

Government of the People's Republic of Bangladesh IMED, Ministry of Planning Sher-e-Bangla Nagar Dhaka-1207

# IMPACT EVALUATION STUDY OF ROAD MAINTENANCE AND IMPROVEMENT PROJECT (UNDER ADB ASSISTANCE)



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# IMPACT EVALUATION STUDY OF THE ROAD MAINTENANCE AND IMPROVEMENT PROJECT (UNDER ADB ASSISTANCE)

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### Conducted by:

## **Technoconsult International Limited (TCIL)**

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#### **EXECUTIVE SUMMERY**

The assignment was intended to conduct an impact evaluation study for the Road Maintenance and Improvement Project (2<sup>nd</sup> revised) covering the implementation period from April 2001 to March 2009 under Asian Development Bank (ADB) assistance and executed by the Roads and Highways Department (RHD), Ministry of Communications aiming to improve the transport efficiency on road thus increase economic activity in the region. The goal of the project were to Improve transport efficiency on existing roads nationwide, by strengthening the governance of road maintenance, and conducting priority periodic maintenance works, bring the people of the poverty prone areas into economic activity, improve transport efficiencies on the strategic Southeast Road Corridor by upgrading road condition and increase capacity, prepare a National Surface Transport Policy which meets the demand of the time, increase private sector participation in the delivery road infrastructure, by establishing the legal environment and by implementing a toll road demonstration project. The Project consisted of a Corridor Improvement Component (CIC) and a Road Maintenance Component (RMC).

According to the provision of contract agreement signed between Implementation Monitoring and Evaluation Division (IMED) and Technoconsult International Limited (TCIL), the objectives of the impact evaluation study were to review the implementation and management status Road Maintenance Component (RMC) and Corridor Improvement Component (CIC), status of private sector participation in the delivery of road infrastructure and toll road demonstration, and operation and periodic maintenance of roads; to assess the impact of the project activities on major expected outputs- especially with respect to transport cost, savings in travel time, vehicle operating costs, enhanced mobility, reduced traffic congestion, increased socio-economic development of users of roads etc; to assess the strengths and weaknesses of the project, sustainability of the project activities and the quality of works as per the technical specification.

The impact evaluation study was done upon the project beneficiaries in two ways. One of which was the beneficiary survey in the target sites, where the beneficiaries were randomly selected for the survey study. However, selection of areas was made on a purposive basis so as to cover all the project districts and all types of project activities. The major beneficiary groups of the project were businesspersons involved in industries, export-import, transportation of goods and passengers, farmers, social elites (teachers, doctors, lawyers, other service holders), small traders, villagers irrespective of their age, sex and economic and social status, students, rickshaw pullers, bus/truck owners and drivers and so on. The project facility users had filled in a set of pre-designed questionnaire encompassing issues about the benefits of the road such as costs of transport, time consumed, access to services, effect of the road on income, prices, wages, employment, and also about the quality aspects of the roads, etc wherever required, and the socio-economic benefits offered by the project. Similar representation of different categories of beneficiaries was maintained for conducting the focus group discussions (FGD). Each category of the beneficiaries had about 20% representation in the survey and FGD. Females constituted about 20%. About 60 Engineers of RHD were interviewed with a semi-designed questionnaire to obtain information about the quality, durability, sustainability, costeffectiveness of civil and construction works, land acquisition and resettlement process and also the maintenance works. About 20 senior level officials of RHD head office were also consulted about the design of highways, longevity of highways, management of the project as against the designing system, management practices in the neighbouring countries and future planning of the highways in Bangladesh. In addition these, the team of consultant including senior officials of Technoconsult International Limited (TCIL) conducted a physical visit started from Daudkandi to Teknaf 43 km under the project areas and collected information of length, thickness, width and present status of turf shoulder, pavement shoulder, carriageway etc from five kilometre intervals to know the status of RMC and CIC components including bridge and bypass.

Implementation and Management Status of the RMC: All improvement works under Contracts 1, 2, 3, 4 & 5 the lengths of the roads had been found similar during physical visit of the project areas as records found in PCR. The pavement width of the road section under Contract 1 & 2 was 10.5 m including 7.5 m carriageway and 1.5 m paved plus 1.5 m turfed shoulder on each roadside. In case of the road section under Contract No. 3 & 4 was 9.0 m pavement width including 7.0 m carriageway, 1.0 paved shoulder on each side of the road as well as 1.5 m turfed shoulder on each roadside. The turfed shoulder from Daudkandi to Raipur under Contract No. 1 was seriously damaged by the erosion of the soils that hanged the road edges. The paved surfaces from Daudkandi to Kutumbupur Bazar were severely damaged by creating cracks and pot holes. The turfed shoulder and the edges of the paved shoulder near the Nimsar Bazar in Burirchang, Comilla were severely damaged by soil erosion from the turfed shoulder that showing the hanging of the paved edges. The paved surfaces of the road near Suagazi in Comilla under Contract No.2 were damaged by creating cracks. After Chowddagram Bazar, bitumen of the road pavement had been swelled up and formed undulation on the road resulted to modify the straightness of the lane dividing white marking into zigzag form. Excess number of wider (about 2.0 m) speed breakers was found on the road section under Contract No. 3. The cracks and potholes were found after Bizupur Bazar on the paved surfaces of the road. No damages were found on the paved & turfed shoulders and paved surfaces along the road section under Contract No. 4. The pavement width of the road section from Kalurghat to Manashertak under Contract No. 5 was 9.0 m including 7.0 m carriageway, 1.0 paved shoulder on each side as well as 1.5 m turfed shoulder on each roadside. No damages were found on the paved & turfed shoulders and paved surfaces along the road section. The pavement width and turfed shoulder from Chittagong to Cox's Bazar (km 19.50 to km 82.00) road under Contract No. 5 were varied along the road section from 6.2 to 9.0 m. From Muzaffarabad at Patia to Kanchan Nagar, Badamtali at Chandanaish, from Bagichar Hat, Chandanaish to Dohazari bus stand; and the road section between km 55 to km 56, the turfed shoulder and edges of the road were damaged by the erosion of soil. The pavement width of the road from Cox's Bazar to Teknaf (6.00 to 43.0 km) road section under Contract No. 5 was 6.0 m as well as 1.0 m turfed shoulder on each roadside but no paved shoulder. Except few cases the shoulder and paved surfaces of this road section was found good enough without any damage. Severe damages were found on the turfed shoulder of the road from 26 to 28 km, via Court Bazar, Ukhia. A large number of severely damaged culverts and bridges were found on the road section under Contract No. 5, especially the Mithachara Bridge near Panerchara Jatrichhaony (km 12.00), Panerchara Bridge (28 m long and 3.9 m width) at South Mithachara (km 13.0), North Kuniapalong (km 17.00) as well as bridges located at km 19, 20, 21, 23 and at Hizlia, Ukhia (km 29.00).

Implementation and Management Status of the CIC: The pavement width of the roads under Contracts 1, 2 & 3 was 10.5 m including 7.5 m carriageway and 1.5 m paved plus 1.5 m turfed shoulder on each roadside. All the bypasses under these contracts had made the roads geometrically straight that reduced the traffic distance, saved travel time than old curved road avoiding traffic congestion. At the end of Comilla bypass under Contract No. 1, the paved surfaces were damaged by creating cracks and potholes and the paved surfaces of Feni bypass were severely damaged by creating cracks and potholes. The turfed shoulders and paved surfaces of the major portion of the road under Contract No. 2 were severely damaged. Though, the potholes on the road section were repairing sporadically conducting by the District level RHD. The road near the Barakunda Bazar was severely damaged by the undulations especially in front of the PHP glass industries. The paved surfaces of the road section under Contract No. 3 from Banshbaria to Vatiary were found severely damaged by creating cracks and potholes. The turfed shoulders of this road section were severely damaged. At the Vatiary point of the road section, paved surfaces, shoulder and turf had been severely damaged by creating cracks and potholes. Though, the asphalt paved overlay of this road section was going on at this point by the District level RHD. The paved surfaces of the Kumira bypass, Kumira bypass-end to Alanker Cinema Hall as well as near Baroauwlia and Shitalpur point (km 21 to km 23) under Contact No. 4 were found severely damage by creating cracks and potholes. The

pavement width of the newly constructed fully access-controlled tolled Chittagong Port Access Road (CPAR) under Contract No. 4 was found 9.8 m including 7.3 m carriageway and 1.2 m paved shoulder on each roadside. All the components of this road section were found standard for two lane traffic facilities and found in good conditions. The Toll Plaza on the CPAR had ensured the private sector participation in the delivery of road infrastructure and toll road demonstration.

**Private Sector Participation:** The Chittagong Port Access Road is the first and only fully toll controlled road in Bangladesh. The toll system is maintained by the private sector leased by the GoB. This toll system had increased the private sector participation in the delivery of the road infrastructure by implementing toll road demonstration.

Impact of the Project Activities on Major Expected Outputs: The impact of the road maintenance and improvement project was evaluated by the responses of the project beneficiaries (Program group and Control Group) in the project areas through the pre-tested questionnaire. The survey work was conducted among 10 districts of the project areas started from the start of Daukandi towards Teknaf 43.0 km point. The findings of the impact of the project activities on the major expected output in the project areas are: The movement had become ease to reach the Capital City Dhaka, District Head Office, inter district, Upazila Head Office, and markets after the project implementation. Easy transportation of the products to the national and international markets had been occurred in the project areas. The time needed from Comilla (Barura), Chandpur, Feni, Noakhali, Laxmipur, Chittagong and Cox's Bazar to reach Dhaka City were 3.1 to 4.0 hrs, 4.1 to 5.0 hrs, 4.1 to 5.0 hrs, 5.1 to 6.0 hrs, 6.1 to 7.0 hrs, 8.1 to 9.0 hrs and 10.1 to above hrs, respectively before the project implementation. These times were reduced to 2.1 to 3 hrs, 3.1 to 4 hrs, 3.1 to 4 hrs, 4.1 to 5 hrs, 4.1 to 5 hrs, 5.1 to 6.0 hrs and 8.1 to 9.0 hrs, respectively after the implementation of the project, respectively. The time needed from Dhaka (Sanir Akhra), Munshiganj (Gazaria), Comilla (Barura), Chandpur, Feni, Noakhali, Laxmipur, Chittagong and Cox's Bazar to reach the Chittagong Port were 8.1 to 9.0 hours, 7.1 to 8.0 hrs, 5.1 to 6.0 hrs, 5.1 to 6.0 hrs, 3.1 to 4 hrs, 6.1 to 7.0 hrs, 6.1 to 7 hrs, 0 to 1.0 hrs and 3.1 to 4 hrs, respectively before the project implementation. These times were reduced to 5.1 to 6.0 hrs, 4.1 to 5 hrs, 3.1 to 4 hrs, 3.1 to 4 hrs, 1.1 to 2 hrs, 3.1 to 4 hrs, 3.1 to 4 hrs, 0 to hrs and 2.1 to 3.0 hrs, respectively after the implementation of the project. From the economic analysis of the cost-effectiveness of the road due to implementation of the project, it was found that the amount of monetary saved for an AC Luxury Bus was about 15,036.0 BDT (Annexure-Five). About 1000 vehicles are plying for an hour on the Dhaka-Chittagong highway that was observed and recorded during the physical visit of the project areas. Therefore, it can be imagined how much money are being saved from the vehicles for 24 hours that are plying using the road after the implementation of the project. The new organization set up was established in the project areas after the project activities and the new employment opportunities have been created after the project activities. In addition, easy transportation and marketing of the goods, easy movement of the people and easy communication with the school and support-service organization had been identified as the major advantages created after the implementation of the project. All types of vehicles including heavy vehicles plied after the implementation of the project. But before the project implementation, the containers/covered vans could not be plied. It has also reduced about 16-20% costs of transportation including reduction of repair and maintenance costs of one vehicle Tk 5,001 to Tk 10,000 to less than Tk 5,000. The prices for land were increased substantially and production pattern of the industrial/firm and agricultural commodity has been changed. Agro-products/fisheries/nursery items were the major commodities identified as new product producing after the project. The repair and maintenance of the roads were not done properly in the project areas after the project implementation. The status of the surface, turf, height, and rain cut of the roads was good followed by broken at places and as good as original. The social and natural environment in the project areas were developed after the implementation of the road maintenance and improvement project. The environment was not affected by the road as well as no possibility to be affected. The tree plantation along the road side after maintenance and improvement of the

road was done but this was not satisfactory level. The income of the people in the project areas had been increased after the project implementation and the price of the commodities in the project areas had been increased after the project implementation. Similarly the daily wages of people had been increased in the project areas.

Strengths of the project: The strengths of the project were: Bypasses had made the road geometrically straight that reduced the distance, traffic jam and saved the time than curved old road; The bus bay, truck bay, rigid pavement and paved road dividers near bazaar areas especially in Chowddagram, Nazira Bazar near Comilla Cantoment, Mia Bazar in Comilla that substantially reduced the traffic jam. The development of road side parking facilities for highway trucks on both sides between railway level crossing and Padua Bazar in Comilla bypass of Dhaka-Chittagong highway reduced the engagement of the traffic lanes of the road by the excess trucks; The roads under both CIC and RMC were widened as a result, two lane standard facilities had been achieved by the roads; By the implementation of contracts Nos. 3, 4 & 5 under RMC, a surface road network had been developed that would be enhanced the economic activities of the connected areas; The private sector participation in the delivery of the road infrastructure by implementing toll road demonstration had been increased first in Bangladesh by the establishment of fully toll controlled system on the Chittagong Port Access Road.

Weaknesses of the project: The weaknesses of the project were: The project was scheduled to implement from April 2001 to March 2005 but actual implementation period of the project was April 2001 to March 2009. It took four years more thus delayed the project implementation work and increased project costs; The Road maintenance works of the RMC was done on the hard, rigid sub-soil layer of the old road comprised with asphalt paved overlay, bituminous surface treatment (double or single) and repair of depressions and potholes, resulted to create the rapid and regular cracks and pot holes; The excess traffic movement and overloaded traffic cause the severe damages on the paved surfaces of the road by creating cracks and pot holes; Continuous overloaded traffic movement on the road causes regular damages on the road. This is continuously happening due to the lack of the traffic load control system by maintaining the upper limit of the vehicles' load in Bangladesh; The regular repair and maintenance of the damaged road were not sufficient enough. Despite of one vital objective of the project, National Surface Transport Policy was not prepared.

Sustainability of the project: To ensure sustainability of the project activities need to ensure quality of the works, which was done for RMC and CIC in collection of samples from the different points/locations of the project areas and tested in RHD laboratories. Upon satisfactory results, the project Authority had issued Defect Clearance Certificate and paid the due payment with security deposit to the respective Contractors. According to the feedback found from the concern officials of the RHD, there is no standard durability period of reconstruction and overlay works of the road. But there is standard durability period of 10 years for newly constructed road like Chittagong Port Access Road subject to proper to proper management of traffic load. The sustainability of the road should be ensured through management of turfed shoulder, rain cut for quick drainage of the water from the road, regular maintenance of cracks and potholes on the paved surfaces of the road as well as traffic load management and distribution. Due to the economic impacts of Port, Beach, industries and others ease the movement of people, exportimport trades for national and international markets.

#### Recommendations

The major recommendations of the project are given below:

Avoidance of the Delay for Project Implementation: To get the time demanding benefits
from the project, delay for the project implementation should be avoided and it should be
implemented within the stipulated time and work frame.

- Distribution of traffic load by the establishment of lane facilities: The continuous increasing traffic load should be distributed by the expansion of the existing two lane facilities of the roads. Though, the development works for 4 lane traffic facilities are going on along the Dhaka-Chittagong highway starting from Daudkandi point. This 4 lane development works should be completed within the stipulated time and work frame without any delay. To reduce the accidents, the road divider should be provided along with the 4 lane road. Considering the present increase rate of traffic, authority need to plan for 6 lane road by phase immediate after the implementation of the 4 lane works, this will support to accelerate the economic growth of the country. Separate lane for slow moving vehicle need to be established. In addition, there is also need to modernize and operationalize the water and rails ways to reduce the traffic pressure from the road. Road divider needs to set up to reduce accident on the road. Road need to be straight wherever applicable which will be saved travel time and reduced distance and accident.
- Traffic load control by the establishment of weighing scale: Overloaded traffic load control should be adopted by the establishment of weighting scale at some strategic points of Dhaka-Chittagong highway and steps to be taken to make it full operative and sustainable.
- Express way/Elevated express way: Express way/Elevated express way/Partially
  elevated express way along with express way should be established from Dhaka to
  Chittagong Port that should be fully tolled controlled road. Therefore, feasibility study and
  fund collection for the establishment of this type of mega project should be done
  immediately.
- Private sector participation by the establishment of Toll Control System: A partial fund from private sector to be injected to RHD to implement Maintenance work. This fund can be earned by the adoption of fully toll controlled system on the road at some strategic points of Dhaka-Chittagong highway. At least 50% of the GoB part of the revenues to be collected from the toll system should be given to the RHD to implement the regular maintenance works of the roads. Another option can also explore for toll collection and maintenance works through private sector participation in toll controlled road section.
- Regular road maintenance: Regular maintenance and repairing works should be done by the RHD local officials. Necessary skilled manpower and adequate delegation of financial power should be given to those local level officials in order to quick, effective and quality maintenance of the damaged roads.
- Design of the Road: Design for attaining the level of longevity of the roads should be changed especially for maintenance works that should be reconstructed from the hard subsoils layer. And enough time should be spent for the compaction of the sub-soil layer.
- Widening of the road: The widening of the road section from Chittagong to Cox's Bazar should be immediately expanded at least upto 10.5 m instead of existing 9.0 m in Baraz areas and 6.2 m in other parts.
- Straightening of the road: The curved road along the road section from Chittagong to Cox's Bazar should be straightened by the establishment of bypasses at different points especially bypassing the bazar areas.
- Selection of Quality Contractor: Quality contractors should be selected to ensure the
  good quality works. To fulfil this purpose, the procurement process should be free from any
  unwanted interruptions such as extra-official/departmental factors/influences and should be
  transparent according to "Public Procurement Rules-2008 (PPR)".
- Reconstruction of the Culverts and Bridges in Cox's Bazar-Teknaf road: Several severely damaged culverts and Brides were observed at different points of the Cox's Bazar-Teknaf road section that should be should be reconstructed immediately.