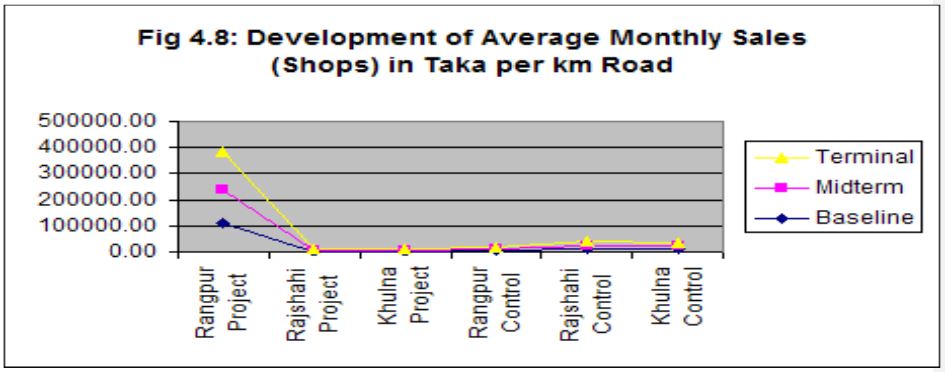


Source: SRIIP Baseline Survey 2013 and Terminal survey 2015 (n = 16 roads)

(10) Apart from the positive employment generation on project roads the average monthly income for employees in the road side establishments/ industries increased as well. In total the average monthly income increased by 22 percent from 2,064 Taka to 2,519 Taka on project roads. On control roads the monthly income dropped by 6.9 percent from 1,693 Taka to 1,575 Taka (see Table 6.12).

Table 6.12: Development of Average Monthly Sales (Shops) in Taka per km Road

Average Monthly Sales in Shop Taka per km Road					
Division	Baseline	Midterm	Terminal	B-M-in %	B-T-in %
Rangpur Project	109934.20	126424.33	149510.51	15.00%	36.00%
Rajshahi Project	2808.01	3229.21	3566.17	15.00%	27.00%
Khulna Project	2708.01	3032.97	3655.81	12.00%	35.00%
Rangpur Control	5199.01	5770.90	6862.69	11.00%	32.00%
Rajshahi Control	11909.01	13338.09	15958.07	12.00%	34.00%
Khulna Control	10909.01	12327.18	13854.44	13.00%	27.00%



Source: SRIIP Baseline Survey 2013 and Terminal survey 2015 (n = 16 roads)

6.3.5 Road Side Markets

(11) Concerning the number of employees in road side markets (consisting of permanent shop owners plus additional employees), the increase on project roads is 17.9 percent and on control roads the number went down by 7.1 percent. In Rajshahi & Rangpur Division, the difference between project and control road (+21.6 and -38.3 percent) is clearer than in Khulna Division (+17.2 and +1.5 percent)

Table 6.13: Dev. of No. of Employee Employment in Market per km Road

Market EmployeeEmployment per km Road					
Division	Baseline	Midterm	Terminal	B-M-in %	B-T-in %
Rangpur Project	20.24	23.07	27.32	14.00%	35.00%
Rajshahi Project	33.35	39.69	41.02	19.00%	23.00%
Khulna Project	33.35	38.02	45.02	14.00%	35.00%
Rangpur Control	25.36	28.66	33.48	13.00%	32.00%
Rajshahi Control	22.08	24.73	29.15	12.00%	32.00%
Khulna Control	24.08	27.45	30.58	14.00%	27.00%

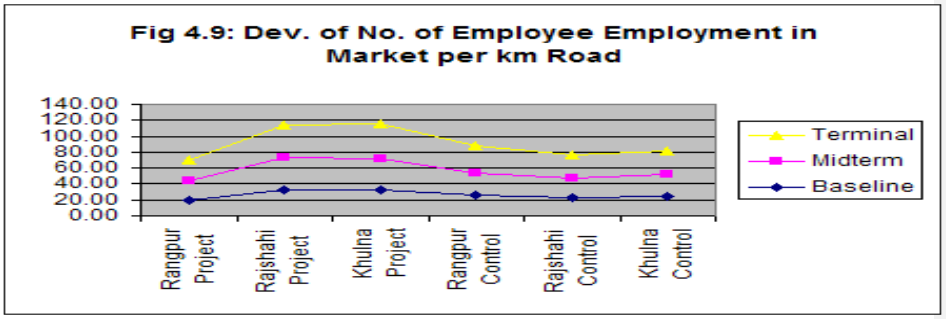
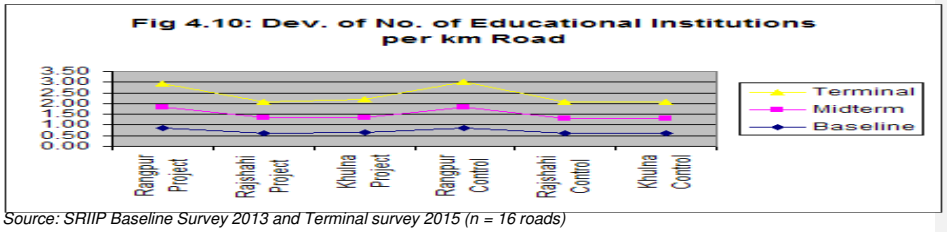


Table 6.14: Dev. of No. of Educational Institutions per km Road

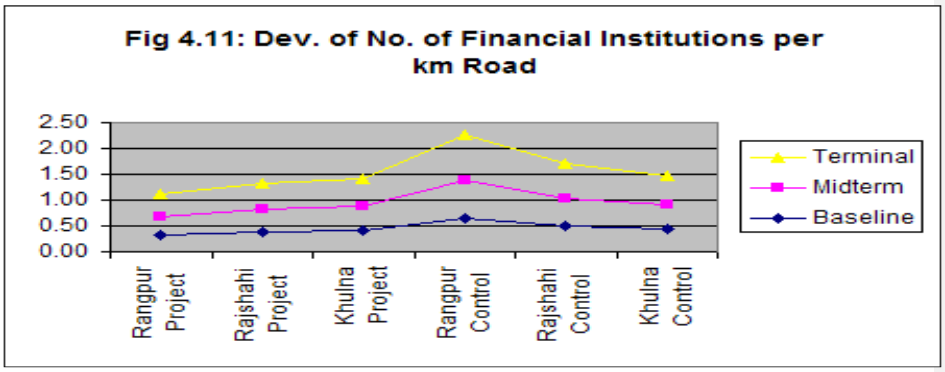
Dev. of No. of Educational Institutions per km Road					
Division	Baseline	Midterm	Terminal	B-M-in %	B-T-in %
Rangpur Project	0.86	0.95	1.14	11.00%	32.00%
Rajshahi Project	0.61	0.73	0.74	19.00%	21.00%
Khulna Project	0.64	0.72	0.85	12.00%	33.00%
Rangpur Control	0.87	0.96	1.18	10.00%	36.00%
Rajshahi Control	0.60	0.68	0.80	14.00%	33.00%
Khulna Control	0.62	0.69	0.79	11.00%	27.00%



Source: SRIIP Baseline Survey 2013 and Terminal survey 2015 (n = 16 roads)

Table 15: Dev. of No. of Financial Institutions per km Road

Dev. of No. of Financial Institutions per km Road					
Division	Baseline	Midterm	Terminal	B-M-in %	B-T-in %
Rangpur Project	0.32	0.37	0.44	15.00%	36.00%
Rajshahi Project	0.39	0.44	0.49	13.00%	25.00%
Khulna Project	0.41	0.47	0.54	15.00%	32.00%
Rangpur Control	0.65	0.72	0.90	11.00%	38.00%
Rajshahi Control	0.49	0.55	0.68	13.00%	38.00%
Khulna Control	0.43	0.49	0.55	15.00%	27.00%



Source: SRIIP Baseline Survey 2013 and Terminal survey 2015 (n = 16 roads)

Table 16: Dev. of No. of Service Centre per km Road

Dev. of No. of Service Centre per km Road					
Division	Baseline	Midterm	Terminal	B-M-in %	B-T-in %
Rangpur Project	0.13	0.15	0.18	15.00%	39.00%
Rajshahi Project	0.16	0.19	0.21	16.00%	29.00%
Khulna Project	0.18	0.20	0.24	12.00%	32.00%
Rangpur Control	0.17	0.19	0.23	12.00%	38.00%
Rajshahi Control	0.11	0.12	0.15	11.00%	38.00%
Khulna Control	0.15	0.17	0.19	14.00%	27.00%

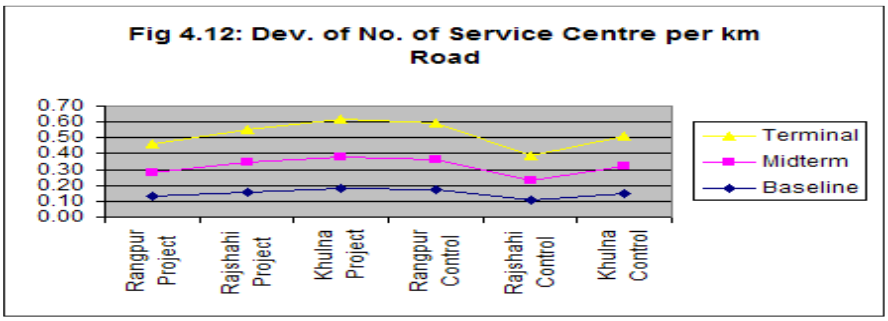
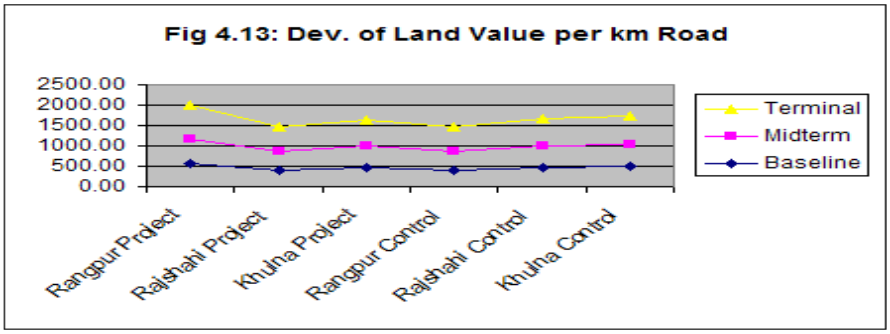


Table 6.17: Dev. of Land Value per km Road

Dev. of Dev. of Land Value per km Road					
Division	Baseline	Midterm	Terminal	B-M-in %	B-T-in %
Rangpur Project	558.03	619.41	809.14	11.00%	45.00%
Rajshahi Project	411.93	461.36	580.82	12.00%	41.00%
Khulna Project	461.93	526.60	660.56	14.00%	43.00%
Rangpur Control	408.54	453.48	608.72	11.00%	49.00%
Rajshahi Control	470.33	517.36	677.28	10.00%	44.00%
Khulna Control	490.33	549.17	701.17	12.00%	43.00%

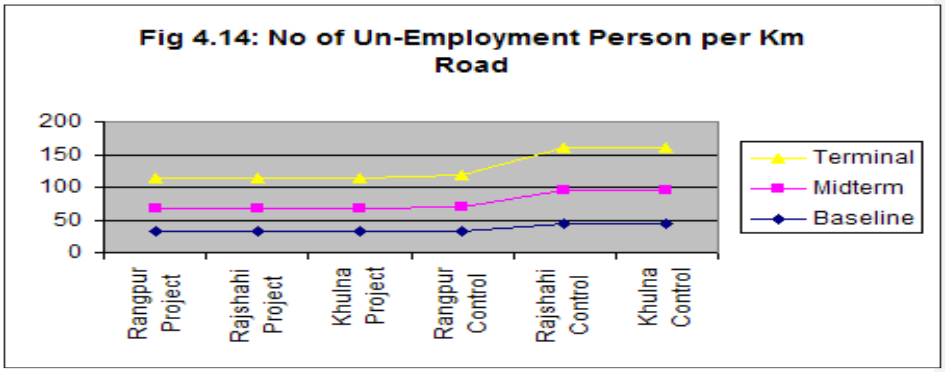


6.3.6 Employment Development at Household Level

(1) In Khulna Division the development is as expected. The road improvement leads to a decrease in the unemployment rate on the household level from 6 to 5.3 percent on project roads in contrast to an increase on control roads (from 5.9 to 7.6 percent). In Rajshahi & Rangpur Division the unemployment rate increased on both categories of roads; on project roads from 3.6 to 6 percent and on control roads from 5.1 to 5.5 percent. In total the positive effect on project roads in Khulna Division is compensated by the negative effect on project roads in Rajshahi & Rangpur Division. In total the unemployment rate on project roads remained nearly unchanged (from 5.4 to 5.5 percent). On control roads the unemployment rate increased from 5.4 to 6.2 percent in the whole project area (see Table 4.18)

Table 6.18: No of Un-Employment Person per Km Road

No of Un-Employment Person per Km Road					
Division	Baseline	Midterm	Terminal	B-M-in %	B-T-in %
Rangpur Project	32	36.48	45.44	14.00%	42.00%
Rajshahi Project	32	36.21	45.83	13.00%	43.00%
Khulna Project	32	36.53	45.51	14.00%	42.00%
Rangpur Control	33	37.53	47.65	15.00%	46.00%
Rajshahi Control	45	51.67	63.26	16.00%	42.00%
Khulna Control	45	51.23	64.15	15.00%	44.00%



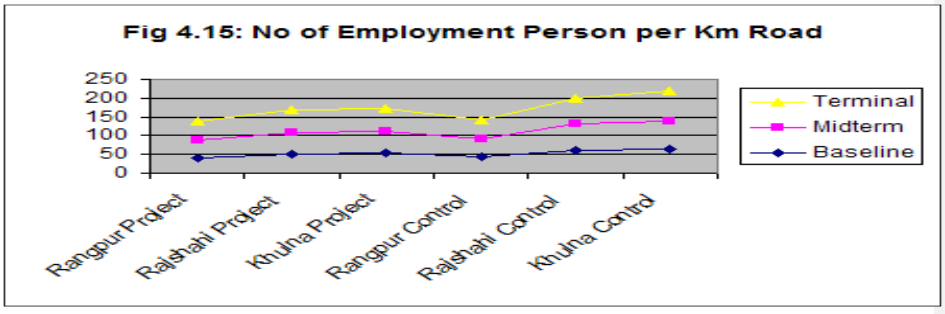
Source: SRIIP Baseline Survey 2013 and Terminal survey 2015 (n = 16 roads)

Source: RIIP Baseline Survey 2004 and Terminal survey 2008 (Baseline n = 8103, Terminal n = 8156; Note: *maybe due to the fact that the construction progress was slow in Rajshahi & Rangpur and so the development could not take place yet. Furthermore, sample size in Rajshahi & Rangpur Division was rather small, with only two roads.

(2) It can be observed that on project roads the share of employment in the secondary (industrial) sector went up from 8.7 to 10.8 percent, while on control roads it decreased slightly from 12.2 to 12 percent. In the agricultural sector the share went down on both types of road category; on project roads from 45.3 to 43.9 percent and on control roads from 48 to 44.3 percent. In the service sector the share on project roads decreased slightly from 46 to 45.3 percent and on control roads it increased from 39.8 to 43.9 percent (compare Table 4.19).

Table 6.19: Table 6.19: No of Employment Person per Km Road

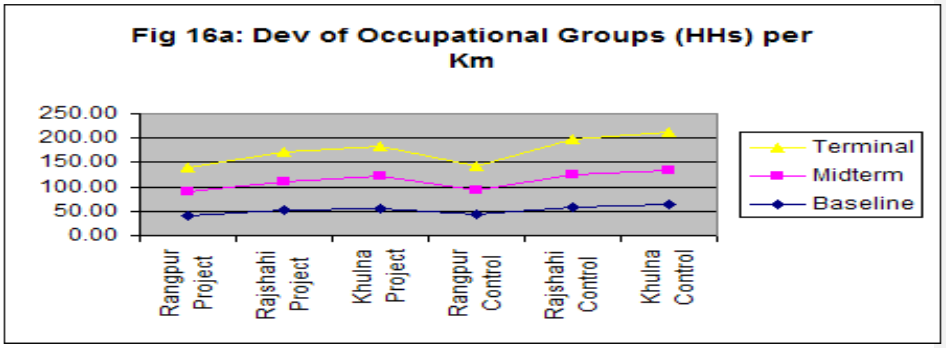
No of Employment Person per Km Road					
Division	Baseline	Midterm	Terminal	B-M-in %	B-T-in %
Rangpur Project	41	47.27	49	14.00%	18.62%
Rajshahi Project	51	58.20	59	14.00%	14.96%
Khulna Project	53	60.00	59	13.00%	10.58%
Rangpur Control	43	48.56	50	12.00%	15.09%
Rajshahi Control	62	68.58	70	11.00%	13.18%
Khulna Control	65	74.45	80	14.00%	23.21%



(3) The share of transport workers on all occupational groups at household level increased on project roads in total by 86 percent from 1.9 to 3.6 percent while on control roads it increased by 56 percent from 2.7 to 4.2 percent. In Rajshahi & Rangpur Division the increase is very prominent on project roads from 0.6 to 5.5 percent compare to a lower increase in Khulna Division from 2.4 to 2.9 percent transport workers of all occupational groups (Table 4.20).

Table 6.20: Dev of Occupational Groups (HHs) per Km

Dev of Occupational Groups (HHS) per Km					
Division	Baseline	Midterm	Terminal	B-M-in %	B-T-in %
Rangpur Project	41.47	48.52	49	17.00%	18.72%
Rajshahi Project	51.05	60.75	60	19.00%	17.16%
Khulna Project	56.05	65.02	62	16.00%	10.43%
Rangpur Control	43.36	49.86	50	15.00%	16.27%
Rajshahi Control	58.68	66.90	71	14.00%	20.87%
Khulna Control	62.68	72.08	78	15.00%	24.56%



6. Recommendations

The project Terminal Benefit Monitoring and Evaluation (BME) survey should follow the Baseline study methodology to assess the trend of changes occurred as a result of project interventions.

The supervision and monitoring of Terminal BME activities during the period of post development period survey should be strengthened with the active involvement of AEs/ UZEs under close follow up and guidance of the respective XENs/ Consultants.

7. Conclusions

The Sustainable Rural Infrastructure Improvement Project (SRIIP) undertaken by LGED aims at improving the socioeconomic situation of the poor through creation of employment opportunities. The components of the projects are mainly, the improvement of Upazila Roads, Union Roads, Growth Center Markets/ Rural Markets and Capacity Development of Local Governance.

The Monitoring and Evaluation is one of the institutional support components to assess or evaluate the benefit and impact of the rural infrastructure improvement and institutional support works. To this end in view, the Terminal data collection was conducted two times from 1st June to 15th July, 2014 during wet season and 1st November to 15th December, 2014 during dry season under guidance of the ISMC consultants of SRIIP. The data were collected from all the BME selected roads, and markets with a view to comparing the existing socio-economic condition with the change due to project intervention.

During this Terminal surveys all the selected 16 (sixteen) roads sub projects and 12 market sub project including 4 control roads and 3 control markets of respective upazilas were surveyed at a time. In collecting the data, all Community Organizers, surveyors and Sub Assistant Engineers of respective Upazila and Socio-Economist, Sociologist of respective districts were engaged who were provided orientation on the methodology for data collection prior to involving them in performing responsibilities. Due to some constraints, a Terminal draft report has been prepared in the month of April. 2016. This report covers near about 10 percent of all the infrastructures under this project.

However, the report contains the analysis of the different aspects of Terminal findings especially in the areas of traffic and pedestrian movement, agro-socioeconomic condition of people along side Upazila Roads, Union Roads and Market day market users and turnover, existing condition of markets and the transportation situation of people during dry and wet season in the survey areas. Terminal report also includes the result of detail economic analysis of the selected roads sub-projects which have been selected for Benefit Monitoring and Evaluation Study.

Finally, it may be mentioned the project, SRIIP is an excellent initiative of LGED towards upgrading the socio-economic situation of the beneficiaries through providing rural roads network, facilitating improved situation in the markets to ensure inflow of goods/commodities as well as providing all weather road access to people in the project areas. These endeavors would certainly help improve the socio-economic condition of the beneficiaries which would positively lead to reduce poverty among the poor and disadvantaged people of the community.