



**Impact Evaluation Study
on
Construction of Large Bridge/Culverts on
Important Feeder and Rural Road**



Carried out by
Evaluation Sector
Implementation Monitoring and Evaluation Division (IMED)
Ministry of Planning, Government of the People's Republic of
Bangladesh

Conducted by
Research Evaluation Associates for Development Ltd. (READ)

June 2010

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Important Feeder and Rural Road**

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Abbreviation

BDHS	Bangladesh Demographic Health Survey
BIDS	Bangladesh Institute of Development Studies
CNG	Compressed Natural Gas
DG	Director General
DPD	Deputy Project Director
DRGA	Debt Relief Grant Assistance
FGD	Focus Group Discussions
FSU	First Stage Sampling Unit
FRB	Feeder Road Type-B
GOB	Government of Bangladesh
IFPRI	International Food Policy Research Institute
IMED	Implementation Monitoring and Evaluation Division
LGED	Local Government Engineering Department
LGRD&C	Local Government Rural Development & Co-operatives
NGO	Non-Government Organization
NHQ	National Head Quarter
PCR	Project Completion Report
PDS	Project Data Sheet
PER	Project Evaluation Report
PP	Project Proforma
PD	Project Director
PSU	Primary Sampling Unit
QCO	Quality Control Officer
RD	Rural Development
READ	Research Evaluation Associates for Development Ltd.
RFP	Request For Proposal
RR	Rural Road
RTWs	River Training Works
SMC	School Management Committee
SSU	Second Stage Sampling Unit
SRS	Systematic Random Sampling
TOR	Terms of Reference
UHFPO	Upazila Health & Family Planning Officer
UP	Union Parishad
USAID	United States Agency for International Development

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Executive Summary

Background: Road communication in Bangladesh, a low lying flood plain land network with the different regions of country, is extremely difficult and expensive. The project was prepared to fund the construction of bridges/culverts on important Feeder Road Type-B (FRB) and Rural Road (RR). The project was implemented all over the country with the aim to increase agriculture production through improvement of communication system for easy and timely movements and marketing of agricultural inputs and ensure better prices to the farmers.

Project Profiles at a Glance

Name of the Project	Construction of Large Bridge/Culvert on Important Feeder and Roads		
Administrative Ministry/Division	LGRD&C/Local Government Division		
Executing Agency	Local Government Engineering Department		
Location of the Project	All over Bangladesh		
Implementation period	July/1997 to June/2007		
Total cost (In lakh Taka)	GOB	PA	Total
	20006.00	6000.00	26006.00

Objectives of the current Impact Evaluation: As in TOR

i. To review the implementation status of the following components of the project: a. Construction works of the bridge/culverts on FRB and RR; b. Rehabilitation works of 1998 and 2004 flood damaged FRB and RR; and c. Repair and maintenance of bridge/culverts. **ii. To assess the impact of the project in terms of:** a. Improvement of communication network through connecting to roads of higher order; b. Easier access to growth centers/rural markets, schools, health centers and movement of inputs and dissemination of information related to extension services to farmers; c. Short-term and long-term employment opportunity for landless labour and poor women through construction and maintenance of bridge and culverts; d. Socio-economic development and standard of living of the beneficiaries of the catchments areas; e. Impact on environment; and f. Sustainability of the project.

Study Methodology: Study design included sample spots (Unions/Mouzas) both as Intervention/Treatment and the Control/Comparison areas. The former (Intervention areas) referred to unions and mouzas included in the project and where bridges/culverts connecting FRBs/RRs constructed/reconstructed; and the latter (Comparison areas) referred to unions and mouzas with either no bridge/culvert connecting rural roads or are at a lower proportions. Major areas of assessments were:

A. Methods of assessments of Sample of structures (FRB and RR with bridges/culverts): quality and coverage of target numbers: Method was through on the spot physical verifications of the bridges/culverts on the basis of normative criteria as specified in the Project Documents, like length (total constructed 8600 meters for FRB and 6000 meters for RR); breadth, load bearing strength (support of the surrounding backfill to carry loads), side walls and roof (curve downward) of the bridge/culvert; cracks/damage, if any. Trained Field investigators under supervision of Civil Engineer conducted the physical verifications and recorded findings in standardized check list pre-designed and pre-tested.

B. Assessment of the impact of the project interventions on acceleration of agricultural production, marketing and income generation: Beneficiary level sample survey in the catchments of the infrastructures (bridges/culverts and FRB/RR) selected for physical verifications. The targets included randomly selected sample households and from each household, both males (preferably head of the household and a married adult female (currently or ever) were interviewed using structured and standardized questionnaire for interpersonal interviews. The samples were taken from both the treatment and Comparison areas.

To assess the net effects of the impact of the infrastructures (Bridges and Culverts on the feeder and rural roads) comparative analyses of findings have been made between the intervention and control area samples. In addition, in the intervention area data have been collected on the basis of beneficiary assessments both prior to and post constructions of the bridge and culvert in the respective sample spots. It is assumed that the impact outcome would be comparable between the pre project (prior to construction of bridges and culverts) and the comparison area (where there is absence or marginal existence of the infrastructures: bridges and culverts).

Sample Design and Technique including Sample Size & Distribution: A stratified multi-stage sampling methodology was applied to select the survey units (i.e. households). In the 6 divisions, districts (2 districts per division), Upazilas and unions were selected as the first stage sampling unit (fsu) and second stage sampling unit (ssu). In the third stage required number of households within each selected unions were chosen. The households were selected with systematic random sampling procedure using an appropriate sampling interval. Equal allocations were applied for this sampling. The sample size was calculated using scientific formula. The sample size estimated was n= 4802; approximately 4800 households. The total number of beneficiary households from 6 divisions was 4800, which were allocated for the **Intervention/Treatment areas** (80%: 4800 households for Catchments: Unions/Mouzas) and sample size for households =1200 allocated for the **Comparison area** (20%: 1200 households for Catchments: Unions/Mouzas).

Qualitative Investigations: Qualitative investigations were conducted applying following methods: Literatures/Documents Search: Project Document (PP), PCR, Feasibility Report (if any), Evaluation Report; Observations: Physically verified the structures and the verifications of the structures; Focus Group Discussions (FGDs): FGDs with Community influential/leaders; and Intensive Interviews with the key informants from LGED, Community influential and from allied departments; and Mouza/Catchments/Community Profile.

Data Collection: Data were collected from the following sample areas: 6 Divisions, 12 Districts, 12 Upazilas and 60 Unions/Mouzas during the month of April-May 2010. The data collection of the study was done through multiple methods through both quantitative and qualitative investigations.

- Documents reviewed: PCR, Evaluation & IMED Report
- Observation Checklists were completed for all the available infrastructures in the sample areas (27 infrastructures: 26 bridges and 1 culvert).
- Hundred percent of the household level (beneficiaries) interpersonal interviews were completed: Intervention Areas: 4800 Households: Respondents: Males—4800; and Females – 1600; and Control Areas: 1200 households: Males—1200; and Females – 400.
- 158 (80%) of the Intensive interviews with the concerned project and allied personnel were completed.
- Focus Group Discussions (FGDs), one per Mouza was completed.
- Conducted a Local level Workshop in Savar, Dhaka on 18th May, 2010.
- Data on Catchments (Mouzas) Profile (primarily development aspects) were collected.

Study Findings

A. Analyses of Project Efficiencies Factors: Review of Project Evaluation Report and the PCR

- In order to rehabilitate the 1998 Flood damage, the project was 1st revised; the project has been revised (2nd revision) to reflect the changed mode of GOB & DRGA Financing to complete the remaining works of already under taken bridges with completion period 2003-2004; and to rehabilitate the 2004 Flood damaged structures of the project area the pp has been revised for 3rd time with completion period 2006-2007.
- During the project period (from July 1997 to June 2007), funds released for the project was 25,986.00 lakh taka and the expenditures during same period was 25,899.19.00 lakh taka leaving a balance in excess of Tk. 86.81 lakh (0.33%), which was duly deposited to the government treasury.
- Total number of bridges and culverts constructed/reconstructed are 309, of which 279 are bridges of 30.35 to 330 meters length and 30 are culverts of 14.5 to 30.35 meters length and the distribution of these completed bridges and culverts by divisions are: 124 in Dhaka; 35 in Chittagong; 24 in Khulna; 27 in Barisal; 80 in Rakshahi and 19 in Sylhet.
- Beneficiaries revealed that the large bridges and culverts constructed under the project facilitated improved communication with growth centers and schools.
- IMED inspections at different project areas revealed the following: The infrastructures (bridges and culverts) succeeded to achieve the expected targets reconstructing the flood damaged bridges and culverts and the goals of creating job opportunities for the poor. Only exceptions are the bridges in Uzirpur and in Banaripara, where the bridges are not well connected with road creating obstacles for smooth communications as the approach roads are defective.

B. Analyses of Project Impact and Effectiveness: The focus of the impact assessments are:

- Current operational status of infrastructures: Bridges and Culverts on the feeder and rural roads: levels of satisfaction in the use, status of repairs and maintenance;
- Changes (improvements) at the levels of communication network connecting the markets, growth centers, schools, health centers, Unions, Upazilas, Districts and Divisions;
- Creation of job opportunities and improved income for the men, women and the poor; and
- Recommendations for sustainable use of the infrastructures.

Observations: Physical Verifications of Bridges and Culverts: The study team observed and physically verified construction of 27 structures (26 bridges and 1 culvert) on 24 feeder and rural roads. The main objectives of observations were to evaluate the present operational/non operational and repair status of the bridges/culverts: construction works of the bridge/culverts on FRB and RR; and Rehabilitation works of 1998 and 2004 flood damaged FRB and RR. The observations were done by the Consultant (Civil Engineer) and under his direct guidance by the well trained Field Supervisors/Investigators. The steps and mechanism for direct observations were:

- Collecting details information from the project areas
- Collecting information from project officials of LGED
- Direct observation by the consultant (Civil Engineer) and Field Investigators

Summary Findings of Observed Infrastructures:

- Out of 27 sample bridges/culvert, 3 (11%) bridges were observed to be completely free of any problem or defect and are now fully operational.
- Two sample bridges (7%) are incomplete and are now non-operational.
- The rest of the 22 infrastructures (82%: sample bridges and culverts) are currently operational but with problems/defects. The problems/defects (in multiple percent)

observed for 22 structures are discussed by types hereunder:

- ✓ 'Abutment walls' of 4 bridges (18%) are faulty: Sliding of back fill earth
- ✓ Girders of 1 bridge (5%) are cracked on MS rod.
- ✓ Piers of 2 nos. bridges (9%) are faulty due to scour hole formed at the bottom of the few piers
- ✓ Slabs of 5 bridges (23%) are defective (i.e. not smooth and RCC casting is not good)
- ✓ Railings of 5 bridges (23%) are defective for (non vertical and straight condition cracked and finishing not smooth)
- ✓ Approach roads 14 bridges (64%) are faulty: (Approach roads are damaged and with spot holes in many paces)
- ✓ River training works (protective works) are defective for 15 bridges (68%): 7 bridges no RTWs and 8 bridges have RTWs with some defects (CC block displaced and washed out)
- ✓ Return walls of 6 bridges are faulty (MS rods are cracked and open)
- ✓ Clear opening (at bottom obstructing water flow) silted for 4 bridges (18%)
- ✓ Wearing coats over the bridge are faulty for 7 bridges (32%): Cracks, not smooth and stone chips found)
- ✓ 1 Culvert (5%) has problem with railing, wing walls slightly cracked and no river training works

Summary Assessments and Recommendations on Observed Infrastructures

The study team observed physically construction/reconstruction, operational and non operational status of 27 nos. infrastructures (26 bridges and 1 culvert). Out of 26 bridges, 3 bridges are operational with no faults or defects for repairs; 2 bridges are incomplete, while 21 bridges and 1 culvert are currently operational requiring some minor repairs. The interpretations including reasons of faults/defects with recommendations/suggestions for required actions are given below.

Reasons and Recommendations on two incomplete bridges

Name	Location	Reasons and recommendations
Construction of RCC bridge on Balia UP Office to Dhantara GC road: Flood damaged structure	Union: Gaotara-Zadabpur; Upazila: Dhamrai; District: Dhaka	The construction works of bridge started on 2004 and stopped on 2006 up to construction of abutments and piers. As per report of the Local Officials of LGED, Dhamrai Upazila, the construction work was stopped by the contractor due to price hike of construction materials, mainly MS rod and cement. The Project Director, LGED, expressed his views that actions were taken against the contractor for non completion of construction. The remaining construction works of the incomplete bridge should be immediately completed by calling fresh tender, so that, the local public demands for better communication could be achieved.
Construction of bridge over Gumyti river on Bakhrabad-Airchar road: Newly constructed structure	Union: Muradnagar; Upazila: Muradnagar; District: Comilla	The construction work of the bridge was incomplete. As per report of the project officials of LGED, Muradnagar, under this project the construction work was started on 2001 but after two years the contractor stopped the work due to price hike of construction materials such as MS rod and cement mainly. Again re-tender was floated for the second contract on 2005 but again for price hike of construction materials the contractor again stopped the works. The contractors completed up to the 1 st and 2 nd contract, abutments, girders, cross beams, piers, partly construction of bridge slab and both side railing. The Project Director and Local Level Officials, LGED, expressed views that actions were taken against the contractor for non completion of construction work as per terms and conditions of the agreement. The remaining construction works of the incomplete bridge should be immediately completed by calling fresh tender, so that, the local public demands for better communication could be achieved.

Reasons and Recommendations on 21 bridges and 1 culvert with minor faults/defects: Reasons of faults/ defect

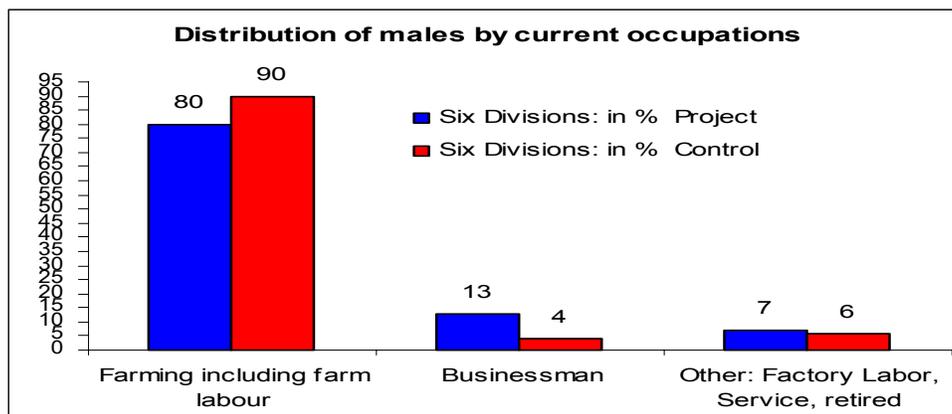
- Due to the long time operation of the bridges/culverts at least more than 3 years

- For want of regular maintenance works after 3 years interval
- Due to wear and tear
- Other unforeseen (natural) reasons

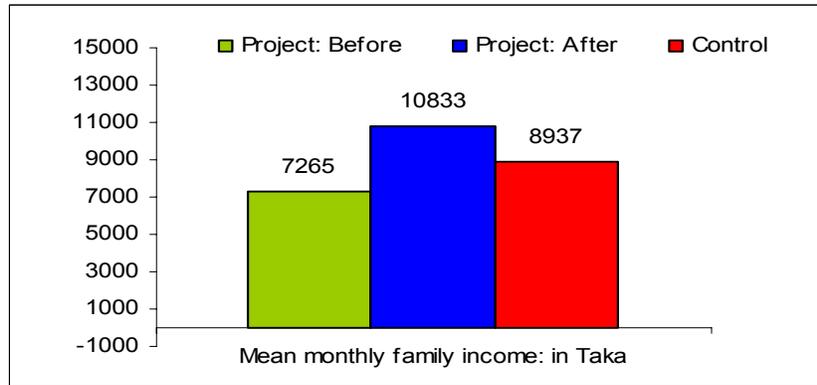
Recommendation/suggestions for present and future guideline

- Minor repair works are needed to be undertaken immediately, so that conditions of those infrastructures do not deteriorate further;
- River training works for the construction of infrastructures are very much important for long time sustainability. But from the physical observation, it was found that 15 bridges have no RTWs or have been done currently with some defects. Immediate repairing and construction of river training works should be carried out. In future, provisions for RTWs should be included in the project plans and budget.
- Regular inspection and close supervision by the LGED officials are needed
- Quality Control Cell may be established for future regular monitoring of the construction works of bridges; and
- The construction works of the bridges/culverts should be executed as per detailed design and approved specifications.

Household Beneficiary Assessments: The mean age of the male respondents are 44 years in the Intervention areas and 45 years in the Control areas, while that of the female respondents, it is 35 years for both Intervention and Control areas. Female respondents in both intervention and in the control areas are currently married, while 98% of the males in both intervention and in the control areas are currently married. Again in both intervention and in control areas, males are 5th grade qualified, while the females in the interventions areas are qualified at 4th grade and those in the control areas are qualified at grade 3. On the levels of age and marital status, hardly there is any difference among the respondents in the intervention and in the control areas reflecting comparability of the samples. But in terms of current occupations, the graphs below show slight difference for the male respondents.

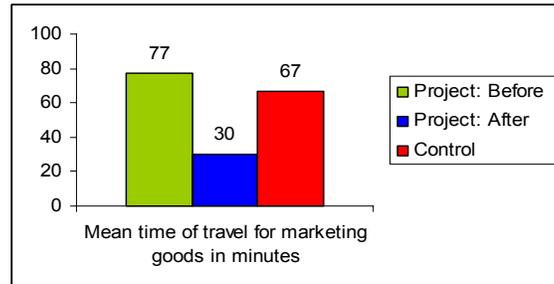


About 10% differences are observed on the current occupations of Farming including farm labor and Business for the male respondents comparatively between the intervention and the control areas and this could be as a result of improvements of the communication net work. The intervention areas have 9% more in Business over the control areas. **Mean monthly family income** (estimates by the male respondents) shown in the bar graphs next page comparatively by Project (before construction of bridge and culvert in green and after construction of in blue) and Control (in red).

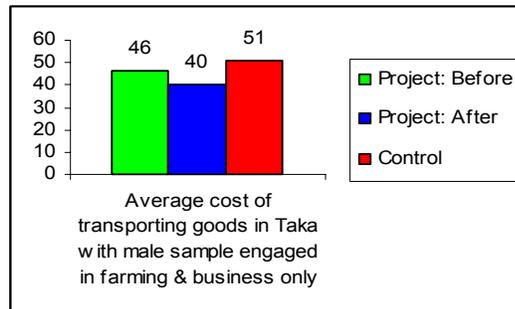
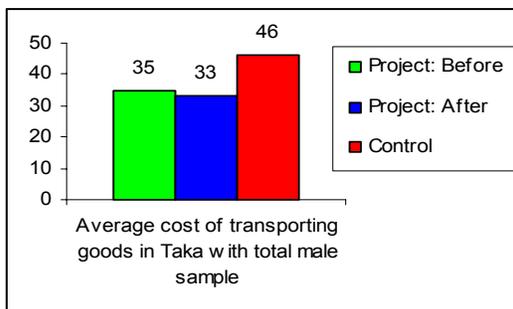


The mean monthly family income of the project areas currently is higher by (additionally) by 49% over its period prior to construction of bridges and culverts and it is again higher (additionally) by 18% over the control areas.

Bar graphs below show the **distribution of mean time of travel and costs** comparatively by Intervention (project before: green) and after: blue) and Control areas (red).

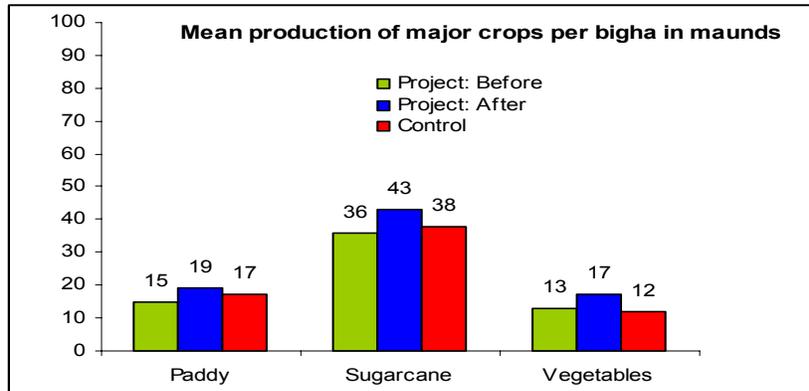


The mean time estimated is less than half in the Project intervention areas at post construction period (30 minutes) compared to the project at prior to construction (77 minutes) and in the control areas (67 minutes).



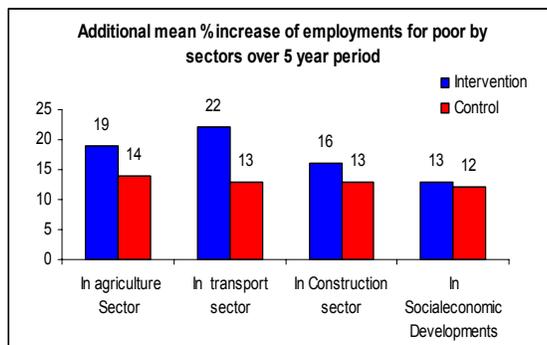
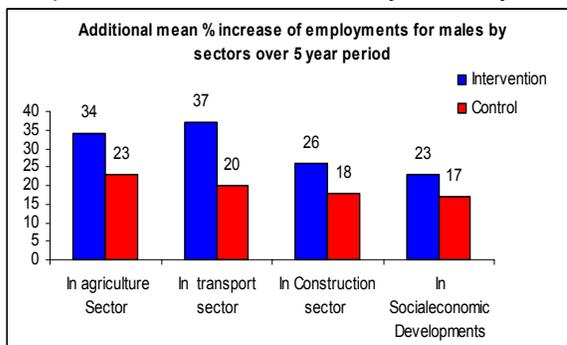
When estimated considering the total male sample, there is some difference on the mean costs of carrying goods to the markets between pre and post construction periods in the project areas; but the difference is much higher between the current project and the control areas. But when estimated considering the male sample engaged in farming and business only (those carrying goods to markets for sales), the estimated costs vary between the groups, Intervention Before and Intervention After by (Tk. 6) and again by Intervention After and the Control, by Tk. 11 on average.

Bar graphs below show the **mean production of major crops** per bigha of land comparatively by project (before: green and after: blue) and control areas (red).



Difference by 2 maunds is observed between project before, project after and in the control areas in case of production of paddy and vegetables; but on production of sugarcane the difference is much higher.

Respondents (males estimating about the males and the poor) were asked to estimate change over time (over 5 years) in respect of employment rates by different sectors and the bar graphs next page demonstrate the comparative findings by Intervention (project: in blue) and Control areas (in red). Here it may be mentioned that during observations (physical verifications) of the bridges and culvert, the maximum time gap between starting and completion of a structure was 4 years only.

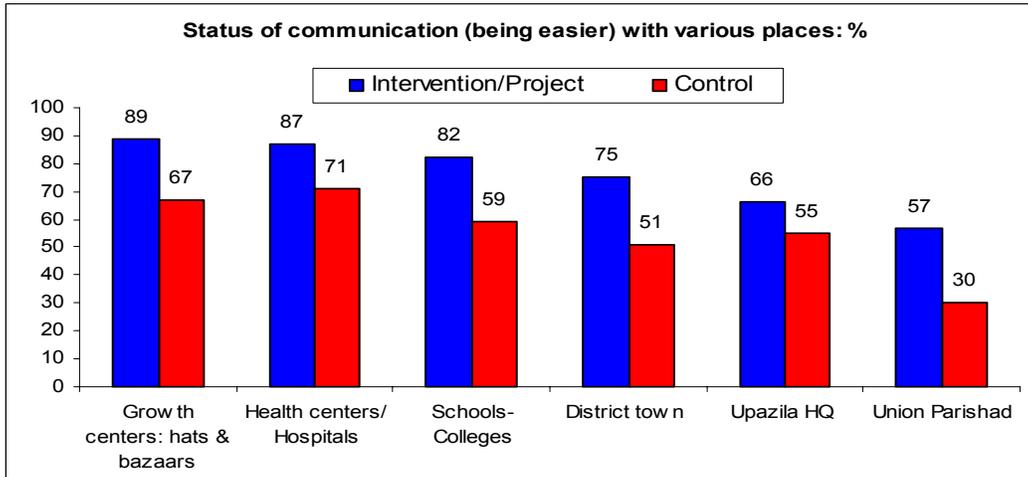


Estimated increase in the rates of employment between the Intervention and the Control for males range between 6 to 17% (median: 10%) across the sectors, while in case of the poor only, the differences range between 1 to 9% (median 4%) only.

Distribution of children attending schools per family in a year comparatively by Intervention (before and after) and Control areas: Although on average, the difference is yet to be observed comparatively by the intervention and control areas, but when the maximum number is considered per family, the difference is observed between the project

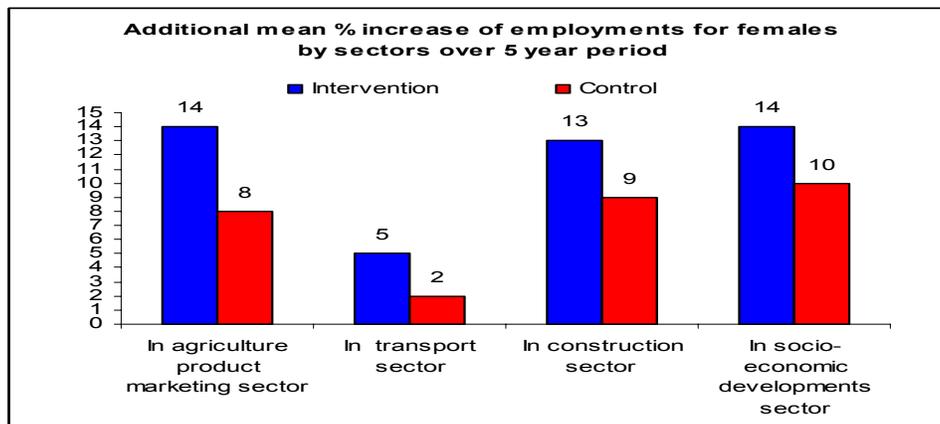
currently and the control areas by 2 children. If the situation of communication network, continues to be unchanged for a longer period, the difference could also be observed on the average number of children attending schools between the project and control areas. This means that the impact is there, but it would take more time for the said impact to be observable at average rates.

Bar graphs below show the distribution of **male respondents perceiving communication being easier** with different locations comparatively within project (intervention) and Control areas.



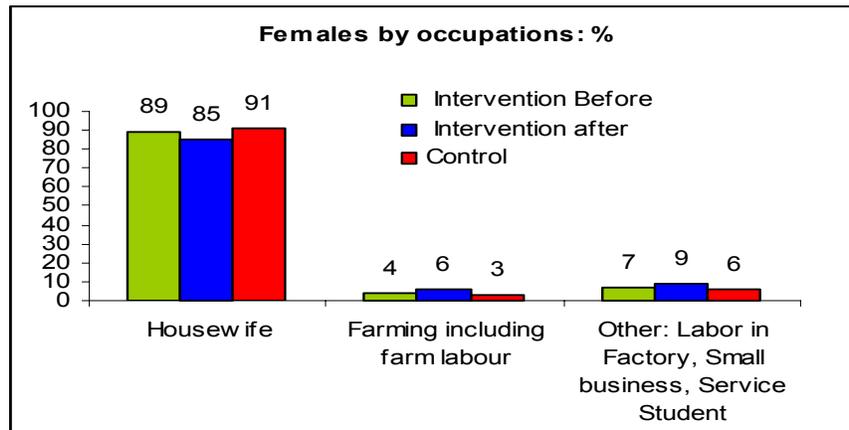
Communications with all the locations as perceived by the males is much easier within the project areas comparatively over those in the Control areas.

Female Responses: Respondents (females estimating about the females) were asked to estimate change over time (over 5 years) in respect of employment rates by different sectors and the bar graphs below demonstrate the comparative findings by Intervention (project: in blue) and Control areas (in red).



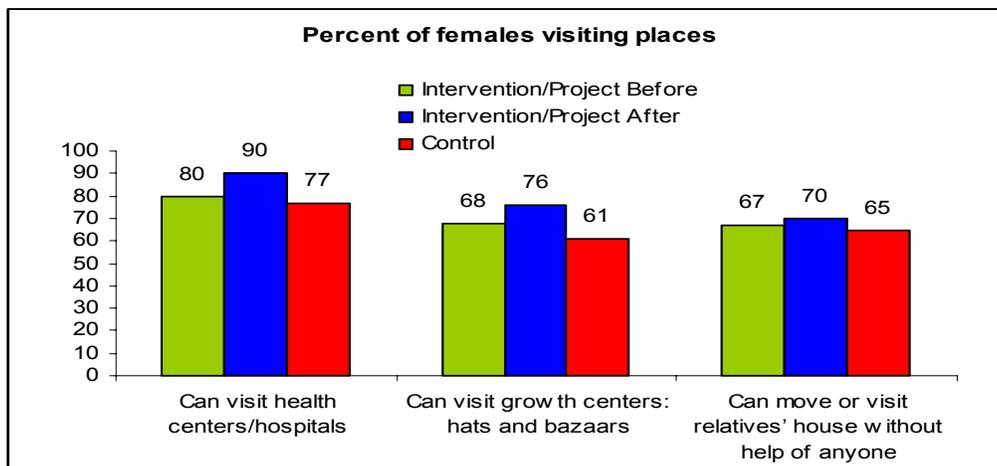
Compared to the situations now over five years in the past, the females have ascertained additional increment in the rates of their employments in the project areas (before and after) in double digits 13 to 14% in agriculture marketing, construction and in allied socio economic development sectors; but in the transport sector the increment is only 5%. In the Control areas, the additional increment in the rates of female employment over last five

years remains within the range of 2 to 10%. The graphs below show the distribution of the female respondents by occupations comparatively between intervention and control areas:



Both in the farming and in the allied Socio economic sectors, the females have been experiencing increments in their levels of engagements in economically gainful activities; such increment is slightly higher in the project areas at post construction periods.

On the issues of female mobility within the community, the improvements have been achieved in the project areas in respect of visits to health centers/hospitals (additionally by 10%), markets (additionally by 8%) and the relatives (additionally by 3%): see bar graphs next page.



Consolidated Findings FGD; Intensive Interviews and Local Workshop

➤ Status of completion and use including problems:

- LGED officials almost unanimously (except one) claimed that the bridges and the culverts are now operating properly. Physical targets (component) of the project were completed properly. But a quarter of the officials were not certain whether the financial targets were met as per estimation.
- Of the formal community leaders (UP) and allied agency personnel, a fifth said that the financial targets of the same could not be achieved.
- Half of the participants of FGDs said that the bridge was completed in the year 2002 but it was open for public use formally in the year 2004; other half of the participants said

that the bridge was completed in the years either 2005, or 2006 or 2007.

➤ **Weaknesses of the project identified were**

- LGED officials remarked that during the rainy season, movements of large boats under the bridge become difficult (15%); some of the bridges not yet completed (12%); one respondent mentioned about shortages of funds; and defective approach roads (24%).
- The formal community leaders (UP) and allied agency personnel mentioned about the following weaknesses of the project: Improved road communication caused increased dacoity/robbery in the locality (3%); incomplete works of the bridge failed to improve road communication (3%); some of the bridges need repair particularly on the approach roads causing problems of communication (15%).

➤ **Benefits Accrued from the Infrastructures: Bridges and Culverts**

- **LGED Officials:** Improved agricultural productions and increased marketing of agricultural products (26%); Communications with the Divisional, District, and Upazila towns have improved (79%); Transportation costs have been reduced (18%); Overall socio economic development of the area achieved (26%);
- **FGD Findings:** Physical communication in the area improved; all sorts of transports are now moving on the road; People can reach their destination in time and easily; Previously during rainy season both male and female students could not attend their schools and even the guardians used to discourage them from attending schools but now they on their own regularly attend schools; enrollment in schools have increased after construction of the bridge; Previously people used to carry farm products, such as vegetables and fruits to the markets on their heads, but now they can reach the markets with farm products in lesser time transporting more products and consequently accruing greater profits; Previously pregnant mothers despite their willingness to consult a doctor could not do so, consequently many pregnant mothers used to die without availing proper maternal care treatment. Now pregnant women do not die due to complications of pregnancy; Sick persons can visit the Hospitals. Job opportunities for the people increased. **Communication with** Upazila headquarters, court, hospitals, schools/madrashas/colleges, markets, divisional towns have become smooth; Motorized vehicles are running on the roads and as a result the whole sellers are now reaching with their transport right to the door steps of the farmers and the farmers are now getting fair price staying within their own locality. Land owners are now motivated to produce more fruits and vegetables, they eventually employ more farm laborers from among the poor and hardcore poor; More poor people are employed as transport workers; More women are now interested to participate in the agricultural activities as the farm products fetch better income; Women are also engaged in cottage industry ventures and handicrafts are now easily marketable; Due to improvements of the communication network due to construction of the bridges and culverts, more NGOs are now working in the remote areas of the villages and as a result women are increasingly participating in the income earning activities.
- **Local Workshop:** People of the area can now easily reach the markets by foot; Students can reach their schools and Madrashas; Various vehicular transports are now plying on the road and the number is swelling everyday; Previously the people of the locality had to carry the marketable goods on their heads or in boats, now they can transport their goods in vehicles within much shorter time and also they are selling their goods at a comparatively fair price; Sick people are now frequently using roads by and they are now visiting the health centers in increased numbers; and People in the past refrained from marketing their products, but current improvements in the road communication have encouraged more people in the rural areas to market their products using the road. Main marketable crops of the are vegetables, fruits, and rice. Previously the farmers were compelled to sell their products to the Paikers/Whole Sellers at the price fixed by them, but now the farmers can easily reach the markets and sell their

products at a fair/competitive price; Marketability of products increased additionally by 70-80%; Improved communication and the increased marketability of farm products have encouraged the farmers to produce their goods in accelerated manner, consequently the people are now offered with increased employment opportunities in the agricultural sector; Currently, many poor people are absorbed as transport laborers using vans, rickshaws, and other kinds of transports; Income of the poor have increased, as they in large numbers are now marketing their products in different markets including important markets in Dhaka City; Women working in the Garments Sector can easily travel to their place of employment; Many rural poor women are employed as laborers performing repair and maintenance of the road; and they are also engaged in planting trees on the road side; The poor of the area previously were unemployed and they were victims of loan sharks and now they can travel to distant places and seek employments; and NGOs are visiting the area in greater numbers and they are now forming women's groups and offering micro credit assistance and as a result, many poor women are achieving economically self reliant/sustaining status.

➤ **Status of Repair and Maintenance including Supervision and Participation**

- **LGED Officials:** The ongoing works for implementation of the project was regularly supervised (86%) and only 14% said that the works were not supervised. Sub Assistant Engineer was constantly present in the site during construction. Supervision was ensured on quality of materials, guiding the mason man, investigating the appropriateness of the tasks during construction as per design, status of mixing materials properly. Supervision by higher level officials like Executive Engineer and Upazila Engineer was ensured from time to time with periodic spot supervision by the Project Director (PD) and DPD. Occasionally, supervision was carried by even still higher level officials of the levels of Chief Engineer and even the Secretary. The range of the frequencies of supervision done as claimed was 2 to 200 times; and the average times supervised as estimated was 2 times in a month, assuming that a bridge was completed approximately over a period of two years. About a quarter of the LGED officials claimed that the community persons (Formal leaders: UP Chairmen and Members) did not participate in the project. In response to a query, the LGED officials said that the need for repair of bridge or a culvert would arise either after one year or two years or three years. More than three fourths of the officials (77%) remarked that repair works are carried out routinely; however, 23% denied the same. The concerns for repairs are: fixing the approach road; filling the gaps created by sliding of mud during rainy season; and any other problems impeding smooth communication and use of the infrastructures. Repair works are mostly carried out by the LGED personnel and sometimes in cooperation with the UP Chairmen and members
- **FGD Findings:** Some repairs of roads have been undertaken; No repair work was ever carried out after construction of the bridge; However the Upazila engineer some time come and visit the bridge

➤ **Impact on Environment**

- **LGED Officials:** LGED officials did not identify any environmental problems due to construction of the bridges and culverts. The approach roads connecting the bridges and culverts sometimes did not have proper drainage system for which rain water caused temporary water logging or minor floods.
- **FGD Findings: Positive Impact:** As the road communication improved in the locality, people are planting trees on the road sides for which the physical environment has improved greatly; With the improvement of the road communication, many GO and NGO agencies are now visiting the area and are motivating the local people on social forestry and also improving the hygiene and sanitation facilities in the locality; Before construction of bridges and culverts, there were water logging leading to further inundation and floods; but now floods are rare. **Negative Impact:** Improvement of the

communication network is impacting on losses of farm lands and more lands are being used for markets; Rivers' depth are reduced affecting riverine communication by boats; Communication improvements have attracted many business concerns on operating brick laying/burning, which is adversely affecting the environment and the climate; Some participants opined that there is no negative impact on the environment.

- **Findings of Local Workshop: Positive Environmental Impact:** The only specific and viable impact of the environment mentioned by the participants is the improvements of social forestry on the road side enhancing the beauty and the climate of the area. The **negative impacts** of the project specified are: Increased incidents of Dacoity and deterioration of the situations of crimes as the criminals can now use good roads for committing dacoity; Communication improvements have encouraged those engaged in brick laying and burning tasks; as a result, many facilities on brick laying has been established in the area causing air pollution; and Water logging in many places has affected pisciculture/fish cultivation.
- **Recommendations for future improvements and sustainability**
- **LGED Officials:** Regarding estimation of the length of total operational status (years of lasting) of a bridge approximately, 62% of the LGED officials could not give any guess, while of those who had given any estimate (38%), majority opined that a bridge would last for about one hundred years. Recommendations of LGED officers/personnel for future effectiveness and sustainability of the infrastructure are: Ensure timely and appropriate repairs and maintenance of the infrastructures and for this some have asked for increased funds (62%); Arrange for proper security preventing incidents of dacoity/robbery on the bridges (15%); Organize local supervision of the infrastructures and form local committees for the purpose (6%); Dredging to increase the depth of some of the rivers need to be undertaken (9%); and Areas without bridges and culverts need allocations for constructing the same (3%).
- **FGD Findings:** Approach roads on both the sides of the bridge need to be widened; Supervise the bridge from time to time to keep it operational; And if ever the roads need repairs, it can be ensured by using proper repair materials; Sometimes roads are damaged due to heavy rains for which the roads may be repaired with Peech (black Coal tar). The locality people can on their own repair the approach roads by covering the spots with mud (earthwork); Heavy transports may be restricted from using the bridge; The earth beneath the bridge can be protected by watching and prohibiting people from taking away mud from there, so that the bridge remains intact; Local level committee may be formed for continuous monitoring of the bridges/culverts and the connecting roads.
- **Findings of Local Workshop: Sustainability of the Project:** Repair and maintenance of the road is the prime concern and if this is ascertained, the road condition will remain operational ensuring existence of good communication network/system; Some of the roads need to be widened to further improve communication; Cleaning of the bottom of the bridge and removing silts is essential for preventing water logging; Most frequent problems identified is the defective approach road causing problems in the use of bridge and the road; hence timely mending of the roads by both LGED and also by the local people will certainly enhance the prospects of sustainability of the benefits accrued due to the project for the people; and The local people can guard against theft of the parts of the bridge and also prevent movements of heavy traffic on the bridge.

Recommendations:

- Construct the approach roads properly (widen the roads at least at the entry of bridges) and ensure timely repair and maintenance of the same; filling of earth on both the sides of the bridges and placing light posts on selected bridges exposed to dacoities;

- Establish Quality Control Cell for timely and increased monitoring of the infrastructures (bridges and culverts) and in such system involve the LGED local officials and also local community; if needed, LGED manpower strength in this area may be enhanced;
- Form local committee for regular surveillance and to ensure maintenance and repair works at the community level;
- Launch social mobilization to motivate the community to participate in the local level surveillance and also contribute for minor repairs and maintenance of the bridges and culverts connecting both feeder and rural roads;
- Plant trees on both sides of the roads, which are not covered yet, encourage local youths and women to participate in such endeavors;
- Ensure river training (protection) works by placing of CC block and keep adequate provisions for the same in the budget;
- Some of the important bridges, where dacoity is committed arrangements of proper security through police, community/gram police may be planned; and
- Above all for future projects on bridges and culverts, adequate allocations of funds for repairs and maintenance may be planned and provided for.

Conclusion: Three bridges are fully operational without requiring any repairs, while the rest 22 bridges need minor repairs. LGED may take note of this situation and undertake intensive monitoring activities so that the department is aware of the need for repairs through their own system adequately prior to an external evaluation like the current one. Special attention need be given for the incomplete bridges to be completed and made operational so that communication system in the localities improves.

The project has achieved its targeted impacts on social, economic and allied developmental contexts. Findings of the current evaluation study also suggest that the communities, where bridges and culvert have been constructed, tremendous benefits have been accrued by the community. Here it may be mentioned that the current study findings also conform to the comparable findings of PCR and the Evaluation Study earlier done internally by IMED.

Ultimate sustainability of the benefits to be enjoyed by the users will come through local level participation—local committees can contribute for keeping the roads operational on a long term basis.

Chapter-I

Background Information

Bangladesh is a low lying flood plain land which is intersected with numerous numbers of rivers, canals and bills. As a result establishment of road communication network with the different regions of country is extremely difficult and expensive. Due to lack of communication-access to marketing facilities, movement of input and dissemination of information related to extension services, attendance to schools and health centers are hampered. According to strategy of RD program, the need for development of rural infrastructure such as growth centers, connecting roads, bridges and culverts is very much felt. The project was prepared to fund the construction of bridges/culverts on important Feeder Road Type-B (FRB) and Rural Road (RR). The project was implemented all over the country with the aim to increase agriculture production through improvement of communication system for easy and timely movement of agricultural inputs and ensure better prices to the farmers. LGED of local government division had been implementing the construction works of bridges and culverts of length more than 40'-0" for establishing communication network of feeder and rural roads with higher category of roads under the project named "Construction of large bridges/culverts through monetized USAID food aid provided under PL-480- Title-III all over Bangladesh. Under that project construction of bridges/culverts of length 4600m (62 Nos.) on FRB and 3000m (38 Nos.) on rural roads have been completed. Since number of bridges /culverts constructed under that project was very few in comparison with necessity, the project was revised increasing the physical works. But due to change of policy of food assistance, USAID disagreed to continue support to the revised large bridges/culverts construction project. However, for maintaining the continuity of the project - the GoB could obtain finance out of Debt Relief Grant Assistance (DRGA) from the Government of Japan.

Bridges/Culverts construction over roads with single gap was given top priority to make the road end to end passable. Bridges/culverts and roads connecting important hats-bazaars were also given priority. The roads which were taken for improvement by HBB or carpeting under other project, were given due emphasis for construction of bridges/culverts. Again, in 1998 flooding caused heavy damages to rural infrastructures - as such project was 1st revised and approved by ministry on 8 august, 1999 at an estimated cost of tk. 22166.00 lakh. The flood rehabilitation works on bridges on FRB and RRs was 1830 meters and approach protection of damaged bridges was 50 Nos. Again, 2001-2002, the project was 2nd revised at a cost of tk. 21760.00 lakh. And again, in 2004, project was 3rd revised, due to upstream flood flow and heavy rainfall that damaged a lot of structures and road pavement. The estimated cost of the project with an additional fund of tk. 50.00 crore stood to tk. 26006.00 lakh. The flood rehabilitation works on bridges on FRB and RRs was 3394 meter and approach protection of damaged bridges was 200 Nos.

Main features/components of the project at a glance relevant for impact evaluation:

- Construct bridges/culverts on important feeder roads type-B of length 8000 meter (62 numbers) and rural roads of length 6000 meter (32 numbers);
- Improve communication system for easy and timely movement of agricultural inputs ensuring better process to the farmers;
- Establish linkages through the rural roads with growth centers (Hats and Bazars) and roads of higher order; and
- Generate employment opportunities for the rural poor including landless and the women and ensure improvement of standard of living; and
- Facilitate irrigated agriculture, drainage and minor flood control works;

A study conducted by the International Food Policy Research Institute (IFPRI) and Bangladesh Institute of Development Studies (BIDS) on Development Impact Rural Infrastructure in Bangladesh in October, 1990 indicate that “infrastructure development endowment caused household income to raise by 33%, income from agriculture increases about 24% that from livestock and fisheries about 78% that from wages almost doubles, but income from business and industries only raises by 17%. Income distribution shows that the landless and marginal farmers gain a larger share of the increase from crop, wages, livestock and fisheries. Above facts reconfirm that overall development of rural Bangladesh depends on development of rural infrastructure.”

Project Profiles at a Glance

Name of the Project	Construction of Large Bridge/Culvert on Important Feeder and Rural Roads.		
Administrative Ministry/Division	LGRD&C/Local Government Division.		
Executing Agency	Local Government Engineering Department.		
Location of the Project	All over Bangladesh		
Implementation period	July/1997 to June/2007		
Total cost (In lakh Taka)	GOB	PA	Total
	20006.00	6000.00	26006.00

Objectives of the project:

- a. To improve rural access/facilitate agricultural production through construction of bridges/culverts on feeder roads type-B and important rural roads aiming at establishing linkages between the growth centers, Union Parishad and rural hats and bazaars with the roads of higher order.
- b. To rehabilitate the flood damaged bridges/culverts
- c. To generate employment opportunities for the rural poor through construction of infrastructures.

Objectives of the current Impact Evaluation: As in TOR

- (i) **To review the implementation status of the following components of the project:**
 - a. Construction works of the bridge/culverts on FRB and RR
 - b. Rehabilitation works of 1998 and 2004 flood damaged FRB and RR
 - c. Repair and maintenance of bridge/culverts.
- (ii) **To assess the impact of the project in terms of:**
 - a. Improvement of communication network through connecting to roads of higher order;
 - b. Easier access to growth centers/rural markets, schools, health centers and movement of inputs and dissemination of information related to extension services to farmers;
 - c. Short-term and long-term employment opportunity for landless labour and poor women through construction and maintenance of bridge and culverts;
 - d. Socio-economic development and standard of living of the beneficiaries of the catchments areas;
 - e. Impact on environment; and
 - f. Sustainability of the project.

Scope of services:

The study design and plan focused on the field works considering the following components of the project. Sampling was designed on the basis of coverage of work. The study covered the items of work specified in the project. Thus the study was designed and the fieldwork was planned considering the following project components:

Table 1: Scope of Services

Name of the Project	Project Cost	Component for evaluation	Coverage of Work- implemented under the project	Area Coverage of the project
Construction of Large Bridge/ Culvert on Important Feeder and Rural Roads.	Tk. 26006.00 Lakh	1 . Construction work of bridge/culverts on: Feeder Road- B and Rural Road:	8600 meters 6000 meters	All the districts of Bangladesh
		2. Repair and maintenance of bridge/culverts on FR-B and R Roads:	All the bridge/ culverts constructed.	
		3. Rehabilitation works for flood-damaged bridges/culverts and approach protection:	1940 meters 250 Nos.	
		4. Impact assessment of the project in the light of the evaluation objectives	Project beneficiaries of catchments area.	

Chapter-II Study Methodology

Objectives of the current evaluation were to examine the construction works (Bridges/culverts on FRB and RR: quality and coverage of target numbers) in the project sites and to assess the impact of the project on agricultural production and income generation. The former, i.e., assessment of construction work (quality and coverage of target numbers) of the bridge/culverts was achieved through sample checks through on-the-spot physical verifications. The latter, i.e., assessment of the impact of the project interventions on acceleration of agricultural production and income generation was achieved by comparing the findings of the treatment area (intervention areas) with those of the comparison areas where the treatment was absent or at lower proportion. The specific project treatments were to improve rural access/facilitate agricultural production and establish linkages between the growth centers, union parishad, rural hats and bazaars, schools and health centers and also generate employment opportunities for the rural poor including women.

Study design included sample spots (Unions/Mouzas) both as Intervention/Treatment and the Control/Comparison areas. The former (Intervention areas) referred to unions and mouzas included in the project and where bridges/culverts connecting FRBs/RRs constructed/reconstructed; and the latter (Comparison areas) referred to unions and mouzas with either no bridge/culvert connecting rural roads or are at a lower proportions. In addition, in the absence of availability of baseline data; the questionnaires and all other data collection instruments (where applicable), either at the household or at the community/institution levels, inquired the status at both pre (prior to construction of the bridge/culvert) and post project (after construction of bridge and culvert till current) periods by integrating questions for the purpose. Questions were framed retroactively to obtain data from the pre construction of the bridge and culvert in the respective sample spots (Mouzas). This arrangement ensured measurement of the net effects of the project or changes occurring due to project structures implemented. Measurement indicators for FRB and RR and Bridges/ Culverts information are as follows:

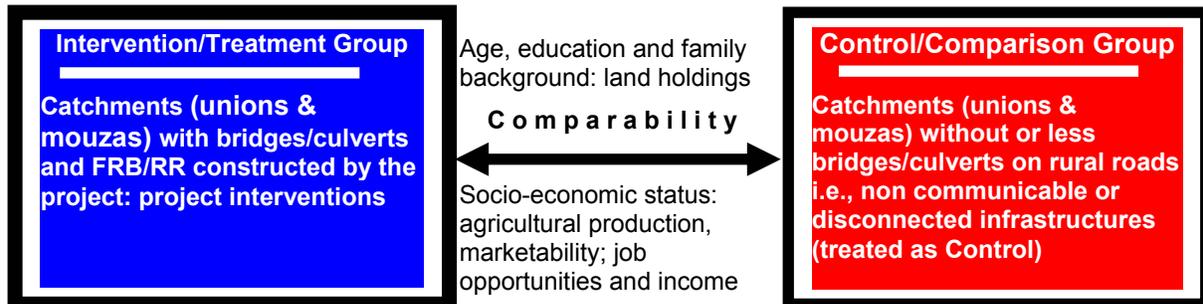
- Number of FRB and RR and Bridges/Culverts
- Number and Condition of bridges/culverts components: Abutments, Girders, Span, Cross Girders, Piers, Railing, Slab, Wing walls and Return walls
- Type: FRB/RR and the types of Bridges and culverts by size
- Length: of bridges and culverts
- Present condition of Approach road of Bridges and culverts

A. Methods of assessments of Sample of structures (FRB and RR with bridges/culverts): quality and coverage of target numbers

Method was through on the spot physical verifications of the bridges/culverts on the basis of normative criteria as specified in the Project Documents, like length (total constructed 8600 meters for FRB and 6000 meters for RR); breadth, load bearing strength (support of the surrounding backfill to carry loads), side walls and roof (curve downward) of the culvert; cracks/damage, if any. Trained Field investigators under supervision of Civil Engineers conducted the physical verifications and record findings in standardized check list pre-designed and pre-tested.

B. Assessment of the impact of the project interventions on acceleration of agricultural production, marketing and income generation

Methods: Beneficiary level sample survey in the catchments of the infrastructures (bridges/culverts and FRB/RR) selected for physical verifications. The targets included randomly selected sample households and from each household, both males (preferably head of the household and a married adult female (currently or ever) were interviewed using structured and standardized questionnaire for interpersonal interviews. The samples were taken from both the treatment (project intervention: Unions and Mouzas) areas and also Comparison areas from the adjacent Unions and Mouzas having rural roads but disconnected due to absence of bridges and culverts. Comparison and intervention area investigations revealed differences between the areas with or without bridges/culverts and FRB/RR connecting the local markets, growth centers, schools, health centers, union parishad and hats/bazaars.



Sample Design and Technique including Sample Size & Distribution

The purpose of the study was to evaluate the program impacts on the beneficiaries. The design covered the changes occurred due to implementation of construction works of the major components of the project: access to growth centers/rural markets, schools, health centers and socio-economic development and standard of living of the beneficiaries.

A stratified multi-stage sampling methodology was applied to select the survey units (i.e. households). In the 6 divisions, districts (2 districts per division), upazilas and unions were selected as the first stage sampling unit (fsu) and second stage sampling unit (ssu). In the third stage required number of households within each selected unions were chosen. The households were selected with systematic sampling procedure using an appropriate sampling interval. Equal allocations were applied for this sampling. The sample size was calculated using the following formula.

Sample size of beneficiaries (household) is
 $n = [z^2 p(1-p)/d^2] \times \text{Design effect}$

Where n= the desired sample size

Z= the standard normal deviate, usually set at 1.96 at 5% level which corresponds to 95% confidence level;

The target proportion is p to have a particular characteristic. If there is no reasonable estimate of p, then consider p= 50% (p=0.50)

The degree accuracy or precision level is d which is considered at 2%

The higher value of d will yield lower sample size and smaller value of d will yield higher sample size.

Suppose 50% of the households (beneficiaries) have increased income or wages and improved their socioeconomic status and standard of living;

z statistic is 1.96, which corresponds to the 95% confidence level.

d is the level of accuracy that is considered 2%.

And design effect is 2.

The sample size is n= 4802; approximately 4800

The total number of beneficiary households from 6 divisions was 4800, which were allocated for the **Intervention/Treatment areas** (80%: 4800 households for Catchments: Unions/Mouzas) and sample size for households = 1200 allocated for the **Comparison area** (20%: 1200 households for Catchments: Unions/Mouzas).

Qualitative Investigations: Qualitative investigations were conducted applying following methods:

Literatures/Documents Search: Project Document (PP), PCR, Feasibility Report (if any), Evaluation Report and Progress Reports were reviewed, primarily to assess the physical progress: comparison of targets versus achievements both physical (construction of structures, their use, equipment) and financial.

Observations: Physically verified the structures and the verifications of the structures, such as the FRBs and RRs with bridges and culverts were carried out by trained investigators using standard guidelines (pre-tested) under the guidance of the of expert Civil

Engineer/Consultant. The observations not only verified the quality of construction, it also investigates status of current repairs and maintenance and the level of use and its effectiveness.

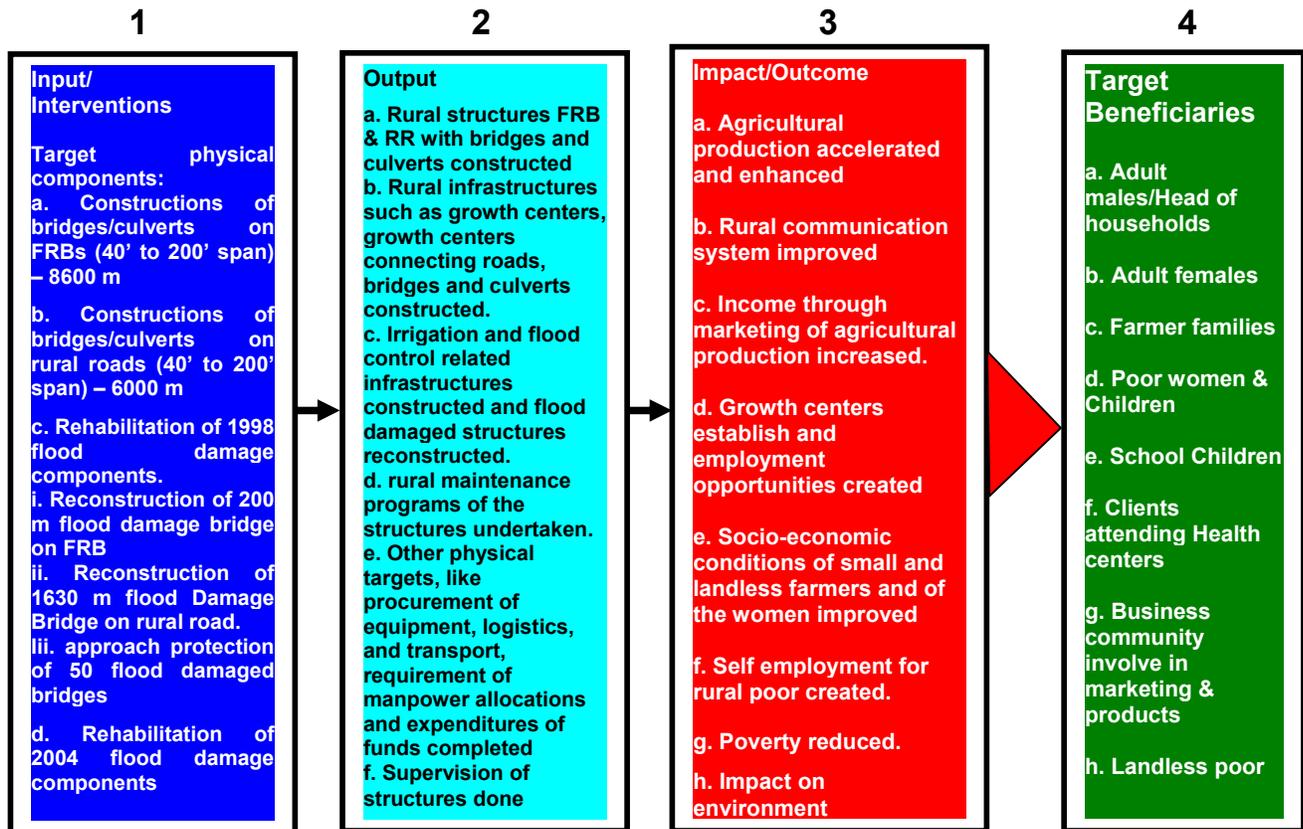
Focus Group Discussions (FGDs): FGDs with Community influential/leaders was conducted in one randomly selected Unions/Mouza of an Upazila both for Interventions/Treatment and Comparison Catchments. Each FGD comprised 8 participants: males, females, youth leaders representing teachers, businessmen, religious leaders, field workers, women and poor leaders, farmers. FGDs apart from investigating the quality and use effectiveness of the structures intensively inquired about the expected outcome effectiveness of the structures, such benefits accrued in-terms of communication, agricultural productions, marketability of products, enhancing school and health center attendance, and creating job opportunities (improving standard of living of the catchments population).

Intensive Interviews: Intensive interviews were conducted with the following (only from treatment areas) Upazila Chairmen/Vice Chairmen; UP Chairmen and members; Upazila Nirbahi Officers at Upazila level; Upazila Education Officers; Upazila Agriculture Officers; UHFPOs; Sub-assistant Engineer (LGED); Upazila Project Implementation Officer at Upazila level; Upazila Engineers at Upazila level; Project Director at NHQ; Executive Engineers; Assistant Engineers.

Mouza/Catchments/Community Profile: Data from all the Mouzas development status, such as number of Schools, markets, communicable and non communicable rural roads, growth centers and their conditions and levels of use were collected.

The flow chart next page delineates assessment of the following input, output and outcome variables of the project in the (in 12 Upazilas of 12 districts) impacting on the: a) communication network and to facilitate the marketing of local products; b) situations of agricultural productions, marketability of agricultural products and the contributions of the project structures (bridges/culverts on FRB/RR) and c) Creation of annual and seasonal employment opportunities for the rural poor people consequential to improved income through construction activities under the project.

Flow Chart-1: Project Interventions, Achievements & Impact on Beneficiaries



The flow chart above delineates the processes of project implementation (inputs) and achievements: (outputs and outcome/impact) and the consequent impact on the target beneficiaries. Column 1 specifies the interventions (inputs); Column 2 explicates the outputs and column 3 underscores the outcome of the project as in Project documents: PP, PCR and Evaluation Report. Column 4 describes the population involved in the project and were influenced and benefited by project inputs and outputs.

Data Collection

Data for the study were collected during the month of April- May 2010. The data collection of the study was done through multiple methods through both quantitative and qualitative investigations.

- Reviewed PP, PCR, Evaluation reports and literatures to primarily measure the implementation gaps on achievement of physical and financial targets;
- Observation Checklists was completed for all the available infrastructures in the sample areas (27 infrastructures: 26 bridges and 1 culvert);
- Hundred percent of the household level (beneficiaries) interpersonal interviews were completed: 6400 respondents from the Intervention areas and 1600 respondents from the Control areas in the following distribution as shown in the table below.

Table-2: Distribution of Household Respondents

Respondents	Intervention Areas: 4800 Households	Control Areas: 1200 households	Total Areas: 6000 households
Males respondents	4800	1200	6000
Females respondents	1600	400	2000
Total respondents	6400	1600	8000

- 158 (80%) of the Intensive interviews (198) with the concerned project and allied personnel were completed; and
- Focus Group Discussions (FGDs), one per Mouza was completed.
- Conducted a Local level Workshop in Savar Dhaka on 18th May 2010.
- Data on Catchments (Mouzas) Profile (primarily development aspects) were collected

Data were collected from the following sample areas:

Table-3: Distribution of Sample Spots

Divisions	Districts	Upazilas	No of Unions/ Mouzas of Intervention areas	No of Unions/ Mouzas of Control areas
Dhaka	Dhaka	Savar	4/4	1/1
	Rajbari	Pangshsha	4/4	1/1
Chittagong	Comilla	Titas	4/4	1/1
	Cox'sbazar	Chakoria	4/4	1/1
Rajshahi	Bogra	Gabtolli	4/4	1/1
	Sirajganj	Ullapara	4/4	1/1
Khulna	Khulna	Paikgacha	4/4	1/1
	Jessore	Bagarpara	4/4	1/1
Barisal	Jhalokathi	Rajapur	4/4	1/1
	Patuakhali	Sadar	4/4	1/1
Sylhet	Habiganj	Baniachang	4/4	1/1
	Sunamganj	Jaganathpur	4/4	1/1
6 Divisions	12 Districts	12 Upazilas	48 Unions/ Mouzas	12 Unions/ Mouzas

Chapter-III Study Findings

Section 1: Analyses of Project Efficiencies Factors

Analyses of Project Efficiencies Factors are discussed citing the findings of the Evaluation Report of the Project and the PCR.

A. Summary Findings of the Project Evaluation Report:

- During the period from July 1997 to June 2007, funds released for the project was 25,986.00 lakh taka and the expenditures during same period was 25,899.19.00 lakh taka leaving a balance in excess of Tk. 86.81 lakh, which was duly deposited to the government treasury.
- Consulting the beneficiaries, it was revealed that the large bridges and culverts constructed under the project facilitated improved communication with growth centers and schools.
- Project completed 1005 of the targeted bridges/culverts of 8600 meter on feeder road and 6000 meter on rural roads and for these infrastructures lands obtained (through GO allocations) was 19 hectares.
- The targeted infrastructures, i.e., feeder roads (1700 meters) and rural roads (1595 meters) damaged by floods of 2004 were rehabilitated (reconstructed) at 100% level.
- Total number of bridges and culverts constructed/reconstructed are 309, of which 279 are bridges of 30.35 to 330 meters length and 30 are culverts of 14.5 to 30.35 meters length and the distribution of these completed bridges and culverts by divisions are: 124 in Dhaka; 35 in Chittagong; 24 in Khulna; 27 in Barisal; 80 in Rajshahi and 19 in Sylhet.
- Following are the outcome of IMED inspections at different project areas:
 - ✓ **Habiganj:** Status of 4 Bridges satisfactory and are currently being used by the people;
 - ✓ **Moulvibazar:** (1) Status of Bridge on river Anfanai: the clearance height of the bridge has been raised at the request of the local people, but the approach road of the bridge has been constructed at 90 degree angle and this has created problems in getting on or down the bridge; (2) Bhuai Terighat Nawabganj road bridge connects 3 markets, 2 Primary Schools and 2 Higher Secondary Schools and the approach h road is well designed and constructed; and (3) Akatuna-Akilkura Road Bridge on river Monu connects 3 markets and 4 UP complexes in the area;
 - ✓ **Lakkshipur:** The road connects with nearby highway and the people of the area has been greatly benefited by the Road;
 - ✓ **Feni:** 3 bridges are constructed here and these have no problem;
 - ✓ **Barisal:** 4 bridges are constructed. The standard of the construction of all the four bridges are satisfactory; and
 - ✓ **Jhalakathi:** 9 bridges were constructed and all are being used satisfactorily.
- **IMED inspection report** further observed that the infrastructures (bridges and culverts) succeeded to achieve the expected targets reconstructing the flood damaged bridges and culverts and the goals of creating job opportunities for the poor. Only exceptions are the bridges in Uzirpur and in Banaripara, where the bridges are not well connected with road creating obstacles for smooth communications as the approach roads are defective.

B. Summary Findings of the Project Completion Report (PCR):

➤ Project Implementation Period:

Implementation Period as per PP		Actual Implementation Period	Time Over-run (% of original implementation period)	Remarks
Original	Latest Revised			
1997-1998 to 2001-2002	1997-1998 to 2006-2007	1997-1998 to 2006-2007	5 years 100%	<ul style="list-style-type: none"> In order to rehabilitate the 1998 Flood damage, the project was 1st revised The project has been revised (2nd revision) to reflect the changed mode of GOB & DRGA Financing to complete the remaining works of already under taken bridges with completion period 2003-2004. To rehabilitate the 2004 Flood damaged structures of the project area the pp has been revised for 3rd time with completion period 2006-2007.

➤ Component wise progress (As per latest approved PP): Physical and Financial Targets and Achievements

(Taka in Lakh)

No.	Items of Work (as per PP)	Unit	Target (as per PP)		Actual Progress		Reasons for Deviation (±)
			Physical (Quantity)	Financial	Physical (Quantity)	Financial	
	1	2	3	4	5	6	7
1.	Feeder Road Bridge/Culverts	m	8600 mm	11285.75	8600 mm	11285.75	
2.	Rural Road Bridge/Culverts	m	6000 mm	6245.25	6000 mm	6245.25	
3.	Land Acquisition	Hec	20 Hec	396.86	19 Hec	395.71	Cost decreased as per actual requirements
4.	Machinery Equipment			9.80		3.75	Cost decreased as per actual requirements
5.	Salary			187.91		164.88	Cost decreased as per actual requirements
6.	Consultancy			622.05		547.00	Cost decreased as per actual requirements
7.	Others						
a.	Office expenditure TA/DA, O&M of Vehicle etc.			170.88		169.35	Cost decreased as per actual requirements
b.	Physical Contingency			87.50		87.50	
8.	1998 Flood Rehabilitation						
a.	On Feeder Road	m	200 m	260.00	200 m	260.00	
b.	On Rural Road	m	1630 m	1630.00	1630 m	1630.00	
c.	Approach Protection	Nos.	50 Nos	110.00	50 Nos	110.00	
9.	2004 Flood Rehabilitation						
a.	On Feeder Road	m	1740 m	2280.00	1740 m	2280.00	
b.	On Rural Road	m	1654 m	1720.00	1654 m	1720.00	
c.	Approach Protection	Nos.	200 Nos	1000.00	200 Nos	1000.00	
	Total			26006.00		25899.19	

Cost/Benefit: This is a service sector project, so cost/benefit ratio was not calculated but the project improved and extended the coverage of basic infrastructure services to a large number of people. The environmental improvement directly or indirectly benefited the

population of the project Area. Improved basic infrastructure services has lead to an improved living environment, better public health and sustained population and employment growth.

Environment Generation through the project:

The project has generated direct employment opportunities for rural poor through construction and is being generated direct employment opportunities through maintenance of the project.

Possibility & Women employment opportunity:

- Directly or indirectly self employment has been generated in this project through construction of infrastructure.
- Employment opportunities were created for women during the construction period as daily labour.

Women's Participation in Development:

During implementation women worked as daily labors. Some women worked as contractor. So women participation in development work is positive.

Probable Impact on Socio-economic Activity:

- The project has generated direct employment opportunities for the rural poor through construction and maintenance of the project activities.
- Employment opportunities were created for women during construction period as daily labor.
- Values of properly increased and consequently tax increased

Impact on environment:

There is no possibility of environment pollution as a result of implementation of the Project. More over with the Construction of bridges the environment has improved. In addition, direct and indirect employment was created through various activities under the project.

Section 2: Analyses of Project Impact and Effectiveness

The focus of the impact assessments are:

- Current operational status of infrastructures: Bridges and Culverts on the feeder and rural roads: levels of satisfaction in the use, status of repairs and maintenance;
- Changes (improvements) at the levels of communication network connecting the markets, growth centers, schools, health centers, Unions, Upazilas, Districts and Divisions;
- Creation of job opportunities and improved income for the men, women and the poor; and
- Recommendations for sustainable use of the infrastructures.

Above assessments were undertaken:

- Through physical check up of the infrastructures;
- Through inquiries with beneficiaries at the household level: males and females; and
- Through opinions elicited from the key informants: LGED officials, Community influential, allied department personnel.

To assess the net effects of the impact of the infrastructures (Bridges and Culverts on the feeder and rural roads) comparative analyses of findings have been made between the intervention and control area samples. In addition, in the intervention area data have been collected on the basis of beneficiary assessments both prior to and post constructions of the bridge and culvert in the respective sample spots. It is assumed that the impact outcome would be comparable between the pre project (prior to construction of bridges and culverts) and the comparison area (where there is absence or marginal existence of the infrastructures: bridges and culverts).

Findings of the quantitative household level beneficiary assessments and qualitative investigations are presented in the following sections.

A. Observations: Physical Verifications of Infrastructures (Bridges and Culverts)

The study team observed and physically verified construction of 27 structures (26 bridges and 1 culvert) on 24 feeder and rural roads. The main objectives of physical observations were to evaluate the present operational/non operational and repair status of the bridges/culverts: construction works of the bridge/culverts on FRB and RR; and Rehabilitation works of 1998 and 2004 flood damaged FRB and RR. The observations were done by the Consultant (Civil Engineer) and his direct guidance by the well trained Field Supervisors/Investigators. The steps and mechanism for direct observations were:

- Collecting details information from the project areas
- Collecting information from project officials of LGED
- Direct observation by the consultant (Civil Engineer) and Field Investigators

Out of observed 26 bridges, length of 6 bridges ranges from 30-50 meters and the rest 20 are 51-203 meters; 15 bridges constructed over feeder roads and 11 bridges constructed over rural roads; and 17 bridges are newly constructed structures and 9 bridges are re-constructed of flood damaged structures. Table 4 shows the location and number of observed bridges/culverts.

Table 4: Location and number of observed sample bridges/culverts

Districts	Upazilas	Name of Scheme	No. of bridges/culverts observed	Length of bridges/ culvert (in meters)	Implementation period	
Dhaka div.						
Dhaka	Savar	Construction of bridge over Nikrail Khal on Nikrail Chikuria Road: Newly constructed structure	1	48.76m	2001-2002	
		Construction of bridge on Turag Vhakurta road: Newly constructed structure	1	59.79m	1998-2000	
Rajbari	Pangsha	Construction of bridge on Purba Char-Afra road: Flood damaged structure	1	120.00m	2005-2005	
Dhaka	Nababganj	Construction of bridge between old & new Bandura road over Isamoti river: Newly constructed structure	1	100.00m	2001-2002	
	Nababganj	Construction of bridge on Komorgonj road over Isamoti river: Newly constructed structure	1	125.00m	2001-2002	
	Keraniganj	Construction of bridge on hazratpur-Dhaleshuri road: Newly constructed structure	1	75.00m	2003-2004	
	Dhamrai	Construction of RCC bridge on Balia UP Office to Dhan tara GC road: Flood damaged structure	1	125.00m	2006-2006	
	Dhanmondi		Construction of bridge over Dhanmondi 32 no. road: Newly constructed structure	1	34.00m	1998-1999
			Construction of bridge over Dhanmondi 8 no. road: Newly constructed structure	1	47.00m	1998-1999
Chittagong div.						
Cox's Bazar	Chakoria	Construction of bridge on Sikolgata- Mazarfari-Eonchi Road on Matamohori River: Newly constructed structure	2 (1 bridge 1 culvert)	Bridge 153.59m Culvert 2.5m	2001-2003	
Comilla	Titas	Construction of bridge on Lalpur-Shibpur Bazar road over Ghoshbaria Khal: Flood damaged structure	1	44.00m	2005-2006	
	Burichang	Construction of 147.15m bridge over Gumati river on Brahmanpara-Buichang road: Newly constructed structure	1	147.15m	1998-2000	
	Muradnagar	Construction of bridge over Gumyiti river on Bakhrabad-Alirchar road: Newly constructed structure	1	140.00m	2000-2001	
	Titas	Construction of bridge on Gazipur bazaar-Jagatpur road: Flood damaged structure	1	57.00m	2005-2006	
Rajshahi div.						
Bogra	Gabtolli	Construction of bridge on Turonihat-Chandanbaysa Road: Newly constructed structure	1	30.00m	2001-2004	
Sirajgonj	Ullapara	Construction of bridge on Goyhata GC-Kuchyamara R&H road: Flood damaged structure	2	100.12m 100.12m	2004-2005	
	Belkuchi	Construction of bridge on Sagunahat-Kallanpur road over Hursagar river: Flood damaged structure	1	105.00m	2005-2006	
Sylhet div.						
Habiganj	Baniachang	Construction of bridge on Baniachang-Kadirgonj Road: Newly constructed structure	1	60.50m	2000-2002	
Sunamganj	Jagannathpur	Construction of bridge on Jagannathpur-Raniganj Road: Newly constructed structure	1	79.75m	2001-2002	
	Chhatak	Construction of bridge over Kaleswari river on Kalipur-Haidarpur road: Newly constructed structure	1	79.75m	2001-2002	
Khulna div.						
Khulna	Paikgacha	Construction of bridge over Shipsha river on Paikgacha GC-Borokhali GC road: Newly constructed structure	1	203.00m	1997-2000	
Jessore	Bagarpara	Construction of bridge on Charavita Growth Center-Gorni Bus stand road over Vairab river: Flood damaged structure	1	60.05m	2004-2005	
Barishal div.						
Jhalokathi	Rajapur	Construction of bridge over Jhangelia river on Mirerhat-Challish Kawnia road: Newly constructed structure	2	99.56m 50.00m	1999-2000	
Patuakhali	Sadar	Construction of bridge at Kazirhat (GCE-03170): Newly constructed structure	1	115.00m	2000-2002	

Findings on the current operational and the repair status of the bridges and culverts are presented in the table 5.

Table- 5: Current operational and the repair status of the bridges and culverts

Name of Scheme	Location of the bridge	Size, bridge loading, type of road, year	Condition of the bridge and overall comments
Dhaka Division			
1. Construction of bridge over Nikrail Khal on Nikrail Chikuria Road: Newly constructed – 1 bridge	Union: Bonogram Upazila: Savar District: Dhaka Division: Dhaka	Length– 48.76m Width – 3.70 m Bridge loading – H ₂₀ Type of Road: Rural Road Year of construction: 2001-2002	<ul style="list-style-type: none"> • 2 nos. abutments are almost in good condition but in both side abutment walls plastering has been done due poor quality of RCC casting. • 2 nos. girder are in good condition • 7 nos. cross beam are in good condition • 4 nos. pier are in good condition • Bridge slab is almost in good condition, but in few places stone chips could be found. • Both side railing are in good condition • Eastern side of approach road are partly damaged for that transport could not be moved easily • No river training works • Return wall is not provided due to hard soil condition of the bridge site • Clear opening is sufficient • Wearing coat has been damaged in few places • Genda and Boliarpur to bridge site of Connecting road is pucca and bonogram to chikuria road is kacha road • The bridge is now operational and at least overall condition of the bridge is good except few cases of bridge components and approach. As the eastern side road of the bridge is kacha for this reason in the rainy season communication problem arises. • It was found during observation that the Rural Road is very busy for all types of vehicle movements. For better communication development eastern side of approach road and road from bridge site chikuria road portion needed carpeting as early possible. The most benefited unions are Bongao – Bridge site, Savar, Burulia, Ashulia.
2. Construction of bridge on Turag Vhakaruta road: Newly constructed – 1 bridge	Union: Vhakaruta Upazila: Savar District: Dhaka Division: Dhaka	Length – 59.79 m Width – 3.72m Bridge loading – H ₂₀ Type of Road: Feeder Road Year of construction: 2001-2002	<ul style="list-style-type: none"> • 2 nos. abutment are almost in good condition but minor defects were found on the both abutment e.g. back filling and block pitching is not good • 2 nos. girders are in good condition. North portion of western side girder has a small cracked and a little portion of concrete is not in position repair needed • 6 nos. cross beam are in good condition, but quality seems to be little poor • 4 nos. pier are in good condition and right position • Bridge slab is almost in good condition, except some problems such as top surface of the bridge slab are not smooth and few places of the slab stone chips was found open and also expansion joint in one point steel plate partly damaged • Both side railing are almost in good condition but few places of the railing MS rod can be found due to damage of cement concrete • Approach road are in good condition • River training works is not good, CC block placement of existing protection works are assorted • Return wall partly damage • Clear opening is sufficient • Wearing coat is not in good condition, has been damaged in few places and open stone chips can found • Dhaka-Aricha main road to bridge site pucca or carpeting but the southern side upto Bosila bridge and Vhakaruta Road is semi pucca • The bridge is now operational and at least overall condition of the bridge is good except few cases of bridge components are faulty. But the road with bridge is suitable for better communication. Minor repair work is needed. It was found during observation that the Feeder road is very busy for all types of traffic transactions. The most benefited unions are Bhakaruta –Bridge site, Tetuljhara, Hazratpur, Kalatia. Before bridge construction people cross the khal by Bamboo Bridge; in kacha road only van, curt could move but now all types of vehicles can move.

Name of Scheme	Location of the bridge	Size, bridge loading, type of road, year	Condition of the bridge and overall comments
3. Construction of bridge on Purba Char-Afra road: 2004 Flood damaged re-construction structure – 1 bridge	Union: Kalikapur & Habaspur Upazila: Pangsha District: Rajbari Division: Dhaka	Length – 120.00m Width – 3.66m Bridge loading – H ₂₀ Type of Road: Feeder Road Year of construction: 2005-2008	<ul style="list-style-type: none"> • 2 nos. abutment are in good condition • 2 nos. girder are in good condition • 18 nos. cross beams are in good condition • 5 nos. piers are in good condition • Bridge slab is in good condition • Both side railing are in good condition • Approach road is in moderately good condition but the approach should be connected in main road with smooth slope • No river training works • Wing wall and return walls are in good condition • The clear opening is sufficient • Wearing coat is in good condition • The bridge is now operational and the overall condition of the bridge is good but only slope should be maintained from approach to road connection • The road where the bridge was constructed is semi pucca. The road condition is good. The road is directly connected with upazila road, district road, hospital and other important places. The most benefited unions are Kalikapur & Habaspur–Bridge site, Ratandia and Bahadurpur. Before bridge construction people cross the khal by Bamboo Bridge and in kacha road only van and cart could move and in rainy season used boat but now all types of vehicles can move.
4. Construction of bridge between old & new Bandura road over Isamoti river: Newly constructed structure – 1 bridge	Union: Bandura Upazila: Nababganj District: Dhaka Division: Dhaka	Length – 100.00m Width– 3.70m Bridge loading – H ₂₀ Type of Road: Feeder Road Year of construction: 2001-2003	<ul style="list-style-type: none"> • 2 nos. abutment are in good condition • 2 nos. girder are in good condition • 7 nos. cross beams are in good condition • 4 nos. piers are in good condition • Bridge slab is in good condition • Both side railing are in good condition • Approach road is in good condition • River training works are in good condition • Return walls are in good condition • The clear opening is sufficient • Wearing coat is in good condition • The bridge is now operational and the overall condition of the bridge is good and no bad condition was found • The road where the bridge was constructed, it is now fully pucca, but during construction it was semi kacha. The road condition is good. The bridge is constructed in single lane, for this reason two vehicles can't move at a time and it takes long time for road crossing. Public demand is extend the lane width should be minimum two lane, so that two vehicle can move at a time. The road directly connected with upazila road, district road, hospital and other important places. The most benefited unions are Bandura, Joykrishwnapur, Shikaripara, Nayansree, and Baruakhali.
5. Construction of bridge on Komorgonj road over Isamoti river: Newly constructed – 1 bridge	Union: Baksnagar Upazila: Nababganj District: Dhaka Division: Dhaka	Length – 125.00m Width– 3.70m Bridge loading – H ₂₀ Type of Road: Rural Road Year of construction: 2001-2003	<ul style="list-style-type: none"> • 2 nos. abutment is in good condition • 2 nos. girder are in good condition • 13 nos. cross beams are in good condition • 5 nos. piers are in good condition • Bridge slab is in good condition • Both side railing are in good condition • Both side approach road are partly damage and in few places spot hole have been formed for this communication is very troublesome • River training works have been done in one side and it is in good condition and another side no protection works • Wing walls and return walls are in good condition • The clear opening is sufficient • Wearing coat is not in good condition, because in few places the stone chips are open • The bridge is now operational and the overall condition of the bridge is good except some problems, i.e. Both side approach roads are partly damage; spot holes are in approach road; one side not river training works done and in few places of wearing the stone chips are open. It is stated that middle span of the bridge is constructed to create higher elevation for navigation system.

Name of Scheme	Location of the bridge	Size, bridge loading, type of road, year	Condition of the bridge and overall comments
Continuation of no. 5.			<ul style="list-style-type: none"> The road where the bridge was constructed, it is now semi pucca (herringboned), but during construction it was kacha. The present condition of the road condition is not good, in some places of the road has been damaged and spot whole formed. The bridge is constructed in single lane, for this two vehicles can't move easily. The bridge directly connected with upazila road, district road, hospital and other important places. The most benefited unions are Baksh Nagar, Barha, Solla, Kailail.
6. Construction of bridge on hazratpur-Dhaleshuri road: Newly constructed – 1 bridge	Union: Hazratpur Upazila: Keraniganj District: Dhaka Division: Dhaka	Length – 75.00m Width– 3.72m Bridge loading – H ₂₀ Type of Road: Feeder Road Year of construction: 2003-2004	<ul style="list-style-type: none"> 2 nos. abutment are in good condition 2 nos. girder are in good condition 10 nos. cross beams are in good condition 4 nos. piers are in good condition Bridge slab is in good condition Both side railing are in good condition Both side approach road is good but only the slope of the northern part of approach is very stiff which is very risky for easy movement of vehicles River training works not satisfactory because in few places of CC blocks in both sides displaces and earth is open Both side return walls are in good condition The clear opening is sufficient Wearing coat is not in good condition, because in few places the stone chips are open The bridge is now operational and the overall condition of the bridge is good and it is suitable for communication, except some minor problems, i.e. the slope of the northern part of approach is very stiff which is very risky for easy movement of vehicles; in few places of wearing coat the stone chips are open. The road where the bridge was constructed, it is pucca. The present condition of the road is good. The bridge directly connected with Hazratpur to Dhaka, Savar, Keraniganj, Nawabganj, Dohar, Sreenagar and many other important places.
7. Construction of RCC bridge on Balia UP Office to Dhantara GC road: Flood damaged structure re-constructed – 1 bridge	Union: Gaotara-Zadabpur Upazila: Dhamrai District: Dhaka Division: Dhaka	Length – 125.00m Width– 3.70m Bridge loading – H ₂₀ Type of Road: Rural Road Year of construction: 2004-2006	<ul style="list-style-type: none"> The construction works of bridge started on 2004 and stopped on 2006. Under this project the construction of bridge was started but not fully completed, only abutments and 5 nos. of piers were constructed. After that the construction work was stopped by the contractor due to rises of value of construction materials, mainly MS rod and cement – it is reported by the concerned sub assistant engineer of Dhamrai Upazila. These constructed components are in good condition now. The bridge is now non operational. The Project Official, LGED, Dhamrai Upazila express his view that action has been taken against the contractor for non completion of construction. Local public demand is too much for construction of the remaining components of the bridge. If the bridge could be completed and communication will be developed with the Saturai, Savar, Dhamrai, Zirani, Tongi and Mirzapur. The remaining construction works of the incomplete bridge should be immediately completed by calling fresh tender, so that, the local public demands for better communication could be achieved.
8. Construction of bridge over Dhanmondi 32 no. road: Newly constructed structure – 1 bridge	Dhanmondi residential area, Dhanmond, Dhaka	Length – 34.00m Width– 12.00m Bridge loading – H ₂₀ S ₁₆ Type of Road: Highway branch road Year of construction: 1998-2000	<ul style="list-style-type: none"> 2 nos. of abutment are in good condition 4 nos. of girder are in good condition Cross beams are in good condition 4 nos. piers are in good condition Bridge slab is in good condition Both side steel railing are in good condition Both side approach road is good, no problem found River training works is 100% satisfactory Both side wing walls and return walls are in good condition The clear opening is sufficient Wearing coat is in good condition The bridge is now operational and the overall condition of the bridge is good and it is situated in the very important place of Dhaka City. The bridge has been connected with Mirpur road, New market, University and in every important places of Dhaka.

Name of Scheme	Location of the bridge	Size, bridge loading, type of road, year	Condition of the bridge and overall comments
9. Construction of bridge over Dhanmondi 8 no. road: Newly constructed structure – 1 bridge	Dhanmondi residential area, Dhanmond, Dhaka	Length – 47.00m Width– 12.00m Bridge loading – H ₂₀ S ₁₆ Type of Road: Highway branch road Year of construction: 1998-2000	<ul style="list-style-type: none"> • 2 nos. abutment is in good condition • 4 nos. girder are in good condition • Cross beams are in good condition • 4 nos. piers are in good condition • Bridge slab is in good condition • Both side steel railing are in good condition • Both side approach road is good, no problem found • River training works is 100% satisfactory • Both side wing walls and return walls are in good condition • The clear opening is sufficient • Wearing coat is in good condition • The bridge is now operational and the overall condition of the bridge is good and it is situated in the very important place of Dhaka City. The bridge has been connected with Mirpur road, New market, University and in every important places of Dhaka.
Chittagong division			
10. Construction of bridge on Sikolgata-Mazarfari-Eonchi Road on Matamohori River: Newly constructed structure- 1 bridge and 1 culvert	Union: Surajpur-Manikpur Upazila: Chokoria District: Cox's Bazar Division: Chittagong	Bridge: Length – 153.59 m Width – 5.46m Bridge loading – H ₂₀ S ₁₆ Type of Road: Rural Road Year of construction: 2000-2003	<ul style="list-style-type: none"> • 2 nos. abutment are in good condition • 2 nos. girder are in good condition • 4 nos. pier are in good condition but the soil of the base of 3 nos. of pier has been scoured • Bridge slab is almost in good condition, but in few places the slab stone chips was found open • Both side railing are in good condition • Return walls and wings wall did not construct • The soil deposited at the middle of the bridge, so the clear opening is obstructed • Wearing coat has been damaged in few places • The Rural Road where the bridge was constructed, one side is pucca and another side is kacha • Approach roads are partly damaged for that transport can not move easily • No river training protection work was done • The bridge is now operational and at least overall condition of the bridge is good except few cases of bridge components are faulty. But the condition of the road where the bridge was constructed, it is not in good condition. In many places the road and 150m brick soling has been washed out and more than 100 places the spot whole have been formed out due to flood. Eastern side of the bridge is not suitable for communication. The width of the bridge and the road is single lane, so it is very difficult to cross two vehicles at a time.
		Culverts: Length – 2.5 m Width – 1.5m Bridge loading – H ₂₀ S ₁₆ Type of Road: Rural Road Year of construction: 2000-2003	<ul style="list-style-type: none"> • 2 nos. of abutment are in good condition • Culvert slab is in good condition • Both side railing are in almost good but some minor cracks were found in one place • Wing walls slightly broken • Clear opening is sufficient • Wearing coat is in good condition • No river training works

Name of Scheme	Location of the bridge	Size, bridge loading, type of road, year	Condition of the bridge and overall comments
11. Construction of bridge on Lalpur-Shibpur Bazar road on Ghoshbaria Khal: Flood damaged structure re-construction – 1 bridge	Union: Mozidpur Upazila: Titus District: Comilla Division: Chittagong	Length – 44.00m Width – 6.80m Bridge loading – H ₂₀ Type of Road: Rural Road Year of construction: 2005-2006	<ul style="list-style-type: none"> • 2 nos. abutment are in good condition • 3 nos. girder are in good condition • 9 nos. cross beams are in good condition • 4 nos. piers are in good condition • Slab condition is good (smooth and RCC casting is good) • Both side railing are in good condition (Vertical and straight condition, no crack and finishing smooth) • No damage in approach road but the slope is very steep, which is obstruction of easy movement of vehicle • River training works was done but the CC block are not level condition, some where the CC blocks have been settle down • Wing wall condition is good • The clear opening is sufficient – water is flowing easily and boat is going up and down easily • Wearing coat is in good condition – no crack, smooth and no stone chips is found open • The bridge is now operational and the overall condition of the bridge is good except the steep slope on approach road, which is obstruction of easy movement of vehicles • The road where the bridge was constructed, it is now fully pucca but during construction it was kacha. The road condition is not good, in few places there are spot wholes. The road with bridge directly connected with school and bazaar, upazila and district road. The most benefited unions are Mozidpur-bridge site, Lalpur, Shibpur, Shahapur, Korikandia, Jagatpur.
12. Construction of 147.15m bridge over Gumati river on Brahmanpara-Buichang road: Newly constructed structure – 1 bridge	Union: Maynamoti & Bharalla Upazila: Burichang District: Comilla Division: Chittagong	Length – 147.15m Width – 6.20m Bridge loading – H ₂₀ Type of Road: Rural Road Year of construction: 1998-2000	<ul style="list-style-type: none"> • 2 nos. abutment are in good condition • 2 nos. girder are in good condition • 7 nos. cross beams are in good condition • 6 nos. piers are in good condition • Slab condition is good (smooth and RCC casting is good) • Both side railing are in good condition (Vertical and straight condition, no crack and finishing smooth) • No damage in approach road but the slope is very steep, which is obstruction of easy movement of vehicle • River training works was done by CC blocks but in few places CC blocks are not in position • Wing wall condition is almost good but in some places stone chips are open • The clear opening is sufficient • Wearing coat is almost in good condition but in few places stone chips are found open • The bridge is now operational and the overall condition of the bridge is good except minor problem in wing walls, approach road and wearing coat • The road where the bridge was constructed, it is now fully pucca but during construction it was semi pucca. The road condition is good. The road with bridge directly connected with school and bazaar, Upazila and district road. The most benefited unions are Maynamoti, Bharalla, Moka, and Rampur.
13. Construction of bridge over Gummyti river on Bakhrabad-Alirchar road: Newly constructed structure – 1 bridge	Union: Muradnagar Upazila: Muradnagar District: Comilla Division: Chittagong	Length – 140.00m Width – 5.25m Bridge loading – H ₂₀ Type of Road: Rural Road Year of construction: 2001-2005	<ul style="list-style-type: none"> • The construction work was not completed and the bridge was non operational. As per report of the project officials of LGED, Muradnagar, under this project the construction work was started on 2001 but after two years the contractor stopped the work for rises of construction materials such as MS rod and cement mainly. Again re-tender was floated for the second contract on 2005 but again for price hike of construction materials the contractor again stopped the works. The contractor completed up to the 2nd contract, 2 nos. abutments, 2 nos. girders, 12 nos. cross beams, 8 nos. piers, partly construction of bridge slab, partly both side railing have been constructed. These constructed components are in good condition now. The Project Director and Local Level Officials, LGED, express his view that action has been taken against the contractor for non completion of construction as per terms and conditions of the agreement. • If the bridge could be completed and communication will be developed with the Comilla district HQ, Dhaka, Chittagon and Sylhet districts HQ, Burichang, Alir Char School, college, growth centres, Bakhrabad and also other important places.

Name of Scheme	Location of the bridge	Size, bridge loading, type of road, year	Condition of the bridge and overall comments
14. Construction of bridge on Gazipur bazaar-Jogotpur road: Flood damaged structure re-constructed – 1 bridge	Union: Jagatpur Upazila: Titas District: Comilla Division: Chittagong	Length – 57.00m Width – 6.80m Bridge loading – H ₂₀ Type of Road: Rural Road Year of construction: 2005-2006	<ul style="list-style-type: none"> • Abutments are almost in good condition, RCC casting is very smooth and no stone chips open but soil from the back side of abutment washed out • 3 nos. girder are in good condition – smooth • 9 nos. cross beams are in good condition • 2 nos. piers are in good condition • Slab condition is almost good but (smooth and RCC casting is not smooth and in few places stone chips are found • Both side railing are in good condition (Vertical and straight condition, no crack and finishing smooth) • Approach roads are not suitable for easy vehicles movement • River training works was done by CC blocks and is in good condition • Wing walls and return walls are good – RCC smooth but the back side of the return walls in some places earth/soil washed out • The clear opening is sufficient • Wearing coat is almost in good condition but in few places stone chips are found open and surface not smooth • The bridge is now operational and the overall condition of the bridge is good and it is suitable for communication though there are some minor problem in approach road, slab, abutment, wearing coat • The road where the bridge was constructed is kacha. The road condition is good. The road with bridge directly connected to Titas union, Upazila, district and school, hat, bazaar and other important places. The most benefited unions are Jagatpur, Balorampur, Mojidpur.
Rajshahi division			
15. Construction of bridge on Turonihat-Chandanbay sa Road: Newly constructed structure – 1 bridge	Union: Baliadighi & Bhelabari Upazila: Gabtoli District: Bogra	Length – 30 m Width – 5.47m Bridge loading – H ₂₀ Type of Road: Feeder Road Year of construction: 2001-2004	<ul style="list-style-type: none"> • One side abutment is in good and eastern side abutment condition is bad • 2 nos. girder are in good condition • 12 nos. cross beam are in good condition • Condition of piers are good • Bridge slab is in good condition • Both side railing are in good condition • The eastern side of approach road is in bad condition. Repair needed. • Present condition of river training protection work is not good. The eastern side of bridge site the road has been washed out during rainy season. Immediate protection work needed. • The eastern side of return wall is faulty due to earth foundation has been scoured. Needed immediate repair. • The clear opening is almost sufficient, but a little maintenance works is needed. • Wearing coat is almost in good condition. • The road where the bridge was constructed is puccka. The road condition is not good. In many places there are spot wholes and carpeting has been damaged. • The bridge is now operational and at least overall condition of the bridge is good except few cases of bridge components are faulty. But the condition of the road where the bridge was constructed, it is not in good condition. In many places there are spot wholes and carpeting has been damaged. The width of the bridge and the road is single lane, so it is very difficult to cross two vehicles at a time. The public demanded to extent the road and bridge width.

Name of Scheme	Location of the bridge	Size, bridge loading, type of road, year	Condition of the bridge and overall comments
16. Construction of bridge on Goyhata GC-Kuchyamara R&H road: Flood damaged structures re-constructed- 2 bridges	Union: Banggala	Length – 100.12m	<ul style="list-style-type: none"> • 2 nos. abutment are in good condition • 3 nos. girder are in good condition • 5 nos. cross beams are in good condition • 4 nos. piers are in good condition • Top surface of slab is in good condition but the bottom surface MS rod is open in one place due to damage of cement concrete • Both side railing are in good condition • One side of the approach road have been damaged by spot whole • River training works partly damaged in few places, such as, CC block displaced • Wing wall and return walls are in good condition • The clear opening is sufficient • Wearing coat is in good condition • The bridge is now operational and the overall condition of the bridge is good except approach road, bottom of slab, river training works partly damaged. • The road where the bridge was constructed, it is now fully pucca but during construction it was kacha. The road condition is not good, in the year 2007-2008 the road has been damaged and not suitable for communication. The road with bridge directly connected with Shimla & Binayekpur bazar and upto Gohatta-Kuchyamara Bazar which connected with school, college, markets and growth center. People can go directly at different important places by using the road. The most benefited unions are Banggala, Purnimagati, Boro Pangasi and Udhunia.
	Upazila: Ullapara	Width – 5.50m	
	District: Sirajgonj	Bridge loading – H ₂₀	<ul style="list-style-type: none"> • 2 nos. abutment are in good condition • 3 nos. girder are in good condition • 5 nos. cross beams are in good condition • 4 nos. piers are in good condition but the base of the piers has been scoured a little bite • Slab is almost in good condition but in one place MS rod is open due to damage of cement concrete • Both side railing are in good condition • Both side of approach road have been damaged due to flood and not suitable for easy communication • River training works partly damaged in few places, such as, CC block displaced • Wing wall and return walls are in good condition but the back filling has been washed out • The clear opening is sufficient • Wearing coat is in good condition • Though the bridge is now in running condition, but there are some minor problem in back filling of abutment, scoured in base of piers, damage of approach road.
	Division: Rajshahi	Type of Road: Feeder Road	
		Year of construction: 2004-2006	
17. Construction of bridge on Sagunahat-Kallanpur road over Hursagar river: Flood damaged structure re-constructed – 1 bridge	Union: Dukhuriabera	Length – 105.00m	<ul style="list-style-type: none"> • 2 nos. abutment are in good condition • 3 nos. girder are in good condition • 6 nos. cross beams are in good condition • 5 nos. piers are in good condition • Slab is almost in good condition • Both side railing are in good condition • Both side of approach road are in good condition • River training works are good • Return walls are in good condition • The clear opening is sufficient • Wearing coat is in good condition • The overall condition of the bridge is good with no defect and it is now in operation. • The road where the bridge was constructed, it is now fully pucca but during construction it was kacha. The road condition is good. The road with bridge directly connected with Upazila and district head quarter, bazar school, college, health center and other important places. The most benefited unions are Dukhuriabera, Daulatpur, Bhangabari.
	Upazila: Belkuchi	Width – 4.80m	
	District: Sirajgonj	Bridge loading – H ₂₀	
	Division: Rajshahi	Type of Road: Feeder Road	
		Year of construction: 2005-2006	

Name of Scheme	Location of the bridge	Size, bridge loading, type of road, year	Condition of the bridge and overall comments
Sylhet division			
18. Construction of bridge on Baniachang-Kadirgonj Road: Newly constructed structure – 1 bridge	Union: Kagapasha Upazila: Baniachang District: Hobiganj Division: Sylhet	Length – 60.50m Width – 3.66m Bridge loading – H ₂₀ Type of Road: Feeder Road Year of construction: 2000-2002	<ul style="list-style-type: none"> • 2 nos. abutment are in good condition • 2 nos. girder are in good condition • 2 nos. cross beam are in good condition • 4 nos. piers are in good condition • Bridge slab is in good condition • Both side railing are in good condition • At present repair works of approach road is on going • No river works • Wing wall and return wall is in good condition • The clear opening is not sufficient, the river bed is silted up on the bridge site • Wearing coat is in good condition • The road where the bridge was constructed is kacha. The road condition is not good. In many places there are spot holes and in rainy season the road is remains under water. Communication disrupted for 6 months. • The bridge is now operational and at least overall condition of the bridge is good except few cases of bridge components are faulty. But the condition of the road where the bridge was constructed, it is not in good condition. In many places there are spot wholes and in rainy season the road is remains under water. Communication disrupted for 6 months.
19. Construction of bridge on Jagannathpur-Raniganj Road: Newly constructed structure – 1 bridge	Union: Raniganj Upazila: Jagannathpur District: Sunamganj Division: Sylhet	Length – 79.75m Width – 3.63m Bridge loading – H ₂₀ Type of Road: Feeder Road Year of construction: 2001-2002	<ul style="list-style-type: none"> • 2 nos. abutment are in good condition • 2 nos. girder are in good condition • Cross beams are in good condition • 4 nos. piers are in good condition • Bridge slab is in good condition • Both side railing are in good condition • Approach road is not in good condition • No river training works • Wing wall and return wall is in good condition • The clear opening is sufficient • Wearing coat is in good condition • The road where the bridge was constructed is kacha. The road condition is not good. In many places there are spot wholes and in rainy season the road is remains under water. Communication disrupted for 6 months. • The bridge is now operational and at least overall condition of the bridge is good except river training protection work and the road is kacha. The most benefited are unions are Raniganj, Pailgaon, Asharkandi, Sadipur (Balaganj) Upazila.
20. Construction of bridge over Kaleswari river on Kalipur-Haidarpur road: Newly constructed structure – 1 bridge	Union: Shingchapair Upazila: Chhatak District: Sunamganj Division: Sylhet	Length – 79.75m Width – 3.63m Bridge loading – H ₂₀ Type of Road: Feeder Road Year of construction: 2001-2002	<ul style="list-style-type: none"> • 2 nos. abutment are in good condition • 2 nos. girder are in good condition • Cross beams are in good condition • 4 nos. piers are in good condition • Bridge slab is in good condition • Both side railing are in good condition • Approach road is under construction • No river training works • Wing wall and return wall are under construction • The clear opening is sufficient • Wearing coat is in good condition • The road where the bridge was constructed is kacha. The road condition is not good. In many places there are spot holes and in rainy season the road is remains under water. Communication disrupted for 6 months. • The bridge is now operational and at least overall condition of the bridge is good except river training protection work and the road is kacha. The most benefited are unions are Shingchapair, Jaobazar, Bhatgao.

Name of Scheme	Location of the bridge	Size, bridge loading, type of road, year	Condition of the bridge and overall comments
Khulna division			
21. Construction of bridge over Shipsha river on Paikgacha GC-Borokhali GC road: Newly constructed structure – 1 bridge	Union: Soladana Upazila: Paikgacha District: Khulna Division: Khulna	Length – 203.00m Width – 3.65m Bridge loading – H ₂₀ Type of Road: Feeder Road Year of construction: 1997-2000	<ul style="list-style-type: none"> • 2 nos. abutment are in good condition • 2 nos. steel girder are in good condition • 55 steel cross beams are in good condition • 16 nos. piers are in good condition • Bridge slab is in good condition • Both side railing are in moderately good condition • Approach road is in moderately good condition • River training protection work is done and in moderately good condition • The northern side of wing wall and return walls are in good condition but the southern part is bad condition • The clear opening is sufficient • Wearing coat is in good condition • The overall condition of the bridge is good except southern part of wing wall and return walls and also now in operation. The road where the bridge was constructed is pucca. The road condition is moderately good. It was found during observation that the Feeder road is very busy for all types of traffic transactions. The most benefited unions are Soladana, Gorikhali, Lata Deloti.
22. Construction of bridge on Charavita Growth Center-Gorni Bus stand road over Vairab river: Flood damaged structure re-constructed – 1 bridge	Union: Bayuari Upazila: Bagarpara District: Jessore Division: Khulna	Length – 60.05m Width – 5.50m Bridge loading – H ₂₀ Type of Road: Rural Road Year of construction: 2004-2006	<ul style="list-style-type: none"> • 2 nos. abutment are in good condition • 3 nos. girder are in good condition • 9 nos. cross beams are in good condition • 4 nos. piers are in good condition • Slab condition is good (smooth and RCC casting is good) • Both side railing are in good condition (Vertical and strait condition, no crack and finishing smooth) • Both side of approach roads are damaged • River training works have been done and in good condition • Wing walls and return walls are in good condition • The clear opening is not sufficient due to deposition by sand and soil on the river bed • Wearing coat is in good condition – no crack, smooth and no stone chips is found open • The bridge is now operational and the overall condition of the bridge is good except the approach road and clear opening • The road where the bridge was constructed, it is now partly pucca, semi pucca and kacha but during construction it was fully kacha. The pucca portion road is good but semi-pucca and kacha portion are very bad. The road with bridge directly connected with school, college, bazaar, hospital, Upazila and district road. The most benefited unions are Bayuari, Bosundia, Narendropur, Jamdia.

Name of Scheme	Location of the bridge	Size, bridge loading, type of road, year	Condition of the bridge and overall comments
Barisal division			
23. Construction of bridge over Jhangalia river on Mirerhat-Challish Kawnia road: Newly constructed structures – 2 bridges	Union: Baroia	Length – 99.56m	<ul style="list-style-type: none"> • 2 nos. abutment are in good condition • 2 nos. girder are in good condition • 9 nos. cross beams are in good condition • 4 nos. piers are in good condition • Bridge slab is in good condition • Both side railing are in moderately good condition • Approach road is in good condition • No river training/protection works • The clear opening is sufficient • Wearing coat is in moderately good condition • The overall condition of the bridge is good. • The road where the bridge was constructed is semi pucca. The road condition is good. The road with bridge directly connected with Upazila. People can go directly at Upazila by using the road and school, college and growth center is also at Upazila. The most benefited unions are Baroia, Mathbari, Galua and Aurabunia.
	Upazila: Rajapur	Width – 3.78m	
	District: Jhalokathi	Bridge loading – H ₂₀	<ul style="list-style-type: none"> • 2 nos. abutment are in moderately good condition • 2 nos. girder are in moderately good condition • 2 nos. cross beams are in good condition • 2 nos. steel piers are in good condition • Bridge slab is in good condition • Both side railing are in moderately good condition • Approach roads are in good condition • No river training/protection works • The clear opening is sufficient • Wearing coat is in good condition • The bridge is now operational and the overall condition of the bridge is good. The road where the bridge was constructed is semi pucca. The road condition is good. The road with bridge directly connected with Upazila. People can go directly at Upazila by using the road.
	Division: Barisal	Type of Road: Feeder Road	
		Year of construction: 1999-2004	
24. Construction of bridge at Kazirhat (GCE-03170): Newly constructed structure – 1 bridge	Union: Madarbunia	Length – 115.00m	<ul style="list-style-type: none"> • 2 nos. abutment are in good condition • 2 nos. girder are in good condition • Cross beams are in good condition • 4 nos. piers are in good condition • Western side of bridge slab partly damaged • Both side railing are in good condition • Approach road is in good condition • River training/protection works are in good condition • Wing walls and return walls are in good condition • The clear opening is sufficient • Wearing coat is in moderately good condition but in few places stone chips are damaged • The bridge is now operational and the overall condition of the bridge is good except a little damage of slab. • The road where the bridge was constructed is pucca. The road condition is good. The road is directly connected with Upazila road, district road, hospital and other important places. The most benefited unions are Madarbunia, Chotobighai, Borobighai, Kalikapur.
	Upazila: Sadar	Width – 3.70m	
	District: Patuakhali	Bridge loading – H ₂₀	<ul style="list-style-type: none"> • 2 nos. abutment are in good condition • 2 nos. girder are in good condition • Cross beams are in good condition • 4 nos. piers are in good condition • Western side of bridge slab partly damaged • Both side railing are in good condition • Approach road is in good condition • River training/protection works are in good condition • Wing walls and return walls are in good condition • The clear opening is sufficient • Wearing coat is in moderately good condition but in few places stone chips are damaged • The bridge is now operational and the overall condition of the bridge is good except a little damage of slab. • The road where the bridge was constructed is pucca. The road condition is good. The road is directly connected with Upazila road, district road, hospital and other important places. The most benefited unions are Madarbunia, Chotobighai, Borobighai, Kalikapur.
	Division: Barisal	Type of Road: Feeder Road	
		Year of construction: 2001-2005	

Summary Findings of Observed Infrastructures:

- Out of 27 sample bridges/culvert, 3 (11%) bridges were observed to be completely free of any problem or defect and fully operational currently.
- Two sample bridges and culverts (7%) are incomplete and are now non-operational.
- The rest of the 22 infrastructures (82%: sample bridges and culverts) are currently operational but with problems/defects. The problems/defects (in multiple percent) observed for 22 structures are discussed by types hereunder:
 - ✓ 'Abutment walls' of 4 bridges (18%) are faulty: Sliding of back fill earth
 - ✓ Girders of 1 bridge (5%) are cracked on MS rod.
 - ✓ Piers of 2 nos. bridges (9%) are faulty due to scour hole formed at the bottom of the few piers
 - ✓ Slabs of 5 bridges (23%) are defective (i.e. not smooth and RCC casting is not good)
 - ✓ Railings of 5 bridges (23%) are defective for (non vertical and straight condition, cracked and finishing not smooth)
 - ✓ Approach roads 14 bridges (64%) are faulty: (Approach roads are damaged and with spot holes in many paces)
 - ✓ River training works (protective works) are defective for 15 bridges (68%): 7 bridges no RTWs and 8 bridges have RTWs with some defects (CC block displaced and washed out)
 - ✓ Return walls of 6 bridges are faulty (MS rods are cracked and open)
 - ✓ Clear opening (at bottom obstructing water flow) silted for 4 bridges (18%)
 - ✓ Wearing coats over the bridge are faulty for 7 bridges (32%): Cracks, not smooth and stone chips found).
 - ✓ 1 Culvert (5%) has problem with railing, wing walls slightly cracked and no river training works.

During observations of the bridges/culvert while discussing with community peoples, who gathered on the spot, identified following impacts accrued from the structures:

- Communication has improved all over the project area connecting schools, colleges, growth centers, university, hat, bazaar, Upazila, district town, and health centers hospitals different directions have been developed;
- Facilitated irrigation (Agriculture) through minor drainage and flood control system;
- Employment has been generated for the rural poor including women and land less;
- Increased production different crops in the rural areas has been achieved; and
- Allied developments such in business, fish culture, poultry farming, tree plantations have also been achieved.

Summary Assessments and Recommendations on Observed Infrastructures

The study team observed physically construction/reconstruction, operational and non operational status of 27 nos. infrastructures (26 bridges and 1 culvert). Out of 26 bridges, 3 bridges are operational with no faults or defects for repairs; 2 bridges are incomplete, while 21 bridges and 1 culvert are currently operational requiring some minor repairs. The interpretations including reasons of faults/defects with recommendations/suggestions for required actions are given below.

Reasons and Recommendations on two incomplete bridges

Construction of RCC bridge on Balia UP Office to Dhantara GC road: Newly constructed structure	Union: Gaotara-Zadabpur; Upazila: Dhamrai; District: Dhaka	The construction works of bridge started on 2004 and stopped on 2006 up to construction of abutments and piers. As per report of the Local Officials of LGED, Dhamrai Upazila, the construction work was stopped by the contractor due to price hike of construction materials, mainly MS rod and cement. The Project Director, LGED, expressed his views that actions were taken against the contractor for non completion of construction. The remaining construction works of the incomplete bridge should be immediately completed by calling fresh tender, so that, the local public demands for better communication could be achieved.
Construction of bridge over Gumyti river on Bakhrabad-Alirchar road: Newly constructed structure	Union: Muradnagar; Upazila: Muradnagar; District: Comilla	The construction work of the bridge was incomplete. As per report of the project officials of LGED, Muradnagar, under this project the construction work was started on 2001 but after two years the contractor stopped the work due to price hike of construction materials such as MS rod and cement mainly. Again re-tender was floated for the second contract on 2005 but again for price hike of construction materials the contractor again stopped the works. The contractors completed up to the 1 st and 2 nd contract, abutments, girders, cross beams, piers, partly construction of bridge slab and both side railing. The Project Director and Local Level Officials, LGED, expressed views that actions were taken against the contractor for non completion of construction work as per terms and conditions of the agreement. The remaining construction works of the incomplete bridge should be immediately completed by calling fresh tender, so that, the local public demands for better communication could be achieved.

Reasons and Recommendations on 21 bridges and 1 culvert with minor faults/defects: Reasons of faults/ defect

- Due to the long time operation of the bridges/culverts at least more than 3 years
- For want of regular maintenance works after 3 years interval
- Due to wear and tear
- Other unforeseen (natural) reasons

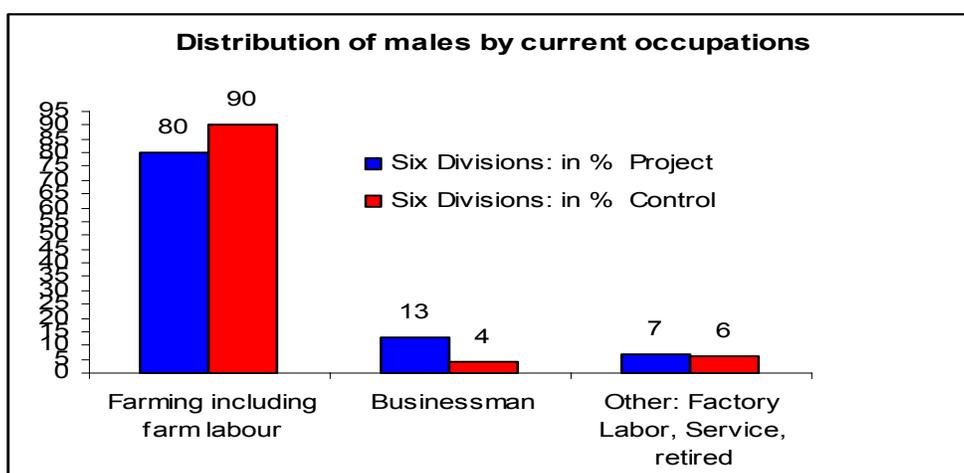
Recommendation/suggestions for present and future guideline

- Minor repair works are needed to be undertaken immediately, so that conditions of those infrastructures do not deteriorate further;
- River training works for the construction of infrastructures are very much important for long time sustainability. But from the physical observation, it was found that 15 bridges have no RTWs or have been done currently with some defects. Immediate repairing and construction of river training works should be carried out. In future, provisions for RTWs should be included in the project plans and budget.
- Regular inspection and close supervision by the LGED officials are needed
- Quality Control Cell may be established for future regular monitoring of the construction works of bridges; and
- The construction works of the bridges/culverts should be executed as per detailed design and approved specifications.

B. Household Beneficiary Assessments

The mean age of the male respondents are 44 years in the Intervention areas and 45 years in the Control areas, while that of the female respondents, it is 35 years for both Intervention and Control areas. Female respondents in both intervention and in the control areas are currently married, while 98% of the males in both intervention and in the control areas are currently married. Again in both intervention and in control areas, males are 5th grade qualified, while the females in the interventions areas are qualified at 4th grade and those in the control areas are qualified at grade 3. On the levels of age and marital status, hardly there is any difference among the respondents in the intervention and in the control areas reflecting comparability of the samples.

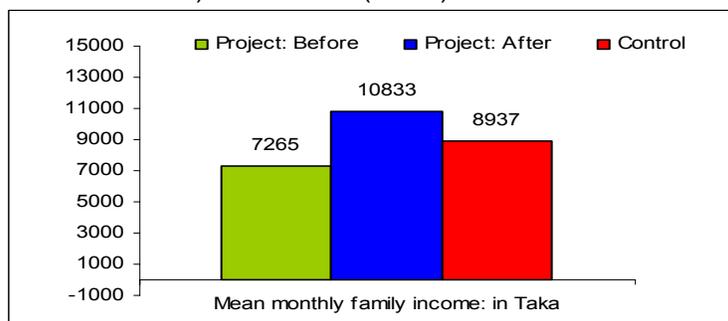
But in terms of current occupations, the graphs below show slight difference for the male respondents.



About 10% differences are observed on the current occupations of Farming including farm labor and Business for the male respondents comparatively between the intervention and the control areas and this could be as result of improvements of the communication net work. The intervention areas have 9% more in Business over the control areas.

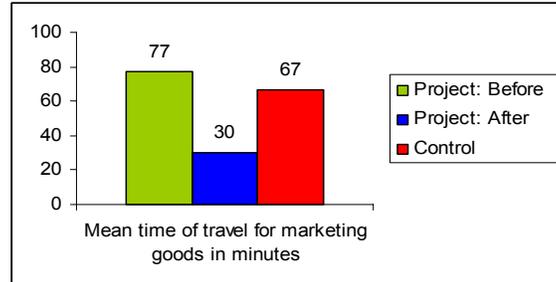
Male Responses: Comparative outcome impact by Intervention and Control areas on: Employment and Income generations, School attendance, Marketing of agricultural products by on costs and time of travels to growth centers, markets and hats and bazars

Mean monthly family income (estimates by the male respondents) shown in the bar graphs below comparatively by Project (before construction of bridge and culvert in green and after construction of in blue) and Control (in red).

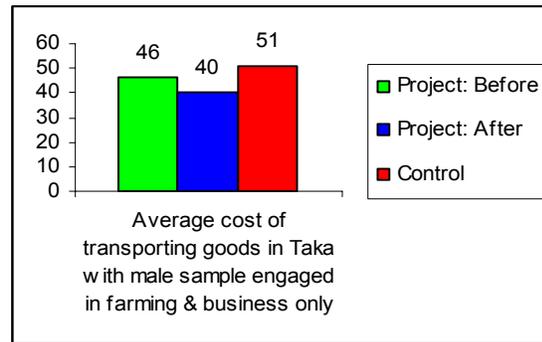
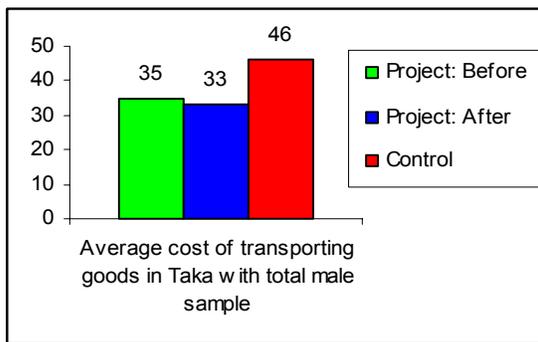


The mean monthly family income of the project areas currently is higher by (additionally) by 49% over its period prior to construction of bridges and culverts and it is again higher (additionally) by 18% over the control areas.

Bar graphs below show the **distribution of mean time of travel and costs** comparatively by Intervention (project before: green and after: blue) and Control areas (red).

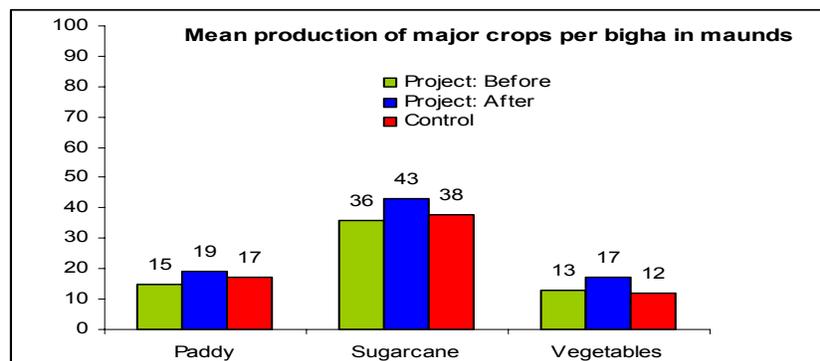


The mean time estimated is less than half in the Project intervention areas at post construction period (30 minutes) compared to the project at prior to construction (77 minutes) and in the control areas (67 minutes).



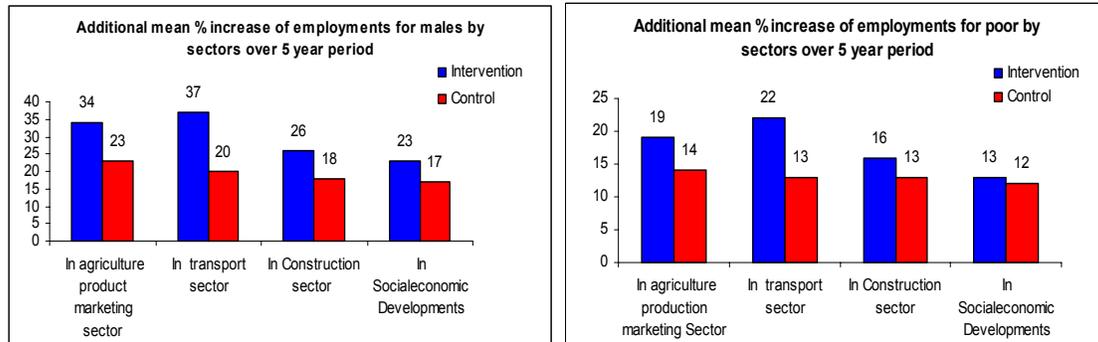
When estimated considering the total male sample, there is some difference on the mean costs of carrying goods to the markets between pre and post construction periods in the project areas; but the difference is much higher between the current project and the control areas. But when estimated considering the male sample engaged in farming and business only (those carrying goods to markets for sales), the estimated costs vary between the groups, Intervention Before and Intervention After by (Tk. 6) and again by Intervention After and the Control, by Tk. 11 on average.

Bar graphs below show the **mean production of major crops** per bigha of land comparatively by project (before: green and After: blue) and control areas (red).



Difference by 2 maunds is observed between project before, project after and in the control areas in case of production of paddy and vegetables; but on production of sugarcane the difference is much higher.

Respondents (males estimating about the males and the poor) were asked to estimate change over time (over 5 years) in respect of employment rates by different sectors and the bar graphs below demonstrate the comparative findings by Intervention (project: in blue) and Control areas (in red). Here it may be mentioned that during observations (physical verifications) of the bridges and culvert, the maximum time gap between starting and completion of a structure was 4 years only.



Estimated increase in the rates of employment between the Intervention and the Control for males range between 6 to 17% (median: 10%) across the sectors, while in case of the poor only, the differences range between 1 to 9% (median 4%) only.

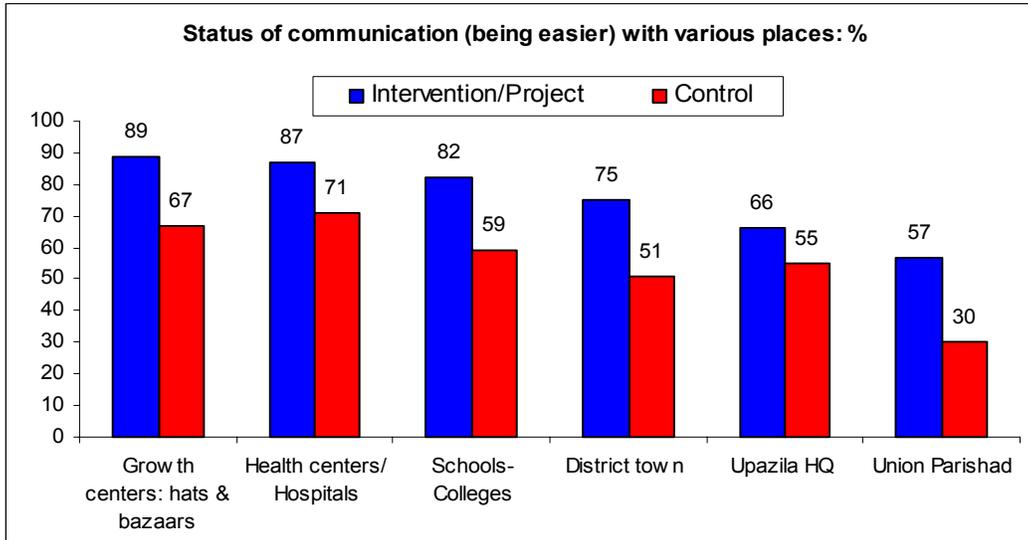
Table below shows the distribution of children attending schools per family in a year comparatively by Intervention (before and after) and Control areas.

Table 6: Distribution of children attending schools per family in a year comparatively by Intervention/Project (before and after) and Control areas

Number of children attending schools in year	Intervention/Project		Control
	Before	After	
Mean attendance	1	1	1
Minimum attendance	0	0	0
Maximum attendance	5	6	4

Although on average, the difference is yet to be observed comparatively by the intervention and control areas, but when the maximum number is considered per family, the difference is observed between the project currently and the control areas by 2 children. If the situation of communication network, continues to be unchanged for a longer period, the difference could also be observed on the average number of children attending schools between the project and control areas. This means that the impact is there, but it would take more time for the said impact to be observable at average rates.

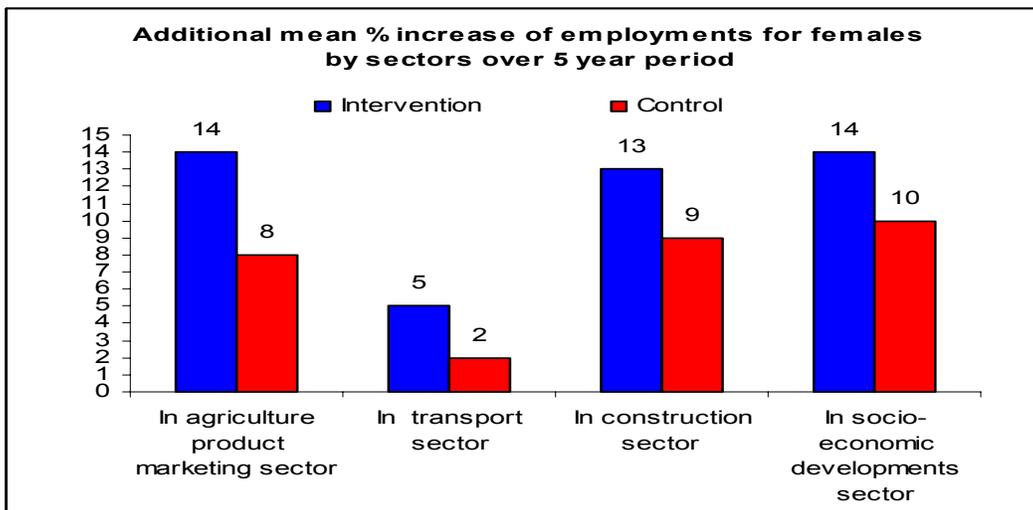
Bar graphs below show the distribution of **male respondents perceiving communication being easier** with different locations comparatively within project (intervention) and Control areas.



Communications with all the locations as perceived by the males is much easier within the project areas comparatively over those in the Control areas.

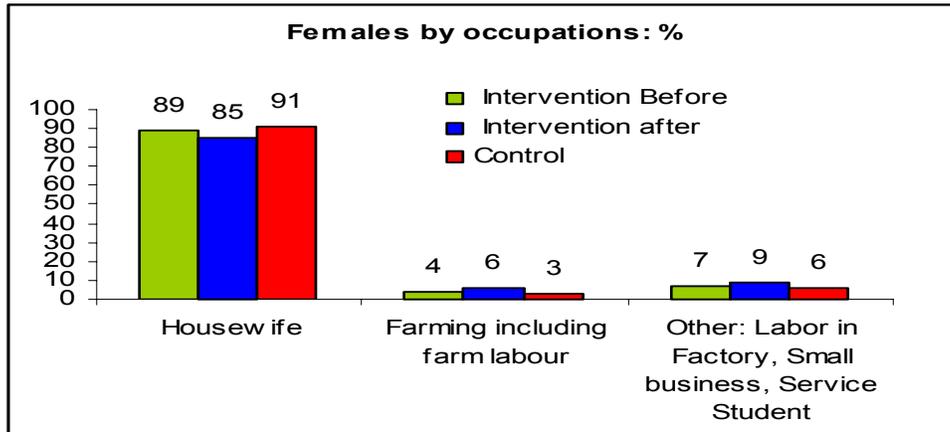
Female Responses:

Respondents (females estimating about the females) were asked to estimate change over time (over 5 years) in respect of employment rates by different sectors and the bar graphs below demonstrate the comparative findings by Intervention (project: in blue) and Control areas (in red).



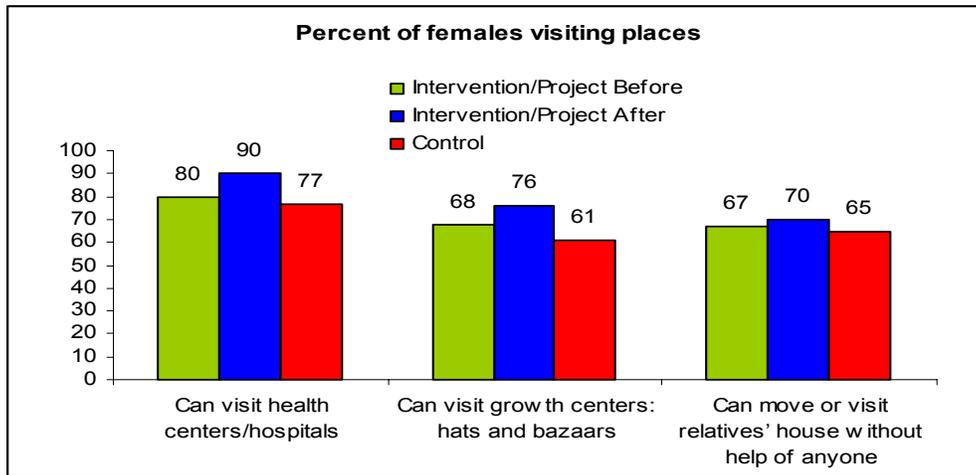
Compared to the situations now over five years in the past, the females have ascertained additional increment in the rates of their employments in the project areas (before and after) in double digits 13 to 14% in agriculture marketing, construction and in allied socio economic development sectors; but in the transport sector the increment is only 5%. In the Control areas, the additional increment in the rates of female employment over last five

years remains within the range of 2 to 10%. The graphs below show the distribution of the female respondents by occupations comparatively between intervention and control areas:



Both in the farming and in the allied Socio economic sectors, the females have been experiencing increments in their levels of engagements in economically gainful activities; such increment is slightly higher in the project areas at post construction periods.

On the issues of female mobility within the community, the improvements have been achieved in the project areas in respect of visits to health centers/hospitals (additionally by 10%), markets (additionally by 8%) and the relatives (additionally by 3%): see bar graphs below.



C. FGD Findings

Of the total FGD participants 9% were females and the rest are males; 44% are farmers, 38% businessmen, 9% are teachers, 6% are service holders and 3% are students. Among the Farmers and Businessmen, many are Ward members, Influential, Community Leaders.

➤ **Date of Completion of the Bridge:**

- Half of the participants said that the bridge was completed in the year 2002 but it was open for public use formally in the year 2004;
- Other half of the participants said that the bridge was completed in the years either 2005, or 2006 or 2007.

➤ **Status of Bridge**

- 80% of the bridges and culverts are newly constructed
- 20% are flood damaged reconstructed bridges/culverts

➤ **Perceived Reasons for Construction of the Bridge**

- For improvement of communication network
- For socio economic development of the area
- For facilitating movements of the male and female students to attend school

➤ **Benefit of Bridge**

- Has improved the physical communication in the area
- All sorts of transports are now moving on the road
- People can reach their destination in time and easily
- Previously during rainy season both male and female students could not attend their schools and even the guardians used to discourage them from attending schools but now they on their own regularly attend schools
- The enrollment in schools have increased after construction of the bridge
- Previously people used to carry farm products, such as vegetables and fruits to the markets on their heads, but now they can reach the markets with farm products in lesser time transporting more products and consequently accruing greater profits
- Previously pregnant mothers despite their willingness to consult a doctor during their pregnancy could not do so, consequently many pregnant mothers used to die without availing proper maternal care treatment. Currently due to the construction of the bridge, as the road communication has improved, pregnant mothers reach the doctors easily for consultation and treatment and as a result pregnant women do not die due to complications of pregnancy
- Facilitated transportation of sick persons to the Hospitals
- Farm products are easily marketed and there is less losses of farm products being rotten
- Job opportunities for the people increased

➤ **Places where communication has become easier and improved**

- To reach the Upazila headquarters, court, hospitals, schools/madrashas/colleges, markets, divisional towns
- Construction of the bridge has helped in achieving overall socio-economic development. As for example, when there was no bridge people used to carry marketable products in boats or on their heads and naturally they had less incentives in producing marketable farm products (fruits and vegetables) and since the communication has improved due to construction of the bridge more motorized vehicles are running on the roads and as a result the whole sellers are now reaching with their transport right to the door steps of the farmers and the farmers are now getting fair price staying within their own locality.

- **Types of Job opportunities short and long term created**
 - As the land owners are now motivated to produce more fruits and vegetables, they eventually employ more farm laborers from among the poor and hardcore poor
 - After the construction of the bridge, there is sudden spurt of use vehicular transports such as CNG, Leguna, Rickshaw and Rickshaw Vans and as a result poor people are employed as transport workers.
 - Before the construction of the bridge, the poor people were less empowered with less opportunities for seeking or bargaining for jobs and wages, as their mobility was greatly restricted, but after the construction of the bridge, as the road communication and network has improved substantially, they can move freely move beyond their locality and even some of them easily reach the capital city Dhaka and pursue higher wages and varied kinds of jobs.
- **Scope of Job opportunities for the Women**
 - Women of our locality do not seek jobs, instead they attend to their family chores
 - More women are now interested to participate in the agricultural activities as the farm products fetch better income
 - Women are also engaged in cottage industry ventures and handicrafts are now easily marketable.
 - Due to improvements of the communication network due to construction of the bridges and culverts, more NGOs are now working in the remote areas of the villages and as a result women are increasingly participating in the income earning activities
- **Positive Impact on the Environment**
 - As the road communication improved in the locality, people are planting trees on the road sides for which the physical environment has improved greatly
 - With the improvement of the road communication, many GO and NGO agencies are now visiting the area and are motivating the local people on social forestry and also improving the hygiene and sanitation facilities in the locality
 - Before construction of bridges and culverts, there were water logging leading to further inundation and floods; but now floods are rare
- **Negative Impact on the Environment**
 - Improvement of the communication network is impacting on losses of farm lands and more lands are being used for markets
 - Rivers' depth are reduced affect ting reverine communication by boats
 - Communication improvements have attracted many business concerns on operating brick laying/burning, which is adversely affecting the environment and the climate
 - Some participants opined that there is no negative impact on the environment
- **Benefit accrued due to the project**
 - Attendance to schools and hospitals have increased
 - Scope of Job and job opportunities have improved with increased wages
 - Road communication has become efficient and travels between places are now more comfortable
 - Engagements in farming and agricultural productions have enhanced
 - Marketability of products and businesses have expanded
 - Women are now more engaged in income earning opportunities
 - Transportation of farm (marketable) products (fruits, vegetables, paddy, rice, wheat) has improved facilitating easier and quicker transportation to different hats and bazaars (markets)
 - Improved transportation system has facilitated saving of time and earning more profits

- Price of farm lands has gone up
- People are now well fed and clothed as their income through increased job opportunities has increased

➤ **Problems created due to the project**

- Only two of the participants mentioned that improvements in the communication systems caused greater incidences of night time robbery and dacoity, but before the construction of the bridge there was no dacoity in the area.
- Rivers' depth are reduced affecting riverine communication by boats
- Communication improvements attracted many business concerns on operating brick layers/burning, which is adversely affecting the environment/climate
- Improved road communications contributed to the growth of local level crimes

➤ **Types and status of increased of Job opportunities in the area**

Sectors	% increased	% increased in case of males	% increased in case of females	% increased in case of the poor
Agriculture and farm productions and marketing	50%	50%	10%	50%
Transportation/communication network	30%	30%	0	50%
Infrastructure construction/repairs: roads	15%	10%	5%	100%
Other socio-economic development	20%	15%	5%	2 to 3 %

➤ **Level of satisfaction of the people in the locality on use of Bridges/Culverts**

- People are using the roads with satisfaction but these need reconstruction/repairs
- No problem
- But at a few distance there is a mud road linked with the rural road connecting the bridge, and during the rainy season, people living in the area face difficulty in using the bridge

➤ **Status of repair of the Bridge**

- Some repairs of roads have been undertaken
- No repair work was ever carried out after construction of the bridge
- However the Upazila engineer some time come and visit the bridge

➤ **Steps to be taken in future to keep the bridge/culvert intact (protect the construction work)**

- If ever the approach roads to the bridge get unusable, the locality people can on their own repair the approach roads by covering the spots with mud (earthwork)
- Heavy transports may be restricted from using the bridge
- The earth beneath the bridge can be protected by watching and prohibiting people from taking away mud from there, so that the bridge remains intact
- Local level committee may be formed for continuous monitoring of the bridges/culverts and the connecting roads

➤ **Steps to be taken in future to keep the bridge operational**

- Approach roads on both the sides of the bridge need to be widened
- Supervise the bridge from time to time to keep it operational
- And if ever the roads need repairs, it can be ensured by using proper repair materials
- Sometimes roads are damaged due to heavy rains for which the roads may be repaired with Peach (black Coal tar)

D. Intensive Interviews

Of the total completed intensive interviews (158), 80% were completed at the local level and the rest 20% were from the national level. The distribution of the respondents by categories at the local and at the national level is as follows:

The distribution of the local Agency personnel/Officers interviewed is:

- LGED officers/personnel: Upazila Engineers; Assistant Engineers; Sub-Assistant Engineers; Surveyor and Work Assistants—62%
- Allied agency/program personnel/officers: Upazila Chairmen/Vice Chairmen; UP Chairmen and members; Upazila Nirbahi Officers; Upazila Education Officers; Upazila Agriculture Officers; UHFPOs -38%

The ongoing works for implementation of the project was regularly supervised (86%) and only 14% said that the works were not supervised. Sub Assistant Engineer was constantly present in the site during construction. Supervision was ensured on quality of materials, guiding the mason man, investigating the appropriateness of the tasks during construction as per design, status of mixing materials properly. Supervision by higher level officials like Executive Engineer and Upazila Engineer was ensured from time to time with periodic spot supervision by the Project Director (PD) and DPD. Occasionally, supervision was carried by even still higher level officials of the levels of Chief Engineer and even the Secretary. The range of the frequencies of supervision done as claimed was 2 to 200 times; and the average times supervised as estimated was 2 times in a month, assuming that a bridge was completed approximately over a period of two years.

Four fifths of the formal community leaders (UP) and allied department officials said that supervision of the construction works of the bridges and culverts was done properly, while only a fifth of them denied that that any spot supervision during construction was done. Half of the formal community leaders (UP) and allied agency personnel (50%) affirmed that they were consulted prior to construction, while half denied the same.

The LGED officials unanimously claimed that the physical targets (component) of the project were completed properly. But a quarter of the officials were not certain whether the financial targets were met as per estimation. Of the formal community leaders (UP) and allied agency personnel, a fifth said that the financial targets of the same could not be achieved.

Less than ten percent (7%) of the LGED officials said that there were problems in purchasing materials, in implementation, and in the management and 93% claimed that there was no problem in this regard.

About a quarter of the LGED officials claimed that the community persons (Formal leaders: UP Chairmen and Members) did not participate in the project. Two thirds of the formal community leaders (UP) and allied agency personnel claimed that they did not participate in the implementation of the project. Even though the community and allied persons did not participate, but they also did not create any obstacle to the completion of the project.

LGED officials did not identify any environmental problems due to construction of the bridges and culverts. The approach roads connecting the bridges and culverts sometimes did not have proper drainage system for which rain water caused temporary water logging or minor floods.

Respondents irrespective of LGED officials or the allied personnel almost unanimously (except one) claimed that the bridges and the culverts are now operating properly.

In response to a query, the LGED officials said that the need for repair of bridge or a culvert would arise either after one year or two years or three years. More than three fourths of the officials (77%) remarked that repair works are carried out routinely; however, 23% denied the same. The concerns for repairs are: fixing the approach road; filling the gaps created by sliding of mud during rainy season; and any other problems impeding smooth communication and use of the infrastructures. Repair works are mostly carried out by the LGED personnel and sometimes in cooperation with the UP Chairmen and members. Of the formal community leaders (UP) and allied agency personnel, three fourths (75%) remarked that repair works are carried out routinely; however, 25% denied the same. Again about three fourths of the formal community leaders (UP) and allied agency personnel (70%) claimed that they had some roles in the repair and maintenance of the infrastructures and the role is most frequently performed in filling up the gaps on the approach road of the bridge with mud.

Regarding estimation of the length of total operational status (years of lasting) of a bridge approximately, 62% of the LGED officials could not give any guess, while of those who had given any estimate (38%), majority opined that a bridge would last for about one hundred years. The strengths and benefits of the project as envisaged by the LGED officials are:

- Improved agricultural productions and increased marketing of agricultural products (26%);
- Communications with the Divisional, District, and Upazila towns have improved (79%);
- Transportation costs have been reduced (18%);
- Overall socio economic development of the area achieved (26%);

The probable benefits of the infrastructures (bridges/culverts) as envisaged by the formal community leaders (UP) and allied agency personnel are:

- Improved agricultural productions and increased marketing of agricultural products (65%)
- Helped in expanding educational programs in the community (55%);
- Facilitated road communication linking with markets, hats and growth centers (50%);
- Communication networks with health centers and hospitals have improved (50%);
- Improved opportunities of jobs and income earning activities (45%);
- NGO roles on implementing developmental programs have accelerated (35%); and
- Lifestyle of the poor has improved (30%)

However, none of the formal community leaders (UP) and allied agency personnel had mentioned about any benefit accrued by or for the women.

The main weaknesses of the project identified by the LGED officials are:

- During the rainy season when rivers or canals are inflated/inundated, the movements of the river transports like large boats under the bridge become difficult (15%);
- Works of some of the bridge not yet completed (12%) (one respondent mentioned about shortages of funds); and
- Defective approach roads (24%).

The formal community leaders (UP) and allied agency personnel mentioned about the following weaknesses of the project:

- Improved road communication caused increased dacoity/robbery in the locality (3%);
- Incomplete works of the bridge failed to improve road communication (3%);
- Some of the bridges need repair particularly on the approach roads causing problems of communication (15%)

Recommendations of LGED officers/personnel for future effectiveness and sustainability of the infrastructure are:

- Ensure timely and appropriate repairs and maintenance of the infrastructures and for this some have asked for increased funds (62%);
- Arrange for proper security preventing incidents of dacoity/robbery on the bridges (15%);
- Organize local supervision of the infrastructures and form local committees for the purpose (6%);
- Dredging to increase the depth of some of the rivers need to be undertaken (9%); and
- Areas without bridges and culverts need allocations for constructing the same (3%)

Recommendations of formal community leaders (UP) and allied agency personnel for future effectiveness and sustainability of the infrastructure are:

- Areas without bridges and culverts need allocations for constructing the same (25%)
- Ensure timely and appropriate repairs and maintenance of the infrastructures, particularly the approach road and for this some have asked for increased funds (70%);
- Organize local supervision of the infrastructures and form local committees (21%); and
- Dredging to increase the depth of some of the rivers need to be undertaken (6%).

E. Local Level Workshop

A local level workshop was conducted on the impact evaluation of the project “Construction of Large Bridge/Culvert on Important Feeder and Rural Roads” on 18th May, 2010 in the auditorium of the of Savar Upazila of Dhaka district. The workshop was started at 11.30 and was concluded at 2 p.m. The workshop was jointly organized by the IMED and READ with support from the Upazila Engineer’s office of LGED, Savar.

The workshop commenced with Mr. Abdul Gani, Vice Chairman Upazila as the Chief Guest and Mrs. Rokea Huq Vice Chairman, Upazila as Special Guest. The workshop was presided by Mr. Mosharraf Hossain, Assiatnt Director IMED. The workshop was also attended by Mr. Delwar Hossain Majumdar, Upazila Engineer, Savar, Mr. Abdul Huq Sardar, Consultant READ, Ms. Susama Ferdous, Additional Director READ and other officers of READ.

The participants in the Workshop were UP Chairman and member of Bangaon Union and the beneficiaries of the project, such as members of the School Management Committee (SMC), Imam, Businessmen, Farmers, Local Influential and College Student and the distribution of the participants is shown in the table below:

Participants’ Identity	Total No.	Male	Female
Upazila Vice Chairman	2	1	1
UP Chairman and Members	7	4	3
SMC members, Imams, Farmers, Businessmen, Local Influential and Students	11	8	3
Upazila Education Officer and Senior Fisheries Officer	2	2	0
LGED Upazila Engineer, Sub Assistant Engineer	2	2	0
IMED Assistant Director	1	1	0
READ Consultant, Additional Director, Deputy Director and Program Officer	5	4	1
Total	30	22	8

Inaugural Session:

Welcome address was delivered by Engineer Md. Abdul Huq, Consultant READ. He explained to the participants the objectives of the workshop and also the Evaluation objectives of the project. The LGED Upazila Engineer explained the scope and activities of the project in Savar. He specifically mentioned that the project was implemented to improve the communication network of the country by constructing bridges and culverts on feeder and rural roads. On the Nikrail-Chakuria Road and on the Nikrail Canal under this project in Savar a 54 meter long RCC Bridge was constructed. The Contractor appointed for the bridge was Messers. Md. Naeb Ali Khan. Total cost incurred to construct the bridge was Tk. 10,268,618. The bridge established communication network between Nikrail and Chakulia villages and then the road is directly connected with Savar Upazila. Again the road is linked with Birulia rural Road. And the road is being used for multiple purposes, such as:

- People of the area can now easily reach the markets by foot;
- Students can reach their schools and Madrashes;
- Various vehicular transports are now plying on the road and the number is swelling everyday;
- Previously the people of the locality had to carry the marketable goods on their heads or in boats, now they can transport their goods in vehicles within much shorter time and also they are selling their goods at a comparatively fair price;
- Other advantages created due to improvements of the communication network is frequent use of roads by the people falling sick and they are now visiting the health centers in increased numbers; and

- People in the past refrained from marketing their products, but current improvements in the road communication have encouraged more people in the rural areas to market their products using the road.

Specific Benefits accrued due to construction of the bridge:

- The main marketable crops are vegetables, fruits, and rice. Previously due to absence of communication or difficulties of communication, the farmers were compelled to sell their products to the Paikers/Whole Sellers at the price fixed by them, but now the farmers can easily reach the markets and sell their products at a fair/competitive price;
- Marketability of products increased additionally by 70-80%;
- Improved communication and the increased marketability of farm products have encouraged the farmers to produce their goods in accelerated manner, consequently the people are now offered with increased employment opportunities in the agricultural sector;
- Currently, many poor people are absorbed as transport laborers using vans, rickshaws, and other kinds of transports;
- Income of the poor have increased, as they in large numbers are now marketing their products in different markets including important markets in Dhaka City;
- Women working in the Garments Sector can easily travel to their place of employment;
- Many rural poor women are employed as laborers performing repair and maintenance of the road; and they are also engaged in planting trees on the road side;
- The poor of the area previously were unemployed and they were victims of loan sharks and now they can travel to distant places and seek employments; and
- NGOs are visiting the area in greater numbers and they are now forming women's groups and offering micro credit assistance and as a result, many poor women are achieving economically self reliant/sustaining status.

Positive Environmental Impact: The only specific and viable impact of the environment mentioned by the participants is the improvements of social forestry on the road side enhancing the beauty and the climate of the area.

The **negative impacts** of the project specified are:

- Increased incidents of Dacoity and deterioration of the situations of crimes as the criminals can now use good roads for committing dacoity;
- Communication improvements have encouraged those engaged in brick laying and burning tasks; as a result, many facilities on brick laying has been established in the area causing air pollution; and
- Water logging in many places has affected pisciculture/fish cultivation.

Sustainability of the Project:

- Repair and maintenance of the road is the prime concern and if this is ascertained, the road condition will remain operational ensuring existence of good communication network/system;
- Some of the roads need to be widened to further improve communication;
- Cleaning of the bottom of the bridge and removing silts is essential for preventing water logging;
- Most frequent problems identified is the defective approach road causing problems in the use of bridge and the road; hence timely mending of the roads by both LGED and also by the local people will certainly enhance the prospects of sustainability of the benefits accrued due to the project for the people; and
- The local people can guard against theft of the parts of the bridge and also prevent movements of heavy traffic on the bridge.

Chapter-IV

Summary Findings: Discussions

Bangladesh is a low lying flood plain land which is intersected with numerous numbers of rivers, canals and bills. As a result establishment of road communication network with the different regions of country is extremely difficult and expensive. Due to lack of communication-access to marketing facilities, movement of input and dissemination of information related to extension services, attendance to schools and health centers are hampered. According to strategy of RD program, the need for development of rural infrastructure such as growth centers, connecting roads, bridges and culverts was felt intensely. The project was implemented all over the country. Main features/components of the project at a glance relevant for impact evaluation:

- Construct bridges/culverts on important feeder roads type-B of length 8000 meter (62 numbers) and rural roads of length 6000 meter (32 numbers);
- Improve communication system for easy and timely movement of agricultural inputs ensuring better process to the farmers;
- Establish linkages through the rural roads with growth centers (Hats and Bazars) and roads of higher order; and
- Generate employment opportunities for the rural poor including landless and the women and ensure improvement of standard of living; and
- Facilitate irrigated agriculture, drainage and minor flood control works;

Objectives of the current Impact Evaluation (as in TOR) are:

To review the implementation status of: Construction works of the bridge/culverts on FRB and RR; Rehabilitation works of 1998 and 2004 flood damaged FRB and RR and Repair and maintenance of bridge/culverts.

To assess the impact of the project in terms of: Improvement of communication network connecting roads of higher order; Easier access to growth centers/rural markets, schools, health centers and movement of inputs and dissemination of information related to extension services to farmers; Short-term and long-term employment opportunity for landless labour and poor women through construction and maintenance of bridge and culverts; Socio-economic development and standard of living of the beneficiaries of the catchments areas; Impact on environment; and Sustainability of the project.

A. Analyses of Project Efficiencies Factors: Review of Project Evaluation Report and the PCR

- In order to rehabilitate the 1998 Flood damage, the project was 1st revised; the project has been revised (2nd revision) to reflect the changed mode of GOB & DRGA Financing to complete the remaining works of already under taken bridges with completion period 2003-2004; and to rehabilitate the 2004 Flood damaged structures of the project area the pp has been revised for 3rd time with completion period 2006-2007.
- During the project period (from July 1997 to June 2007), funds released for the project was 25,986.00 lakh taka and the expenditures during same period was 25,899.19.00 lakh taka leaving a balance in excess of Tk. 86.81 lakh (0.33%), which was duly deposited to the government treasury.
- Total number of bridges and culverts constructed/reconstructed are 309, of which 279 are bridges of 30.35 to 330 meters length and 30 are culverts of 14.5 to 30.35 meters length and the distribution of these completed bridges and culverts by divisions are: 124 in Dhaka; 35 in Chittagong; 24 in Khulna; 27 in Barisal; 80 in Rakshahi and 19 in Sylhet.
- Beneficiaries revealed that the large bridges and culverts constructed under the project

facilitated improved communication with growth centers and schools.

- IMED inspections at different project areas revealed the following: The infrastructures (bridges and culverts) succeeded to achieve the expected targets reconstructing the flood damaged bridges and culverts and the goals of creating job opportunities for the poor. Only exceptions are the bridges in Uzirpur and in Banaripara, where the bridges are not well connected with road creating obstacles for smooth communications as the approach roads are defective.

B: Analyses of Project Impact and Effectiveness

The focus of the impact assessments are: Current operational status of infrastructures; Changes (improvements) at the levels of communication network; Creation job opportunities and improved income for the men, women and the poor; and Recommendations for sustainable use of the infrastructures. These assessments were undertaken through: inquiries with beneficiaries at the household level: males and females; physical check up of the infrastructures; and opinions elicited from the key informants: LGED officials, Community influential, allied department personnel. To assess the net effects of the impact of the infrastructures (Bridges and Culverts on the feeder and rural roads) comparative analyses of findings have been made between the intervention and control area samples.

➤ Observations Findings (Physical Verifications of the 26 Bridges and 1 Culvert)

- Out of 27 sample bridges/culvert, 3 (11%) bridges were observed to be completely free of any problem or defect and fully operational currently.
- Two sample bridges/culvert (7%) are incomplete and are now non-operational.
- The rest of the 22 infrastructures (82%: sample bridges/culverts) are currently operational but with few problems/defects. The problems/defects (in multiple percent) observed for 22 structures are discussed by types hereunder:
 - ✓ 'Abutment walls' of 4 bridges (18%) are faulty: Sliding of back fill of earth.
 - ✓ Girders of 1 bridge (5%) are cracked on ms rod.
 - ✓ Slabs of 5 bridges (23%) are defective (i.e. not smooth and RCC casting is not good)
 - ✓ Railings of 5 bridges (23%) are defective for (non vertical and straight condition, cracked and finishing not smooth)
 - ✓ Approach roads 13 bridges (59%) are faulty: (Approach roads are damaged and with spot wholes in many paces)
 - ✓ River training works (protective works) are defective for 15 bridges (68%): 7 bridges no RTWs and 8 bridges have RTWs with some defects (CC block displaced and washed out)
 - ✓ Return walls of 6 bridges are faulty (MS rods are cracked and open)
 - ✓ Clear opening (at bottom obstructing water flow) silted for 4 bridges (18%)
 - ✓ Wearing coats over the bridge are faulty for 7 bridges (32%) (cracks, not smooth and stone chips found).
 - ✓ 1 Culvert (5%) has problem with railing and wing walls slightly cracked

During observations of the bridges/culvert while discussing with community peoples, who gathered on the spot, identified following impacts accrued from the structures:

- Communication has improved all over the project area connecting schools, colleges, growth centers, university, hat, bazaar, Upazila, district town, and health centers hospitals different directions have been developed;
- Facilitated irrigation (Agriculture) through minor drainage and flood control system;
- Employment has been generated for the rural poor including women and land less;
- Increased production different crops in the rural areas has been achieved; and
- Allied developments such in business, fish culture, poultry farming, tree plantations have also been achieved.

Summary Assessments of Infrastructures

The study team observed physically construction/reconstruction, operational and non operational status of 27 nos. infrastructures (26 bridges and 1 culvert). Out of 26 bridges, 3 bridges are operational with no faults or defects for repairs; 2 bridges are incomplete, while 21 bridges and 1 culvert are currently operational requiring some minor repairs. The interpretations including reasons of faults/defects with recommendations/suggestions for required actions are given next page.

Reasons and Recommendations on two incomplete bridges

Construction of RCC bridge on Balia UP Office to Dhantara GC road: Flood damaged structure	Union: Gaotara-Zadabpur; Upazila: Dhamrai; District: Dhaka	The construction works of bridge started on 2004 and stopped on 2006 up to construction of abutments and piers. As per report of the Local Officials of LGED, Dhamrai Upazila, the construction work was stopped by the contractor due to price hike of construction materials, mainly MS rod and cement. The Project Director, LGED, expressed his views that actions were taken against the contractor for non completion of construction. The remaining construction works of the incomplete bridge should be immediately completed by calling fresh tender, so that, the local public demands for better communication could be achieved.
Construction of bridge over Gumyti river on Bakhrabad-Alirchar road: Newly constructed structure	Union: Muradnagar; Upazila: Muradnagar; District: Comilla	The construction work of the bridge was incomplete. As per report of the project officials of LGED, Muradnagar, under this project the construction work was started on 2001 but after two years the contractor stopped the work due to price hike of construction materials such as MS rod and cement mainly. Again re-tender was floated for the second contract on 2005 but again for price hike of construction materials the contractor again stopped the works. The contractors completed up to the 1 st and 2 nd contract, abutments, girders, cross beams, piers, partly construction of bridge slab and both side railing. The Project Director and Local Level Officials, LGED, expressed views that actions were taken against the contractor for non completion of construction work as per terms and conditions of the agreement. The remaining construction works of the incomplete bridge should be immediately completed by calling fresh tender, so that, the local public demands for better communication could be achieved.

Reasons and Recommendations on 21 bridges and 1 culvert with minor faults/defects: Reasons of faults/ defect

- Due to the long time operation of the bridges/culverts at least more than 3 years
- For want of regular maintenance works after 3 years interval
- Due to wear and tear
- Other unforeseen (natural) reasons

Recommendation/suggestions for present and future guideline

- Minor repair works are needed to be undertaken immediately, so that conditions of those infrastructures do not deteriorate further;
- River training works for the construction of infrastructures are very much important for long time sustainability. But from the physical observation, it was found that 15 bridges have no RTWs or have been done currently with some defects. Immediate repairing and construction of river training works should be carried out. In future, provisions for RTWs should be included in the project plans and budget.
- Regular inspection and close supervision by the LGED officials are needed
- Quality Control Cell may be established for future regular monitoring of the construction works of bridges; and
- The construction works of the bridges/culverts should be executed as per detailed design and approved specifications.

➤ Findings of Household level Beneficiary Assessments

Household Beneficiary Assessments

The mean age of the male respondents are 44 years in the Intervention areas and 45 years in the Control areas, while that of the female respondents, it is 35 years for both Intervention and Control areas. Female respondents in both intervention and in the control areas are currently married, while 98% of the males in both intervention and in the control areas are currently married. Again in both intervention and in control areas, males are 5th grade qualified, while the females in the interventions areas are qualified at 4th grade and those in the control areas are qualified at grade 3. On the levels of age and marital status, hardly there is any difference among the respondents in the intervention and in the control areas reflecting comparability of the samples.

About 10% differences are observed on the current occupations of Farming including farm labor and Business for the male respondents comparatively between the intervention and the control areas and this could be as result of improvements of the communication net work. The intervention areas have 9% more in Business over the control areas. In the occupations of the female respondents no such difference is observed.

Mean monthly family income: The mean monthly family income of the project areas currently is higher by (additionally) by 49% over its period prior to construction of bridges and culverts and it is again higher (additionally) by 18% over the control areas.

Distribution of mean time of travel and costs: The mean time estimated is less than half in the Project intervention areas at post construction period (30 minutes) compared to the project at prior to construction (77 minutes) and in the control areas (67 minutes). There is some difference on the mean costs of carrying goods to the markets between pre and post construction periods in the project areas; but the difference is much higher between the current project and the control areas. The reason of the costs being less within the project areas at pre and post periods is because the respondents possibly carried less goods on their heads.

Mean production of major crops: Difference by 2 maunds is observed between project before, project after and in the control areas incase of production of paddy and vegetables; but on production of sugarcane the difference is much higher.

Change in the rates of Employment: Estimated increase in the rates of employment between the Intervention and the Control for males range between 6 to 17% (median: 10%) across the sectors, while in case of the poor only, the differences range between 1 to 9% (median 4%) only.

Distribution of children attending schools per family in a year: Although on average, the difference is yet to be observed comparatively by the intervention and control areas, but when the maximum number is considered per family, the difference is observed between the project currently and the control areas by 2 children. If the situation of communication network, continues to be unchanged for a longer period, the difference could also be observed on the average number of children attending schools between the project and control areas. This means that the impact is there, but it would take more time for the said impact to be observable at average rates.

Male respondents perceiving communication being easier with different locations: Communications with all the locations as perceived by the males is much easier within the project areas comparatively over those in the Control areas.

Female Responses:

Respondents (females estimating about the females) were asked to estimate change over time (over 5 years) in respect of employment rates by different sectors. Compared to the situations now over five years in the past, the females have ascertained additional increment in the rates of their employments in the project areas (before and after) in double digits 13 to 14% in agriculture marketing, construction and in allied socio economic development sectors; but in the transport sector the increment is only 5%. In the Control areas, the additional increment in the rates of female employment over last five years remains within the range of 2 to 10%. Both in the farming and in the allied Socio economic sectors, the females have been experiencing increments in their levels of engagements in economically gainful activities; such increment is slightly higher in the project areas at post construction periods.

On the issues of female mobility within the community, the improvements have been achieved in the project areas in respect of visits to health centers/hospitals (additionally by 10%), markets (additionally by 8%) and the relatives (additionally by 3%).

Findings of Qualitative In-depth Investigations

Variables: Indicators	Intensive Interviews Findings		FGD Findings	Findings of Local Workshop
	LGED Officials	Allied Personnel		
Status of completion and use including problems	<p>LGED officials almost unanimously (except one) claimed that the bridges and the culverts are now operating properly. Physical targets (component) of the project were completed properly. But a quarter of the officials were not certain whether the financial targets were met as per estimation. 7% of the LGED officials said that there were problems in purchasing materials, in implementation, and in the management and 93% claimed that there was no problem in this regard.</p> <p>Weaknesses of the project identified are: During the rainy season, movements of large boats under the bridge become difficult (15%); Some of the bridges not yet completed (12%); one respondent mentioned about shortages of funds; and Defective approach roads (24%).</p>	<p>Of the formal community leaders (UP) and allied agency personnel, a fifth said that the financial targets of the same could not be achieved.</p> <p>The formal community leaders (UP) and allied agency personnel mentioned about the following weaknesses of the project: Improved road communication caused increased dacoity/robbery in the locality (3%); Incomplete works of the bridge failed to improve road communication (3%); Some of the bridges need repair particularly on the approach roads causing problems of communication (15%).</p>	<p>Half of the participants said that the bridge was completed in the year 2002 but it was open for public use formally in the year 2004; Other half of the participants said that the bridge was completed in the years either 2005, or 2006 or 2007.</p> <p>80% of the bridges and culverts are newly constructed; 20% are flood damaged reconstructed bridges/culverts.</p> <p>People are using the roads with satisfaction but these need reconstruction/repairs; No problem; But at a few distance there is a mud road linked with the rural road connecting the bridge, and during the rainy season, people living in the area face difficulty in using the bridge.</p>	<p>The project was implemented to improve the communication network of the country by constructing bridges and culverts on feeder and rural roads. On the Nikrail-Chakuria Road and on the Nikrail Canal under this project in Savar a 54 meter long RCC Bridge was constructed. The Contractor appointed for the bridge was M/S Md. Naeb Ali Khan. Total cost incurred to construct the bridge was Tk. 10,268,618. The bridge established communication network between Nikrail and Chakulia villages and then the road is directly connected with Savar Upazila. Again the road is linked with Birulia rural Road. And the road is being used for multiple purposes</p>

Variables: Indicators	Intensive Interviews Findings		FGD Findings	Findings of Local Workshop
	LGED Officials: 62%	Allied Personnel: 38%		
Benefits Accrued from the Infrastructures: Bridges and Culverts	<p>The strengths and benefits of the project as envisaged by the LGED officials are: Improved agricultural productions and increased marketing of agricultural products (26%); Communications with the Divisional, District, and Upazila towns have improved (79%); Transportation costs have been reduced (18%); Overall socio economic development of the area achieved (26%);</p>	<p>The probable benefits of the infrastructures (bridges/culverts) as envisaged by the formal community leaders (UP) and allied agency personnel are: Improved agricultural productions and increased marketing of agricultural products (65%); Helped in expanding educational programs in the community (55%); Facilitated road communication linking with markets, hats and growth centers (50%); Communication networks with health centers and hospitals have improved (50%); Improved opportunities of jobs and income earning activities (45%); NGO roles on implementing developmental programs have accelerated (35%); and Lifestyle of the poor has improved (30%).</p> <p>However, none of the formal community leaders (UP) and allied agency personnel had mentioned about any benefit accrued by or for the women.</p>	<p>Physical communication in the area improved; all sorts of transports are now moving on the road; People can reach their destination in time and easily; Previously during rainy season both male and female students could not attend their schools and even the guardians used to discourage them from attending schools but now they on their own regularly attend schools; enrollment in schools have increased after construction of the bridge; Previously people used to carry farm products, such as vegetables and fruits to the markets on their heads, but now they can reach the markets with farm products in lesser time transporting more products and consequently accruing greater profits; Previously pregnant mothers despite their willingness to consult a doctor could not do so, consequently many pregnant mothers used to die without availing proper maternal care treatment. Now pregnant women do not die due to complications of pregnancy; Sick persons can visit the Hospitals. Job opportunities for the people increased. Communication with Upazila headquarters, court, hospitals, schools/ madrashas/ colleges, markets, divisional towns have become smooth; Motorized vehicles are running on the roads and as a result the whole sellers are now reaching with their transport right to the door steps of the farmers and the farmers are now getting fair price staying within their own locality. Land owners are now motivated to produce more fruits and vegetables, they eventually employ more farm laborers from among the poor and hardcore poor; More poor people are employed as transport workers;</p> <p>Women of our locality do not seek jobs, instead they attend to their family chores; More women are now interested to participate in the agricultural activities as the farm products fetch better income; Women are also engaged in cottage industry ventures and handicrafts are now easily marketable; Due to improvements of the communication network due to construction of the bridges and culverts, more NGOs are now working in the remote areas of the villages and as a result women are increasingly participating in the income earning activities.</p>	<p>People of the area can now easily reach the markets by foot; Students can reach their schools and Madrashas; Various vehicular transports are now plying on the road and the number is swelling everyday; Previously the people of the locality had to carry the marketable goods on their heads or in boats, now they can transport their goods in vehicles within much shorter time and also they are selling their goods at a comparatively fair price; Sick people are now frequently using roads by and they are now visiting the health centers in increased numbers; and People in the past refrained from marketing their products, but current improvements in the road communication have encouraged more people in the rural areas to market their products using the road.</p> <p>Main marketable crops of the area are vegetables, fruits, and rice. Previously the farmers were compelled to sell their products to the Paikers/Whole Sellers at the price fixed by them, but now the farmers can easily reach the markets and sell their products at a fair/competitive price; Marketability of products increased additionally by 70-80%; Improved communication and the increased marketability of farm products have encouraged the farmers to produce their goods in accelerated manner, consequently the people are now offered with increased employment opportunities in the agricultural sector; Currently, many poor people are absorbed as transport laborers using vans, rickshaws, and other kinds of transports; Income of the poor have increased, as they in large numbers are now marketing their products in different markets including important markets in Dhaka City; Women working in the Garments Sector can easily travel to their place of employment; Many rural poor women are employed as laborers performing repair and maintenance of the road; and they are also engaged in planting trees on the road side; The poor of the area previously were unemployed and they were victims of loan sharks and now they can travel to distant places and seek employments; and NGOs are visiting the area in greater numbers and they are now forming women's groups and offering micro credit assistance and as a result, many poor women are achieving economically self reliant/sustaining status.</p>

Variables: Indicators	Intensive Interviews Findings		FGD Findings	Findings of Local Workshop
	LGED Officials	Allied Personnel		
Status of Repair and Maintenance including Supervision and Participation	<p>The ongoing works for implementation of the project was regularly supervised (86%) and only 14% said that the works were not supervised. Sub Assistant Engineer was constantly present in the site during construction. Supervision was ensured on quality of materials, guiding the mason man, investigating the appropriateness of the tasks during construction as per design, status of mixing materials properly. Supervision by higher level officials like Executive Engineer and Upazila Engineer was ensured from time to time with periodic spot supervision by the Project Director (PD) and DPD. Occasionally, supervision was carried by even still higher level officials of the levels of Chief Engineer and even the Secretary. The range of the frequencies of supervision done as claimed was 2 to 200 times; and the average times supervised as estimated was 2 times in a month, assuming that a bridge was completed approximately over a period of two years.</p> <p>About a quarter of the LGED officials claimed that the community persons (Formal leaders: UP Chairmen and Members) did not participate in the project.</p> <p>In response to a query, the LGED officials said that the need for repair of bridge or a culvert would arise either after one year or two years or three years. More than three fourths of the officials (77%) remarked that repair works are carried out routinely; however, 23% denied the same. The concerns for repairs are: fixing the approach road; filling the gaps created by sliding of mud during rainy season; and any other problems impeding smooth communication and use of the infrastructures. Repair works are mostly carried out by the LGED personnel and sometimes in cooperation with the UP Chairmen and members.</p>	<p>Four fifths of the formal community leaders (UP) and allied department officials said that supervision of the construction works of the bridges and culverts was done properly, while only a fifth of them denied that that any spot supervision during construction was done. Half of the formal community leaders (UP) and allied agency personnel (50%) affirmed that they were consulted prior to construction, while half denied the same.</p> <p>Two thirds of the formal community leaders (UP) and allied agency personnel claimed that they did not participate in the implementation of the project. Even though the community and allied persons did not participate, but they also did not create any obstacle to the completion of the project.</p> <p>Of the formal community leaders (UP) and allied agency personnel, three fourths (75%) remarked that repair works are carried out routinely; however, 25% denied the same. Again about three fourths of the formal community leaders (UP) and allied agency personnel (70%) claimed that they had some roles in the repair and maintenance of the infrastructures and the role is most frequently performed in filling up the gaps on the approach road of the bridge with mud.</p>	<p>Some repairs of roads have been undertaken; No repair work was ever carried out after construction of the bridge; However the Upazila engineer some time come and visit the bridge</p>	

Variables: Indicators	Intensive Interviews Findings		FGD Findings	Findings of Local Workshop
	LGED Officials	Allied Personnel		
Impact on Environment	<p>LGED officials did not identify any environmental problems due to construction of the bridges and culverts. The approach roads connecting the bridges and culverts sometimes did not have proper drainage system for which rain water caused temporary water logging or minor floods.</p>		<p>Positive Impact: As the road communication improved in the locality, people are planting trees on the road sides for which the physical environment has improved greatly; With the improvement of the road communication, many GO and NGO agencies are now visiting the area and are motivating the local people on social forestry and also improving the hygiene and sanitation facilities in the locality; Before construction of bridges and culverts, there were water logging leading to further inundation and floods; but now floods are rare.</p> <p>Negative Impact: Improvement of the communication network is impacting on losses of farm lands and more lands are being used for markets; Rivers' depth are reduced affecting riverine communication by boats; Communication improvements have attracted many business concerns on operating brick laying/burning, which is adversely affecting the environment and the climate; Some participants opined that there is no negative impact on the environment.</p>	<p>Positive Environmental Impact: The only specific and viable impact of the environment mentioned by the participants is the improvements of social forestry on the road side enhancing the beauty and the climate of the area.</p> <p>The negative impacts of the project specified are: Increased incidents of Dacoity and deterioration of the situations of crimes as the criminals can now use good roads for committing dacoity; Communication improvements have encouraged those engaged in brick laying and burning tasks; as a result, many facilities on brick laying has been established in the area causing air pollution; and Water logging in many places has affected pisciculture/fish cultivation.</p>

Variables: Indicators	Intensive Interviews Findings		FGD Findings	Findings of Local Workshop
	LGED Officials	Allied Personnel		
Recommendations for future improvements and sustainability	<p>Regarding estimation of the length of total operational status (years of lasting) of a bridge approximately, 62% of the LGED officials could not give any guess, while of those who had given any estimate (38%), majority opined that a bridge would last for about one hundred years.</p> <p>Recommendations of LGED officers/personnel for future effectiveness and sustainability of the infrastructure are: Ensure timely and appropriate repairs and maintenance of the infrastructures and for this some have asked for increased funds (62%); Arrange for proper security preventing incidents of dacoity/robbery on the bridges (15%); Organize local supervision of the infrastructures and form local committees for the purpose (6%); Dredging to increase the depth of some of the rivers need to be undertaken (9%); and Areas without bridges and culverts need allocations for constructing the same (3%).</p>	<p>Recommendations of formal community leaders (UP) and allied agency personnel for future effectiveness and sustainability of the infrastructure are: Areas without bridges and culverts need allocations for constructing the same (25%); Ensure timely and appropriate repairs and maintenance of the infrastructures, particularly the approach road and for this some have asked for increased funds (70%); Organize local supervision of the infrastructures and form local committees (21%); and Dredging to increase the depth of some of the rivers need to be undertaken (6%).</p>	<p>Approach roads on both the sides of the bridge need to be widened; Supervise the bridge from time to time to keep it operational; And if ever the roads need repairs, it can be ensured by using proper repair materials; Sometimes roads are damaged due to heavy rains for which the roads may be repaired with Peech (black Coal tar).</p> <p>The locality people can on their own repair the approach roads by covering the spots with mud (earthwork); Heavy transports may be restricted from using the bridge; The earth beneath the bridge can be protected by watching and prohibiting people from taking away mud from there, so that the bridge remains intact; Local level committee may be formed for continuous monitoring of the bridges/culverts and the connecting roads.</p>	<p>Sustainability of the Project: Repair and maintenance of the road is the prime concern and if this is ascertained, the road condition will remain operational ensuring existence of good communication network/system; Some of the roads need to be widened to further improve communication; Cleaning of the bottom of the bridge and removing silts is essential for preventing water logging; Most frequent problems identified is the defective approach road causing problems in the use of bridge and the road; hence timely mending of the roads by both LGED and also by the local people will certainly enhance the prospects of sustainability of the benefits accrued due to the project for the people; and The local people can guard against theft of the parts of the bridge and also prevent movements of heavy traffic on the bridge.</p>

Chapter-V

Recommendations and Conclusion

Recommendations:

- Construct the approach roads properly (widen the roads at least at the entry of bridges) and ensure timely repair and maintenance of the same; filling of earth on both the sides of the bridges and placing light posts on selected bridges exposed to dacoities;
- Establish Quality Control Cell for timely and increased monitoring of the infrastructures (bridges and culverts) and in such system involve the LGED local officials and also local community; if needed, LGED manpower strength in this area may be enhanced;
- Form local committee for regular surveillance and to ensure maintenance and repair works at the community level;
- Launch social mobilization to motivate the community to participate in the local level surveillance and also contribute for minor repairs and maintenance of the bridges and culverts connecting both feeder and rural roads;
- Plant trees on both sides of the roads, which are not covered yet, encourage local youths and women to participate in such endeavors;
- Ensure River training (protection) works by placing of CC block and keep adequate provisions for the same in the budget;
- Some of the important bridges, where dacoity is committed arrangements of proper security through police, community/gram police may be planned; and
- Above all for future projects on bridges and culverts, adequate allocations of funds for repairs and maintenance may be planned and provided for.

Conclusion:

Three bridges are fully operational without requiring any repairs, while the rest 22 bridges need minor repairs. LGED may take note of this situation and undertake intensive monitoring activities so that the department is aware of the need for repairs through their own system adequately prior to an external evaluation like the current one. Special attention need be given for the incomplete bridges to be completed and made operational so that communication system in the localities improves.

The project has achieved its targeted impacts on social, economic and allied developmental contexts. Findings of the current evaluation study also suggest that the communities, where bridges and culvert have been constructed, tremendous benefits have been accrued by the community. Here it may be mentioned that the current study findings also conform to the comparable findings of PCR and the Evaluation Study earlier done internally by IMED.

Ultimate sustainability of the benefits to be enjoyed by the users will come through local level participation—local committees can contribute for keeping the roads operational on a long term basis.

Reference

1. Government of the People's Republic of Bangladesh, Local Government Engineering Department, Project Proforma for "Construction of Large Bridges/Culverts on Important Feeder and Rural Roads" (PCP Approved by the ECNEC on 25 November, 1997) (1st Revised PP Approved by DPEC on 20 February, 1999) (3rd Revision for 2004 Flood Rehabilitation), July 2005.
2. Project Completion Report (PCR) of Construction of Construction of Large Bridges/Culverts on Important Feeder and Rural Roads", Government of the People's Republic of Bangladesh, Local Government Engineering Department, LGRD & Co-operatives/Local Government Division.
3. Standard Request For Proposal (RFP) for the Selection of Consultant Services For "Construction of Large Bridges/Culverts on Important Feeder and Rural Roads" (for lump-sum Consultancy) Invitation for Proposals No: 1/1, Issued on: 07/01/2010, Proposal Package No: 01.
4. Population Census 2001, National Report (Provisional), Bangladesh Bureau of Statistics, Planning Division, Ministry of Planning, July 2003.

Appendix 1: Detailed Tables of Household Survey

Table 1: Distribution of males by current occupations: in %

Occupations	Six Divisions: in %	
	Project	Control
Farming including farm labour	80	90
Businessman	13	4
Other: Factory Labor, Service, retired	7	6
Total	100	100

Table 2: Mean monthly family income estimated by the male respondents and by pre & post project and control area

Mean monthly family income by heads (in Taka)	Project		Control
	Before	After	
Mean monthly family income	7265	10833	8937

Table 3: Distribution of male respondent by mean time of travel for marketing goods and by pre and post project period and by control area

Mean time of travel for marketing	Project: Before	Project: After	Control
Mean time of travel for marketing goods in minutes	77	30	67

Table 4: Distribution of male respondent by mean cost for marketing goods and by pre and post project period and by control area

Cost (in taka)	Total		
	Intervention		Control
	Project: Before	Project: After	Control
Mean costs in taka for marketing goods	35	33	46

Table 5: Mean production of major crops per bigha in maunds opined by male respondents and by before and after project and by control area: in %

Name of crop: mean production in maunds	Total		
	Intervention		Control
	Project: Before	Project: After	Control
Paddy	15	19	17
Sugarcane	36	43	38
Vegetables	13	17	12

Table 6: Additional mean % increase of employment by different sector over 5 years period for male and for poor opined by male respondents: in %

Sectors	For male		For poor	
	Intervention	Control	Intervention	Control
In agriculture product marketing sector	34	23	19	14
In transport sector	37	20	22	13
In construction sector	26	18	16	13
In socio-economic developments sector	23	17	13	12

Table 7: Distribution of male respondents perceiving communication being easier with different locations comparatively within project (intervention) and Control areas: in %

Status of communication (being easier) with various places: %	Intervention/ Project	Control
Growth centers: hats and bazaars	89	67
Health centers/Hospitals	87	71
Schools-Colleges	82	59
District town	75	51
Upazila HQ	66	55
Union Parishad	57	30

Table 8: Additional mean % increase of employment by different sector over 5 years period for female opined by female respondents: in %

Sectors of increase employment	Intervention	Control
In agriculture product marketing sector	14	8
In transport sector	5	2
In construction sector	13	9
In socio-economic developments sector	14	10

Table 9: Distribution of female respondents by occupation: in %

Female Occupations: in %	Intervention Before	Intervention after	Control
Housewife	89	85	91
Farming including farm labour	4	6	3
Other: Labor in Factory, Small business, Service Student	7	9	6

Table 10: Women respondent's perception on opinion on advantage/benefit gaining of women from the development of communication system: in %

Percent of females visiting places	Intervention/ Project Before	Intervention/ Project After	Control
Can visit health centers/hospitals	80	90	77
Can visit growth centers: hats and bazaars	68	76	61
Can move or visit relatives' house without help of anyone	67	70	65

Appendix 2: Data Collection Tools
(QUESTIONNIRE IN BANGLA)

Impact Evaluation Study on Construction of Large Bridge/Culvert on Important Feeder and Rural Road

Lubv Rwi c ckgj v

(c0R± Gwi qri Rb": th iv`vq cKtí i Avl Zvq etR/Kvj fVU`bngZ ntqfQ)

fngKv: Avmínvj vgyAvj vBKg | Avgiv iW bvgK Mtel Yv cZóvb Ges cwi Kí bv gSjYj tqi AvBGgBwW (IMED) Gi cñ t_íK gwV chñq gj`vqb Rixci Dfí k` GtmQ | Avcbvív Rrtbb `vbxq miKvi cKSkj Aw`Bi (Local Government Engineering Department) KZK evsj v`tki wnfbe, i`ZcY`ndWwi I Múgy motKi Dci tmZíKvj fVU`bngZ ntqfQ | GB Rwi íci Dfí k` nt`Q, cKí wli bngP Kvr gj`vqb Ges Gi dtj thvMthvM e`e`v, Kul Drcv`b I mpeavfVWt` i Avq I Kgnst`vbi tñtñ wK wK cwi eZB ntqfQ tm wltq Z_` mSth Kiv | Avgiv G m`utK`Avcbvi gj`evb gZvgZ mSthni Rb` GtmQ |

G chñz Avcbv Avcbvi gj`evb e`e` c0vbi gra`tg GB Mtel Yvq Ae`vb ivLíZ cñi b | Avcbvi gZvgZ í`agvÍ Mtel Yvi KtR e`eüZ nte hv Avcbvi Gj vKvi Dbqtb mnvqK ntZ cñi | Avcbvi t`qv Z_` m`úY`Mwcb ivLv nte | Avcbvi Abguz tñj Avng mvñjvKvi í`i` KíZ cwi |

tKm bst

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wfvM:	tKwbs :	tRj v:	tKwbs :
DctRj v:	tKw bs :	BDwbq:	tKw bs :
tgsRv/ qW`bs :	tKw bs :	Múg :	tKw bs :
iv`v bng:			

DÉi`vZvi aiY: 1. cñ`l 2. gñj v

mvñjvKvi MhYKvixi bvg : mvñjvKvi MhYi Zwi L:
 mcví fVBRtí i bvg : Zwi L:
 mvñjvKvi MhY: í`i`i mgq : tkl mgq:

tmKkb-1: Lubvi mvavi Y Z_`vej x

1. DÉi`vZvi bng (Lubv cávb):
2. cñi eñi i tguU m`m` mSL`v:Rb

K. Lubvi Z_`vej x

bs	bvg (wñvb Lubv cávb/ DÉi`vZvi Zvi bvg cñ`tg wj Lp)	wj ½ 1. cñ`l 2. gñj v	eqm (cY`eQíi) 1 eQíi i bñP ntj 000 wj Lp	wKñvMZ thvM Zv	%ewmK Ae`v	tckv
1	2	3	4	5	6	7

Kjvg 6: %ewmK Ae`vi tKw: 1. AwemZ; 2. weemZ; 3. weav/wecZik; 4. Avj v`v/cñi Z`³; 5. Zij vKcñB
 Kjvg 7: tckv tKw: 1. Kul Kvr; 2. Kul gRj; 3. Kj -Kvi Lubvi klgK; 4. tñ`e`emv; 5. gvSvix e`emv; 6. eo e`emv;
 7. PíKix; 8. Mñbx; 9. tñKvi; 10. Qñ/Qñx 11. Ab`vb` (bñ`ñ Kí`b):
 tmKkb-2: wWwi Ges Múgy motKi Dci bngZ etR/Kvj fVU`bngP I í`ñvteñY m`úKZ Z_`

19. Avcbri GjvKvq etR/Kvj fivUqbgfY I ms`vfi i tKvb KvR tKvbfi te Avcib AskMhY KtiQtj b k?

K. iv`v-I etR/Kvj fivUqbgfY KvR: 1. niv 2. bv	L. iv`v-I etR/Kvj fivUqms`vfi i KvR: 1. niv 2. bv
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M. niv ntj , tKvbKvRi mt`_ Avcib RvZ Qtj b?

ibgfY KvR	I qYvteqY I ms`vfi i KvR
1. ibgfY KvR (ibr`e Ki`b:)	1. ktg ir`tq
2. gmiU Lbtbi KvR	2. UvKv ir`tq
3. ktgK`vb	3. Z`vi kK`ti
4. Rag`vb	4. Ab`vb` (ibr`e Ki`b)
5. ivb`eivbi KvR	
6. `j MVtb	
7. Ab`vb` (ibr`e Ki`b)	

N. KZr`b KvR KtiQtj b? ibgfY KvR:ir`b I qYvteqY I ms`vfi i KvR:ir`b

tmKkb 6: (etR/Kvj fivUqbgZ ni qvi) ceq eZqrb Av`qmgvRK Ae`v

20. Avcbri cni exfi i DcvRbKvix m`m`msL`v KZRB?

K. cte`qKZRB Qtj :Rb	L. eZqrb KZRB :Rb
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21. Avcbri tckv k? (cte`f I eZqrb)

etR/Kvj fivUqbgZ ni qvi cte`e		eZqrb	
c`vb tckv	Ab`vb` tckv	c`vb tckv	Ab`vb` tckv
1. Kvi KvR	1. Kvi KvR	1. Kvi KvR	1. Kvi KvR
2. Kvi gRj	2. Kvi gRj	2. Kvi gRj	2. Kvi gRj
3. Kj -Kvi Lvbi ktgK	3. Kj -Kvi Lvbi ktgK	3. Kj -Kvi Lvbi ktgK	3. Kj -Kvi Lvbi ktgK
4. qj`e`emv	4. qj`e`emv	4. qj`e`emv	4. qj`e`emv
5. gvSvix e`emv	5. gvSvix e`emv	5. gvSvix e`emv	5. gvSvix e`emv
6. eo e`emv	6. eo e`emv	6. eo e`emv	6. eo e`emv
7. PvKix	7. PvKix	7. PvKix	7. PvKix
8. teKvi	8. teKvi	8. teKvi	8. teKvi
9. Ab`vb` (ibr`e Ki`b).....	9. Ab`vb` (ibr`e Ki`b).....	9. Ab`vb` (ibr`e Ki`b).....	9. Ab`vb` (ibr`e Ki`b).....

22. Avcbri cni exfi i tgrU Artqi Dm I cni gvY

Artqi Dm	etR/Kvj fivUqbgZ ni qvi cte`e Mo gvmK Avq (UvKvq)	eZqrb Mo gvmK Avq (UvKvq)
1. Kvi LvZ t`tK		
2. ci` cvj b t`tK (nim/ gj Mv/Mi`/QmJ cvj b)		
3. Ab`vb` t`tK tclli Z (ti qgtUY)		
4. eUkx m`u` t`tK		
5. FY` t` qv t`tK		
6. e`emv-embR` t`tK		
7. grm Pvi t`tK		
8. kvKmevRi evMb/dtj i evMb t`tK		
9. PvKix		
10. Ab`vb` (ibr`e Ki`b)		
tgrU gvmK Avq		

23. D`i`vZvi gvmK Avq hr` cte`f Zj brq tek nq, Zte mRtAm Ki`b, Zvi Avq ep`i gj KviY ,tj v k k?

.....

24. Avcbrî cî erî i tgrî gîmK e"q

e"qi LvZ	eîR/Kvj fîU"bgZ nî qvî c"e"Mo gîmK e"q (UvKvq)	eZ"rb Mo gîmK e"q (UvKvq)
1. Lv"		
2. dmj Pvl ver`		
3. PîKrmv		
4. tcvl vK		
5. "j /Ktj R/gr` tmv		
6. cî enb		
7. eîj (e" jr/M"vm/tKîi nmb)		
8. Drme		
9. Ab"vb" (bîr` Kî"b)		
tgrî gîmK e"q		

25. Avcbrî cî erî c"e"KZRb "dj thZ Ges eZ"rb KZRb "dj hvq?

c"e"		eZ"rb	
îK"jv cîZ"rb hvî qvî DcîhmK m`tm"i msL"v	KZRb thZ	îK"jv cîZ"rb hvî qvî DcîhmK m`tm"i msL"v	KZRb hvq
.....Rb	.....Rb	.....Rb	.....Rb

îmKkb 7: cî îetki Dcî cîve

26. îv"vq eîR/Kvj fîU"nî qvî dj cî îetki Dcî îK aîîbî cîve ctotQ?

K. BîZerPK cîve: cî îetMZ îK aîîbî m"ear m"o nîqtQ	L. cî îetMZ îK aîîbî mgm"v m"o nîqtQ

27. Avcbrî i Gj vKvq eîR/Kvj fîU"bg"Yî c"e" Ges eZ"rbî eb"v cîî "îZ tKgb?

K. c"e": 1. nqîb 2. Kg 3. teîk	L. eZ"rb : 1. nqîb 2. Kg 3. teîk
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28. Avcbrî i Gj vKvq îv"vq eîR/Kvj fîU"bg"Yî c"e" eZ"rb îb"îPj vPj i tKvb mgm"v nQj er AvtQ îK?

K. c"e"îb"îPj vPj i tKvb mgm"v nZ îKbr: 1. nîv 2. bv 3. cîhvR" bq/c"e"îb"îPj vPj KîZ bv	L. eZ"rb îb"îPj vPj i tKvb mgm"v nî"Q îKbr: 1. nîv 2. bv 3. cîhvR" bq/eZ"rb îb"îPj vPj Kîî bv
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îmKkb 8: cîKîî i mîj -Kîj

29. îv"v-NîîUI Dbîîbî dj (eîR/Kvj fîU"bg"Yî dj) Avcbrî i îK îK DcKvî nîqtQ er îK m"ear cî"Ob?

.....

30. îv"v-NîîUI Dbîîbî dj (eîR/Kvj fîU"bg"Yî dj) Avcbrî îK aîîbî Am"earî m"qîb nîqtQb?

.....

31. er"emqZ cîKîî fîel"îZ Avî i KîhRî îvLî Rb" Avcbrî gZîgZ er m"vî k îK?

.....

կայրի ցոյ վի i Rb՝ շեյ x

32. K. DEi՝vixi bvg: L. Lvbv Zvjv Kvi m՝m՝ bs:
 M. DEi՝vixi eqm: N. DEi՝vixi լկՊՄZ thM՝Zr:
 O. DEi՝vixi RweZ m՝sb mSL՝v: tQj: tqtq: tgvU:
 P. DEi՝vixi tckr: c՞e՞ eZԳրb:
 Q. (hի՝ DEi՝vixi A_ԳԸrRbKvix tKvb tckvq լbtqmRZ _վK Zmիj Zvi Arq vj լceX Ki՝b):
 c՞e՞ ցոյմK Arq (hի՝ _վK): Սկv eZԳրb ցոյմK Arq (hի՝ _վK): Սկv

33. Arcbri Gj vKvq thMthM e՛e՛vi Db՛Zi Kvi ՚Y tKvb tKvb tKvb tKvb ցոյ վի i լ լ լ լ i Kցմ՝ vb tետոQ?
 (շKի i ceԶP Ae՛vi tԿիիZ Zj br Kի eZԳրb kZKiv KZfM (%) tետոQ իմB մտմե DEi՝ v b)

իդի (շKիU atի atի լRիAm Ki՝b)	ցոյ վի i իդիի (%)	լ լ լ լ i իդիի (%)
1. Kմ cY՝ erVi RiZKi ՚Yi իդիի		
2. hvbemb Pj vPիj i իդիի		
3. AeKvիtgv լbgԳYi i ms՝տի i իդիի		
4. mavi Y մցոյմRK DbԳbgj K KիRi իդիի		
5. Ab՝vb՝ (Db՝ Թ Ki՝b)		

34. Arcbri Gj vKvq thMthM e՛e՛vi Db՛Z (եR/Kyj fիU՞) լ qvq Arcbri er ցոյ վի i լK աիbi մթար լtqtQ?

c՞e՞	eZԳրb
1. mntR hիZvqZ KiիZ cvi Zig bv	1. mntRB hիZvqZ KiիZ cmi
2. erVi /իM՝ լm՝Uտի իիZ cvi Zig bv	2. mntRB erVi /իM՝ լm՝Uտի իիZ cmi
3. mntRB ՚Ի՝ իK՝ ՚իիZ cvi Zig bv	3. mntRB ՚Ի՝ իK՝ ՚իիZ cmi
4. Kիv mնի՝ ՕrovB GKv AvZիq-՝Rիbi erox իիZ cvi Zig bv	4. Kիv mնի՝ ՕrovB GKv AvZիq-՝Rիbi erox իիZ cmi
5. Ab՝vb՝ (Թ՝ Թ Ki՝b)	5. Ab՝vb՝ (Թ՝ Թ Ki՝b)

35. Arcbri Gj vKvq eR/Kyj fիU՞bgԳY i ms՝տի i իKvb KիR իKvb fիte Arcab AskMիY KիUտիj b լK?

K. iv՝-i eR/Kyj fիU՞bgԳY KիR: 1. ուր 2. իv	L. iv՝-i eR/Kyj fիU՞ms՝տի i KիR: 1. ուր 2. իv
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M. ուր լtj , իKvb KիRi մի_ Arcab RոZ լտիj b?

լbgԳY KիR	i ՊYտեղY i ms՝տի i KիR
1. լbgԳY KիR (Թ՝ Թ Ki՝b:))	1. կց լի իq
2. ցոյ լbtbi KիR	2. Սկv լի իq
3. կիK ՝ vb	3. Z՝vi լK Kի
4. Rոց ՝ vb	4. Ab՝vb՝ (Թ՝ Թ Ki՝b)
5. i vb՝-erbi KիR	.....
6. ՚j Mիb	.....
7. Ab՝vb՝ (Թ՝ Թ Ki՝b) .....	.....

N. KZի՝ b KիR Kիi լտիj b? լbgԳY KիR: լի b i ՊYտեղY i ms՝տի i KիR: լի b

36. Arcbri cմ erի c՞e՞KZRb ՚ճի իիZ Ges eZԳրb KZRb ՚ճի հvq?

c՞e՞		eZԳրb	
լկՊY շKի՛տի hvi qvi DcիMի m՝իմ՝i mSL՝v	KZRb իիZ	լկՊY շKի՛տի hvi qvi DcիMի m՝իմ՝i mSL՝v	KZRb հvq
.....Rb	.....Rb	.....Rb	.....Rb

37. Arcbri Gj vKvq իKvb GիRi /DbԳbgj K շKի՛տի KիR Kիi լK? 1. ուր 2. իv 3. Rոbbv

K. ուր լtj , իKvb tKvb լիZ KիR Kիi?.....

38. Arcab իKvb GիRi /DbԳbgj K շKի՛տի m՝m՝ լK?

K. thMthM e՛e՛vi Db՛տի c՞e՞ A_ի eR/Kyj fիU՞ լ լ լ լ qvi n լ qvi ArիM լտիj b լKbv?	thMthM e՛e՛vi Db՛տի cի A_ի eR/Kyj fիU՞ լ լ լ լ qvi cի eZԳրb m՝m՝ լKbv?
1. ուր 2. իv	1. ուր 2. իv

39. (iv`wi big ałi wRtAm Ki`b) iv`wU Avcab er Avcbriv e`enri KiłZ criłQb wK? 1. niw 2. br
 K. wK wK Dłłłk` Avcab er Avcbriv iv`wU e`enri KiłQb?
 1. Y agvł hvZiqłZI Rb` 2. gjj cwi entłbi Rb` 3. DfqB 4. Ab`vb` (ab`ł Ki`b)

40. iv`wU e`enrił tKvb iKg mgm`vi m`łxb ntłqłQb er nt`Qb wK? 1. niw 2. br
 K. niw ntłj, wK ałłbi mgm`vi m`łxb ntłqłQb er nt`Qb?.....

ab`er` w`łq m`łvrKvi MłY łkl Ki`b

Impact Evaluation Study on Construction of Large Bridge/Culvert on Important Feeder and Rural Road

Lvbv Rmi c ckgvj v

(KtUvj Gvi qvi Rb: th BDmbqtb cKt i Avl Ziv iv vq tKvb etR/Kvj fVU^obugZ nqib ev tKvb etR/Kvj fVU^ovbB ev f msL^oK etR/Kvj fVU^oAvtQ)

fugKv: Avmivj vgyAvj vBKg | Avgiv iW bvgK Mtel Yv cZov Ges cni Kf bv gSvj tqi AvBGgBw (IMED) Gi cfl t₁K gvW chq gj vq Ri tci Df tk GtmQ | Avcbiv Rrtbb vbx mi Kvi cKSkj Aw Bi (Local Government Engineering Department) KZK evj v₁ tki wfb₁ i ZcY^ondWri I MgrY motKi Dci tmZ/Kvj fVU^obugZ ntqQ | GB Rmi tci Df k^o nt^oQ, cKf iW i bgy Kiv gj vq Ges Gi dtj thMthw e^ov, Kul Drc^o b I m^oavt fVU^o i Avq I Kgms^o vbi t₁ t₁ K K cni eZB ntqQ tm veltq Z^o msMh Kiv | Avgiv G m^outK^o Avcbiv gj vq gZvgZ msMni Rb^o GtmQ |

G ch^o t₁ Avcbiv Avcbiv gj vq e^o c^o vbi gva^o tg GB Mtel Yvq Ae^o vb ivL^o Z c^o t₁ b | Avcbiv gZvgZ i ayv^o t₁ Mtel Yvi Kiv R e^o e^o Z nte hv Avcbiv Gj vKvi Dbqtb mrvqK ntZ c^o t₁ | Avcbiv t₁ qv Z^o m^o v^o t₁ m^o v^o t₁ Avcbiv Abg^o Z t₁ Avq m^o v^o t₁ Kiv i^o K^o t₁ Z c^o t₁ |

tKm bst

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w ^o fVU ^o :	tKwbs :	tRj v:	tKwbs :
DctRj v:	tKw bs :	BDmbq:	tKw bs :
tgsRv/i qw ^o bs :	tKw bs :	Mtg :	tKw bs :
iv ^o v ^o bvg:			

D^o E^o v^o Zvi aiY: 1. c^o j^o l 2. g^o m^o j^o v

m^o v^o t₁ Kiv MhYKivi bvg : m^o v^o t₁ Kiv Mh^o Y^o Zvi L:
 m^o v^o t₁ Kiv fVU^o t₁ i bvg : Zvi L:
 m^o v^o t₁ Kiv MhY: i^o i^o mgq : t₁ k^o l mgq:

t₁ m^o Kkb-1: Lvbvi m^o v^o i Y Z^o v^o e^o j^o x

1. D^o E^o v^o Zvi bvg (Lvbv c^o v^o b):
2. c^o v^o i t₁ t₁ i t₁ g^o v^o m^o m^o msL^o v: Rb

K. Lvbvi Z^o v^o e^o j^o x

bs	bvg (thvb Lvbv c ^o v ^o b/ D ^o E ^o v ^o Zvi bvg c ^o t ₁ t ₁ v ^o j ^o Lp)	v ^o j ^o 1/2 1. c ^o j ^o l 2. g ^o m ^o j ^o v	eqm (c ^o v ^o e ^o t ₁) 1 e ^o t ₁ i b ^o t ₁ P nt ₁ 000 v ^o j ^o Lp	m ^o v ^o t ₁ v ^o Zv thw ^o Zv	w ^o e ^o m ^o K Ae ^o v	t ₁ kv
1	2	3	4	5	6	7

Kj v^o g 6: w^o e^o m^o K Ae^o v^o i t₁ Kiv: 1. Aw^o e^o m^o Z; 2. w^o e^o m^o Z; 3. w^o e^o v^o t₁ e^o c^o Z^o K; 4. Avj^o v^o v^o c^o v^o Z^o v^o ; 5. Z^o j^o v^o K^o c^o b
 Kj v^o g 7: t₁ kv i t₁ Kiv: 1. Kul Kiv; 2. Kul gRj; 3. K^o j^o -Kiv Lvbvi k^o g^o K; 4. t₁ i^o e^o emv; 5. g^o v^o S^o v^o x e^o emv; 6. eo e^o emv;
 7. P^o k^o i^o x; 8. M^o m^o b^o x; 9. t₁ e^o Kiv; 10. Q^o v^o /Q^o v^o i^o x 11. Ab^o v^o b^o (v^o b^o t₁ K^o i^o b):

10. th tKvb cY" (Knl RvZ I Ab"vb" th tKvb cY") erRvi RvZKI tY KZ mgq j vM I KZ LiP nq?

c#e	eZ#rb
K. c#eMto KZ mgq j vMZ: .....(ngbtU)	L. eZ#rb Mto KZ mgq j vM: .....(ngbtU)
L. c#e th tKvb cY" erRvi RvZKI tY Mto KZ LiP nZ: .....UvKv	L. eZ#rb th tKvb cY" erRvi RvZKI tY Mto KZ LiP nq: .....UvKv

tmKkb 3: Knl nel qK Z_

11. Avcbri Gj vKvq c#eP Zj bVq Rj v#Zv KtqtQ nk? 1. n'u 2. bv
12. Avcbri Gj vKvq c#eP Zj bVq Knl RvZtZ cwb v#vkb Ges tmPI m#eav ntqtQ nk? 1. n'u 2. bv
13. Avcbri Gj vKvq c#eP Zj bVq eZ#rb km' Drcr` b tetotQ nk? 1. n'u 2. bv
14. Avcbri Gj vKvq c#eP Zj bVq nk nk dmtj i Drcr` b tetotQ Ges c#eP Zj bVq kZKiv KZ fM tetotQ?

dmtj i bVg	neNv c#Z Drcr` tbi cni gvY (gY-G)		c#eP Zj bVq neNv c#Z KZ gvY tetotQ?	c#eP Zj bVq kZKiv KZ fM (%) tetotQ?
	c#e	eZ#rb		
1. avb				
2. Mg				
3. f#v				
4. cvU				
5. AvL/B#z				
6. mmi lv				
7. Wj RvZvq (gm/gmj / Kj vB)				
8. kvK-meR (bVg D#j L-Ki`b:)				
9. Ab"vb" (v#v` K i`b)				

tmKkb 4: Kgms`v#bi m#hM

15. Avcbri i Gj vKvq c#eP Zj bVq eZ#rb tKvbtKvbt#t#t Kgms`vb Avt v e#v tctqtQ? (ce#ZPAe`vi t#t#tZ Zj bv Kti eZ#rb kZKiv KZ fM (%) tetotQ tmB mntmte DEi v`b)

t#t#t (c#ZvU ati ati vRtAm Ki`b)	kZKiv KZ nvti (%) tetotQ	cj`l#t i t#t#t (%)	gmj v#t i t#t#t (%)	v#t`#t i t#t#t (%)
1. Knl cY" erRvi RvZKI tY i t#t#t				
2. hvbemb Pj vP#j i t#t#t				
3. AeKvRtgv vbg#Yi i ms`v#t i t#t#t				
4. m#avi Y m#v#RK Db#vbg#j K KvRi t#t#t				
5. Ab"vb" (D#j L-Ki`b)				

16. Avcbri cvtki Gj vKvq eR/Kj fV#vbg#Y i ms`v#t i KvR tmB Gj vKv t#vK b#K vBti i t#vK t#vK m#hM tctqtQ?

1. tmB Gj vKv t#vK 2. vBti i t#vK 3. Ab"vb" (v#v` K i`b):

22. Arcbri cni etfi cte KZRb thZ Ges eZgrib KZRb thZ hq?

cte		eZgrib	
ktjv cZorb hvl qvi DcjhMx m`tm`i mSL`v	KZRb thZ	ktjv cZorb hvl qvi DcjhMx m`tm`i mSL`v	KZRb hq
.....Rb	.....Rb	.....Rb	.....Rb

tmKkb 6: cni tetki Dci clve

23. Arcbri i Gj vKiq cte Ges eZgribi eb`v cni v`z tkGb?

K. cte. 1. nqib 2. Kg 3. teik	L. eZgrib : 1. nqib 2. Kg 3. teik
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24. Arcbri i Gj vKiq iv`v-NtUI Dbqbmni etR/Kvj fvU`bgfY ntj Arcbri i kK kK DcKvi mjeav nZ?

.....

kgvT gnj vt` i Rb` ckej x (eZgrib mevnZ A`ev KLtbv netq ntqUJ Gi/c gnj v)

25. K. DEi`vixi bvg: L. Lvov Zvj Kvi m`m` bs:
 M. DEi`vixi eqm: N. DEi`vixi ktjvMZ thM`Zv:
 O. DEi`vixi RmeZ mSvb mSL`v: t0tj : tqtq: tgvU:
 P. DEi`vixi tckv: cte eZgrib:
 Q. (hv` DEi`vixi A`DcvR0Kvix tkvb tckvq btqmRZ`vtK Zmtj Zvi Avq gj wceX Ki`b):
 cte gnmK Avq (hv` _vtK):UvKv eZgrib gnmK Avq (hv` _vtK):UvKv

26. Arcbri i Gj vKiq iv`v-NtUI Dbqbmni etR/Kvj fvU`bgfY ntj gnj vt` i kK kK DcKvi ev mjeav nZ?

.....

27. Arcbri Gj vKiq hvZiqvZ e`e`vi DbwZ (etR/Kvj fvU`bv nl qvq) bv nl qvi dtj t0tj tqtq` i kK kK Amjeav nt`Q?

.....

28. Arcbri Gj vKiq cte Zj bvg eZgrib tkvbtKvbt`tj gnj vt` i Kgms`vb ep` tctqvQ?

(ceZPAe`vi tcl`tZ Zj bv Kti eZgrib kZKiv KZfW (%) tetotQ tmB mtmte DEi`v b)

tjT (clZU atI atI mRtAm Ki`b)	gnj vt` i tjT (%)	`m`t` i tjT (%)
1. Kml cY` evRvi RvZKi`vYi tjT		
2. hvbemb Pj vPij i tjT		
3. AeKvWtgv wbgfYi i ms`v`i i tjT		
4. mavi Y mvgmRK Dbqbgj K KvRi tjT		
5. Ab`vb` (Dtj L-Ki`b)		

29. Arcbri crik'i Gj vKvq etR/Kvj fivU'bgf' I ms'at'i i tkvb KtrR tkvb fite Arcab AskMhY Kti iQtj b kK?

K. iv'-I etR/Kvj fivU'bgf' KtrR: 1. niv 2. bv	L. iv'-I etR/Kvj fivU'ms'at'i KtrR: 1. niv 2. bv
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M. niv ntj , tkvb&KtrRi mrt_ Arcab RvZ iQtj b?

ubgf' KtrR	i qYite qY I ms'at'i KtrR
1. ubgf' KvR (ub' t' Ki'b:)	1. ktg v' tq
2. gnuLbtbi KtrR	2. UvKv v' tq
3. ktgK `vb	3. Z'vi kK Kti
4. Rvg `vb	4. Ab'vb' (ub' t' Ki'b)
5. ivb'e'vbi KvR	.....
6. `j MVtb	.....
7. Ab'vb' (ub' t' Ki'b) .....	.....

30. etR/Kvj fivU'Zixi KtrR AskMhY Kti Arcab tkvb fivZv er gRjx tctqtQb kK? 1. niv 2. bv

K. niv ntj , fivZv er gRjxi cail grb KZ? %abK:UvKv

L. cjt'i i Zj brq gRjx Kg f' l qv ntqtQ kK? 1. niv : KZ?:UvKv 2. bv

31. Arcbri cail erfi cte'KZRb `tj thZ Ges eZg'rb KZRb `tj hvq?

cte'		eZg'rb	
kt'lv clZ'rb hvl qvi DcthvMx m`tm'i msL'v	KZRb thZ	kt'lv clZ'rb hvl qvi DcthvMx m`tm'i msL'v	KZRb hvq
.....Rb	.....Rb	.....Rb	.....Rb

32. Arcbri Gj vKvq tkvb GbrRI /Dbqbgj K clZ'rb KvR Kti kK? 1. niv 2. bv 3. Rvbbv

K. niv ntj , tkvb&tkvb&LvtZ KvR Kti?

33. Arcab tkvb GbrRI /Dbqbgj K clZ'rb m`m' kK?

K. thvMthvM e'e'vi Dbq'bi cte' A_ f' etR/Kvj fivU' n l qvi AvtM iQtj b kKbv?	thvMthvM e'e'vi Dbq'bi cti A_ f' etR/Kvj fivU' n l qvi eZg'rb m`m' kKbv?
1. niv 2. bv	1. niv 2. bv

34. Arcbriv Gj vKvi iv'-NVU Arcab er Arcbriv e'enri Kitz crik'Qtb kK? 1. niv 2. bv

K. kK kK Df' k' Arcab er Arcbriv iv'v, tjv e'enri KitzQtb?

1. Yagv' hvZiqf'Zi Rb" 2. gjj cail ent'bi Rb" 3. DfqB 4. Ab'vb' (ub' t' Ki'b)

35. iv'-e'enrti tkvb i Kg mgn'vi m'g'ub ntqtQb er nt'Qb kK? 1. niv 2. bv

K. niv ntj , kK ai'tbi mgn'vi m'g'ub ntqtQb er nt'Qb?

ab'er` v' tq mv'lvKvi MhY tkil Ki'b

10. eR/Kyj fU°Zixi cte°vBtWj mRK'ij I gidij mRK'ij mgrflv m°v b Kiv ntqQj mK? 1. niiv 2. bv
11. eR/Kyj fU°Zixi cte°cail tekMZ mgrflv h_v EIA & IEE (Environmental Impact Assessment and Initial Environmental Examination) mgrflv m°v b Kiv ntqQj mK? 1. niiv 2. bv
12. cKf er°eqbKrtj vbrq RbMtYi mluq AskMhY uQj mK? 1. niiv 2. bv
- K. n'v ntj, mKaitbi AskMhY uQj ?.....
13. cKf er°eqbKrtj vbrq RbMtYi Zid t_k tKvb cZeUKZi GtmQj mK? 1. niiv 2. bv
14. cKf er°eqbKrtj gmj v` i AskMhY uQj mK? 1. niiv 2. bv
- K. n'v ntj, mKfite?.....
- L. br ntj, tKb?
- cKf ,tj v er°eqtbi dtj cail tekMZ tKvb mgn'v mpo ntqQj mK? 1. niiv 2. bv
- K. niiv ntj, mK mK mgn'v ntqQj?
- eR/Kyj fU°Gi tFSZ AeKvWtgv ,tj v mWKfite Kvr KItQ mK? 1. niiv 2. bv
- K. br ntj, tKb mWKfite Kvr KItQ br?
15. eR/Kyj fU°Gi tFSZ AeKvWtgv ,tj v i qYvte qiyi Rb vbrq chq tKvb KugU AvtQ mK? 1. niiv 2. bv
- K. GB KugU mK mK Kvr KIti _tK?
16. KZ v b ci ci eR/Kyj fU°Gi tFSZ AeKvWtgv ,tj v i qYvte qiyi I tgi vZ Kivi K_v?
17. er°emqZ cKf mWKfite i qYvte qiyi Kiv nq mK? 1. niiv 2. bv
- K. niiv ntj, mKfite i qYvte qiyi Kiv nq?
- L. Kiv i qYvte qiyi Kvr i vqZi tqtQb?
- M. br ntj, tKb i qYvte qiyi Kiv nq br?
- N. mKfite i qYvte qiyi Kiv hq?
18. eR/Kyj fU°Gi mWRvBb tKvb Bi t_k cFZ Kiv ntqQj Avcbri Rvrv AvtQ mK? 1. niiv 2. bv
19. mWRvBb cF EZ Kivi AvtM eR/Kyj fU°mBU-G gmU cix flv Kiv ntqQj mK? 1. niiv 2. bv 3. Rmobb
20. mWRvBb cF EZ Kivi cte°mWKfite Rm c Kvr Kiv ntqQj mK? 1. niiv 2. bv 3. Rmobb
21. eR/Kyj fU°bgp Krtj mBU cail eZB Kiv ntqQj mK? 1. niiv 2. bv 3. Rmobb
22. eR/Kyj fU°bgp Krtj mK mK bgp hScmZ mKv vi /WKv vix ms`v mBU-G GtmQj b?
23. eR/Kyj fU°Gi Avl ,m,m Xij vBtq KsqU m s-G ugKvri tgnkb i fivteUi tgnkb e`envi Kiv ntqQj mK? 1. niiv 2. bv 3. Rmobb
24. mgnb Krtj tKvb gvbqSj tmj uQj mK? 1. niiv 2. bv 3. Rmobb
25. eR/Kyj fU°bgp Krtj mntqU, Gg Gm iW, BU, evj cr_i BZ`m e`eUZ grj vgvj Zdkxj Abhvq cix flv Kiv nZ mK? 1. niiv 2. bv 3. Rmobb
26. eR/Kyj fU°Gi Uc v Xij vB-Gi cte°qj vW tu÷ Kiv ntqQj mK? 1. niiv 2. bv 3. Rmobb
27. mgnb mrgM h_v BU, evj mntqU, KsqU, Gg Gm iW, teqm s BZ`m mgnb Krtj cix flv dj vj `Bti msiv qZ AvtQ mK? 1. niiv 2. bv 3. Rmobb
28. mWRvBb Abhvq eR/Kyj fU°Gi vqZi Kvj KZ ermi aiv ntqQj Rvrv AvtQ mK? 1. niiv: KZ ermi aiv ntqQj ?ermi 2. bv
29. eR/Kyj fU°bgp Krtj DalZb KgRZP tK tK cail kB KItZb?
- 32K. Krti i i` nZ tkl chS-KZeri (AvbgmbK) cail kB KIti uQj b?eri
30. eR/Kyj fU°bgp Krti AMhZ Zj mSZ Kivi Rb tKvb gubUis tmj uQj mK? 1. niiv 2. bv 3. Rmobb
31. eR/Kyj fU°bgp Krti mWRvBb i i` umc tKkb Abhvq ntqQj mK? 1. niiv 2. bv 3. Rmobb
32. eR/Kyj fU°bgp mrgM mKv vi /WKv vix ms`v ,YMZgvb eRvq ti tL e`envi KIti uQj b etj mK Avcbri avl Yv? 1. niiv 2. bv 3. Rmobb
33. cKf i mdj Zv ,tj v mK mK?
34. cKf i `p` m K ,tj v mK mK?
35. er°emqZ cKf m fial tZ Avl i Krti i vLvi Rb Avcbri gZigZ er mcvl k mK?

(ab`er` v` tQ m flv Kivi MhY tkl Ki`b)

Impact Evaluation Study on Construction of Large Bridge/Culvert on Important Feeder and Rural Road

`j xq Avtj vPbvi vbt` KKr: BDibqb chiq (FGD Guideline at Union Level)

AskMhYKvi x: RbcZbra/RbtbZv (cj`l, gnj v, hpK) Ges cfrvkrj x e`v³ (cj`l, gnj v l hpK)
[ciz FGD-tZ AskMhYKvi x Kgct` 8 Rb]

tRj v :	tKw bs :
Dc`Rj v :	tKw bs :
BDibqb :	tKw bs :

GdRw mgS`Kvi xi bgt mrvZrKvi xi bgt

`j xq Avtj vPbvi vbt Zwi L:

`j xq Avtj vPbvq AskMhYKvi x` i Z` t

µgK bs	big	ij ½ (cj`l / gnj v)	eqm	K`v	tckv	c`ex (m` m`)
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						

Research Evaluation Associates for Development (READ) Ltd.
House # 27/1, Road # 13A (New); Dhanmondi R/A, Dhaka-1209

For Project Area

1. K. Arcbri BDtqtb(iv~vi bvg Dtg L~Ki) GB iv~vq Kte etR/Kyj fU~bgfY Kiv ntqtQ?
L. iv~vq ubgZ etR/Kyj fU~b bZb ubgZ etR/Kyj fU~bmk eb~vq qjZM~etR/Kyj fU~bemb Kiv ntqtQ?
M. Arcbri Gj vKvq uK Kvi~Y etR/Kyj fU~bgfY Kiv ntqtQj ?
2. etR/Kyj fU~Zix ni qvq hvZvqtZi t~t~t (etki Kti ~g , Ktj R, gr~tmv, ~f~tK~; tM~ tmUvi , I grtK~_tj vZ hvZvqtZi t~t~t Ges cY~ evRvi RvZKi~Y t~t~t) uK uK mjevav ntqtQ?
K. cjeP Zj bvg tKv~vq tKv~vq gvbj mntRB Pj vPj Ki~Z cvi?
3. etR/Kyj fU~Zix ni qvq Arcbri v Kti t~t~t uK ai~tbi mjevav tctqtQb ev uK fite j v fvb ntqtQb?
4. K. etR/Kyj fU~Zix ni qvq Mtgi ~ni~Rb~Moxi Kgms~t~tbi (~f tgv~x l ~xN~gqv~x) uK ai~tbi mjevav tetotQ?
L. Gi gra~tg gnvj v ktgtKi Kgms~t~tbi (~f tgv~x l ~xN~gqv~x) uK ai~tbi mjevav tetotQ?
5. etR/Kyj fU~Zix ni qvq cvi tetki Dci uK ai~tbi BvZevPK c~fve ctotQ?
K. etR/Kyj fU~Zix ni qvq cvi tetki Dci uK ai~tbi t~vZevPK c~fve ctotQ?
6. cKf er~evqtbi dtj uK uK mjevav ev DcKvi ntqtQ?
7. cKf er~evqtbi dtj uK uK Amjevav m~s ntqtQ?
8. Arcbri i Gj vKvq thM~thM e~e~vi Dv~Zi Kvi~Y tKvbtKvbt~t~t Kgms~t~tbi Av~iv ep~x tctqtQ?
(cKf i ceZPAe~vi t~t~t~t Zj bv Kti ez~t~t kZKiv KZfM (%) tetotQ tmB mntmte DEi ~ b)

t~t~t	kZKiv KZ n~t~t (%) tetotQ	cj~t~t i t~t~t (%)	gnj v~t~t i t~t~t (%)	~m~f~t i t~t~t (%)
1. Kti cY~ evRvi RvZKi~Yi t~t~t				
2. hvbemb Pj vPj i t~t~t				
3. AeKvWtgv ubg~fYi I ms~t~t i t~t~t				
4. mvari Y mvgmRK Dv~t~t~t K KvtRi t~t~t				
5. Ab~vb~ (Dtg L~Ki~b)				

9. Gj vKvi RbMY m~s~t~t RbKfite iv~v~l etR/Kyj fU~e~envi Ki~Z cvi~tQb uK?
K. e~en~t~t mgm~v~vKtj , uK ai~tbi mgm~v~e~mi Z Dtg L~Ki~b |
10. K. etR/Kyj fU~P t~f~Z AeKvWtgv , t~j v uK fite i qjYvte~qjY Kiv nq?
L. tK i qjYvte~qjY Kti ~t~t?
M. GB i qjYvte~qjY KvtR Arcbri v uK fvgKv iv~t~Z cvi~t b?
11. f~el ~Z iv~v~l etR/Kyj fU~e~t~j v hv~Z me mgtqi Rb~ e~en~t~t Dc~thM~v~t~tK tmRb~ uK Kiv Dv~Z etj Arcbri v gtb Kti~b?

For Control Area

1. Arcbri i Gj vKvi thM~thM e~e~vi ev iv~v~Nv uK i Kg?
2. Arcbri cvi~t Gj vKvi etR/Kyj fU~q~l qvq Arcbri v tmLvb t~t~t uK ai~tbi mjevav cvi~tQb?
3. Arcbri i Gj vKvq ez~t~t tKv~vq, uK ai~tbi Rj v~x~Zv, hvZvqtZ i eb~v mgm~v i t~t~t?
4. Arcbri i Gj vKvq etR/Kyj fU~ubgZ ntj hvZvqtZ e~e~vq uK uK mjevav nZ (etki Kti ~g , Ktj R, gr~tmv, ~f~tK~; tM~ tmUvi , grtK~_tj vZ hvZvqtZi t~t~t)?
5. Arcbri i Gj vKvq etR/Kyj fU~vKtj Arcbri v Kti t~t~t uK ai~tbi mjevav tctZb?
6. Arcbri i Gj vKvq etR/Kyj fU~ubgZ ntj Mtgi ~ni~Rb~Moxi Kgms~t~tbi uK ai~tbi mjevav nZ?
7. Arcbri i Gj vKvq etR/Kyj fU~ubgZ ntj gnvj v ktgtKi Kgms~t~tbi uK ai~tbi mjevav nZ?
8. Arcbri i Gj vKvq etR/Kyj fU~ubgZ ntj uK uK mjevav nZ etj Arcbri v gtb Kti~b?
9. Arcbri i Gj vKvq thM~thM e~e~vi Dv~Z ntj tKvbtKvbt~t~t Kgms~t~tbi Av~iv ep~x cvi~t?
(ceZPAe~vi t~t~t~t Zj bv Kti ez~t~t kZKiv KZfM (%) evote tmB mntmte DEi ~ b)

t~t~t	kZKiv KZ n~t~t (%) evote	cj~t~t i t~t~t (%)	gnj v~t~t i t~t~t (%)	~m~f~t i t~t~t (%)
1. Kti cY~ evRvi RvZKi~Yi t~t~t				
2. hvbemb Pj vPj i t~t~t				
3. AeKvWtgv ubg~fYi I ms~t~t i t~t~t				
4. mvari Y mvgmRK Dv~t~t~t K KvtRi t~t~t				
5. Ab~vb~ (Dtg L~Ki~b)				

10. Arcbri i Gj vKvi thM~thM e~e~vi Dv~t~t uK Kiv Dv~Z etj Arcbri v gtb Kti~b?

ab~ev~ ~t~t tkl Ki~b |

Impact Evaluation Study on Construction of Large Bridge/Culvertson Important Feeder and Rural Road

AerVi t'fkb tPKuj ÷ etR/Kvj fVU©

wefM : tKW bs: tRj v: tKW bs:
 DctRj v: tKW bs: BDibqb: tKW bs:
 Mtg: tKW bs:

chfeYKvixi big: Zvi L:

Z_c0vbKvixi big, c`ex I wKrb:

mfi Rugtb cil`k0 Kti Ges cKt msaké-e'p3 tK wRAmw Kti bxtPi Z_ , t'j v mslMh Kti wj uceX Ki tZ nte|

(e' erqbKvix ms`vi KvQ t_ tK Z_ mslMh Ki tZ nte)

1. cKt' i big I AvBw bs (th iv`w Dci etR/Kvj fVU©bigZ ntqtQ Zvi big):
2. iv`wUj ^N'qKZ wUvi?
3. iv`w th RvqMiq etR/Kvj fVU©bigZ ntqtQ fmiU tKvb BDibqbtbi gta` ctotQ?
4. iv`wU tKrbt'KvixBDibqbtbi Dci w`tq wMtqtQ (tKrbt'KvixBDibqbtbi t'j vKRb iv`wU t'ek e`enwi Kti _vtK)?
.....
5. cKt' i Avl Ziq D³ iv`vq KquU etR/Kvj fVU©bigZ ntqtQ: K. etR:.....L. Kvj fVU©
6. iv`wU tZ t'gU KZ_ t'j v etR/Kvj fVU©AvtQ (cKt' i Avl Ziq ubigZ I Ab`vb` mn t'gU):
7. etR/Kvj fVU© bZb ubigZ bnk eb`vq t'izMf`-etR/Kvj fVU©ms`vi Kiv ntqtQ: 1. bZb ubigZ 2. ms`vi Kiv ntqtQ
8. hLb cKt' wU er`emqZ nq ZLb iv`w aiY wK I Kg wJ?
1. c'fivUvB cKv iv`v (c'P Xij vB-KvixKiv) 2. KvPv er g'wU iv`v-3. Ab`vb` (vbr`0 Kiv)
9. cKt' wU KvR: 'i' ntqtQj:(gim I eQi) t'kl ntqtQj:(gim I eQi)
10. cKt' wU Avl Ziq GB iv`w etR/Kvj fVU©bg'Yi Rb` eiv' KZ A_ qKZ wJ?(UvKv)
11. cKt' wU Avl Ziq GB iv`w etR/Kvj fVU©bg'Yi Rb` t'gU cKZ e`q KZ ntqtQj?(UvKv)
12. etR/Kvj fVU© t'Yte'YI KvRi Rb` `vbxq t'Kvb KquU (t'j eri KbUwKuls fmmvBwU) AvtQ wKbv? 1. niw 2. bv
K. niw ntj , KquU big wK?
- L. Kiv v GB KquU m`m?
- M. GB KquU tZ kZKiv KZfVU© g'v v I KZfVU© c'j' I?
- N. GB KquU wK wK KvR Kti _vtK?
- O. Kv` i gra`tg (t'Kvb KZ'et'YI gra`tg) GB KquU KvR Kti _vtK?
- P. At_ p' thwMv Kiv v` t'q _vtK (t'Kvb c'iz0rb er Aw`Bi)?
13. etR/Kvj fVU© ubig'YI ci ntZ G hier KZeri ms`vi (i'Yvte'YI I t'givgZ) Kiv ntqtQ?eri
14. etR/Kvj fVU© ubig'YI ci GKeri I i'Yvte'YI I t'givgtZi KvR Kiv bv ntj , wK Kv' t'Y nqub?
.....

15. etR/Kyj fU@U @bg@Yi ci Gj@RB@W-i tKvb KgPvi@x @Kser KgRZP grtS grtS c@i`k@ Kti etR/Kyj fU@K@gl@tK (i @Y@te@Y K@gl@tK) tKvb ci@gk@`b @K? 1. n`u 2. bv

16. @b@ni Z iv`wi etR/Kyj fU@U KZUb tj w teqri Ki tZ c@ti? (Av@bg@bK)

17. etR/Kyj fU@n@u@KZ @e`wi Z Z`_`

c@vb c@vb Ask	@WRvBb Ab@mti (cKt `Bi t`_tK Z`_` @btZ nte)	ev`@e @bgZ (mti R@gtb ch@e@Y Kti @j @ce@x Ki tZ nte)	ch@e@Y tYi dj v@j /g@e`
K. `u`vb mSL`v	.....@U	.....@U	
L. etR/Kyj fU@GI c@i g@rc	%N@: .....@glvri	%N@: .....@glvri	
	c@f: .....@glvri	c@f: .....@glvri	
	D@PZv: .....@glvri	D@PZv: .....@glvri	

17K. etR/Kyj fU@n@u@KZ @e`wi Z Z`_`: (ch@e@YKvix mti R@gtb t`_tL @e`wi Z @j @ce@x Ki`b)

c@vb c@vb Ask	g@e`
M. etR/Kyj fU@GI Ge@t@t@U `@t@I eZ@vb Ae`v tKgb	
N. etR/Kyj fU@GI M@W@ K@gl Ges Gi eZ@vb Ae`v tKgb	
O. etR/Kyj fU@GI @m @xg K@gl Ges Gi eZ@vb Ae`v tKgb	
P. etR/Kyj fU@GI K@gl @c@ri (`u`vb Gi L@J) Ges Gi eZ@vb Ae`v tKgb	
Q. etR/Kyj fU@GI `@e Gi eZ@vb Ae`v tKgb	
R. etR/Kyj fU@GI `@c@tki t@j s Gi eZ@vb Ae`v tKgb	
S. etR/Kyj fU@GI Dfq c@tk@ G`@c@P ti w (msthM iv`wi) Gi eZ@vb Ae`v tKgb	
O. etR/Kyj fU@GI DRvb I f@utZ c@Zi @lgj K (ni fvi t@l@s I qvK@) KivR Gi eZ@vb Ae`v tKgb	
U. etR/Kyj fU@GI DBs I qv I @U@b@ qv mg@ni eZ@vb Ae`v tKgb	
V. etR/Kyj fU@GI b@t@i @K@ri I t@b@s eZ@vb @nj /c@j g@gl @`tq fivU ntq AvtQ @K?	
W. etR/Kyj fU@GI I q`wi s tKiv@GI eZ@vb Ae`v tKgb?	
X. th iv`vq etR/Kyj fU@bgZ ntq@ tm iv`w@ c@Kv iv`v@bv Kiv@v iv`v`	
Y. th iv`vq etR/Kyj fU@bgZ ntq@ tm iv`w@I eZ@vb Ae`v tKgb (thgb -Kv@c@s @VK AvtQ @Kbv, iv`vq tKvb fiv@Piv AvtQ @Kbv, Kiv@v iv`vq g@gl mti @tq MZ@ntq@ @Kbv, Pj v@tj i @m@e@v nt`Q @Kbv BZ`v@ @e`wi Z Z`_` @b@`@ Kti @j @ce@x Ki`b)	

(Gj@Kvi RbMY@K @R@v@ Ges @btR ch@e@Y Kti Z`_` mSL@ Ki`b)

18. etR/Kyj fU@U @bg@Y m@gM@i _YMZg@v tKgb @J? (RbM@Yi g@e`)

@bg@Y m@gM@i g@v	g@e` (2 I 3 Gi Rb`)
1. f@j: tKb?	
2. t@v@v@J: tKb?	
3. L@v@: tKb?	

19. etR/Kyj fU@U @bg@Yi ci ciB tKvb Ask t`f@% b@ ntq@J @K? 1. n`u 2. bv

K. n`u ntj , @bg@Yi KZ@`b ci t`f@% @tq@J ev b@ ntq@J?

L. fiv@ Ask KZ @`b ci t@v@Z Kiv ntq@J? 1.@`b ci 2. GLbi t@v@Z Kiv nq@b

M. t@v@Z Kiv ntj , tK ev Kiv t@v@Z Kiv ntq@J?

20. etR/Kyj fU@U @bg@bi ci niZ G ch@-hvZiq@Zi t`@t@ tKvb cKvi @m@e@v AvtQ @K? 1. n`u 2. bv

K. ni@v ntj , @K @K @m@e@v?

21. etR/Kyj fU@U @bg@bi ci @bg@Y Kiv@Ri t`w@I Kiv t@v tKvb m@K `N@bv ntq@J @K? 1. n`u 2. bv

22. eIR/Kyj fIU⁹bg⁹Yi ArM hvZvqZ e⁻v tKgb nQj ?
 1. fVj 2. tgiUvgU/Pj vPj thM⁻ 3. LviC 4. GiKerxiB Pj vPtj i AthM⁻ 5. Ab⁻vb⁻ (abr⁻θ Ki⁻b)

23. eIR/Kyj fIU⁹bg⁹Yi ArM iv⁻vq nK nK hvevnb Pj vPj KiZ:

24. eZ⁹vb iv⁻vUtZ nK nK hvevnb Pj vPj Kti? (abr⁻ch⁹e⁹Yi mgq t⁻ tL Ges RbMYtK cKk⁻Kti)

25. eIR/Kyj fIU⁹bg⁹Yi ci c⁹ej el⁹Y Gj vKvq Rj ve⁻Zv m⁹o nq nKbr? 1. n⁻u 2. bv
 K. n⁻u ntj nK ai tbi?

26. eIR/Kyj fIU⁹bg⁹Y Gj vKvq eb⁻v nq⁹stj b figKv ti tL tQ nK ? 1. n⁻u 2. bv
 K. n⁻u ntj nK fite?

27. eIR/Kyj fIU⁹bg⁹Z ni qv Drcw⁻ Z km⁻ b⁹o ni qv KtqtQ nK ? 1. n⁻u 2. bv

28. eIR/Kyj fIU⁹ th iv⁻vq nq⁹Z ntqtQ tmu⁹ Gj vKvi t⁻g , Ktj R, g⁻tK⁹θ i tM⁻ t⁻mu⁹t⁻i i m⁻t⁻ nK fite msh⁹?

.....
 .

29. eIR/Kyj fIU⁹ nq⁹Z ni qv Gj vKvi tj vKRb nK nK m⁻thM m⁻peav t⁻f⁻M Ki tQ?

(ch⁹e⁹YKvixi abr⁻ m⁻ti Rig⁻t⁻b t⁻ tL Z⁻ u⁻j u⁻ce⁻x Ki⁻b)

30. eZ⁹vb eIR/Kyj fIU⁹ i tKrb Ask t⁻f⁻t⁻ b⁹o ni qv ArQ nKbr ev tgi vGZ thM⁻ nKbr? 1. n⁻u 2. bv
 K. fiv⁻ Ask⁻ t⁻j v ev tgi vGZ thM⁻ Ask⁻ t⁻j v nK nK Zvi b⁻g D⁻tj L⁻Ki⁻b:

31. th iv⁻vq eIR/Kyj fIU⁹ nq⁹Z ntqtQ tmu⁹ eZ⁹vb Pj vPtj i D⁻ch⁻M⁻ nKbr? 1. n⁻u 2. bv

32. eIR/Kyj fIU⁹ nq⁹Z Kt⁻Ri g⁻v (eIR/Kyj fIU⁹ t⁻ Lvi ci ch⁹e⁹YKvixi g⁻se⁻)

Kt ⁻ Ri g ⁻ v	g ⁻ se ⁻
1. fVj : tKb?	
2. tgiUvgU: tKb?	
3. LviC: tKb?	

33. iv⁻v⁻l eIR/Kyj fIU⁹ eZ⁹vb Ae⁻v tKgb? (cK⁻t⁻ u⁻ m⁻u⁻t⁻ K⁻ ch⁹e⁹YKvixi m⁻ve⁻ g⁻se⁻)

1. iv⁻vUtZ eIR/Kyj fIU⁹ bg⁹bi , YMZg⁻v c⁻k⁻e m⁻g⁻ub
2. eIR/Kyj fIU⁹ ni K⁻ t⁻ b⁻ g⁻ndK mgq⁻Z mg⁻vB b⁻ v K⁻ vq Pj vPtj i t⁻q⁻t⁻ m⁻g⁻ni⁻ m⁻o nq
3. m⁻Z eb⁻v Ges AnZep⁻tZ iv⁻vU t⁻f⁻t⁻ h⁻vl qv Pj vPtj i t⁻q⁻t⁻ m⁻g⁻ni⁻ m⁻o ntqtQ
4. iv⁻vU tgi vGZ/i q⁻Y⁻te⁻q⁻Y b⁻v ni qv Pj vPtj i t⁻q⁻t⁻ m⁻g⁻ni⁻ m⁻o ntqtQ
5. iv⁻vU c⁻q⁻r⁻t⁻bi Zj b⁻q c⁻k⁻-Kg ni qv h⁻ns⁻K/Ah⁻ns⁻K h⁻vevnb Pj vPtj m⁻g⁻ni⁻ m⁻o ntqtQ
6. iv⁻vU Rbe⁻uj / , i⁻Z⁻p⁻Y⁻g⁻vKvq b⁻v ni qv Pj vPtj L⁻p⁻B Kg
7. t⁻ij s Gi eZ⁹vb Ae⁻v f⁻t⁻j v b⁻q
8. d⁻l⁻U⁻vZ Gi eZ⁹vb Ae⁻v f⁻t⁻j v b⁻q
9. G⁻v⁻t⁻c⁻p⁻ t⁻i⁻v⁻Wi eZ⁹vb Ae⁻v f⁻t⁻j v b⁻q
10. Ab⁻vb⁻ (abr⁻θ Ki⁻b):

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BDibqab/tg\$Rv Dbqab tPKuj ÷
(GB Z_ ,tj v wdī mpcvi fvBRvi msMth Ki tē)

tg\$Rvi bvg:..... BDibqab :
 DctRj v:..... tRj v :
 Z_ msMthKvixi bvg:..... Zwi L:.....
 Z_ cōvbKvixi bvg, c`ex l wKvrb:

	tg\$Rv	BDibqab
1. tg\$Rvi tgvU ArqZb:	.....eMqKtj wglvi	.....eMqKtj wglvi
2. tg\$Rvi tgvU tj vKmsL`vt	.....Rb `ni`^:.....% `ni`^bq: .....%	.....Rb `ni`^:.....% `ni`^bq:%
3. ciKv iv`v:	..... wKtj wglvi	..... wKtj wglvi
4. AravciKv iv`v:	..... wKtj wglvi	..... wKtj wglvi
5. KvPv iv`v:	1. wKtj wglvi	2. wKtj wglvi
K. el fKtj KvPv iv`v Ae`v:	1. cmbtZ Wje hwq 2. MZ`nq 3. Ab`vb` wbr` θ Ki`b:	1. cmbtZ Wje hwq 2. MZ`nq 3. Ab`vb` wbr` θ Ki`b:
6. Gj vKvi wK ai tbi hrbeimb Pj vPj Kti:	.....	.....
7. wKtj v cōZōtbi msL`v: (cōBgvi x`g , nvB`g , gr`tmv, Ktj R memn)	1. mi Kvix: .....wJ 2. GbwRI KZ`R cwi Pwv Z: .....wJ	1. mi Kvix: .....wJ 2. GbwRI KZ`R cwi Pwv Z: .....wJ
8. evRvi /gvfKvui msL`v:	.....wJ	.....wJ
9. em ÷ vU /tU = uy ÷ vU /URK ÷ vU AvtQ wKbr?	1. n`v 2. bv	1. n`v 2. bv
10. tbs`e` i AvtQ wK?	1. niiv: .....wJ 2. bv	1. niiv .....wJ 2. bv
11. tM`_ tmoUvi AvtQ wK?	1. niiv: .....wJ 2. bv	1. niiv :wJ 2. bv
12. KZiU GbwRI KvR Kti?	.....wJ	.....wJ
13. GbwRI ,tj vi bvg	.....	.....
14. GbwRI ,tj vi cōvb KvRt	.....	.....
15. migmRK msN/Kve	.....wJ	.....wJ
16. nmcrZij /wKubK	.....wJ	.....wJ
17. `v`^tKb`^1 ai b	.....	.....
18. Kvj fvU`Gi msL`v	.....wJ	.....wJ
K. KvRix Kqil	.....wJ	.....wJ
19. eR Gi msL`v	.....wJ	.....wJ
K. KvRix Kqil	.....wJ	.....wJ

20. GB cKf Oror D ³ BDibqab Avl wK wK Dbqabg K cKf er`emqZ ntqtQ Ges tKvb cōZōvb er gS`yvj q Kti tQ?		
cKt i bvg l KvRi aiY (wK wK KvR Kti tQ)	er`erqbkvix cōZōvb/gS`yvj tqi bvg	Kte er`emqZ ntqtQ (tKvb eQti er eZ`vb mgq t`_tK KZ eQi AvtM)

Appendix 3: Pictures of Infrastructures and Workshop



Bridge over Bhairab River, Bayuari, Bagarpara, Jessore



Bridge on Matamohori River, Surajpur-Manikpur, Chokoria, Cox's Bazar



Bridge on Goyhata-Kuchyamara Road, Bangala, Ullapara, Sirajganj



Bridge on Purba Char-Afra Road, Habaspur, Pangsha, Rajbari



Bridge over Shipsha River, Soladana, Paikgacha, Khulna



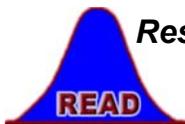
Bridge over Nikrail Khal, Bonogram, Savar, Dhaka



Local Level Workshop at Savar Upazila



Local Level Workshop at Savar Upazila



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