

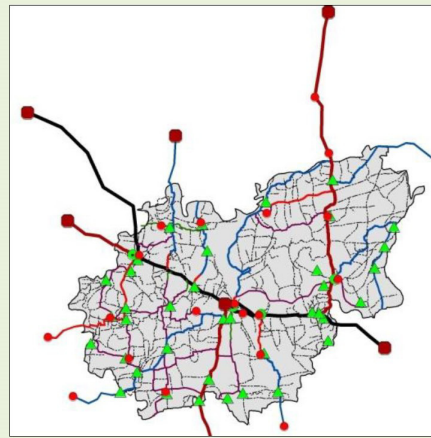


ReCAP
Research for Community Access Partnership



Planning and Prioritisation of Rural Roads in Bangladesh

Report of the First Stakeholders Workshop
(27 February, 2017)



Department of Urban and Regional Planning (DURP)

Bangladesh University of Engineering and Technology
(BUET)

BAN2072A

October 2016 (Revised February 2017)



The views in this document are those of the authors and they do not necessarily reflect the views of the Research for Community Access Partnership (ReCAP), Department of Urban and Regional Planning (DURP), Bangladesh University of Engineering and Technology (BUET).

Cover Photo:

Mr. Md. Mashrur Rahman using
LGED's GIS Database

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RESEACH FOR COMMUNITY ACCESS PARTNERSHIP (ReCAP) *Safe and sustainable transport for rural communities*

ReCAP is a research programme, funded by UK Aid, with the aim of promoting safe and sustainable transport for rural communities in Africa and Asia. ReCAP comprises the Africa Community Access Partnership (AfCAP) and the Asia Community Access Partnership (AsCAP). These partnerships support knowledge sharing between participating countries in order to enhance the uptake of low cost, proven solutions for rural access that maximise the use of local resources. The ReCAP programme is managed by Cardno Emerging Markets (UK) Ltd.

See www.research4cap.org

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We are grateful to the LGED and other government officials of the study area for providing access to their data and relevant literatures. The project team is indebted to the Department of Urban and Regional Planning (DURP) of Bangladesh University of Engineering and Technology (BUET) for providing necessary logistic supports. We also acknowledge ReCAP for their constant support and assistance.

Acronyms, Units and Currencies

| | |
|-------|---|
| AADT | Annual Average Daily Traffic |
| AHP | Analytical Hierarchical Process |
| BC | Bituminous Carpeting |
| BUET | Bangladesh University of Engineering and Technology |
| CBA | Cost Benefit Analysis |
| CVD | Commercial Vehicles per Day |
| DURP | Department of Urban and Regional Planning |
| EIRR | Economic Internal Rate of Return |
| GIS | Geographic Information System |
| HBB | Herring Bone Bond (Brick paved) |
| LGED | Local Government and Engineering Department |
| LGI | Local Government Institutions |
| MCA | Multi Criteria Analysis |
| MP | Member of Parliament |
| NMT | Non-motorised Transport |
| NPV | Net Present Value |
| ReCAP | Research for Community Access Partnership |
| RED | Roads Economic Decision Model |
| RHD | Roads and Highways Department |
| SFYP | Seventh Five Year Plan |
| TTCS | Travel Time Cost Saving |
| VOCS | Vehicle Operating Cost Saving |

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1 Executive Summary

This workshop report is the second deliverable of the project as per ToR. The purpose of the workshop was to provide a forum for the stakeholders for them to consider and discuss the proposed planning and prioritisation methodology, and to receiving their suggestions and recommendations before finalizing the methodology by the DURP Project Team. Another purpose was to discuss and identify various issues related to rural road development and maintenance which may also help to finalize the methodology.

The Workshop was attended by elected local political leaders from the pilot district for the study, Tangail, including one Member of Parliament and Chairpersons of Upazila and Union Parishads, female members of local union parishads; LGED officials from the headquarters and field-level offices in Tangail, representatives from various government departments including the Planning Commission and Bureau of Statistics, and representatives of local trade associations from Tangail. Representatives of ReCAP also participated in the workshop.

The deliberations at the Workshop provided valuable insights from local stakeholders; otherwise it would have been difficult to comprehend from outside several pertinent issues related to rural road development. Face to face discussions with various interest groups were very effective to identify generally agreeable issues related to planning and prioritisation of rural roads. The workshop was also effective to draw conclusions on different aspects of the proposed methodology as well as to identify some major issues in rural road development that needed to be addressed by LGED and other concerned government departments.

2 Introduction

Bangladesh has about 321,462 km rural roads of different categories. The Local Government Engineering Department (LGED) and Local Government Institutions (LGI) develop and maintain all rural roads, which share more than 93% of total roads in Bangladesh. The major part of the rural road network is yet to be developed as all-weather roads. Due to high growth in traffic demand and changed circumstances, many roads also need to be further improved.

LGED spends a considerable amount of resources every year for the development and maintenance of rural roads. However, the selection of roads from a large number of candidate roads is not always undertaken through a rational selection process. Consequently, many roads of higher importance may remain neglected while roads of lower importance may get resources allocated for development and/or upgrading. For the effective utilization of available resources and promotion of sustainable rural mobility and access, there is a need to develop a planning and prioritisation methodology for the development and maintenance of rural roads in Bangladesh.

The Department of Urban and Regional Planning (DURP) of Bangladesh University of Engineering and Technology (BUET) in collaboration with LGED, is implementing a project to develop an appropriate planning and prioritisation methodology for the rural roads in Bangladesh. The project (Project reference: BAN2072A) is being sponsored by the Research for Community Access Partnership (ReCAP) programme, a UK aid funded six-year programme, with an overall aim to promote safe and sustainable rural access in Asia and Africa.

As part of the required activities of the above-mentioned project, the First Stakeholders Workshop was organised on 9 August 2016. The workshop, held at the Seminar Room of LGED, was organised by DURP and hosted by LGED.

The main purpose of the workshop was to provide a forum for the stakeholders for them to consider and discuss the proposed planning and prioritisation methodology, and to receive their suggestions and recommendations before finalizing the methodology by the DURP Project Team. Another purpose was to discuss and identify various issues related to rural road development and maintenance which may also help to finalise the methodology.

There were three presentations in the workshop consisting of the progress of project work, a brief introduction of the project and the proposed methodology. The stakeholders gave their comments and suggestions that needed to be considered before finalising the methodology. They also discussed various issues related to rural road planning, development and maintenance. The details of these discussions are provided in Section 3 of this report. The programme of the workshop is attached as Annex A to this report.

The Workshop was attended by elected local political leaders from the pilot district for the study, Tangail, including one Member of Parliament and Chairpersons of Upazila and Union Parishads, female members of local union parishads; LGED officials from the headquarters and field-level offices in Tangail, representatives from various government departments including the Planning Commission and Bureau of Statistics, and representatives of local trade associations from Tangail. Representatives of ReCAP also participated in the workshop.

The list of participants is attached as Annex B to this report.

3 Inaugural Session

The inaugural session of the workshop was chaired by, Mr. Md. Abul Kalam Azad, Additional Chief Engineer, LGED and Chairperson of AsCAP, Bangladesh Steering Committee. Professor Dr. Ishrat Islam, the Head of the department of Urban and Regional Planning of Bangladesh University of Engineering and Technology (BUET), Mr. Sanower Hossain, Member of Parliament, Tangail 5 constituency, and Mr. Les Sampson, Infrastructure Research Manager, ReCAP addressed the session.

Professor Islam, in her speech, drew attention to the importance of the prioritisation of roads. She mentioned that, LGED has long been responsible for constructing and maintaining the rural roads. Therefore, this project, with its successful accomplishment, would assist LGED for even more effective and efficient rural road developments. She thanked ReCAP for giving such an opportunity to the Department of URP, and LGED for their collaboration. She also reiterated the interest and commitment of the Department of URP in undertaking the work.

Mr. Hossain, honourable MP, welcomed and appreciated such a project in Bangladesh. He emphasised the importance of prioritisation in the development of rural roads. He also thanked the BUET team and LGED for selecting Tangail district as the pilot district. He regretted that although being an adjacent district to the capital city of Dhaka, Tangail had not been given that much priority compared to the other more distant districts in the past. He emphasised to develop those rural roads which served most people and also requested to give due importance to the low-lying flood prone areas in planning and prioritisation. He concluded by saying that, he is hopeful about the outcome of the project which would not only re-establish access to the rural people, but also foster economic advancement in different rural sectors.

Mr. Sampson in his speech elaborated the purpose and activities of ReCAP (Research for Community Access Partnership) by referring to its involvement with past and present DFID funded research programmes for developing rural infrastructures. While focusing on the ReCAP projects worldwide, Mr Sampson emphasised the importance of partnership for research programmes in development activities, especially in the transport sectors. He also mentioned the importance of such projects in accessing the economic opportunities and social facilities through improvements of infrastructure and transport. In addition to this, he discussed about the importance of ReCAP projects in improving the accessibility of rural poor in Africa and Asia. In conclusion, he mentioned two of the other ReCAP funded projects in Bangladesh which would complement the current planning and prioritisation project.

Finally, Mr. Azad highlighted the importance of roads regarding fulfilment of the Millennium Development Goals as well as the goal of upgrading Bangladesh to a middle-income country. He also thanked the Department of URP for arranging the stakeholder workshop, as the opinion of the stakeholders is of paramount importance in this project.

4 Proceedings

4.1 Summary of the three presentations by BUET

In the first presentation, Dr. Abdul Quium, Team Leader of the project, gave a brief summary about the project. Thereafter, he briefly mentioned the meetings that were held prior to the submission of the inception report. In the kick-off meeting, as he continued, discussion was held about the preliminary methodology of the project and how that has changed following the feedback from LGED and ReCAP personnel. Then he mentioned about the field visit in Tangail, where the BUET Team familiarised with the development issues of rural roads. This visit was followed by discussions with the field level officials, public leaders and others on the availability of data and

collaboration with local officials. He discussed the main points of the methodology that was submitted in the inception report. He also mentioned the post inception meetings and other activities, which formed the basis for the revised methodology. Finally, he outlined the proposed revised methodology, which was discussed in detail in the last presentation.

Dr. Md. Musleh Uddin Hasan, the Project Coordinator and associate to the Transportation Engineer in the transportation study team, presented the context of this research project, where he mentioned why this project was important for Bangladesh. Afterwards, he outlined the project objectives. He also discussed the present road prioritisation practice in Bangladesh. He illustrated the current prioritisation method of rural roads for maintenance with an example, where the present scoring system of different criteria was shown. Finally, he described the study area of Tangail district along with detailed justification for the selection of this district for the project.

Lastly, Ms. Farzana Khatun, associate to the Transportation Engineer in the transportation study team, presented the proposed revised methodology of the project. She described how the methodology was developed and modified after the inception phase. The proposed revised methodology will have three separate elements for prioritisation: improvement, further improvement/upgrading and maintenance. These three types were considered keeping in mind different types of development activities for rural roads by LGED and the current budget allocation practice. She also presented potential lists of criteria that may be followed to prioritise the development of rural roads. It was also mentioned that the methodology considered economic, social and environmental factors which reflected in the selection of prioritisation criteria.

4.2 Discussion by various speakers

The participants at the workshop raised a number of important issues related to rural road development by LGED. The following issues were considered important and discussed at the workshop:

- Lack of participation of local leaders and other stakeholders in planning and development of rural roads
- Deficiencies in planning and design standards of rural roads
- Absence of adequate cross drainage structures
- Lack of road maintenance
- Overlooking the development of road shoulders in improving/developing roads in recent years
- Possibility of creating a fund for emergency road maintenance after major floods
- Suggestions of some additional criteria for planning and prioritisation
- Unregulated flow of heavy traffic from national roads onto rural roads
- Consideration of Cement Concrete (CC) paved roads in place of Bituminous Concrete (BC) paved roads
- Importance of network consideration in road planning and prioritisation

The absence of participation of local leaders and other stakeholders in the planning and prioritisation process was considered a major issue in rural road development by LGED. Several participants including Mr. Sanower Hossain, Honorable M.P. and Mr. Anayet Hossain Montu, Upazila Chairman of Mirzapur were critical about this issue in the workshop. They reiterated that local leaders were the best informed persons who would be able to suggest the most suitable type of road improvements including where drainage structures and other improvements were needed.

They strongly suggested the involvement of local leaders in any future road planning and development work by LGED. The Chairman of Mirzapur Upazila also stressed the importance of incorporation of Upazila Master Plan in this proposed methodology on planning and prioritisation of rural roads.

Several speakers mentioned the deficiencies in planning and design standards of rural roads. The design standards of many roads were not adequate to handle the current volume and type of traffic. Bridges and other drainage structures were narrow and their pavement width was insufficient. Pavement strength was also insufficient to handle heavy traffic. In addition to all these, participants gave due importance to the topographic variation of different regions during the road design. Some of the participants also complained about the low-quality of pavement materials and construction standards. There was one suggestion if LGED could consider the construction of CC paved roads instead of BC paved roads.

Lack of maintenance was cited as a major issue. Some participants pointed out that lack of attention on shoulder development and maintenance in recent years was causing early damage to roads. Lack of surface drainage was another common problem. They also stated that routine maintenance was essentially needed to be in place.

One participant suggested if LGED could consider developing a new IT-based technology to monitor the needs of road maintenance similar to the one developed in China.

Often roads were badly damaged after some major floods. However, LGED did not have any special fund to repair such roads on an emergency basis which was also pointed out in the workshop by some other participants. In this respect, the Upazila Chairman of Mirzapur suggested if LGED could consider creating an emergency road maintenance fund similar to the one of RHD.

One participant questioned what was new in the proposed methodology by the BUET team. The methodology seemed to be similar to LGED's current practices. Another participant wondered if the new methodology would be theoretical and would remain unused.

Some participants suggested the inclusion of a few additional criteria such as underdevelopment and number of connections with other roads that a road provided for prioritisation of road development. There was one suggestion for giving higher priority to development of roads that were connected to cyclone shelters and similar other special centres. Along with this, some participants also pointed out the importance of the connectivity of roads to the rural markets. In this regard, they particularly focused on the easy movement of the agricultural products within the rural markets which should be facilitated by this connectivity of rural roads.

The uncontrolled flow of heavy traffic from national roads onto LGED managed rural roads was considered a major problem in up keeping of rural roads. In this respect, several participants suggested some form of regulatory measures so that the invasion of heavy traffic from national roads could be controlled and/or managed.

The proposed methodology incorporated traffic volume data as one of the prime factors in its framework. In this respect, one of the participants questioned how the methodology would predict the general traffic growth resulting from the improvement of the rural roads.

A number of participants thanked LGED and BUET for organising the Workshop and inviting them to participate.

4.3 Response from the BUET Team and LGED

On behalf of LGED Mr. Abul Kalam Azad and Mr. Iftekhar Ahmed, SE, (Planning), and the BUET Team leader responded to the issues raised by the participants. Their responses are summarised as follows.

The BUET Team and LGED recognise the importance of local stakeholders' participation in road development activities. The proposed planning and prioritisation methodology has the provision of participation for local leaders and other stakeholders. First, the Upazila Engineer may convene a consultation meeting of the local leaders and other stakeholders. Following the guidelines described in the methodology, the stakeholders may identify a core road network comprising of all RHD roads in the upazila (the given roads of the network), and some Upazila and Union roads which would serve upazila-wise mobility needs, and ensure connectivity with the neighbouring greater region/rest of the country. Second, they may also identify some roads from among these Upazila and Union roads which may need upgrading (further improvement/upgrading in terms of widening and/or pavement strengthening) on a priority basis. Third, the stakeholders can also discuss what type of "improvement" will be needed for such prioritised roads. This is, however, not relevant for the present project. The Upazila Engineer can consider these suggestions while undertaking detail design for such prioritised roads when funding becomes available.

The same network approach to planning can be followed to identify Union and Village roads which may meet union-wise mobility/accessibility needs. However, it may not be feasible to consider consultation meetings at the Union level from the beginning. Given his/her other responsibilities, it may be too difficult for an Upazila Engineer to organise separate consultation meetings at every union. In this connection, mention may be made of the list of Important Village Roads (IVR) prepared by Upazila level LGED officials. This list may serve the purpose of identifying Union and Village roads which may meet unionwise mobility/accessibility needs. In addition, important unions and village roads may also be identified at the Upazila level consultation meeting,

LGED is aware of the deficiencies of the current planning and design standards that were developed some decades back when rural road development was in its early stage and the traffic movement needs were very different. Currently LGED is reviewing all such standards. It was informed that under a different project, a team of experts from BUET was developing new planning and design standards for rural roads. These new design standards will also consider variations across the country, for example, soil and environmental conditions as well as traffic conditions. By the end of 2016, several separate design standards are expected to be available for different parts of the country. Thereafter, these new design standards will be sent for review by the Government and subsequent approval. Once the new standards are in place, the current deficiencies in planning and design can be overcome.

Separately, LGED is also considering rebuilding of very old road structures such as narrow bridges. Two other ReCAP funded projects, namely the development of concrete to withstand the harsh marine environment in coastal areas of Bangladesh, and road building on soft clay soils in Khulna region (and other parts of the country) will also help to overcome the current deficiencies in construction materials and standards.

There are several new things in the methodology proposed by the BUET team. First, it follows a network approach to road development and includes the provision of stakeholders' participation in planning and prioritisation, which has already been discussed above. Second, there are three types of road development activities: improvement, further improvement (upgrading), and maintenance. As understood by the BUET team, at present LGED follows a methodology for prioritisation of road maintenance only. No methodologies are available for the two other types of development activities

– road improvement and further improvement. In the case of donor funded projects, methodologies had been considered for road improvement. However, such methodologies were not considered for general application for the entire country. The proposed methodology by the BUET Team has separate components for road improvement and further improvement/upgrading. Multi-criteria Analyses (MCA) together with Cost Benefit Analysis (CBA), where traffic volume justify the consideration of CBA, has been proposed. The criteria for the MCAs are to be selected by stakeholders including the LGED officials and not by the BUET Team.

Third, the BUET team has proposed rationalization of the relative weights of the criteria currently used for prioritisation of road maintenance including inclusion of some new criteria. The AHP methodology has been suggested which will be implemented considering the views of LGED experts and other experts on rural roads.

The BUET team welcomes suggestions for the inclusion of additional criteria for MCAs. The inclusion of these additional criteria will be considered after consultation with concerned LGED officials. In developing the proposed methodology, the BUET Team has always considered its ease and practicability. The Team had many rounds of consultation with LGED officials to ensure that the methodology (including its data requirements) and the software can be easily used by LGED officials at the field level and at the headquarters. The Team is aware that some new data fields will have to be created in the current road database to meet the needs of the proposed methodology. However, only those additional data will be suggested for the MCAs which can be easily collected and do not make the whole methodology impracticable. Further, to run the proposed software on the methodology, it should require only a few additional direct inputs from the user such as connectivity, local priority and road safety.

LGED officials informed that some small funds are generally available at the local level which may be used for routine road maintenance. However, the utilization of this small fund is locally decided and depends on the local situation.

The management of heavy traffic (axle load) on national highways is also an issue. Similar to RHD, LGED is an infrastructure provider. At the national level, however, there is a regulatory authority – Bangladesh Road Transport Authority (BRTA). There is no such regulatory authority for rural roads. LGED is aware of the road damage caused by heavy traffic coming from national roads. Given its nature, an inter-ministerial meeting is planned in the near future to discuss this issue and consider what measures may be required to control heavy traffic on rural roads.

The analysis of time series data for traffic volume, both for CVD and other modes will help to determine the growth rate of traffic and to estimate the future traffic volume. In future traffic estimation, both the normal traffic growth and generated traffic will be estimated.

5 Stakeholders Opinion Survey on MCA Criteria

After the discussion session of the workshop, participants were given questionnaires to fill out. They included lists of potential criteria for conducting the MCA. Participants were requested to put relative weights on a scale of 1 to 5 (1 for lowest and 5 for highest) for each criterion so that finally the weighted rank of these criteria can be determined. The questionnaire forms and the results of an analysis are shown in Annex C.

6 Major conclusions and Recommendations

The Workshop reiterated the view that involvement of the local leaders and other concerned stakeholders in planning and development of rural roads can make a qualitative difference in

development and maintenance of rural roads. The local leaders are among the best informed persons in a locality. Their involvement can help in identifying the important roads that can be prioritised for development as well as determining the nature of their development. The stakeholders requested the Local Government and Engineering Department to consider the involvement of local leaders in its future rural road planning and development activities.

The proposed methodology by the BUET Team should follow a network planning approach to identify important roads that may be prioritised for development. In this respect, it was recommended that the proposed methodology should incorporate the network approach which was a part of an earlier version of the methodology. The BUET Team was urged to revise the presented methodology accordingly. The Team was also requested to consider a few additional criteria for MCA analysis.

The new methodology on planning and prioritisation should not become theoretical and remain unused. It was suggested that the new planning tool to be developed must be simple and practical that LGED officials can easily use. The outputs ought to be clearly visualised, and be able to show stakeholders what difference the results can make to rural road planning and development in the future.

The current planning and design standards on rural roads need to be urgently reviewed and upgraded. Many rural roads and road structures are not suitable to meet the needs of the present day traffic conditions. Due considerations should also be given to provide sufficient number of cross-drainage structures (bridges, culverts, etc.) to avoid drainage and local flooding problems which many rural areas suffer from.

LGED needs to provide greater attention to road maintenance and surface drainage. Lack of attention on road shoulder development and their maintenance are causing early damage to roads. Deficiencies in road surface drainage, especially in market areas, is another common problem that need to be addressed.

The presence of heavy commercial vehicles (vehicles with heavy axle load) on rural roads is a major problem and causing early damage to roads. It was proposed that LGED may approach the Government to consider regulatory measures to control the flow of heavy traffic from national roads onto rural roads.

7 Closing of the Workshop (Summary of the Speeches)

At the end of the workshop, the BUET project team summarized the discussions and outcomes of the workshop. Dr. Chandra Shrestha, ReCAP Regional Technical Manager – Asia, appreciated the successful completion of the workshop and hoped that, the important issues that had been raised would be addressed by LGED and the BUET Team. He also thanked the participants for their active participation in the discussion of the workshop. This was followed by a vote of thanks by A.K.M. Azad, Additional Chief Engineer of LGED.

8 Additional Remarks

The project team revised the planning and prioritisation methodology in line with suggestions and recommendations at the workshop, and the discussion with LGED and ReCAP officials after the Workshop on the same day. The report was further modified in line with the suggestions made at the ReCAP Steering Committee Meeting held on the 30th October and consultation with LGED officials after the meeting. The revised methodology is attached as Annex D to this workshop report.

Annex A: Programme of the Workshop

First Stakeholders Workshop on **Planning and Prioritisation of Rural Roads in Bangladesh**

Venue: LGED Seminar Room

Date: 9th August, 2016

Programme

1. Registration: 9.30-10.00
2. Inaugural Session: 10.00-10.40
 - Dr. Ishrat Islam, Professor and Head, Department of URP, BUET (10.15–10.20)
 - Mr. LesSampson, Infrastructure Research Manager, ReCAP(10.20-10.30)
 - Opening Address: Mr. Abul Kalam Azad, Additional Chief Engineer, LGED (10.30-10.40)
3. Tea Break: 10.40– 10.50
4. Technical Session: (10.50- 1.10)
 - Dr. Abdul Quium, Project Team Leader, BUET (10.50-11.0)
 - Dr. Musleh Uddin Hasan, Associate Professor, DURP, BUET, (11.00 – 11.10)
 - Ms. Farzana Khatun, Assistant Professor, DURP, BUET (11.10 – 11.40)
 - Open Discussion (11.40 – 12.40)
 - Mr. Sanower Hossain, Honourable Member of Parliament
Planning Commission, Upazila Chairmen, Union Chairmen,
Other officers/stakeholders
 - Questionnaire survey for criteria assessment (12.40-1.10)
5. Closing Session: 1.10-1.30
 - Mr. Chandra Shrestha, Regional Technical Manager (1.10-1.15)
 - Closing Speech Mr. Shyama Prosad Adhikari, Chief Engineer, LGED (1.15-1.30)
6. Lunch: 1.30



BUET

URP

Department of Urban & Regional



LGED

Local Government Engineering



ReCAP

Research for Community Access

Annex B: List of Participants

First Stakeholders Workshop on **Planning and Prioritisation of Rural Roads in Bangladesh**

Venue: LGED Seminar Room

Date: 9th August, 2016

List of Participants

Honourable representatives from study district Tangail

Honourable Member of Parliament

1. Mr. Sanower Hossain, Member of Parliament, Tangail-5 constituency

Upazila Parishad Chairmen

2. Mr. Anayet Hossain Montu, Chairman, Mirzapur Upazila
3. Advocate Khorshed ALam, Chairman, Tangail Sadar Upazila

Union Parishad Chairpersons

4. Mr. Md. Shawkat Hossain, Bekra union, Nagarpur Upazila
5. Mr. Md. Tofazzal Haque
6. Mr. Md. Rafiqul
7. Mr. Md. Khalequzzaman Chowdhury
8. Mr. Md. Zakir Hossain

Union Parishad members (male and female)

9. Mr. Md. Abdur Razzak, Bekra union, Nagarpur Upazila
10. Mr. Md. Abdul Aziz Miah
11. Mrs. Laila Akter Lili
12. Mr. Md. Adil Khan
13. Mrs. Majeda Khan

Representatives from Bus/Tempo Owners Association and Drivers Association

14. Mr. Liakot Ali, Vice President
15. Mr. S. M. Shahidul Islam
16. Mr. Mir Lutfor Rahman Khan

LGED and other officials from study district Tangail

17. Mr. Delwar Hossain, Executive Engineer, Tangail district
18. Mr. Mohammad Hossain, Upazila Engineer, Mirzapur Upazila
19. Mr. Md. Abdur Rahim, Upazila Engineer
20. Mr. A. K. M. Hedayet Ullah, Upazila Engineer
21. Mr. M. A. Mannan, Upazila Engineer
22. Mr. Md. Mosiul Islam Khan, Sub-assistant Engineer, Nagarpur Upazila
23. Mr. Md. Ashraf Hossain, Sub-assistant Engineer, Ghatail Upazila
24. Mr. Md. Abdul Jalil, Sub-assistant Engineer, Tangail Sadar Upazila
25. Mr. Md. Feroz Reza, Sub-assistant Engineer, Mirzapur Upazila
26. Mr. Md. Masum Kabir, District Sociologist, LGED
27. Mr. Md. Abdur Razzaque, Upazila Statistical Officer

LGED Headquarters

28. Mr. A K M Azad, Addl. CE (I)
29. Mr. Md. Mohsin, Addl. CE (IWRM)
30. Mr. Md. Anwar Hossain, Addl. CE (Urban)
31. Mr. Md. Joynal Abedin, Addl. CE (Maintenance)
32. Mr. Iftekhar Ahmed, SE(Planning)
33. Mr. AbulBasher, SE (Training)
34. Mr. Shahidul Haque, SE(Maintenance)
35. Mr. Abdur Rashid Khan, PD, ECRRP
36. Mr. Mostafa Kamal, PD, RTIP-II
37. Mr. Syed Abdur Rahim, EE, Maintenance
38. Mr. Md. Golam Yazdani, DPD, RTIP-II
39. Mr. Monzur Sadeque, EE, Planning Unit
40. Mr. Shakhawat Hossain, ICT Expert, RTIP-II
41. Mr. Md. Zakir Hossain, Sr AE, GIS Unit
42. Mr. Md. Abu Fattah, Media Consultant, LGED
43. Mrs. Farhana Lima, Assistant Engineer (UMU), LGED
44. Mr. M. A. Quader, Superintendent Engineer, LGED
45. Mr. Khandaker Ali Noor, Superintendent Engineer (Design), LGED
46. Engineer. Md. Ahsan Habib, Project Director, CRDP
47. Engineer. G. A. Akhter Hossain, Project Director, SRIIP
48. Mr. Tanweer Hossain, Senior Assistant Engineer, RTIP-II
49. Mr. Rokibul Hasan, AE (GIS)
50. Mr. A. K. M. Mostofa Morshed, AE (Planning)
51. Mr. Sheikh Anisur Rahman, DPD, ECRRP
52. Mr. Md. Faridul Islam, AE (Planning)
53. Mr. Md. Firoz Reza, SAE
54. Mr. Mostofa Imam, Assistant Chief, LGED
55. Mr. Md. Shahidur Rahman, Administrative Officer, LGED

56. Mr. Manosh Mondol, AE, CE Office, LGED

ReCAP

57. Mr. Les Sampson, Infrastructure Research Manager, ReCAP

58. Dr. Chandra Shrestha, ReCAP Regional Technical Manager - Asia

BUET Team

59. Prof. Dr. Ishrat Islam, Head, Department of URP, BUET

60. Dr. A S M Abdul Quium, Team Leader

61. Prof. Dr. Sarwar Jahan, Associate to Team Leader

62. Prof. Dr. Mohammad Shakil Akther, GIS Expert

63. Dr. Md. Musleh Uddin Hasan, Program Coordinator and Associate to Transportation Engineer in the transportation study team

64. Ms. Farzana Khatun, Associate to Transportation Engineer in the transportation study team

65. Mr. Tanjeeb Ahmed, Associate to Transportation Expert

66. Mr. Tanvir Hossain Shubho, Associate to Transportation Expert

67. Mr. Mashrur Rahman, Associate to GIS Expert

Annex C: Questionnaire Forms for the Opinion Survey

রাস্তার উন্নয়নের জন্য প্রস্তাবিত নির্ণায়কের গুরুত্বকতখানি নির্ধারণ করুন (কমযানবাহন)

Proposed List of Criteria for Improvement of Roads (Low Traffic Volume)

আপনার মতে প্রযোজ্য গুরুত্বের ঘরে টিক চিহ্ন দিন

| নির্ণায়ক (Criteria) | গুরুত্বের পরিমাণ* (Level of Importance) | | | | |
|---|--|---|---|---|---|
| | ১ | ২ | ৩ | ৪ | ৫ |
| 1. রাস্তা ব্যবহারকারীর সংখ্যা (Population Served) | | | | | |
| 2. রাস্তা কর্তৃক সংযুক্ত বিভিন্ন সুযোগ-সুবিধার সংখ্যা - স্কুল, কলেজ, হাসপাতাল, ইত্যাদি (Facilities served) | | | | | |
| 3. রাস্তা কর্তৃক সংযুক্ত গ্রোথ সেন্টার ও গ্রামীণ বাজার এর সংখ্যা (Growth centres (GC)/Rural Markets (RM) served) | | | | | |
| 4. বড়/প্রধান রাস্তার সাথে সংযোগ (Connectivity to Higher Roads and other centres) | | | | | |
| 5. রাস্তার অসম্পূর্ণতা (Presence of gap in road) | | | | | |
| 6. রাস্তা পানিতে নিমজ্জিত থাকার সময়কাল (Duration of submergence) | | | | | |
| 7. অন্য কোন নির্ণায়ক যা উপরে উল্লেখ করা হয়নি (Any other criteria not mentioned above) | | | | | |
| | | | | | |

***গুরুত্বের পরিমাণ (Level of Importance)**

১ = অত্যন্ত কম গুরুত্বপূর্ণ (Very Low Importance)

২ = কম গুরুত্বপূর্ণ (Low Importance)

৩ = মাঝারি গুরুত্বপূর্ণ (Moderate Importance)

৪ = অধিক গুরুত্বপূর্ণ (High Importance)

৫ = অধিকতর গুরুত্বপূর্ণ (Very High Importance)

রাস্তার উন্নয়নের জন্য প্রস্তাবিত নির্ণায়কের গুরুত্বকতখানি নির্ধারণকরণ

(অধিকতর যানবাহন এবং স্বল্প অর্থনৈতিক সুবিধাসম্পন্ন রাস্তা)

Proposed List of Criteria for Improvement of Roads (High Traffic Volume but Low Economic Benefit)

আপনার মতে প্রযোজ্য গুরুত্বের ঘরে টিক চিহ্ন দিন

| নির্ণায়ক (Criteria) | গুরুত্বের পরিমাণ* | | | | |
|---|-------------------|---|---|---|---|
| | ১ | ২ | ৩ | ৪ | ৫ |
| 1. রাস্তা ব্যবহারকারীর সংখ্যা (Population Served) | | | | | |
| 2. রাস্তা কর্তৃক সংযুক্ত বিভিন্ন সুযোগ-সুবিধার সংখ্যা – স্কুল, কলেজ, হাসপাতাল, ইত্যাদি (Facilities served) | | | | | |
| 3. রাস্তা কর্তৃক সংযুক্ত গ্রোথ সেন্টার ও গ্রামীণ বাজার এর সংখ্যা (Growth centres (GC)/Rural Markets (RM) served) | | | | | |
| 4. বড়/প্রধান রাস্তার সাথে সংযোগ (Connectivity to Higher Roads and other centres) | | | | | |
| 5. রাস্তার অসম্পূর্ণতা (Presence of gap in road) | | | | | |
| 6. রাস্তা পানিতে নিমজ্জিত থাকার সময়কাল (Duration of submergence) | | | | | |
| 7. অন্য কোন নির্ণায়ক যা উপরে উল্লেখ করা হয়নি (Any other criteria not mentioned above) | | | | | |
| | | | | | |

*গুরুত্বের পরিমাণ (Level of Importance)

১ = অত্যন্ত কম গুরুত্বপূর্ণ (Very Low Importance)

২ = কম গুরুত্বপূর্ণ (Low Importance)

৩ = মাঝারি গুরুত্বপূর্ণ (Moderate Importance)

৪ = অধিক গুরুত্বপূর্ণ (High Importance)

৫ = অধিকতর গুরুত্বপূর্ণ (Very High Importance)

রাস্তার উন্নয়নের জন্য প্রস্তাবিত নির্ণায়কের গুরুত্বকতখানিতা নির্ধারণকরণ
(অধিক যানবাহন এবং অধিক অর্থনৈতিক সুবিধাসম্পন্ন রাস্তা)

Proposed List of Criteria for Improvement of Roads (High Traffic Volume and High Economic Benefit)

আপনার মতে প্রযোজ্য গুরুত্বের ঘরে টিক চিহ্ন দিন

| নির্ণায়ক (Criteria) | গুরুত্বের পরিমাণ* (Level of Importance) | | | | |
|--|--|---|---|---|---|
| | ১ | ২ | ৩ | ৪ | ৫ |
| 1. রাস্তা কর্তৃক সংযুক্ত বিভিন্ন সুযোগ-সুবিধার সংখ্যা – স্কুল, কলেজ, হাসপাতাল, ইত্যাদি (Facilities served) | | | | | |
| 2. রাস্তা কর্তৃক সংযুক্ত গ্রোথ সেন্টার ও গ্রামীণ বাজার এর সংখ্যা Growth centres (GC)/Rural Markets (RM) served) | | | | | |
| 3. বড়/প্রধান রাস্তার সাথে সংযোগ (Connectivity to Higher Roads and other centres) | | | | | |
| 4. অন্য কোন নির্ণায়ক যা উপরে উল্লেখ করা হয়নি (Any other criteria not mentioned above) | | | | | |
| | | | | | |

***গুরুত্বের পরিমাণ (Level of Importance)**

- ১ = অত্যন্ত কম গুরুত্বপূর্ণ (Very Low Importance)
 ২ = কম গুরুত্বপূর্ণ (Low Importance)
 ৩ = মাঝারি গুরুত্বপূর্ণ (Moderate Importance)
 ৪ = অধিক গুরুত্বপূর্ণ (High Importance)
 ৫ = অধিকতর গুরুত্বপূর্ণ (Very High Importance)

রাস্তার অধিকতর উন্নয়নের জন্য প্রস্তাবিত নির্ণায়ক গুরুত্বকতখানিতা নির্ধারণকরণ

Proposed List of Criteria for Further improvement/upgrading of Roads/Upgrading

আপনার মতে প্রযোজ্য গুরুত্বের ঘরে টিক চিহ্ন দিন

| নির্ণায়ক (Criteria) | গুরুত্বের পরিমাণ* | | | | |
|---|-----------------------|---|---|---|---|
| | (Level of Importance) | | | | |
| | ১ | ২ | ৩ | ৪ | ৫ |
| 1. যানবাহনের সংখ্যা (Traffic volume) | | | | | |
| 2. রাস্তার প্রস্থ, লেনের সংখ্যা ইত্যাদি (Road geometry) | | | | | |
| 3. রাস্তার পেইভমেন্টের ধরন - হেরিংবোন অথবা বিটুমিনাস (Pavement type) | | | | | |
| 4. রাস্তার শ্রেণি - উপজেলা, ইউনিয়ন ও গ্রাম সড়ক (Road type) | | | | | |
| 5. রাস্তা ব্যবহারকারীর সংখ্যা (Population served) | | | | | |
| 6. রাস্তা কর্তৃক সংযুক্ত বিভিন্ন সুযোগ-সুবিধার সংখ্যা - স্কুল, কলেজ, হাসপাতাল, ইত্যাদি (Facilities served) | | | | | |
| 7. রাস্তা কর্তৃক সংযুক্ত গ্রোথ সেন্টার ও গ্রামীণ বাজার এর সংখ্যা (Growth centres (GC)/Rural Markets (RM) served) | | | | | |
| 8. বড়/প্রধান রাস্তার সাথে সংযোগ (Connectivity to Higher Roads and other centres) | | | | | |
| 8. রাস্তার অসম্পূর্ণতা (Presence of gap in road) | | | | | |
| 9. রাস্তা পানিতে নিমজ্জিত থাকার সময়কাল (Duration of submergence) | | | | | |
| 11. অন্য কোন নির্ণায়ক যা উপরে উল্লেখ করা হয়নি (Any other criteria not mentioned above) | | | | | |
| | | | | | |

*গুরুত্বের পরিমাণ (Level of Importance)

১ = অত্যন্ত কম গুরুত্বপূর্ণ (Very Low Importance)

২ = কম গুরুত্বপূর্ণ (Low Importance)

৩ = মাঝারি গুরুত্বপূর্ণ (Moderate Importance)

৪ = অধিক গুরুত্বপূর্ণ (High Importance)

৫ = অধিকতর গুরুত্বপূর্ণ (Very High Importance)

রাস্তার রক্ষনাবেক্ষণের জন্য প্রস্তাবিত নির্ণায়কের গুরুত্বকতখানি নির্ধারণকরণ
Proposed List of Criteria for Maintenance of Roads

আপনার মতে প্রযোজ্য গুরুত্বের ঘরে টিক চিহ্ন দিন

| Criteria (নির্ণায়ক) | গুরুত্বের পরিমাণ* (Level of Importance) | | | | |
|---|--|---|---|---|---|
| | ১ | ২ | ৩ | ৪ | ৫ |
| 1. যানবাহনের সংখ্যা (Traffic volume) | | | | | |
| 2. সর্বশেষ রক্ষনাবেক্ষণের বছর (Last maintenance year) | | | | | |
| 3. রাস্তার পেইভমেন্টের ধরন - বিটুমিনাস অথবা আর.সি.সি (Pavement type) | | | | | |
| 4. বাস চলাচলের উপযুক্ত রাস্তা (Bus route) | | | | | |
| 5. দাতা অর্থায়নে নির্মিত রাস্তা (Donor funded road) | | | | | |
| 6. রাস্তার প্রকারভেদ - উপজেলা, ইউনিয়ন ও গ্রাম সড়ক (Road type) | | | | | |
| 7. রাস্তা ব্যবহারকারীর সংখ্যা (Population served) | | | | | |
| 8. রাস্তা কর্তৃক সংযুক্ত বিভিন্ন সুযোগ-সুবিধার সংখ্যা - স্কুল, কলেজ, হাসপাতাল, ইত্যাদি (Facilities served) | | | | | |
| 9. রাস্তা কর্তৃক সংযুক্ত গ্রোথ সেন্টার ও গ্রাম্য বাজার এর সংখ্যা (Growth centres (GC)/Rural Markets (RM) served) | | | | | |
| 10. বড়/প্রধান রাস্তার সাথে সংযোগ (Connectivity to Higher Roads and other centres) | | | | | |
| 9. রাস্তার অসম্পূর্ণতা (Presence of gap in road) | | | | | |
| 11. রাস্তা পানিতে নিমজ্জিত থাকার সময়কাল (Duration of submergence) | | | | | |
| 13. অন্য কোন নির্ণায়ক যা উপরে উল্লেখ করা হয়নি (Any other criteria not mentioned above) | | | | | |
| | | | | | |

*গুরুত্বের পরিমাণ (Level of Importance)

১ = অত্যন্ত কম গুরুত্বপূর্ণ (Very Low Importance)

২ = কম গুরুত্বপূর্ণ (Low Importance)

৩ = মাঝারি গুরুত্বপূর্ণ (Moderate Importance)

৪ = অধিক গুরুত্বপূর্ণ (High Importance)

৫ = অধিকতর গুরুত্বপূর্ণ (Very High Importance)

Evaluation of the Opinion Survey

Name:

A total of 38 questionnaire forms were filled up by the participants in the workshop. The scores collected from the opinion survey are then evaluated through weighted average method. In this process, firstly, the number of responses for each score (scale 1-5) was counted. For example, for population served criteria, score 5 has fifteen (15) responses, score 4 has nine responses (9) responses, score 3 has eight (8) responses and score 2 has four (4) responses. After that, the weighted average of these scores were taken to determine the final weighted rank of the criteria. An example of the final results of this analysis is given in the following Table C1:

Table C1: Evaluation of Criteria for Low Traffic Volume Roads

| No. | Criteria | 1 | 2 | 3 | 4 | 5 | No Response | Total | Weighted Average | Final Rank |
|-----|--|---|---|---|----|----|-------------|-------|------------------|------------|
| 1 | Population Served | 0 | 4 | 8 | 9 | 15 | 2 | 38 | 3.76 | 3 |
| 2 | Facilities Served | 3 | 0 | 5 | 13 | 17 | 0 | 38 | 4.08 | 1 |
| 3 | Growth Centres (GC) Served/Rural Markets (RM) served | 1 | 5 | 3 | 9 | 17 | 3 | 38 | 3.71 | 2 |
| 4 | Connectivity to Higher Roads and other centres | 3 | 4 | 6 | 8 | 14 | 3 | 38 | 3.45 | 4 |
| 5 | Presence of gap in the road | 6 | 8 | 8 | 7 | 9 | 0 | 38 | 3.13 | 5 |
| 6 | Duration of submergence | 8 | 9 | 6 | 5 | 7 | 3 | 38 | 2.61 | 6 |
| 7 | Other Criteria | | | | | | | | | |
| 7.1 | Flood Risk | | | | | 1 | | | | |
| 7.2 | Priority From Local Leaders | | | | | 1 | | | | |
| 7.3 | Poverty | | | | 2 | 1 | | | | |
| 7.4 | Traffic Volume | | | | | 1 | | | | |
| 7.5 | Requirement of earth work | | | | | 1 | | | | |
| 7.6 | Length of Road | 1 | | 1 | | | | | | |

Annex D: Revised Methodology on Planning and Prioritisation of Rural Roads (following the recommendations at the Workshop and discussion with LGED and ReCAP representatives)

D.1 Introduction

Prior to developing the methodology, the project team reviewed the literature on rural road development in Bangladesh and its neighbouring countries as well as in some other Asian and African countries. It may be mentioned here that, a detail literature review was presented in the Inception Report. The team also had several rounds of consultation meetings with LGED officials in Dhaka, and met field-level government officials, elected representatives, local leaders and other knowledgeable persons in two upazilas of Tangail, the selected pilot district. The main purpose of such consultation meetings were:

- To have a clear understanding of the current prioritisation practices at LGED and issues in rural road development;
- Requirements of LGED;
- Opinion of local leaders, people and other stakeholders on benefits and impacts of rural roads and their prioritisation; and
- Availability of information from secondary and other local sources.

The project team has also considered the following important government policies, conditions and assumptions in developing the methodology:

- Government policy on rural roads as outlined in the Seventh Five Year Plan (SFYP) (see pp. 392-93) and other official documents;
- It is envisaged that generally no new rural roads will be constructed. The existing roads, as needed and prioritised, may be improved, further improved (or upgraded) and maintained;
- The current prioritisation practices of LGED, methodologies applied in previous studies such as the Regional Road Network Study for prioritisation under RRMIMP-II (LGED, 2002), and Guidelines of the Project Appraisal Framework (PAF) prepared by the Planning Commission (Planning Commission, 2005);
- The selection of rural roads for development should be based on a set of prioritisation criteria which should reflect road investment costs, usual direct benefits to road users (where such estimation is possible), improved accessibility to markets and social infrastructure facilities, connectivity, pass ability of the road in all seasons, and other local priority of special nature (for example, access to cyclone shelters, access to “ghats” and public transport stops, stations etc.);
- Minimum new data collection, which should be available from secondary sources such as LGED and other government departments and other local government sources. Unless otherwise essential, primary data collection should be avoided.

Following discussion with LGED officials it was decided that methodologies on prioritisation are to be developed for three types of road development works namely, improvement, further improvement/upgrading and maintenance of rural roads. The definitions of these three terms as follows:

Improvement

- Converting a kutchha (earthen) road to a pucca (paved) road i.e., from earthen to BC/HBB/RCC in an existing alignment
- Construction of new alignment – such will be very rare in the current context of Bangladesh where the Government has a policy for no new road construction.
- Converting a partly paved road to fully paved road

Further Improvement/Upgrading

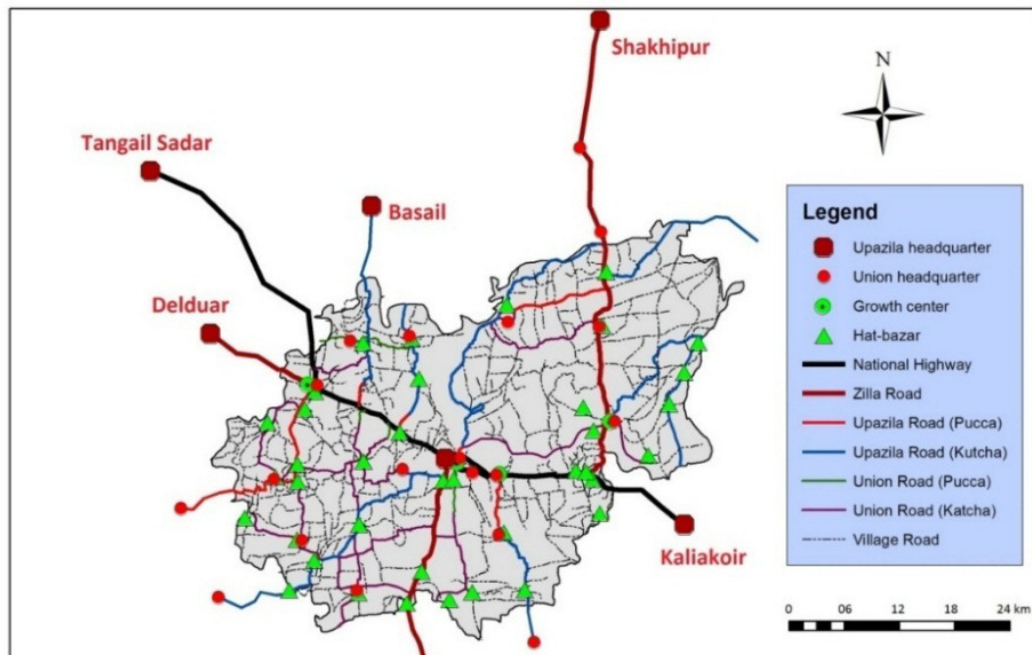
- Improvement of road geometric standards and raising of embankment and widening or both and raising embankment /road height.

Maintenance

- Maintenance of an already paved road. Maximum utilisation of the LGED's current GIS database.

D.2 Methodology

An upazila may have different categories of roads – national and regional highways and zila roads that are managed by the Roads and Highways Department (RHD); and upazila, union and village roads managed by LGED. For the purpose of the present study, roads managed by RHD will be considered as given roads and only the roads managed by LGED will be considered for development. An example of an upazila road network with different types of roads and their status is shown in Map D1



Map D1:Upazila road network with different types of roads in Mirzapur, Tangail District

Source: LGED GIS Database, 2010

The revised methodology on planning and prioritisation of rural roads has two major components. The first component follows a network approach to road planning; and the second component involves prioritisation of road development based on a set of physical, economic, social and environmental criteria (Figure D1). Both components include the provision of local stakeholders' participation in both network planning and prioritisation.

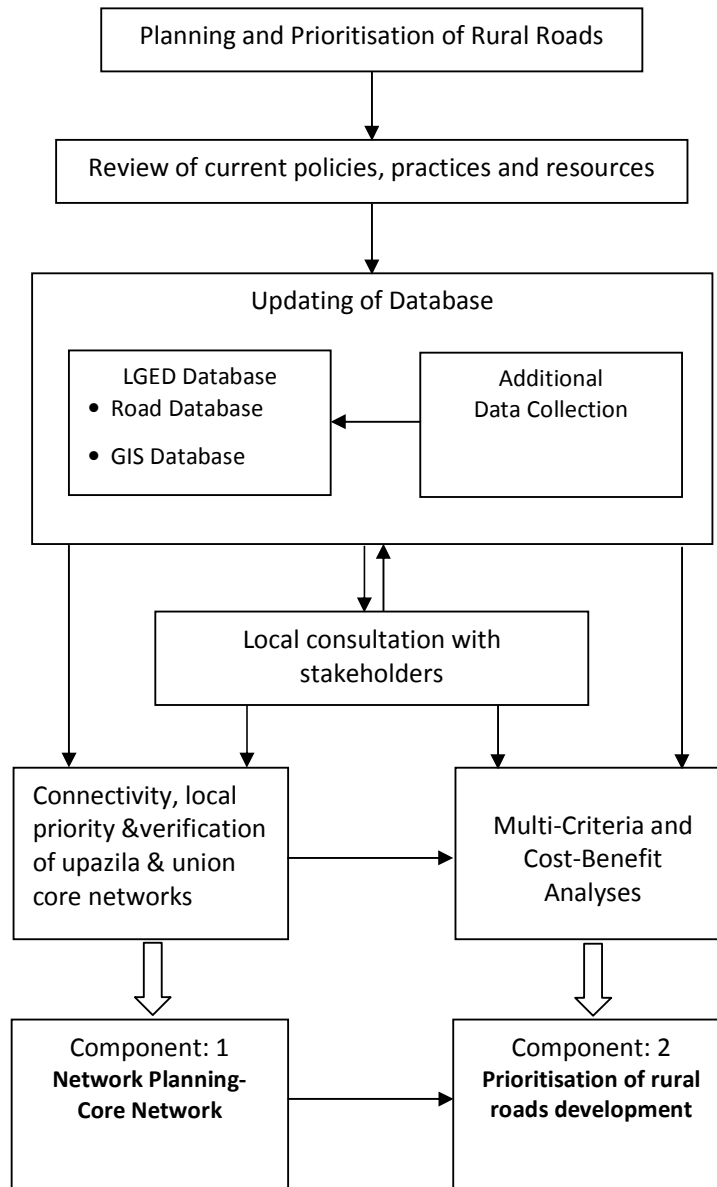


Figure D1: Schematic diagram showing overall approach to planning and prioritisation of rural roads

The local stakeholders will be involved in identifying core upazila road networks which would serve upazila-wise access needs, and ensure connectivity with the neighbouring greater region/rest of the country. They will also identify core union road networks which would serve union-wise and inter-village access needs and ensure connectivity with other areas of the same and neighbouring upazila(s).

The prioritisation component of the methodology will consider physical (including connectivity), economic, social and environmental aspects with their due significance. A set of prioritisation criteria for the assessment of costs, benefits, and social and environmental effects will be selected. The selected criteria will include road investment costs, direct benefits to road users (where such estimation is possible), improved accessibility to markets and social infrastructure facilities, connectivity, pass ability of the road in all seasons, and other local priority of special nature.

Stakeholders may also be involved in selecting the prioritisation criteria as well as determining their relative weights.

Further details on these two components of the methodology are presented below.

D.2.1 Defining the core upazila and union road networks and identification of priority road development needs

The Upazila Engineer may organise a consultation meeting with the local leaders and other stakeholders. The stakeholders will identify a core road network comprising of all RHD roads in the upazila (the given roads of the network), and some upazila and union roads, which would serve upazila-wise mobility and accessibility needs, and ensure connectivity with the neighbouring greater region/rest of the country. In selecting the upazila and union roads which will form the core road network, the following connectivity criteria are suggested:

- All upazila roads that directly connect to national and regional highways of RHD, zila and upazila headquarters and other higher order national centres, and railway and steamer stations
- All upazila roads that directly connect to designated growth centres in an upazila or a neighbouring upazila, zila roads of RHD, and that crosses the geographical boundary of an upazila to connect an important centre or a national highway or zila road in a neighbouring upazila
- All union roads that directly connects to upazila and union headquarters, important market centres in the same or neighbouring upazila, and zila roads.

In any prioritisation scheme, all roads of the upazila core network will get additional importance as together they will form a network vital to maintain inter- and intra-upazila transport connectivity. It is important to mention here that in determining the priority for road development other factors will also be considered that are discussed below under the prioritisation component.

The activity centres (Upazila and Union headquarter and growth centres) will form the nodes, and upazila and union roads connecting them will be the links of the core network. The Upazila Engineer will identify all roads of the core network in the Road database of LGED as agreed in the consultation meeting.

At the consultation meeting, the local stakeholders may also identify some roads from among these upazila and union roads which may need improvement or further improvement/upgrading in terms of geometric standards such as road width and/or pavement strengthening on a priority basis. The stakeholders can also discuss what type of “improvement” may be needed for such prioritised roads. However, this will be not relevant for the present project. The Upazila Engineer can consider these suggestions while undertaking detail design for such prioritised roads when funding becomes available.

The same network approach to planning can be followed to identify important union and village roads which may meet union-wise accessibility needs and may be prioritised for development. However, it may not be feasible to consider consultation meetings at the union level from the beginning. Given his/her other responsibilities, it may be too difficult for an Upazila Engineer to organise separate consultation meetings at every union. At the beginning, identification of union and village roads may also be undertaken at the above-mentioned consultation meeting at the Upazila

level. In selecting important union and village roads forming the core road network at the union level the following connectivity criteria are suggested:

- All union roads that are not included in the upazila core network as defined above
- Village roads that directly connect to union headquarters, important markets, upazila and zila roads and another village
- Already identified important village roads (IVR).

In any prioritisation scheme all roads of the union core network will get additional priority as together they will form a network vital to maintain inter- and intra-union rural accessibility. In determining the priority for their development, similar to upazila core network, other factors will also be considered that are discussed below under the prioritisation component. Some roads of the union core network which may need improvement on a priority basis can also be selected in the core network identification process. The Upazila Engineer will identify all roads of the union core network from the Road database of LGED as well as roads with local priorities, as agreed in the consultation meeting.

D.2.2 Proposed methodology for prioritisation of rural roads

The prioritisation methodology will consider economic, social and environmental aspects with due attention. A set of prioritisation criteria for the assessment of costs, benefits, and social and environmental effects will be selected. The selected criteria will include road investment costs, direct benefits to road users (where such estimation is possible), improved accessibility to markets and social infrastructure facilities, connectivity, pass ability of the road in all seasons, and other local priority of special nature.

The prioritisation methodologies on improvement, further improvement/upgrading and maintenance of rural roads will cover all the three types of rural roads namely, *Upazila* Roads (UZR), Union Roads (UNR) and Village Roads (VR). Figure D2 shows the basic steps involved in determining the priorities for the three types of road development works. These basic steps for each type of development are explained below.

Planning and Prioritisation of Rural Roads in Bangladesh

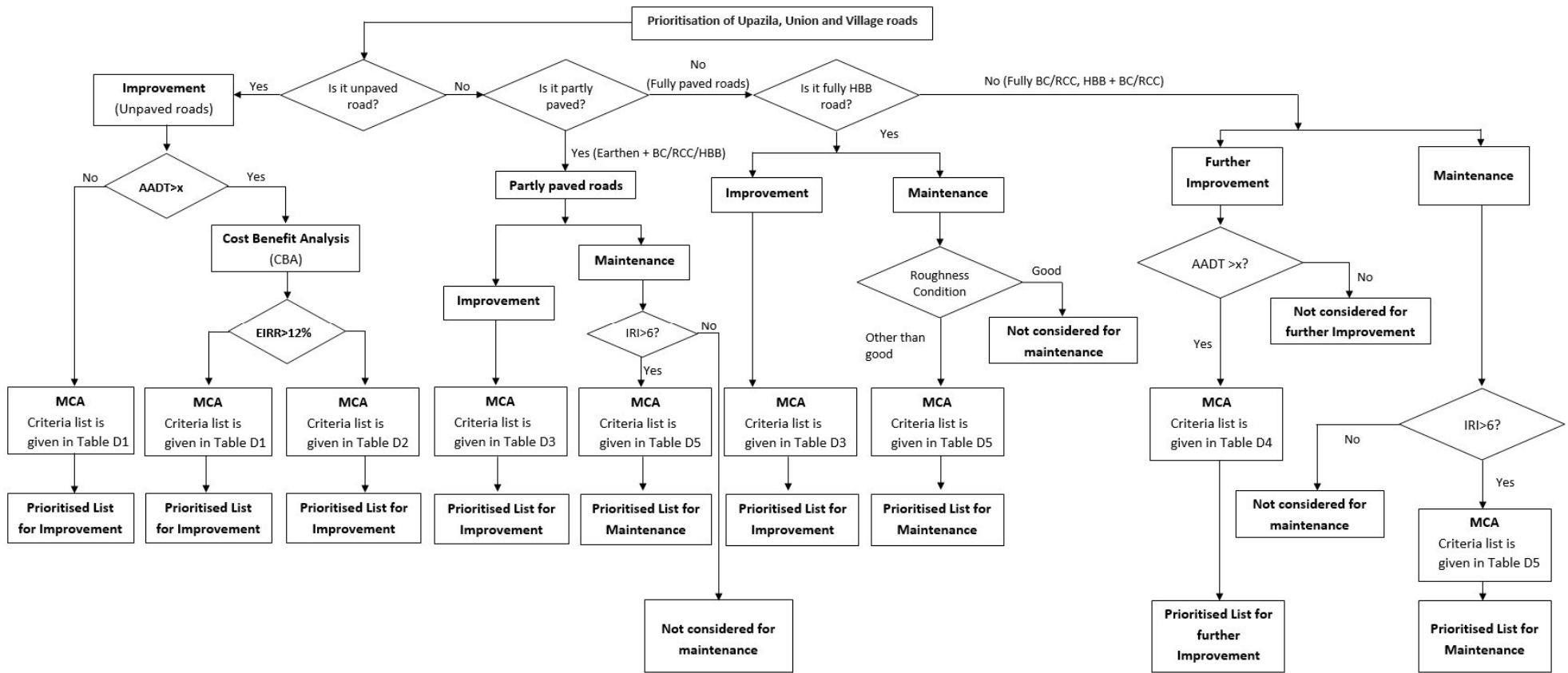


Figure D2: Flow Chart for prioritisation of rural roads

D.2.2.1 Prioritisation for “improvement” of rural roads

All unpaved or earthen roads are considered for development under the category “improvement”. Besides, the partly paved roads that needed to be fully paved are included in this category. Also included are the HBB roads that needed to be upgraded into BC or RCC. The local situation would determine the appropriate type of improvement. For example, in “haor” and some coastal areas, where roads may remain submerged for a considerable time, RCC may be right type of pavement. A Multi-Criteria Analysis (MCA), or a Multi-Criteria Analysis in conjunction with a Cost Benefit Analysis (CBA) will be used for the prioritisation of unpaved roads. CBA will not be undertaken for a very low-volume unpaved roads as such analysis may not produce any meaningful results. An Annual Average Daily Traffic (AADT) value is proposed to be used as a screening criterion to undertake CBA.

It may be noted here that the RED software developed by the World Bank also suggests such an approach. Further details on MCA and CBA are provided in sections D3 and D4, respectively.

An AADT value will be considered as a cut-off value. The cut-off value of AADT will be determined after CBA of rural roads with different traffic volume and other factors. Unpaved roads having AADT value less than this value will be prioritised using an MCA. Social and environmental criteria and the relative cost of improvement of a road will be considered in the MCA. Potential evaluation criteria to be used in the MCA are listed out in section D.3.1 (Tables D1, D2 and D3).

CBA will be undertaken for the unpaved roads having AADT values greater than the cut-off value. The details on the CBA are provided in Section D4. Economic Internal Rate of Return (EIRR) will be calculated for all such unpaved roads. Two separate lists of prioritisation will be produced – one for the roads for which EIRR values are greater than the minimum acceptable rate, and the second list for those roads for which EIRR values are less than the minimum acceptable rate. The roads in the first priority list (i.e., the roads which have EIRR values greater than the minimum acceptable rate) should get the highest priority over the roads in the other lists.

- For roads with EIRR values less than the current minimum acceptable rate (as determined by the Government), prioritisation will be undertaken using an MCA. The MCA will be based on the same set of criteria to be applied for low-volume roads as discussed above (Table D1)
- For roads with EIRR values greater than the current minimum acceptable rate, prioritisation will be undertaken using an MCA based on a separate set of criteria provided in Table D2

It is important to reiterate here that actual prioritisation of roads will be based on the outcome of MCA. CBA results will be used mainly to determine which roads should get highest priority for improvement considering their economic efficiency. The ultimate decision rests with the decision makers, however.

D.2.2.2 Prioritisation for “further improvement”/Upgrading of rural roads

Roads which are already paved but requires upgrading in terms of geometric standards (widening, for example) or pavement strengthening due to changes in traffic volume and/or their composition (considerable increase in number of heavy vehicle, for example) will be considered under this category of development.

Prioritisation for the development of such roads will be undertaken by using an MCA. The MCA for further improvement/upgrading will be based on social and environmental criteria (similar to earlier described MCAs for road improvement) along with the other factors which include traffic volume (AADT), road geometry, surface type (BC or RCC) and road type (UZR, UNR or VR). The proposed

criteria to be used for prioritisation of further improvement/upgrading of roads are provided in Table D4.

D.2.2.3 Prioritisation for “maintenance” of rural roads

In order to determine if a road needs maintenance, its current International Roughness Index (IRI) value will be checked. The IRI value, if available, will be used as a screening criterion of all paved roads (HBB, RCC and BC roads) and partly paved roads (where maintenance of only the paved segments are necessary). If IRI is not available, the case in HBB roads, roughness condition will be manually observed. Based on the manual observation, the HBB roads may be categorized as ‘Good’, ‘Fair’ or ‘Bad’. Roads with IRI values greater than 6 and roughness condition other than ‘good’ will be considered for prioritisation of the roads for maintenance. This is also in line with the current practice of LGED.

An MCA will be undertaken for roads with IRI values greater than 6 and roughness condition other than ‘good’. The MCA will be based on criteria which include volume of commercial traffic (CVD), last maintenance year, road surface type, as well as social and environmental factors. The choice of these criteria follows the current practices of LGED and the Guidelines for Rural Roads and Culverts Maintenance prepared by the Ministry of Local Government, Rural Development and Cooperatives (LGRDC, 2013). Based on the MCA, three separate priority lists would be produced for *Upazila*, Union and Village roads. The list of potential criteria for determining the prioritisation list of maintenance is given in Table D5.

D.3. Multi-Criteria Analysis (MCA)

The multi-criteria analysis (MCA) will form an important part of the proposed prioritisation methodology. An MCA or an MCA in conjunction with a cost benefit analysis will be used for prioritisation of roads. A set of factors or criteria, reflecting policy or social objectives of rural road development, is selected for ranking of projects. Such criteria may or may not include cost variables but may include variables such as improvement of access to markets and services, traffic volume, social and economic welfare etc.

After selection of factors, their relative weights are established. The use of Analytical Hierarchy Process (AHP) is common for the establishment of relative weights of the factors. A sample survey instrument to determine the relative weights of the criteria to be used in an MCA is provided in Annex E. Finally, the priority score or index value of each candidate road project is calculated by summing the product of the value of each factor (often the actual value is normalized) by its relative weight. This section outlines the potential evaluation criteria that will be considered for undertaking the MCAs.

D.3.1 Selection of evaluation criteria for Multi-Criteria Analysis (MCA)

D.3.1.1 MCA for improvement of low traffic volume village roads

Village roads are mostly used by NMTs and pedestrians. The volume of vehicular traffic on village roads is expected to be very low. Benefits in terms of savings in vehicular operating costs and time savings (passenger and vehicular) are expected to be insignificant. Therefore, a conventional cost benefit analysis for the appraisal of very low traffic volume village roads may not make much sense. The benefits of village roads, however, would come mainly in the form of access benefits to the village people. An MCA methodology has been considered to assess the access benefits of village roads to the local people.

An initial list of potential criteria for an MCA involving economic, social and environmental factors has been identified considering LGED's current practice, views of experts and literature review. Table D1 shows a list of such potential social and environmental criteria to undertake the MCA.

D.3.1.2 MCA for improvement of higher traffic volume roads

A relatively large number of vehicles use *Upazila*, Union and some village roads. For this reason, the benefits of improving such *Upazila*, Union and village roads may be estimated in terms of savings in vehicle operating costs. A conventional cost benefit analysis methodology has been proposed to estimate such benefits and costs. However, these roads also provide access benefits to the people living along such roads many of whom may not be using any vehicular traffic. In order to make a more complete assessment, the access benefits to such people also need to be assessed by using an MCA. Table D2 provides a list of potential criteria for improvement of unpaved roads with relatively higher traffic volume.

It is important to mention here that a cost benefit analysis will also be undertaken for all such roads. An MCA based on the criteria listed in Table D2 will be used for those roads for which EIRR values will be greater than 12%. For other roads with EIRR values less than the minimum acceptable rate, an MCA will be applied using the same set of criteria listed in Table D1.

The final selection of evaluation criteria and their relative weights for the above-mentioned MCAs will be determined by applying the Analytic Hierarchy Process (AHP) technique based on the outcome of an opinion survey among policy makers, experts, and other stakeholders. It should be mentioned here that LGED currently uses a priority ranking system by rating several socio-economic and traffic related criteria (Table D6). An example of the calculation using the current rating system of LGED is also given in Table D7. The application of the AHP technique will rationalize the current rating system.

D.3.1.3 MCA for improvement of partially paved and HBB to fully paved roads

Some partially paved roads (having an unpaved segment) and the HBB roads will also be considered for improvement. In addition to the criteria for the MCA of improvement of unpaved roads, some additional criteria, such as surface type, road type, road safety and road width will be considered in this case. For traffic volume, commercial traffic (CVD) will be considered instead of AADT. Table D3 shows list of criteria used for prioritisation of improvement of such partially paved and HBB roads.

D.3.1.4 MCA for further improvement/Upgrading of roads

Criteria related to road attributes such as surface type, road type, road safety and road width along with the criteria for the improvement of unpaved roads will be considered for further improvement/upgrading of the roads. For traffic volume commercial traffic (CVD) will be considered instead of AADT. Table D4 shows list of criteria used for prioritisation of further improvement of roads.

D.3.1.5 MCA for maintenance of the roads

For the maintenance of the roads, criteria such as, traffic volume, last maintenance year, surface type, road type, facilities served, Growth Centres (GC)/Rural Markets (RM) served, connectivity to higher roads and other centres will be considered. For traffic volume, commercial traffic (CVD) will be considered instead of AADT. Table D5 shows list of criteria used for prioritisation of roads for maintenance.

Table D1: List of potential social and environmental criteria for the improvement of low traffic volume unpaved roads

| Criteria | Description | Unit of measurement |
|---|--|---|
| 1. Traffic Volume | <ul style="list-style-type: none"> Annual Average Daily Traffic (AADT) will be considered | AADT (MT) <ul style="list-style-type: none"> 0-50 51-100 101-200 201-300 Above 300 |
| 2. Facilities served | <ul style="list-style-type: none"> Education Institutes, Health facilities, Industries, Other public centres will be considered as the important facilities | Number of Facilities per km |
| 3. Growth centres (GC)/Rural Markets (RM) served | <ul style="list-style-type: none"> Hats and Bazars served by the roads | Lease value per growth centre |
| 4. Connectivity to Higher Roads and other centres | <ul style="list-style-type: none"> Upazila level connectivity Union level connectivity | Upazila level connectivity (67%) |
| | | Union level connectivity (33%) |
| 5. Local priority | <ul style="list-style-type: none"> Priority given by local representatives | Yes/No |

Table D2: List of potential criteria for improvement of high traffic volume unpaved roads

| Criteria | Description of Analysis | Unit of measurement |
|---|--|--|
| 1. Facilities served | <ul style="list-style-type: none"> Education Institutes, Health facilities, Industries, Other public centres will be considered as the important facilities | Number of facilities per km |
| 2. Growth centres (GC)/Rural Markets (RM) served | <ul style="list-style-type: none"> Union wise lease value will be considered to determine the rate. | Lease value per growth centre |
| 3. Connectivity to Higher Roads and other centres | <ul style="list-style-type: none"> Upazila level connectivity Union level connectivity | Upazila level connectivity (67%) Union level connectivity (33%) |
| 4. Local priority | <ul style="list-style-type: none"> Priority given by local representatives | Yes/No |

Note: These roads will be considered for CBA. Traffic volume and number of population will be included in CBA

Table D3: List of potential criteria for improvement of partially paved roads

| Criteria | Description | Unit of measurement |
|---|--|--|
| 1. Traffic volume | <ul style="list-style-type: none"> Annual Average of Daily Commercial Traffic will be considered | CVD |
| 2. Surface type | <ul style="list-style-type: none"> BC+HBB+Other fully paved Fully HBB/Other paved BC+HBB+Other+Earthen | |
| 3. Road type | <ul style="list-style-type: none"> UZR will be given the highest priority, followed by UNR and then village roads (VR) | VR<UNR<UZR |
| 4. Road Safety | <ul style="list-style-type: none"> Whether should be considered for road safety | Yes/No |
| 5. Facilities served | <ul style="list-style-type: none"> Education Institutes, Health facilities, Industries, Other public centres will be considered as the important facilities | Number of Facilities per km |
| 6. Growth centres (GC)/Rural Markets (RM) served | <ul style="list-style-type: none"> Hats and Bazars are termed as GC and RM Union wise lease value will be considered to determine the rate. | Lease value per growth centre |
| 7. Connectivity to Higher Roads and other centres | <ul style="list-style-type: none"> Upazila level connectivity Union level connectivity | Upazila level connectivity (67%) Union level connectivity (33%) |
| 8. Local priority | <ul style="list-style-type: none"> Priority given by local representatives | Yes/No |
| 9. *Road width | <ul style="list-style-type: none"> Carriageway Width of the roads will be considered | Carriageway Width |

*Road width is added as per discussions with the LGED personnel in the meeting held on 6th October, 2016

Table D4: List of potential criteria for further improvement/upgrading of roads

| Criteria | Description | Unit of measurement |
|---|--|--|
| 1. Traffic volume | <ul style="list-style-type: none"> Annual Average of Daily Commercial Traffic will be considered | CVD |
| 2. Road type | <ul style="list-style-type: none"> UZR will be given the highest priority, followed by UNR and then village roads (VR) | VR<UNR<UZR |
| 3. Road Safety | <ul style="list-style-type: none"> Whether should be considered for road safety | Yes/No |
| 4. Facilities served | <ul style="list-style-type: none"> Education Institutes, Health facilities, Industries, Other public centres will be considered as the important facilities | Number of Facilities per km |
| 5. Growth centres (GC)/Rural Markets (RM) served | <ul style="list-style-type: none"> Hats and Bazars are termed as GC and RM Union wise lease value will be considered to determine the rate. | Lease value per growth centre |
| 6. Connectivity to Higher Roads and other centres | <ul style="list-style-type: none"> Upazila level connectivity Union level connectivity | Upazila level connectivity (67%) Union level connectivity (33%) |
| 7. Local priority | <ul style="list-style-type: none"> Priority given by local representatives | Yes/No |
| 8. *Road width | <ul style="list-style-type: none"> Carriageway Width of the roads will be considered | Carriageway Width |

*Road width is added as per discussions with the LGED personnel in the meeting held on 6th October, 2016

Table D5: List of potential criteria for maintenance of roads

| Criteria | Description | Unit of measurement |
|---|--|--|
| 1. Traffic volume | <ul style="list-style-type: none"> Annual Average of Daily Commercial Traffic will be considered | CVD |
| 2. Last maintenance year | <ul style="list-style-type: none"> Roads with long gaps of maintenance will be prioritised | Number of years between present and the last maintenance year |
| 3. Surface type | <ul style="list-style-type: none"> Current pavement type will determine nature of improvement (HBB to BC or increasing width) | |
| 4. Road type | <ul style="list-style-type: none"> UZR will be given the highest priority, followed by UNR and then village roads (VR). | VR<UNR<UZR |
| 5. Facilities served | <ul style="list-style-type: none"> Education Institutes, Health facilities, Industries, Other public centres will be considered as the important facilities | Number of Facilities per km |
| 6. Growth centres (GC)/Rural Markets (RM) served | <ul style="list-style-type: none"> Hats and Bazars are termed as GC and RM Union wise lease value will be considered to determine the rate. | Lease value per growth centre |
| 7. Connectivity to Higher Roads and other centres | <ul style="list-style-type: none"> Upazila level connectivity Union level connectivity | Upazila level connectivity (67%) Union level connectivity (33%) |

Table D6: LGED's current priority ranking system

| Criteria | Definition | Score |
|---|-------------------------------------|--------------|
| Gap (Physical discontinuity – absence of bridge etc.) | No gap | 12 |
| | Up to 50 m | 6 |
| | Major gap | 3 |
| CVD (Commercial vehicles per day) – shows importance in terms of traffic flow | 0-50 | 0 |
| | 51-100 | 30 |
| | 101-200 | 40 |
| | 201-300 | 50 |
| | 301+ | 100 |
| Funding source | Donor | 12 |
| Markets per (No.) | Growth Centre | 12 |
| | Rural Market | 6 |
| Hospital per/unit | <i>Upazila</i> /Union Health Centre | 3 |
| | Clinic, Non-govt hospital | 3 |
| Office | UP Office | 9 |
| | Other govt. office | 3 |
| School | College | 9 |
| | High School | 6 |
| | Primary School | 3 |
| Industry | Large | 9 |
| | Medium | 6 |
| | Small | 3 |
| Road Type | <i>Upazila</i> Road | 9 |
| | Union Road | 6 |
| | Village Road | 3 |
| Road Surface Type | Fully BC | 12 |
| | BC+HBB+Other fully paved | 10 |
| | Fully HBB/Other paved | 6 |
| | BC+HBB+Other+Earthen | 3 |

Table D7: Example of the calculation of road prioritisation for maintenance based on the current rating system of LGED

| Group | Description | Number | Rating* | Score |
|---------------------------|--------------------------------|--------|---------|------------|
| Classification | <i>Upazila</i> Road | | 12 | 12 |
| Surface Type | Fully BC | | 0 | 0 |
| Gaps | Major Gaps | | 3 | 3 |
| Traffic Volume | AADT 1000+ | 1 | 100 | 100 |
| Market | Growth Centre | 1 | 12 | 12 |
| | Rural Market | 3 | 6 | 18 |
| Hospitals | <i>Upazila</i> Health Complex | 1 | 9 | 9 |
| Social Centres | Union <i>Parishad</i> Office | 1 | 12 | 12 |
| | Other Public Centre | 1 | 6 | 6 |
| Educational | College | 2 | 9 | 18 |
| | Secondary School | 3 | 6 | 18 |
| | Primary School/ <i>Madrasa</i> | 10 | 3 | 30 |
| Total Point Scored | | | | 238 |

*Currently used by LGED

D.3.2 The MCA scoring and weighting framework

Composite scores using the selected criteria will be calculated for all candidate roads. It is evident from the tables that the values of the selected criteria are in different units and scale. The nominal values will be converted into dimensionless standard values before they can be used to calculate the composite score. The following equation will be used to calculate the composite score:

$$I = \sum (w_i \times x_i)$$

I = Composite index, w_i = Relative weight of criteria i , x_i = Value of criteria i

The priority order for the development of candidate roads will be determined on the basis of their composite scores.

D.4 Cost Benefit Analysis (CBA)

D.4.1 Projection of future traffic volume

Projection of traffic volume is an important factor in undertaking CBA. The current AADT and CVD values by type of vehicle will be obtained from the LGED's road database. The expansion factor method will be used to project future traffic volume of roads. The basis for the growth factor will be a trend analysis of traffic growth on similar LGED roads in recent years. The project team will examine traffic growth rates in different situations and decide growth rates for current and generated traffic volumes. It is likely that the growth rates will vary by district/locality depending on type of economic development in the surrounding areas.

D.4.2 Cost Benefit Analysis

The projected future traffic volume can give an indication of the priority of roads for development. However, a conventional cost benefit analysis (CBA) methodology will be used for making a better assessment on economic considerations. EIRR (and other indicators of economic assessment such as NPV, B/C ratio etc.) will be estimated for *Upazila*, Union and village roads with considerable traffic volume. The cost components in the analysis will include updated standard construction and maintenance costs for different categories of roads¹ and road structures as used by LGED. The benefits will be estimated in terms of reduced vehicle operating costs (VOC) for different types of vehicles. In estimating benefits, benefits to generated traffic at half the benefits to current traffic will be considered. The values of VOC will be taken from the recent studies on these parameters (for example, GTZ, 2009) and other evaluation studies. These parameter values can be updated when more recent values are available.

The project team will develop a computer program on CBA as part of the software for the overall prioritisation model. The estimation models in the CBA program will be similar to RED models. The program will be used to estimate EIRR and other economic assessment criteria.

D.5 References

- GTZ (2009). Road User Cost Study For LGED Roads, Final Report, Rural Infrastructure Improvement Project (RIIP) RDP-25, Institutional Support and Training Component, Ministry of Local Government, Rural Development and Cooperatives, Government of Bangladesh.
- LGED (2016). "Road Database", Local Government Engineering Department, Local Government Division, Ministry of Local Government, Rural Development and Cooperatives. Website: <http://www.lged.gov.bd/>
- LGRDC (201³). *Guidelines for Rural Roads and Culverts Maintenance*, Local Government Division, Ministry of Local Government, Rural Development and Cooperatives, Government of Bangladesh.
- LGED (2002). *Regional Road Network Study for Prioritisation under RRMIMP-II*, Final Report, prepared for LGED by DHV Consultants, The Netherlands, DEVCONSultants Limited, SARM Associates Ltd. and Design Consultants Ltd.
- Planning Commission (2005). Project Appraisal Framework: Road Sector Manual, Planning Commission, Government of Bangladesh.

¹ LGED has established design and construction standards based on defined traffic volumes.

Annex E: A Sample AHP Questionnaire



Planning and prioritisation of rural roads in Bangladesh

Multi-Criteria Analysis Survey Instrument (Sample instrument)

Form 1: Prioritisation for improvement of rural roads (low volume unpaved road)

Date _____ Location _____

Surveyor _____

Information on the respondent:

Name (Optional) _____

Occupation: a. Official of the Ministry _____
b. LGED Official _____
c. Local Official _____
d. Expert _____
e. Local leader _____
f. Other _____

Additional information and comments by the respondent (if any):

Pairwise comparison:

For each pair of criteria in the table below (there are 15), please think carefully and consider which criterion is more important, A or B. On a 10-point scale, rate the relative importance of the more important criterion compared with the other one. For example, for the first pair, between the two criteria **traffic volume** and **facilities served** by the road, which one you consider more important? Should you consider traffic volume is more important than facilities served, provide a rating for this importance. If you consider traffic volume is considerably more important than facilities served, you may rate this importance as 5. Put 5 in the third cell.

Explanatory notes for each criterion are provided below the table.

Form 1: Improvement of low traffic volume unpaved roads

| Criterion A | | Criterion B | |
|---|--|---|-----------------------------|
| On a 10-point scale, rate if criterion A is more important than B (1 means slightly more important; 3 means more important; 5 means considerably more important; 7 means highly more important; 9 means extremely more important; other points are in-between these importance levels) | | On a 10-point scale, rate if criterion B is more important than A (1 means slightly more important; 3 means more important; 5 means considerably more important; 7 means highly more important; 9 means extremely more important; other points are in-between these importance levels) | |
| <p>A is more important B is more important</p> | | | |
| Traffic volume | | | Facilities served |
| Traffic volume | | | Growth centre/Market served |
| Traffic volume | | | Connectivity |
| Traffic volume | | | Local priority |
| Facilities served | | | Growth centre/Market served |
| Facilities served | | | Connectivity |
| Facilities served | | | Local priority |
| Growth centre/Market served | | | Connectivity |
| Growth centre/Market served | | | Local priority |
| Connectivity | | | Local Priority |

Explanatory notes:

Traffic volume: AADT (Average Annual Daily Traffic) of the road.

Connectivity: Linkage with national and regional highways or a zila road; linkage with upazila centre or a Growth centre; linkage with union centre or a rural market centre; linkage with an upazila or union road; linkage with bus, rail station and ‘ghats’, linkage with special facilities such as an important industry, supply chain point, cyclone shelter etc.

Facilities served: Number of facilities which include, educational institutions (by type), health facilities, government offices and other public facilities, industries

Growth Centre/Market served: Hats and Bazars (GCs are already designated)

Local priority: Priority given by local representatives

Annex F: Comments Received from ReCAP

In the main body of the Report, we have carefully considered and addressed the valuable comments made by participants, including LGED and ReCAP officials, at the First Stakeholders Workshop. This appendix addresses the comments and observations made by ReCAP officials on the 1st version of the Stakeholders Workshop Report. The consolidated comments of the ReCAP officials and responses of the BUET team are provided below. As necessary, we have also made changes in the relevant parts of the Report (main body and annexes as the case may be) to address those comments.

Overall Comments

Comment 1: Are any more delays envisaged?

Our response: We envisage delays on account of conducting local level workshops in 12 upazilas of the pilot district and late engagement of a programmer. Therefore, the project timeline needed to be revised. The revised present timeline has already been agreed and shown in Addendum 2.

Comment 2: We would like to discuss where the innovation is in the approach

Our response: There are several innovations in the approach. The main ones are briefly discussed here.

The conventional approach to network planning focuses on traffic flow. The main purpose is to minimise travel time and/or travel distance or maximise traffic flow capacity. Methodologies such as the Minimal Spanning Tree may also be considered to minimise network length. However, the network planning approach adopted in the present case focuses on connectivity to ensure accessibility (the primary objective of rural road development) at all levels – village, union and upazila. The activity centres (upazila and union headquarters, and growth and market centres) will form the nodes, and upazila and some union roads connecting them will be the links of a core road network. Villages are to be connected either directly to such centres or to a link of the core network providing access to the facilities at those centres and/or on the links. The approach also considers connectivity with the neighbouring upazilas as well as with the wider region. Thus it ensures rural access to facilities both within and outside an upazila.

The methodology combines both the top-down and bottom-up approaches to planning. While the adopted methodology relies mainly on a rational approach to planning and prioritisation considering an objective evaluation of planning factors, it also considers valuable inputs from local consultation meetings to improve the overall process and the quality of output. The local consultation meetings complement the technical process. Such meetings may also help to show transparency in the planning and prioritisation process and ensure local ownership of the output.

LGED undertakes three types of rural road development activities: improvement, further improvement and maintenance. All of these activities have been considered within a single planning framework based on a consistent approach.

Comment 3: Are LGED happy with the approach?

Our response: The methodology has been revised and finalised after several rounds of consultation with LGED officials including detail discussion at a working group meeting. The proposed methodology satisfies the needs of LGED in planning and prioritisation of rural roads.

Comment 4: We need to be careful about keeping within the LVR envelope.

Our response: The BUET team is careful about it. It has already been discussed with Mr. Jesper Cook on the eve of last Steering Committee Meeting held on the 30 October 2016.

Comment 5: There is a balance that the needs to be defined between essential local community and political support and political interference which we need to careful about.

Our response: We agree. The local consultation meetings are to be designed and organized keeping this in mind.

Comment 6: Has a change in approach any resource implications?

Our response: We proposed for a new position of Programmer required to develop a program. Also, we are conducting local level consultation workshops in 12 upazilas of Tangail district. Therefore, additional resources would be required.

Comment 7: We need to discuss how the programme can meet deadline”

Our response: The project time line requires an additional three months – from April, 2017 to June 2017. The new time line has already been agreed and shown in Addendum 2.

Comments inside the Report

Comment 1: Regarding the position of Mr. Les Sampson (Page 9)

Our response: His position has been corrected in the text of the report as well as in the list of participants.

Comment 2: Is this suggesting that political prioritisation is more important than technical considerations? (Page 11)

Our response: We did not imply so. We believe, this would rather complement the otherwise technical considerations. The involvement of stakeholders (political/local leaders, representation from other government departments, knowledgeable persons, etc.) in the planning and prioritisation process is important. Inputs received from local consultation meetings forms only one of the many criteria that have been considered in the methodology. All other criteria are “technical” in nature and their values can be objectively measured/evaluated. The overall weight of the criterion of local prioritisation is not high compared with the combined weight of the other criteria.

Further, it may be mentioned here that the local leaders present at the first workshop made a strong demand for their direct involvement in road development activities including in the planning process. LGED agreed in principle. Subsequently, following discussions at the Working Group meeting and meetings with LGED officials, the involvement of the local leaders through a local consultation meeting has been accommodated in the methodology.

The local consultation meeting also helps in many ways to overcome the limitations of the data available from LGED’s databases. Since the GIS and road databases are not integrated, without local verification it is not possible to identify a core network by a program alone. A preliminary network can be identified though. Also, there are not sufficient information in the road database to fully evaluate the local conditions - physical or functional by a program. It is expected that when local leaders consider the priority of roads, they would consider factors (for example, access to a local cyclone shelter, a landing point of goods by other modes, etc.) not explicitly covered by other “technical” criterion.

Comment 3: If trucks are overloaded this cannot be accommodated in design; it has to be controlled, regulated and policed. (Page 11)

Comment 4: Quality of construction and quality control is a major problem common to most developing countries and especially for rural infrastructure with budgetary constraints. (Page 11)

Comment 5: Absolutely critical. Maintenance tends to be the first thing that is cut when funds are scarce. (Page 11)

Our response to comments 3, 4 and 5: We agree. These matters were raised and discussed at the workshop as some general issues on rural road development in Bangladesh, addressed to LGED and not necessarily in the context of the present ReCAP project.

LGED is very much aware of all these problems and have considered actions to address them. The LGED officials present at the workshop discussed these matters and their responses are included in the main text of the workshop report (please see pages 12 and 13 of this report).

Comment 6: Suggestion of the word ‘underdeveloped’ instead of ‘backwardness’ (See Page 11).

Our response: We welcome the suggestion. The word has been altered accordingly.

Comment 7: Such as? Can you provide examples of the new data fields? (Page 13)

Response: Examples of the new data fields are connectivity, local priority and road safety. These are also mentioned in the main body of the report on page 13. The revised text reads as follows:

“The Team had many rounds of consultation with LGED officials to ensure that the methodology (including its data requirements) and the software can be easily used by LGED officials at the field level and at the headquarters. The Team is aware that some new data fields will have to be created in the current road database to meet the needs of the proposed methodology. However, only those additional data will be suggested for the MCAs which can be easily collected and do not make the whole methodology impracticable. Further, to run the proposed software based on the methodology, it should require only a few additional direct inputs from the user such as connectivity, local priority and road safety.”

Comment 8: ‘If trucks are overloaded this cannot be accommodated in design it has to controlled, regulated and policed.’ Also relates to comment 3 above.

Our response: The comment has been made against the following text in the main body of the Report (p. 13): “The management of heavy traffic (axle load) on national highways is also an issue. Similar to RHD, LGED is an infrastructure provider. At the national level, however, there is a regulatory authority – Bangladesh Road Transport Authority (BRTA). There is no such regulatory authority for rural roads. LGED is aware of the road damage caused by heavy traffic coming from national roads. Given its nature, an inter-ministerial meeting is planned in the near future to discuss this issue and consider what measures may be required to control heavy traffic on rural roads.”

We discussed and agreed on this matter in the workshop. As we learned from LGED, the matter would be discussed in an inter-ministerial meeting in the future.

Comment 9: Involvement of local leaders needs to be included but it cannot override technical considerations and good engineering practice. Needs to be qualified. (Page 14)

Our response: We agree. In our methodology, the local leaders involvement in the process does not override the technical considerations. Rather their involvement complements the technical considerations. This matter is discussed in our response to comment 2 above.

Comment 10: Specification of additional criteria requested by LGED (Page 14)

Our response: The comment was made against the following text in the report: “The proposed methodology by the BUET Team should follow a network planning approach to identify important roads that may be prioritised for development. In this respect, it was recommended that the proposed methodology should incorporate the network approach which was a part of an earlier version of the methodology. The BUET Team was urged to revise the presented methodology accordingly. The Team was also requested to consider a few additional criteria for MCA analysis.”

We fully agree. The revised methodology, as suggested, is included in Annex D of this report. Concerning the second point, we would like to mention that that preliminary sets of criteria were selected based on our survey of opinions of the participants present at the first workshop and LGED officials. The merits and practicality of inclusion of these criteria were discussed with LGED officials, and thoroughly scrutinised at the working group meeting where senior LGED officials were present. Following this, as suggested in the working group meeting, we also had several small group meetings with relevant LGED officials. Finally, it was agreed that additional inputs from the local stakeholders and officials would be required the following criteria: connectivity, local priority and road safety.

Comment 11: ReCAP agreed (Page 14)

Our response: The comment has been made against the following text: “The new methodology on planning and prioritisation should not become theoretical and remain unused. It was suggested that the new planning tool to be developed must be simple and practical that LGED officials can easily use. The outputs ought to be clearly visualised, and be able to show to stakeholders what difference the results can make to rural road planning and development in the future.”

This is an observation from ReCAP. We fully agree with ReCAP.

Comment 12: It seems to me that we need to be very clear what type of roads we are talking about. While these roads are rural roads I suspect these are not Low volume roads (i.e. roads carrying < 300 vpd or < 1million E80s) (Page 14)

Our response: The nature and volume of traffic in the rural roads in Bangladesh have changed in recent decades due mainly to increased economic activities and migration to urban areas. Many roads are no longer low volume roads. In many cases, the existing design and planning standards did not meet the current traffic conditions. LGED is aware of the problem and is in the process of reviewing the existing design and planning standards. A new set of planning and design standards are expected to replace the current ones in the near future.

Comment 13: ReCAP agreed with the statement regarding the necessity of rules and regulations to control the heavy commercial vehicles (Page 14)

Our response: We thank ReCAP for their agreement.

Comment 14: Comment 1 (page 18)

Our response: Mr. Les Sampson’s position has been corrected in the list of the participants.

Comment 15: A column with weighted average or total score will add further clarity. (P. 24)

Our response: As suggested, a column is added in Table C1.

Comment 16: What to do with other than RCC and BC Road? Not to maintain them? (P. 30)

Our response: Yes, we agree that all roads need to be maintained. The methodology has been revised accordingly (in consultation with LGED). LGED also agreed that brick-paved roads will also be maintained. The revised methodology incorporates this need.

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